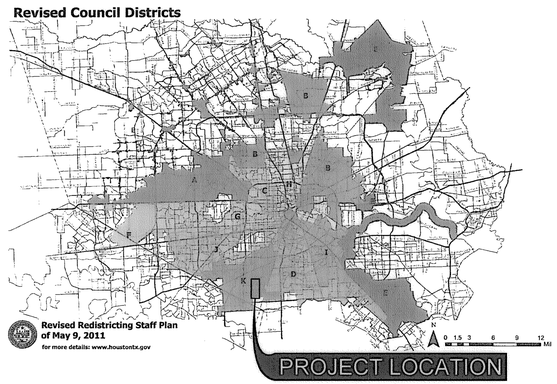
FOR REDUCED PLANS
original scale in inches
0 1 2 3

CITY OF HOUSTON

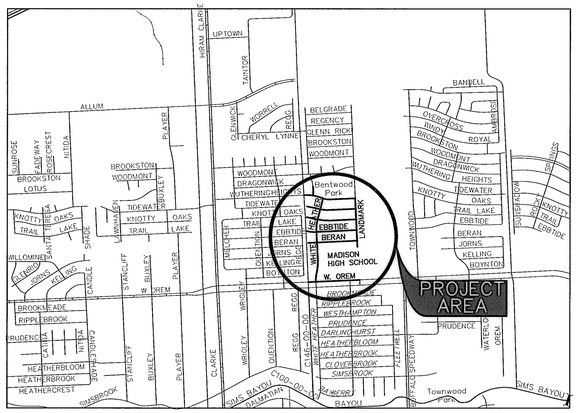
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION DIVISION
WHITEHEATHER DRAINAGE AND PAVING SUB–PROJECT IV

WBS NO. M–000262–0004–4

No.	Date	Revisions	App.



VICINITY MAP
N.T.S.



VICINITY MAP
KEY MAP NO. 572J
GIMS MAP NO. 5252C, 5252D, 5251A
COUNCIL DISTRICT K

TEXAS DEPARTMENT OF LICENSING AND REGULATION
ARCHITECTURAL BARRIERS PROJECT REGISTRATION
NUMBER – EABPRJB2806468

INTERPOSE NO OBJECTION
For items located outside HCFCD R.O.W.
Harris County Flood Control District
APR 17 2012
THE SIGNATURE ABOVE VALID
FOR TWO (2) YEARS ONLY
FINAL PERMITTING BY OTHERS
Fil 201220

MAYOR
ANNISE D. PARKER

CONTROLLER
RONALD C. GREEN

DISTRICT
COUNCIL MEMBERS

HELENA BROWN DISTRICT A	JERRY DAVIS DISTRICT B	ELLEN COHEN DISTRICT C
WANDA ADAMS DISTRICT D	MIKE SULLIVAN DISTRICT E	AL HOANG DISTRICT F
OLIVER PENNINGTON DISTRICT G	EDWARD GONZALEZ DISTRICT H	JAMES G. RODRIGUEZ DISTRICT I
MIKE LASTER DISTRICT J	LARRY GREEN DISTRICT K	

COUNCIL MEMBERS
AT–LARGE

STEPHEN C. COSTELLO POSITION 1	ANDREW C. BURKS, JR. POSITION 2
MELISSA NORIEGA POSITION 3	C.O. "BRAD" BRADFORD POSITION 4
JACK CHRISTIE POSITION 5	

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988–5504, Fax (713) 988–1441 www.seshorizon.com

SURVEYED BY:
LANDTECH CONSULTANTS INC.
FB NO.: P–5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
87749
REGISTERED
PROFESSIONAL ENGINEER
04-01-2012

SES HORIZON CONSULTING
ENGINEERS, INC.
TEXAS REGISTERED
ENGINEERING FIRM F-003922

WATER 4-19-2012	TRAFFIC AND TRANSPORTATION 4/12/12
WASTEWATER	SIGNALS Keto Hristova 4-19-12
STORM WATER 4/18/2012	MANAGING ENGINEER 04-19-2012
STREET & BRIDGE 4/18/2012	PARK–FORESTRY DEPT 4-18-12
CONSTRUCTION 9/18/12 J Gurung 09/18/12	SPONSOR DIV / DEPT N/A

CITY ENGINEER — 4-23-12 DATE

DIRECTOR OF PUBLIC WORKS AND ENGINEERING — 4/24/12 DATE

SHEET No. 1 OF 191

49210
ENGINEER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 25, 2012 2:34:24 PM
FILE NAME: F:\WHB–SG4\CAD\GNRL\WHB–SG4–COVER SHEET.DWG

FOR REDUCED PLANS
original scale in inches

SHEET	DESCRIPTION
1	COVER SHEET
2	INDEX OF DRAWINGS
3	UTILITY NOTES
4	CONSTRUCTION LEGEND AND TOPO LEGEND
5 - 6	OVERALL PROJECT LAYOUT
7 - 8	STORM SEWERS - EXISTING & PROPOSED PROJECT LAYOUT
9 - 10	SANITARY SEWERS - EXISTING PROJECT LAYOUT
11 - 12	WATER LINES - EXISTING & PROPOSED PROJECT LAYOUT
13 - 14	STREET LIGHT - EXISTING & PROPOSED PROJECT LAYOUT
15 - 17	TYPICAL SECTION
18 - 19	PROPOSED CONDITIONS DRAINAGE AREA MAP
20 - 31	PROPOSED CONDITIONS HYDRAULIC CALCULATIONS
32 - 33	SURVEY CONTROL MAP
34 - 38	SURVEY CONTROL SWING TIES
39	HORIZONTAL ALIGNMENT DATA
	PLAN & PROFILE PLANS
	WHITEHEATHER DR.
40	FROM STA. 0+00.00 TO STA. 4+20.00
41	FROM STA. 0+00.00 TO STA. 4+20.00 PROFILE
42	FROM STA. 4+20.00 TO STA. 8+40.00
43	FROM STA. 4+20.00 TO STA. 8+40.00 PROFILE
44	FROM STA. 8+40.00 TO STA. 12+60.00
45	FROM STA. 8+40.00 TO STA. 12+60.00 PROFILE
46	FROM STA. 12+60.00 TO STA. 16+80.00
47	FROM STA. 12+60.00 TO STA. 16+80.00 PROFILE
48	FROM STA. 16+80.00 TO STA. 21+40.00
49	FROM STA. 16+80.00 TO STA. 21+40.00 PROFILE
50	FROM STA. 21+40.00 TO STA. 24+00.00
51	FROM STA. 21+40.00 TO STA. 24+00.00 PROFILE
	WHITEHEATHER DR.
52	FROM STA. 30+00.00 TO STA. 33+00.00
53	FROM STA. 30+00.00 TO STA. 33+00.00 PROFILE
	LANDMARK DR.
54	FROM STA. 8+40.00 TO STA. 12+60.00
55	FROM STA. 12+60.00 TO STA. 16+00.00
56	FROM STA. 16+00.00 TO STA. 20+60.00
57	FROM STA. 20+60.00 TO STA. 24+00.00
	WEST OREM DR.
58	FROM STA. 0+00.00 TO STA. 4+20.00
59	FROM STA. 4+20.00 TO STA. 8+40.00
60	FROM STA. 8+40.00 TO STA. 12+60.00
61	FROM STA. 12+60.00 TO STA. 15+00.00
	BERAN DR.
62	FROM STA. 0+00.00 TO STA. 4+20.00
63	FROM STA. 4+20.00 TO STA. 8+40.00
64	FROM STA. 8+40.00 TO STA. 12+60.00
65	FROM STA. 12+60.00 TO STA. 14+20.00
	EBBTIDE DR.
66	FROM STA. 0+00.00 TO STA. 3+60.00
67	FROM STA. 3+60.00 TO STA. 8+40.00
68	FROM STA. 8+40.00 TO STA. 12+60.00
69	FROM STA. 12+60.00 TO STA. 15+20.00

SHEET	DESCRIPTION
	PLAN & PROFILE PLANS (CONT.)
	KNOTTY OAKS TR.
70	FROM STA. 0+00.00 TO STA. 2+80.00
71	FROM STA. 2+80.00 TO STA. 7+00.00
72	FROM STA. 7+00.00 TO STA. 11+20.00
73	FROM STA. 11+20.00 TO STA. 14+20.00
	TIDEWATER DR.
74	FROM STA. 0+00.00 TO STA. 3+80.00
75	FROM STA. 3+80.00 TO STA. 8+00.00
76	FROM STA. 8+00.00 TO STA. 12+00.00
77	FROM STA. 12+00.00 TO STA. 14+20.00
	WUTHERING HEIGHTS DR.
78	FROM STA. 0+00.00 TO STA. 4+20.00
79	FROM STA. 4+20.00 TO STA. 8+40.00
80	FROM STA. 8+40.00 TO STA. 12+60.00
81	FROM STA. 12+60.00 TO STA. 15+00.00
	STORM WATER POLLUTION PREVENTION PLANS
82	STORM WATER POLLUTION PREVENTION PLAN
83	STORM WATER POLLUTION PREVENTION PLAN
83A	STORM WATER POLLUTION PREVENTION PLAN DETAILS
83B	HCFCD STORM WATER POLLUTION PREVENTION DETAILS
	TREE PRESERVATION AND PLANTING PLAN
84 - 85	OVERALL TREE PROTECTION LAYOUT
	WHITEHEATHER DR.
86	FROM STA. 0+00.00 TO STA. 4+20.00
87	FROM STA. 4+20.00 TO STA. 8+40.00
88	FROM STA. 8+40.00 TO STA. 12+60.00
89	FROM STA. 12+60.00 TO STA. 16+80.00
90	FROM STA. 16+80.00 TO STA. 21+40.00
91	FROM STA. 21+40.00 TO STA. 24+00.00
	WHITEHEATHER DR.
92	FROM STA. 30+00.00 TO STA. 33+00.00
	LANDMARK DR.
93	FROM STA. 8+40.00 TO STA. 12+60.00
94	FROM STA. 12+60.00 TO STA. 16+00.00
95	FROM STA. 16+00.00 TO STA. 20+60.00
96	FROM STA. 20+60.00 TO STA. 24+00.00
	WEST OREM DR.
97	FROM STA. 0+00.00 TO STA. 4+20.00
98	FROM STA. 4+20.00 TO STA. 8+40.00
99	FROM STA. 8+40.00 TO STA. 12+60.00
100	FROM STA. 12+60.00 TO STA. 15+00.00
	BERAN DR.
101	FROM STA. 0+00.00 TO STA. 4+20.00
102	FROM STA. 4+20.00 TO STA. 8+40.00
103	FROM STA. 8+40.00 TO STA. 12+60.00
104	FROM STA. 12+60.00 TO STA. 14+20.00

SHEET	DESCRIPTION
	TREE PRESERVATION AND PLANTING PLAN (CONT.)
	EBBTIDE DR.
105	FROM STA. 0+00.00 TO STA. 3+60.00
106	FROM STA. 3+60.00 TO STA. 8+40.00
107	FROM STA. 8+40.00 TO STA. 12+60.00
108	FROM STA. 12+60.00 TO STA. 15+20.00
	KNOTTY OAKS TR.
109	FROM STA. 0+00.00 TO STA. 2+80.00
110	FROM STA. 2+80.00 TO STA. 7+00.00
111	FROM STA. 7+00.00 TO STA. 11+20.00
112	FROM STA. 11+20.00 TO STA. 14+20.00
	TIDEWATER DR.
113	FROM STA. 0+00.00 TO STA. 3+80.00
114	FROM STA. 3+80.00 TO STA. 8+00.00
115	FROM STA. 8+00.00 TO STA. 12+00.00
116	FROM STA. 12+00.00 TO STA. 14+20.00
	WUTHERING HEIGHTS DR.
117	FROM STA. 0+00.00 TO STA. 4+20.00
118	FROM STA. 4+20.00 TO STA. 8+40.00
119	FROM STA. 8+40.00 TO STA. 12+60.00
120	FROM STA. 12+60.00 TO STA. 15+00.00
121	TREE PRESERVATION PLAN SPECIFICATION
122	TREE PRESERVATION PLAN DETAILS
123	TREE PLANTING DETAILS & SPECS
	TRAFFIC CONTROL PLANS
124	TRAFFIC GENERAL NOTES
125 - 126	ADVANCED WARNING SIGN LAYOUT
127 - 138	TRAFFIC CONTROL PLAN
138A	TRAFFIC CONTROL PLAN FOR BOULEVARD CLOSURES
139 - 140	TRAFFIC CONTROL PLAN PROFILE CONCRETE BARRIER
141 - 142	CONSTRUCTION PHASE PLAN LAYOUT
	TRAFFIC SIGNAL SHEETS
143	EXISTING TRAFFIC SIGNAL PLAN SHEET
144	PROPOSED TRAFFIC SIGNAL PLAN SHEET
145	POLE SCHEDULE SHEET
146	CABLE SCHEMATIC SHEET
147	TRAFFIC SIGNAL GENERAL NOTES
148	HARDWARE LEGENDS
149	TYPICAL MAST ARM / POLE FIXTURE CONFIGURATION
150	TRAFFIC SIGNAL STRUCTURES (SHEET 1 OF 2)
151	TRAFFIC SIGNAL STRUCTURES (SHEET 2 OF 2)
152	POLE FOUNDATION DETAILS
153	PEDESTAL POLE WITH SCREW-IN ANCHOR FOUNDATION
154	PULL BOXES
155	OVERHEAD STREET NAMES SIGN MOUNTING DETAILS
156	CONTROLLER FOUNDATIONS
157	LOOP DETECTOR INSTALLATION DETAILS
158	ELECTRICAL SERVICE SUPPORT PEDESTAL SERVICE TYPE PS
159	TRAFFIC CONTROL PLAN FOR SIGNAL CONSTRUCTION
160	CROSSWALK CLOSURES AND PEDESTRIAN DETOURS, SOLAR SCHOOL ZONE FLASHING BEACON
161	COMMUNICATIONS OVERVIEW
162	COMMUNICATIONS SERVICE BOX DETAILS

SHEET	DESCRIPTION
	CITY OF HOUSTON STANDARDS & DETAILS
163	PROJECT IDENTIFICATION SIGN
164	PAVEMENT MARKINGS
165 - 166	PAVEMENT MARKING DETAILS
167	BARRICADE STANDARDS
168 - 171	STREET & BRIDGE DETAILS
172	DRIVEWAY SCHEDULE & DETAILS
173 - 175	STORM SEWER DETAILS
176 - 177	LOW FLOW CHANNEL & SLOPE PAVING OUTFALL DETAILS
178 - 179	WATER DETAILS
180	12 IN. DIAMETER WATER LINE AERIAL CROSSING DETAIL
181	8 IN. DIAMETER WATER LINE AERIAL CROSSING DETAIL
182	TXDOT PRESTRESSED CONCRETE PILING DETAIL
	EARTHWORK CROSS SECTIONS
183	WEST OREM
184	BERAN DR.
185	EBBTIDE DR.
186	KNOTTY OAKS TR.
187	TIDEWATER DR.
188	WUTHERING HEIGHTS DR.
189	LANDMARK DR.
190	WHITEHEATHER DR.
191	WHITEHEATHER DR.

No.	Date	Revisions	App.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

INDEX OF DRAWINGS

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	49210
ISAAC MUNIZ, E.I.T.	
SHEET NO. 2 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
APPROVED
CITY PROJECT NUMBER
HOUSTON, TEXAS

PLOTTED ON: Tuesday, April 10, 2012 10:40:52 AM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-SHEET INDEX.DWG

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT 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/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT 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/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN 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 TEXAS/SWBT FACILITIES.

CENTERPOINT ENERGY (GAS) – GENERAL NOTES

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.

* WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 967-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.

* WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

* WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

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

CENTERPOINT ENERGY (ELECTRIC) – GENERAL NOTES

WARNING: OVERHEAD ELECTRICAL FACILITIES

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 TO 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.

GENERAL NOTES

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND STANDARD CONSTRUCTION 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. UTILITIES PRESENTED ON THESES DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATION IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/800-245-4545 AND LONE STAR ONE CALL AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES, SIDEWALKS, STREET PAVING AND TRAFFIC CONTROL DEVICE. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.

No.	Date	Revisions	App.

PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY — Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date 4-13-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

Date:
CABLE Approved for underground conduit facilities only.

SES HORIZON
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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 04-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

UTILITY NOTES

WBS NO.: M-000262-0004-4	CITY DWG NO.: 49210
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 3 OF 191	

PUBLIC WORKS AND ENGINEERING — CITY NUMBER — HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Tuesday, April 10, 2012 7:23:47 AM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-UTILITY NOTES.DWG

FOR REDUCED PLANS
original scale in inches

SURVEY TOPO LEGEND (EXISTING CONDITIONS)

- POWER POLE
- ELECTRIC JUNCTION BOX
- TRAFFIC SIGN
- SAN MANHOLE
- STM MANHOLE
- B OR BB INLET
- GRATE INLET
- POST
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- GAS LIGHT
- GAS VALVE
- SPRINKLER VALVE
- BUILDING
- FENCE
- RECORDS
- TEMPORARY BENCHMARK
- SHRUB
- HEDGE

ASP	asphalt
AXLE	fnd axle
BBGO	basketball goal
BH	bore hole
BLDG	building
BOLT	fnd bolt
BORE	bore hole
BOX	misc utility box
BRDG	bridge
BRDR	landscape border
BSSN	business sign
BU	bush
BULK	bulkhead
BUSH	bush
CALC	calculated pt
CH	control hub
CL	cell centerline
CLPV	centerline pvmt
CMON	fnd city monument
COL	column
CONC	concrete
CU	culvert
DEFAULT	default
DFL	ditch flow line
DHB	ditch high bank
DRCL	drive cl
DRIV	drive
DTOE	ditch toe
EBOX	elec. box or pedestal
EP	edge of pavement
EW	edge of water
FC	fence corner
FEN	fence
FH	fire hydrant
FLBD	flower bed
FST	footstone
GASP	gas station pump
GASV	gas valve
GATE	gate
GB	ground break
GCAT	cathodic marker
GND	ground
GRAS	grass
GRAV	gravel
GSM	gas meter
GMKR	elec marker
LAND	landscape
GRINL	grate inlet
MHW	mean high water
GPNT	gas paint line - yellow
EPNT	elec paint line - red
WPNT	water paint line - blue

GSV	gas valve
GUTR	gutter
GUY	guy anchor or wire
HB	high bank
HDWL	headwall
HEDG	hedge
HLP	misc. H.L.&P. Co.
HST	headstone
INL	inlet
INLT	inlet
IP	fnd iron pipe
IR	fnd iron rod
MAIL	mailbox
MH	manhole
MHEL	manhole-elec.
MHGS	manhole-gas
MHHW	mean higher high water
MHMS	manhole-misc
MHPH	manhole-phone
MHSN	manhole-sanitary
MHST	manhole-storm
MON	fnd monument
MS	misc structure
MTPL	meter pole
MTSN	metro sign
NAIL	set nail
OHLN	overhead line
OTFL	outfall pipe
OVHG	overhang
PAPT	cell panel point
PARK	parking area
PBOX	phone box or pedestal
PHPL	phone pole
PIPE	exposed pipe
PKPL	parking light pole
PL	pole
PLMK	pipeline marker
POOL	pool
POST	post
POTH	pot hub
PP	power pole
PRCH	porch
PWPL	power pole
BBINL	BB inlet
BINL	B inlet
PBOXL	lg. phone box/pad
PMKR	phone marker
TCBOX	traffic control box
TCBOXL	lg. Traffic control box
PPNT	phone or comm paint line - orange
CATV	cable television paint line
DINL	D inlet
RAIL	rail
RR	misc railroad items
ROW	cell row points
RRCL	railroad c.l.
RRSP	fnd railroad spike
SHLD	shoulder
SHRB	shrub
SLAB	slab
SN	sign
SNCO	sanitary cleanout
SNGT	grease trap
SNSN	street name sign
SP	sheet piling
SPHD	sprinkler head
SPV	sprinkler valve
STEP	step
STLT	street light pole
STSN	stop sign
TBDG	top of bridge
TBM	tbm
TC	top of curb
TLPL	traffic light pole
TOE	toe of slope
TOP	top of slope
TPBM	top of beam
TPIP	top of pipe
TPRL	top of rail
TR	tree
TRLT	traffic light
TRPL	transformer pole
TRSN	traffic sign
UGLN	underground line
UTLP	utility pad
WALK	sidewalk
WALL	wall
WELL	well
WTRM	water meter
WTRV	water valve
WV	water valve
XCON	fnd x in conc
YDLT	yard light
Z	general pt elev
CHK	check shot
CINL	C inlet
EBOXL	lg. elec box
TSBOX	traffic signal box
TSBOXL	lg. traf. Sig. box
EINL	E inlet
CINL	C inlet
STRP	Stripe

CONSTRUCTION LEGEND

NEW ITEMS

1. PROPOSED REINFORCED CONCRETE PAVEMENT
2. PROPOSED PAVING HEADER/JOINT
3. PROPOSED 6" CURB
4. PROPOSED 5' SIDEWALK IN ALL LOCATIONS UNLESS OTHERWISE NOTED
5. PROPOSED CONCRETE DRIVEWAY
6. PROPOSED 6" TO 3" TRANSITION CURB
7. PROPOSED PAVEMENT STRIPE/MARKINGS
8. PROPOSED PAVEMENT BUTTON(S)
9. PROPOSED RIPRAP – 24" MIN. THICKNESS
10. PROPOSED FILL MATERIAL
11. PROPOSED SODDING
12. GEOTECHNICAL BORING LOG
13. PROPOSED ASPHALT TRANSITION TO MATCH EXISTING PAVEMENT AND TOP OF CURB ELEVATION
14. PROPOSED 6' MEDIAN CONCRETE PAVING NOSE – 6" THICK COLORED BLACK
15. PROPOSED METAL BEAM GUARD FENCE
16. PROPOSED ASPHALT PAVEMENT
17. PROPOSED 5" DEPTH SLOPE PAVING WITH WEEP HOLES
18. PROPOSED ASPHALT DRIVEWAY
19. PROPOSED CONCRETE WALKWAY
20. PROPOSED STORM SEWER
21. PROPOSED STORM BOX CULVERT
22. PROPOSED STORM INLET
23. PROPOSED STORM SEWER MANHOLE
24. ADJUST RIM ELEVATION OF EXISTING STORM SEWER MANHOLE
25. PROPOSED 24" RCP CULVERT
26. PROPOSED CONCRETE HEADWALL
27. PROPOSED RING GRATE
28. PROPOSED 5" THICK CONCRETE SLOPE PAVING
30. PROPOSED SANITARY SEWER
31. ADJUST RIM ELEVATION OF EXISTING SANITARY SEWER MANHOLE
32. PROPOSED SANITARY SEWER MANHOLE
33. PROPOSED SANITARY SEWER–PLACE 1 FULL SECTION OF SANITARY SEWER (GRAVITY NON–PRESSURE) CENTERED AT WATER LINE CROSSING, HAVING AT LEAST 115 PSI AT 5% DEFLECTION, EMBEDDED IN CEMENT STABILIZED SAND FOR THE TOTAL OF ONE PIPE SEGMENT PLUS 1 FOOT BEYOND THE JOINTS ON EACH END. THE CEMENT STABILIZED SAND SHALL HAVE A MINIMUM OF 10% CEMENT PER CUBIC YARD OF CEMENT STABILIZED SAND MIXTURE (AT LEAST 2.5 BAGS OF CEMENT PER CUBIC YARD OF MIXTURE)
34. PROPOSED SANITARY SEWER (AUGER METHOD)
35. PROPOSED SANITARY SEWER, ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE CENTERED ON THE CROSSING, SEALED AT BOTH ENDS WITH CEMENT GROUT, AT LEAST 18' LONG, AT LEAST TWO NOMINAL SIZES LARGER THAN THE SANITARY SEWER AND SUPPORTED BY SPACES BETWEEN THE SEWER AND THE ENCASING PIPE AT A MAXIMUM OF FIVE–FOOT INTERVALS.
40. PROPOSED WATER LINE (OPEN CUT)
41. PROPOSED WATER LINE (AUGER METHOD)
42. PROPOSED FIRE HYDRANT
43. PROPOSED WATER METER
44. PROPOSED SECTION OF DUCTILE IRON PIPE WITH RESTRAINED JOINTS – OFFSET DETAILS ARE AS PER COH DETAIL DWG NO. 02511–01.
45. PROPOSED 3" PVC DRAIN

EXISTING ITEMS

50. REMOVE EXISTING PAVEMENT WITH OR WITHOUT BASE (ALL TYPES AND THICKNESSES) AND/OR CONCRETE CURB
51. REMOVE EXISTING DRIVEWAY, INCLUDING CONCRETE/TIMBER HEADWALLS
52. SAWCUT EXISTING PAVEMENT AND PROVIDE CONSTRUCTION JOINT WITH DOWELS
53. REMOVE AND RELOCATE EXISTING SIGN
54. EXISTING SIGN TO REMAIN
55. EXISTING STRUCTURE TO REMAIN
56. EXISTING TREE/HARDSCAPE AND LANDSCAPE TO BE PRESERVED
57. REMOVE EXISTING SPEED HUMP AND REPLACE WITH SPEED CUSHION
58. EXISTING SIDEWALK TO BE REMOVED
59. EXISTING MAILBOX AND/OR MAILBOX STRUCTURE TO REMAIN
60. EXISTING ILLUMINATION POLE TO BE REMOVED AND RELOCATED
61. EXISTING CONCRETE SIDEWALK TO REMAIN
62. REMOVE AND RELOCATE EXISTING POWER POLE
63. EXISTING STORM INLET TO REMAIN
64. EXISTING FENCE TO REMAIN
65. EXISTING FENCE TO BE REMOVED AND REPLACED
66. EXISTING CONCRETE SLOPE PAVING
67. REMOVE AND REPLACE EXISTING FENCE
68. REMOVE AND REPLACE EXISTING CONCRETE SLOPE PAVING
69. REMOVE AND REPLACE EXISTING CONCRETE LOW FLOW CHANNEL WALL
70. REMOVE EXISTING STORM SEWER
71. REMOVE EXISTING STORM SEWER INLET
72. REMOVE EXISTING STORM SEWER MANHOLE
73. PLUG AND ABANDON EXISTING STORM SEWER MANHOLE
74. PLUG AND ABANDON EXISTING STORM SEWER INLET
75. PLUG AND ABANDON EXISTING STORM SEWER
76. PLUG AND ABANDON EXISTING STORM BOX CULVERT
77. REMOVE EXISTING STORM BOX CULVERT
78. REMOVE EXISTING CULVERT
79. EXISTING STORM SEWER TO REMAIN
80. REMOVE EXISTING SANITARY SEWER
81. EXISTING SANITARY SEWER TO REMAIN
82. REMOVE EXISTING SANITARY SEWER MANHOLE
83. PLUG AND ABANDON EXISTING SANITARY SEWER MANHOLE
84. EXISTING SANITARY SEWER MANHOLE TO REMAIN
85. PLUG AND ABANDON EXISTING SANITARY SEWER
87. REMOVE EXISTING INLET LEAD AND PLUG IT AT REMAINING MANHOLE
91. REMOVE & SALVAGE EXISTING FIRE HYDRANT – FH WILL REMAIN IN SERVICE UNTIL WATER LINE AND NEW FH'S ARE IN SERVICE
92. CUT, PLUG AND ABANDON EXISTING WATER LINE
93. EXISTING WATER METER TO REMAIN
94. ADJUST EXISTING WATER VALVE TO GRADE ELEVATION
95. REMOVE AND RELOCATE EXISTING POWER POLE
96. EXISTING FIRE HYDRANT TO REMAIN
97. EXISTING WATER LINE TO REMAIN
98. EXISTING WATER METER W/BOX RELOCATE AND REINSTALL OUT OF SIDEWALK
99. EXISTING STORM SEWER MANHOLE TO REMAIN
100. ADJUST EXISTING WATER METER TO GRADE ELEVATION
101. CUT, PLUG & REMOVE EXISTING WATER LINE.

No.	Date	Revisions	App.

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67749
REGISTERED PROFESSIONAL ENGINEER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

CONSTRUCTION LEGEND AND TOPO LEGEND

WBS NO.: M–000262–0004–4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 4 OF 191	

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49210
ENGINEER
HOUSTON, TEXAS

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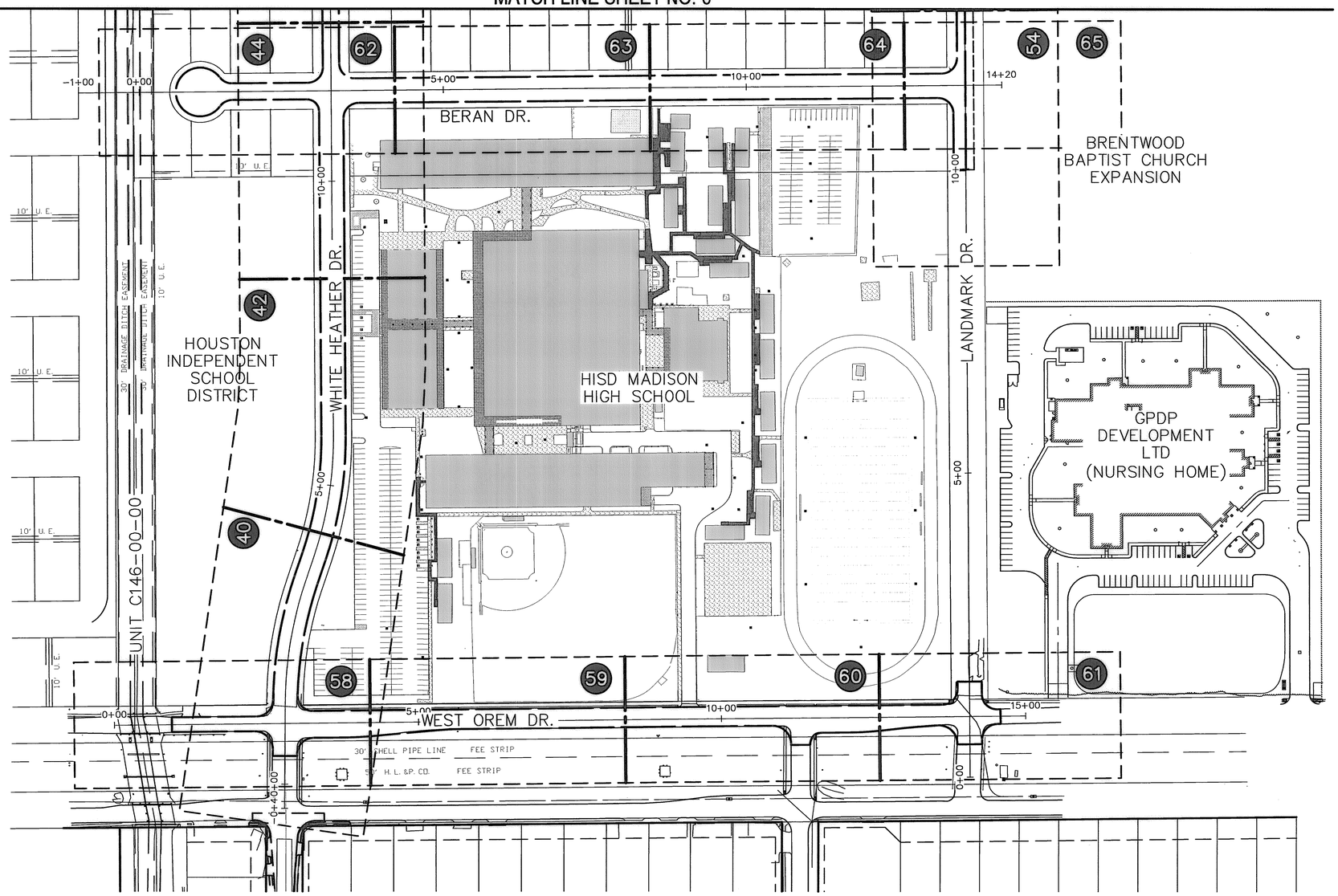
FOR REDUCED PLANS
original scale in inches

0 1 2 3

LEGEND

- XX — PLAN AND PROFILE SHEET NUMBER
- LIMITS OF PROPOSED PAVEMENT
- LIMITS OF PLAN AND PROFILE SHEETS

MATCH LINE SHEET NO. 6



N
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REGISTERED PROFESSIONAL ENGINEER

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

OVERALL PROJECT LAYOUT

1 OF 2

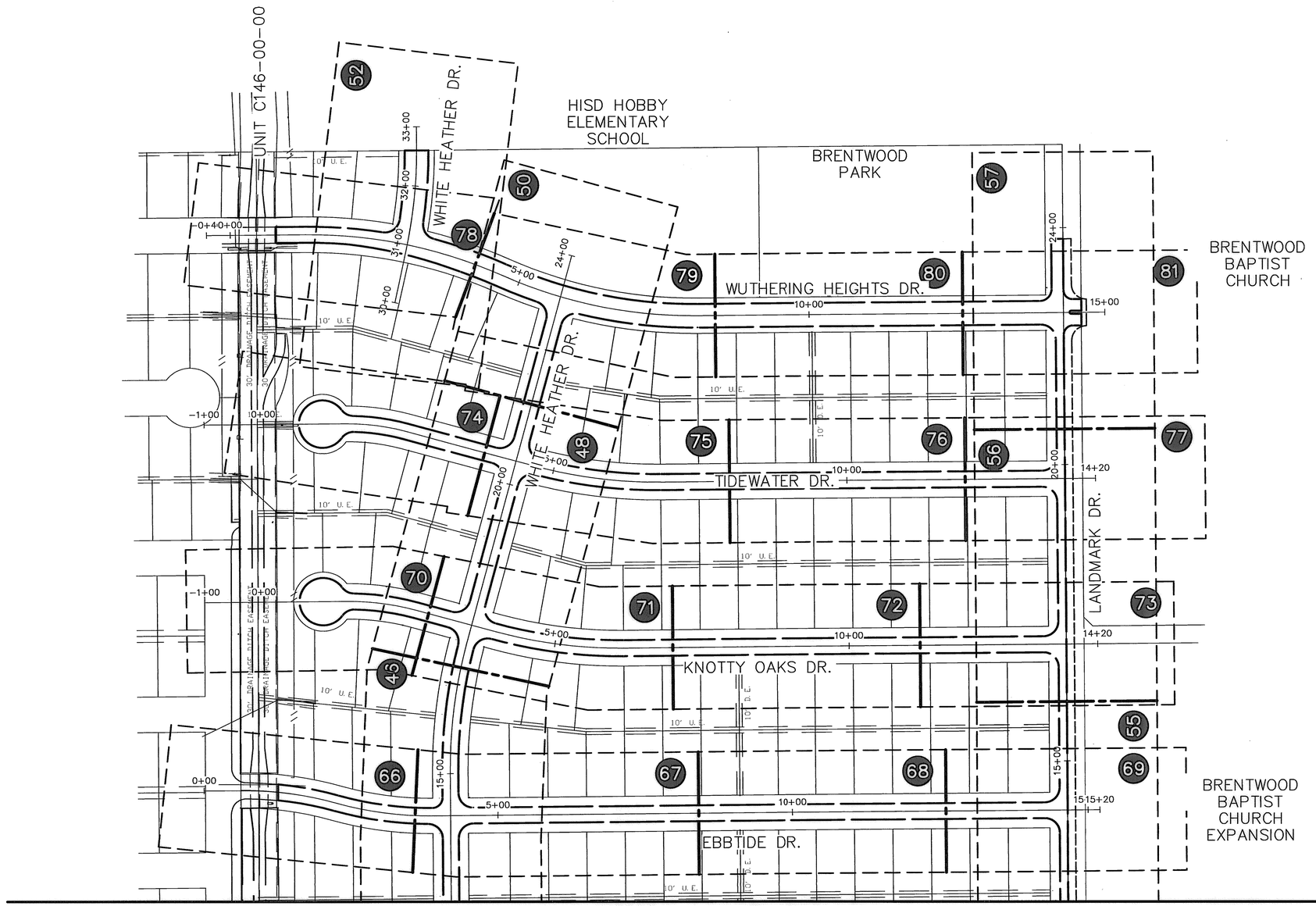
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
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FOR REDUCED PLANS
original scale in inches

0 1 2 3



MATCH LINE SHEET NO. 5

LEGEND

- XX — PLAN AND PROFILE SHEET NUMBER
- LIMITS OF PROPOSED PAVEMENT
- LIMITS OF PLAN AND PROFILE SHEETS

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WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

OVERALL PROJECT LAYOUT

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
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1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 6 OF 191	

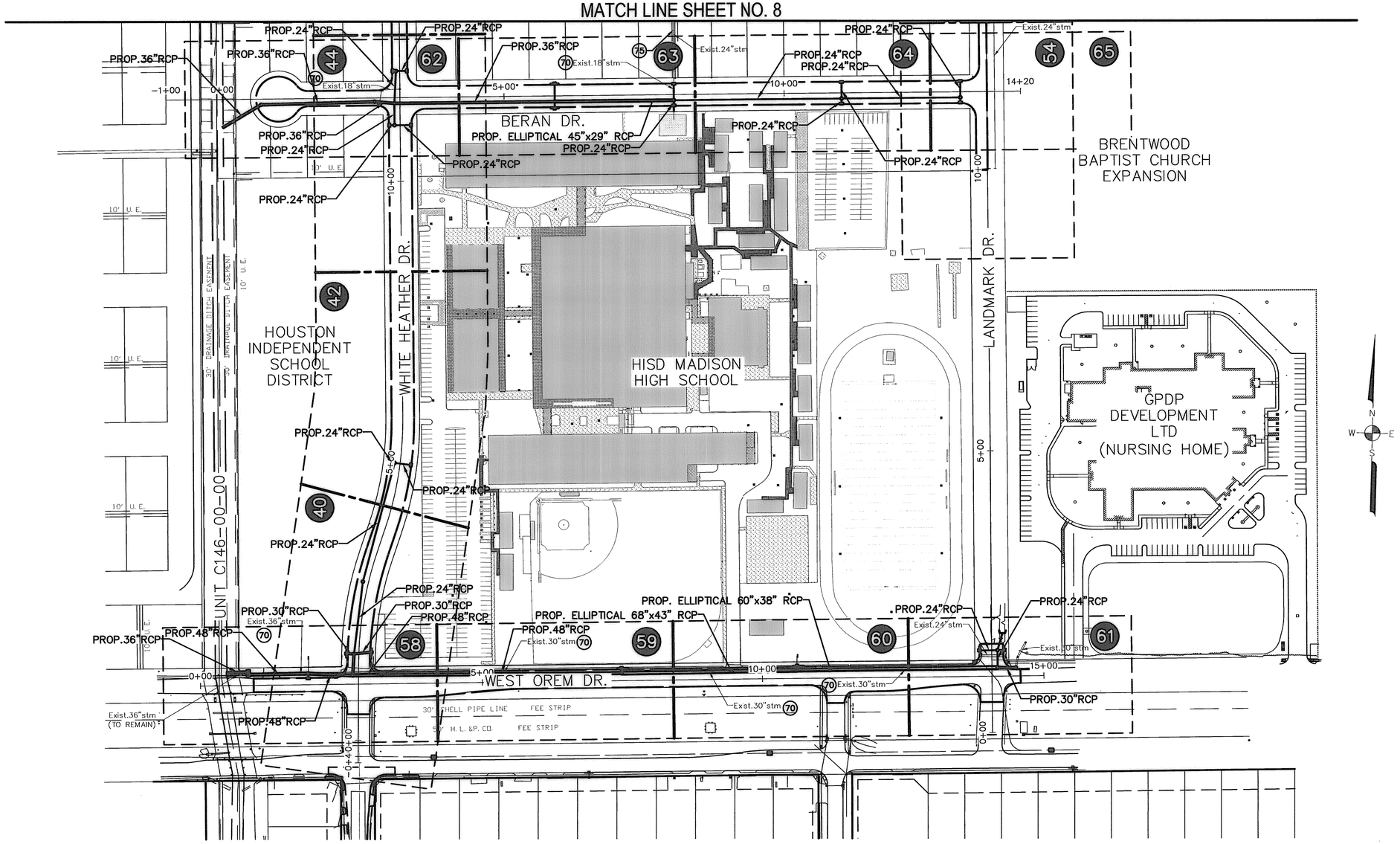
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CITY NUMBER
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FOR REDUCED PLANS
original scale in inches

3 2 1 0

MATCH LINE SHEET NO. 8



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. INLET CONNECTION
- EXIST. STORM SEWER
- EXIST. INLET CONNECTION
- (70) REMOVE EXISTING STORM SEWER
- (73) PLUG AND ABANDON EXISTING STORM SEWER MANHOLE
- (75) PLUG AND ABANDON EXISTING STORM SEWER
- (79) EXISTING STORM SEWER TO REMAIN

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OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
12-31-12

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WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

STORM SEWERS - EXISTING & PROPOSED PROJECT LAYOUT

1 OF 2

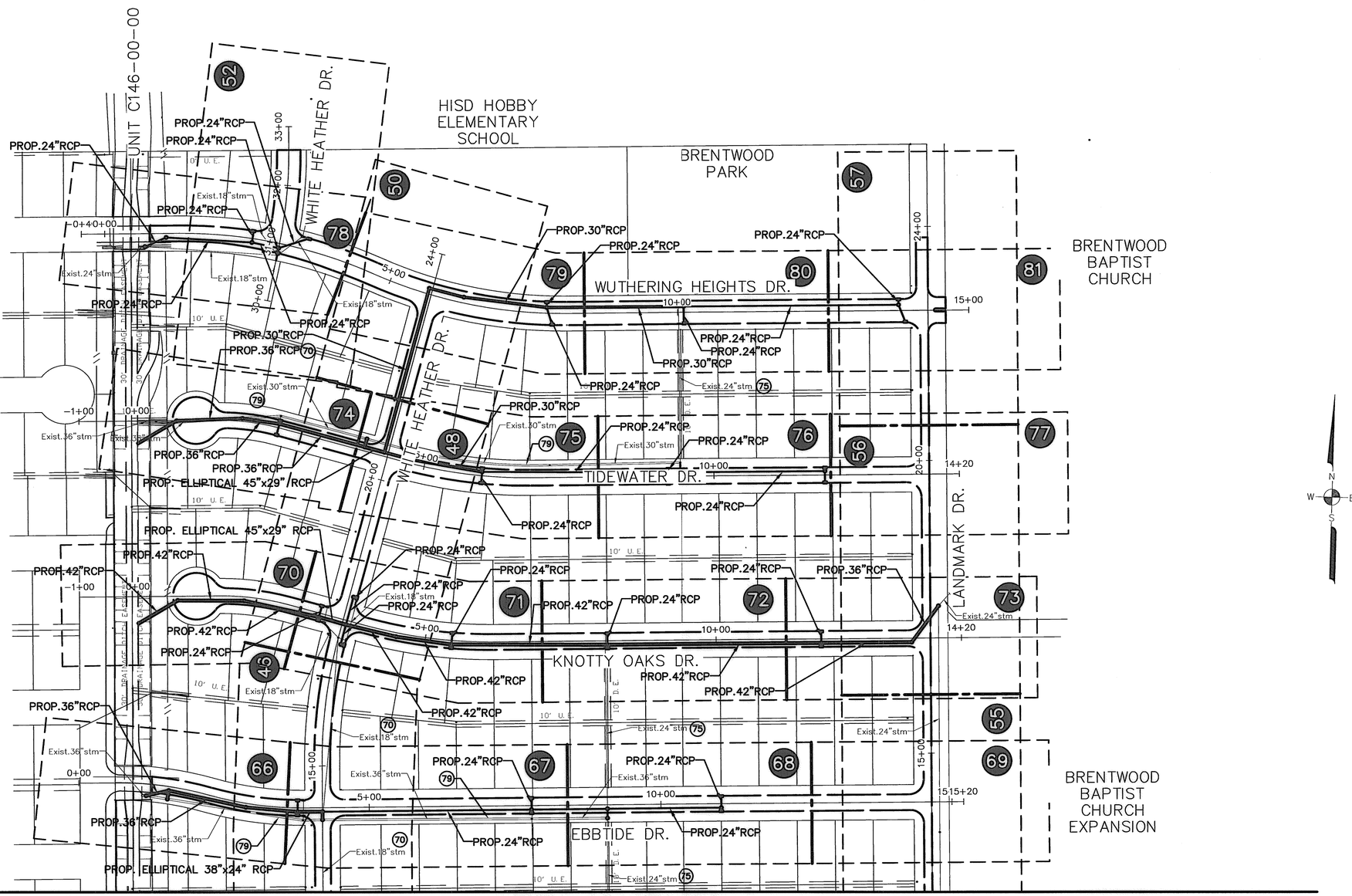
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ISAAC MUNIZ, E.I.T.	
SHEET NO. 7 OF 191	

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FOR REDUCED PLANS
original scale in inches

3 2 1 0



MATCH LINE SHEET NO. 7

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. INLET CONNECTION
- EXIST. STORM SEWER
- EXIST. INLET CONNECTION
- (70) REMOVE EXISTING STORM SEWER
- (73) PLUG AND ABANDON EXISTING STORM SEWER MANHOLE
- (75) PLUG AND ABANDON EXISTING STORM SEWER
- (79) EXISTING STORM SEWER TO REMAIN

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WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STORM SEWERS - EXISTING & PROPOSED PROJECT LAYOUT

2 OF 2

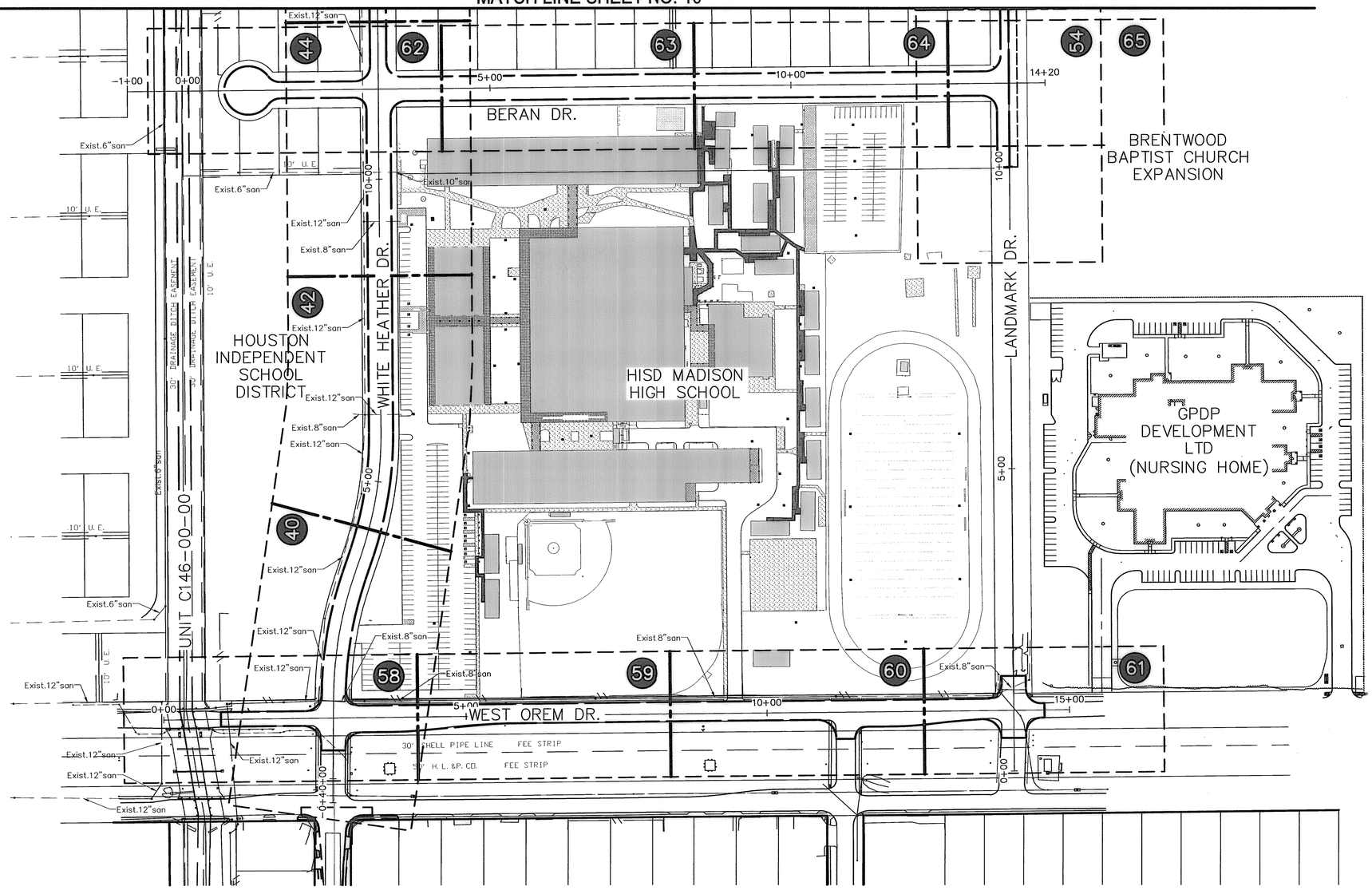
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FILE NO.: SM5056	
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CITY OF HOUSTON PM	
I. ISAAC MUNIZ, E.I.T.	
SHEET NO. 8 OF 191	

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FOR REDUCED PLANS
original scale in inches

MATCH LINE SHEET NO. 10



LEGEND

- ○ EXIST. SANITARY SEWER MH
- EXIST. SANITARY SEWER (24" DIA.)
- EXIST. SANITARY SEWER (GREATER THAN 24" DIA.)

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EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

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WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

SANITARY SEWERS - EXISTING PROJECT LAYOUT

1 OF 2

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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 9 OF 191	

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CITY NUMBER
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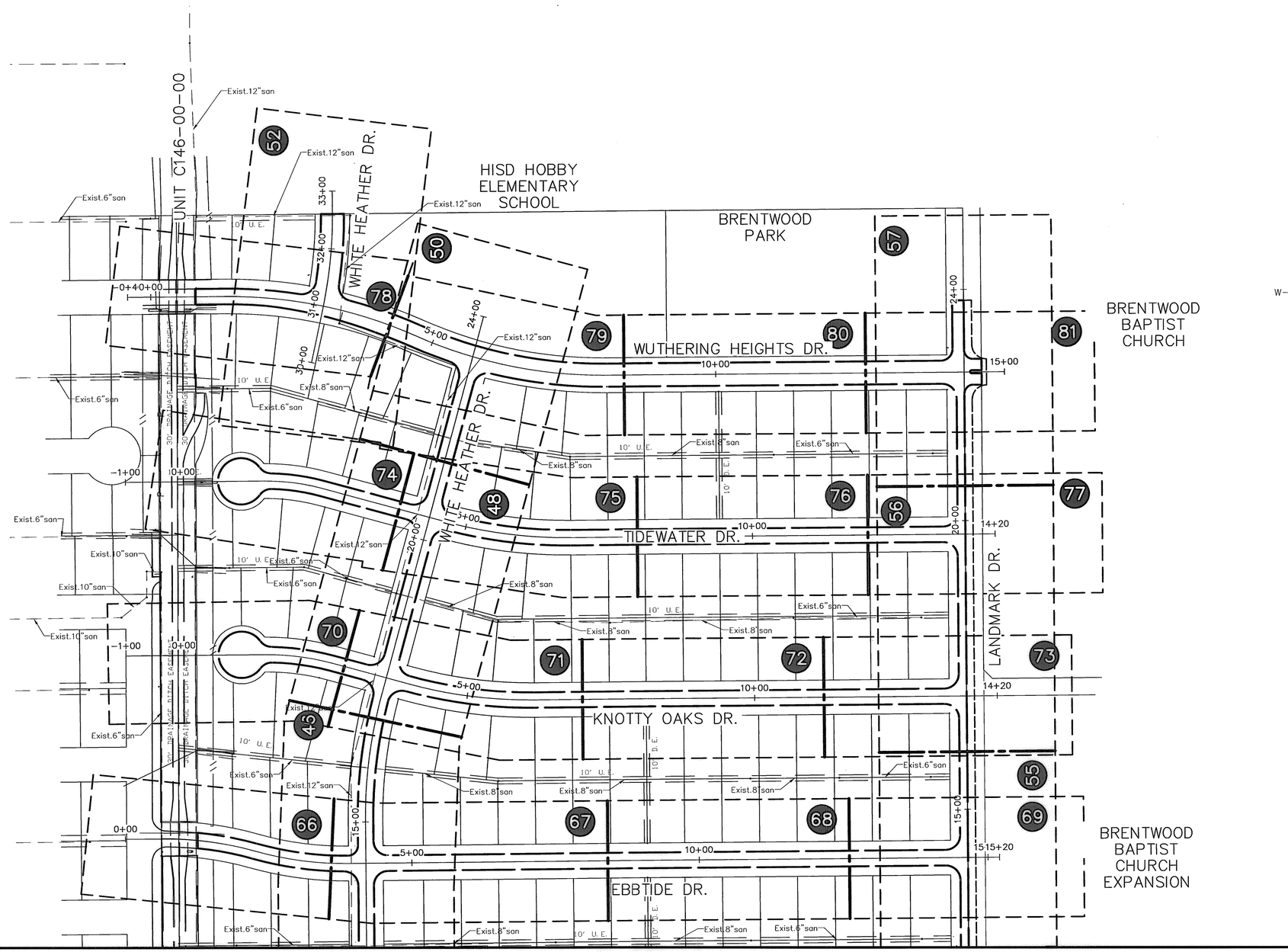
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FOR REDUCED PLANS
original scale in inches

3 2 1 0

LEGEND

- EXIST. SANITARY SEWER MH
- EXIST. SANITARY SEWER (24" DIA.)
- EXIST. SANITARY SEWER (GREATER THAN 24" DIA.)



MATCH LINE SHEET NO. 9

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REGISTERED PROFESSIONAL ENGINEER

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WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

SANITARY SEWERS - EXISTING PROJECT LAYOUT

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 10 OF 191	

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CITY NUMBER
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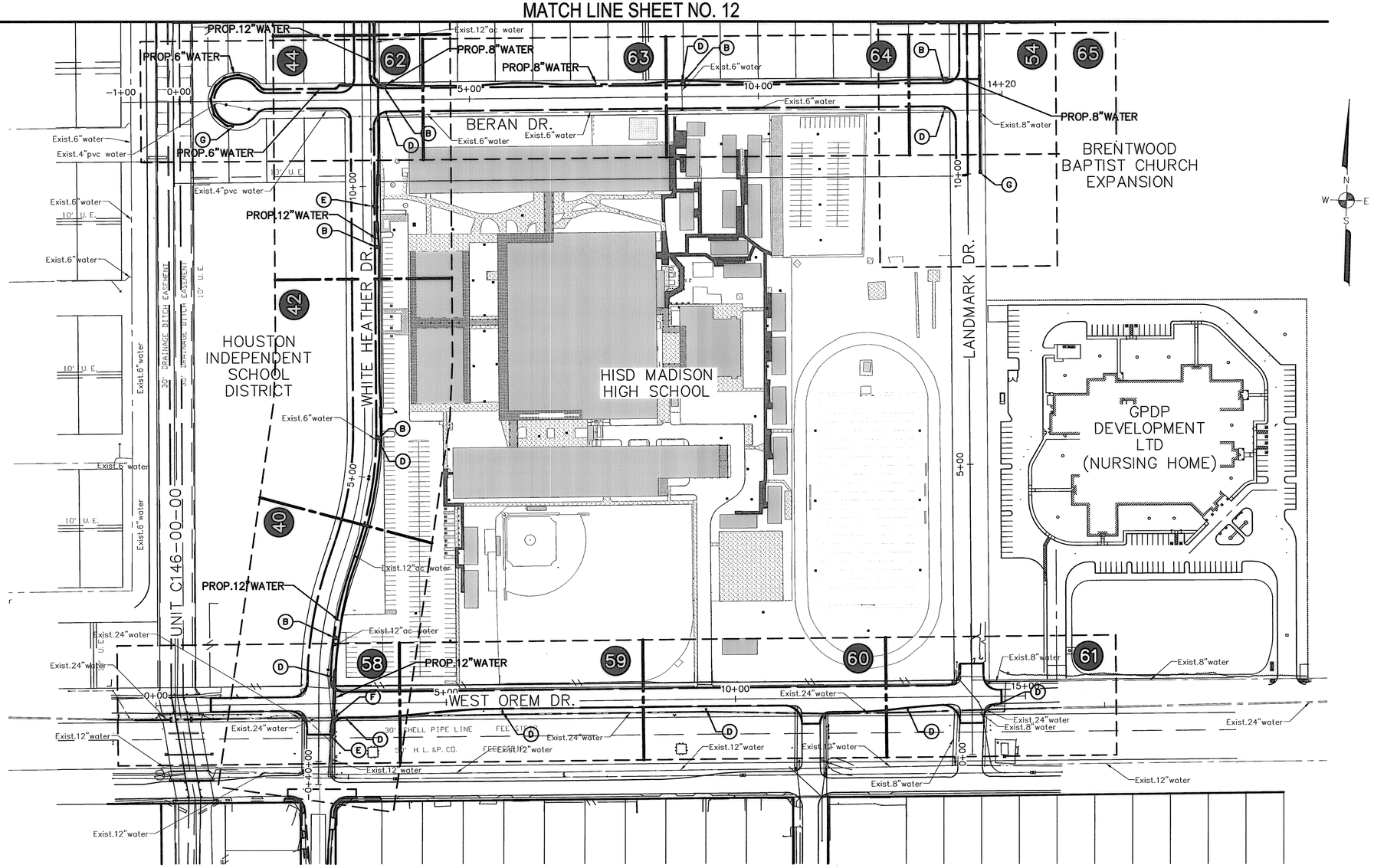
FOR REDUCED PLANS
original scale in inches

3 2 1 0

LEGEND

- PROP. WATERLINE
- EXIST. WATERLINE
- (A) PROP. GATE VALVE W/BOX
- (B) PROP. FIRE HYDRANT ASSEMBLY
- (D) EXIST. FIRE HYDRANT
- (E) PROP. WET CONNECTION
- (F) PROP. TS&V
- (G) B.O.V. W/BOX

MATCH LINE SHEET NO. 12



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REGISTERED PROFESSIONAL ENGINEER
09/28/2012

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WATER LINES - EXISTING & PROPOSED PROJECT LAYOUT

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 11 OF 191	

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CITY OF HOUSTON, TEXAS

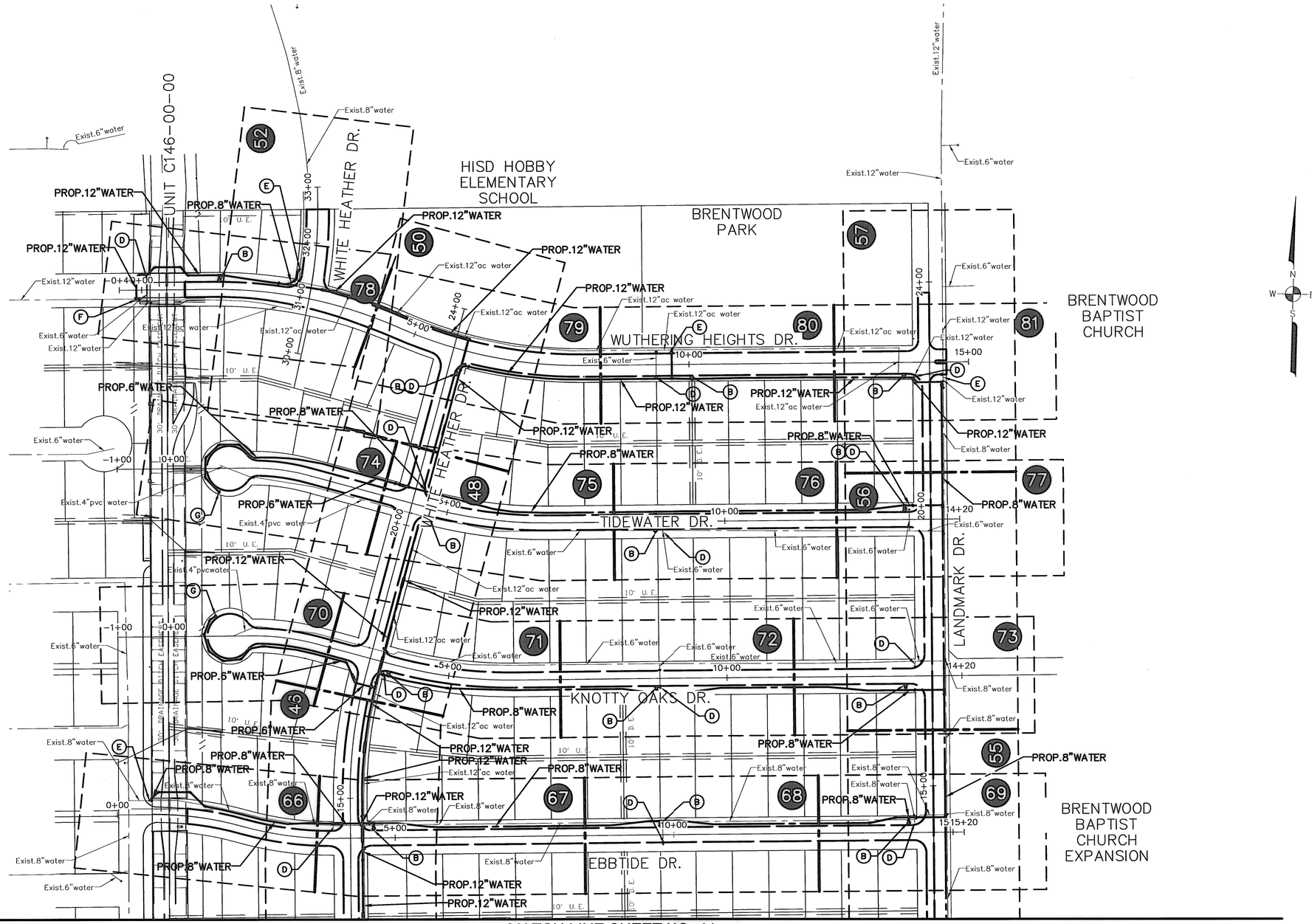
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FOR REDUCED PLANS
original scale in inches

3 2 1 0

LEGEND

- PROP. WATERLINE
- EXIST. WATERLINE
- (A) PROP. GATE VALVE W/BOX
- (B) PROP. FIRE HYDRANT ASSEMBLY
- (D) EXIST. FIRE HYDRANT
- (E) PROP. WET CONNECTION
- (F) PROP. TS&V
- (G) B.O.V. W/BOX



MATCH LINE SHEET NO. 11

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EPIFANIO E. SALAZAR JR.
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STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WATER LINES - EXISTING & PROPOSED PROJECT LAYOUT

2 OF 2

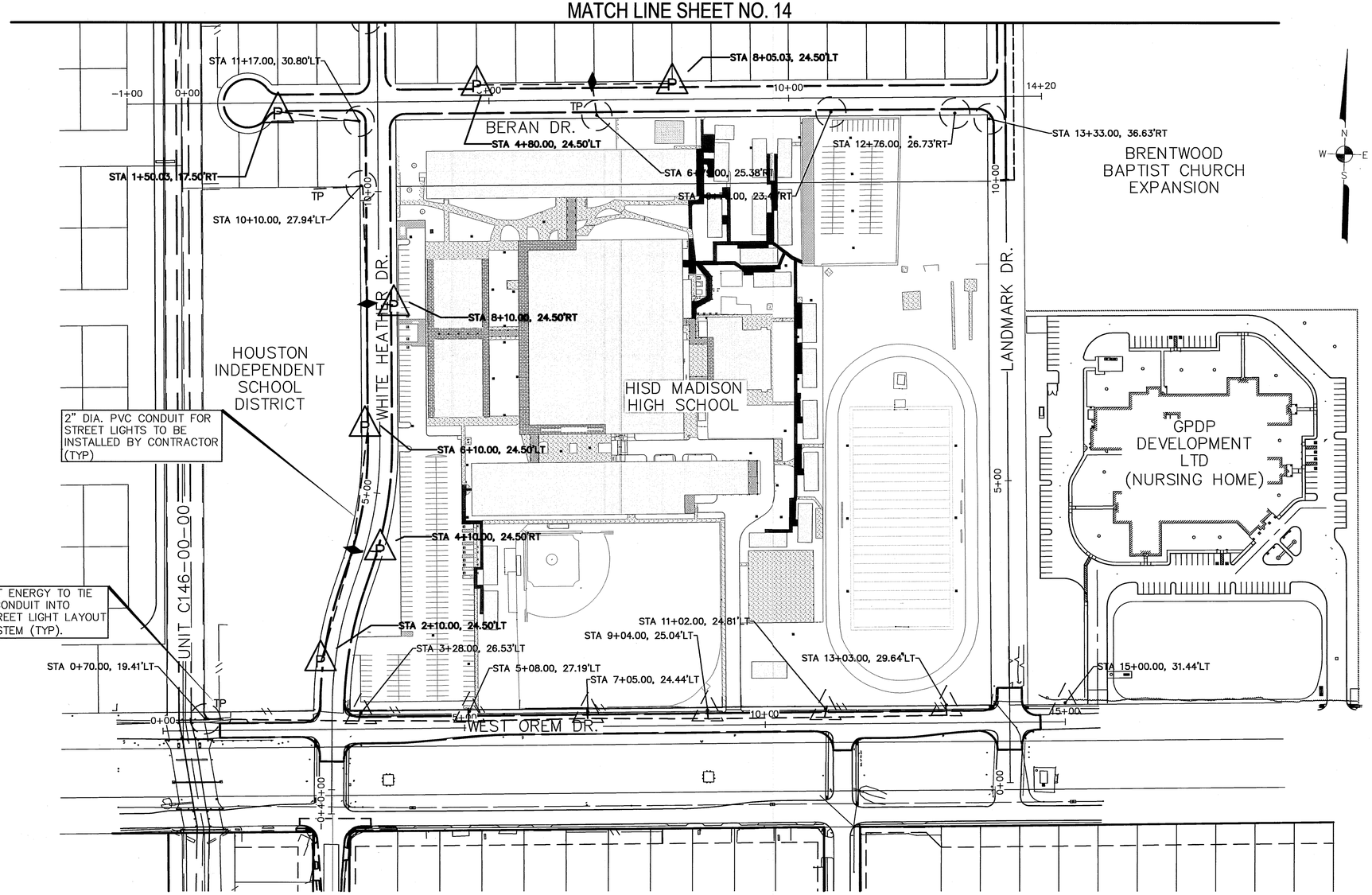
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1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 12 OF 191	

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FOR REDUCED PLANS
original scale in inches

MATCH LINE SHEET NO. 14



NOTES:

1. THE CONDUIT SHALL BE PLACED 3 FEET BEHIND CURB UNLESS SIDEWALK IS TO BE INSTALLED. WHERE SIDEWALKS EXIST, CONDUIT SHALL BE PLACED UP TO 6 INCHES BEHIND THE SIDEWALK (OR IN GRASSY AREA BETWEEN THE CURB AND THE START OF SIDEWALK, WHERE 12 INCHES OR MORE OF GRASSY AREA EXISTS).
2. ALL PROPOSED AND RE-INSTALLED LIGHTS SHOULD BE SHOWN TO BE INSTALLED BETWEEN THE PROPERTY LINES.

LEGEND

- EXISTING POWER POLE WITH LIGHTING FIXTURE TO BE REMOVED AND REINSTALLED AT SAME LOCATION (BY CENTERPOINT ENERGY).
- EXISTING METAL POLE STREET LIGHT TO BE REMOVED AND REINSTALLED AT SAME LOCATION (BY CENTERPOINT ENERGY).
- (P) PROPOSED NEW POWER POLE WITH LIGHTING FIXTURE
- (P) PROPOSED NEW METAL POLE STREET LIGHT
- UNDERGROUND CONDUCTOR (TO BE INSTALLED BY CONTRACTOR PER CENTERPOINT ENERGY SPECIFICATIONS) (STREET LIGHT CONDUITS CROSSING UNDER DRIVEWAYS OR SIDEWALKS, SCHEDULE 40 PVC OR BETTER IS REQUIRED. WHEN CROSSING UNDER STREETS, THE CONDUIT SHALL BE PVC CONDUIT SCHEDULE 80.)
- PROPOSED PULL BOX (TO BE INSTALLED BY CONTRACTOR PER CENTERPOINT ENERGY SPECIFICATIONS)
- TP PROPOSED TERMINAL POLE
- LIMITS OF PROPOSED PAVEMENT

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
07/13/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

STREET LIGHT - EXISTING & PROPOSED PROJECT LAYOUT

1 OF 2

WBS NO.: M-000262-0004-4	CITY R/W NO.:
FILE NO.: SM5056	
DRAWING SCALE	1" = 100'
CITY OF HOUSTON PM	ISAAC MUNIZ, E.I.T.
SHEET NO. 13 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
49210
LICENSED
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 1:53:59 PM
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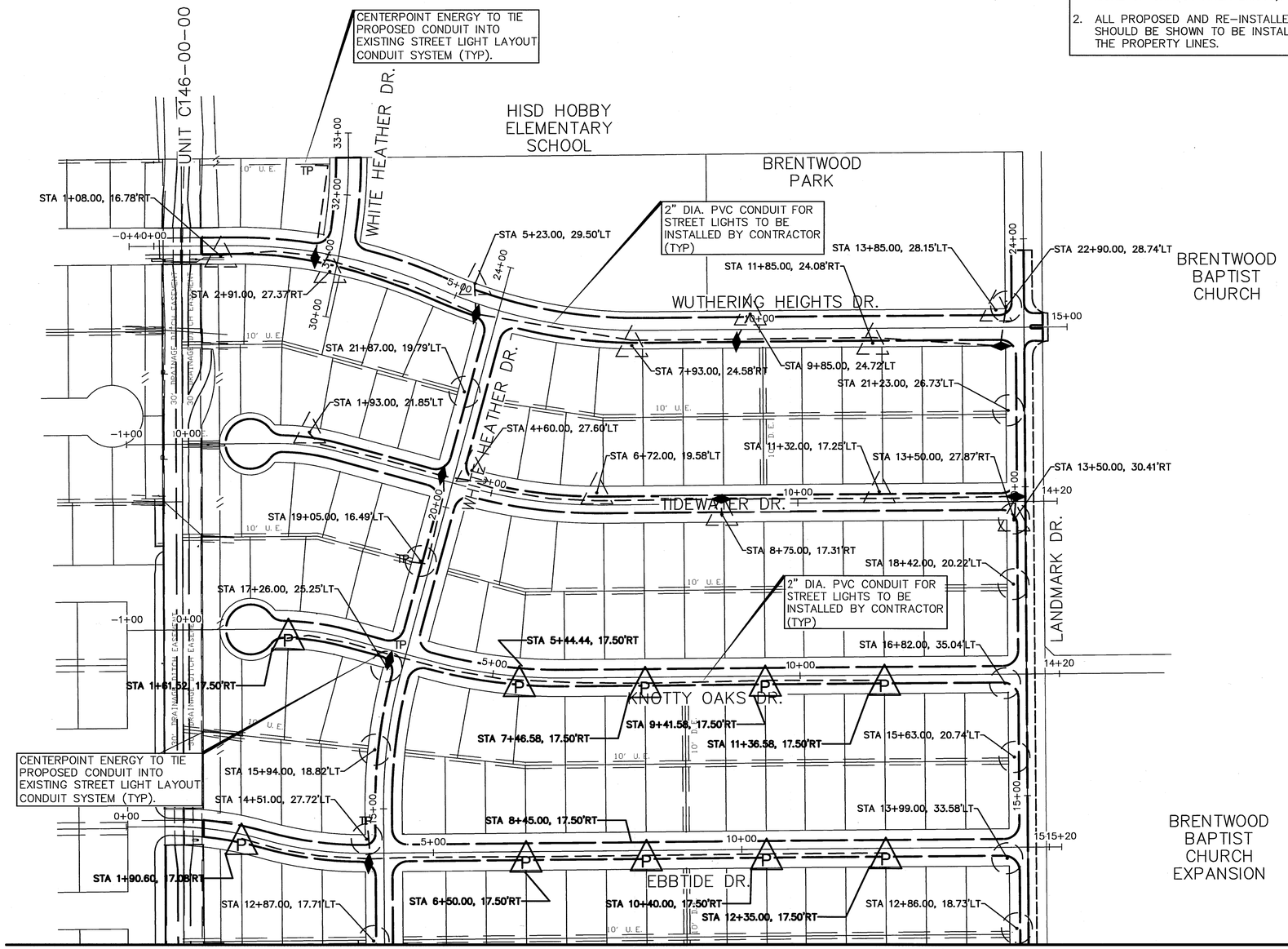
FOR REDUCED PLANS
original scale in inches

NOTES:

1. THE CONDUIT SHALL BE PLACED 3 FEET BEHIND CURB UNLESS SIDEWALK IS TO BE INSTALLED. WHERE SIDEWALKS EXIST, CONDUIT SHALL BE PLACED UP TO 6 INCHES BEHIND THE SIDEWALK (OR IN GRASSY AREA BETWEEN THE CURB AND THE START OF SIDEWALK, WHERE 12 INCHES OR MORE OF GRASSY AREA EXISTS).
2. ALL PROPOSED AND RE-INSTALLED LIGHTS SHOULD BE SHOWN TO BE INSTALLED BETWEEN THE PROPERTY LINES.

LEGEND

- EXISTING POWER POLE WITH LIGHTING FIXTURE TO BE REMOVED AND REINSTALLED AT SAME LOCATION (BY CENTERPOINT ENERGY).
- EXISTING METAL POLE STREET LIGHT TO BE REMOVED AND REINSTALLED AT SAME LOCATION (BY CENTERPOINT ENERGY).
- PROPOSED NEW POWER POLE WITH LIGHTING FIXTURE
- PROPOSED NEW METAL POLE STREET LIGHT
- UNDERGROUND CONDUCTOR (TO BE INSTALLED BY CONTRACTOR PER CENTERPOINT ENERGY SPECIFICATIONS) (STREET LIGHT CONDUITS CROSSING UNDER DRIVEWAYS OR SIDEWALKS, SCHEDULE 40 PVC OR BETTER IS REQUIRED. WHEN CROSSING UNDER STREETS, THE CONDUIT SHALL BE PVC CONDUIT SCHEDULE 80.)
- PROPOSED PULL BOX (TO BE INSTALLED BY CONTRACTOR PER CENTERPOINT ENERGY SPECIFICATIONS)
- TP — PROPOSED TERMINAL POLE
- LIMITS OF PROPOSED PAVEMENT



MATCH LINE SHEET NO. 13

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 09-04-12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

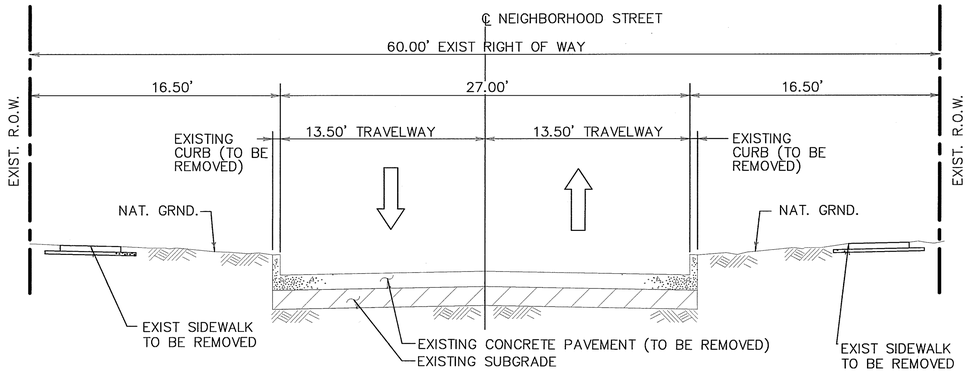
STREET LIGHT - EXISTING & PROPOSED PROJECT LAYOUT

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 14 OF 191	

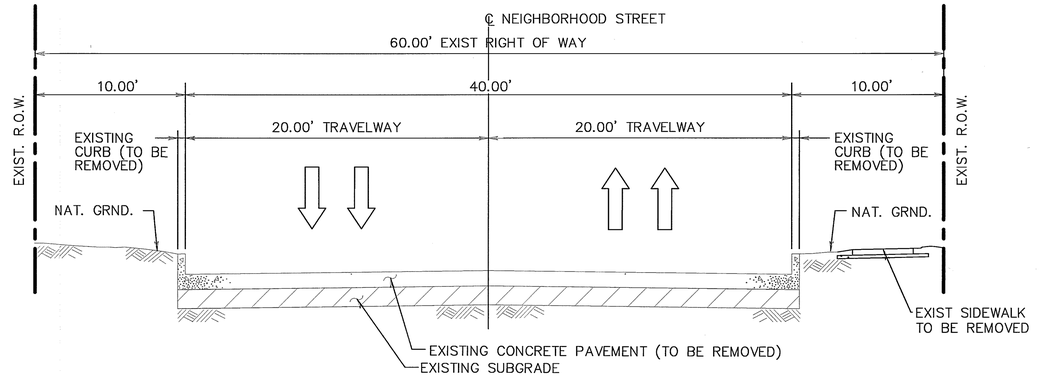
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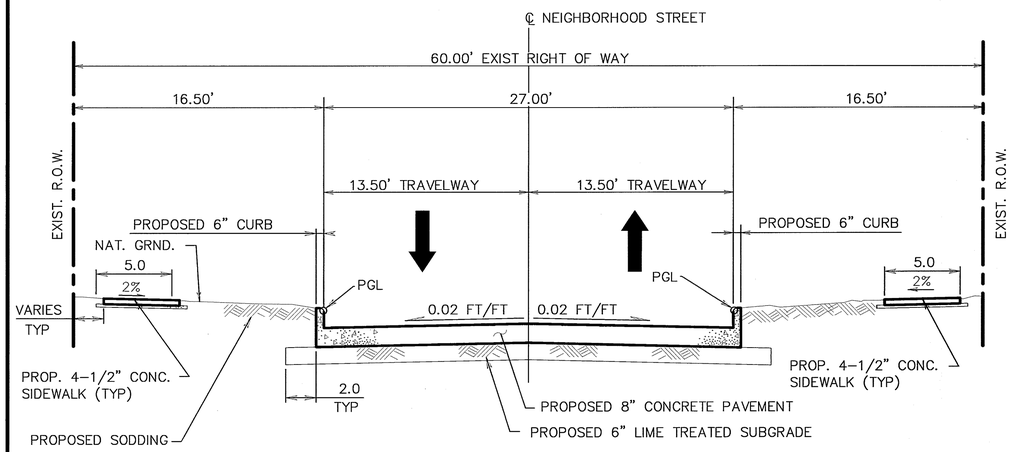
EXISTING TYPICAL SECTION

TYPICAL NEIGHBORHOOD STREET SECTION



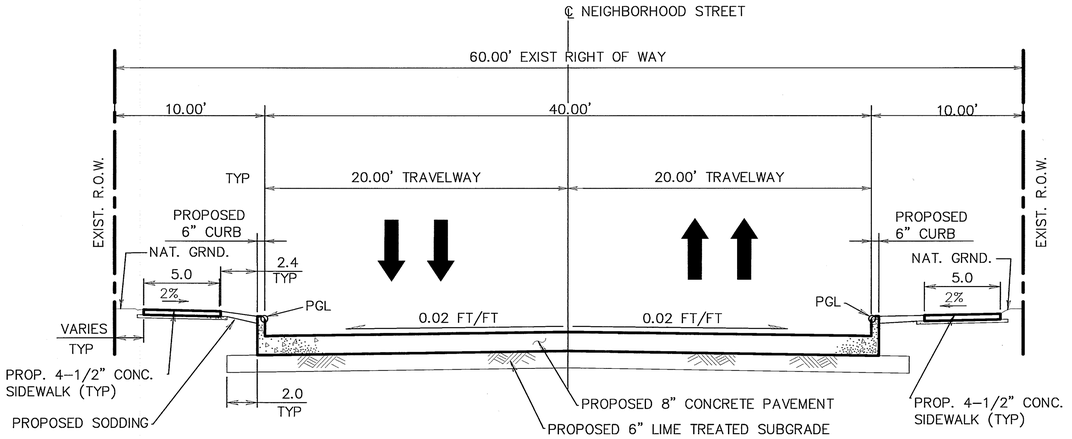
EXISTING TYPICAL SECTION

WHITE HEATHER DR. FROM STA. 0+46.50 to STA. 11+62
BERAN DR. FROM STA. 3+00 to STA. 13+60
WUTHERING HEIGHTS DR. FROM STA. 2+80 to STA. 14+30



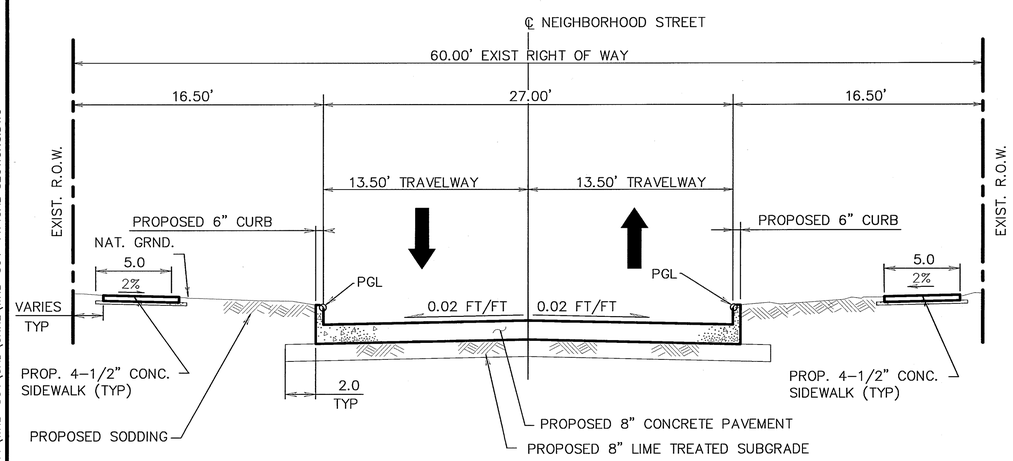
PROPOSED TYPICAL SECTION

TYPICAL NEIGHBORHOOD STREET SECTION



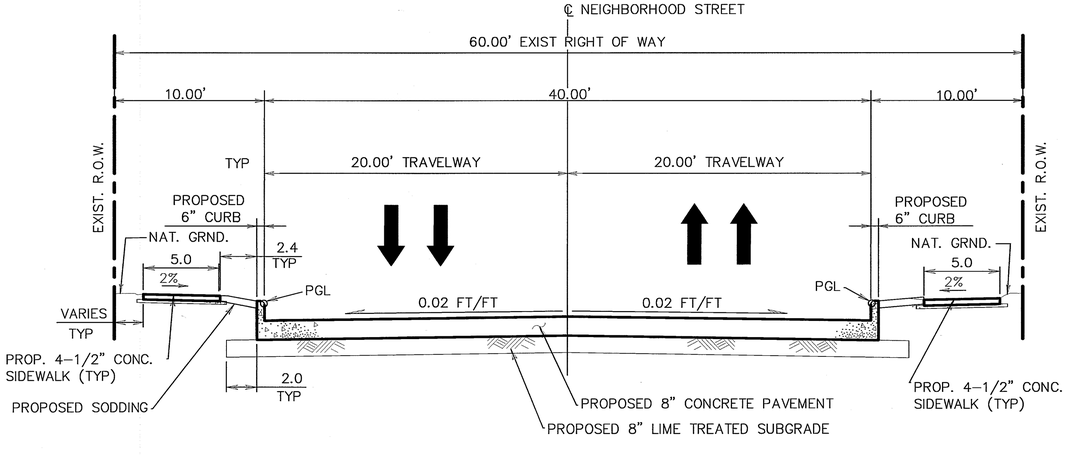
PROPOSED TYPICAL SECTION

BERAN DR. FROM STA. 3+00 to STA. 13+60
WUTHERING HEIGHTS DR. FROM STA. 2+80 to STA. 14+30



PROPOSED TYPICAL SECTION

WHITE HEATHER DR. FROM STA. 11+62 to STA. 22+83



PROPOSED TYPICAL SECTION

WHITE HEATHER DR. FROM STA. 0+46.50 to STA. 11+62

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Thursday, April 12, 2012 2:18:22 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-TYPICAL SECTIONS.DWG

No.	Date	Revisions	App.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

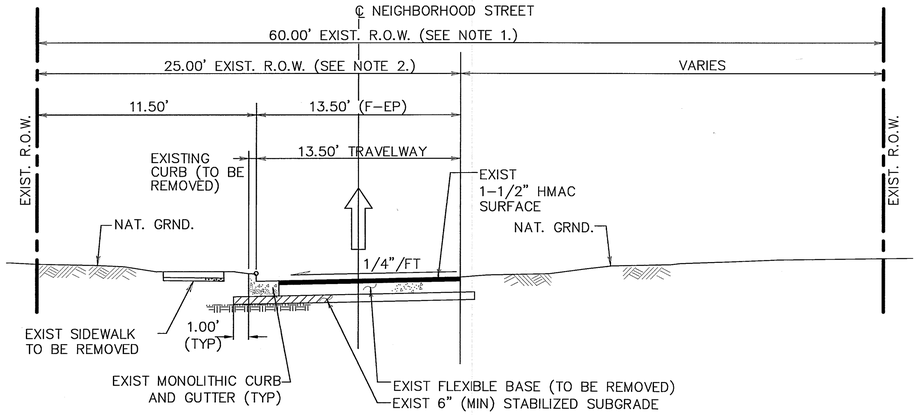
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TYPICAL SECTION

1 OF 3

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 15 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

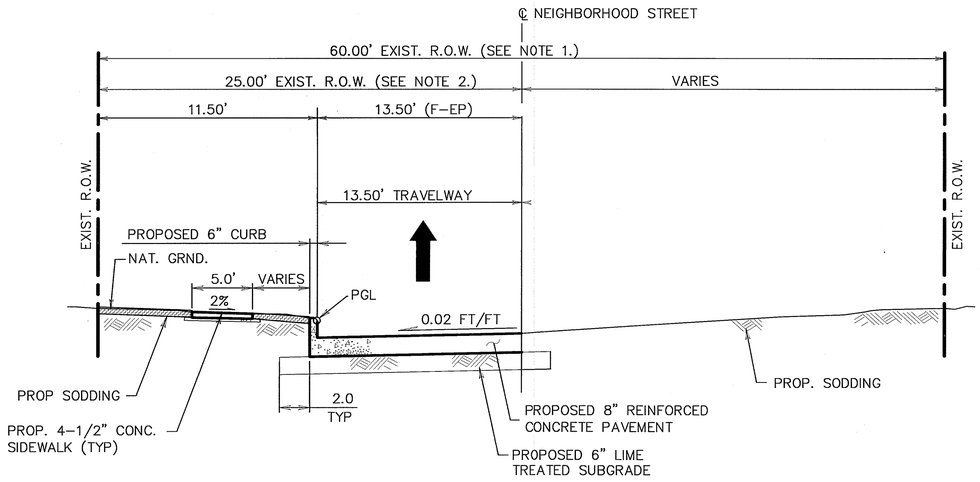


EXISTING TYPICAL SECTION

TYPICAL LANDMARK STREET SECTION

NOTE:

EXISTING RIGHT OF WAY FOR LANDMARK IS
1. 60.00' BETWEEN WUTHERING HEIGHTS & NORTH OF KNOTTY OAKS
2. 25.00' BETWEEN KNOTTY OAKS & BERAN DR.



PROPOSED TYPICAL SECTION

TYPICAL LANDMARK STREET SECTION
FROM STA. 10+00 to STA. 22+37

No.	Date	Revisions	App.

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TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR J. CORREDOR
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TYPICAL SECTION

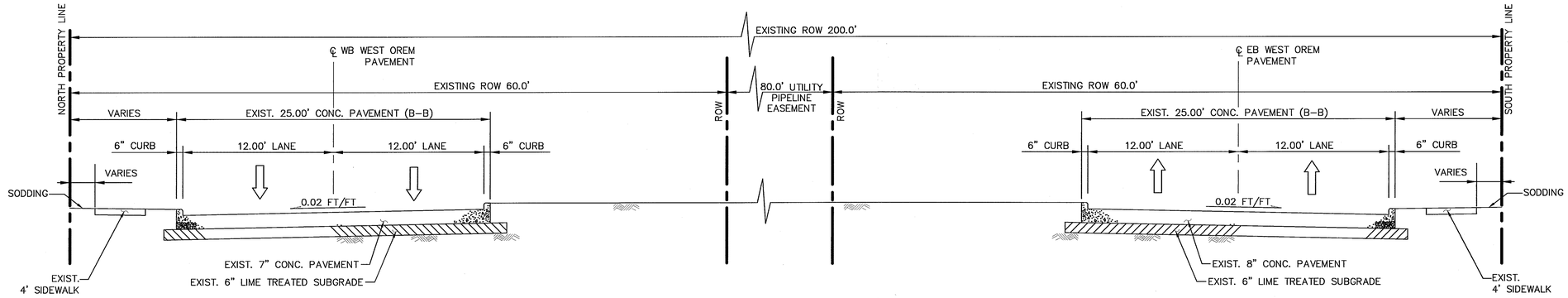
2 OF 3

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 16 OF 191	

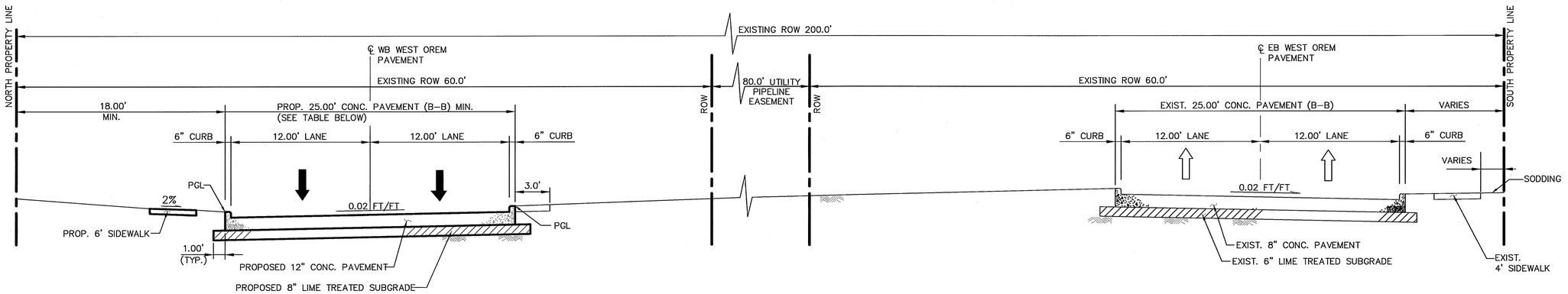
PUBLIC WORKS ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Thursday, April 12, 2012 2:18:31 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-TYPICAL SECTIONS.DWG



EXISTING WEST OREM TYPICAL SECTION



PROPOSED WESTBOUND LANES TYPICAL SECTION
WEST OREM DRIVE WEST OF WHITE HEATHER

STREET WIDTHS			
0+70	TO	2+60	25'
2+60	TO	3+80	45'
3+80	TO	5+50	VARIES 45' – 34'
5+50	TO	11+14	34'
11+14	TO	12+25	VARIES 45' – 34'
12+25	TO	13+66	VARIES 45' – 34'
13+66	TO	14+35	34'
14+35	TO	14+55	25'

No.	Date	Revisions	App.

FOR REDUCED PLANS
original scale in inches

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TYPICAL SECTION

3 OF 3

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 17 OF 191	

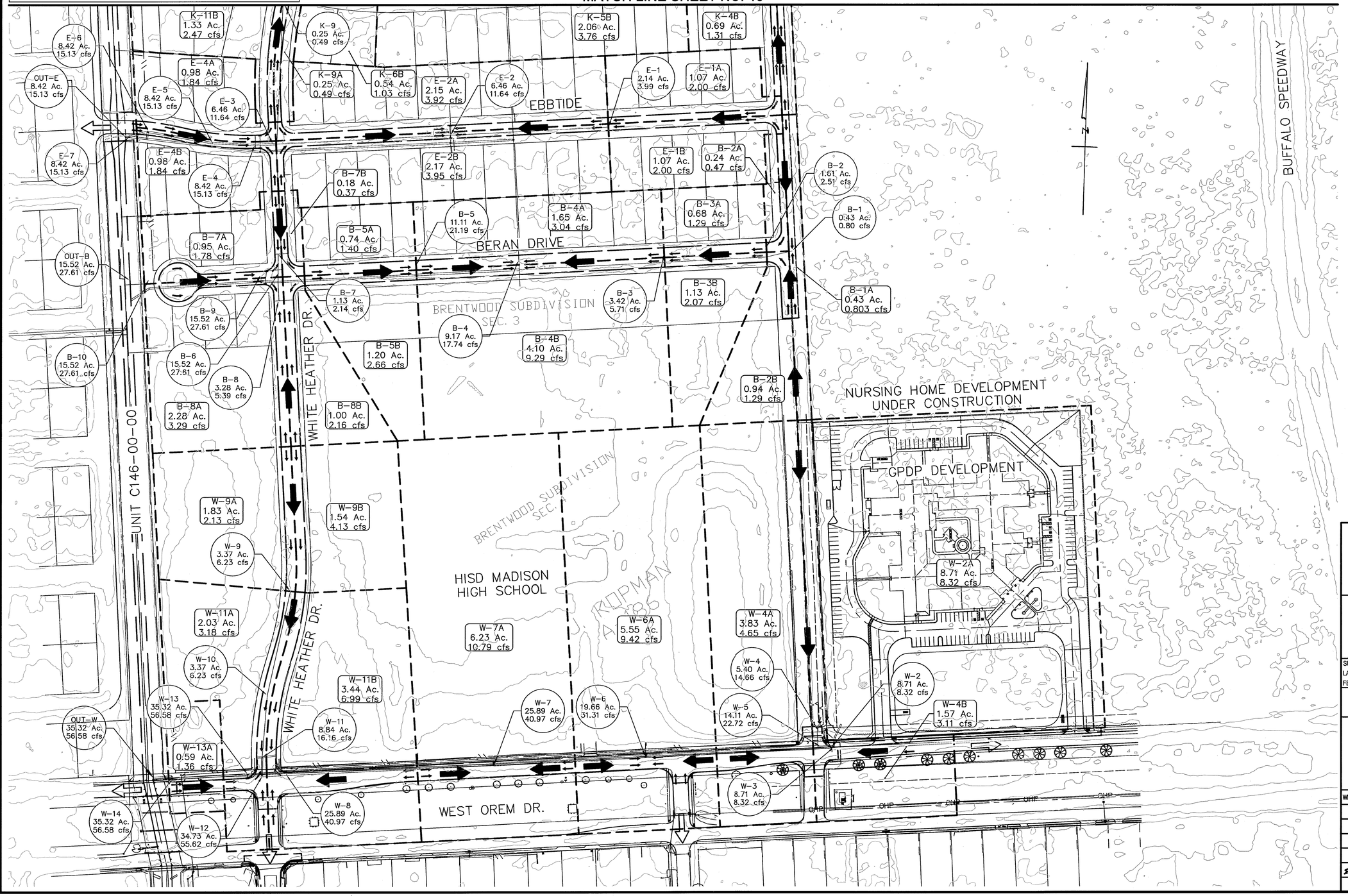
PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

FLOODPLAIN NOTES:

ACCORDING TO MAPS(S), 48201C0865L AND 48201C0870L OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAPS FOR HARRIS COUNTY, TEXAS DATED JUNE 18, 2007, THE SUBJECT PROJECT AREA IS PARTIALLY SITUATED WITHIN ZONE X DESCRIBED AS OTHER FLOOD AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES 1% ANNUAL CHANCE FLOOD.

MATCH LINE SHEET NO. 19



LEGEND

- PROJECT SUBDRAINAGE AREA LIMITS
- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROPOSED STORM SEWER MH
- PROPOSED INLET
- EXISTING STORM SEWER MH
- EXISTING INLET

RUNOFF COMPUTATIONS 2 YEAR DESIGN FREQUENCY

X-XXX
XXX Ac.
XXX cfs

- DRAINAGE AREA ID
- ACRES
- CUBIC FEET PER SECOND

CUMULATIVE JUNCTION DISCHARGE COMPUTATIONS 2 YEAR DESIGN FREQUENCY

X-XX
XXX Ac.
XXX cfs

- JUNCTION ID
- ACRES
- CUBIC FEET PER SECOND

- 100-YR FLOOD PLAIN BOUNDARY
- FLOODWAY
- SHEET FLOW DIRECTION 2-YR EVENT
- OVERLAND FLOW DIRECTION 100-YR EVENT
- EXISTING AND DEVELOPED SHEET FLOW DIRECTION ON SURROUNDING PROPERTIES.

0 50' 100'
GRAPHIC SCALE

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TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
05-30-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS DRAINAGE AREA MAP

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1"= 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 18 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 4:27:04 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-DRAINAGEAREA-MAP.DWG

FOR REDUCED PLANS
original scale in inches

3 2 1 0

FLOODPLAIN NOTES:

ACCORDING TO MAPS(S), 48201C0865L AND 48201C0870L OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAPS FOR HARRIS COUNTY, TEXAS DATED JUNE 18, 2007, THE SUBJECT PROJECT AREA IS PARTIALLY SITUATED WITHIN ZONE X DESCRIBED AS OTHER FLOOD AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES 1% ANNUAL CHANCE FLOOD.

GLEN RICK DRIVE
BROOKSTONE DRIVE
WHITE HEATHER DR.
WOODMONT DRIVE
UNIT C146-00-00
LANDMARK DRIVE
BUFFALO SPEEDWAY
HISD HOBBY ELEMENTARY SCHOOL
BRENTWOOD BAPTIST CHURCH
BRENTWOOD PARK
BRENTWOOD SUBDIVISION SEC. 3
WUTHERING HEIGHTS DRIVE
TIDEWATER DRIVE
KNOTTY OAKS TRAIL
BRENTWOOD BAPTIST CHURCH EXPANSION

H-2A 1.32 Ac. 2.45 cfs
H-1A 1.94 Ac. 4.00 cfs
T-4A 2.08 Ac. 3.86 cfs
T-3A 3.89 Ac. 3.77 cfs
T-2A 1.39 Ac. 1.42 cfs
T-1A 0.27 Ac. 0.77 cfs
H-3 4.87 Ac. 9.29 cfs
H-1 3.55 Ac. 6.92 cfs
H-4 4.87 Ac. 9.29 cfs
T-5 10.46 Ac. 14.36 cfs
T-2 1.90 Ac. 2.61 cfs
T-1 0.27 Ac. 0.77 cfs
OUT-H 4.87 Ac. 9.29 cfs
H-2 4.87 Ac. 9.29 cfs
H-1B 1.61 Ac. 2.96 cfs
T-1B 0.10 Ac. 0.22 cfs
T-4B 0.65 Ac. 1.24 cfs
T-4 10.46 Ac. 14.36 cfs
T-3 7.73 Ac. 9.69 cfs
T-3B 1.94 Ac. 3.55 cfs
T-2B 0.14 Ac. 0.28 cfs
OUT-T 19.09 Ac. 28.58 cfs
T-10 19.09 Ac. 28.58 cfs
T-10A 1.56 Ac. 2.88 cfs
T-9 16.37 Ac. 24.25 cfs
T-8A 0.60 Ac. 1.14 cfs
T-7A 1.88 Ac. 3.44 cfs
T-6A 0.57 Ac. 1.09 cfs
T-11 19.09 Ac. 28.58 cfs
K-12 42.18 Ac. 36.55 cfs
T-10B 1.16 Ac. 2.17 cfs
K-8 0.26 Ac. 0.51 cfs
K-8A 0.26 Ac. 0.51 cfs
T-8B 0.46 Ac. 0.89 cfs
T-8 5.91 Ac. 10.55 cfs
T-7B 1.92 Ac. 3.51 cfs
T-7 4.85 Ac. 8.86 cfs
T-6 1.05 Ac. 2.01 cfs
T-6B 0.48 Ac. 0.92 cfs
K-13 42.18 Ac. 36.55 cfs
K-11A 1.32 Ac. 2.45 cfs
K-6A 0.45 Ac. 0.87 cfs
K-11 42.18 Ac. 36.55 cfs
K-10 39.53 Ac. 32.58 cfs
K-7 39.02 Ac. 31.94 cfs
K-6 39.02 Ac. 31.94 cfs
K-5 38.03 Ac. 30.83 cfs
K-5A 2.02 Ac. 3.69 cfs
K-4 33.95 Ac. 24.99 cfs
K-4A 0.69 Ac. 1.31 cfs
OUT-K 42.18 Ac. 36.55 cfs
K-1 32.08 Ac. 30.24 cfs
K-2A 0.49 Ac. 1.05 cfs
K-1 32.08 Ac. E 22.24 cfs S 8.00 cfs
K-2 0.49 Ac. 1.05 cfs
K-3 32.57 Ac. 23.01 cfs

MATCH LINE SHEET NO. 18

LEGEND

- PROJECT SUBDRAINAGE AREA LIMITS
- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROPOSED STORM SEWER MH
- PROPOSED INLET
- EXISTING STORM SEWER MH
- EXISTING INLET

RUNOFF COMPUTATIONS
2 YEAR DESIGN FREQUENCY

X-XXX
X.XX Ac.
X.XX cfs

- DRAINAGE AREA ID
- ACRES
- CUBIC FEET PER SECOND

CUMULATIVE JUNCTION DISCHARGE COMPUTATIONS
2 YEAR DESIGN FREQUENCY

X-XX
XXX Ac.
XXX cfs

- JUNCTION ID
- ACRES
- CUBIC FEET PER SECOND

- 100-YR FLOOD PLAIN BOUNDARY
- FLOODWAY
- SHEET FLOW DIRECTION 2-YR EVENT
- OVERLAND FLOW DIRECTION 100-YR EVENT
- EXISTING AND DEVELOPED SHEET FLOW DIRECTION ON SURROUNDING PROPERTIES.

0 50' 100'
GRAPHIC SCALE

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS DRAINAGE AREA MAP

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1"= 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 19 OF 191	

PUBLIC WORKS
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 4:27:31 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-DRAINAGEAREA-MAP.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/14/2012 4:21:30 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM W - WEST OREM
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-W.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
W-9A	0.349	1.83	26.12	26.12	3.33	0.000	2.129
	0.8	0.18	Business District				
	0.3	1.65	Railroad Yard areas				
W-9B	0.8	1.54	25.79	25.79	3.35	0.000	4.131
	0.8	1.54	Business District				
W-11A	0.472	2.03	26.33	26.33	3.32	0.000	3.182
	0.8	0.70	Business District				
	0.3	1.33	Railroad Yard areas				
W-11B	0.626	3.44	27.43	27.43	3.25	0.000	6.990
	0.8	2.24	Business District				
	0.3	1.20	Railroad Yard areas				
W-13A	0.664	0.59	24.11	24.11	3.47	0.000	1.360
	0.8	0.43	Business District				
	0.3	0.16	Railroad Yard areas				
W-2A	0.306	8.71	29.64	29.64	3.12	0.000	8.320
	0.306	8.71	Detention Basin				
W-4A	0.376	3.83	27.67	27.67	3.23	0.000	4.653
	0.8	0.58	Business District				
	0.3	3.25	Railroad Yard areas				
W-4B	0.399	1.57	10.00	10.00	4.96	0.000	3.107
	0.8	0.31	Business District				
	0.3	1.26	Railroad Yard areas				
W-6A	0.533	5.55	28.52	28.52	3.18	0.000	9.419
	0.8	2.59	Business District				
	0.3	2.96	Railroad Yard areas				
W-7A	0.547	6.23	28.80	28.80	3.17	0.000	10.792
	0.8	3.08	Business District				
	0.3	3.15	Railroad Yard areas				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
W-9A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
W-9B	Curb	5.13	0.30	3.00	0.014	0.33	n/a	n/a	12.00
W-13A	Curb	5.13	0.52	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
W-9A	Curb	2.129	2.067	0.532	0.062	W-11A	5.96	5.13	11.40
W-9B	Curb	4.131	3.468	1.033	0.663	W-11B	8.03	5.13	11.37
W-13A	Curb	1.360	1.359	0.340	0.001	W-11A	5.21	5.13	8.70

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
W-4A	Curb	8.00	0.00	1.00	2.00	0.38	2.00	0.014	1.50	1.50
W-4B	Curb	8.00	0.00	0.38	2.00	1.00	2.00	0.014	1.50	1.50
W-6A	Curb	18.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
W-7A	Curb	18.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
W-11A	Curb	18.00	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50
W-11B	Curb	18.00	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
W-4A	Curb	8.00	n/a	n/a	4.653	24.036	0.297	8.65	7.26
W-4B	Curb	8.00	n/a	n/a	3.107	24.036	0.271	10.70	7.05
W-6A	Curb	18.00	n/a	n/a	9.419	54.080	0.288	11.65	11.65
W-7A	Curb	18.00	n/a	n/a	10.792	54.080	0.300	9.60	9.60
W-11A	Curb	18.00	n/a	n/a	3.245	54.080	0.254	6.80	11.70
W-11B	Curb	18.00	n/a	n/a	7.653	54.080	0.275	5.72	9.58

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
W-2A	CrcMh	0.306	8.71	29.64	3.12		0.00	8.320
W-4A	Curb	0.376	3.83	27.67	3.23		0.00	4.653
W-4B	Curb	0.399	1.57	10.00	4.96		0.00	3.107
W-6A	Curb	0.533	5.55	28.52	3.18		0.00	9.419
W-7A	Curb	0.547	6.23	28.80	3.17		0.00	10.792
W-9A	Curb	0.349	1.83	26.12	3.33		0.00	2.129
W-9B	Curb	0.800	1.54	25.79	3.35		0.00	4.131
W-11A	Curb	0.472	2.03	26.33	3.32		0.00	3.182
W-10	CrcMh	0.555	3.37	26.14	3.33		0.00	6.231
W-11	CrcMh	0.564	8.84	27.51	3.24		0.00	16.159
W-12	CrcMh	0.463	34.73	32.60	2.96		8.00	55.597
W-13	CrcMh	0.466	35.32	32.85	2.95		8.00	56.550
W-14	CrcMh	0.466	35.32	32.85	2.95		8.00	56.550
K-1	Junct	0.000	0.00	0.00	0.00		8.00	8.000
W-11B	Curb	0.626	3.44	27.43	3.25		0.00	6.990
W-13A	Curb	0.664	0.59	24.11	3.47		0.00	1.360
W-2	CrcMh	0.306	8.71	29.70	3.11		0.00	8.320
W-3	CrcMh	0.306	8.71	29.70	3.11		0.00	8.320
W-4	CrcMh	0.382	5.40	27.78	3.23		8.00	14.663
W-5	CrcMh	0.335	14.11	29.86	3.10		8.00	22.698
W-6	CrcMh	0.391	19.66	31.29	3.03		8.00	31.291
W-7	CrcMh	0.429	25.89	32.44	2.97		8.00	40.947
W-8	CrcMh	0.429	25.89	32.44	2.97		8.00	40.947
W-9	CrcMh	0.555	3.37	26.14	3.33		0.00	6.231
OUT-W	Outlt	0.466	35.32	32.85	2.95		8.00	56.550

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
26	W-2A	W-2	46.51	45.95	Cir 1	0.00	2.50	30.0	1.867	0.013
27	W-13A	W-13	46.94	46.75	Cir 1	0.00	2.00	5.0	3.803	0.013
2	W-3	W-5	45.88	45.83	Cir 1	0.00	2.50	32.0	0.156	0.013
3	W-5	W-6	45.83	45.23	Ell 1	5.04	3.20	356.0	0.169	0.013
4	W-6	W-7	45.23	44.69	Ell 1	5.68	3.59	314.0	0.172	0.013
5	W-7	W-8	44.69	43.97	Cir 1	0.00	4.00	426.0	0.169	0.013
6	W-8	W-12	43.97	43.88	Cir 1	0.00	4.00	51.0	0.176	0.013
7	W-12	W-13	43.88	43.75	Cir 1	0.00	4.00	79.0	0.165	0.013
8	W-13	W-14	43.75	43.57	Cir 1	0.00	4.00	106.0	0.170	0.013
9	W-14	OUT-W	38.34	37.84	Cir 2	0.00	3.00	40.0	1.250	0.013
10	W-2	W-3	45.95	45.88	Cir 1	0.00	2.50	20.0	0.350	0.013
11	W-4A	W-4	47.45	47.30	Cir 1	0.00	2.00	30.0	0.500	0.013
12	W-4B	W-4	47.45	47.30	Cir 1	0.00	2.00	10.0	1.500	0.013
13	K-1	W-4	49.47	47.30	Cir 1	0.00	2.00	1605.0	0.135	0.013
14	W-4	W-5	47.30	47.00	Cir 1	0.00	2.00	37.0	0.811	0.013
15	W-6A	W-6	46.52	45.23	Cir 1	0.00	2.50	7.0	18.750	0.013
16	W-7A	W-7	46.46	44.69	Cir 1	0.00	2.50	7.0	26.135	0.013
17	W-9A	W-9	47.15	46.65	Cir 1	0.00	2.00	10.0	5.006	0.013
18	W-9B	W-9	47.15	46.65	Cir 1	0.00	2.00	30.0	1.667	0.013
19	W-9	W-10	46.25	45.87	Cir 1	0.00	2.00	219.0	0.174	0.013
20	W-10	W-11	45.87	45.36	Cir 1	0.00	2.00	129.0	0.395	0.013
21	W-11A	W-11	45.70	45.36	Cir 1	0.00	2.50	10.0	3.402	0.013
22	W-11B	W-11	45.70	45.36	Cir 1	0.00	2.50	30.0	1.133	0.013
23	W-11	W-12	45.36	45.25	Cir 1	0.00	2.50	37.0	0.297	0.013

Conveyance Hydraulic Computations. Tailwater = 40.840 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
26*	49.17	49.15	51.10	0.041	0.65	2.50	8.19	4.79	8.3	56.3	0.000
27*	47.59	47.59	51.11	0.004	0.24	0.84	6.33	2.99	1.4	44.3	0.000
2	49.09	49.06	51.10	0.041	1.27	2.50	3.32	1.69	8.3	16.3	0.000
3	49.06	48.55	50.65	0.026	1.43	3.20	4.16	1.79	22.7	58.1	0.000
4	48.55	48.04	51.19	0.026	1.60	3.35	4.54	2.01	31.3	80.2	0.000
5	48.04	47.66	51.13	0.081	2.45	3.69	5.07	3.38	40.9	59.3	0.000
6	47.66	47.61	50.81	0.081	2.41	3.73	5.17	3.36	40.9	60.6	0.000
7	47.61	47.59	51.01	0.149	3.13	3.84	5.28	4.48	55.6	58.5	0.000
8	47.59	47.57	51.11	0.154	3.13	4.00	5.37	4.50	56.6	59.4	0.000
9*	40.91	40.84	51.75	0.178	1.28	3.00	9.82	6.74	56.6	149.8	0.000
10	49.15	49.09	51.10	0.041	1.01	2.50	4.48	1.69	8.3	24.4	0.000
11*	49.22	49.21	50.65	0.042	0.74	1.91	4.41	4.26	4.7	16.1	0.000
12*	49.21	49.21	51.65	0.019	0.45	1.91	5.83	3.78	3.1	27.8	0.000
13	51.05	49.21	52.02	0.124	1.58	1.91	3.01	2.59	8.0	8.4	0.000
14*	49.21	49.06	50.65	0.417	1.26	2.00	7.06	6.34	14.7	20.5	0.000
15*	48.55	48.55	51.19	0.052	0.39	2.50	19.19	4.98	9.4	178.4	0.000
16*	48.05	48.04	51.13	0.069	0.39	2.50	22.46	5.19	10.8	210.6	0.000
17*	48.30	48.30	51.42	0.009	0.28	1.65	7.97	3.40	2.1	50.8	0.000
18*	48.31	48.30	51.42	0.033	0.51	1.65	6.57	4.11	4.1	29.3	0.000
19	48.30	48.08	51.42	0.075	1.19	2.00	3.21	1.98	6.2	9.5	0.000
20	48.08	47.67	50.75	0.075	0.93	2.00	4.38	1.98	6.2	14.3	0.000
21*	47.67	47.67	50.37	0.006	0.35	2.31	7.63	3.64	3.2	76.0	0.000
22*	47.68	47.67	50.37	0.029	0.68	2.31	6.52	4.55	7.0	43.9	0.000
23	47.67	47.61	50.37	0.154	1.57	2.36	4.96	3.36	16.2	22.5	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.5	0.0	8	173.0
Circular	Concrete	2.0	0.0	9	2075.0
Elliptical	Concrete	3.2	5.04	1	356.0
Elliptical	Concrete	3.59	5.68	1	314.0
Circular	Concrete	4.0	0.0	4	662.0
Circular	Concrete	3.0	0.0	1	80.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	14
Curb In Sag		8.0	0.0	0.0	0.0	0.0	2
Curb In Sag		18.0	0.0	0.0	0.0	0.0	4
Curb On Grade		5.125	0.0	0.0	0.0	0.0	3
Conduit Junction		0.0	0.0	0.0	0.0	0.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= W-2 Previous intensity used.
Discharge decreased downstream node Id= W-10 Previous intensity used.
Discharge decreased downstream node Id= W-3 Previous intensity used.
Discharge decreased downstream node Id= W-8 Previous intensity used.
Discharge decreased downstream node Id= W-14 Previous intensity used.
Decreasing conduit size @ downstream Run# 9
Capacity of grade inlet exceeded at inlet Id= W-9A
Capacity of grade inlet exceeded at inlet Id= W-9B
Capacity of grade inlet exceeded at inlet Id= W-13A
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 8

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE.
2. ADDITIONAL Q (8.00 CFS) IN NODE W-4 IS THE MAXIMUM FLOW COMING FROM BRENTWOOD BAPTIST CHURCH FACILITY NODE K-1 (EXISTING MANHOLE) IN ORDER TO ALLEVIATE KNOTTY OAKS SYSTEM K USING EXISTING 24" RCP STORM. SEE SHEET NO. 26.
3. BRENTWOOD BAPTIST CHURCH EXISTING AND FUTURE DEVELOPMENT MUST COMPLY WITH COH INFRASTRUCTURE DESIGN MANUAL 9.05-DESIGN REQUIREMENTS, SECTION H-STORMWATER DETENTION.
4. GPDP DEVELOPMENT, LTD. A NURSING HOME DEVELOPMENT PROVIDED A DETENTION POND IN COMPLIANCE WITH COH INFRASTRUCTURE DESIGN MANUAL. THE HCFCD DETENTION BASIN SUMMARY IS:

   AREA SERVICED = 8.71 ACRES

   1% STORM (100-YEAR STORM) DATA:
   DETENTION STORAGE MIN. VOLUME REQUIRED= 4.80 ACRE-FEET
   DETENTION STORAGE VOLUME PROVIDED= 5.31 ACRE-FEET
   DETENTION STORAGE RATE PROVIDED= 0.55 AC FT PER AC
   MAXIMUM OUTFLOW RATE ALLOWED= 17.4 CFS
   MAXIMUM OUTFLOW RATE PROVIDED= 16.8 CFS
   RESTRICTOR SIZE= 16.7"
   PEAK WATER SURFACE ELEVATION IN BASIN 53.10 FT

   10% STORM (10-YEAR STORM) DATA:
   MAXIMUM OUTFLOW RATE ALLOWED= 10.40 CFS
   MAXIMUM OUTFLOW RATE PROVIDED= 7.17 CFS
   RESTRICTOR SIZE= 3-1"
   PEAK WATER SURFACE ELEVATION IN BASIN= 45.47 FT

5. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — FRANCISCO A. AREVALO — 98562 — LICENSED PROFESSIONAL ENGINEER — ARIZONA — 03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

WEST OREM DR. 2-YEAR EVENT
1 OF 11

WBS NO.: M-000262-0004-4	CITY OWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 20 OF 191	

PUBLIC WORKS & ENGINEERING — 49210 — CII — HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:28:04 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/14/2012 4:29:57 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM W - WEST OREM
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-W.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
W-9A	0.349	1.83	26.12	26.12	6.89	0.000	4.400
	0.8	0.18	Business District				
	0.3	1.65	Railroad Yard areas				
W-9B	0.8	1.54	25.79	25.79	6.92	0.000	8.527
	0.8	1.54	Business District				
W-11A	0.472	2.03	26.33	26.33	6.86	0.000	6.581
	0.8	0.70	Business District				
	0.3	1.33	Railroad Yard areas				
W-11B	0.626	3.44	27.43	27.43	6.75	0.000	14.520
	0.8	2.24	Business District				
	0.3	1.20	Railroad Yard areas				
W-13A	0.664	0.59	24.11	24.11	7.11	0.000	2.787
	0.8	0.43	Business District				
	0.3	0.16	Railroad Yard areas				
W-2A	0.306	8.71	29.64	29.64	6.53	0.000	17.423
	0.306	8.71	Detention Basin				
W-4A	0.376	3.83	27.67	27.67	6.72	0.000	9.674
	0.8	0.58	Business District				
	0.3	3.25	Railroad Yard areas				
W-4B	0.399	1.57	10.00	10.00	9.36	0.000	5.862
	0.8	0.31	Business District				
	0.3	1.26	Railroad Yard areas				
W-6A	0.533	5.55	28.52	28.52	6.64	0.000	19.646
	0.8	2.59	Business District				
	0.3	2.96	Railroad Yard areas				
W-7A	0.547	6.23	28.80	28.80	6.61	0.000	22.533
	0.8	3.08	Business District				
	0.3	3.15	Railroad Yard areas				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
W-9A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
W-9B	Curb	5.13	0.30	3.00	0.014	0.33	n/a	n/a	12.00
W-13A	Curb	5.13	0.52	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
W-9A	Curb	4.400	3.375	1.100	1.025	W-11A	9.24	5.13	15.00
W-9B	Curb	8.527	5.300	2.132	3.227	W-11B	12.29	5.13	14.90
W-13A	Curb	2.787	2.368	0.697	0.419	W-11A	7.87	5.13	11.40

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
W-4A	Curb	8.00	0.00	1.00	2.00	0.38	2.00	0.014	1.50	1.50
W-4B	Curb	8.00	0.00	0.38	2.00	1.00	2.00	0.014	1.50	1.50
W-6A	Curb	18.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
W-7A	Curb	18.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
W-11A	Curb	18.00	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50
W-11B	Curb	18.00	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
W-4A	Curb	8.00	n/a	n/a	9.674	24.036	0.452	11.40	9.44
W-4B	Curb	8.00	n/a	n/a	5.862	24.036	0.324	13.55	8.95
W-6A	Curb	18.00	n/a	n/a	19.646	54.080	0.415	15.29	15.29
W-7A	Curb	18.00	n/a	n/a	22.533	54.080	0.467	12.56	12.56
W-11A	Curb	18.00	n/a	n/a	8.025	54.080	0.278	9.55	16.40
W-11B	Curb	18.00	n/a	n/a	17.747	54.080	0.385	7.70	13.00

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
W-2A	CrcMh	0.306	8.71	29.64	6.53		0.00	17.423
W-4A	Curb	0.376	3.83	27.67	6.72		0.00	9.674
W-4B	Curb	0.399	1.57	10.00	9.36		0.00	5.862
W-6A	Curb	0.533	5.55	28.52	6.64		0.00	19.646
W-7A	Curb	0.547	6.23	28.80	6.61		0.00	22.533
W-9A	Curb	0.349	1.83	26.12	6.89		0.00	4.400
W-9B	Curb	0.800	1.54	25.79	6.92		0.00	8.527
W-11A	Curb	0.472	2.03	26.33	6.86		0.00	6.581
W-10	CrcMh	0.555	3.37	26.14	6.88		0.00	12.879
W-11	CrcMh	0.564	8.84	27.49	6.74		0.00	33.583
W-12	CrcMh	0.463	34.73	32.03	6.31		8.00	109.497
W-13	CrcMh	0.466	35.32	32.18	6.30		8.00	111.752
W-14	CrcMh	0.466	35.32	32.18	6.30		8.00	111.752
K-1	Junct	0.000	0.00	0.00	0.00		8.00	8.000
W-11B	Curb	0.626	3.44	27.43	6.75		0.00	14.520
W-13A	Curb	0.664	0.59	24.11	7.11		0.00	2.787
W-2	CrcMh	0.306	8.71	29.69	6.52		0.00	17.423
W-3	CrcMh	0.306	8.71	29.69	6.52		0.00	17.423
W-4	CrcMh	0.382	5.40	27.76	6.71		8.00	21.863
W-5	CrcMh	0.335	14.11	29.84	6.51		8.00	38.817
W-6	CrcMh	0.391	19.66	30.99	6.40		8.00	57.266
W-7	CrcMh	0.429	25.89	31.89	6.32		8.00	78.193
W-8	CrcMh	0.429	25.89	31.89	6.32		8.00	78.193
W-9	CrcMh	0.555	3.37	26.14	6.88		0.00	12.879
OUT-W	Outlt	0.466	35.32	32.18	6.30		8.00	111.752

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
26	W-2A	W-2	46.51	45.95	Cir 1	0.00	2.50	30.0	1.867	0.013
27	W-13A	W-13	46.94	46.75	Cir 1	0.00	2.00	5.0	3.803	0.013
2	W-3	W-5	45.88	45.83	Cir 1	0.00	2.50	32.0	0.156	0.013
3	W-5	W-6	45.83	45.23	Ell 1	5.04	3.20	356.0	0.169	0.013
4	W-6	W-7	45.23	44.69	Ell 1	5.68	3.59	314.0	0.172	0.013
5	W-7	W-8	44.69	43.97	Cir 1	0.00	4.00	426.0	0.169	0.013
6	W-8	W-12	43.97	43.88	Cir 1	0.00	4.00	51.0	0.176	0.013
7	W-12	W-13	43.88	43.75	Cir 1	0.00	4.00	79.0	0.165	0.013
8	W-13	W-14	43.75	43.57	Cir 1	0.00	4.00	106.0	0.170	0.013
9	W-14	OUT-W	38.34	37.84	Cir 2	0.00	3.00	40.0	1.250	0.013
10	W-2	W-3	45.95	45.88	Cir 1	0.00	2.50	20.0	0.350	0.013
11	W-4A	W-4	47.45	47.30	Cir 1	0.00	2.00	30.0	0.500	0.013
12	W-4B	W-4	47.45	47.30	Cir 1	0.00	2.00	10.0	1.500	0.013
13	K-1	W-4	49.47	47.30	Cir 1	0.00	2.00	1605.0	0.135	0.013
14	W-4	W-5	47.30	47.00	Cir 1	0.00	2.00	37.0	0.811	0.013
15	W-6A	W-6	46.52	45.23	Cir 1	0.00	2.50	7.0	18.750	0.013
16	W-7A	W-7	46.46	44.69	Cir 1	0.00	2.50	7.0	26.135	0.013
17	W-9A	W-9	47.15	46.65	Cir 1	0.00	2.00	10.0	5.006	0.013
18	W-9B	W-9	47.15	46.65	Cir 1	0.00	2.00	30.0	1.667	0.013
19	W-9	W-10	46.25	45.87	Cir 1	0.00	2.00	219.0	0.174	0.013
20	W-10	W-11	45.87	45.36	Cir 1	0.00	2.00	129.0	0.395	0.013
21	W-11A	W-11	45.70	45.36	Cir 1	0.00	2.50	10.0	3.402	0.013
22	W-11B	W-11	45.70	45.36	Cir 1	0.00	2.50	30.0	1.133	0.013
23	W-11	W-12	45.36	45.25	Cir 1	0.00	2.50	37.0	0.297	0.013

Conveyance Hydraulic Computations. Tailwater = 43.670 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
26*	50.52	50.47	51.35	0.179	0.96	2.50	10.08	6.09	17.4	56.3	0.000
27*	47.92	47.92	51.31	0.015	0.34	1.17	7.84	3.67	2.8	44.3	0.000
2	50.43	50.38	51.35	0.179	2.34	2.50	3.64	3.55	17.4	16.3	0.000
3	50.38	50.04	51.15	0.075	1.84	3.20	5.16	3.06	38.8	58.1	0.000
4	50.04	49.78	51.44	0.088	2.13	3.59	5.78	3.58	57.3	80.2	0.000
5	49.78	48.53	51.38	0.294	4.00	4.00	6.22	6.22	78.2	59.3	0.000
6	48.53	48.38	51.00	0.294	4.00	4.00	6.22	6.22	78.2	60.6	0.000
7	48.38	47.92	51.26	0.576	4.00	4.00	8.71	8.71	109.5	58.5	0.000
8	47.92	43.95	51.35	0.600	4.00	4.00	8.89	8.89	111.8	59.4	0.000
9*	43.95	43.67	52.00	0.696	1.94	3.00	11.58	9.13	111.8	149.8	0.000
10	50.47	50.43	51.35	0.179	1.57	2.50	5.38	3.55	17.4	24.4	0.000
11	50.82	50.72	51.15	0.181	1.12	2.00	5.33	3.08	9.7	16.1	0.000
12*	50.73	50.72	51.15	0.067	0.62	2.00	7.00	4.57	5.9	27.8	0.000
13	51.05	50.72	52.55	0.124	1.58	2.00	3.01	2.55	8.0	8.4	0.000
14	50.72	50.38	51.15	0.926	1.84	2.00	7.22	6.96	21.9	20.5	0.000
15*	50.06	50.04	51.44	0.227	0.56	2.50	23.83	6.37	19.6	178.4	0.000
16*	49.80	49.78	51.38	0.299	0.55	2.50	27.90	6.72	22.5	210.6	0.000
17*	49.43	49.42	51.72	0.038	0.40	2.00	9.89	4.19	4.4	50.8	0.000
18*	49.47	49.42	51.72	0.141	0.74	2.00	8.07	5.16	8.5	29.3	0.000
19	49.42	48.72	51.92	0.321	2.00	2.00	4.10	4.10	12.9	9.5	0.000
20	48.72	48.62	51.25	0.321	1.49	2.00	5.12	4.10	12.9	14.3	0.000
21*	48.63	48.62	50.62	0.026	0.50	2.50	9.46	4.47	6.6	76.0	0.000
22*	48.66	48.62	51.62	0.124	0.99	2.50	8.00	5.72	14.5	43.9	0.000
23	48.62	48.38	50.00	0.665	2.50	2.50	6.84	6.84	33.6	22.5	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.5	0.0	8	173.0
Circular	Concrete	2.0	0.0	9	2075.0
Elliptical	Concrete	3.2	5.04	1	356.0
Elliptical	Concrete	3.59	5.68	1	314.0
Circular	Concrete	4.0	0.0	4	662.0
Circular	Concrete	3.0	0.0	1	80.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	14
Curb In Sag		8.0	0.0	0.0	0.0	0.0	2
Curb In Sag		18.0	0.0	0.0	0.0	0.0	4
Curb On Grade		5.125	0.0	0.0	0.0	0.0	3
Conduit Junction		0.0	0.0	0.0	0.0	0.0	1
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= W-2 Previous intensity used.
Discharge decreased downstream node Id= W-10 Previous intensity used.
Discharge decreased downstream node Id= W-3 Previous intensity used.
Discharge decreased downstream node Id= W-8 Previous intensity used.
Discharge decreased downstream node Id= W-14 Previous intensity used.
Decreasing conduit size @ downstream Run# 9
Capacity of grade inlet exceeded at inlet Id= W-9A
Computed ponded width exceeds allowable width at inlet Id= W-9A
Capacity of grade inlet exceeded at inlet Id= W-9B
Computed ponded width exceeds allowable width at inlet Id= W-9B
Capacity of grade inlet exceeded at inlet Id= W-13A
Computed left ponded width exceeds allowable width at inlet Id= W-4B
Computed right ponded width exceeds allowable width at inlet Id= W-6A
Computed left ponded width exceeds allowable width at inlet Id= W-6A
Computed right ponded width exceeds allowable width at inlet Id= W-7A
Computed left ponded width exceeds allowable width at inlet Id= W-7A
Computed right ponded width exceeds allowable width at inlet Id= W-11A
Computed right ponded width exceeds allowable width at inlet Id= W-11B
Run# 8 Insufficient capacity.
Run# 7 Insufficient capacity.
Run# 23 Insufficient capacity.
Run# 6 Insufficient capacity.
Run# 5 Insufficient capacity.
Run# 19 Insufficient capacity.
Run# 14 Insufficient capacity.
Run# 2 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00.

2. ADDITIONAL Q (8.00 CFS) IN NODE W-4 IS THE MAXIMUM FLOW COMING FROM BRENTWOOD BAPTIST CHURCH FACILITY NODE K-1 (EXISTING MANHOLE) IN ORDER TO ALLEVIATE KNOTTY OAKS SYSTEM K USING EXISTING 24" RCP STORM. SEE SHEET NO. 27.

3. BRENTWOOD BAPTIST CHURCH EXISTING AND FUTURE DEVELOPMENT MUST COMPLY WITH COH INFRASTRUCTURE DESIGN MANUAL 9.05-DESIGN REQUIREMENTS, SECTION H-STORMWATER DETENTION.

4. GPDP DEVELOPMENT, LTD. A NURSING HOME DEVELOPMENT PROVIDED A DETENTION POND IN COMPLIANCE WITH COH INFRASTRUCTURE DESIGN MANUAL. THE HCFCD DETENTION BASIN SUMMARY IS:

AREA SERVICED = 8.71 ACRES

1% STORM (100-YEAR STORM) DATA:

DETENTION STORAGE MIN. VOLUME REQUIRED=	4.80 ACRE-FEET
DETENTION STORAGE VOLUME PROVIDED=	5.31 ACRE-FEET
DETENTION STORAGE RATE PROVIDED=	0.55 AC FT PER AC
MAXIMUM OUTFLOW RATE ALLOWED=	17.4 CFS
MAXIMUM OUTFLOW RATE PROVIDED=	16.8 CFS
RESTRICTOR SIZE=	16.7"
PEAK WATER SURFACE ELEVATION IN BASIN	53.10 FT

10% STORM (10-YEAR STORM) DATA:

MAXIMUM OUTFLOW RATE ALLOWED=	10.40 CFS
MAXIMUM OUTFLOW RATE PROVIDED=	7.17 CFS
RESTRICTOR SIZE=	3-1"
PEAK WATER SURFACE ELEVATION IN BASIN=	45.47 FT

5. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS
HYDRAULIC CALCULATIONS
WEST OREM DR. 100-YEAR EVENT
2 OF 11

WBS NO.: M-000262-0004-4	CITY SWO NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 21 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:28:20 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/19/2012 9:05:19 AM

PROJECT NAME : WHITE HEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM B - BERAN DRIVE
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-B.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-1A	0.533	0.43	23.62	23.62	3.50	0.000	0.803
	0.8	0.20	Business District				
	0.3	0.23	Railroad Yard areas				
B-2A	0.55	0.24	22.78	22.78	3.57	0.000	0.471
	0.8	0.12	Business District				
	0.3	0.12	Railroad Yard areas				
B-2B	0.401	0.94	24.89	24.89	3.41	0.000	1.287
	0.8	0.19	Business District				
	0.3	0.75	Railroad Yard areas				
B-3A	0.55	0.68	24.34	24.34	3.45	0.000	1.291
	0.55	0.68	Residential Lots < 1/4 acre				
B-3B	0.539	1.13	25.21	25.21	3.39	0.000	2.066
	0.8	0.54	Business District				
	0.3	0.59	Railroad Yard areas				
B-4A	0.55	1.65	25.92	25.92	3.34	0.000	3.035
	0.55	1.65	Residential Lots < 1/4 acre				
B-4B	0.702	4.10	27.82	27.82	3.22	0.000	9.286
	0.8	3.30	Business District				
	0.3	0.80	Railroad Yard areas				
B-5A	0.55	0.74	24.48	24.48	3.44	0.000	1.401
	0.55	0.74	Residential Lots < 1/4 acre				
B-5B	0.654	1.20	25.33	25.33	3.38	0.000	2.657
	0.8	0.85	Business District				
	0.3	0.35	Railroad Yard areas				
B-7A	0.55	0.95	24.91	24.91	3.41	0.000	1.783
	0.55	0.95	Residential Lots < 1/4 acre				
B-7B	0.578	0.18	22.39	22.39	3.60	0.000	0.374
	0.8	0.10	Business District				
	0.3	0.08	Railroad Yard areas				
B-8A	0.437	2.28	26.56	26.56	3.30	0.000	3.291
	0.55	1.01	Residential Lots < 1/4 acre				
	0.8	0.12	Business District				
	0.3	1.15	Railroad Yard areas				
B-8B	0.635	1.00	25.00	25.00	3.41	0.000	2.163
	0.8	0.67	Business District				
	0.3	0.33	Railroad Yard areas				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
B-2A	Curb	5.13	1.00	2.00	0.014	0.33	n/a	n/a	12.00
B-2B	Curb	5.13	1.00	2.00	0.014	0.33	n/a	n/a	12.00
B-3A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-5A	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00
B-5B	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
B-2A	Curb	0.471	0.471	0.118	0.000	B-3A	3.54	5.13	5.15
B-2B	Curb	1.287	1.253	0.322	0.034	B-3B	5.91	5.13	7.55
B-3A	Curb	1.291	1.291	0.323	0.000	B-4A	4.46	5.13	9.45
B-3B	Curb	2.100	2.044	0.525	0.056	B-4B	5.92	5.13	11.35
B-5A	Curb	1.401	1.401	0.350	0.000	B-4A	4.90	5.13	9.35
B-5B	Curb	2.657	2.390	0.664	0.267	B-4B	7.11	5.13	11.90

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
B-1A	Curb	5.13	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
B-4A	Curb	13.00	0.00	0.37	2.00	0.30	2.00	0.014	1.50	1.50
B-4B	Curb	13.00	0.00	0.30	2.00	0.37	2.00	0.014	1.50	1.50
B-7A	Curb	5.13	0.00	1.00	2.00	0.34	2.00	0.014	1.50	1.50
B-7B	Curb	5.13	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
B-8A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
B-8B	Curb	5.13	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
B-1A	Curb	5.13	n/a	n/a	0.803	13.140	0.215	5.85	6.30
B-4A	Curb	13.00	n/a	n/a	3.035	39.058	0.258	9.30	10.40
B-4B	Curb	13.00	n/a	n/a	9.608	39.058	0.326	9.54	11.06
B-7A	Curb	5.13	n/a	n/a	1.783	13.140	0.234	7.45	6.65
B-7B	Curb	5.13	n/a	n/a	0.374	13.140	0.211	4.15	4.15
B-8A	Curb	5.13	n/a	n/a	3.291	13.140	0.291	11.10	7.60
B-8B	Curb	5.13	n/a	n/a	2.163	13.140	0.245	3.85	11.05

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
B-8	CrcMh	0.497	3.28	26.58	3.30		0.00	5.387
B-9	CrcMh	0.577	15.52	30.27	3.08		0.00	27.613
B-10	CrcMh	0.577	15.52	30.27	3.08		0.00	27.613
B-1A	Curb	0.533	0.43	23.62	3.50		0.00	0.803
B-2A	Curb	0.550	0.24	22.78	3.57		0.00	0.471
B-2B	Curb	0.401	0.94	24.89	3.41		0.00	1.287
B-3A	Curb	0.550	0.68	24.34	3.45		0.00	1.291
B-3B	Curb	0.539	1.13	25.21	3.39		0.00	2.066
B-4A	Curb	0.550	1.65	25.92	3.34		0.00	3.035
B-4B	Curb	0.702	4.10	27.82	3.22		0.00	9.286
B-5A	Curb	0.550	0.74	24.48	3.44		0.00	1.401
B-5B	Curb	0.654	1.20	25.33	3.38		0.00	2.657
B-7A	Curb	0.550	0.95	24.91	3.41		0.00	1.783
B-7B	Curb	0.578	0.18	22.39	3.60		0.00	0.374
B-8A	Curb	0.437	2.28	26.56	3.30		0.00	3.291
B-8B	Curb	0.635	1.00	25.00	3.41		0.00	2.163
B-1	CrcMh	0.533	0.43	23.64	3.50		0.00	0.803
B-2	CrcMh	0.458	1.61	25.00	3.41		0.00	2.514
B-3	CrcMh	0.503	3.42	26.31	3.32		0.00	5.712
B-4	CrcMh	0.601	9.17	27.89	3.22		0.00	17.738
B-5	CrcMh	0.603	11.11	28.86	3.16		0.00	21.187
B-6	CrcMh	0.577	15.52	30.27	3.08		0.00	27.613
B-7	CrcMh	0.554	1.13	24.92	3.41		0.00	2.138
OUT-B	Outlt	0.577	15.52	30.27	3.08		0.00	27.613

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	B-1A	B-1	47.86	47.36	Cir 1	0.00	2.00	7.0	7.161	0.013
2	B-1	B-2	47.36	47.25	Cir 1	0.00	2.00	55.0	0.200	0.013
3	B-2	B-3	46.65	46.23	Cir 1	0.00	2.00	211.0	0.199	0.013
4	B-3	B-4	46.23	45.63	Cir 1	0.00	2.00	300.0	0.200	0.013
5	B-4	B-5	45.63	45.42	Ell 1	3.77	2.40	212.0	0.099	0.013
6	B-5	B-6	45.42	45.14	Cir 1	0.00	3.00	285.0	0.098	0.013
7	B-6	B-9	45.14	45.10	Cir 1	0.00	3.00	35.0	0.114	0.013
8	B-9	B-10	43.60	41.75	Cir 1	0.00	3.00	230.0	0.804	0.013
9	B-10	OUT-B	40.25	39.25	Cir 1	0.00	3.00	45.0	2.223	0.013
10	B-2A	B-2	47.56	47.06	Cir 1	0.00	2.00	10.0	5.006	0.013
11	B-2B	B-2	47.56	47.06	Cir 1	0.00	2.00	30.0	1.667	0.013
12	B-3A	B-3	46.92	46.42	Cir 1	0.00	2.00	10.0	5.006	0.013
13	B-3B	B-3	46.92	46.42	Cir 1	0.00	2.00	30.0	1.667	0.013
14	B-4A	B-4	46.02	45.63	Cir 1	0.00	2.00	10.0	3.903	0.013
15	B-4B	B-4	46.02	45.63	Cir 1	0.00	2.00	30.0	1.300	0.013
16	B-5A	B-5	46.80	46.30	Cir 1	0.00	2.00	10.0	5.006	0.013
17	B-5B	B-5	46.80	46.30	Cir 1	0.00	2.00	30.0	1.667	0.013
18	B-7A	B-7	47.25	46.75	Cir 1	0.00	2.00	7.0	7.161	0.013
19	B-7B	B-7	47.25	46.75	Cir 1	0.00	2.00	20.0	2.501	0.013
20	B-8A	B-8	47.23	46.73	Cir 1	0.00	2.00	10.0	5.006	0.013
21	B-8B	B-8	47.23	46.73	Cir 1	0.00	2.00	30.0	1.667	0.013
22	B-7	B-6	46.75	45.14	Cir 1	0.00	2.00	38.0	4.241	0.013
23	B-8	B-6	46.73	45.14	Cir 1	0.00	2.00	58.0	2.742	0.013

Conveyance Hydraulic Computations. Tailwater = 42.250 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1*	49.42	49.42	52.03	0.001	0.16	2.00	6.74	2.61	0.8	60.8	0.000
2	49.42	49.31	52.03	0.001	0.38	2.00	1.92	0.26	0.8	10.2	0.000
3	49.31	48.91	51.72	0.012	0.68	2.00	2.67	0.80	2.5	10.1	0.000
4	48.91	48.50	51.07	0.063	1.07	2.00	3.32	1.82	5.7	10.2	0.000
5	48.50	48.44	50.09	0.073	1.57	2.40	3.61	2.50	17.7	20.6	0.000
6	48.44	48.16	50.97	0.100	2.48	3.00	3.38	3.00	21.2	21.0	0.000
7	48.16	48.10	51.40	0.170	3.00	3.00	3.91	3.91	27.6	22.6	0.000
8*	45.03	42.33	51.82	0.170	1.43	1.43	8.29	8.29	27.6	60.1	0.000
9*	42.33	42.25	53.08	0.170	1.08	3.00	12.04	6.69	27.6	99.9	0.000
10*	49.31	49.31	51.72	0.000	0.14	2.00	5.06	2.18	0.5	50.8	0.000
11*	49.31	49.31	51.72	0.003	0.29	2.00	4.67	2.89	1.3	29.3	0.000
12*	48.91	48.91	51.09	0.003	0.22	2.00	6.87	2.90	1.3	50.8	0.000
13*	48.91	48.91	51.09	0.008	0.36	2.00	5.37	3.37	2.1	29.3	0.000
14*	48.50	48.50	50.09	0.018	0.35	2.00	8.12	3.76	3.0	44.9	0.000
15*	48.55	48.50	50.09	0.167	0.83	2.00	7.54	5.31	9.3	25.9	0.000
16*	48.44	48.44	50.97	0.004	0.23	2.00	7.04	3.04	1.4	50.8	0.000
17*	48.45	48.44	50.97	0.014	0.41	2.00	5.78	3.62	2.7	29.3	0.000
18*	48.16	48.16	51.42	0.006	0.24	1.41	8.57	3.25	1.8	60.8	0.000
19*	48.16	48.16	51.42	0.000	0.14	1.41	3.71	2.24	0.4	35.9	0.000
20*	48.19	48.19	51.40	0.021	0.35	1.46	9.08	3.85	3.3	50.8	0.000

Conveyance Hydraulic Computations. Tailwater = 42.250 (ft) (CONT.)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
21*	48.19	48.19	51.40	0.009	0.37	1.46	5.44	3.43	2.2	29.3	0.000
22*	48.16	48.16	51.42	0.009	0.29	2.00	7.53	3.41	2.1	46.8	0.000
23*	48.19	48.16	51.40	0.056	0.51	2.00	8.47	4.45	5.4	37.6	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	18	896.0
Elliptical	Concrete	2.4	3.77	1	212.0
Circular	Concrete	3.0	0.0	4	595.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	10
Curb In Sag		5.125	0.0	0.0	0.0	0.0	5
Curb On Grade		5.125	0.0	0.0	0.0	0.0	6
Curb In Sag		13.0	0.0	0.0	0.0	0.0	2
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= B-1 Previous intensity used.
Discharge decreased downstream node Id= B-9 Previous intensity used.
Discharge decreased downstream node Id= B-10 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= B-2B
Capacity of grade inlet exceeded at inlet Id= B-3B
Capacity of grade inlet exceeded at inlet Id= B-5B
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 7
Run# 7 Insufficient capacity.
Run# 6 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE.
2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03/30/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

BERAN DR. 2-YEAR EVENT
3 OF 11

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 22 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
LICENSE NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON:Monday, April 09, 2012 4:28:35 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/19/2012 9:08:25 AM

PROJECT NAME : WHITE HEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM B - BERAN DRIVE
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-B.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-1A	0.533	0.43	23.62	23.62	7.17	0.000	1.641
	0.8	0.20	Business District				
	0.3	0.23	Railroad Yard areas				
B-2A	0.55	0.24	22.78	22.78	7.27	0.000	0.959
	0.8	0.12	Business District				
	0.3	0.12	Railroad Yard areas				
B-2B	0.401	0.94	24.89	24.89	7.02	0.000	2.647
	0.8	0.19	Business District				
	0.3	0.75	Railroad Yard areas				
B-3A	0.55	0.68	24.34	24.34	7.08	0.000	2.649
	0.55	0.68	Residential Lots < 1/4 acre				
B-3B	0.539	1.13	25.21	25.21	6.98	0.000	4.254
	0.8	0.54	Business District				
	0.3	0.59	Railroad Yard areas				
B-4A	0.55	1.65	25.92	25.92	6.91	0.000	6.268
	0.55	1.65	Residential Lots < 1/4 acre				
B-4B	0.702	4.10	27.82	27.82	6.71	0.000	19.317
	0.8	3.30	Business District				
	0.3	0.80	Railroad Yard areas				
B-5A	0.55	0.74	24.48	24.48	7.07	0.000	2.876
	0.55	0.74	Residential Lots < 1/4 acre				
B-5B	0.654	1.20	25.33	25.33	6.97	0.000	5.473
	0.8	0.85	Business District				
	0.3	0.35	Railroad Yard areas				
B-7A	0.55	0.95	24.91	24.91	7.02	0.000	3.667
	0.55	0.95	Residential Lots < 1/4 acre				
B-7B	0.578	0.18	22.39	22.39	7.32	0.000	0.761
	0.8	0.10	Business District				
	0.3	0.08	Railroad Yard areas				
B-8A	0.437	2.28	26.56	26.56	6.84	0.000	6.814
	0.55	1.01	Residential Lots < 1/4 acre				
	0.8	0.12	Business District				
	0.3	1.15	Railroad Yard areas				
B-8B	0.635	1.00	25.00	25.00	7.01	0.000	4.450
	0.8	0.67	Business District				
	0.3	0.33	Railroad Yard areas				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
B-2A	Curb	5.13	1.00	2.00	0.014	0.33	n/a	n/a	12.00
B-2B	Curb	5.13	1.00	2.00	0.014	0.33	n/a	n/a	12.00
B-3A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-3B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B-5A	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00
B-5B	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
B-2A	Curb	0.959	0.959	0.240	0.000	B-3A	5.06	5.13	6.75
B-2B	Curb	2.647	2.097	0.662	0.550	B-3B	8.80	5.13	9.85
B-3A	Curb	2.649	2.437	0.662	0.212	B-4A	6.80	5.13	12.40
B-3B	Curb	4.803	3.550	1.201	1.254	B-4B	9.75	5.13	15.50
B-5A	Curb	2.876	2.520	0.719	0.356	B-4A	7.46	5.13	12.30
B-5B	Curb	5.473	3.699	1.368	1.774	B-4B	11.02	5.13	15.65

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
B-1A	Curb	5.13	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
B-4A	Curb	13.00	0.00	0.37	2.00	0.30	2.00	0.014	1.50	1.50
B-4B	Curb	13.00	0.00	0.30	2.00	0.37	2.00	0.014	1.50	1.50
B-7A	Curb	5.13	0.00	1.00	2.00	0.34	2.00	0.014	1.50	1.50
B-7B	Curb	5.13	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
B-8A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
B-8B	Curb	5.13	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
B-1A	Curb	5.13	n/a	n/a	1.641	13.140	0.230	7.65	8.25
B-4A	Curb	13.00	n/a	n/a	6.836	39.058	0.288	12.60	14.10
B-4B	Curb	13.00	n/a	n/a	22.345	39.058	0.659	12.96	15.09
B-7A	Curb	5.13	n/a	n/a	3.667	13.140	0.310	9.75	8.70
B-7B	Curb	5.13	n/a	n/a	0.761	13.140	0.214	5.45	5.45
B-8A	Curb	5.13	n/a	n/a	6.814	13.140	0.557	14.55	10.00
B-8B	Curb	5.13	n/a	n/a	4.450	13.140	0.358	5.05	14.45

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
B-8	CrcMh	0.497	3.28	26.57	6.84		0.00	11.154
B-9	CrcMh	0.577	15.52	29.31	6.56		0.00	58.769
B-10	CrcMh	0.577	15.52	29.31	6.56		0.00	58.769
B-1A	Curb	0.533	0.43	23.62	7.17		0.00	1.641
B-2A	Curb	0.550	0.24	22.78	7.27		0.00	0.959
B-2B	Curb	0.401	0.94	24.89	7.02		0.00	2.647
B-3A	Curb	0.550	0.68	24.34	7.08		0.00	2.649
B-3B	Curb	0.539	1.13	25.21	6.98		0.00	4.254
B-4A	Curb	0.550	1.65	25.92	6.91		0.00	6.268
B-4B	Curb	0.702	4.10	27.82	6.71		0.00	19.317
B-5A	Curb	0.550	0.74	24.48	7.07		0.00	2.876
B-5B	Curb	0.654	1.20	25.33	6.97		0.00	5.473
B-7A	Curb	0.550	0.95	24.91	7.02		0.00	3.667
B-7B	Curb	0.578	0.18	22.39	7.32		0.00	0.761
B-8A	Curb	0.437	2.28	26.56	6.84		0.00	6.814
B-8B	Curb	0.635	1.00	25.00	7.01		0.00	4.450
B-1	CrcMh	0.533	0.43	23.63	7.17		0.00	1.641
B-2	CrcMh	0.458	1.61	24.98	7.01		0.00	5.174
B-3	CrcMh	0.503	3.42	26.07	6.89		0.00	11.859
B-4	CrcMh	0.601	9.17	27.88	6.70		0.00	36.917
B-5	CrcMh	0.603	11.11	28.56	6.63		0.00	44.450
B-6	CrcMh	0.577	15.52	29.31	6.56		0.00	58.769
B-7	CrcMh	0.554	1.13	24.92	7.02		0.00	4.396
OUT-B	Outlt	0.577	15.52	29.31	6.56		0.00	58.769

Conveyance Configuration Data

Run #	Node US	Node I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	B-1A	B-1	47.86	47.36	Cir 1	0.00	2.00	7.0	7.161	0.013
2	B-1	B-2	47.36	47.25	Cir 1	0.00	2.00	55.0	0.200	0.013
3	B-2	B-3	46.65	46.23	Cir 1	0.00	2.00	211.0	0.199	0.013
4	B-3	B-4	46.23	45.63	Cir 1	0.00	2.00	300.0	0.200	0.013
5	B-4	B-5	45.63	45.42	Ell 1	3.77	2.40	212.0	0.099	0.013
6	B-5	B-6	45.42	45.14	Cir 1	0.00	3.00	285.0	0.098	0.013
7	B-6	B-9	45.14	45.10	Cir 1	0.00	3.00	35.0	0.114	0.013
8	B-9	B-10	43.60	41.75	Cir 1	0.00	3.00	230.0	0.804	0.013
9	B-10	OUT-B	40.25	39.25	Cir 1	0.00	3.00	45.0	2.223	0.013
10	B-2A	B-2	47.56	47.06	Cir 1	0.00	2.00	10.0	5.006	0.013
11	B-2B	B-2	47.56	47.06	Cir 1	0.00	2.00	30.0	1.667	0.013
12	B-3A	B-3	46.92	46.42	Cir 1	0.00	2.00	10.0	5.006	0.013
13	B-3B	B-3	46.92	46.42	Cir 1	0.00	2.00	30.0	1.667	0.013
14	B-4A	B-4	46.02	45.63	Cir 1	0.00	2.00	10.0	3.903	0.013
15	B-4B	B-4	46.02	45.63	Cir 1	0.00	2.00	30.0	1.300	0.013
16	B-5A	B-5	46.80	46.30	Cir 1	0.00	2.00	10.0	5.006	0.013
17	B-5B	B-5	46.80	46.30	Cir 1	0.00	2.00	30.0	1.667	0.013
18	B-7A	B-7	47.25	46.75	Cir 1	0.00	2.00	7.0	7.161	0.013
19	B-7B	B-7	47.25	46.75	Cir 1	0.00	2.00	20.0	2.501	0.013
20	B-8A	B-8	47.23	46.73	Cir 1	0.00	2.00	10.0	5.006	0.013
21	B-8B	B-8	47.23	46.73	Cir 1	0.00	2.00	30.0	1.667	0.013
22	B-7	B-6	46.75	45.14	Cir 1	0.00	2.00	38.0	4.241	0.013
23	B-8	B-6	46.73	45.14	Cir 1	0.00	2.00	58.0	2.742	0.013

Conveyance Hydraulic Computations. Tailwater = 44.980 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1*	51.33	51.33	52.50	0.005	0.23	2.00	8.37	3.17	1.6	60.8	0.000
2	51.33	51.22	52.50	0.005	0.54	2.00	2.37	0.52	1.6	10.2	0.000
3	51.22	50.91	52.30	0.052	1.02	2.00	3.23	1.65	5.2	10.1	0.000
4	50.91	50.09	52.30	0.272	2.00	2.00	3.77	3.77	11.9	10.2	0.000
5	50.09	49.42	51.20	0.318	2.40	2.40	5.19	5.19	36.9	20.6	0.000
6	49.42	48.16	52.05	0.440	3.00	3.00	6.29	6.29	44.4	21.0	0.000
7	48.16	47.10	52.00	0.770	3.00	3.00	8.31	8.31	58.8	22.6	0.000
8*	47.10	45.33	52.32	0.770	2.41	3.00	9.64	8.31	58.8	60.1	0.000
9*	45.33	44.98	53.58	0.770	1.66	3.00	14.65	9.40	58.8	99.9	0.000
10*	51.22	51.22	52.30	0.002	0.19	2.00	6.28	2.71	1.0	50.8	0.000
11*	51.22	51.22	52.30	0.014	0.41	2.00	5.78	3.60	2.6	29.3	0.000
12*	50.91	50.91	52.30	0.014	0.31	2.00	8.51	3.60	2.6	50.8	0.000
13*	50.92	50.91	52.30	0.035	0.52	2.00	6.63	4.15	4.3	29.3	0.000
14*	50.10	50.09	51.20	0.076	0.51	2.00	10.04	4.66	6.3	44.9	0.000
15*	50.31	50.09	51.20	0.723	1.29	2.00	9.01	7.25	19.3	25.9	0.000
16*	49.42	49.42	52.05	0.016	0.32	2.00	8.72	3.71	2.9	50.8	0.000
17*	49.43	49.42	52.05	0.058	0.59	2.00	7.13	4.47	5.5	29.3	0.000
18*	48.18	48.18	52.00	0.026	0.33	1.43	10.63	3.97	3.7	60.8	0.000
19*	48.18	48.18	52.00	0.001	0.20	1.43	4.59	2.52	0.8	35.9	0.000
20*	48.31	48.30	52.65	0.090	0.50	1.57	11.23	4.79	6.8	50.8	0.000

Conveyance Hydraulic Computations. Tailwater = 44.980 (ft)(CONT.)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
21*	48.31	48.30	52.65	0.038	0.53	1.57	6.72	4.20	4.5	29.3	0.000
22*	48.18	48.16	52.00	0.037	0.42	2.00	9.32	4.18	4.4	46.8	0.000
23*	48.30	48.16	52.65	0.241	0.75	2.00	10.40	5.68	11.2	37.6	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	18	896.0
Elliptical	Concrete	2.4	3.77	1	212.0
Circular	Concrete	3.0	0.0	4	595.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	10
Curb In Sag		5.125	0.0	0.0	0.0	0.0	5
Curb On Grade		5.125	0.0	0.0	0.0	0.0	6
Curb In Sag		13.0	0.0	0.0	0.0	0.0	2
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= B-1 Previous intensity used.
Discharge decreased downstream node Id= B-9 Previous intensity used.
Discharge decreased downstream node Id= B-10 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= B-2B
Capacity of grade inlet exceeded at inlet Id= B-3A
Computed ponded width exceeds allowable width at inlet Id= B-3A
Capacity of grade inlet exceeded at inlet Id= B-3B
Computed ponded width exceeds allowable width at inlet Id= B-3B
Capacity of grade inlet exceeded at inlet Id= B-5A
Computed ponded width exceeds allowable width at inlet Id= B-5A
Capacity of grade inlet exceeded at inlet Id= B-5B
Computed ponded width exceeds allowable width at inlet Id= B-5B
Computed right ponded width exceeds allowable width at inlet Id= B-4A
Computed left ponded width exceeds allowable width at inlet Id= B-4A
Computed right ponded width exceeds allowable width at inlet Id= B-4B
Computed left ponded width exceeds allowable width at inlet Id= B-4B
Computed left ponded width exceeds allowable width at inlet Id= B-8A
Computed right ponded width exceeds allowable width at inlet Id= B-8B
Run# 7 Insufficient capacity.
Run# 6 Insufficient capacity.
Run# 5 Insufficient capacity.
Run# 4 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00.
2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

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STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03/30/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS
HYDRAULIC CALCULATIONS

BERAN DR. 100-YEAR EVENT
4 OF 11

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 23 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 4:28:49 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

FOR REDUCED PLANS
original scale in inches

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/15/2012 3:42:18 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM E - EBBTIDE
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-E.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
E-1A	0.55	1.07	25.12	25.12	3.40	0.000	2.000
	0.55	1.07	Residential Lots < 1/4 acre				
E-1B	0.55	1.07	25.12	25.12	3.40	0.000	2.000
	0.55	1.07	Residential Lots < 1/4 acre				
E-2A	0.55	2.15	26.44	26.44	3.31	0.000	3.915
	0.55	2.15	Residential Lots < 1/4 acre				
E-2B	0.55	2.17	26.46	26.46	3.31	0.000	3.950
	0.55	2.17	Residential Lots < 1/4 acre				
E-4A	0.55	0.98	24.96	24.96	3.41	0.000	1.838
	0.55	0.98	Residential Lots < 1/4 acre				
E-4B	0.55	0.98	24.96	24.96	3.41	0.000	1.838
	0.55	0.98	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
E-1A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
E-1B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
E-1A	Curb	2.000	1.963	0.500	0.037	E-2A	5.75	5.13	11.15
E-1B	Curb	2.000	1.963	0.500	0.037	E-2B	5.75	5.13	11.15

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
E-2A	Curb	5.13	0.00	0.33	2.00	0.30	2.00	0.014	1.50	1.50
E-2B	Curb	5.13	0.00	0.30	2.00	0.33	2.00	0.014	1.50	1.50
E-4A	Curb	5.13	0.00	0.32	2.00	1.00	2.00	0.014	1.50	1.50
E-4B	Curb	5.13	0.00	1.00	2.00	0.32	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Width Left (ft)	Ponded Width Right (ft)
E-2A	Curb	5.13	n/a	n/a	3.952	13.140	0.327	10.90	11.10
E-2B	Curb	5.13	n/a	n/a	3.987	13.140	0.329	11.15	10.95
E-4A	Curb	5.13	n/a	n/a	1.838	13.140	0.235	10.45	2.80
E-4B	Curb	5.13	n/a	n/a	1.838	13.140	0.235	3.65	10.25

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
E-2	CrcMh	0.550	6.46	26.52	3.31		0.00	11.745
E-3	CrcMh	0.550	6.46	26.52	3.31		0.00	11.745
E-4	CrcMh	0.550	8.42	26.73	3.29		0.00	15.247
E-1AUX	CrcMh	0.550	2.14	25.19	3.39		0.00	3.994
E-5	CrcMh	0.550	8.42	26.73	3.29		0.00	15.247
E-6	CrcMh	0.550	8.42	26.73	3.29		0.00	15.247
E-7	CrcMh	0.550	8.42	26.73	3.29		0.00	15.247
E-1A	Curb	0.550	1.07	25.12	3.40		0.00	2.000
E-1B	Curb	0.550	1.07	25.12	3.40		0.00	2.000
E-2A	Curb	0.550	2.15	26.44	3.31		0.00	3.915
E-2B	Curb	0.550	2.17	26.46	3.31		0.00	3.950
E-4A	Curb	0.550	0.98	24.96	3.41		0.00	1.838
E-4B	Curb	0.550	0.98	24.96	3.41		0.00	1.838
E-1	CrcMh	0.550	2.14	25.19	3.39		0.00	3.994
OUT-E	Outlt	0.550	8.42	26.73	3.29		0.00	15.247

Conveyance Configuration Data

Run #	Node US	Node DS	I.D.	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	E-1AUX	E-2		46.56	46.30	Cir 1	0.00	2.00	130.0	0.200	0.013
2	E-2	E-3		46.30	45.79	Cir 1	0.00	2.00	358.0	0.142	0.013
3	E-3	E-4		45.79	45.74	Ell 1	3.15	2.00	43.0	0.116	0.013
4	E-4	E-5		44.24	43.98	Cir 1	0.00	3.00	86.0	0.302	0.013
5	E-5	E-6		42.98	42.07	Cir 1	0.00	3.00	135.0	0.674	0.013
6	E-6	E-7		41.07	40.95	Cir 1	0.00	3.00	40.0	0.300	0.013
7	E-7	OUT-E		39.79	39.66	Cir 1	0.00	3.00	8.0	1.625	0.013
8	E-1A	E-1		47.21	46.96	Cir 1	0.00	2.00	20.0	1.250	0.013
9	E-1B	E-1		47.21	46.96	Cir 1	0.00	2.00	7.0	3.574	0.013
10	E-2A	E-2		46.40	46.30	Cir 1	0.00	2.00	20.0	0.500	0.013
11	E-2B	E-2		46.40	46.30	Cir 1	0.00	2.00	7.0	1.429	0.013
12	E-4A	E-4		47.29	46.79	Cir 1	0.00	2.00	20.0	2.501	0.013
13	E-4B	E-4		47.29	46.79	Cir 1	0.00	2.00	7.0	7.161	0.013
14	E-1	E-1AUX		46.96	46.56	Cir 1	0.00	2.00	197.0	0.203	0.013

Conveyance Hydraulic Computations. Tailwater = 42.660 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	48.95	48.73	50.80	0.031	0.87	2.00	3.03	1.27	4.0	10.2	0.000
2	48.73	47.75	50.40	0.267	2.00	2.00	3.74	3.74	11.7	8.6	0.000
3	47.75	47.74	51.46	0.084	1.30	2.00	3.45	2.37	11.7	13.8	0.000
4	45.59	44.06	51.46	0.052	1.35	1.35	4.95	4.95	15.2	36.8	0.000
5*	44.06	42.70	51.75	0.052	1.08	1.08	6.63	6.63	15.2	55.0	0.000
6	42.70	42.66	52.20	0.052	1.35	1.71	4.94	3.65	15.2	36.7	0.000
7*	42.66	42.66	52.26	0.052	0.86	3.00	9.11	5.49	15.2	85.4	0.000
8*	49.29	49.29	51.38	0.008	0.38	2.00	4.81	3.34	2.0	25.4	0.000
9*	49.29	49.29	51.38	0.008	0.29	2.00	6.95	3.34	2.0	42.9	0.000
10*	48.74	48.73	50.40	0.030	0.67	2.00	4.21	4.04	3.9	16.1	0.000
11*	48.73	48.73	50.40	0.030	0.52	2.00	6.14	4.06	3.9	27.2	0.000
12*	48.79	48.79	51.46	0.007	0.31	2.00	5.98	3.13	1.8	35.9	0.000
13*	48.79	48.79	51.46	0.007	0.24	2.00	8.65	3.13	1.8	60.8	0.000
14	49.29	48.95	51.38	0.031	0.87	2.00	3.05	1.27	4.0	10.2	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	9	766.0
Elliptical	Concrete	2.0	3.15	1	43.0
Circular	Concrete	3.0	0.0	4	269.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	8
Curb On Grade		5.125	0.0	0.0	0.0	0.0	2
Curb In Sag		5.125	0.0	0.0	0.0	0.0	4
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= E-1AUX Previous intensity used.
Discharge decreased downstream node Id= E-3 Previous intensity used.
Discharge decreased downstream node Id= E-5 Previous intensity used.
Discharge decreased downstream node Id= E-6 Previous intensity used.
Discharge decreased downstream node Id= E-7 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= E-1A
Capacity of grade inlet exceeded at inlet Id= E-1B
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 3
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 12
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 13
Run# 2 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE.
2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — FRANCISCO A. AREVALO — 98562 — LICENSED PROFESSIONAL ENGINEER — 03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

EBBTIDE DR. 2-YEAR EVENT
5 OF 12

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 24 OF 191	

PUBLIC WORKS & ENGINEERING — 49210 — HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:29:05 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/15/2012 3:43:15 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM E - EBBTIDE
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-E.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
E-1A	0.55	1.07	25.12	25.12	6.99	0.000	4.116
	0.55	1.07	Residential Lots < 1/4 acre				
E-1B	0.55	1.07	25.12	25.12	6.99	0.000	4.116
	0.55	1.07	Residential Lots < 1/4 acre				
E-2A	0.55	2.15	26.44	26.44	6.85	0.000	8.101
	0.55	2.15	Residential Lots < 1/4 acre				
E-2B	0.55	2.17	26.46	26.46	6.85	0.000	8.174
	0.55	2.17	Residential Lots < 1/4 acre				
E-4A	0.55	0.98	24.96	24.96	7.01	0.000	3.780
	0.55	0.98	Residential Lots < 1/4 acre				
E-4B	0.55	0.98	24.96	24.96	7.01	0.000	3.780
	0.55	0.98	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
E-1A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
E-1B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
E-1A	Curb	4.116	3.247	1.029	0.870	E-2A	8.86	5.13	14.60
E-1B	Curb	4.116	3.247	1.029	0.870	E-2B	8.86	5.13	14.60

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
E-2A	Curb	5.13	0.00	0.33	2.00	0.30	2.00	0.014	1.50	1.50
E-2B	Curb	5.13	0.00	0.30	2.00	0.33	2.00	0.014	1.50	1.50
E-4A	Curb	5.13	0.00	0.32	2.00	1.00	2.00	0.014	1.50	1.50
E-4B	Curb	5.13	0.00	1.00	2.00	0.32	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
E-2A	Curb	5.13	n/a	n/a	8.971	13.140	0.811	14.80	15.10
E-2B	Curb	5.13	n/a	n/a	9.043	13.140	0.821	15.15	14.85
E-4A	Curb	5.13	n/a	n/a	3.780	13.140	0.317	13.70	3.65
E-4B	Curb	5.13	n/a	n/a	3.780	13.140	0.317	4.75	13.45

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
E-2	CrcMh	0.550	6.46	26.51	6.84		0.00	24.316
E-3	CrcMh	0.550	6.46	26.51	6.84		0.00	24.316
E-4	CrcMh	0.550	8.42	26.65	6.83		0.00	31.622
E-1AUX	CrcMh	0.550	2.14	25.18	6.99		0.00	8.226
E-5	CrcMh	0.550	8.42	26.65	6.83		0.00	31.622
E-6	CrcMh	0.550	8.42	26.65	6.83		0.00	31.622
E-7	CrcMh	0.550	8.42	26.65	6.83		0.00	31.622
E-1A	Curb	0.550	1.07	25.12	6.99		0.00	4.116
E-1B	Curb	0.550	1.07	25.12	6.99		0.00	4.116
E-2A	Curb	0.550	2.15	26.44	6.85		0.00	8.101
E-2B	Curb	0.550	2.17	26.46	6.85		0.00	8.174
E-4A	Curb	0.550	0.98	24.96	7.01		0.00	3.780
E-4B	Curb	0.550	0.98	24.96	7.01		0.00	3.780
E-1	CrcMh	0.550	2.14	25.18	6.99		0.00	8.226
OUT-E	Outlt	0.550	8.42	26.65	6.83		0.00	31.622

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	E-1AUX	E-2	46.56	46.30	Cir 1	0.00	2.00	130.0	0.200	0.013
2	E-2	E-3	46.30	45.79	Cir 1	0.00	2.00	358.0	0.142	0.013
3	E-3	E-4	45.79	45.74	Ell 1	3.15	2.00	43.0	0.116	0.013
4	E-4	E-5	44.24	43.98	Cir 1	0.00	3.00	86.0	0.302	0.013
5	E-5	E-6	42.98	42.07	Cir 1	0.00	3.00	135.0	0.674	0.013
6	E-6	E-7	41.07	40.95	Cir 1	0.00	3.00	40.0	0.300	0.013
7	E-7	OUT-E	39.79	39.66	Cir 1	0.00	3.00	8.0	1.625	0.013
8	E-1A	E-1	47.21	46.96	Cir 1	0.00	2.00	20.0	1.250	0.013
9	E-1B	E-1	47.21	46.96	Cir 1	0.00	2.00	7.0	3.574	0.013
10	E-2A	E-2	46.40	46.30	Cir 1	0.00	2.00	20.0	0.500	0.013
11	E-2B	E-2	46.40	46.30	Cir 1	0.00	2.00	7.0	1.429	0.013
12	E-4A	E-4	47.29	46.79	Cir 1	0.00	2.00	20.0	2.501	0.013
13	E-4B	E-4	47.29	46.79	Cir 1	0.00	2.00	7.0	7.161	0.013
14	E-1	E-1AUX	46.96	46.56	Cir 1	0.00	2.00	197.0	0.203	0.013

Conveyance Hydraulic Computations. Tailwater = 45.330 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	51.88	51.79	52.14	0.131	1.37	2.00	3.59	2.62	8.2	10.2	0.000
2	51.79	47.51	51.90	1.146	2.00	2.00	7.74	7.74	24.3	8.6	0.000
3	47.51	46.39	52.30	0.362	2.00	2.00	4.91	4.91	24.3	13.8	0.000
4	46.39	45.68	52.30	0.223	2.15	2.15	5.83	5.83	31.6	36.8	0.000
5*	45.68	45.38	52.55	0.223	1.64	3.00	8.02	7.03	31.6	55.0	0.000
6	45.38	45.35	53.10	0.223	2.16	3.00	5.81	4.47	31.6	36.7	0.000
7*	45.35	45.33	52.30	0.223	1.27	3.00	11.14	7.03	31.6	85.4	0.000
8*	52.03	52.03	52.15	0.033	0.55	2.00	5.93	4.11	4.1	25.4	0.000
9*	52.03	52.03	52.15	0.033	0.42	2.00	8.61	4.11	4.1	42.9	0.000
10*	51.82	51.79	51.90	0.127	1.01	2.00	5.11	5.07	8.1	16.1	0.000
11*	51.80	51.79	51.90	0.129	0.75	2.00	7.54	5.09	8.2	27.2	0.000
12*	48.80	48.79	52.30	0.028	0.44	2.00	7.40	4.00	3.8	35.9	0.000
13*	48.79	48.79	52.30	0.028	0.34	2.00	10.73	4.00	3.8	60.8	0.000
14	52.03	51.88	52.15	0.131	1.36	2.00	3.62	2.62	8.2	10.2	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	9	766.0
Elliptical	Concrete	2.0	3.15	1	43.0
Circular	Concrete	3.0	0.0	4	269.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	8
Curb On Grade		5.125	0.0	0.0	0.0	0.0	2
Curb In Sag		5.125	0.0	0.0	0.0	0.0	4
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= E-1AUX Previous intensity used.
Discharge decreased downstream node Id= E-3 Previous intensity used.
Discharge decreased downstream node Id= E-5 Previous intensity used.
Discharge decreased downstream node Id= E-6 Previous intensity used.
Discharge decreased downstream node Id= E-7 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= E-1A
Computed ponded width exceeds allowable width at inlet Id= E-1A
Capacity of grade inlet exceeded at inlet Id= E-1B
Computed ponded width exceeds allowable width at inlet Id= E-1B
Computed right ponded width exceeds allowable width at inlet Id= E-2A
Computed left ponded width exceeds allowable width at inlet Id= E-2A
Computed right ponded width exceeds allowable width at inlet Id= E-2B
Computed left ponded width exceeds allowable width at inlet Id= E-2B
Computed left ponded width exceeds allowable width at inlet Id= E-4A
Computed right ponded width exceeds allowable width at inlet Id= E-4B
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 12
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 13
Run# 3 Insufficient capacity.
Run# 2 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00.

2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

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03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS
HYDRAULIC CALCULATIONS
EBBTIDE DR. 100-YEAR EVENT
6 OF 11

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 25 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:29:19 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/15/2012 3:33:04 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM K - KNOTTY OAKS
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-K.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
K-1	0.323	32.08	33.42	33.42	2.92	0.000	30.242
	0.323	32.08	Undeveloped				
K-2A	0.616	0.49	23.82	23.82	3.49	0.000	1.054
	0.8	0.31	Business District				
	0.3	0.18	Undeveloped				
K-4A	0.55	0.69	24.37	24.37	3.45	0.000	1.310
	0.55	0.69	Residential Lots < 1/4 acre				
K-4B	0.55	0.69	24.37	24.37	3.45	0.000	1.310
	0.55	0.69	Residential Lots < 1/4 acre				
K-5A	0.55	2.02	26.32	26.32	3.32	0.000	3.687
	0.55	2.02	Residential Lots < 1/4 acre				
K-5B	0.55	2.06	26.36	26.36	3.32	0.000	3.757
	0.55	2.06	Residential Lots < 1/4 acre				
K-6A	0.55	0.45	23.69	23.69	3.50	0.000	0.866
	0.55	0.45	Residential Lots < 1/4 acre				
K-6B	0.55	0.54	23.97	23.97	3.48	0.000	1.033
	0.55	0.54	Residential Lots < 1/4 acre				
K-8A	0.55	0.26	22.89	22.89	3.56	0.000	0.509
	0.8	0.13	Business District				
	0.3	0.13	Undeveloped				
K-9A	0.55	0.25	22.83	22.83	3.56	0.000	0.490
	0.8	0.13	Business District				
	0.3	0.13	Undeveloped				
K-11A	0.55	1.32	25.50	25.50	3.37	0.000	2.449
	0.55	1.32	Residential Lots < 1/4 acre				
K-11B	0.55	1.33	25.52	25.52	3.37	0.000	2.466
	0.55	1.33	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
K-4A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
K-4B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
K-6A	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
K-6B	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
K-4A	Curb	1.310	1.310	0.327	0.000	K-5A	4.50	5.13	9.50
K-4B	Curb	1.310	1.310	0.327	0.000	K-5B	4.50	5.13	9.50
K-6A	Curb	0.866	0.866	0.217	0.000	K-5A	3.65	5.13	8.00
K-6B	Curb	1.033	1.033	0.258	0.000	K-5B	4.03	5.13	8.55

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
K-2A	Curb	5.13	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
K-5A	Curb	5.13	0.00	0.33	2.00	0.30	2.00	0.014	1.50	1.50
K-5B	Curb	5.13	0.00	0.30	2.00	0.33	2.00	0.014	1.50	1.50
K-8A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
K-9A	Curb	5.13	0.00	1.00	2.00	0.33	2.00	0.014	1.50	1.50
K-11A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
K-11B	Curb	5.13	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
K-2A	Curb	5.13	n/a	n/a	1.054	13.140	0.218	7.00	6.50
K-5A	Curb	5.13	n/a	n/a	3.687	13.140	0.312	10.60	10.80
K-5B	Curb	5.13	n/a	n/a	3.757	13.140	0.315	10.90	10.70
K-8A	Curb	5.13	n/a	n/a	0.509	13.140	0.212	6.15	2.90
K-9A	Curb	5.13	n/a	n/a	0.490	13.140	0.212	2.85	5.95
K-11A	Curb	5.13	n/a	n/a	2.449	13.140	0.255	10.80	5.70
K-11B	Curb	5.13	n/a	n/a	2.466	13.140	0.255	5.70	10.80

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
K-2A	Curb	0.616	0.49	23.82	3.49		0.00	1.054
K-4A	Curb	0.550	0.69	24.37	3.45		0.00	1.310
K-4B	Curb	0.550	0.69	24.37	3.45		0.00	1.310
K-5A	Curb	0.550	2.02	26.32	3.32		0.00	3.687
K-5B	Curb	0.550	2.06	26.36	3.32		0.00	3.757
K-6A	Curb	0.550	0.45	23.69	3.50		0.00	0.866
K-6B	Curb	0.550	0.54	23.97	3.48		0.00	1.033
K-1	CrcMh	0.323	32.08	33.42	2.92		-8.00	22.242
K-2	CrcMh	0.616	0.49	23.85	3.49		0.00	1.054
K-3	CrcMh	0.327	32.57	33.63	2.91		-8.00	23.014
K-4	CrcMh	0.336	33.95	34.06	2.89		-8.00	24.988
K-5	CrcMh	0.359	38.03	35.04	2.84		-8.00	30.836
K-6	CrcMh	0.364	39.02	35.72	2.81		-8.00	31.942
K-7	CrcMh	0.364	39.02	35.72	2.81		-8.00	31.942
K-8	CrcMh	0.550	0.26	22.91	3.56		0.00	0.509
K-8A	Curb	0.550	0.26	22.89	3.56		0.00	0.509
K-9A	Curb	0.550	0.25	22.83	3.56		0.00	0.490
K-11A	Curb	0.550	1.32	25.50	3.37		0.00	2.449
K-11B	Curb	0.550	1.33	25.52	3.37		0.00	2.466
K-9	CrcMh	0.550	0.25	22.85	3.56		0.00	0.490
K-10	CrcMh	0.367	39.53	35.94	2.80		-8.00	32.589
K-11	CrcMh	0.378	42.18	36.10	2.79		-8.00	36.560
K-12	CrcMh	0.378	42.18	36.10	2.79		-8.00	36.560
K-13	CrcMh	0.378	42.18	36.10	2.79		-8.00	36.560
OUT-K	Outlt	0.378	42.18	36.10	2.79		-8.00	36.560

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	K-1	K-3	46.77	46.46	Cir 1	0.00	3.00	77.0	0.403	0.013
2	K-3	K-4	45.96	45.34	Cir 1	0.00	3.50	155.0	0.400	0.013
3	K-4	K-5	45.34	43.86	Cir 1	0.00	3.50	368.0	0.402	0.013
4	K-5	K-6	43.86	42.80	Cir 1	0.00	3.50	268.0	0.396	0.013
5	K-6	K-7	42.80	42.43	Cir 1	0.00	3.50	86.0	0.430	0.013
6	K-7	K-10	42.43	42.06	Cir 1	0.00	3.50	88.0	0.420	0.013
7	K-10	K-11	40.06	39.99	Ell 1	3.77	2.40	48.0	0.146	0.013
8	K-11	K-12	39.99	39.79	Cir 1	0.00	3.50	131.0	0.153	0.013
9	K-12	K-13	39.79	39.58	Cir 1	0.00	3.50	141.0	0.149	0.013
10	K-13	OUT-K	39.58	39.52	Cir 1	0.00	3.50	40.0	0.150	0.013
11	K-2A	K-2	47.73	47.62	Cir 1	0.00	2.00	7.0	1.572	0.013
12	K-2	K-3	47.62	47.46	Cir 1	0.00	2.00	40.0	0.400	0.013
13	K-4A	K-4	47.01	46.51	Cir 1	0.00	2.00	20.0	2.501	0.013
14	K-4B	K-4	47.01	46.51	Cir 1	0.00	2.00	7.0	7.161	0.013
15	K-5A	K-5	45.90	45.40	Cir 1	0.00	2.00	20.0	2.501	0.013
16	K-5B	K-5	45.90	45.40	Cir 1	0.00	2.00	7.0	7.161	0.013
17	K-6A	K-6	46.78	46.28	Cir 1	0.00	2.00	20.0	2.501	0.013
18	K-6B	K-6	46.78	46.28	Cir 1	0.00	2.00	7.0	7.161	0.013
19	K-8A	K-8	46.88	46.38	Cir 1	0.00	2.00	7.0	7.161	0.013
20	K-8	K-10	46.38	45.88	Cir 1	0.00	2.00	49.0	1.020	0.013
21	K-9A	K-9	46.88	46.38	Cir 1	0.00	2.00	7.0	7.161	0.013
22	K-9	K-10	46.38	45.88	Cir 1	0.00	2.00	35.0	1.429	0.013
23	K-11A	K-11	46.48	45.98	Cir 1	0.00	2.00	20.0	2.501	0.013
24	K-11B	K-11	46.48	45.98	Cir 1	0.00	2.00	7.0	7.161	0.013

Conveyance Hydraulic Computations. Tailwater = 43.020 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	48.31	47.43	52.02	0.110	1.54	1.54	6.07	6.07	22.2	42.5	0.000
2*	47.43	46.88	51.62	0.052	1.46	1.54	6.08	5.65	23.0	63.9	0.000
3*	46.88	45.58	51.18	0.061	1.52	1.72	6.23	5.30	25.0	64.1	0.000
4	45.58	44.52	50.07	0.093	1.72	1.72	6.54	6.54	30.8	63.5	0.000
5*	44.52	44.16	50.95	0.100	1.72	1.73	6.81	6.74	31.9	66.3	0.000
6*	44.16	43.22	51.25	0.100	1.73	1.73	6.74	6.74	31.9	65.5	0.000
7	43.22	43.10	51.05	0.247	2.00	2.40	5.16	4.59	32.6	25.0	0.000
8	43.10	43.07	50.65	0.131	2.67	3.28	4.65	3.91	36.6	39.5	0.000
9	43.07	43.03	51.05	0.131	2.71	3.45	4.58	3.81	36.6	39.0	0.000
10	43.03	43.02	51.77	0.131	2.69	3.50	4.60	3.80	36.6	39.1	0.000
11*	49.62	49.62	51.90	0.002	0.26	2.00	4.31	2.79	1.1	28.5	0.000
12	49.62	49.46	51.90	0.002	0.37	2.00	2.66	0.34	1.1	14.4	0.000
13*	47.27	46.88	51.18	0.003	0.26	0.37	5.41	3.30	1.3	35.9	0.000
14*	47.21	46.88	51.18	0.003	0.20	0.37	7.81	3.30	1.3	60.8	0.000
15*	46.33	45.58	50.07	0.026	0.43	0.43	7.35	7.35	3.7	35.9	0.000
16*	46.24	45.58	50.07	0.027	0.34	0.34	10.71	10.71	3.8	60.8	0.000
17*	48.28	48.28	50.95	0.001	0.21	2.00	4.78	2.71	0.9	35.9	0.000
18*	48.28	48.28	50.95	0.002	0.18	2.00	7.28	2.83	1.0	60.8	0.000
19	48.88	48.38	51.05	0.001	0.13	2.00	5.87	0.16	0.5	60.8	0.000
20	48.38	47.88	51.05	0.001	0.21	2.00	2.98	0.16	0.5	23.0	0.000
21*	47.88	47.88	51.05	0.000	0.13	1.50	5.80	2.26	0.5	60.8	0.000
22*	47.88	47.88	51.05	0.000	0.19	2.00	3.31	2.26	0.5	27.2	0.000
23*	47.98	47.98	50.65	0.012	0.35	2.00	6.51	3.54	2.4	35.9	0.000
24*	47.98	47.98	50.65	0.012	0.28	2.00	9.45	3.61	2.5	60.8	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	3.0	0.0	1	77.0
Circular	Concrete	3.5	0.0	8	1277.0
Elliptical	Concrete	2.4	3.77	1	48.0
Circular	Concrete	2.0	0.0	14	253.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	7
Curb On Grade		5.125	0.0	0.0	0.0	0.0	4
Circular Manhole		0.0	0.0	0.0	0.0	0.0	13
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= K-2 Previous intensity used.
Discharge decreased downstream node Id= K-8 Previous intensity used.
Discharge decreased downstream node Id= K-9 Previous intensity used.
Discharge decreased downstream node Id= K-7 Previous intensity used.
Decreasing conduit size @ downstream Run# 7
Discharge decreased downstream node Id= K-12 Previous intensity used.
Discharge decreased downstream node Id= K-13 Previous intensity used.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 23
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 24
Run# 7 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 20
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 22
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 17
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 18
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 12

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE.
2. ADDITIONAL NEGATIVE Q (-8.00 CFS) IN NODE K-1 (EXISTING MANHOLE) IS THE MAXIMUM DEVIATED FLOW TO DISCHARGE FROM BRENTWOOD BAPTIST CHURCH INTO WEST OREM SYSTEM NODE W-4 USING EXISTING 24" RCP STORM, IN ORDER TO ALLEVIATE KNOTTY OAKS SYSTEM K. SEE SHEET NO. 20
3. BRENTWOOD BAPTIST CHURCH EXISTING AND FUTURE DEVELOPMENT MUST COMPLY WITH COH INFRASTRUCTURE DESIGN MANUAL 9.05-DESIGN REQUIREMENTS, SECTION H-STORMWATER DETENTION. THE FOLLOWING DETENTION PARAMETERS WERE CALCULATED ACCORDINGLY:

   AREA SERVICED = 32.08 ACRES

COH ALLOWS A MAXIMUM 100-YEAR EVENT=	2.0 CFS/ACRE
MAXIMUM OUTFLOW RATE ALLOWED=	64.16 CFS/ACRE
EQUIVALENT UNDEVELOPED C FACTOR=	0.323

   EQUIVALENT C-FACTOR WAS USED TO SIMULATE THE MAXIMUM TOTAL Q FOR 2-YEAR AND 100-YEAR EVENTS IN HOUSTORM CALCULATIONS.
4. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
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STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
05/30/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

KNOTTY OAKS TR. 2-YEAR EVENT
7 OF 11

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 26 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
LICENSE NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:29:36 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/19/2012 3:28:42 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM K - KNOTTY OAKS
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-K.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
K-1	0.323	32.08	33.42	33.42	6.19	0.000	64.145
	0.323	32.08	Undeveloped				
K-2A	0.616	0.49	23.82	23.82	7.14	0.000	2.157
	0.8	0.31	Business District				
	0.3	0.18	Undeveloped				
K-4A	0.55	0.69	24.37	24.37	7.08	0.000	2.687
	0.55	0.69	Residential Lots < 1/4 acre				
K-4B	0.55	0.69	24.37	24.37	7.08	0.000	2.687
	0.55	0.69	Residential Lots < 1/4 acre				
K-5A	0.55	2.02	26.32	26.32	6.86	0.000	7.625
	0.55	2.02	Residential Lots < 1/4 acre				
K-5B	0.55	2.06	26.36	26.36	6.86	0.000	7.772
	0.55	2.06	Residential Lots < 1/4 acre				
K-6A	0.55	0.45	23.69	23.69	7.16	0.000	1.772
	0.55	0.45	Residential Lots < 1/4 acre				
K-6B	0.55	0.54	23.97	23.97	7.13	0.000	2.117
	0.55	0.54	Residential Lots < 1/4 acre				
K-8A	0.55	0.26	22.89	22.89	7.26	0.000	1.037
	0.8	0.13	Business District				
	0.3	0.13	Undeveloped				
K-9A	0.55	0.25	22.83	22.83	7.26	0.000	0.999
	0.8	0.13	Business District				
	0.3	0.13	Undeveloped				
K-11A	0.55	1.32	25.50	25.50	6.95	0.000	5.048
	0.55	1.32	Residential Lots < 1/4 acre				
K-11B	0.55	1.33	25.52	25.52	6.95	0.000	5.084
	0.55	1.33	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
K-4A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
K-4B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
K-6A	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
K-6B	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
K-4A	Curb	2.687	2.463	0.672	0.224	K-5A	6.85	5.13	12.45
K-4B	Curb	2.687	2.463	0.672	0.224	K-5B	6.85	5.13	12.45
K-6A	Curb	1.772	1.760	0.443	0.012	K-5A	5.46	5.13	10.45
K-6B	Curb	2.117	2.042	0.529	0.074	K-5B	6.07	5.13	11.20

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
K-2A	Curb	5.13	0.00	0.30	2.00	0.30	2.00	0.014	1.50	1.50
K-5A	Curb	5.13	0.00	0.33	2.00	0.30	2.00	0.014	1.50	1.50
K-5B	Curb	5.13	0.00	0.30	2.00	0.33	2.00	0.014	1.50	1.50
K-8A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
K-9A	Curb	5.13	0.00	1.00	2.00	0.33	2.00	0.014	1.50	1.50
K-11A	Curb	5.13	0.00	0.30	2.00	1.00	2.00	0.014	1.50	1.50
K-11B	Curb	5.13	0.00	1.00	2.00	0.30	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
K-2A	Curb	5.13	n/a	n/a	2.157	13.140	0.245	9.15	8.50
K-5A	Curb	5.13	n/a	n/a	7.862	13.140	0.672	14.10	14.35
K-5B	Curb	5.13	n/a	n/a	8.070	13.140	0.697	14.50	14.25
K-8A	Curb	5.13	n/a	n/a	1.037	13.140	0.218	8.00	3.80
K-9A	Curb	5.13	n/a	n/a	0.999	13.140	0.217	3.75	7.75
K-11A	Curb	5.13	n/a	n/a	5.048	13.140	0.400	14.15	7.50
K-11B	Curb	5.13	n/a	n/a	5.084	13.140	0.403	7.50	14.20

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
K-2A	Curb	0.616	0.49	23.82	7.14		0.00	2.157
K-4A	Curb	0.550	0.69	24.37	7.08		0.00	2.687
K-4B	Curb	0.550	0.69	24.37	7.08		0.00	2.687
K-5A	Curb	0.550	2.02	26.32	6.86		0.00	7.625
K-5B	Curb	0.550	2.06	26.36	6.86		0.00	7.772
K-6A	Curb	0.550	0.45	23.69	7.16		0.00	1.772
K-6B	Curb	0.550	0.54	23.97	7.13		0.00	2.117
K-1	CrcMh	0.323	32.08	33.42	6.19		-8.00	56.145
K-2	CrcMh	0.616	0.49	23.84	7.14		0.00	2.157
K-3	CrcMh	0.327	32.57	33.58	6.18		-8.00	57.870
K-4	CrcMh	0.336	33.95	33.93	6.15		-8.00	62.231
K-5	CrcMh	0.359	38.03	34.74	6.08		-8.00	75.121
K-6	CrcMh	0.364	39.02	35.31	6.04		-8.00	77.782
K-7	CrcMh	0.364	39.02	35.31	6.04		-8.00	77.782
K-8	CrcMh	0.550	0.26	22.91	7.25		0.00	1.037
K-8A	Curb	0.550	0.26	22.89	7.26		0.00	1.037
K-9A	Curb	0.550	0.25	22.83	7.26		0.00	0.999
K-11A	Curb	0.550	1.32	25.50	6.95		0.00	5.048
K-11B	Curb	0.550	1.33	25.52	6.95		0.00	5.084
K-9	CrcMh	0.550	0.25	22.85	7.26		0.00	0.999
K-10	CrcMh	0.367	39.53	35.49	6.02		-8.00	79.267
K-11	CrcMh	0.378	42.18	35.56	6.02		-8.00	87.954
K-12	CrcMh	0.378	42.18	35.56	6.02		-8.00	87.954
K-13	CrcMh	0.378	42.18	35.56	6.02		-8.00	87.954
OUT-K	Outlt	0.378	42.18	35.56	6.02		-8.00	87.954

Conveyance Configuration Data

Run #	Node US	Node I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	K-1	K-3	46.77	46.46	Cir 1	0.00	3.00	77.0	0.403	0.013
2	K-3	K-4	45.96	45.34	Cir 1	0.00	3.50	155.0	0.400	0.013
3	K-4	K-5	45.34	43.86	Cir 1	0.00	3.50	368.0	0.402	0.013
4	K-5	K-6	43.86	42.80	Cir 1	0.00	3.50	268.0	0.396	0.013
5	K-6	K-7	42.80	42.43	Cir 1	0.00	3.50	86.0	0.430	0.013
6	K-7	K-10	42.43	42.06	Cir 1	0.00	3.50	88.0	0.420	0.013
7	K-10	K-11	40.06	39.99	Ell 1	3.77	2.40	48.0	0.146	0.013
8	K-11	K-12	39.99	39.79	Cir 1	0.00	3.50	131.0	0.153	0.013
9	K-12	K-13	39.79	39.58	Cir 1	0.00	3.50	141.0	0.149	0.013
10	K-13	OUT-K	39.58	39.52	Cir 1	0.00	3.50	40.0	0.150	0.013
11	K-2A	K-2	47.73	47.62	Cir 1	0.00	2.00	7.0	1.572	0.013
12	K-2	K-3	47.62	47.46	Cir 1	0.00	2.00	40.0	0.400	0.013
13	K-4A	K-4	47.01	46.51	Cir 1	0.00	2.00	20.0	2.501	0.013
14	K-4B	K-4	47.01	46.51	Cir 1	0.00	2.00	7.0	7.161	0.013
15	K-5A	K-5	45.90	45.40	Cir 1	0.00	2.00	20.0	2.501	0.013
16	K-5B	K-5	45.90	45.40	Cir 1	0.00	2.00	7.0	7.161	0.013
17	K-6A	K-6	46.78	46.28	Cir 1	0.00	2.00	20.0	2.501	0.013
18	K-6B	K-6	46.78	46.28	Cir 1	0.00	2.00	7.0	7.161	0.013
19	K-8A	K-8	46.88	46.38	Cir 1	0.00	2.00	7.0	7.161	0.013
20	K-8	K-10	46.38	45.88	Cir 1	0.00	2.00	49.0	1.020	0.013
21	K-9A	K-9	46.88	46.38	Cir 1	0.00	2.00	7.0	7.161	0.013
22	K-9	K-10	46.38	45.88	Cir 1	0.00	2.00	35.0	1.429	0.013
23	K-11A	K-11	46.48	45.98	Cir 1	0.00	2.00	20.0	2.501	0.013
24	K-11B	K-11	46.48	45.98	Cir 1	0.00	2.00	7.0	7.161	0.013

Conveyance Hydraulic Computations. Tailwater = 45.520 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	51.84	51.30	52.55	0.703	3.00	3.00	7.94	7.94	56.1	42.5	0.000
2	51.30	51.18	52.55	0.328	2.62	3.50	7.50	6.01	57.9	63.9	0.000
3	51.18	51.10	52.30	0.379	2.80	3.50	7.55	6.47	62.2	64.1	0.000
4	51.10	49.62	51.80	0.553	3.50	3.50	7.81	7.81	75.1	63.5	0.000
5	49.62	49.11	51.90	0.593	3.50	3.50	8.08	8.08	77.8	66.3	0.000
6	49.11	48.59	51.90	0.593	3.50	3.50	8.08	8.08	77.8	65.5	0.000
7	48.59	47.88	51.60	1.464	2.40	2.40	11.15	11.15	79.3	25.0	0.000
8	47.88	46.89	51.60	0.758	3.50	3.50	9.14	9.14	88.0	39.5	0.000
9	46.89	45.82	52.00	0.758	3.50	3.50	9.14	9.14	88.0	39.0	0.000
10	45.82	45.52	52.27	0.758	3.50	3.50	9.14	9.14	88.0	39.1	0.000
11*	51.45	51.45	52.55	0.009	0.37	2.00	5.33	3.41	2.2	28.5	0.000
12	51.45	51.30	52.55	0.009	0.52	2.00	3.28	0.69	2.2	14.4	0.000
13*	51.19	51.18	52.30	0.014	0.37	2.00	6.70	3.63	2.7	35.9	0.000
14*	51.19	51.18	52.30	0.014	0.29	2.00	9.69	3.63	2.7	60.8	0.000
15*	51.12	51.10	51.80	0.113	0.63	2.00	9.05	4.97	7.6	35.9	0.000
16*	51.11	51.10	51.80	0.117	0.48	2.00	13.25	5.00	7.8	60.8	0.000
17*	49.62	49.62	51.90	0.006	0.30	2.00	5.92	3.20	1.8	35.9	0.000
18*	49.62	49.62	51.90	0.009	0.26	2.00	9.02	3.40	2.1	60.8	0.000
19*	48.59	48.59	51.60	0.002	0.18	2.00	7.28	2.84	1.0	60.8	0.000
20*	48.59	48.59	51.60	0.002	0.29	2.00	3.68	2.84	1.0	23.0	0.000
21*	48.59	48.59	51.60	0.002	0.18	2.00	7.20	2.60	1.0	60.8	0.000
22*	48.59	48.59	51.60	0.002	0.26	2.00	4.10	2.60	1.0	27.2	0.000
23*	47.89	47.88	51.60	0.049	0.51	1.90	8.05	4.36	5.0	35.9	0.000
24*	47.89	47.88	51.60	0.050	0.39	1.90	11.71	4.37	5.1	60.8	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	3.0	0.0	1	77.0
Circular	Concrete	3.5	0.0	8	1277.0
Elliptical	Concrete	2.4	3.77	1	48.0
Circular	Concrete	2.0	0.0	14	253.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	7
Curb On Grade		5.125	0.0	0.0	0.0	0.0	4
Circular Manhole		0.0	0.0	0.0	0.0	0.0	13
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= K-2 Previous intensity used.
Discharge decreased downstream node Id= K-8 Previous intensity used.
Discharge decreased downstream node Id= K-9 Previous intensity used.
Discharge decreased downstream node Id= K-7 Previous intensity used.
Decreasing conduit size @ downstream Run# 7
Discharge decreased downstream node Id= K-12 Previous intensity used.
Discharge decreased downstream node Id= K-13 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= K-4A
Computed ponded width exceeds allowable width at inlet Id= K-4A
Capacity of grade inlet exceeded at inlet Id= K-4B
Computed ponded width exceeds allowable width at inlet Id= K-4B
Capacity of grade inlet exceeded at inlet Id= K-6A
Capacity of grade inlet exceeded at inlet Id= K-6B
Computed right ponded width exceeds allowable width at inlet Id= K-5A
Computed left ponded width exceeds allowable width at inlet Id= K-5A
Computed right ponded width exceeds allowable width at inlet Id= K-5B
Computed left ponded width exceeds allowable width at inlet Id= K-5B
Computed left ponded width exceeds allowable width at inlet Id= K-11A
Computed right ponded width exceeds allowable width at inlet Id= K-11B
Run# 10 Insufficient capacity.
Run# 9 Insufficient capacity.
Run# 8 Insufficient capacity.
Run# 7 Insufficient capacity.
Run# 6 Insufficient capacity.
Run# 5 Insufficient capacity.
Run# 4 Insufficient capacity.
Run# 1 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00.

2. ADDITIONAL NEGATIVE Q (-8.00 CFS) IN NODE K-1 (EXISTING MANHOLE) IS THE MAXIMUM DEVIATED FLOW TO DISCHARGE FROM BRENTWOOD BAPTIST CHURCH INTO WEST OREM SYSTEM NODE W-4 USING EXISTING 24" RCP STORM, IN ORDER TO ALLEVIATE KNOTTY OAKS SYSTEM K.
SEE SHEET NO. 21

3. BRENTWOOD BAPTIST CHURCH EXISTING AND FUTURE DEVELOPMENT MUST COMPLY WITH COH INFRASTRUCTURE DESIGN MANUAL 9.05-DESIGN REQUIREMENTS, SECTION H-STORMWATER DETENTION. THE FOLLOWING DETENTION PARAMETERS WERE CALCULATED ACCORDINGLY:

AREA SERVICED = 32.08 ACRES

COH ALLOWS A MAXIMUM 100-YEAR EVENT= 2.0 CFS/ACRE

MAXIMUM OUTFLOW RATE ALLOWED= 64.16 CFS/ACRE
EQUIVALENT UNDEVELOPED C FACTOR= 0.323

EQUIVALENT C-FACTOR WAS USED TO SIMULATE THE MAXIMUM TOTAL Q FOR 2-YEAR AND 100-YEAR EVENTS IN HOUSTORM CALCULATIONS.

4. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE CUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
CONSULTING ENGINEERS, INC.
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
05-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

KNOTTY OAKS TR. 100-YEAR EVENT
8 OF 11

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 27 OF 191	

PUBLIC WORKS ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:29:50 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/21/2012 1:04:31 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM T - TIDEWATER
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-T.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
T-1A	0.8	0.27	22.94	22.94	3.56	0.000	0.768
	0.8	0.27	Business District				
T-1B	0.6	0.10	21.67	21.67	3.65	0.000	0.219
	0.8	0.06	Business District				
	0.3	0.04	Railroad Yard areas				
T-2A	0.3	1.39	25.06	25.06	3.40	0.000	1.419
	0.3	1.39	Railroad Yard areas				
T-2B	0.55	0.14	22.07	22.07	3.62	0.000	0.279
	0.8	0.07	Business District				
	0.3	0.07	Railroad Yard areas				
T-3A	0.3	3.89	27.70	27.70	3.23	0.000	3.771
	0.3	3.89	Railroad Yard areas				
T-3B	0.55	1.94	26.24	26.24	3.32	0.000	3.546
	0.55	1.94	Residential Lots < 1/4 acre				
T-4A	0.56	2.08	26.38	26.38	3.31	0.000	3.858
	0.8	1.08	Business District				
	0.3	1.00	Railroad Yard areas				
T-4B	0.55	0.65	24.27	24.27	3.46	0.000	1.236
	0.55	0.65	Residential Lots < 1/4 acre				
T-6A	0.55	0.57	24.06	24.06	3.47	0.000	1.089
	0.55	0.57	Residential Lots < 1/4 acre				
T-6B	0.55	0.48	23.79	23.79	3.49	0.000	0.922
	0.55	0.48	Residential Lots < 1/4 acre				
T-7A	0.55	1.88	26.18	26.18	3.33	0.000	3.441
	0.55	1.88	Residential Lots < 1/4 acre				
T-7B	0.55	1.92	26.22	26.22	3.33	0.000	3.511
	0.55	1.92	Residential Lots < 1/4 acre				
T-8A	0.55	0.60	24.14	24.14	3.47	0.000	1.144
	0.55	0.60	Residential Lots < 1/4 acre				
T-8B	0.55	0.46	23.72	23.72	3.50	0.000	0.885
	0.55	0.46	Residential Lots < 1/4 acre				
T-10A	0.55	1.56	25.81	25.81	3.35	0.000	2.876
	0.55	1.56	Residential Lots < 1/4 acre				
T-10B	0.55	1.16	25.06	25.06	3.40	0.000	2.171
	0.55	1.16	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
T-2A	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
T-2B	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
T-4A	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00
T-4B	Curb	5.13	0.50	2.00	0.014	0.33	n/a	n/a	12.00
T-6A	Curb	5.13	0.31	2.00	0.014	0.33	n/a	n/a	12.00
T-6B	Curb	5.13	0.31	2.00	0.014	0.33	n/a	n/a	12.00
T-8A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
T-8B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
T-2A	Curb	1.419	1.419	0.355	0.000	T-3A	4.81	5.13	9.60
T-2B	Curb	0.279	0.279	0.070	0.000	T-3B	2.05	5.13	5.25
T-4A	Curb	3.858	3.306	0.965	0.553	T-3A	7.76	5.13	11.03
T-4B	Curb	1.236	1.236	0.309	0.000	T-3B	4.90	5.13	8.45
T-6A	Curb	1.089	1.089	0.272	0.000	T-7A	4.08	5.13	8.80
T-6B	Curb	0.922	0.922	0.230	0.000	T-7B	3.73	5.13	8.30
T-8A	Curb	1.144	1.144	0.286	0.000	T-7A	4.17	5.13	9.05
T-8B	Curb	0.885	0.885	0.221	0.000	T-7B	3.61	5.13	8.20

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
T-1A	Curb	5.13	0.00	0.30	2.00	2.00	2.00	0.014	1.50	1.50
T-1B	Curb	5.13	0.00	2.00	2.00	0.30	2.00	0.014	1.50	1.50
T-3A	Curb	8.00	0.00	0.37	2.00	0.33	2.00	0.014	1.50	1.50
T-3B	Curb	8.00	0.00	0.33	2.00	0.37	2.00	0.014	1.50	1.50
T-7A	Curb	5.13	0.00	0.31	2.00	0.30	2.00	0.014	1.50	1.50
T-7B	Curb	5.13	0.00	0.31	2.00	0.30	2.00	0.014	1.50	1.50
T-10A	Curb	5.13	0.00	0.45	2.00	0.51	2.00	0.014	1.50	1.50
T-10B	Curb	5.13	0.00	0.51	2.00	0.45	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
T-1A	Curb	5.13	n/a	n/a	0.768	13.140	0.214	7.50	2.30
T-1B	Curb	5.13	n/a	n/a	0.219	13.140	0.210	1.85	4.45
T-3A	Curb	8.00	n/a	n/a	4.324	24.036	0.290	9.86	11.73
T-3B	Curb	8.00	n/a	n/a	3.546	24.036	0.277	11.20	9.40
T-7A	Curb	5.13	n/a	n/a	3.441	13.140	0.298	10.45	10.55
T-7B	Curb	5.13	n/a	n/a	3.511	13.140	0.302	10.55	10.60
T-10A	Curb	5.13	n/a	n/a	2.876	13.140	0.272	9.10	8.90
T-10B	Curb	5.13	n/a	n/a	2.171	13.140	0.245	8.00	8.20

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
T-1A	Curb	0.800	0.27	22.94	3.56		0.00	0.768
T-1B	Curb	0.600	0.10	21.67	3.65		0.00	0.219
T-2A	Curb	0.300	1.39	25.06	3.40		0.00	1.419
T-2B	Curb	0.550	0.14	22.07	3.62		0.00	0.279
T-3A	Curb	0.300	3.89	27.70	3.23		0.00	3.771
T-3B	Curb	0.550	1.94	26.24	3.32		0.00	3.546
T-4A	Curb	0.560	2.08	26.38	3.31		0.00	3.858
T-4B	Curb	0.550	0.65	24.27	3.46		0.00	1.236
T-6A	Curb	0.550	0.57	24.06	3.47		0.00	1.089
T-6B	Curb	0.550	0.48	23.79	3.49		0.00	0.922
T-7A	Curb	0.550	1.88	26.18	3.33		0.00	3.441
T-7B	Curb	0.550	1.92	26.22	3.33		0.00	3.511
T-8A	Curb	0.550	0.60	24.14	3.47		0.00	1.144
T-8B	Curb	0.550	0.46	23.72	3.50		0.00	0.885
T-10A	Curb	0.550	1.56	25.81	3.35		0.00	2.876
T-10B	Curb	0.550	1.16	25.06	3.40		0.00	2.171
T-1N	CrcMh	0.800	0.27	22.96	3.55		0.00	0.768
T-1S	CrcMh	0.600	0.10	21.70	3.65		0.00	0.219
T-1	CrcMh	0.746	0.37	23.28	3.53		0.00	0.974
T-2	CrcMh	0.405	1.90	25.16	3.40		0.00	2.614
T-3	CrcMh	0.389	7.73	27.78	3.23		0.00	9.693
T-4	CrcMh	0.433	10.46	28.68	3.17		0.00	14.359
T-5	CrcMh	0.433	10.46	28.68	3.17		0.00	14.359
T-6	CrcMh	0.550	1.05	24.08	3.47		0.00	2.005
T-7	CrcMh	0.550	4.85	26.27	3.32		0.00	8.861
T-8	CrcMh	0.550	5.91	27.31	3.26		0.00	10.582
T-9	CrcMh	0.475	16.37	29.68	3.12		0.00	24.223
T-10	CrcMh	0.486	19.09	30.15	3.09		0.00	28.638
T-11	CrcMh	0.486	19.09	30.15	3.09		0.00	28.638
T-12	CrcMh	0.486	19.09	30.15	3.09		0.00	28.638
T-4AUX	CrcMh	0.433	10.46	28.68	3.17		0.00	14.359
T-9AUX	CrcMh	0.475	16.37	29.68	3.12		0.00	24.223
T-6AUX	CrcMh	0.550	1.05	24.08	3.47		0.00	2.005
T-8AUX	CrcMh	0.550	5.91	27.31	3.26		0.00	10.582
OUT-T	Outlt	0.486	19.09	30.15	3.09		0.00	28.638

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
27	T-8A	T-8	47.54	47.04	Cir 1	0.00	2.00	7.0	7.161	0.013
28	T-8B	T-8	47.54	47.04	Cir 1	0.00	2.00	20.0	2.501	0.013
29	T-10A	T-10	46.83	46.33	Cir 1	0.00	2.00	7.0	7.161	0.013
30	T-10B	T-10	46.83	46.33	Cir 1	0.00	2.00	20.0	2.501	0.013
1	T-1N	T-1	48.18	47.95	Cir 1	0.00	2.00	50.0	0.460	0.013
2	T-1S	T-1	48.18	47.95	Cir 1	0.00	2.00	50.0	0.460	0.013
3	T-1	T-2	47.95	47.75	Cir 1	0.00	2.00	56.0	0.357	0.013
4	T-2	T-3	47.75	46.04	Cir 1	0.00	2.00	368.0	0.465	0.013
5	T-3	T-4	46.04	45.34	Cir 1	0.00	2.50	237.0	0.295	0.013
6	T-4	T-4AUX	45.34	44.89	Cir 1	0.00	2.50	143.0	0.315	0.013
7	T-5	T-9	41.40	40.53	Cir 1	0.00	2.50	291.0	0.299	0.013
8	T-9AUX	T-10	40.43	40.02	Cir 1	0.00	3.00	151.0	0.272	0.013
9	T-10	T-11	40.02	39.84	Cir 1	0.00	3.00	64.0	0.281	0.013
10	T-11	T-12	39.84	39.44	Cir 1	0.00	3.00	148.0	0.270	0.013
11	T-12	OUT-T	39.44	39.32	Cir 1	0.00	3.00	32.0	0.375	0.013
12	T-6	T-6AUX	46.92	46.15	Cir 1	0.00	2.00	249.0	0.309	0.013
13	T-7	T-8	46.08	44.59	Cir 1	0.00	2.00	319.0	0.467	0.013
14	T-8	T-8AUX	44.59	44.21	Cir 1	0.00	2.50	122.0	0.311	0.013
15	T-1A	T-1N	48.68	48.18	Cir 1	0.00	2.00	7.0	7.161	0.013
16	T-1B	T-1S	48.68	48.18	Cir 1	0.00	2.00	7.0	7.161	0.013
17	T-2A	T-2	48.21	47.71	Cir 1	0.00	2.00	30.0	1.667	0.013
18	T-2B	T-2	48.21	47.71	Cir 1	0.00	2.00	10.0	5.006	0.013
19	T-3A	T-3	47.05	46.55	Cir 1	0.00	2.00	30.0	1.667	0.013
20	T-3B	T-3	47.05	46.55	Cir 1	0.00	2.00	10.0	5.006	0.013
21	T-4A	T-4	47.93	47.43	Cir 1	0.00	2.00	30.0	1.667	0.013
22	T-4B	T-4	47.93	47.43	Cir 1	0.00	2.00	10.0	5.006	0.013
23	T-6A	T-6	47.42	46.92	Cir 1	0.00	2.00	7.0	7.161	0.013
24	T-6B	T-6	47.42	46.92	Cir 1	0.00	2.00	20.0	2.501	0.013
25	T-7A	T-7	46.58	46.08	Cir 1	0.00	2.00	7.0	7.161	0.013
26	T-7B	T-7	46.58	46.08	Cir 1	0.00	2.00	20.0	2.501	0.013
31	T-4AUX	T-5	41.58	41.40	Cir 1	0.00	2.50	61.0	0.295	0.013
32	T-9	T-9AUX	40.53	40.47	Ell 1	3.77	2.40	35.0	0.171	0.013
34	T-6AUX	T-7	46.15	46.08	Cir 1	0.00	2.00	21.0	0.333	0.013
35	T-8AUX	T-9	42.15	42.06	Cir 1	0.00	2.50	49.0	0.184	0.013

Conveyance Hydraulic Computations. Tailwater = 42.320 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
27*	49.04	49.04	51.71	0.003	0.19	2.00	7.50	2.85	1.1	60.8	0.000
28*	49.04	49.04	51.71	0.002	0.22	2.00	4.81	2.68	0.9	35.9	0.000
29*	48.33	48.33	51.00	0.016	0.30	2.00	9.89	3.71	2.9	60.8	0.000
30*	48.33	48.33	51.00	0.009	0.33	2.00	6.29	3.42	2.2	35.9	0.000
1*	48.51	48.51	53.00	0.001	0.30	0.56	2.55	2.54	0.8	15.4	0.000
2*	48.51	48.51	52.85	0.000	0.17	0.56	1.75	1.47	0.2	15.4	0.000
3	48.51	48.34	53.00	0.002	0.36	0.59	2.50	1.25	1.0	13.6	0.000
4*	48.34	48.26	52.38	0.013	0.56	2.00	3.66	0.83	2.6	15.5	0.000
5	48.26	47.68	51.22	0.055	1.15	2.34	4.39	2.03	9.7	22.4	0.000
6	47.68	47.39	52.10	0.122	1.43	2.50	4.94	2.93	14.4	23.1	0.000
7	43.17	42.76	53.10	0.122	1.46	2.23	4.84	3.11	14.4	22.5	0.000
8	42.72	42.56	51.80	0.131	1.85	2.54	5.31	3.79	24.2	34.9	0.000
9	42.56	42.52	51.00	0.183	2.05	2.68	5.57	4.30	28.6	35.5	0.000
10	42.52	42.38	51.50	0.183	2.08	2.94	5.48	4.07	28.6	34.8	0.000
11	42.38	42.32	52.01	0.183	1.85	3.00	6.25	4.05	28.6	41.0	0.000
12	48.85	48.09	51.59	0.008	0.54	1.94	2.93	0.64	2.0	12.6	0.000
13	48.02	47.02	50.75	0.152	1.09	2.00	5.09	2.82	8.9	15.5	0.000
14	47.02	46.71	51.71	0.066	1.19	2.50	4.57	2.16	10.6	23.0	0.000
15*	48.98	48.51	53.00	0.001	0.16	0.33	6.65	2.28	0.8	60.8	0.000
16*	48.87	48.51	52.85	0.000	0.09	0.33	4.55	0.65	0.2	60.8	0.000
17*	48.62	48.34	52.38	0.004	0.30	0.63	4.80	1.66	1.4	29.3	0.000
18*	48.37	48.34	52.38	0.000	0.11	0.63	4.32	0.33	0.3	50.8	0.000
19*	48.27	48.26	51.22	0.028	0.49	1.71	6.40	4.00	3.8	29.3	0.000
20*	48.26	48.26	51.22	0.024	0.36	1.71	9.28	3.93	3.5	50.8	0.000
21*	48.42	47.68	52.10	0.029	0.49	0.49	6.45	6.45	3.9	29.3	0.000
22*	48.15	47.68	52.10	0.003	0.22	0.25	6.78	5.55	1.2	50.8	0.000
23*	48.85	48.85	51.59	0.002	0.19	1.93	7.39	2.75	1.1	60.8	0.000
24*	48.85	48.85	51.59	0.002	0.22	1.93	4.87	2.65	0.9	35.9	0.000
25*	48.02	48.02	50.75	0.023	0.32	1.94	10.43	3.87	3.4	60.8	0.000
26*	48.03	48.02	50.75	0.024	0.42	1.94	7.24	3.92	3.5	35.9	0.000
31	43.16	43.17	52.60	0.122	1.46	1.77	4.82	3.87	14.4	22.4	0.000
32	42.76	42.72	51.80	0.137	1.60	2.25	4.82	3.50	24.2	27.1	0.000
34	48.09	48.02	50.81	0.008	0.53	1.94	3.01	0.64	2.0	13.1	0.000
35	43.55	42.76	51.72	0.066	1.40	1.40	3.75	3.75	10.6	17.7	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	23	1355.0
Circular	Concrete	2.5	0.0	6	903.0
Circular	Concrete	3.0	0.0	4	395.0
Elliptical	Concrete	2.4	3.77	1	35.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	6
Curb On Grade		5.125	0.0	0.0	0.0	0.0	8
Curb In Sag		8.0	0.0	0.0	0.0	0.0	2
Circular Manhole		0.0	0.0	0.0	0.0	0.0	18
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= T-1N Previous intensity used.
Discharge decreased downstream node Id= T-1S Previous intensity used.
Discharge decreased downstream node Id= T-4AUX Previous intensity used.
Discharge decreased downstream node Id= T-6AUX Previous intensity used.
Discharge decreased downstream node Id= T-5 Previous intensity used.
Discharge decreased downstream node Id= T-8AUX Previous intensity used.
Decreasing conduit size @ downstream Run# 32
Decreasing conduit size @ downstream Run# 32
Discharge decreased downstream node Id= T-9AUX Previous intensity used.
Discharge decreased downstream node Id= T-11 Previous intensity used.
Discharge decreased downstream node Id= T-12 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= T-4A
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 29
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 30
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 14
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 27
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 28
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 6

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE.
2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — FRANCISCO A. AREVALO — 98562 — LICENSED PROFESSIONAL ENGINEER — 03/30/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

TIDEWATER DR. 2-YEAR EVENT
9 OF 11

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 28 OF 191	

PUBLIC WORKS & ENGINEERING — 49210 — CITY MEMBER — HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:30:06 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/21/2012 1:06:25 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM T - TIDEWATER
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\2012 Final Design\SYSTEM-T.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
T-1A	0.8	0.27	22.94	22.94	7.25	0.000	1.566
	0.8	0.27	Business District				
T-1B	0.6	0.10	21.67	21.67	7.41	0.000	0.444
	0.8	0.06	Business District				
	0.3	0.04	Railroad Yard areas				
T-2A	0.3	1.39	25.06	25.06	7.00	0.000	2.920
	0.3	1.39	Railroad Yard areas				
T-2B	0.55	0.14	22.07	22.07	7.36	0.000	0.566
	0.8	0.07	Business District				
	0.3	0.07	Railroad Yard areas				
T-3A	0.3	3.89	27.70	27.70	6.72	0.000	7.842
	0.3	3.89	Railroad Yard areas				
T-3B	0.55	1.94	26.24	26.24	6.87	0.000	7.333
	0.55	1.94	Residential Lots < 1/4 acre				
T-4A	0.56	2.08	26.38	26.38	6.86	0.000	7.982
	0.8	1.08	Business District				
	0.3	1.00	Railroad Yard areas				
T-4B	0.55	0.65	24.27	24.27	7.09	0.000	2.535
	0.55	0.65	Residential Lots < 1/4 acre				
T-6A	0.55	0.57	24.06	24.06	7.12	0.000	2.231
	0.55	0.57	Residential Lots < 1/4 acre				
T-6B	0.55	0.48	23.79	23.79	7.15	0.000	1.887
	0.55	0.48	Residential Lots < 1/4 acre				
T-7A	0.55	1.88	26.18	26.18	6.88	0.000	7.113
	0.55	1.88	Residential Lots < 1/4 acre				
T-7B	0.55	1.92	26.22	26.22	6.87	0.000	7.259
	0.55	1.92	Residential Lots < 1/4 acre				
T-8A	0.55	0.60	24.14	24.14	7.11	0.000	2.345
	0.55	0.60	Residential Lots < 1/4 acre				
T-8B	0.55	0.46	23.72	23.72	7.16	0.000	1.810
	0.55	0.46	Residential Lots < 1/4 acre				
T-10A	0.55	1.56	25.81	25.81	6.92	0.000	5.936
	0.55	1.56	Residential Lots < 1/4 acre				
T-10B	0.55	1.16	25.06	25.06	7.00	0.000	4.467
	0.55	1.16	Residential Lots < 1/4 acre				

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
T-2A	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
T-2B	Curb	5.13	0.33	2.00	0.014	0.33	n/a	n/a	12.00
T-4A	Curb	5.13	0.37	2.00	0.014	0.33	n/a	n/a	12.00
T-4B	Curb	5.13	0.50	2.00	0.014	0.33	n/a	n/a	12.00
T-6A	Curb	5.13	0.31	2.00	0.014	0.33	n/a	n/a	12.00
T-6B	Curb	5.13	0.31	2.00	0.014	0.33	n/a	n/a	12.00
T-8A	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00
T-8B	Curb	5.13	0.30	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
T-2A	Curb	2.920	2.582	0.730	0.338	T-3A	7.34	5.13	12.60
T-2B	Curb	0.566	0.566	0.142	0.000	T-3B	2.91	5.13	6.80
T-4A	Curb	7.982	5.102	1.995	2.879	T-3A	11.85	5.13	14.40
T-4B	Curb	2.535	2.236	0.634	0.299	T-3B	7.37	5.13	11.05
T-6A	Curb	2.231	2.139	0.558	0.092	T-7A	6.18	5.13	11.55
T-6B	Curb	1.887	1.865	0.472	0.022	T-7B	5.60	5.13	10.85
T-8A	Curb	2.345	2.228	0.586	0.117	T-7A	6.32	5.13	11.85
T-8B	Curb	1.810	1.800	0.453	0.010	T-7B	5.43	5.13	10.75

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
T-1A	Curb	5.13	0.00	0.30	2.00	2.00	2.00	0.014	1.50	1.50
T-1B	Curb	5.13	0.00	2.00	2.00	0.30	2.00	0.014	1.50	1.50
T-3A	Curb	8.00	0.00	0.37	2.00	0.33	2.00	0.014	1.50	1.50
T-3B	Curb	8.00	0.00	0.33	2.00	0.37	2.00	0.014	1.50	1.50
T-7A	Curb	5.13	0.00	0.31	2.00	0.30	2.00	0.014	1.50	1.50
T-7B	Curb	5.13	0.00	0.31	2.00	0.30	2.00	0.014	1.50	1.50
T-10A	Curb	5.13	0.00	0.45	2.00	0.51	2.00	0.014	1.50	1.50
T-10B	Curb	5.13	0.00	0.51	2.00	0.45	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
T-1A	Curb	5.13	n/a	n/a	1.566	13.140	0.228	9.75	3.00
T-1B	Curb	5.13	n/a	n/a	0.444	13.140	0.211	2.40	5.85
T-3A	Curb	8.00	n/a	n/a	11.059	24.036	0.515	13.95	16.55
T-3B	Curb	8.00	n/a	n/a	7.632	24.036	0.376	14.95	12.55
T-7A	Curb	5.13	n/a	n/a	7.322	13.140	0.611	13.90	14.00
T-7B	Curb	5.13	n/a	n/a	7.291	13.140	0.607	13.85	13.95
T-10A	Curb	5.13	n/a	n/a	5.936	13.140	0.473	11.95	11.70
T-10B	Curb	5.13	n/a	n/a	4.467	13.140	0.359	10.50	10.75

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
T-1A	Curb	0.800	0.27	22.94	7.25		0.00	1.566
T-1B	Curb	0.600	0.10	21.67	7.41		0.00	0.444
T-2A	Curb	0.300	1.39	25.06	7.00		0.00	2.920
T-2B	Curb	0.550	0.14	22.07	7.36		0.00	0.566
T-3A	Curb	0.300	3.89	27.70	6.72		0.00	7.842
T-3B	Curb	0.550	1.94	26.24	6.87		0.00	7.333
T-4A	Curb	0.560	2.08	26.38	6.86		0.00	7.982
T-4B	Curb	0.550	0.65	24.27	7.09		0.00	2.535
T-6A	Curb	0.550	0.57	24.06	7.12		0.00	2.231
T-6B	Curb	0.550	0.48	23.79	7.15		0.00	1.887
T-7A	Curb	0.550	1.88	26.18	6.88		0.00	7.113
T-7B	Curb	0.550	1.92	26.22	6.87		0.00	7.259
T-8A	Curb	0.550	0.60	24.14	7.11		0.00	2.345
T-8B	Curb	0.550	0.46	23.72	7.16		0.00	1.810
T-10A	Curb	0.550	1.56	25.81	6.92		0.00	5.936
T-10B	Curb	0.550	1.16	25.06	7.00		0.00	4.467
T-1N	CrcMh	0.800	0.27	22.95	7.25		0.00	1.566
T-1S	CrcMh	0.600	0.10	21.69	7.40		0.00	0.444
T-1	CrcMh	0.746	0.37	23.22	7.22		0.00	1.991
T-2	CrcMh	0.405	1.90	25.14	6.99		0.00	5.384
T-3	CrcMh	0.389	7.73	27.76	6.71		0.00	20.166
T-4	CrcMh	0.433	10.46	28.53	6.64		0.00	30.032
T-5	CrcMh	0.433	10.46	28.53	6.64		0.00	30.032
T-6	CrcMh	0.550	1.05	24.07	7.11		0.00	4.109
T-7	CrcMh	0.550	4.85	26.26	6.87		0.00	18.327
T-8	CrcMh	0.550	5.91	27.17	6.77		0.00	22.020
T-9	CrcMh	0.475	16.37	29.32	6.56		0.00	51.002
T-10	CrcMh	0.486	19.09	29.67	6.53		0.00	60.505
T-11	CrcMh	0.486	19.09	29.67	6.53		0.00	60.505
T-12	CrcMh	0.486	19.09	29.67	6.53		0.00	60.505
T-4AUX	CrcMh	0.433	10.46	28.53	6.64		0.00	30.032
T-9AUX	CrcMh	0.475	16.37	29.32	6.56		0.00	51.002
T-6AUX	CrcMh	0.550	1.05	24.07	7.11		0.00	4.109
T-8AUX	CrcMh	0.550	5.91	27.17	6.77		0.00	22.020
OUT-T	Outlt	0.486	19.09	29.67	6.53		0.00	60.505

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
27	T-8A	T-8	47.54	47.04	Cir 1	0.00	2.00	7.0	7.161	0.013
28	T-8B	T-8	47.54	47.04	Cir 1	0.00	2.00	20.0	2.501	0.013
29	T-10A	T-10	46.83	46.33	Cir 1	0.00	2.00	7.0	7.161	0.013
30	T-10B	T-10	46.83	46.33	Cir 1	0.00	2.00	20.0	2.501	0.013
1	T-1N	T-1	48.18	47.95	Cir 1	0.00	2.00	50.0	0.460	0.013
2	T-1S	T-1	48.18	47.95	Cir 1	0.00	2.00	50.0	0.460	0.013
3	T-1	T-2	47.95	47.75	Cir 1	0.00	2.00	56.0	0.357	0.013
4	T-2	T-3	47.75	46.04	Cir 1	0.00	2.00	368.0	0.465	0.013
5	T-3	T-4	46.04	45.34	Cir 1	0.00	2.50	237.0	0.295	0.013
6	T-4	T-4AUX	45.34	44.89	Cir 1	0.00	2.50	143.0	0.315	0.013
7	T-5	T-9	41.40	40.53	Cir 1	0.00	2.50	291.0	0.299	0.013
8	T-9AUX	T-10	40.43	40.02	Cir 1	0.00	3.00	151.0	0.272	0.013
9	T-10	T-11	40.02	39.84	Cir 1	0.00	3.00	64.0	0.281	0.013
10	T-11	T-12	39.84	39.44	Cir 1	0.00	3.00	148.0	0.270	0.013
11	T-12	OUT-T	39.44	39.32	Cir 1	0.00	3.00	32.0	0.375	0.013
12	T-6	T-6AUX	46.92	46.15	Cir 1	0.00	2.00	249.0	0.309	0.013
13	T-7	T-8	46.08	44.59	Cir 1	0.00	2.00	319.0	0.467	0.013
14	T-8	T-8AUX	44.59	44.21	Cir 1	0.00	2.50	122.0	0.311	0.013
15	T-1A	T-1N	48.68	48.18	Cir 1	0.00	2.00	7.0	7.161	0.013
16	T-1B	T-1S	48.68	48.18	Cir 1	0.00	2.00	7.0	7.161	0.013
17	T-2A	T-2	48.21	47.71	Cir 1	0.00	2.00	30.0	1.667	0.013
18	T-2B	T-2	48.21	47.71	Cir 1	0.00	2.00	10.0	5.006	0.013
19	T-3A	T-3	47.05	46.55	Cir 1	0.00	2.00	30.0	1.667	0.013
20	T-3B	T-3	47.05	46.55	Cir 1	0.00	2.00	10.0	5.006	0.013
21	T-4A	T-4	47.93	47.43	Cir 1	0.00	2.00	30.0	1.667	0.013
22	T-4B	T-4	47.93	47.43	Cir 1	0.00	2.00	10.0	5.006	0.013
23	T-6A	T-6	47.42	46.92	Cir 1	0.00	2.00	7.0	7.161	0.013
24	T-6B	T-6	47.42	46.92	Cir 1	0.00	2.00	20.0	2.501	0.013
25	T-7A	T-7	46.58	46.08	Cir 1	0.00	2.00	7.0	7.161	0.013
26	T-7B	T-7	46.58	46.08	Cir 1	0.00	2.00	20.0	2.501	0.013
31	T-4AUX	T-5	41.58	41.40	Cir 1	0.00	2.50	61.0	0.295	0.013
32	T-9	T-9AUX	40.53	40.47	Ell 1	3.77	2.40	35.0	0.171	0.013
34	T-6AUX	T-7	46.15	46.08	Cir 1	0.00	2.00	21.0	0.333	0.013
35	T-8AUX	T-9	42.15	42.06	Cir 1	0.00	2.50	49.0	0.184	0.013

Conveyance Hydraulic Computations. Tailwater = 45.650 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
27*	48.90	48.90	52.80	0.011	0.27	1.86	9.31	3.50	2.3	60.8	0.000
28*	48.90	48.90	52.80	0.006	0.31	1.86	5.96	3.26	1.8	35.9	0.000
29*	47.69	47.64	52.50	0.068	0.42	1.31	12.25	2.72	5.9	60.8	0.000
30*	47.65	47.64	52.50	0.039	0.48	1.31	7.77	4.21	4.5	35.9	0.000
1	52.12	51.89	53.50	0.005	0.43	2.00	3.14	0.50	1.6	15.4	0.000
2*	51.89	51.89	53.50	0.000	0.23	2.00	2.16	2.15	0.4	15.4	0.000
3	51.89	51.70	53.50	0.008	0.52	2.00	3.08	0.63	2.0	13.6	0.000
4*	51.70	51.49	53.00	0.056	0.82	2.00	4.47	4.45	5.4	15.5	0.000
5	51.49	51.36	52.00	0.240	1.86	2.50	5.15	4.11	20.2	22.4	0.000
6	51.36	50.60	52.70	0.532	2.50	2.50	6.12	6.12	30.0	23.1	0.000
7	50.28	48.73	53.60	0.532	2.50	2.50	6.12	6.12	30.0	22.5	0.000
8	48.52	47.64	53.00	0.580	3.00	3.00	7.22	7.22	51.0	34.9	0.000
9	47.64	47.12	52.50	0.816	3.00	3.00	8.56	8.56	60.5	35.5	0.000
10	47.12	45.91	52.00	0.816	3.00	3.00	8.56	8.56	60.5	34.8	0.000
11	45.91	45.65	52.51	0.816	3.00	3.00	8.56	8.56	60.5	41.0	0.000
12	51.73	51.04	53.00	0.033	0.79	2.00	3.58	1.31	4.1	12.6	0.000
13	50.98	48.90	52.30	0.651	2.00	2.00	5.83	5.83	18.3	15.5	0.000
14	48.90	48.87	52.80	0.286	1.97	2.50	5.31	4.49	22.0	23.0	0.000
15*	52.12	52.12	53.50	0.005	0.22	2.00	8.25	3.14	1.6	60.8	0.000
16*	51.89	51.89	53.50	0.000	0.12	2.00	5.63	2.15	0.4	60.8	0.000
17*	51.70	51.70	53.20	0.017	0.43	2.00	5.94	3.71	2.9	29.3	0.000
18*	51.70	51.70	53.20	0.001	0.15	2.00	5.35	2.34	0.6	50.8	0.000
19*	51.53	51.49	52.00	0.119	0.71	2.00	7.88	5.01	7.8	29.3	0.000
20*	51.50	51.49	52.00	0.104	0.51	2.00	11.47	4.91	7.3	50.8	0.000
21*	51.40	51.36	52.70	0.123	0.71	2.00	7.92	5.04	8.0	29.3	0.000
22*	51.36	51.36	52.70	0.012	0.30	2.00	8.40	3.60	2.5	50.8	0.000
23*	51.73	51.73	53.00	0.010	0.26	2.00	9.17	3.46	2.2	60.8	0.000
24*	51.73	51.73	53.00	0.007	0.31	2.00	6.03	3.33	1.9	35.9	0.000
25*	50.98	50.98	52.30	0.098	0.46	2.00	12.91	4.86	7.1	60.8	0.000
26*	51.00	50.98	52.30	0.102	0.61	2.00	8.93	4.89	7.3	35.9	0.000
31	50.60	50.28	53.30	0.532	2.50	2.50	6.12	6.12	30.0	22.4	0.000
32	48.73	48.52	52.80	0.606	2.40	2.40	7.18	7.18	51.0	27.1	0.000
34	51.04	50.98	52.30	0.033	0.77	2.00	3.68	1.31	4.1	13.1	0.000
35	48.87	48.73	53.10	0.286	2.50	2.50	4.49	4.49	22.0	17.7	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	23	1355.0
Circular	Concrete	2.5	0.0	6	903.0
Circular	Concrete	3.0	0.0	4	395.0
Elliptical	Concrete	2.4	3.77	1	35.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	6
Curb On Grade		5.125	0.0	0.0	0.0	0.0	8
Curb In Sag		8.0	0.0	0.0	0.0	0.0	2
Circular Manhole		0.0	0.0	0.0	0.0	0.0	18
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= T-1N Previous intensity used.
Discharge decreased downstream node Id= T-1S Previous intensity used.
Discharge decreased downstream node Id= T-4AUX Previous intensity used.
Discharge decreased downstream node Id= T-6AUX Previous intensity used.
Discharge decreased downstream node Id= T-5 Previous intensity used.
Discharge decreased downstream node Id= T-8AUX Previous intensity used.
Decreasing conduit size @ downstream Run# 32
Decreasing conduit size @ downstream Run# 32
Discharge decreased downstream node Id= T-9AUX Previous intensity used.
Discharge decreased downstream node Id= T-11 Previous intensity used.
Discharge decreased downstream node Id= T-12 Previous intensity used.
Capacity of grade inlet exceeded at inlet Id= T-2A
Computed ponded width exceeds allowable width at inlet Id= T-2A
Capacity of grade inlet exceeded at inlet Id= T-4A
Computed ponded width exceeds allowable width at inlet Id= T-4A
Capacity of grade inlet exceeded at inlet Id= T-4B
Capacity of grade inlet exceeded at inlet Id= T-6A
Capacity of grade inlet exceeded at inlet Id= T-6B
Capacity of grade inlet exceeded at inlet Id= T-8A
Capacity of grade inlet exceeded at inlet Id= T-8B
Computed right ponded width exceeds allowable width at inlet Id= T-3A
Computed left ponded width exceeds allowable width at inlet Id= T-3A
Computed right ponded width exceeds allowable width at inlet Id= T-3B
Computed left ponded width exceeds allowable width at inlet Id= T-3B
Computed right ponded width exceeds allowable width at inlet Id= T-7A
Computed left ponded width exceeds allowable width at inlet Id= T-7A

(CONT.)
Computed right ponded width exceeds allowable width at inlet Id= T-7B
Computed left ponded width exceeds allowable width at inlet Id= T-7B
Run# 11 Insufficient capacity.
Run# 10 Insufficient capacity.
Run# 9 Insufficient capacity.
Run# 8 Insufficient capacity.
Run# 32 Insufficient capacity.
Run# 35 Insufficient capacity.
Run# 7 Insufficient capacity.
Run# 31 Insufficient capacity.
Run# 6 Insufficient capacity.
Run# 13 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00.

2. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

SES HORIZON
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TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
05/30/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS
HYDRAULIC CALCULATIONS
TIDEWATER DR. 100-YEAR EVENT
10 OF 11

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 29 OF 191	

PROJECT NUMBER 49210
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Tuesday, April 10, 2012 7:15:43 AM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/21/2012 1:10:24 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM H - WUTHERING HEIGHTS
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\FINAL DESIGN\SYSTEM-H.stm

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
H-1A	0.62	1.94	26.24	26.24	3.32	0.000	3.995
	0.8	1.24	Business District				
	0.3	0.70	Railroad Yard areas				
H-1B	0.55	1.61	25.88	25.88	3.35	0.000	2.964
	0.55	1.61	Residential Lots < 1/4 acre				
H-2A	0.55	1.32	25.50	25.50	3.37	0.000	2.449
	0.55	1.32	Residential Lots < 1/4 acre				

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	n	Gutter DeprW (ft)	Head Allowed (ft)
H-1A	Curb	5.13	0.00	1.00	2.00	0.35	2.00	0.013	1.50	1.50
H-1B	Curb	5.13	0.00	0.37	2.00	0.62	2.00	0.013	1.50	1.50
H-2A	Curb	5.13	0.00	0.62	2.00	1.00	2.00	0.013	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
H-1A	Curb	5.13	n/a	n/a	3.995	13.140	0.329	7.15	11.95
H-1B	Curb	5.13	n/a	n/a	2.964	13.140	0.276	9.30	8.45
H-2A	Curb	5.13	n/a	n/a	2.449	13.140	0.255	8.90	5.95

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
H-1A	Curb	0.620	1.94	26.24	3.32		0.00	3.995
H-1B	Curb	0.550	1.61	25.88	3.35		0.00	2.964
H-2A	Curb	0.550	1.32	25.50	3.37		0.00	2.449
H-1	CrcMh	0.588	3.55	26.39	3.31		0.00	6.917
H-2	CrcMh	0.578	4.87	26.58	3.30		0.00	9.289
H-3	CrcMh	0.578	4.87	26.58	3.30		0.00	9.289
H-4	CrcMh	0.578	4.87	26.58	3.30		0.00	9.289
OUT-H	Outlt	0.578	4.87	26.58	3.30		0.00	9.289

Conveyance Configuration Data

Run #	Node US	Node DS	I.D.	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	H-1	H-2		47.20	47.04	Cir 1	0.00	2.00	48.0	0.333	0.013
2	H-2	H-3		47.04	46.50	Cir 1	0.00	2.00	136.0	0.397	0.013
3	H-3	H-4		46.50	46.34	Cir 1	0.00	2.00	40.0	0.400	0.013
4	H-4	OUT-H		40.52	40.04	Cir 1	0.00	2.00	10.0	4.806	0.013
5	H-1A	H-1		47.84	47.34	Cir 1	0.00	2.00	50.0	1.000	0.013
6	H-1B	H-1		47.70	47.20	Cir 1	0.00	2.00	10.0	5.006	0.013
7	H-2A	H-2		47.84	47.34	Cir 1	0.00	2.00	20.0	2.501	0.013

Conveyance Hydraulic Computations. Tailwater = 42.040 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	48.86	48.75	51.87	0.093	1.04	1.71	4.22	2.42	6.9	13.1	0.000
2	48.75	48.44	52.01	0.167	1.18	1.94	4.84	2.99	9.3	14.3	0.000
3	48.44	48.34	53.00	0.167	1.17	2.00	4.85	2.96	9.3	14.4	0.000
4*	42.06	42.04	53.00	0.167	0.59	2.00	12.10	5.31	9.3	49.8	0.000
5*	48.88	48.86	52.01	0.031	0.57	1.52	5.43	4.07	4.0	22.7	0.000
6*	48.86	48.86	51.87	0.017	0.33	1.66	8.80	3.73	3.0	50.8	0.000
7*	48.75	48.75	52.01	0.012	0.35	1.41	6.51	3.54	2.4	35.9	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	7	314.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	3
Circular Manhole		0.0	0.0	0.0	0.0	0.0	4
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= H-3 Previous intensity used.
Discharge decreased downstream node Id= H-4 Previous intensity used.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 3

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 3/21/2012 1:14:18 PM

PROJECT NAME : WHITEHEATHER-IV
JOB NUMBER : FINAL DESIGN
PROJECT DESCRIPTION : SYSTEM H - WUTHERING HEIGHTS
PROJECT File: F:\WHB-SG4\ENG\HouStorm\Proposed\FINAL DESIGN\SYSTEM-H.stm

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
H-1A	0.62	1.94	26.24	26.24	6.87	0.000	8.260
	0.8	1.24	Business District				
	0.3	0.70	Railroad Yard areas				
H-1B	0.55	1.61	25.88	25.88	6.91	0.000	6.120
	0.55	1.61	Residential Lots < 1/4 acre				
H-2A	0.55	1.32	25.50	25.50	6.95	0.000	5.048
	0.55	1.32	Residential Lots < 1/4 acre				

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	n	Gutter DeprW (ft)	Head Allowed (ft)
H-1A	Curb	5.13	0.00	1.00	2.00	0.35	2.00	0.013	1.50	1.50
H-1B	Curb	5.13	0.00	0.37	2.00	0.62	2.00	0.013	1.50	1.50
H-2A	Curb	5.13	0.00	0.62	2.00	1.00	2.00	0.013	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
H-1A	Curb	5.13	n/a	n/a	8.260	13.140	0.720	9.35	15.70
H-1B	Curb	5.13	n/a	n/a	6.120	13.140	0.490	12.20	11.10
H-2A	Curb	5.13	n/a	n/a	5.048	13.140	0.400	11.70	7.80

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
H-1A	Curb	0.620	1.94	26.24	6.87		0.00	8.260
H-1B	Curb	0.550	1.61	25.88	6.91		0.00	6.120
H-2A	Curb	0.550	1.32	25.50	6.95		0.00	5.048
H-1	CrcMh	0.588	3.55	26.37	6.86		0.00	14.318
H-2	CrcMh	0.578	4.87	26.54	6.84		0.00	19.245
H-3	CrcMh	0.578	4.87	26.54	6.84		0.00	19.245
H-4	CrcMh	0.578	4.87	26.54	6.84		0.00	19.245
OUT-H	Outlt	0.578	4.87	26.54	6.84		0.00	19.245

Conveyance Configuration Data

Run #	Node US	Node DS	I.D.	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	H-1	H-2		47.20	47.04	Cir 1	0.00	2.00	48.0	0.333	0.013
2	H-2	H-3		47.04	46.50	Cir 1	0.00	2.00	136.0	0.397	0.013
3	H-3	H-4		46.50	46.34	Cir 1	0.00	2.00	40.0	0.400	0.013
4	H-4	OUT-H		40.52	40.04	Cir 1	0.00	2.00	10.0	4.806	0.013
5	H-1A	H-1		47.84	47.34	Cir 1	0.00	2.00	50.0	1.000	0.013
6	H-1B	H-1		47.70	47.20	Cir 1	0.00	2.00	10.0	5.006	0.013
7	H-2A	H-2		47.84	47.34	Cir 1	0.00	2.00	20.0	2.501	0.013

Conveyance Hydraulic Computations. Tailwater = 45.800 (ft)

Run #	Hyd. Gr.line US (ft)	Hyd. Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	49.79	49.60	52.37	0.397	2.00	2.00	4.56	4.56	14.3	13.1	0.000
2	49.60	48.63	52.51	0.718	2.00	2.00	6.13	6.13	19.2	14.3	0.000
3	48.63	48.34	53.50	0.718	2.00	2.00	6.13	6.13	19.2	14.4	0.000
4*	45.87	45.80	53.50	0.718	0.86	2.00	14.79	7.24	19.2	49.8	0.000
5*	49.86	49.79	52.51	0.132	0.84	2.00	6.64	5.10	8.3	22.7	0.000
6*	49.80	49.79	52.37	0.073	0.47	2.00	10.89	4.63	6.1	50.8	0.000
7*	49.61	49.60	52.51	0.049	0.51	2.00	8.05	4.36	5.0	35.9	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

NOTE:
The convey length should be from upstream to downstream inside box.
This length may also be used as Pay Item.
Using hydraulic length, from node center to node center, may result in profile error, and this length should not be used as Pay Item.

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	7	314.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Curb In Sag		5.125	0.0	0.0	0.0	0.0	3
Circular Manhole		0.0	0.0	0.0	0.0	0.0	4
Outlet		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= H-3 Previous intensity used.
Discharge decreased downstream node Id= H-4 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= H-1A
Computed left ponded width exceeds allowable width at inlet Id= H-1B
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 3
Run# 3 Insufficient capacity.
Run# 2 Insufficient capacity.
Run# 1 Insufficient capacity.

NOTES:

1. TAILWATER ELEVATION AT TOP OF OUTFALL PIPE, FOR 2-YEAR EVENT.
2. TAILWATER ELEVATION AT MAXIMUM 100-YEAR FREQUENCY LEVEL IN WHITEHEATHER CHANNEL HCFCD C146-00-00 WITH 10-YEAR FREQUENCY LEVEL IN SIMS BAYOU HCFCD C100-00-00, FOR 100-YEAR EVENT.
3. ALL HOUSTORM WARNING MESSAGES HAVE BEEN REVIEWED AND DEEMED ACCEPTABLE WITHIN THE DESIGN GUIDELINES OF THIS PROJECT.INSUFFICIENT CAPACITY WARNING MESSAGE IMPLIES A PRESSURED CONDUIT, THAT WAS VERIFIED WORKING WITH A HGL LOWER THAN THE GUTTER ELEVATION, ASSUMED AS THE CRITICAL ELEVATION FOR THE 2 YEAR STORM EVENT. THE TOTAL HYDRAULIC CAPACITY (PROPOSED STORM SEWER PLUS PROJECTED OVERLAND FLOW) WAS FOUND TO BE SUFFICIENT TO CONVEY THE 100 YEAR STORM EVENT.

No.	Date	Revisions	App.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PROPOSED CONDITIONS HYDRAULIC CALCULATIONS

WUTHERING HEIGHTS DR. 2 AND 100-YEAR EVENT
11 OF 11

WBS NO.: M-000262-0004-4	CITY ENGINEER
FILE NO.: SM5056	PUBLIC WORKS AND ENGINEERING
DRAWING SCALE	49210
N.T.S.	LICENSE NUMBER
CITY OF HOUSTON PM	HOUSTON, TEXAS
ISAAC MUNIZ, E.I.T.	
SHEET NO. 30 OF 191	

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Monday, April 09, 2012 4:30:36 PM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

NO ADVERSE IMPACT REPORT DOCUMENTATION

SITE
Civil Engineering, L.P.
Hydrology, Hydraulics, Engineering, Permitting

November 10, 2009

Ms. Cheryl Harris
City of Houston - Public Works and Engineering
Senior Project Manager
611 Walker, 15th Floor
Houston, Texas 77002

Mr. Herb Herndon, P.E.
Harris County Flood Control District
9900 Northwest Freeway
Houston, Texas 77098

Re: ***Hydraulic Impact Analysis – Whiteheather Storm Sewer Improvements KM #572, J,N WBS No.M-000262-0001-4 (Segment III and IV),*** *4SPN1238-03*

Dear Ms. Harris, Dear Mr. Herndon:

We are writing to submit this letter report and study regarding the above captioned project. The City of Houston is proposing to reconstruct storm sewers and paving within the South Glen and Brentwood Subdivisions, collectively known as Whiteheather Storm Sewer Improvements Segments III and IV. Exhibit 1 is a Vicinity Map.

4Site Civil Engineering L.P. has been retained by the City of Houston to prepare this analysis to evaluate any impacts to flooding conditions in the area. Herein, you will find the assignment has been met and the conclusions indicate there will be no impact to receiving water bodies for storm events up to and including the 100-yr event.

Site Plan:
Exhibit 2 is a site map. Proposed improvements include very little change in land use. No new roads will be built, and no existing roads will be widened. Since, only a few of the existing streets will have new sidewalks, the added increased impervious cover will be negligible. Further, some 63 lots adjacent to Sims Bayou have been purchased by HCFCD and the homes removed. This decreases the impervious cover, but is also negligible.

Exhibit 2 also shows existing and proposed storm sewers. All storm sewers will be replaced and some will be upsized. The outfall location of a few segments will be moved away from C146-00-00 and directly into Sims Bayou. These are noted on Exhibit 2.

11419 Overbrook Lane, Houston Texas 77077, 281 759 8484 off, 281 759 8585 fax

Hydrology:

Sims Bayou:
Exhibit 3 is the Drainage Area Map taken from the FIS. It shows the project boundary limits all lie within subarea C100E. The HEC-HMS model uses the Green-Ampt method to develop a "Time of Concentration" and Clark's Storage coefficient "R". These are then coupled with a basin size and percent impervious in the model to develop a runoff hydrograph. The plots in Appendix 1 show the basin data for C100E. The parameters that are used to compute the time of concentration and the storage coefficient include the following:

- Percent Impervious – The project includes no new streets or widening of existing streets and only a few new sidewalks will be added. Further, HCFCD bought some 63 lots bordering Sims Bayou within the project area. These homes were demolished and removed leaving each lot essentially free of impervious cover. These issues are not adequate to affect the percent impervious of subarea C100E.
- Length of Watershed - The overall length of the subarea is not affected by this project for there are no diversions near the upstream end.
- Length to Centroid - The length to centroid is not affected by the project for there are no diversions into or away from subarea C100E. The planned diversion is internal to C100E
- Percent Development – This parameter is not affected since we are not adding any new development to the area
- Percent Conveyance - This parameter remains unchanged since no point source flow is changed to sheet flow and vice versa

These parameters are used to measure the peak rate of runoff for a subarea C100E. That runoff hydrograph combined with the Sims Bayou hydrograph from points upstream, define the peak flow rate in Sims Bayou at routing node 8361. This is shown on the model map included in Appendix 1. Tables 1 through 3 show the peak flow rates along Sims Bayou for the 100-yr, 50-yr and 10-yr storm event.

C146-00-00:
Flow rates along C146-00-00 may be measured with a different methodology since it is a much smaller ditch than Sims Bayou (Rational Method would be the most typical). A primary parameter would be service acreage. Since, the project includes a diversion of acreage from C146-00-00 to Sims Bayou the flow rate in C146-00-00 and the 100-yr water surface profile would both be lowered. That improvement is not quantified herein.

Other parameters for the Rational Method would include a runoff "C" value and time of concentration. The "C" factor is not affected since no new developments will be added to the service area. Further, the time of concentration is measure along the longest watercourse for each subarea draining into C146-00-00. The project area does not lie along that watercourse since most of the drainage area for C146-00-00 lies to the west. Consequently, the longest watercourse would traverse though the west side of C146-00-00 which is not in the project area. This is evident on Exhibit 3.

11419 Overbrook Lane, Houston Texas 77077, 281 759 8484 off, 281 759 8585 fax

Hydraulics:
The project includes no proposed changes to C146-00-00 (existing concrete lined) or Sims Bayou. However, Sims Bayou is undergoing major reconstruction in the area. That effort headed up by the US Corps of Engineers is being coordinated with local project managers to ensure facilities are built properly and to avoid conflicts.

Appendix 2 includes the HEC-RAS for Sims Bayou and Table 4 summarizes the results. Whiteheather Bridge is at station 89,680.8. A few sections just downstream are bolded on sheet 2 of Table 4. The water surface elevations shown represent base flood elevations near the project. Appendix 2 also includes graphic plots of those three cross sections. All indicate the 100-yr base flood elevation is confined to the banks of Sims Bayou.

Exhibits 4a through 4d are excerpts of the effective FIRM panels 48201C - 0865L, 0870L, 1005L and 1010L. Segment III appears in some of the floodplain zone of Sims Bayou. Since the project includes no fill in this area, the overbank storage capacity and the 100-yr flood profile would not be impacted. Further, this map is based on effective FIS which does not include the current improvements to Sims Bayou. The graphic plots in Appendix 2 and the results summarized in Table 4 do include the current improvements to Sims Bayou.

Conclusions:
Based on the analyses described above, the following conclusions are drawn:

- The parameters that are used to measure peak runoff into Sims Bayou are not affected by the proposed project.
- The parameters that are used to measure peak runoff into C146-00-00 are not affected by the proposed project.
- Flow rates in C146-00-00 and Sims Bayou will not be increased by the proposed project
- There will be no impact to flooding conditions in C146-00-00 or within Sims Bayou for storm events up to and including the 100-yr event

I trust this is adequate for your review and acceptance. However contact me if you have any questions or need additional information. I can be reached anytime cellular at 281 455 9474.

Regards,

11-11-2009

STATE OF TEXAS
LAWRENCE S. LOPEZ
88565
LICENSED
PROFESSIONAL ENGINEER

Lawrence S. Lopez, P.E.
President - Firm #F-5076
cc: Mr. Epi Salazar, P.E. – SES Horizon Consulting Engineers Inc.
Ms. Jennifer Garcia – 4Site Civil Engineering L.P.
N:\WHB-SG4\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS\Whitheather Segments III and IV\Letter Report.doc

11419 Overbrook Lane, Houston Texas 77077, 281 759 8484 off, 281 759 8585 fax

Harris County
Flood Control District

9900 Northwest Freeway
Houston, Texas 77092
713-684-4000
www.hcfcd.org

December 7, 2009

Mr. Lawrence S. Lopez, P.E.
4Site Civil Engineering L.P.
11419 Overbrook Lane
Houston, TX 77077

RE: Project No. 2005862
Preliminary Storm Sewer Analysis
Whiteheather Storm Sewer Improvements
Segments III and IV
City of Houston
Sims Bayou Watershed
HCFCD Unit C100-00-00; Key Map 572JN; Pct 1

Dear Mr. Lopez:

Thank you for informing the Flood Control District about the referenced project. The proposed project is located in the Sims Bayou watershed. The existing condition of the entire tract is considered to be fully developed. Therefore, the proposed development shall require no site specific stormwater detention in accordance with the Flood Control District's Policy, Criteria, and Procedure Manual.

The stormwater runoff from the subject project is proposed to drain directly into the Sims Bayou Federal Flood Control Project, HCFCD Unit C100-00-00. The runoff shall outfall to a channel that is designed and constructed to contain the 1% storm runoff from the drainage area. Therefore, detailed calculations, within a separate drainage report, is not required by the Flood Control District for this project.

The Flood Control District has no objection to the proposed storm sewers. Please continue to coordinate this project with the Flood Control District by submitting site plans for review and signature. You should also be aware that other agencies involved in reviewing this project, including the City of Houston, might apply other stormwater requirements.

December 7, 2009
Mr. Lawrence S. Lopez, P.E.
4Site Civil Engineering, L.P.

Please note that the information herein reflects the Flood Control District's policies and criteria in effect as of the date of this letter. This information does not supersede any future changes or additions to the Flood Control District's policies and criteria.

Sincerely,

David B. Saha

David B. Saha, P.E.
Watershed Coordination Department

DBS:HEH:dj

cc: Mark L. Loethen, P.E., CFM, City of Houston

Ltr 12-07-09 Project #2005862 Whitehesther Storm Sewer Impact Seg III, IV.doc

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
FRANCISCO A. AREVALO
98562
LICENSED PROFESSIONAL ENGINEER
03-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

NO ADVERSE IMPACT REPORT DOCUMENTATION

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 31 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.

FOR REDUCED PLANS
original scale in inches
0 1 2 3

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FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HYDRAULIC CALCULATIONS.DWG

FOR REDUCED PLANS
original scale in inches

0 1 2 3

BOYNTON DRIVE | KELLING DRIVE | JORNS DRIVE | BERAN DRIVE | EBBTIDE DRIVE | TRAIL LAKE DRIVE | KNOTTY OAKS DRIVE | TIDEWATER DRIVE

REGG DRIVE

30' DRAINAGE DITCH EASEMENT

CITY OF HOUSTON SURVEY MARKER NO. 5252-7703

CITY OF HOUSTON SURVEY MARKER NO. 5252-0802

WEST OREM DRIVE

30" SHELL PIPE LINE FEE STRIP

50' H.L.&P. CO. FEE STRIP

WHITE HEATHER DRIVE (S)

WHITE HEATHER DRIVE

WHITE HEATHER DRIVE (N)

WUTHERING HEIGHTS DRIVE

BERAN DRIVE

EBBTIDE DRIVE

KNOTTY OAKS TRAIL

TIDEWATER DRIVE

LANDMARK DRIVE

DESIGN BASELINE

DESIGN BASELINE CURVE TABLE					
Curve	Radius	Length	Delta	Chord	Chord Bear.
C1	560.00'	155.77'	15°56'13"	155.26'	S 84°33'39" E
C2	580.00'	164.63'	16°15'48"	164.08'	S 84°43'27" E
C3	430.00'	117.33'	15°38'00"	116.96'	S 85°02'21" E
C4	800.00'	218.28'	15°38'00"	217.61'	S 85°02'21" E
C5	374.00'	102.05'	15°38'00"	101.73'	S 85°02'21" E
C6	800.00'	218.29'	15°38'02"	217.61'	S 85°02'18" E
C7	774.00'	167.29'	12°23'01"	166.96'	N 03°20'10" E
C8	640.00'	205.03'	18°21'19"	204.15'	N 07°07'44" E
C9	600.00'	200.58'	19°09'16"	199.65'	N 06°43'46" E
C10	812.00'	221.50'	15°37'46"	220.82'	N 04°57'46" E
C11	800.00'	341.37'	24°26'56"	338.79'	S 80°37'53" E
C12	800.00'	341.37'	24°26'56"	338.79'	S 80°37'53" E

NOTES:

1. ALL BEARINGS SHOWN HEREON ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.
2. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES (U.S. SURVEY FOOT) UNLESS NOTED OTHERWISE. TO CONVERT SURFACE TO GRID VALUES MULTIPLY BY THE PROJECT SCALE FACTOR 0.99987723.
3. BENCHMARK: CITY OF HOUSTON MONUMENT NO. 5251-7709
   TSARP BRASS DISK STAMPED 030110 IN CONCRETE SIDEWALK LOCATED ON DOWNSTREAM, EAST CONCRETE WALK, AT THE SOUTHEAST CORNER OF THE BRIDGE AT WHITE HEATHER DRIVE AND SIMS BAYOU (C100-00-00).
   ELEV.=53.03' (NAVD 88, 2001 ADJUSTMENT, GEOID99)
4. SEE SHEET 2 OF 2 FOR TEMPORARY BENCHMARK (TBM), DESIGN BASELINE POINT, FOUND PROPERTY CORNER TABLES AND MONUMENT SHEETS.
5. * DENOTES UNABLE TO SET BASELINE POINTS.

0 100 200
SCALE : 1" = 100'

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47913 PROFESSIONAL LICENSED SURVEYOR

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

SURVEY CONTROL MAP

SHEET 1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG. NO.
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 32 OF 191	49210

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FOR REDUCED PLANS
original scale in inches

3 2 1 0

FOUND PROPERTY CORNER TABLE				
Point	Station & Offset	Surf.Northing	Surf.Easting	Description
214	3+80.43, 28.73' LT WHITE HEATHER DR. (S)	13795130.157	3100317.244	FND 1/2IN IR
391	11+18.31, 29.77' RT WHITE HEATHER DR. (S) 3+44.77, 30.16' RT BERAN DR.	13795858.455	3100371.379	FND 1/2IN IR
442	11+78.01, 29.46' LT WHITE HEATHER DR. (S) 2+85.55, 29.55' LT BERAN DR.	13795915.137	3100309.256	FND 3/8IN IR
702	14+59.05, 32.13' RT WHITE HEATHER DR. (S) 4+52.14, 30.59' LT EBBTIDE DR.	13796198.899	3100356.788	FND 1/2IN IR
812	17+23.65, 29.52' RT WHITE HEATHER DR. (S) 3+84.95, 29.81' RT KNOTTY OAKS TR.	13796453.791	3100370.508	FND 1/2IN IR
840	17+23.51, 29.54' LT WHITE HEATHER DR. (S) 3+25.89, 29.94' RT KNOTTY OAKS TR.	13796466.722	3100312.876	FND 1/2IN IR
881	17+83.39, 29.76' RT WHITE HEATHER DR. (S) 3+85.19, 29.94' LT KNOTTY OAKS TR.	13796512.003	3100383.958	FND 1/2IN IR
1173	1+49.86, 29.77' LT BERAN DR.	13795908.596	3100173.724	FND 1\2IN IR
1204	0+84.81, 47.98' RT BERAN DR.	13795827.706	3100112.625	FND 1\2IN IR
1260	1+49.99, 29.99' RT BERAN DR.	13795848.917	3100176.829	FND 1\2IN IR
1265	2+15.09, 29.86' LT BERAN DR.	13795911.933	3100238.865	FND 1\2IN IR
1266	2+15.37, 29.89' RT BERAN DR.	13795852.272	3100242.125	FND 1\2IN IR
1432	8+04.73, 29.06' LT BERAN DR.	13795940.510	3100827.818	FND 1\2IN IR
1446	8+69.65, 29.07' LT BERAN DR.	13795943.759	3100892.650	FND 1\2IN IR
1629	13+30.16, 30.11' RT BERAN DR. 11+06.52, 30.09' LT LANDMARK DR.	13795907.589	3101355.539	FND 3\4IN IP
1647	13+35.39, 27.30' LT BERAN DR. 11+63.93, 24.87' LT LANDMARK DR.	13795965.189	3101357.906	FND 3\4IN IP
1901	13+37.02, 29.68' RT KNOTTY OAKS TR. 16+66.95, 29.94' LT LANDMARK DR.	13796467.340	3101327.928	FND 1\2IN IR
2095	21+16.62, 30.15' LT LANDMARK DR.	13796916.440	3101305.445	FND 1\2IN IR
2129	14+00.47, 30.10' RT WUTHERING HEIGHTS DR. 22+26.54, 29.92' LT LANDMARK DR.	13797026.242	3101300.234	FND 1\2IN IR
2192	14+02.27, 42.14' LT WUTHERING HEIGHTS DR. 22+98.78, 28.14' LT LANDMARK DR.	13797098.481	3101298.430	FND 5\8IN IR
2410	1+30.36, 30.14' LT WHITE HEATHER DR. (N) 2+70.20, 29.55' LT WUTHERING HEIGHTS DR.	13797160.827	3100186.898	FND 1/2IN IR
2522	3+91.08, 30.22' RT WUTHERING HEIGHTS DR.	13797077.940	3100292.987	FND 1/2IN IR
2837	10+04.71, 29.69' RT WUTHERING HEIGHTS DR.	13797006.928	3100904.942	FND 1\2IN IR
2898	11+34.47, 30.11' RT WUTHERING HEIGHTS DR.	13797012.976	3101034.563	FND 1\2IN PTP
2962	13+30.16, 29.89' RT WUTHERING HEIGHTS DR.	13797022.946	3101229.998	FND 1\2IN IR
3096	1+74.30, 29.90' RT TIDEWATER DR.	13796791.141	3100155.511	FND 1\2IN IR
3163	2+54.69, 29.92' RT TIDEWATER DR.	13796780.103	3100229.541	FND 1\2IN IR
4549	9+09.94, 29.32' LT EBBTIDE DR.	13796220.432	3100814.083	FND 3\8IN IR
4550	9+09.81, 29.61' RT EBBTIDE DR.	13796161.570	3100816.898	FND 1\2IN IR
4732	2+41.95, 29.99' RT KNOTTY OAKS TR.	13796484.757	3100231.998	FND 1\2IN IR
4765	2+02.91, 29.19' LT KNOTTY OAKS TR.	13796548.792	3100201.757	FND 1\2IN IR
4839	17+83.20, 29.80' LT WHITE HEATHER DR. (S) 3+25.63, 29.74' LT KNOTTY OAKS TR.	13796524.989	3100325.825	FND 1\2IN IR

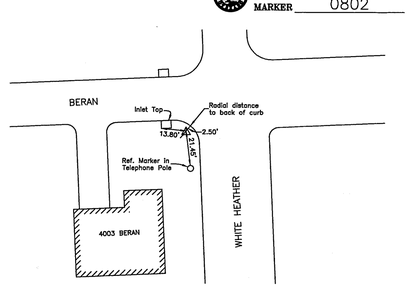
TEMPORARY BENCHMARK (TBM) TABLE							
TBM No.	Station & Offset	Surf.Northing	Surf.Easting	Elev.	Description	Grid Northing	Grid Easting
1	3+09.76, 84.79' RT WEST OREM DR. 0+15.68, 31.09' RT WHITE HEATHER DR. (S)	13794762.662	3100343.068	52.50	FND 3/8IRwCAP	13793069.079	3099962.439
2	3+79.01, 24.69' LT WHITE HEATHER DR. (S)	13795127.659	3100320.725	51.73	SET 3/8IRwCAP	13793434.031	3099940.099
3	7+79.02, 26.02' LT WHITE HEATHER DR. (S)	13795516.815	3100332.540	52.43	SET 3/8IRwCAP	13793823.140	3099951.912
5	1+10.06, 0.25' LT BERAN DR.	13795877.131	3100135.444	53.74	SET 3/8IRwCAP	13794183.411	3099754.840
6	8+30.82, 21.81' RT BERAN DR.	13795891.002	3100856.403	51.27	SET 3/8IRwCAP	13794197.280	3100475.711
7	13+59.02, 23.05' RT BERAN DR. 11+13.60, 1.23' LT LANDMARK DR.	13795916.083	3101384.016	52.65	SET CONC NAILwSHINER	13794222.358	3101003.259
8	14+67.21, 14.32' RT EBBTIDE DR. 14+02.33, 1.90' RT LANDMARK DR.	13796204.614	3101372.838	52.91	SET 3/8IRwCAP	13794510.854	3100992.083
9	9+73.84, 14.28' RT EBBTIDE DR.	13796180.076	3100880.083	51.75	SET 3/8IRwCAP	13794486.319	3100499.388
10	3+98.41, 15.56' RT EBBTIDE DR. 14+08.90, 21.58' LT WHITE HEATHER DR. (S)	13796146.136	3100305.632	52.33	SET 3/8IRwCAP	13794452.383	3099925.007
11	0+93.89, 19.41' RT EBBTIDE DR.	13796176.170	3100002.591	53.40	CH*CUT 'X' IN CONC SIDEWALK	13794482.413	3099622.003
12	0+99.72, 0.49' LT KNOTTY OAKS TR.	13796519.681	3100095.852	52.96	SET 3/8IRwCAP	13794825.882	3099715.254
13	3+32.82, 18.09' RT KNOTTY OAKS TR. 17+35.37, 22.61' LT WHITE HEATHER DR. (S)	13796476.751	3100322.263	51.37	SET 3/8IRwCAP	13794782.957	3099941.636
14	7+93.76, 14.74' RT KNOTTY OAKS TR.	13796455.200	3100784.599	51.22	SET 3/8IRwCAP	13794761.409	3100403.916
15	13+68.88, 14.34' LT KNOTTY OAKS TR. 17+10.99, 1.91' RT LANDMARK DR.	13796512.899	3101357.557	52.39	SET 3/8IRwCAP	13794819.101	3100976.804
16R	13+69.85, 13.91' RT TIDEWATER DR. 19+62.73, 1.28' RT LANDMARK DR.	13796764.302	3101344.461	52.97	RESET 3/8IRwCAP	13795070.474	3100963.709
17	8+64.25, 14.90' RT TIDEWATER DR.	13796738.129	3100839.533	51.69	SET 3/8IRwCAP	13795044.304	3100458.843
18	4+16.60, 21.63' RT TIDEWATER DR. 20+18.99, 18.22' LT WHITE HEATHER DR. (S)	13796752.377	3100389.270	52.03	SET 3/8IRwCAP	13795058.550	3100008.635
19	1+10.71, 1.58' RT TIDEWATER DR.	13796817.841	3100093.307	52.91	SET 3/8IRwCAP	13795124.006	3099712.709
20	0+45.04, 22.84' LT WUTHERING HEIGHTS DR.	13797155.892	3099957.203	53.93	CH*CUT 'X' IN CONC SIDEWALK	13795462.016	3099576.621
21	3+00.07, 0.07' RT WUTHERING HEIGHTS DR. 0+99.93, 0.07' RT WHITE HEATHER DR. (N)	13797127.053	3100212.628	52.49	FND CROWS FOOT IN CONC	13795433.179	3099832.015
22	5+74.04, 0.10' RT WUTHERING HEIGHTS DR. 23+27.87, 0.38' LT WHITE HEATHER DR. (S)	13797049.660	3100474.981	53.39	FND 'X' IN CONC	13795355.796	3100094.336
23	9+18.67, 0.02' RT WUTHERING HEIGHTS DR.	13797032.272	3100817.532	51.94	SET 60D NAIL	13795338.410	3100436.845
24R	14+31.98, 0.47' RT WUTHERING HEIGHTS DR. 22+56.18, 1.58' RT LANDMARK DR.	13797057.399	3101330.221	53.50	RESET CONC NAILwSHINER	13795363.535	3100949.470
44	11+49.76, 83.51' RT WEST OREM DR.	13794807.124	3101181.884	53.52	SET 3/8IR w/CAP	13793113.536	3100801.152
45	(ON WEST OREM DR. & EAST OF LANDMARK DR.)	13794862.011	3101691.181	53.99	SET 3/8IR w/CAP	13793168.416	3101310.387
COH MON (LC-4)	11+28.10, 26.13' LT WHITE HEATHER DR. (S) 2+88.88, 20.35' RT BERAN DR.	13795865.460	3100315.063	52.01	FND COH MON 5252-0802	13794171.742	3099934.438
COH MON (LC-57703)	(AT REGG DR. & KNOTTY OAKS DR.)	13796599.937	3099940.167	51.69	FND COH MON 5252-7703	13794906.128	3099559.588

DESIGN BASELINE POINT TABLE (* DENOTES UNABLE TO SET, SEE TABLE BELOW)						
Point	Station	Surf.Northing	Surf.Easting	Description	Gird Northing	Grid Easting
6000	STA 0+00.000 BERAN DR.	13795871.396	3100025.533	* SET 16000 INSTEAD	13794177.677	3099644.943
6001	STA 14+20.000 BERAN DR.	13795942.142	3101443.769	* SET 16001 INSTEAD	13794248.414	3101063.005
6002	STA 0+00.000 EBBTIDE DR.	13796191.979	3099908.770	* SET 16002 INSTEAD	13794498.221	3099528.194
6003	STA 0+69.209 EBBTIDE DR.	13796195.034	3099977.912	SET X CUT IN CONC.	13794501.275	3099597.327
6005	STA 2+24.975 EBBTIDE DR.	13796180.317	3100132.477	SET SQUARE NAIL w/SHINER	13794486.559	3099751.874
6007	STA 3+89.608 EBBTIDE DR.	13796165.229	3100295.862	SET SQUARE NAIL w/SHINER	13794471.474	3099915.239
6008	STA 15+20.000 EBBTIDE DR.	13796221.547	3101424.851	* SET 16008 INSTEAD	13794527.785	3101044.089
6009	STA 0+00.000 KNOTTY OAKS TR.	13796514.220	3099996.284	* SET 16009 INSTEAD	13794820.422	3099615.697
6010	STA 1+40.032 KNOTTY OAKS TR.	13796521.196	3100136.141	SET X CUT IN CONC.	13794827.397	3099755.538
6012	STA 2+57.358 KNOTTY OAKS TR.	13796511.082	3100252.666	SET X CUT IN CONC.	13794817.284	3099872.048
6013	STA 3+98.296 KNOTTY OAKS TR.	13796479.911	3100390.114	SET X CUT IN CONC.	13794786.117	3100009.479
6015	STA 6+16.579 KNOTTY OAKS TR.	13796461.093	3100606.905	SET X CUT IN CONC.	13794767.301	3100226.244
6016	STA 14+20.000 KNOTTY OAKS TR.	13796501.121	3101409.328	* SET 16016 INSTEAD	13794807.324	3101028.568
6017	STA 0+00.000 LANDMARK DR.	13794803.916	3101440.404	* SET 16017 INSTEAD	13793110.328	3101059.641
6018	STA 24+00.000 LANDMARK DR.	13797200.969	3101321.522	SET 3/8" IR w/CAP	13795507.087	3100940.773
6019	STA 0+00.000 TIDEWATER DR.	13796813.907	3099982.651	* SET 16019 INSTEAD	13795120.073	3099602.066
6020	STA 1+39.959 TIDEWATER DR.	13796820.880	3100122.436	SET X CUT IN CONC.	13795127.045	3099741.834
6022	STA 2+42.006 TIDEWATER DR.	13796812.083	3100223.786	SET X CUT IN CONC.	13795118.248	3099843.171
6023	STA 4+64.815 TIDEWATER DR.	13796762.805	3100441.077	SET SQUARE NAIL w/SHINER	13795068.977	3100060.436
6025	STA 6+83.104 TIDEWATER DR.	13796743.984	3100657.874	SET SQUARE NAIL w/SHINER	13795050.157	3100277.207
6026	STA 14+20.000 TIDEWATER DR.	13796780.697	3101393.855	* SET 16026 INSTEAD	13795086.866	3101013.097
6027	STA 0+00.000 WEST OREM DR.	13794831.421	3100029.354	SET X CUT IN CONC.	13793137.829	3099648.764
6028	STA 15+00.000 WEST OREM DR.	13794908.524	3101527.371	SET X CUT IN CONC.	13793214.923	3101146.597
6029	STA 0+00.000 WHITEHEATHER DR.(N)	13797028.512	3100196.034	* SET 16029 INSTEAD	13795334.651	3099815.423
6030	STA 0+95.160 WHITEHEATHER DR.(N)	13797122.359	3100211.785	SET X CUT IN CONC.	13795428.486	3099831.172
6032	STA 2+62.449 WHITEHEATHER DR.(N)	13797289.039	3100221.501	SET X CUT IN CONC.	13795595.146	3099840.887
6033	STA 3+00.000 WHITEHEATHER DR.(N)	13797326.544	3100219.630	SET X CUT IN CONC.	13795632.646	3099839.016
6034	STA 0+00.000 WHITEHEATHER DR.(S)	13797745.877	3100312.559	SET X CUT IN CONC.	13793052.296	3099931.934
6035	STA 1+33.706 WHITEHEATHER DR.(S)	13794879.498	3100307.779	SET SQUARE NAIL w/SHINER	13793185.900	3099927.155
6037	STA 3+38.736 WHITEHEATHER DR.(S)	13795082.074	3100333.115	RESET SQUARE NAIL w/SHINER	13793388.451	3099952.488
6038	STA 3+80.929 WHITEHEATHER DR.(S)	13795122.569	3100344.962	RESET SQUARE NAIL w/SHINER	13793428.942	3099964.333
6040	STA 5+81.514 WHITEHEATHER DR.(S)	13795320.846	3100368.357	RESET SQUARE NAIL w/SHINER	13793627.195	3099987.725
6041	STA 15+01.910 WHITEHEATHER DR.(S)	13796240.102	3100322.562	SET SQUARE NAIL w/SHINER	13794546.338	3099941.935
6043	STA 17+23.414 WHITEHEATHER DR.(S)	13796460.092	3100341.665	SET SQUARE NAIL w/SHINER	13794766.301	3099961.036
6044	STA 24+00.000 WHITEHEATHER DR.(S)	13797119.923	3100491.303	* SET 16044 INSTEAD	13795426.051	3100110.656
6045	STA 0+00.000 WUTHERING HEIGHTS DR.	13797130.842	3099913.358	SET X CUT IN CONC.	13795436.968	3099532.781
6046	STA 1+27.108 WUTHERING HEIGHTS DR.	13797137.175	3100040.308	SET X CUT IN CONC.	13795443.300	3099659.716
6048	STA 4+68.479 WUTHERING HEIGHTS DR.	13797082.024	3100374.576	SET X CUT IN CONC.	13795388.157	3099993.943
6050	STA 8+09.850 WUTHERING HEIGHTS DR.	13797026.874	3100708.844	SET X CUT IN CONC.	13795333.013	3100328.170
6051	STA 15+00.000 WUTHERING HEIGHTS DR.	13797061.259	3101398.137	SET 3/8" IR w/CAP	13795367.393	3101017.378

Point	Station	Surf.Northing	Surf.Easting	Description	Gird Northing	Grid Easting
16000	STA 0+25.00 BERAN DR.	13795872.641	3100050.503	SET 3/8IR W/CAP	13794178.921	3099669.909
16001	STA 13+90.00 KNOTTY OAKS TR. STA 16+96.64 LANDMARK TR.	13795941.124	3101423.794	SET 3/8IR W/CAP	13794247.397	3101043.032
16002	STA 0+07.00 EBBTIDE DR.	13796192.289	3099915.765	SET 3/8IR W/CAP	13794498.530	3099535.188
16008	STA 13+90.00 KNOTTY OAKS TR. STA 16+96.64 LANDMARK TR.	13796220.547	3101404.868	SET 3/8IR W/CAP	13794526.785	3101024.108
16009	STA 0+30.00 KNOTTY OAKS TR.	13796515.700	3100026.244	SET 3/8IR W/CAP	13794821.902	3099645.654
16016	STA 13+90.00 KNOTTY OAKS TR. STA 16+96.64 LANDMARK TR.	13796499.616	3101379.368	SET 3/8IR W/CAP	13794805.820	3100998.611
16017	STA 13+90.00 KNOTTY OAKS TR. STA 16+96.64 LANDMARK TR.	13794843.870	3101438.436	SET X CUT IN CONC.	13793150.277	3101057.672
16019	STA 0+30.00 TIDEWATER DR.	13796815.422	3100012.610	SET 3/8IR W/CAP	13795121.587	3099632.021
16026	STA 13+90.01 TIDEWATER DR. STA 19+76.66 LANDMARK DR.	13796779.210	3101363.904	SET 3/8IR W/CAP	13795085.379	3100983.150
16029	STA 0+45.15 WHITE HEATHER DR. (N)	13797073.043	3100203.508	SET 3/8IR W/CAP	13795379.176	3099822.896
16044	STA 23+57.49 WHITE HEATHER DR. (S)	13797078.470	3100481.902	SET 3/8IR W/CAP	13795384.603	3100101.256

CITY OF HOUSTON

CITY SURVEY MARKER 5252 0802



ON MAP SHEET: 5252-C4

Texas Coordinate System of 1983, S.C. Zone NAD 83
X= 3,099,934.6049
Y= 13,794,171.7928

Elevations Adjustment
52.012 NAVD 88 (2001)

Method For Vert. CONVENTIONAL

Ellipsoid Height= N\A

Lat.= 29° 37' 51.27378"N
Lon.= 95° 26' 16.46246"W
Method For Horizontal CONVENTIONAL

General Location: SOUTHWEST CORNER OF WHITE HEATHER AND BERAN BEHIND CURB
Date Set: AUGUST, 1968 Type of Mark: 4A
Survey Markers Useful As Azimuth From Station

NOTE:
1. Azimuths are from South orientation.
2. Scale Factor (S.F. 0.99987723).
3. Surface= Grid / S.F.

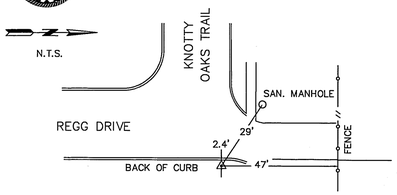
Surveyed By. LANDTECH CONSULTANTS
2525 N. LOOP W. STE 300
Houston, TX 77008

REVISED: JANUARY 7, 2010

City of Houston, Harris County, Texas

CITY OF HOUSTON

CITY SURVEY 5252 7703
SITE CONTROL MONUMENT



Project WBS# M-000262-0004-4

Texas Coordinate System of 1983, South Central Zone, U. S. Survey Feet
X= 3,099,559.59
Y= 13,794,906.13

Keymap Page: 5252-C1

Orthometric Elevation = 51.69
Ellipsoid Height= N/A
Geoid: Geoid 99
Datum Source & Adjustment: NAD 83

Lat.= 29° 37' 58.65364" N
Lon.= 95° 26' 20.45689" W

Reference Frame Used: N/A
Vertical Adjustment used: NAVD 88 (2001 Adj.)

General Location: EAST SIDE OF REGG DRIVE AT THE INTERSECTION OF REGG DRIVE AND KNOTTY OAKS TRAIL

Date Set: 06-04-05 Type of Mark: 3/4" IR. WTH 3" BRASS CAP IN CONC.

3 Nearest project control points (bearings and distances stated below):
To Point#11 S 08°22'47" E 428.34'
To Point#12 S 62°43'44" E 175.15'
To Point#19 N 35°05'56" E 266.33'

NOTE:
1. Bearings are grid bearings.
2. Scale Factor = (S.F. 0.99987723).
3. Surface= Grid / S.F.

Surveyed By. Landtech Consultants, INC.
2525 N. Loop W. Ste 300
Houston, TX 77008

Revised January 23, 2012

City of Houston, Harris County, Texas

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47292 PROFESSIONAL SURVEYOR 9-5-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

SURVEY CONTROL MAP

SHEET 2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 33 OF 191	

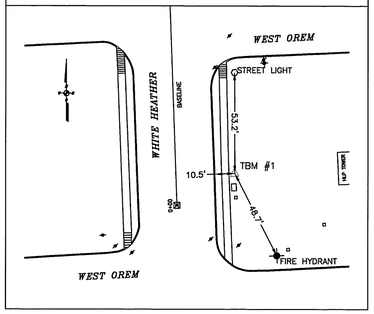
PUBLIC WORKS AND ENGINEERING 49210 LICENSE NUMBER HOUSTON, TEXAS

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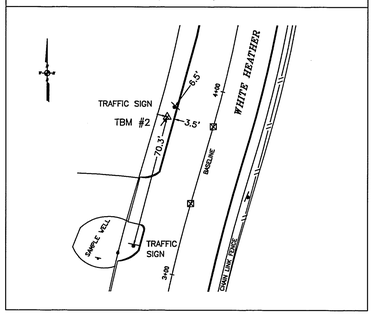
FOR REDUCED PLANS
original scale in inches

0 1 2 3

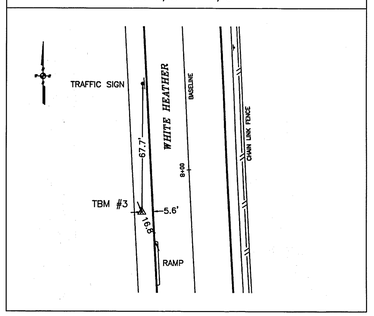
TBM # 1
WHITE HEATHER DR. & WEST OREM DR.
SET 3/8" IR W/CAP



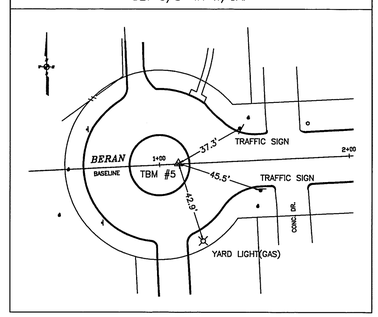
TBM # 2
APPROX. 280' N. OF WHITE HEATHER
DR. & WEST OREM DR.
SET 3/8" IR W/CAP



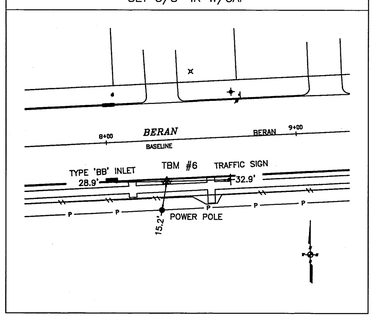
TBM # 3
APROX. 370' S. OF WHITE HEATHER DR.
& BERAN DR.
SET 3/8" IR W/CAP



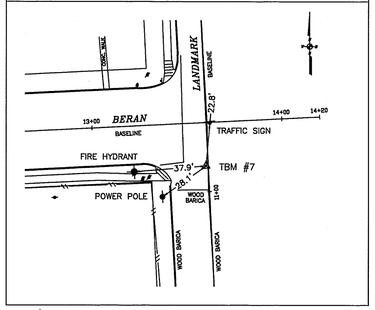
TBM # 5
APPROX. 205' W. OF WHITE HEATHER DR.
& BERAN DR.
SET 3/8" IR W/CAP



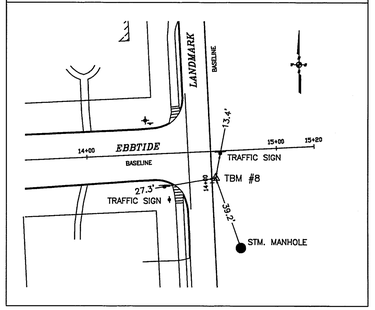
TBM # 6
APPROX. 510' E. OF WHITE HEATHER DR.
& BERAN DR.
SET 3/8" IR W/CAP



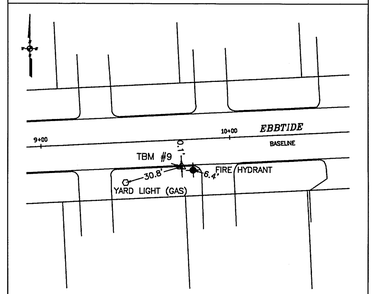
TBM # 7
BERAN DR. & LANDMARK DR.
SET CONC. NAIL W/SHINER



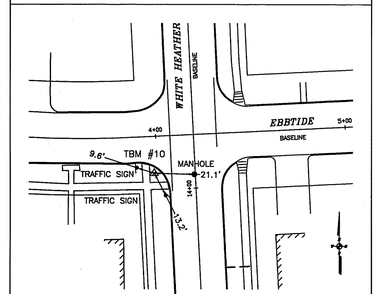
TBM # 8
LANDMARK DR. & EBBTIDE DR.
SET 3/8" IR W/CAP



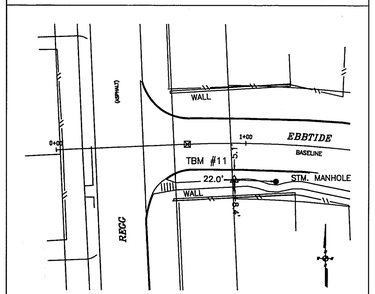
TBM # 9
APPROX. 490' W. OF LANDMARK DR. & EBBTIDE DR.
SET 3/8" IR W/CAP



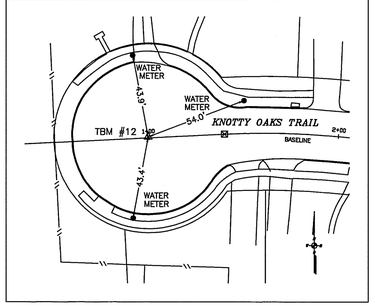
TBM # 10
WHITE HEATHER DR. & EBBTIDE DR.
SET 3/8" IR W/CAP



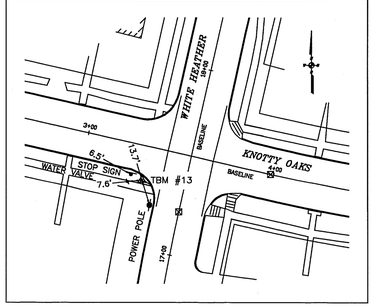
TBM # 11
S. SIDE OF EBBTIDE DR. @ REGG DR.
CUT X IN CONC. SIDEWALK



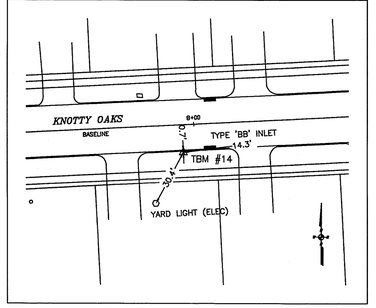
TBM # 12
APPROX. 250' W. OF WHITE HEATHER DR.
& KNOTTY OAKS TR.
SET 3/8" IR W/CAP



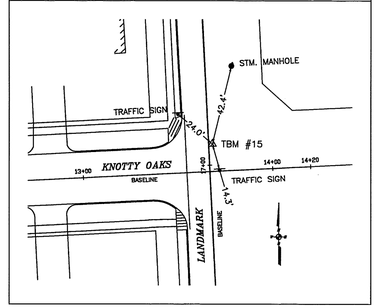
TBM # 13
WHITE HEATHER DR. & KNOTTY OAKS TR.
SET 3/8" IR W/CAP



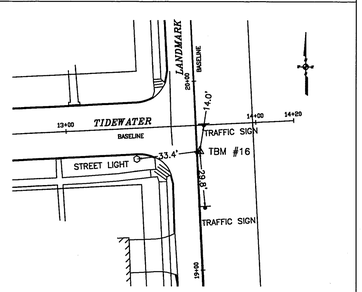
TBM # 14
APPROX. 440' E. OF WHITE HEATHER DR.
& KNOTTY OAKS TR.
SET 3/8" IR W/CAP



TBM # 15
KNOTTY OAKS TR. & LANDMARK DR.
SET 3/8" IR W/CAP



TBM # 16
TIDEWATER DR. & LANDMARK DR.
SET 3/8" IR W/CAP



PLOTTED ON:
FILE NAME: S:\2011\1110031\SURVEY\3PT.DWG

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 117176 LICENSED PROFESSIONAL SURVEYOR 2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

SWING TIES

SHEET 1 OF 5

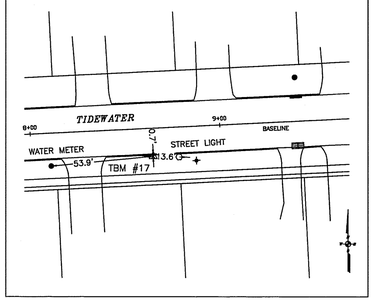
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FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 34 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 LICENSED HOUSTON, TEXAS

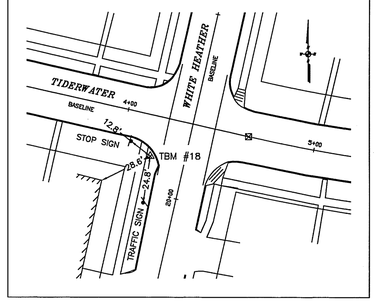
FOR REDUCED PLANS
original scale in inches

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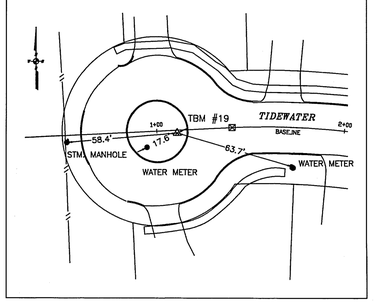
TBM # 17
APPROX. 430' E. OF WHITE HEATHER DR.
& TIDEWATER DR.
SET 3/8" IR W/CAP



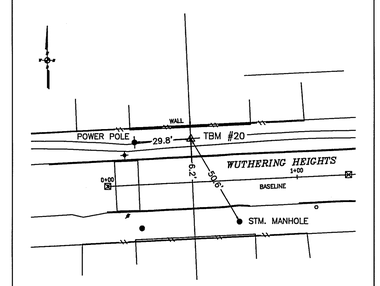
TBM # 18
WHITE HEATHER DR. & TIDEWATER DR.
SET 3/8" IR W/CAP



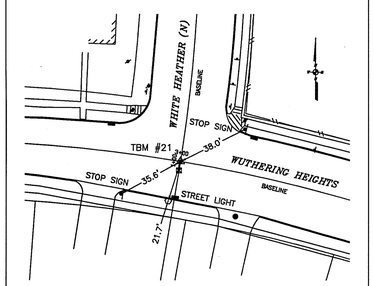
TBM # 19
APPROX. 320' W. OF WHITE HEATHER DR.
& TIDEWATER DR.
SET 3/8" IR W/CAP



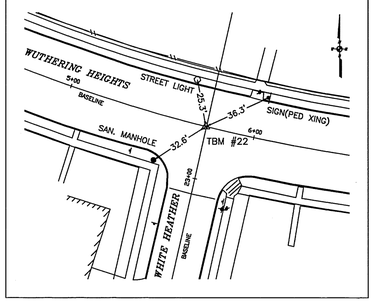
TBM # 20
APPROX. 260' W. OF WHITE HEATHER DR. (N)
& WUTHERING HEIGHTS DR.
CUT X IN CONC. SIDEWALK



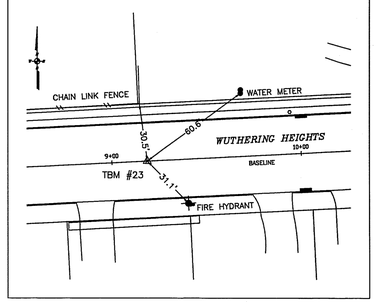
TBM # 21
WHITE HEATHER DR. (N) & WUTHERING HEIGHTS DR.
FND CROW'S FOOT IN CONC.



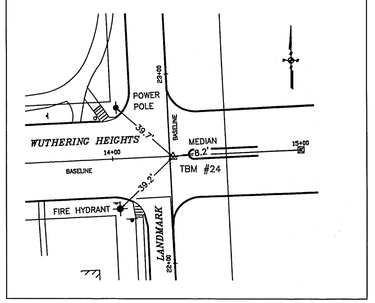
TBM # 22
WHITE HEATHER DR. (S) & WUTHERING HEIGHTS DR.
FND. X CUT IN CONC.



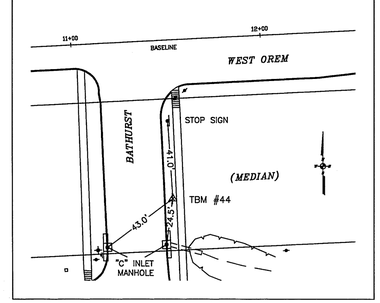
TBM # 23
APPROX. 340' E. OF WHITE HEATHER DR. (S) &
WUTHERING HEIGHTS DR.
SET 60D NAIL



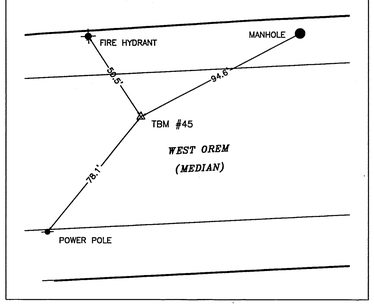
TBM # 24
WUTHERING HEIGHTS DR. & LANDMARK DR.
SET CONC. NAIL W/SHINER



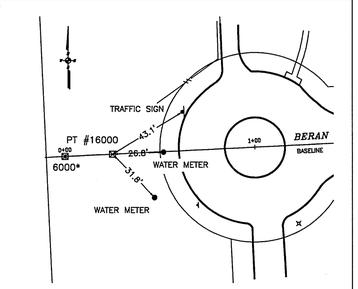
TBM # 44
APPROX. 250' W. OF WEST OREM DR.
& LANDMARK DR.
SET 3/8" IR W/CAP



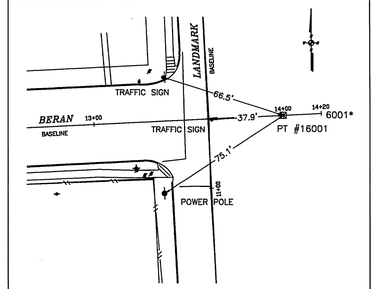
TBM # 45
APPROX. 250' E. OF WEST OREM DR.
& LANDMARK DR.
SET 3/8" IR W/CAP



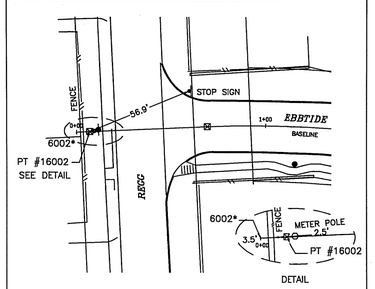
PT. # 16000
(6000* UNABLE TO SET)
REGG DR. & BERAN DR.
SET 3/8" IR w/CAP



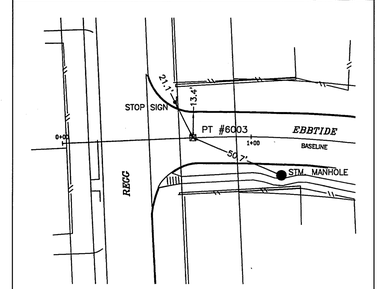
PT. # 16001
(6001* UNABLE TO SET)
BERAN DR. & LANDMARK DR.
SET 3/8" IR w/CAP



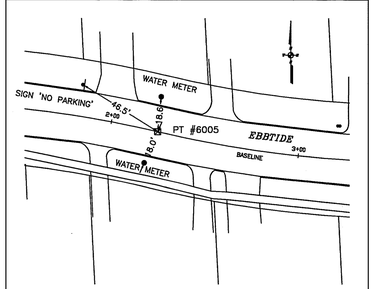
PT. # 16002
(6002* UNABLE TO SET)
EBBTIDE DR. & E. OF REGG DR.
SET 3/8" IR w/CAP



PT. # 6003
EBBTIDE DR. & E. OF REGG DR.
SET X CUT IN CONC.



PT. # 6005
APPROX. 190' E. OF REGG DR. & EBBTIDE DR.
SET SQUARE NAIL w/SHINER



PLOTTED ON:
FILE NAME: S:\2011\1110031\SURVEY\3PTDWG

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47014 PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

SWING TIES

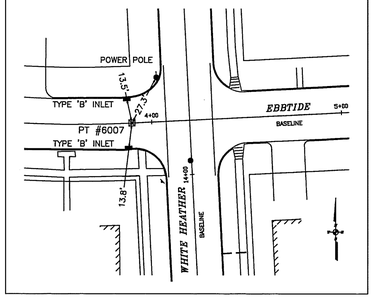
SHEET 2 OF 5

WBS NO.: M-000262-0004-4	CITY DWG NO.:
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 35 OF 191	

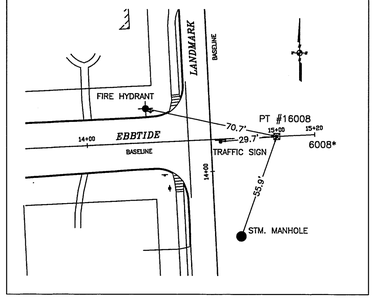
PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

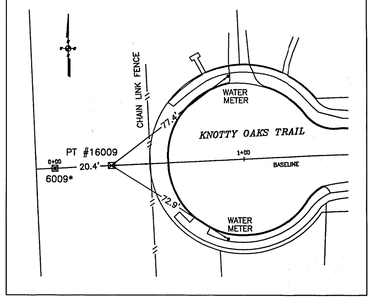
PT. # 6007
APPROX. 30' W. OF WHITE HEATHER DR. & EBBTIDE DR.
SET SQUARE NAIL w/SHINER



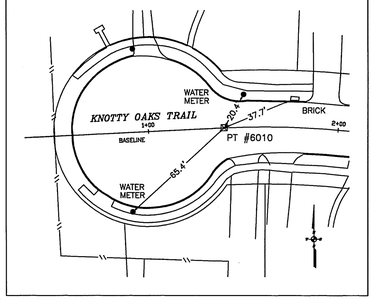
PT. # 16008
(6008* UNABLE TO SET)
APPROX. 30' E. OF EBBTIDE DR. @ LANDMARK DR.
SET 3/8" IR w/CAP



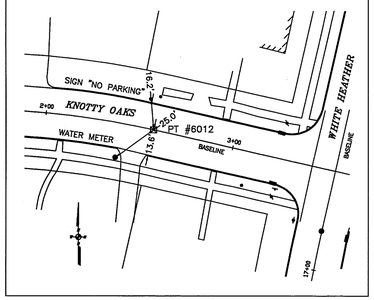
PT. # 16009
(6009* UNABLE TO SET)
KNOTTY OAKS TR. APPROX. 70' E. OF REGG DR. (E)
SET 3/8" IR w/CAP



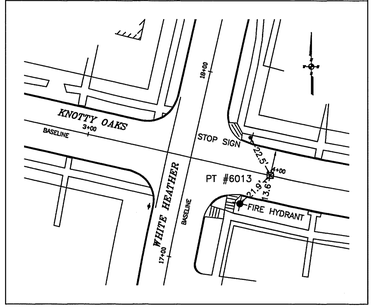
PT. # 6010
KNOTTY OAKS TR. APPROX. 210' W. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



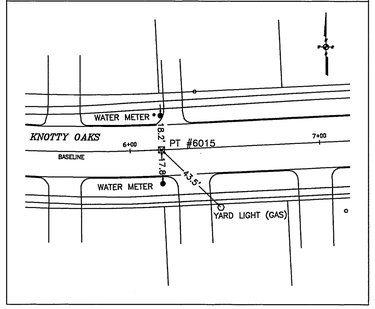
PT. # 6012
KNOTTY OAKS TR. APPROX. 100' W. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



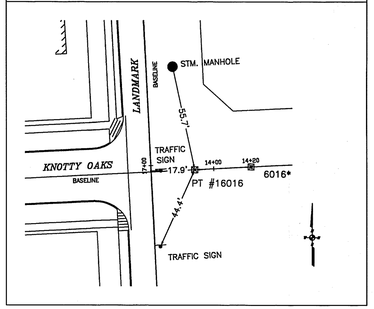
PT. # 6013
KNOTTY OAKS TR. APPROX. 40' E. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



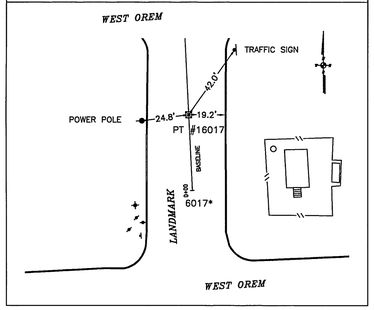
PT. # 6015
KNOTTY OAKS TR. APPROX. 260' E. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



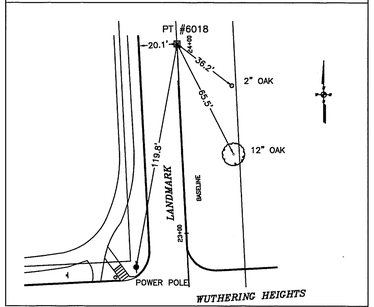
PT. # 16016
(6016* UNABLE TO SET)
KNOTTY OAKS TR. APPROX. 20' E. OF LANDMARK DR.
SET 5/8" IR w/CAP



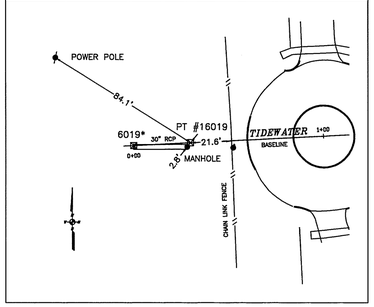
PT. # 16017
(6017* UNABLE TO SET)
LANDMARK DR. APPROX. 100' S. OF WEST OREM DR.
SET X CUT IN CONC.



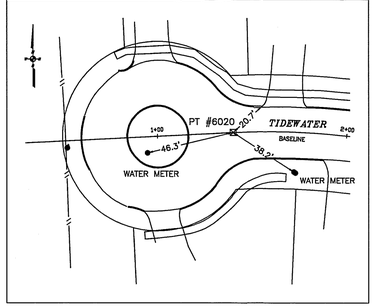
PT. # 6018
LANDMARK DR. APPROX. 150' N. OF
WUTHERING HEIGHTS DR.
SET 3/8" IR w/CAP



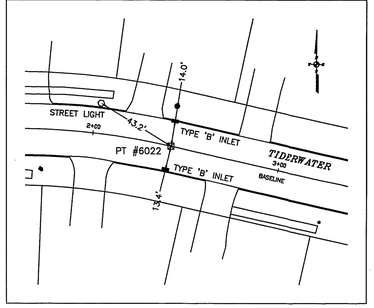
PT. # 16019
(6019* UNABLE TO SET)
TIDEWATER DR. APPROX. 420' W. OF WHITE HEATHER DR.
SET 3/8" IR w/CAP



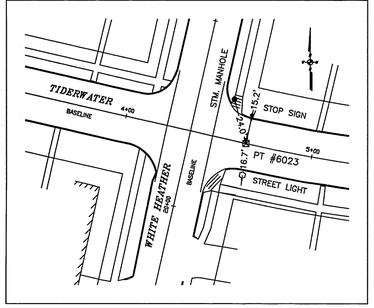
PT. # 6020
TIDEWATER DR. APPROX. 300' W. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



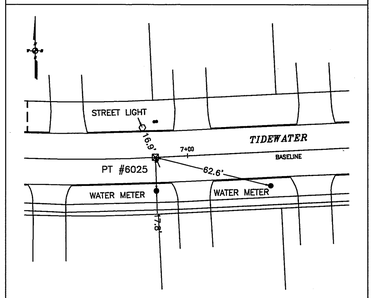
PT. # 6022
TIDEWATER DR. APPROX. 190' W. OF
WHITE HEATHER DR.
SET X CUT IN CONC.



PT. # 6023
TIDEWATER DR. APPROX. 30' E. OF
WHITE HEATHER DR.
SET SQUARE NAIL w/SHINER



PT. # 6025
TIDEWATER DR. APPROX. 250' E. OF
WHITE HEATHER DR.
SET SQUARE NAIL w/SHINER



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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 4733 PROFESSIONAL ENGINEER
5/15/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

SWING TIES

SHEET 3 OF 5

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 36 OF 191	

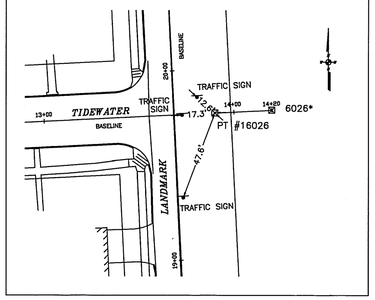
PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

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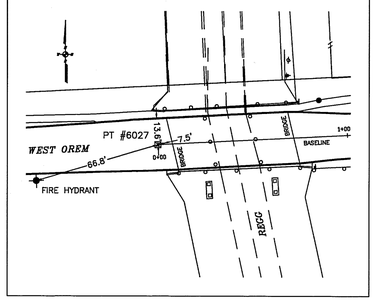
FOR REDUCED PLANS
original scale in inches

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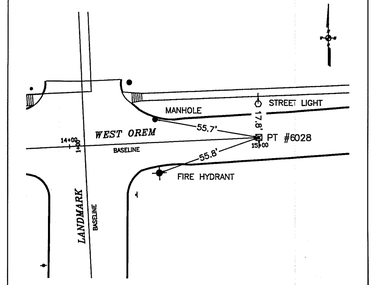
PT. # 16026
(6026* UNABLE TO SET)
TIDEWATER DR. APPROX. 20' E. OF LANDMARK DR.
SET 5/8" IR w/CAP



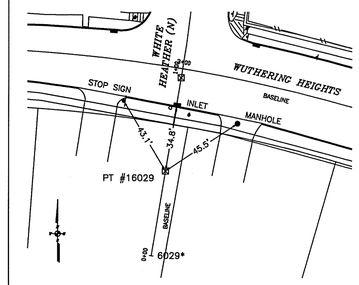
PT. # 6027
WEST OREM DR. @ REGG DR. W. SIDE
SET X CUT IN CONC.



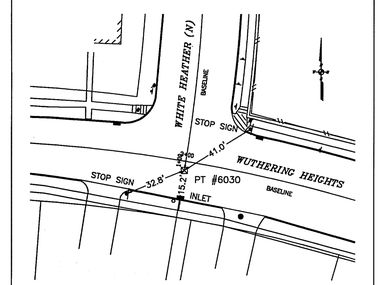
PT. # 6028
WEST OREM DR. APPROX. 90' E. OF LANDMARK DR.
SET X CUT IN CONC.



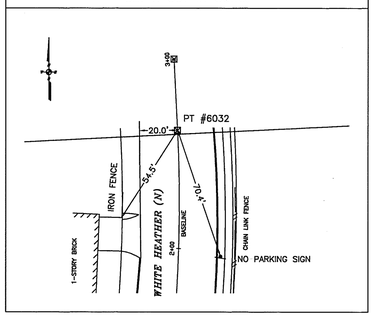
PT. # 16029
(6029* UNABLE TO SET)
WHITE HEATHER DR. (N) APPROX. 55' S. OF
WUTHERING HEIGHTS DR.
SET 3/8" IR w/CAP



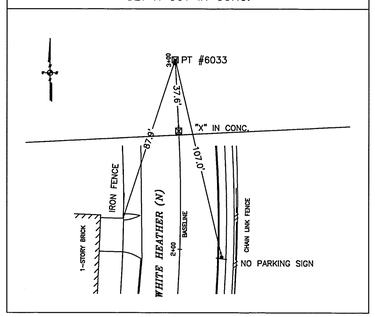
PT. # 6030
WHITE HEATHER DR. (N) & WUTHERING HEIGHT DR.
SET X CUT IN CONC.



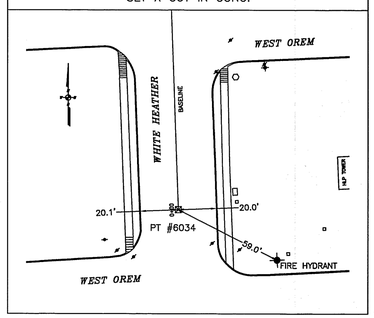
PT. # 6032
WHITE HEATHER DR. (N) APPROX. 160' N. OF
WUTHERING HEIGHTS DR.
SET X CUT IN CONC.



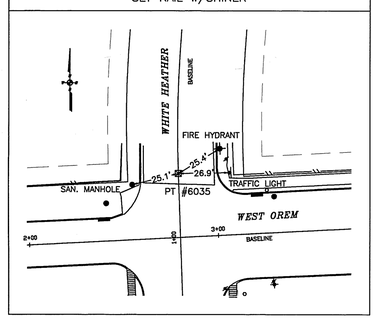
PT. # 6033
WHITE HEATHER DR. (N) APPROX. 200' N. OF
WUTHERING HEIGHTS DR.
SET X CUT IN CONC.



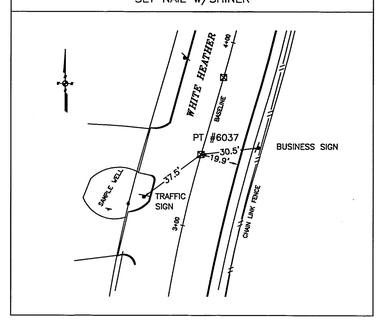
PT. # 6034
WHITE HEATHER DR. (S) APPROX. 100' S.
OF WEST OREM DR.
SET X CUT IN CONC.



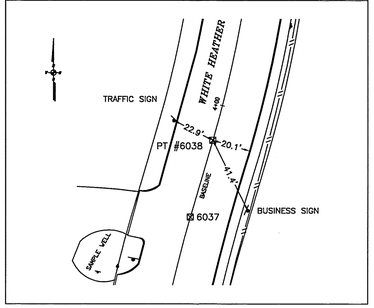
PT. # 6035
WHITE HEATHER DR. (S) APPROX. 30' N.
OF WEST OREM DR.
SET NAIL w/SHINER



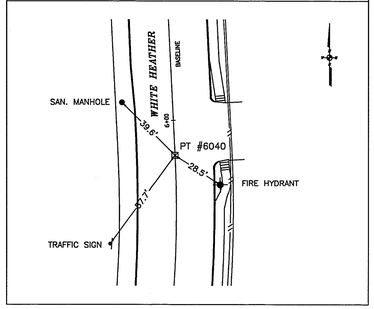
PT. # 6037
WHITE HEATHER DR. (S) APPROX. 240' N.
OF WEST OREM DR.
SET NAIL w/SHINER



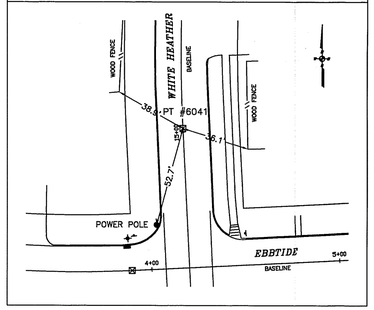
PT. # 6038
WHITE HEATHER DR. (S) APPROX. 280' N.
OF WEST OREM DR.
SET NAIL w/SHINER



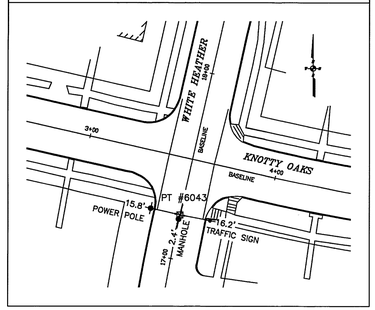
PT. # 6040
WHITE HEATHER DR. (S) APPROX. 480' N.
OF WEST OREM DR.
SET NAIL w/SHINER



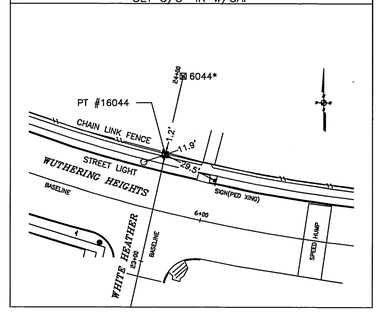
PT. # 6041
WHITE HEATHER DR. (S) APPROX. 70' N.
OF EBBTIDE DR.
SET SQUARE NAIL w/SHINER



PT. # 6043
WHITE HEATHER DR. (S) APPROX. 30' S.
OF KNOTTY OAKS TR.
SET SQUARE NAIL w/SHINER



PT. # 16044
(6044* UNABLE TO SET)
WHITE HEATHER DR. (S) & N. SIDE OF
WUTHERING HEIGHTS DR.
SET 3/8" IR w/CAP



PLOTTED ON:
FILE NAME: S:\2011\111003\SURVEY\3PT.DWG

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 87519 ENGINEER 4/5/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

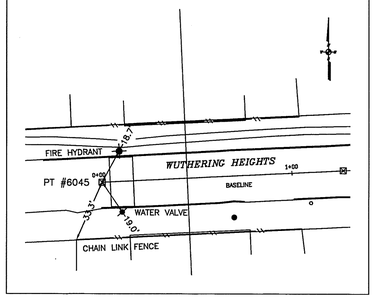
SWING TIES

SHEET 4 OF 5

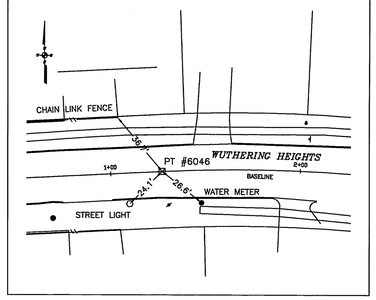
WBS NO.: M-000262-0004-4
FILE NO.: SM5056
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 37 OF 191

CITY DWG NO.:
PUBLIC WORKS AND ENGINEERING
49210
JMOBER
HOUSTON, TEXAS

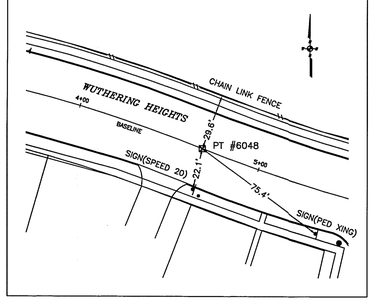
PT. # 6045
WUTHERING HEIGHTS DR. APPROX. 300' W. OF
WHITE HEATHER DR. (N)
SET X CUT IN CONC.



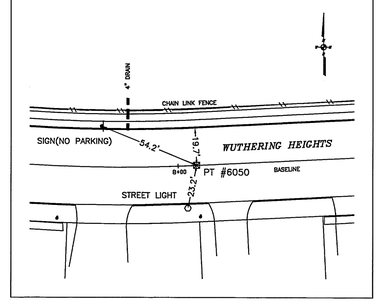
PT. # 6046
WUTHERING HEIGHTS DR. APPROX. 170' W. OF
WHITE HEATHER DR. (N)
SET X CUT IN CONC.



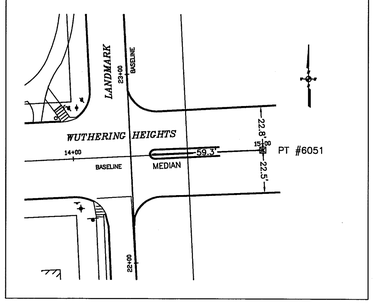
PT. # 6048
WUTHERING HEIGHTS DR. APPROX. 170' E. OF
WHITE HEATHER DR. (N)
SET X CUT IN CONC.



PT. # 6050
WUTHERING HEIGHTS DR. APPROX. 230' E. OF
WHITE HEATHER DR. (S)
SET X CUT IN CONC.



PT. # 6051
WUTHERING HEIGHTS DR. APPROX. 70' E. OF
LANDMARK DR.
SET 3/8" IR w/CAP



FOR REDUCED PLANS
original scale in inches

PLOTTED ON:
FILE NAME: S:\2011\1110031\SURVEY\3PT.DWG

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 4793 PROFESSIONAL LAND SURVEYOR
4/5/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

SWING TIES

SHEET 5 OF 5

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 38 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

Alignment: **Beran Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13795871.396	3100025.533
End:	14+20.000	13795942.142	3101443.769

Tangent Data

Parameter	Value	Parameter	Value
Length:	1420.000	Course:	N 87° 08' 39.3315" E

Alignment: **Ebbtide Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13796191.979	3099908.770
End:	0+69.209	13796195.034	3099977.912

Tangent Data

Parameter	Value	Parameter	Value
Length:	69.209	Course:	N 87° 28' 14.1226" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+69.209	13796195.034	3099977.912
RP:		13795635.579	3100002.626
PCC:	2+24.975	13796180.317	3100132.477

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 56' 13.3373"		Type: RIGHT
Radius:	560.000		
Length:	155.766	Tangent:	78.389
Mid-Ord:	5.407	External:	5.460
Chord:	155.264	Course:	S 84° 33' 39.2088" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+24.975	13796180.317	3100132.477
RP:		13796744.509	3100266.966
PT:	3+89.608	13796165.229	3100295.862

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	16° 15' 48.1284"		Type: LEFT
Radius:	580.000		
Length:	164.633	Tangent:	82.873
Mid-Ord:	5.832	External:	5.891
Chord:	164.080	Course:	S 84° 43' 26.6043" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	3+89.608	13796165.229	3100295.862
End:	15+20.000	13796221.547	3101424.851

Tangent Data

Parameter	Value	Parameter	Value
Length:	1130.392	Course:	N 87° 08' 39.3315" E

Alignment: **Knotty Oaks Tr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13796514.220	3099996.284
End:	1+40.032	13796521.196	3100136.141

Tangent Data

Parameter	Value	Parameter	Value
Length:	140.032	Course:	N 87° 08' 39.3315" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+40.032	13796521.196	3100136.141
RP:		13796091.730	3100157.565
PT:	2+57.358	13796511.082	3100252.666

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 38' 00.0000"		Type: RIGHT
Radius:	430.000		
Length:	117.327	Tangent:	59.030
Mid-Ord:	3.995	External:	4.033
Chord:	116.963	Course:	S 85° 02' 20.6685" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+57.358	13796511.082	3100252.666
End:	3+98.296	13796479.911	3100390.114

Tangent Data

Parameter	Value	Parameter	Value
Length:	140.938	Course:	S 77° 13' 20.6685" E

Curve Point Data

Description	Station	Northing	Easting
PC:	3+98.296	13796479.911	3100390.114
RP:		13797260.099	3100567.048
PT:	6+16.579	13796461.093	3100606.905

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 38' 00.0000"		Type: LEFT
Radius:	800.000		
Length:	218.283	Tangent:	109.823
Mid-Ord:	7.433	External:	7.503
Chord:	217.606	Course:	S 85° 02' 20.6685" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	6+16.579	13796461.093	3100606.905
End:	14+20.000	13796501.121	3101409.328

Tangent Data

Parameter	Value	Parameter	Value
Length:	803.421	Course:	N 87° 08' 39.3315" E

Alignment: **Landmark Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13794803.916	3101440.404
End:	24+00.000	13797200.969	3101321.522

Tangent Data

Parameter	Value	Parameter	Value
Length:	2400.000	Course:	N 02° 50' 21.3656" W

Alignment: **Tidewater Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13796813.907	3099982.651
End:	1+39.959	13796820.880	3100122.436

Tangent Data

Parameter	Value	Parameter	Value
Length:	139.959	Course:	N 87° 08' 39.3315" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+39.959	13796820.880	3100122.436
RP:		13796447.345	3100141.069
PT:	2+42.006	13796812.083	3100223.786

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 38' 00.0000"		Type: RIGHT
Radius:	374.000		
Length:	102.047	Tangent:	51.342
Mid-Ord:	3.475	External:	3.508
Chord:	101.731	Course:	S 85° 02' 20.6685" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+42.006	13796812.083	3100223.786
End:	4+64.815	13796762.805	3100441.077

Tangent Data

Parameter	Value	Parameter	Value
Length:	222.809	Course:	S 77° 13' 20.6685" E

Curve Point Data

Description	Station	Northing	Easting
PC:	4+64.815	13796762.805	3100441.077
RP:		13797542.991	3100618.025
PT:	6+83.104	13796743.984	3100657.874

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 38' 01.8317"		Type: LEFT
Radius:	800.000		
Length:	218.290	Tangent:	109.827
Mid-Ord:	7.434	External:	7.504
Chord:	217.613	Course:	S 85° 02' 17.7192" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	6+83.104	13796743.984	3100657.874
End:	14+20.000	13796780.697	3101393.855

Tangent Data

Parameter	Value	Parameter	Value
Length:	736.896	Course:	N 87° 08' 39.3315" E

Alignment: **West Orem Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13794831.421	3100029.354
End:	15+00.000	13794908.524	3101527.371

Tangent Data

Parameter	Value	Parameter	Value
Length:	1500.000	Course:	N 87° 03' 12.8279" E

Alignment: **Whiteheather Dr.**
(From West Oaks Dr. to Wuthering Heights Dr.)

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13794745.877	3100312.559
End:	1+33.706	13794879.498	3100307.779

Tangent Data

Parameter	Value	Parameter	Value
Length:	133.706	Course:	N 02° 02' 55.1416" W

Curve Point Data

Description	Station	Northing	Easting
PC:	1+33.706	13794879.498	3100307.779
RP:		13794902.377	3100947.370
PT:	3+38.736	13795082.074	3100333.115

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	18° 21' 18.7513"		Type: RIGHT
Radius:	640.000		
Length:	205.030	Tangent:	103.401
Mid-Ord:	8.193	External:	8.299
Chord:	204.154	Course:	N 07° 07' 44.2341" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	3+38.736	13795082.074	3100333.115
End:	3+80.929	13795122.569	3100344.962

Tangent Data

Parameter	Value	Parameter	Value
Length:	42.193	Course:	N 16° 18' 23.6097" E

Curve Point Data

Description	Station	Northing	Easting
PC:	3+80.929	13795122.569	3100344.962
RP:		13795291.035	3099769.098
PT:	5+81.514	13795320.846	3100368.357

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	19° 09' 16.0000"		Type: LEFT
Radius:	600.000		
Length:	200.585	Tangent:	101.237
Mid-Ord:	8.363	External:	8.481
Chord:	199.652	Course:	N 06° 43' 45.6098" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	5+81.514	13795320.846	3100368.357
End:	15+01.910	13796240.102	3100322.562

Tangent Data

Parameter	Value	Parameter	Value
Length:	920.396	Course:	N 02° 51' 07.1562" W

Curve Point Data

Description	Station	Northing	Easting
PC:	15+01.910	13796240.102	3100322.562
RP:		13796280.504	3101133.556
PT:	17+23.414	13796460.092	3100341.665

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 37' 46.4877"		Type: RIGHT
Radius:	812.000		
Length:	221.504	Tangent:	111.444
Mid-Ord:	7.541	External:	7.612
Chord:	220.817	Course:	N 04° 57' 46.0877" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	17+23.414	13796460.092	3100341.665
End:	24+00.000	13797119.923	3100491.303

Tangent Data

Parameter	Value	Parameter	Value
Length:	676.586	Course:	N 12° 46' 39.3315" E

Alignment: **Whiteheather Dr.**
(North of Wuthering Heights Dr.)

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13797028.512	3100196.034
End:	0+95.160	13797122.359	3100211.785

Tangent Data

Parameter	Value	Parameter	Value
Length:	95.160	Course:	N 09° 31' 40.1599" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+95.160	13797122.359	3100211.785
RP:		13797250.476	3099448.462
PT:	2+62.449	13797289.039	3100221.501

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	12° 23' 01.1700"		Type: LEFT
Radius:	774.000		
Length:	167.289	Tangent:	83.972
Mid-Ord:	4.515	External:	4.542
Chord:	166.964	Course:	N 03° 20' 09.5749" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+62.449	13797289.039	3100221.501
End:	3+00.000	13797326.544	3100219.630

Tangent Data

Parameter	Value	Parameter	Value
Length:	37.551	Course:	N 02° 51' 21.0100" W

Alignment: **Wuthering Heights Dr.**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	13797130.842	3099913.358
End:	1+27.108	13797137.175	3100040.308

Tangent Data

Parameter	Value	Parameter	Value
Length:	127.108	Course:	N 87° 08' 39.3315" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+27.108	13797137.175	3100040.308
RP:		13796338.168	3100080.165
PCC:	4+68.479	13797082.024	3100374.576

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	24° 26' 56.0000"		Type: RIGHT
Radius:	800.000		
Length:	341.371	Tangent:	173.323
Mid-Ord:	18.139	External:	18.560
Chord:	338.787	Course:	S 80° 37' 52.6685" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	4+68.479	13797082.024	3100374.576
RP:		13797825.881	3100668.987
PT:	8+09.850	13797026.874	3100708.844

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	24° 26' 55.9999"		Type: LEFT
Radius:	800.000		
Length:	341.371	Tangent:	173.323
Mid-Ord:	18.139	External:	18.560
Chord:	338.787	Course:	S 80° 37' 52.6684" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	8+09.850	13797026.874	3100708.844
End:	15+00.000	13797061.259	3101398.137

Tangent Data

Parameter	Value	Parameter	Value
Length:	690.150	Course:	N 87° 08' 39.3315" E

No.	Date	Revisions	App.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67748
REGISTERED PROFESSIONAL ENGINEER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

HORIZONTAL ALIGNMENT DATA

WBS NO.: M-000262-0004-4	CITY DWG. NO.
FILE NO.: SM5056	PUBLIC WORKS AND ENGINEERING
DRAWING SCALE	49210
N.T.S.	CITY NUMBER
CITY OF HOUSTON PM	HOUSTON, TEXAS
ISAAC MUNIZ, E.I.T.	
SHEET NO. 39 OF 191	

PLOTTED ON: Tuesday, April 10, 2012 8:13:40 AM
FILE NAME: F:\WHB-SG4\CAD\GNRL\WHB-SG4-HORIZONTAL ALIGNMENT DATA.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 58

REFER TO PROP. TRAFFIC SIGNALS DRAWINGS FOR THE REMOVAL AND REPLACEMENT OF THE EXIST. TRAFFIC SIGNALS AT THE INTERSECTIONS OF WHITEHEATHER AND WEST OREM.

SIDEWALK AND PAVEMENT CONSTRUCTION (BY OTHERS)

CenterPoint Energy 4" IP STL Gas Line

CenterPoint Energy 2" IP STL Gas Line

AT&T TEXAS/SBC 8-4" C PVC

4030 LOT04 BLK4

STA 2+70.00, 15.50'LT
TYPE "C" MH (W-12)
RIM ELEV= 50.85 (23)
FL=43.88 (48" E)
FL=43.88 (48" W)
FL=45.25 (30" N)

STA 1+52.86, 20.00'LT (22)
TYPE C-2A INLET (W-11A)
TOC ELEV= 50.95
PROP. 11.38' 30" STM SWR LEAD

STA 1+52.86, 8.62'LT
TYPE "C" MH (W-11)
RIM ELEV= 50.68 (23)
FL=45.36 (24" N)
FL=45.36 (30" S)
FL=45.36 (30" E)
FL=45.36 (30" W)

REMOVE & DISPOSE 110' OF EXIST. 12" WATER LINE

STA 2+80.00, 10.00'LT
TYPE "C" MH (W-10)
RIM ELEV= 50.95 (23)
FL=45.87 (24" N)
FL=45.87 (24" S)

℄ STA 2+49.52 (5)(51)(52) L= 38.0'

℄ STA 2+87.50 L= 21.0' (5)(51)

℄ STA 3+32.60 L= 23.0' (5)(51)

℄ STA 2+43.53 L= 31.0' (5)(51)(52)

NORTH R.O.W.

SOUTH R.O.W.

WEST R.O.W.

EAST R.O.W. 4' TYP

60.0' R.O.W.

41.0' B-B

B-79

24"stm

36"stm

12"san

8"san

48" RCP

30" RCP

24" RCP

Concrete Pvmt

℄ WHITEHEATHER DR.

2+00

3+00

4+00

0+00

1+00

0+40

R30'

R27'

R25'

R10' TYP

12"ac water

Exist. 12"water

24"pvc water

8" c.i. water abandoned

CHAIN LINK FENCE

TRAFFIC LIGHT

GATE

CONC. DR.

MANHOLE

WATER METER

POST

ASPH.

CONC.

12" OAK

FND. 1/2" IR

TRAFFIC SIGN

TBM-1

TBM-2

PROP. 12"WATER

ABANDON EXISTING 12" WATER LINE AND TRANSFER SERVICES TO PROPOSED 12" WATER LINE

2-12"x45° BENDS, A.B.
1-12" WET CONNECTION
1-12" CUT, PLUG & ABANDON

1-24"X12" TS&V W/BOX
1-12" CUT, PLUG & ABANDON

AT&T TEXAS/SBC CABLE

CenterPoint Energy 4" IP STL Gas Line

STA 1+57.00, 20.00'RT
TYPE C-2A INLET (W-11B)
TOC ELEV= 50.88 (22)
FL ELEV. = 45.70

PROP. 28.91' 30" STM SWR LEAD

1-FULL SECTION (18' MIN) WATER LINE W/RESTRAINED JOINTS CENTERED UNDER EXIST. 8" SAN SWR

SEE SHEET 41 FOR 12" WATER LINE CONNECTION DETAIL

1-F.H., 3' B.C.
1-12"x6" TEE, AB
1-6" GV W/BOX

WATER VALVE

FIRE HYDRANT

TRAFFIC SIGN

BUSINESS SIGN

MATCH LINE STA. 4+20 (SEE SHEET NO. 42)

SEE SHEET NO. 59

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 2 ELEVATION 51.73'
WHITEHEATHER DR. STA.3+79.01, 24.69' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

Owner/Point Energy/ ELECTRIC FACILITIES — Date 4-12-12
CenterPoint Energy/ GAS FACILITIES — Date 4-12-12
AT&T TEXAS/SWBT UTILITY NOT SHOWN — Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.
CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — LICENSED PROFESSIONAL ENGINEER — 4-12-12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 40 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 18, 2012 4:26:07 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

WHITEHEATHER DR.

FOR REDUCED PLANS
original scale in inches

STA. 1+11.00 (W) TOC 51.50
STA. 1+20.00 (E) TOC 51.50
STA. 1+53.00 (W) TOC 50.67
STA. 1+57.00 (E) TOC 50.88

West R.O.W.
East R.O.W.
℄ Pvmt
West TOC
East TOC
TOC 51.68
TOC @ -1.67% (E)
TOC @ -1.50% (W)
TOC @ 0.30% (E&W)

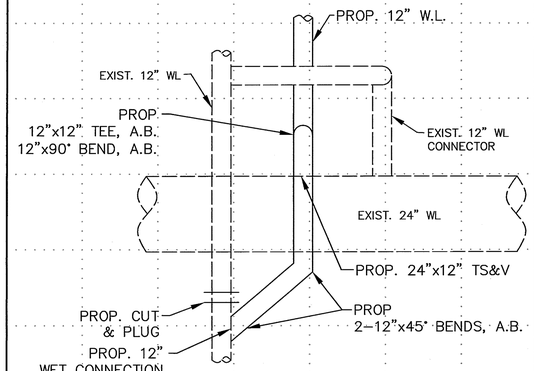
1'0" MIN.CLR.
2 YEAR HGL
2 YEAR HGL
2 YEAR HGL
5' MIN. COVER
SBC 2-4" 'C' PVC
Exist. 12" water ac
Exist. 12" water ac
PROP. 12" WATER
38'~30" RCP @ 0.30%
129'~24" RCP @ 0.40%
Exist. 12" water ac
219'~24" RCP @ 0.36%
FL. ELEV = 46.37
PROP. 12" WATER
2'0" MIN.CLR.
Exist. 12" water ac
30" strm
PROP. 12" WATER
PROP. 6"F.H. LEAD
SBC 2-4" 'C' PVC
SBC 2-4" 'C' PVC
24" Equilon Crude Oil Pipeline
24" pvc water
PROP. 12" WATER
2'0" MIN.CLR.
Exist. 12" san
Exist. 12" san
Exist San MH
FL=41.28 (12" N)
FL=41.18 (12" S)
Exist San MH
FL=41.42 (12" N)
FL=41.52 (8" E)
FL=41.32 (12" W)
69'
(44)

STA 1+52.86
PROP. TYPE C-2A INLET
FL IN=45.70 (30" E)

STA 2+70.00
PROP. TYPE "C" MH
FL IN=43.88 (48" E)
FL IN=45.25 (30" N)
FL OUT=43.88 (48" W)

STA 1+52.86
PROP. TYPE "C" MH
FL IN=45.36 (24" N)
FL IN=45.36 (30" E)
FL OUT=45.36 (30" S)
FL OUT=45.36 (30" W)

STA 2+80.00
PROP. TYPE "C" MH
FL IN=45.87 (24" N)
FL OUT=45.87 (24" S)



12" WATER LINE CONNECTION DETAIL
PLAN VIEW

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 2 ELEVATION 51.73'
WHITEHEATHER DR. STA.3+79.01, 24.69' LT

PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY — Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
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(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 0+00.00 TO STA. 4+20.00 PROFILE

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 41 OF 191	

CITY OF HOUSTON — PUBLIC WORKS AND ENGINEERING — 49210 — NUMBER — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 10:53:41 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

0 1 2 3

(SEE SHEET NO. 40)
MATCH LINE STA. 4+20

STA 5+00.00, 20.00'LT
TYPE B–B INLET (W–9A)
TOC ELEV= 51.92 (22)
FL ELEV. = 47.15

STA 5+00.00, 10.00'LT
TYPE "C" MH (W–9)
RIM ELEV= 51.62 (23)
FL=46.65 (24" E)
FL=46.45 (24" W)
FL=46.65 (24" S)

REMOVE & DISPOSE 10'
OF EXIST. 12" WATER LINE

PROP. 10.00'
STM SWR LEAD

PROP. 30.00'
STM SWR LEAD

12" OAK
15" OAK
10" OAK
TRAFFIC SIGN
12" OAK
MANHOLE
12" OAK
SAN. MANHOLE
12" OAK
TRAFFIC SIGN
8" OAK
8" OAK
12" OAK
12" OAK
12" OAK

12"san
8"san
12"san
12"san
12"ac water
12"ac water
12"ac water
12"ac water
8" water abandoned
Concrete Pvmt
12"san

WEST R.O.W.
EAST R.O.W.
60.0' R.O.W.
41.0' B–B
4.0' TYP
RAMP
TBM–3
B–99

℄ WHITEHEATHER DR.

5+00
6+00
7+00
8+00

24" RCP

8" c.i. water abandoned
PROP. 12"WATER
PROP. 12"WATER
PROP. 12"WATER
CHAIN LINK FENCE
CHAIN LINK FENCE
ASPH.

1–F.H., 3' B.C.
1–12"x6" TEE, AB
1–6" GV W/BOX

℄ STA 5+92.73
L= 31.0' (5)(51)(52)

ABANDON EXISTING 12"
WATER LINE AND
TRANSFER SERVICES TO
PROPOSED 12" WATER LINE

1–FULL SECTION (18' MIN)
WATER LINE W/RESTRAINED JOINTS
CENTERED OVER EXIST. 12" SAN SWR

STA 5+00.00, 20.00'RT
TYPE B–B INLET (W–9B)
TOC ELEV= 51.92 (22)
FL ELEV. = 47.15

TRAFFIC SIGN
FIRE HYDRANT
GATE
GATE
TRAFFIC SIGN

(SEE SHEET NO. 44)
MATCH LINE STA. 8+40

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252–0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 3 ELEVATION 52.43'
WHITEHEATHER DR. STA.7+79.02, 26.02' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713–223–4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVES ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988–5504, Fax (713) 988–1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F–003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
OCT 31, 2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P–5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB–PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.: M–000262–0004–4	CITY PWE NO.
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 42 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 10:54:13 PM
FILE NAME: F:\WHB–SG4\CAD\P&P'S\WH–SG4_P&PS–V.DWG

FOR REDUCED PLANS
original scale in inches

WHITEHEATHER DR.

STA. 5+00.00 (E&W) TOC 51.92

STA. 8+00.00 (E&W) TOC 52.62

West R.O.W.

West TOC

East TOC

℄ Pvmt

TOC 51.68

TOC @ 0.30% (E&W)

TOC 52.70

2 YEAR HGL

219'~24" RCP @ 0.36%

Exist. 12" water ac

Exist. F.H. Lead

5' MIN. COVER

Exist. 12" water ac

PROP. 12" WATER

FL. ELEV = 46.37

PROP. 6"F.H. LEAD

2'0" MIN.CLR.

PROP. 12" WATER

Exist San MH
FL=41.39 (12" N)
FL=41.34 (12" S)

Exist. 12" san

Exist. 12" san

Exist San MH
FL=41.63 (12" N)
FL=41.68 (12" S)
FL=45.48 (8" W)
FL=41.63 (12" E)

STA 5+00.00
PROP. TYPE "C" MH
FL IN=46.65 (24" E)
FL IN=46.45 (24" W)
FL OUT=46.65 (24" S)

STA 5+00.00
PROP. TYPE B-B INLET
FL OUT=47.15 (24" E)

64 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24

4+20 5+00 6+00 7+00 8+00 8+40

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 3 ELEVATION 52.43
WHITEHEATHER DR. STA.7+79.02, 26.02' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
UNDERGROUND ELECTRIC LINES UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

CenterPoint Energy/ GAS FACILITIES — Date: 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

AT&T TEXAS/SWBT UTILITIES ARE SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-12-12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 4+20.00 TO STA. 8+40.00 PROFILE

WBS NO.: M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 43 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 10:54:51 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 62

REMOVE & DISPOSE 95' OF EXIST. 12" WATER LINE, 20' OF EXIST. 4" WATER LINE, & 28' OF EXIST. 6" WATER LINE

CenterPoint Energy 2" IP STL Gas Line

STA 11+00.00, 20.00'LT
TYPE B-B INLET (B-8A)
(22) TOC ELEV= 51.93
FL ELEV. = 47.23

STA 11+00.00, 10.00'LT
TYPE "C" MH (B-8)
(23) RIM ELEV= 51.63
FL=46.73 (24" W)
FL=46.73 (24" E)
FL=46.75 (24" N)

STA 3+05.00, 10.00'RT
TYPE "C" MH (B-6)
RIM ELEV= 51.33 (23)
FL=45.14 (36" E)
FL=45.14 (24" N)
FL=45.14 (36" W)
FL=45.14 (24" S)

STA 11+96.00, 13.50'LT
TYPE B-B INLET (B-7A)
TOC ELEV= 51.91 (22)
FL ELEV. = 47.25

1-F.H., 3' B.C.
1-12"x6" TEE, A.B.
1-6" GV W/BOX

PROP. 10.00' STM SWR LEAD
PROP. 30.00' STM SWR LEAD
PROP. 6.75' STM SWR LEAD
24" RCP
R20'
R25' TYP

℄ WHITEHEATHER DR.

℄ BERAN DR.

PROP. 12"WATER

℄ STA 9+35.12
L= 31.0' (5) (51) (52)

ABANDON EXISTING 12" WATER LINE AND TRANSFER SERVICES TO PROPOSED 12" WATER LINE

1-FULL SECTION (18' MIN) WATER LINE W/RESTRAINED JOINTS CENTERED OVER EXIST. 8" SAN SWR

1-FULL SECTION (18' MIN) WATER LINE W/RESTRAINED JOINTS CENTERED OVER EXIST. 10" SAN SWR

1-12"x6" TEE, AB
1-6"x90° BEND, A.B.
1-6" WET CONNECTION
1-6" CUT & PLUG
1-6" GV W/BOX

STA 11+00.00, 20.00'RT
TYPE B-B INLET (B-8B)
(22) TOC ELEV= 51.93
FL ELEV. = 47.23

1-12" GV W/BOX

1-12"x8" CROSS, AB
1-12"GV W/BOX
2-12"x45° BENDS, AB

STA 11+96.00, 6.75'LT
TYPE "C" MH (B-7)
RIM ELEV= 51.55 (23)
FL=46.75 (24" E)
FL=46.75 (24" S)
FL=46.75 (24" W)

STA 11+96.00, 13.50'RT
TYPE B-B INLET (B-7B)
TOC ELEV= 51.91 (22)
FL ELEV. = 47.25

PROP. 20.25' STM SWR LEAD

SEE SHEET 45 FOR 6" WATER LINE CONNECTION DETAIL

SEE SHEET NO. 63

(SEE SHEET NO. 42) MATCH LINE STA. 8+40

(SEE SHEET NO. 46) MATCH LINE STA. 12+60

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 4 ELEVATION 52.01'
WHITEHEATHER DR. STA.11+28.10, 26.13' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR OVERHEAD UNDERGROUND OUTLINES, UNLESS OTHERWISE NOTED) AND AT TIME OF TRENCH EXPOSE — Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN — Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. — Date 4-12-12

CABLE Approved for underground conduit facilities only. — Date:

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC. TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

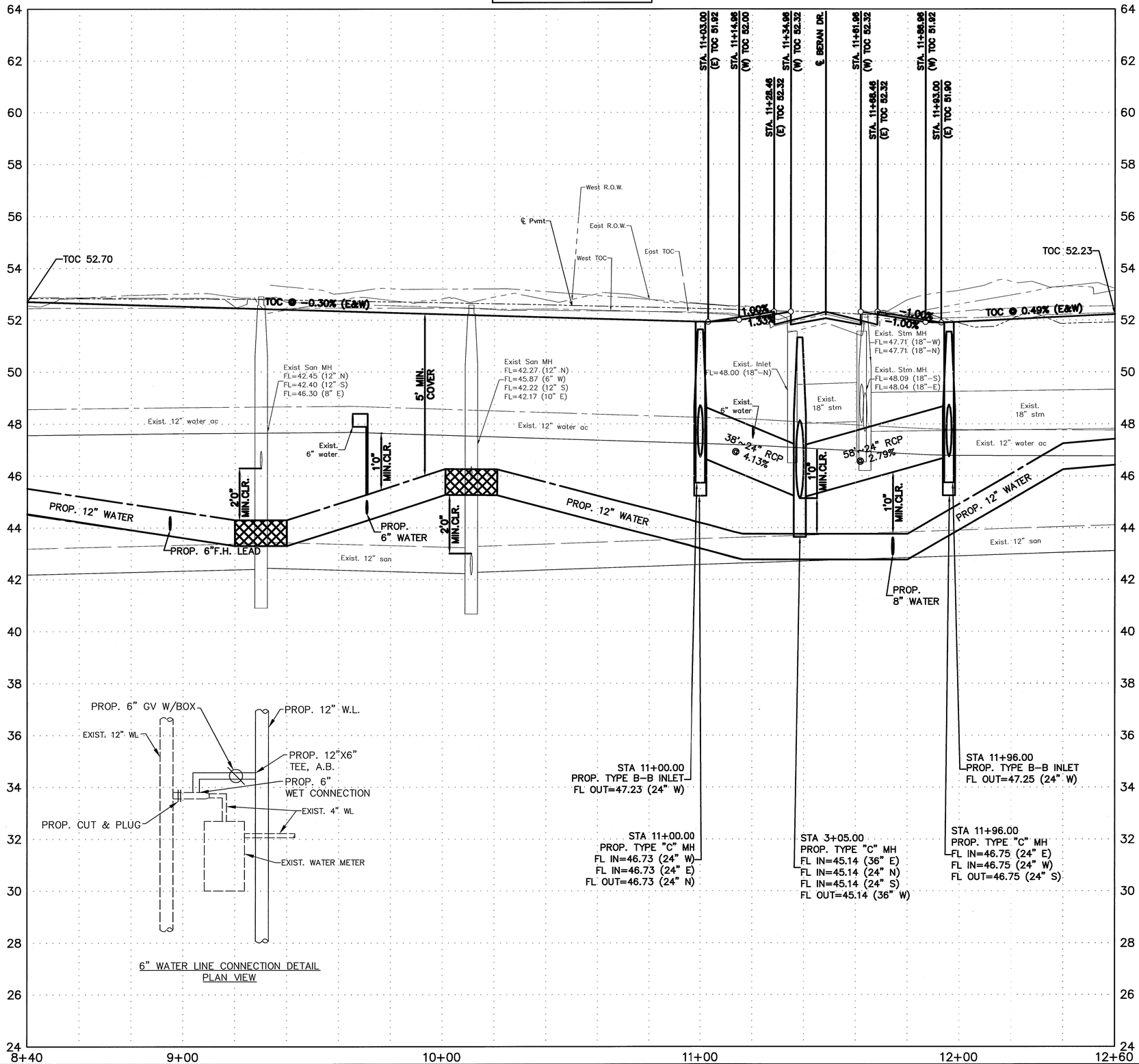
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 44 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — CITY ENGINEER — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 18, 2012 3:02:36 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

WHITEHEATHER DR.



6" WATER LINE CONNECTION DETAIL
PLAN VIEW

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 4 ELEVATION 52.01'
WHITEHEATHER DR. STA.11+28.10, 26.13' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND OUTLINES, UNLESS OTHERWISE NOTED) VOID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (ONLY SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00 PROFILE

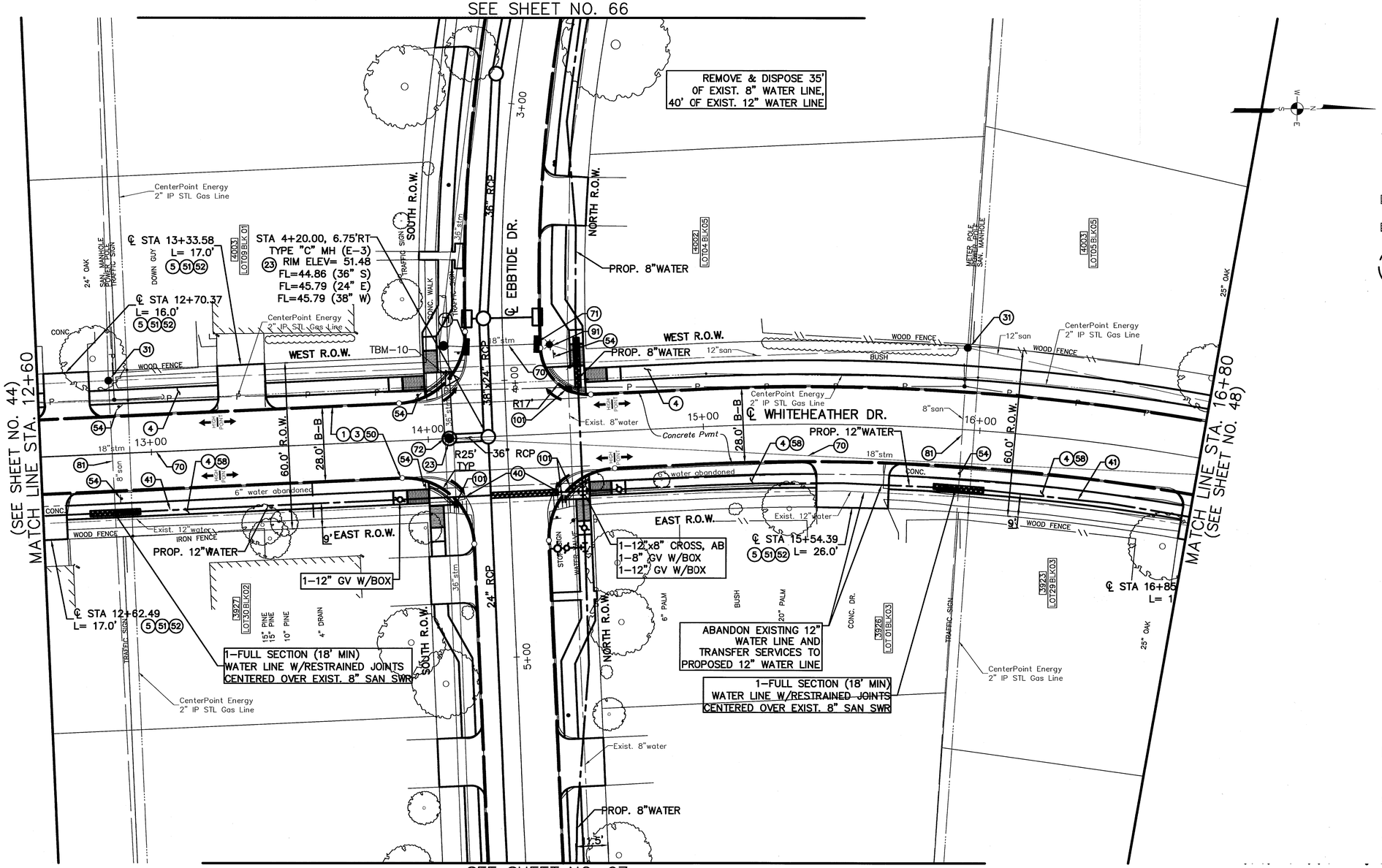
WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 45 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 REGISTERED ENGINEER

PLOTTED ON: Wednesday, April 11, 2012 10:56:07 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 66



SEE SHEET NO. 67

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
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- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

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0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 10 ELEVATION 52.33
WHITEHEATHER DR. STA.14+08.90, 21.58' LT

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CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date 4-13-12
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TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 16+80.00

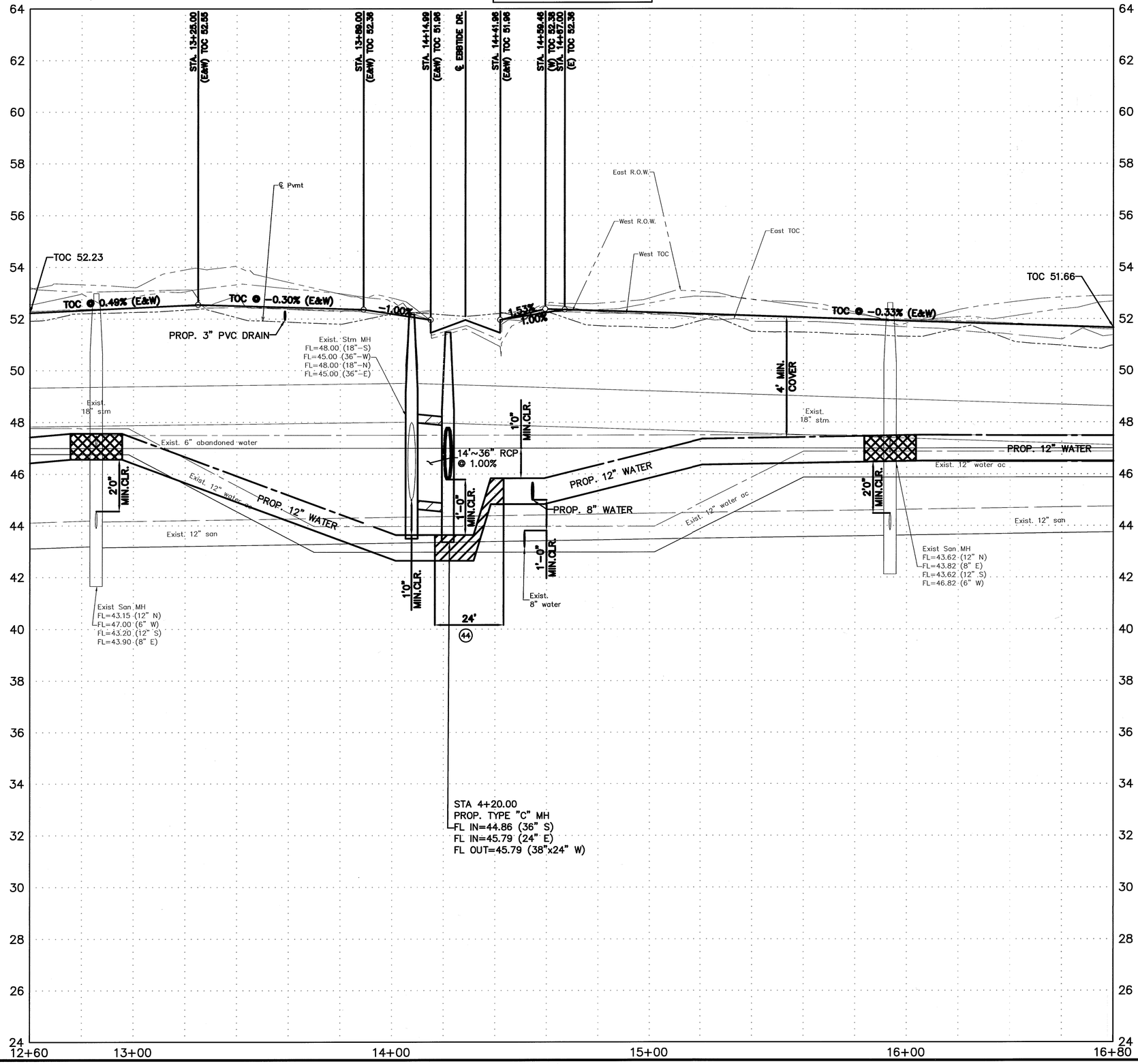
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 46 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:10:03 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches
0 1 2 3

WHITEHEATHER DR.



LEGEND

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0 20' 40'

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 12+60.00 TO STA. 16+80.00 PROFILE

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FILE NO.: SM5056	
DRAWING SCALE	
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 47 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:10:35 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 70

SEE SHEET NO. 74

(SEE SHEET NO. 46) MATCH LINE STA. 16+80

MATCH LINE STA. 21+40 (SEE SHEET NO. 50)

REMOVE & DISPOSE 50' OF EXIST. 4" WATER LINE, 55' OF EXIST. 6" WATER LINE & 83' OF EXIST. 12" WATER LINE

℄ KNOTTY OAKS TR.

℄ WHITEHEATHER DR.

℄ TIDEWATER DR.

SOUTH R.O.W.

NORTH R.O.W.

WEST R.O.W.

EAST R.O.W.

PROP. 6"WATER

PROP. 20.25' STM SWR LEAD
STA 3+62.18, 7.46'RT
TYPE "C" MH (K-10)
RIM ELEV= 51.25 (23)
FL=45.88 (24" N)
FL=42.06 (42" E)
FL=45.88 (24" S)
FL=40.06 (45" W)

℄ STA 18+63.09
L= 19.0'
(5) (51) (52)

℄ STA 19+44.82
(5) (51) (52) L= 17.0'

PROP. 14.21' 36" STM SWR LEAD
STA 20+47.37, 6.75'LT
TYPE "C" MH (T-9)
RIM ELEV= 51.96 (23)
FL=40.53 (30" N)
FL=40.53 (45" W)
FL=42.06 (30" E)

PROP. 6.75' STM SWR LEAD

PROP. 6.75' STM SWR LEAD

PROP. 12" WATER

PROP. 6.75' STM SWR LEAD

PROP. 12"WATER

PROP. 12"WATER

PROP. 12"WATER

PROP. 12"WATER

PROP. 8"WATER

℄ STA 18+85.99
L= 17.0'
(5) (51) (52)

℄ STA 18+81.48
(5) (51) (52) L= 25.0'

℄ STA 19+75.49
(5) (51) (52) L= 18.0'

℄ STA 21+23.06
(5) (51) (52) L= 18.0'

STA 17+11.00, 6.75'RT
TYPE "C" MH (K-9)
RIM ELEV= 52.46 (23)
FL=46.38 (24" N)
FL=46.38 (24" E)

STA 17+95.00, 6.75'RT
TYPE "C" MH (MH-K8)
RIM ELEV= 52.46 (23)
FL=46.38 (24" S)
FL=46.38 (24" E)

STA 17+11.00, 13.50'RT
TYPE B-B INLET (K-8B)
TOC ELEV= 51.06 (22)
FL ELEV. = 46.88

STA 17+95.00, 13.50'RT
TYPE B-B INLET (I-K8A)
TOC ELEV= 51.56 (22)
FL ELEV. = 46.88

1-12"x6" TEE, A.B.
1-6" GV W/BOX
1-12" GV W/BOX
1-12"x8" TEE, A.B.
1-8" GV W/BOX

1-FULL SECTION (18' MIN) WATER LINE W/RESTRAINED JOINTS CENTERED OVER EXIST. 8" SAN SWR

ABANDON EXISTING 12" WATER LINE AND TRANSFER SERVICES TO PROPOSED 12" WATER LINE

2-12"x45° BENDS, A.B.
1-12" GV W/BOX

1-F.H., 3' B.C.
1-12"x6" TEE, AB
1-6" GV W/BOX

2-12"x45° BENDS, A.B.
1-12"x8" CROSS, AB
1-12" GV W/BOX

PROP. 14.54' 30" STM SWR LEAD

CenterPoint Energy 2" IP STL Gas Line

Exist. 4"water

Exist. 6"water

Exist. 12" water

Concrete Pvmt

WOOD FENCE

TYPE 'B' INLET WATER VALVE FND. 1/2" IR

SAN. MANHOLE

POWER POLE

GAS MARKER

TRAFFIC SIGN

STOP SIGN

FIRE HYDRANT

WATER VALVE

STREET LIGHT

CONC. WALK

CONC. DR.

12" OAK

22" OAK

25" OAK

20" OAK

BUSH

HEDGE

[4002] LOT12 BLK05

[4003] LOT13 BLK05

[4002] LOT23 BLK05

[3922] LOT01 BLK04

[3919] LOT27 BLK04

[3918] LOT01 BLK06

18" RCP

24" RCP

30" RCP

36" RCP

42" RCP

45° x 29' RCP

R25' TYP

TBM-18

SEE SHEET NO. 71

SEE SHEET NO. 75

LEGEND

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- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
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- PROP. WATERLINE
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- CRITICAL LOCATION

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0 20' 40'

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CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
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PROJECT T.B.M.
TBM# 13 ELEVATION 51.37'
WHITEHEATHER DR. STA.17+35.37, 22.61' LT

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
4-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 16+80.00 TO STA. 21+40.00

WBS NO.: M-000262-0004-4	CITY PROJECT NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 48 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
REGISTERED
ENGINEER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:11:05 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

WHITEHEATHER DR.

STA. 17+15.00 (E&W) TOC 51.55
STA. 17+40.00 (E) TOC 51.95 (W) TOC 51.15
℄ KNOTTY OAKS TR.
STA. 17+67.00 (E) TOC 51.95 (W) TOC 51.15
STA. 17+82.00 (E&W) TOC 51.55
STA. 20+02.00 (E&W) TOC 52.19
STA. 20+27.00 (E&W) TOC 52.59
℄ TIDEWATER DR.
STA. 20+54.00 (E&W) TOC 52.59
STA. 20+79.00 (E&W) TOC 52.99

West R.O.W.
East R.O.W.
℄ Pvmt
West TOC
East TOC

TOC 51.66
TOC 53.17
TOC @ 0.30% (E&W)
TOC @ 0.30% (E&W)
1.00%
1.00%
1.00%
1.00%
1.00%
1.00%

Exist. Stm MH
FL=47.49 (18"-W)
FL=47.49 (18"-N)
Exist. Stm MH
FL=46.99 (18"-S)
FL=46.99 (18"-NW)
FL=46.99 (18"-E)
Exist. Stm MH
FL=47.49 (18"-SE)
FL=47.59 (18"-N)
Exist. Stm MH
FL=47.45 (18"-S)
Exist. Stm MH
FL=47.24 (18"-S)
Exist. Stm MH
FL=45.97 (30"-W)
FL=46.07 (30"-E)

(44) 56'
Exist. 18" stm
Exist. 18" stm
Exist. 18" stm
4' MIN. COVER
49'~24" RCP @ 1.02%
Exist. F.H. Lead
Exist. 6" water
Exist. 12" water ac
PROP. 12" WATER
Exist. 12" water ac
Exist. 12" water ac
PROP. 12" WATER
1'0" MIN.CLR.
Exist. 6" water
40 (44)
1'0" MIN.CLR.
PROP. 12" WATER
PROP. 6" WATER
2'0" MIN.CLR.
PROP. 8" WATER
1'0" MIN.CLR.
Exist. 12" san
PROP. 6"F.H. LEAD
Exist. 12" san
PROP. 8" WATER
2 YEAR HGL
Exist San MH
FL=44.04 (12" N)
FL=46.59 (6" W)
FL=44.09 (12" S)
FL=44.09 (8" E)
1'0" MIN.CLR.
291'~30" RCP @ 0.30%
35'~24" RCP @ 1.43%
PROP. 12" WATER
1'0" MIN.CLR.
FL. ELEV = 40.81

STA 3+62.18
PROP. TYPE "C" MH
FL IN=45.88 (24" N)
FL IN=42.06 (42" E)
FL IN=45.88 (24" S)
FL OUT=40.06 (45" W)

STA 17+11.00
PROP. TYPE "C" MH
FL IN=46.38 (24" E)
FL OUT=46.38 (24" N)

STA 17+95.00
PROP. TYPE "C" MH
FL IN=46.38 (24" E)
FL OUT=46.38 (24" S)

STA 20+47.37
PROP. TYPE "C" MH
FL IN=40.53 (30" N)
FL IN=42.06 (30" E)
FL OUT=40.53 (45" W)

STA 17+11.00
PROP. TYPE B-B INLET
FL OUT=46.88 (24" W)

STA 17+95.00
PROP. TYPE B-B INLET
FL OUT=46.88 (24" W)

64 62 60 58 56 54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24
16+80 17+00 18+00 19+00 20+00 21+00 21+40

LEGEND

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0 20' 40'

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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
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04-12-2012

SURVEYED BY:
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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

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WHITEHEATHER DR.

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FROM STA. 16+80.00 TO STA. 21+40.00 PROFILE

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SHEET NO. 49 OF 191	

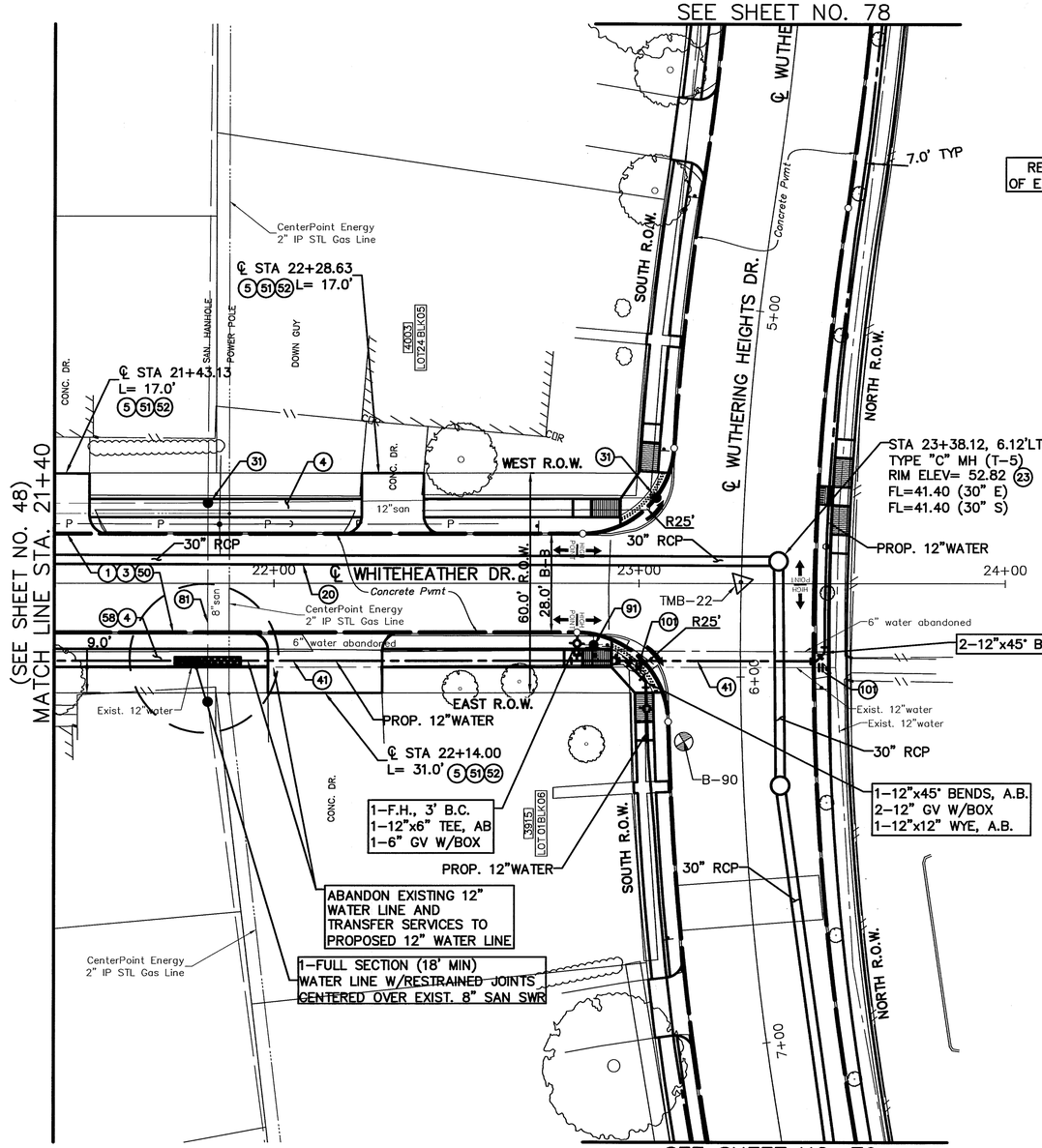
PUBLIC WORKS AND ENGINEERING
49210
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:11:34 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 78

(SEE SHEET NO. 48)
MATCH LINE STA. 21+40



SEE SHEET NO. 79

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 22 ELEVATION 53.39'
WHITEHEATHER DR. STA.23+27.87, 0.38' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

Date:
CABLE Approved for underground conduit facilities only.

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 21+40.00 TO STA. 24+00.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 50 OF 191	

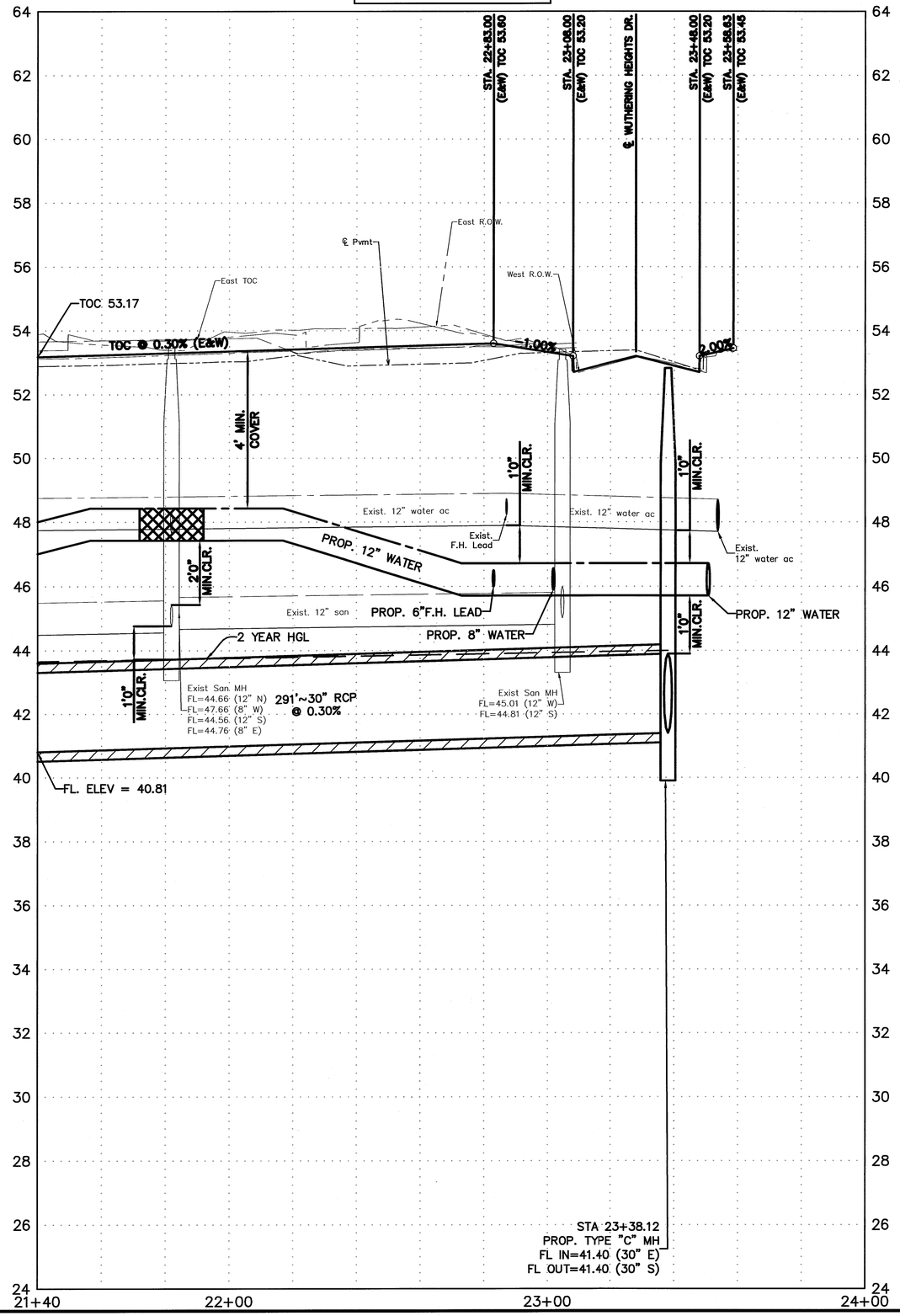
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:12:04 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

0 1 2 3

WHITEHEATHER DR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 22 ELEVATION 53.39'
WHITEHEATHER DR. STA.23+27.87, 0.38' LT

PRIVATE UTILITY LINES SHOWN

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CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR EXISTING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

TEXAS-ONESTOP UTILITY LINES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

Date:
CABLE Approved for underground conduit facilities only.

SES HORIZON
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(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 21+40.00 TO STA. 24+00.00 PROFILE

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 51 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 LICENSED PROFESSIONAL ENGINEER HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:12:36 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 78

CenterPoint Energy
2" IP STL Gas Line

PROP. 12"WATER

12.0' TYP

Concrete Pvmt

2+00

Exist. 12"water

24" RCP

NORTH R.O.W.

40/18
LOT 01 BLK 07

CenterPoint Energy
2" IP STL Gas Line

REMOVE & DISPOSE 40'
OF EXIST. 12" WATER LINE

1-12"x8" WYE
1-12" GV W/BOX
1-8" GV W/BOX

℄ STA 32+06.31
L= 17.0'
5 51 52

1-8" WET CONNECTION
2-8"x45° BENDS, A.B.

4

CenterPoint Energy
2" IP STL Gas Line

71 70

24" RCP

101

PROP. 8.75'
STM SWR LEAD

71

Exist. 12"water

FND. 1/2" IR

Exist. 8"water

PROP. 8"WATER

Exist. 12"water ac

30+00

40

31+00

℄ WHITEHEATHER DR 32+00

1 3 50

33+00

52

81

Concrete Pvmt

41.0' B-B

60.0' R.O.W.

TBM-21

R25'
TYP

STA 3+00.00, 8.00'RT
TYPE "C" MH (H-1)
23 RIM ELEV= 52.33
FL=47.34 (24" E)
FL=47.20 (24" W)
FL=47.20 (24" S)

18" stm

70

71

81

31

12"san

12"stm

4 58

31

NO PARKING SIGN

SOUTH R.O.W.

Exist. 12"water

12"san

FND. 1/2" IR

℄ WUTHERING HEIGHTS DR.

4+00

NORTH R.O.W.

7.0' TYP

PROP. 12"WATER

SEE SHEET NO. 79

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
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- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

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0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 21 ELEVATION 52.49
WHITEHEATHER DR. STA.0+99.93, 0.07' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) YOU AT THE OF RISK!!! Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date 4-12-12

AT&T TEXAS/SWBT UTILITIES SHOWN Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED ENGINEER
12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PLAN AND PROFILE
FROM STA. 30+00.00 TO STA. 33+00.00

WBS NO.: M-000262-0004-4	CITY DWG. NO.
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 52 OF 191	

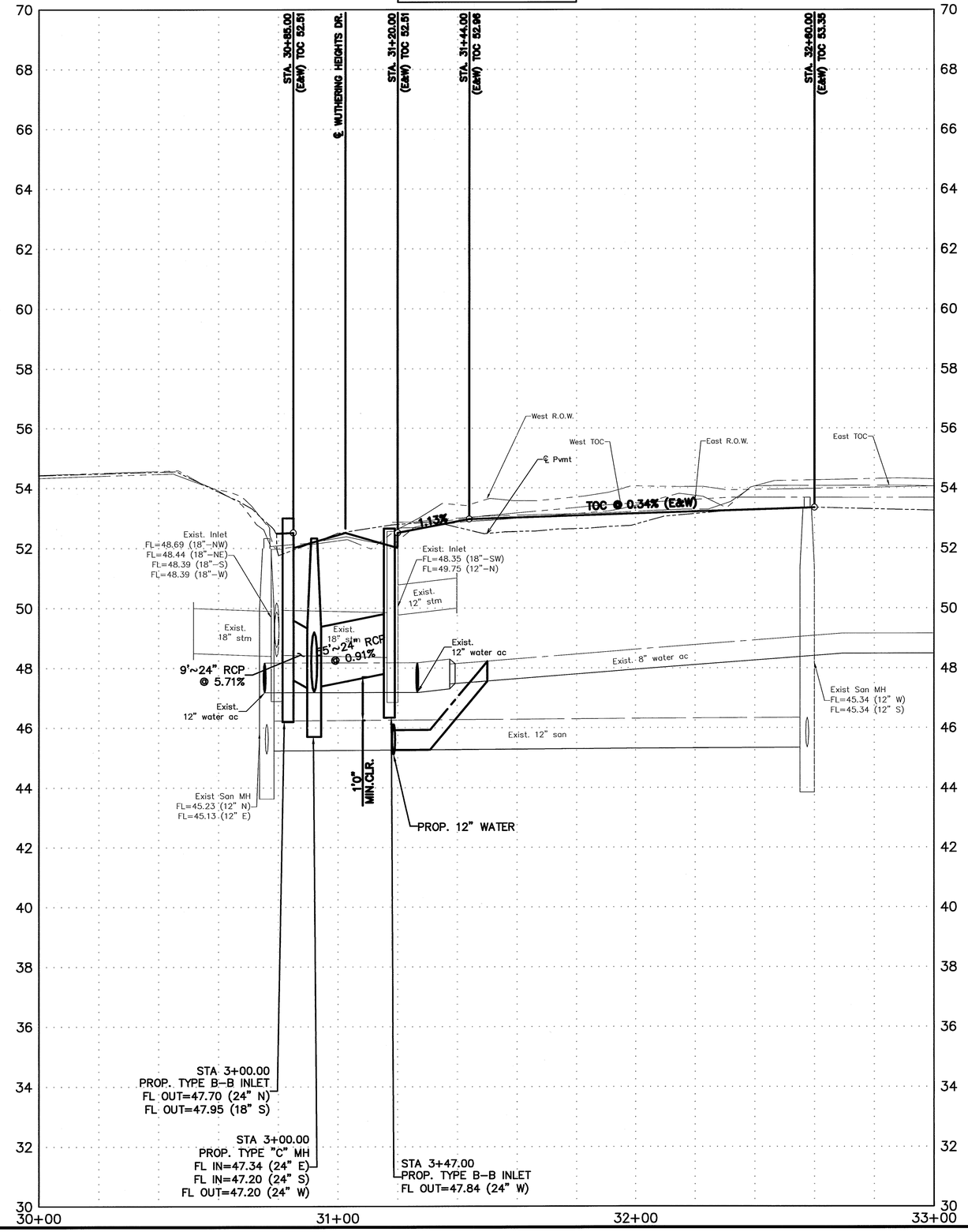
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 18, 2012 3:38:48 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

0 1 2 3

WHITEHEATHER DR



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
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- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

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0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 21 ELEVATION 52.49'
WHITEHEATHER DR. STA.0+99.93, 0.07' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
(ALIGNMENTS ONLY FOR DETERMINING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VOID AT END OF REVIEW DAY

CenterPoint Energy/ GAS FACILITIES — Date: 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-12-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

PROFILE
FROM STA. 30+00.00 TO STA. 33+00.00 PROFILE

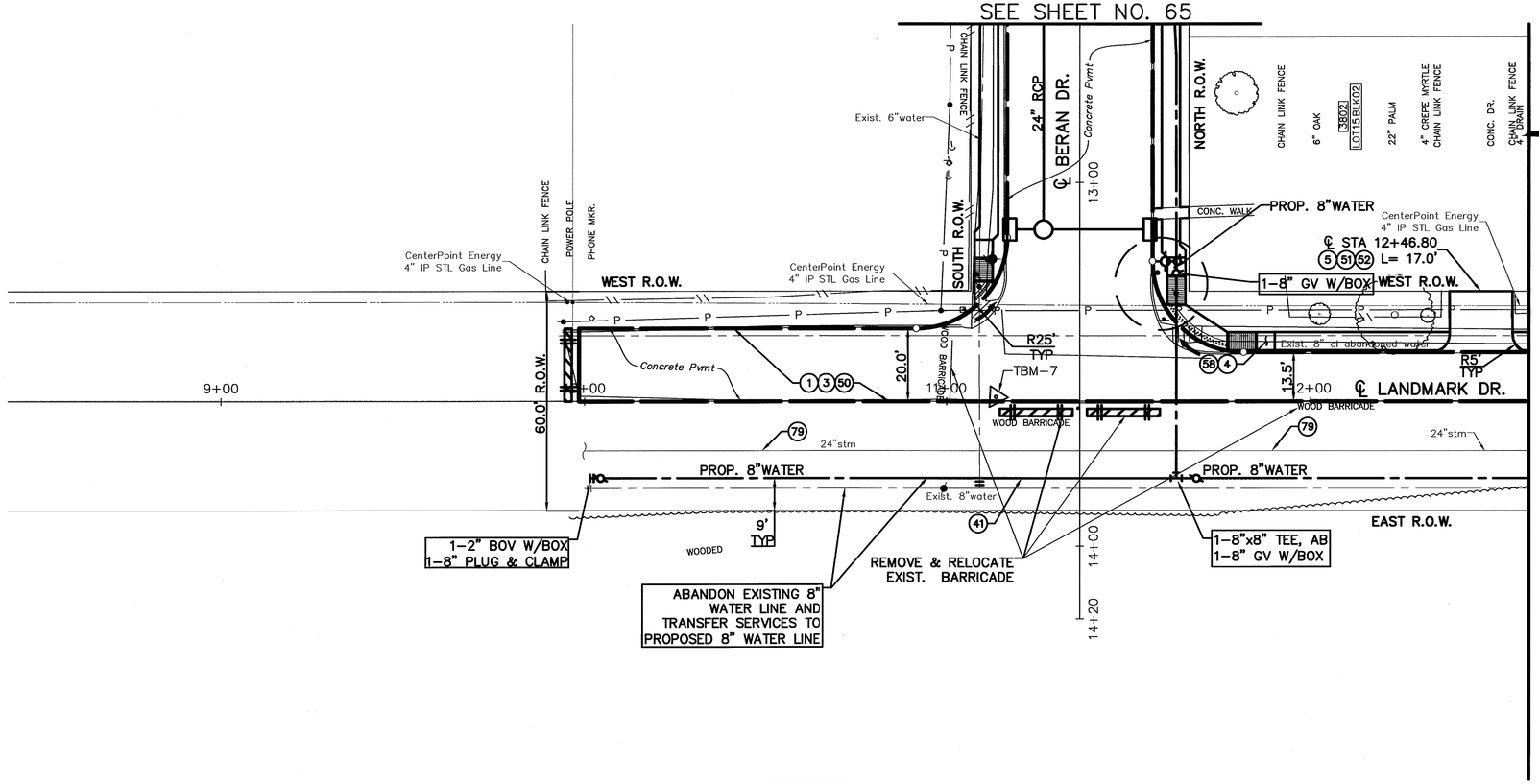
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2'
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 53 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 11:31:36 AM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-V.DWG

FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 65



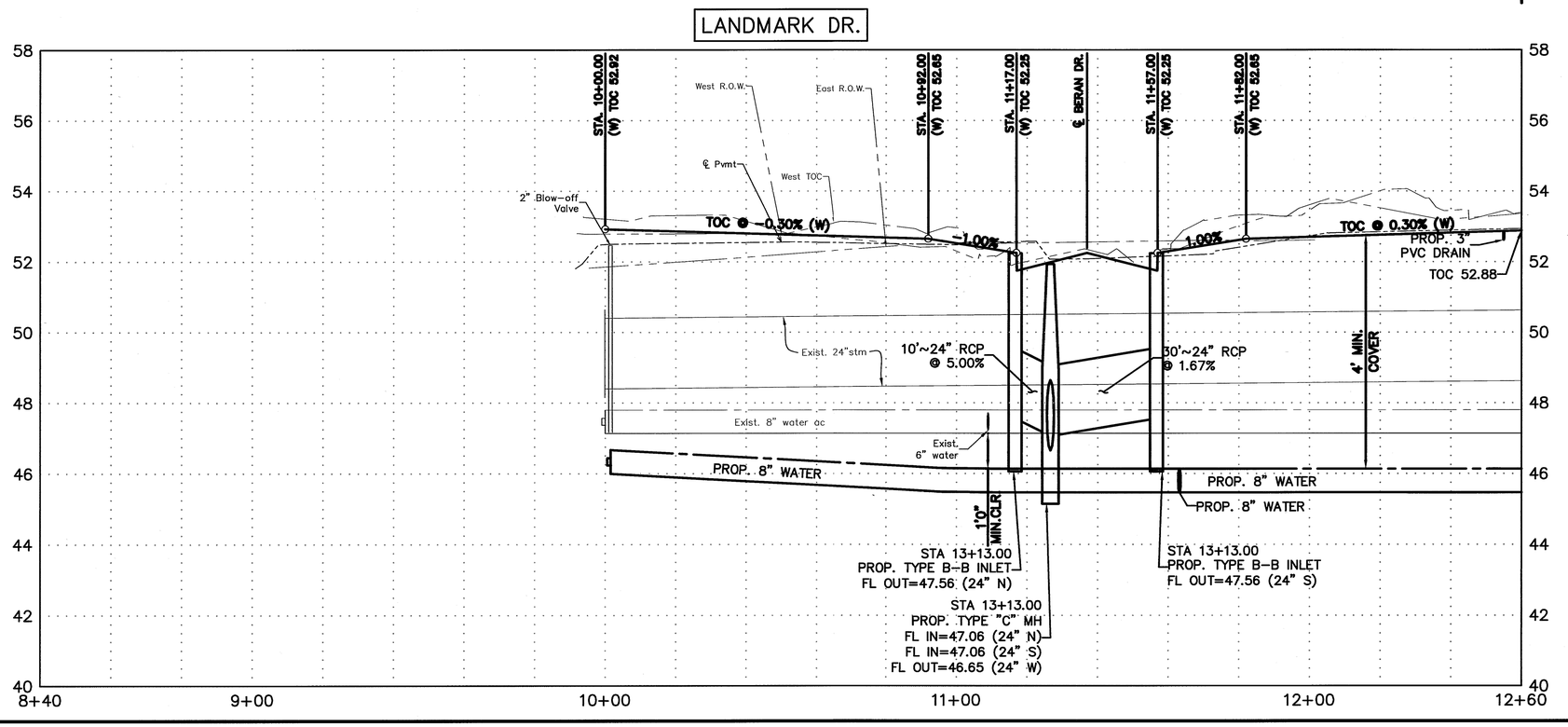
LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
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- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

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0 20' 40'

LANDMARK DR.



PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 7 ELEVATION 52.65'
LANDMARK DR. STA.11+13.60, 1.23' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES Date 4-12-12
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY.

CenterPoint Energy/ GAS FACILITIES Date 4-12-12
GAS SERVICES LINES ARE NOT SHOWN

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
04-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

LANDMARK DR.

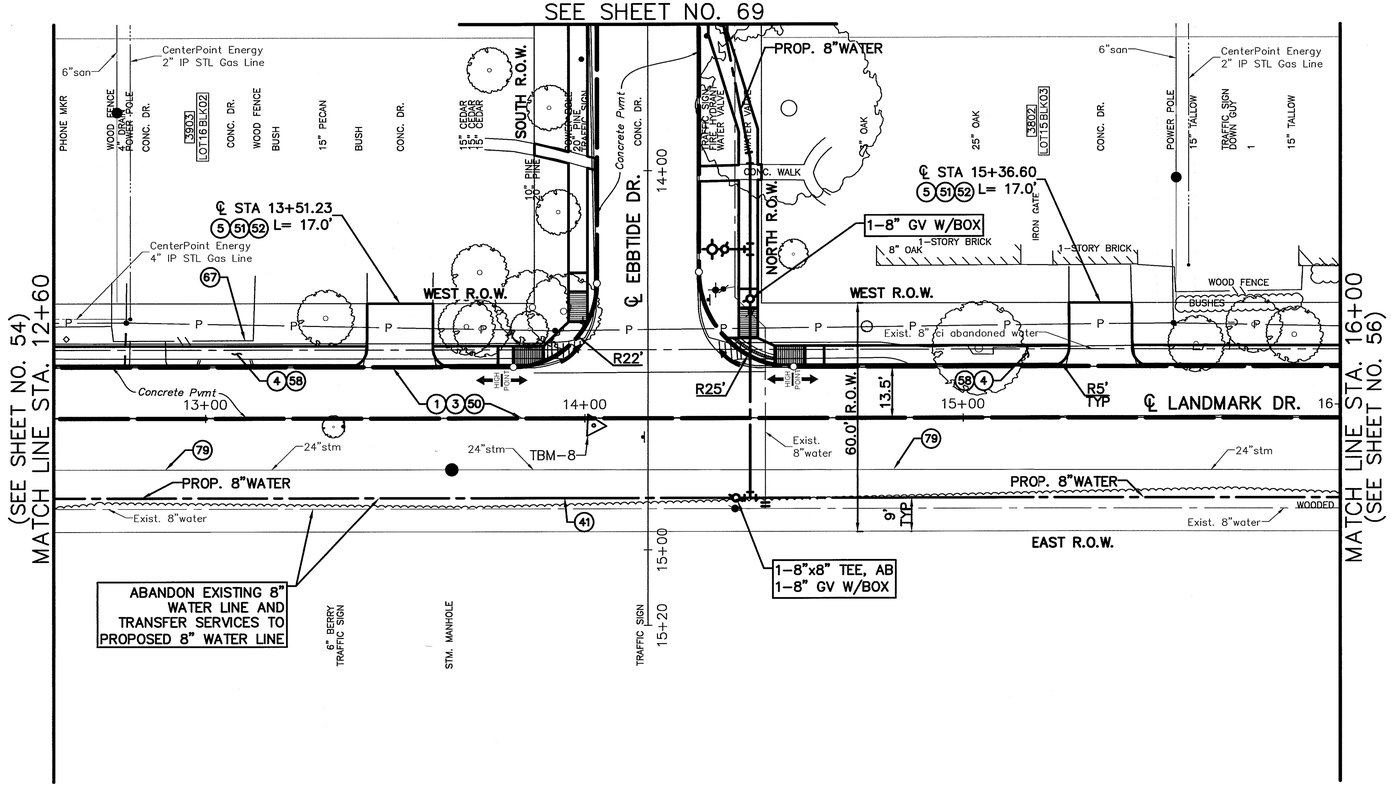
PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

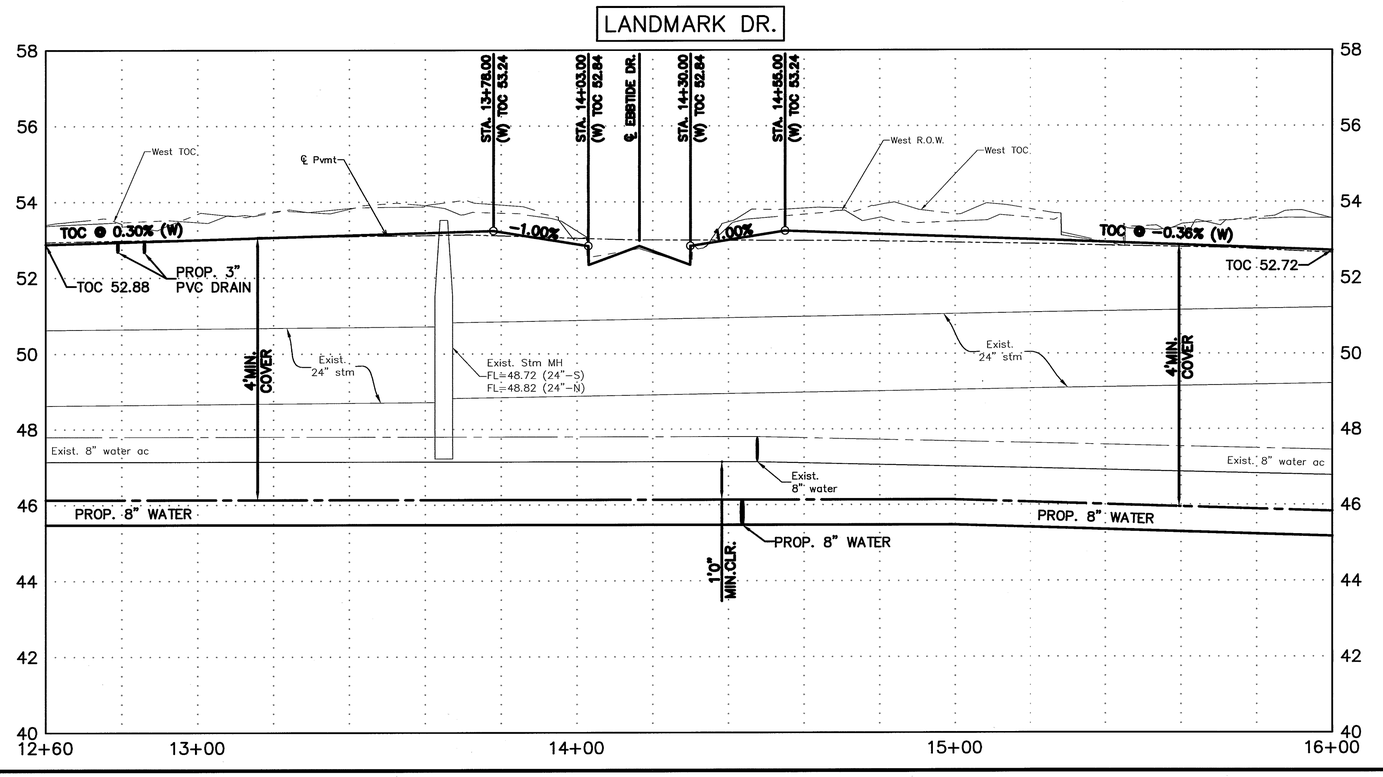
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 54 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:16:17 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-LANDMARK.DWG

SEE SHEET NO. 69





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

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0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 8 ELEVATION 52.91'
LANDMARK DR. STA.14+02.33, 1.90' RT

PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) NEED AT SIDE OF DEVELOPMENT. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

CABLE Approved for underground conduit facilities only. Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 REGISTERED PROFESSIONAL ENGINEER 04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

LANDMARK DR.

PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 16+00.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 55 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 CITY ENGINEER

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Wednesday, April 11, 2012 11:17:07 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS-LANDMARK.DWG

SEE SHEET NO. 73

SEE SHEET NO. 77

(SEE SHEET NO. 55) MATCH LINE STA. 16+00

MATCH LINE STA. 20+60 (SEE SHEET NO. 57)

PROP. 8"WATER

Exist. 6"water

6"san

CenterPoint Energy 2" IP STL Gas Line

42" RCP

℄ KNOTTY OAKS TR.

℄ TIDEWATER DR.

SOUTH R.O.W.

NORTH R.O.W.

WEST R.O.W.

EAST R.O.W.

CONC. DR.

Concrete Pvmt

CHAIN LINK FENCE

REMOVE & DISPOSE 30' OF EXIST. 6" WATER LINE

℄ STA 19+09.03
(5)(51)(52) L= 17.0'

1-8" GV W/BOX

R25' TYP

R5' TYP

℄ LANDMARK DR.

60.0' R.O.W.

13.5'

Exist. 8" ci abandoned water

24"stm

16" RCP

TBM-15

TBM-16

PROP. 8"WATER

Exist. 8"water

9' TYP

1-8"x 8" TEE, AB
1-8" GV W/BOX

STA 17+51.65, 13.97'RT
TYPE "C" MH (K-1)
RIM ELEV= 52.60
FL=46.77 (36" SW) (23)

ABANDON EXISTING 8" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

TRAFFIC SIGN

STM. MANHOLE

FIRE HYDRANT

WATER VALVE

TRAFFIC SIGN BUSH

POWER POLE

ELEC. BOX(ATT)

ELEC. BOX(ATT)

ELEC. BOX

AC UNIT

24" TALLOW

8" STUMP

25" OAK

20" PINE

50" OAK

12" CEDAR

12" HACK

12" TALLOW

12" CREPE MYRTLE

3803 LOT16 BLK04

3807 LOT14 BLK04

3815 LOT15 BLK06

3802 LOT13 BLK06

13+00

14+00

14+20

17+00

18+00

19+00

20+00

FOR REDUCED PLANS original scale in inches

LANDMARK DR.

STA. 16+57.00 (W) TOC 52.52

STA. 16+82.00 (W) TOC 52.12

STA. 17+10.00 (W) TOC 52.12

STA. 17+35.50 (W) TOC 52.52

STA. 19+10.00 (W) TOC 53.40

STA. 19+38.00 (W) TOC 53.13

STA. 19+53.00 (W) TOC 52.51

STA. 19+91.00 (W) TOC 52.51

STA. 20+16.00 (W) TOC 52.51

℄ Pvmt

West R.O.W.

West TOC

TOC @ -0.36% (W)

TOC 52.72

-1.00%

1.00%

TOC @ 0.50% (W)

-1.00%

-1.00%

1.00%

TOC 53.04

Exist. 24" stm

Exist. Stm MH
FL=49.47 (24"-S)
FL=49.57 (24"-NE)

Exist. 24" stm

77'~36" RCP @ 0.40%

1'0" MIN.CLR.

4' MIN. COVER

Exist. 8" water ac.

Exist. 6" water

Exist. 6" water

PROP. 8" WATER

PROP. 8" WATER

PROP. 8" WATER

1'0" MIN.CLR.

STA 13+35.00
PROP. TYPE "C" MH
FL IN=46.46 (36" NE)
FL OUT=45.96 (42" W)

STA 17+51.65
PROP. TYPE "C" MH
FL OUT=46.77 (36" SW)

60 58 56 54 52 50 48 46 44 42

16+00 17+00 18+00 19+00 20+00 20+60

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 16 ELEVATION 53.20'
LANDMARK DR. STA.19+62.73, 1.28' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF WORK ONLY. Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

Date:
CABLE Approved for underground conduit facilities only.

SES HORIZON
CONSULTING ENGINEERS, INC.
1010 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

LANDMARK DR.

PLAN AND PROFILE
FROM STA. 16+00.00 TO STA. 20+60.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 56 OF 191	

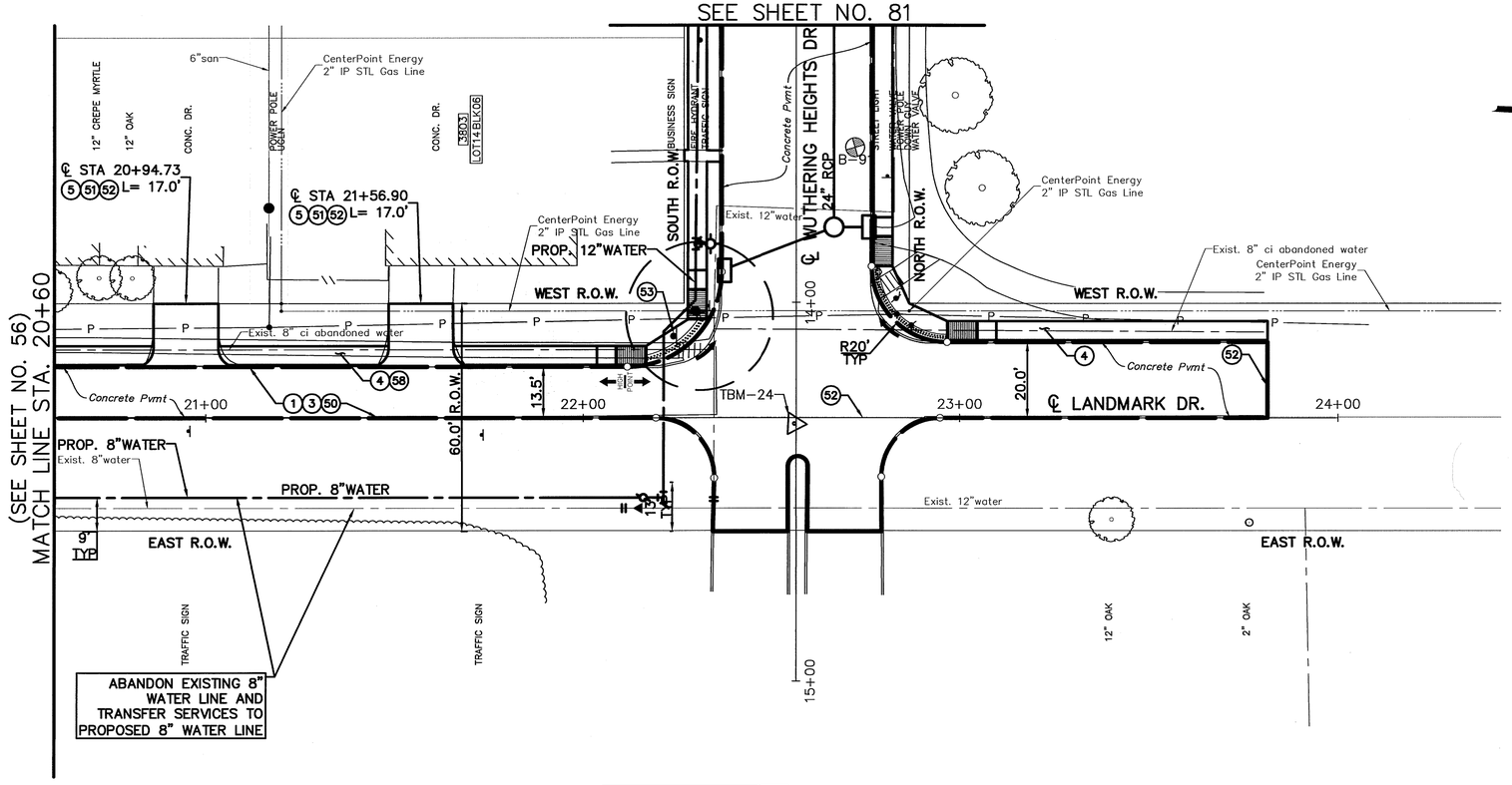
CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 LICENSE NUMBER HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:17:57 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-LANDMARK.DWG

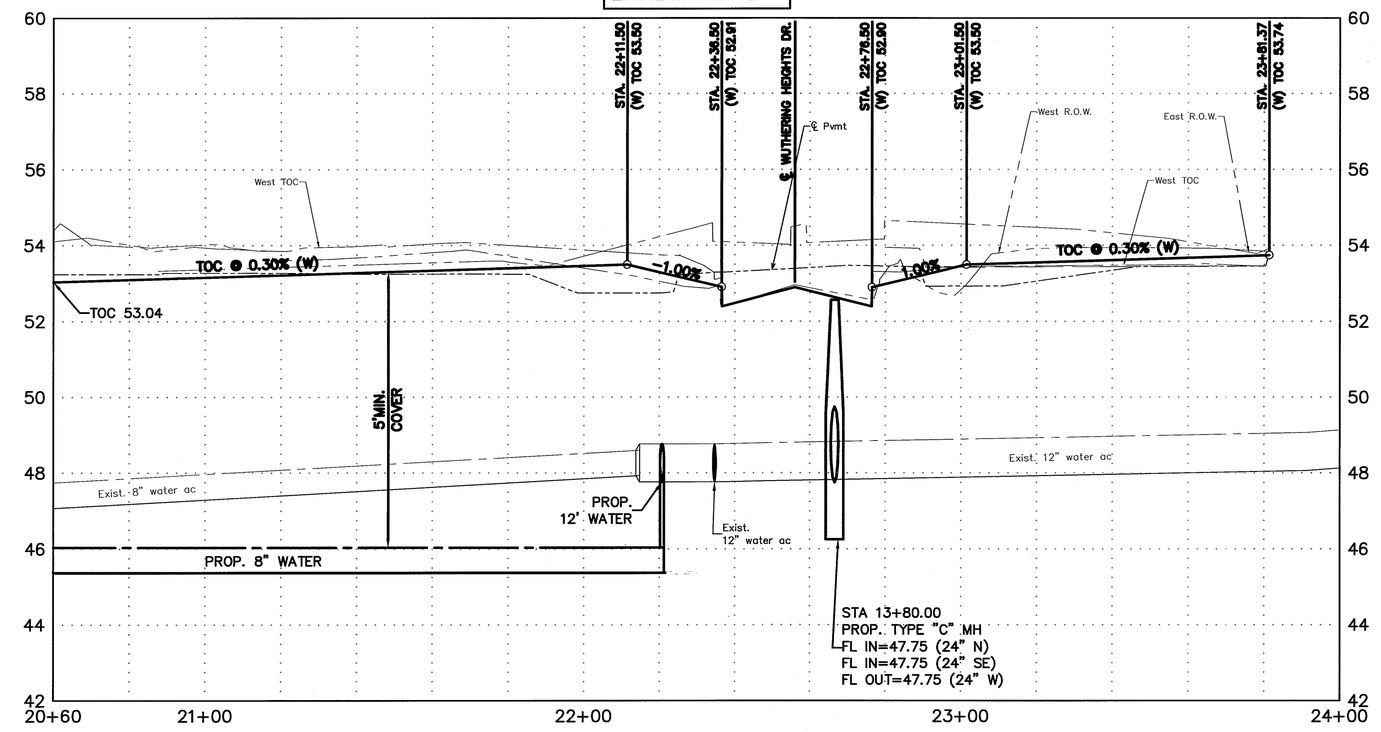
FOR REDUCED PLANS
original scale in inches

SEE SHEET NO. 81

(SEE SHEET NO. 56)
MATCH LINE STA. 20+60



LANDMARK DR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 24 ELEVATION 53.43'
LANDMARK DR. STA 22+56.18, 1.58' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY — Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

LANDMARK DR.

PLAN AND PROFILE
FROM STA. 20+60.00 TO STA. 24+00.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 57 OF 191	

PUBLIC WORKS
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:18:47 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS-LANDMARK.DWG

SEE SHEET NO. 40

C.O.H.
VOL. 5825, PG. 621, H.C.D.R
LOT 8, BLK 18
PAMELA HEIGHTS, SEC. 2
VOL. 54, PG. 18 H.C.M.R.

UNIT C-146-00-00

STA 0+85.00, 19.00'LT
TYPE "C" MH (W-14)
RIM ELEV= 52.25 (23)
FL=43.57 (48" E)
FL=43.57 (36" N)

STA 1+91.00, 12.00'LT
TYPE B-B INLET (W-13A)
(22) TOC ELEV= 51.27
FL ELEV. = 46.94

STA 1+91.00, 19.80'LT
TYPE "C" MH (W-13)
RIM ELEV= 51.11 (23)
FL=43.75 (48" E)
FL=43.75 (48" W)
FL=43.75 (24" S)

STA 2+70.00, 15.50'LT
TYPE "C" MH (W-12)
(23) RIM ELEV= 50.85
FL=43.88 (48" E)
FL=43.88 (48" W)
FL=45.25 (30" N)

STA 3+21.00, 15.50'LT
TYPE "C" MH (W-8)
RIM ELEV= 50.44 (23)
FL=43.97 (48" E)
FL=43.97 (48" W)

℄ STA 1+25.48
L= 25.0' (5) (51) (52)

PROP. 7.80'
STM SWR LEAD

℄ WHITEHEATHER DR.
℄ WEST OREM DR.

NORTH R.O.W.
SOUTH R.O.W.
60.0' R.O.W.
25.0' B-B
45.0' B-B

36" RCP
48" RCP
30" RCP
24" RCP

PROP. 12"WATER
Exist. 8" abandoned water

Concrete Pvmt
SBC 2-4" 'C' PVC
Exist. 24"water
Exist. 12"water
Exist. 6" water
12"san
8"san
36"stm
30"stm
24"stm
24"Equilon Crude Oil Pipeline

CenterPoint Energy
2" STL Gas Line
CenterPoint Energy
4" STL Gas Line

TYPE 'BB' INLET
STREET LIGHT
STM. MANHOLE
SAN. MANHOLE
POWER POLE
GUY WIRE
CORNER POST
CAUTION SIGN
CHAIN LINK FENCE

WEST OREM DR.
STA 2+80.00
WHITEHEATHER DR.
STA 1+00.00

TBM 1

R27'
R25'
R30'

MATCH LINE STA. 4+20
(SEE SHEET NO. 59)

FOR REDUCED PLANS
original scale in inches

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 1 ELEVATION 52.50'
WEST OREM DR. STA.3+09.76, 84.79' RT

PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date 4-12-12
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) AND AT THE OT RETAIL ONLY.
CenterPoint Energy/ GAS FACILITIES — Date 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)
TEXAS/SWBT UTILITY LINES SHOWN — Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.
CABLE Approved for underground conduit facilities only. — Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WEST OREM DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.: M-000262-0004-4	CITY ENG. NO.
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 58 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

WEST OREM DR.

CL Unit C-146-00-00
(concrete lined channel)

STA. 0+69.00 (N) TOC 52.25
STA. 1+29.00 (N) TOC 52.00
STA. 1+91.00 (N) TOC 51.61
STA. 2+30.00 (N) TOC 51.40
STA. 2+60.00 (N) TOC 51.07
STA. 3+00.00 (N) TOC 50.87
STA. 3+27.50 (N) TOC 51.31

TOC @ -0.42% (N)
TOC @ -0.63% (N)
TOC @ -0.54% (N)
TOC @ -1.10% (N)
TOC @ 1.10% (N)
TOC @ 0.30% (N)
TOC 51.59

North TOC
South TOC
South R.O.W.
℄ Pvmt
North R.O.W.
℄ WHITE HEATHER DR.

Exist. 24" water ac
SBC 2-4" 'C' PVC
2 YEAR HGL
36" RCP
100 YEAR TW=43.67
10 YEAR TW=41.67
Exist. Stm MH FL=43.20 (36"-E) FL=37.87 (36"-W)
38'~36" RCP @ 1.31%
Exist. 36" stm
STA 0-47
Exist. 36" Outfall
FL = 37.84
PROP. 36" OUTFALL FL = 37.84

Exist. Stm MH FL=43.70 (30"-E) FL=46.00 (24"-S) FL=43.20 (36"-W)
Exist. Inlet FL=46.60 (24"-N)
106'~48" RCP @ 0.17%
Exist. San MH FL=41.18 (12" E) FL=41.18 (12" S)
Exist. 36" stm
Exist. Inlet FL=46.25 (24"-N)
79'~48" RCP @ 0.16%
Exist. 24" water ac
Exist. 12" san
Exist San MH FL=41.27 (12" E) FL=41.27 (12" W)
Exist San MH FL=41.42 (12" N) FL=41.52 (8" E) FL=41.32 (12" W)
STA 1+91.00 PROP. TYPE "C" MH FL IN=43.75 (48" E) FL IN=43.75 (24" S) FL OUT=43.75 (48" W)
STA 0+85.00 PROP. TYPE "C" MH FL IN=43.57 (48" E) FL OUT=38.34 (36" W)

Exist. 12" AC water
51'~48"RCP @ 0.18%
Exist. 30" stm
Exist. Inlet FL=43.65 (30"-E) FL=43.65 (30"-W)
Exist. Stm MH FL=43.65 (30"-E) FL=43.65 (30"-W)
426'~48"RCP @ 0.17%
FL. ELEV = 44.14
Exist. 30" stm
PROP. 12" WATER
Exist. 8" san
PROP. 12" WATER STA 2+70.00 PROP. TYPE "C" MH FL IN=43.88 (48" E) FL IN=45.25 (30" N) FL OUT=43.88 (48" W)
Exist San MH FL=41.44 (8" E) FL=41.44 (8" W)
STA 3+21.00 PROP. TYPE "C" MH FL IN=43.97 (48" E) FL OUT=43.97 (48" W)
1'0" MIN.CLR.

0+00 1+00 2+00 3+00 4+00 4+20
38 40 42 44 46 48 50 52 54 56

PLOTTED ON: Wednesday, April 11, 2012 11:22:22 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 58)
MATCH LINE STA. 4+20

MATCH LINE STA. 8+40
(SEE SHEET NO. 60)

STREET LIGHT
CONC. WALK
PED XING SIGN
CHAIN LINK FENCE
STREET LIGHT
SAN MANHOLE
STM MANHOLE TYPE "B" INLET

STA 7+98.77, 2137.97'RT
TYPE C-2A INLET (W-7A)
(22) TOC ELEV= 51.21
FL ELEV. = 46.46

PROP. 6.43' 30"
STM SWR LEAD

STA 7+47.36, 13.57'LT
TYPE "C" MH (W-7)
RIM ELEV= 51.33 (23)
FL=44.69 (68" E)
FL=44.69 (48" W)
FL=44.69 (30" N)

8"san
NORTH R.O.W.
30"stm
48" RCP
30"stm
18"stm
30"stm
68"x43" RCP
5+00
6+00
℄ WEST OREM DR.
7+00
8+00
60.0' R.O.W.
34.0' B-B
Concrete Pvmt
Exist. 24"water
Exist. 24"water
Exist. 24"water
SOUTH R.O.W.
24"Equilon Crude Oil Pipeline

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

WEST OREM DR.

56
54
52
50
48
46
44
42
40
38

STA 5+90.00
(N) TOC 52.10

STA 7+47.00
(N) TOC 51.83

North TOC
South TOC
North R.O.W.
℄ Pvmt
South R.O.W.

TOC 51.59
TOC @ 0.30% (N)
TOC @ -0.30% (N)
TOC @ 0.30% (N)
TOC 51.91

2 YEAR HGL

Exist. Inlet
FL=47.78 (18"-S)

Exist San MH
FL=42.90 (8" E)
FL=42.90 (8" W)

Exist. Stm MH
FL=43.23 (30"-E)
FL=47.68 (18"-N)
FL=43.23 (30"-W)

426'~48" RCP
@ 0.17%

314'~68"x43" RCP @ 0.17%

FL. ELEV = 44.14
FL. ELEV = 44.85

Exist. 30" stm
Exist. 30" stm
Exist. 24" water ac
Exist. 8" san
Exist. 8" san
Exist. 24" water ac
Exist. 8" san

STA 7+47.36
PROP. TYPE "C" MH
FL IN=44.69 (68" E)
FL IN=44.69 (30" N)
FL OUT=44.69 (48" W)

4+20 5+00 6+00 7+00 8+00 8+40

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 1 ELEVATION 52.50'
WEST OREM DR. STA.3+09.76, 84.79' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES GAS SERVICES LINES ARE NOT SHOWN. Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

CABLE Approved for underground conduit facilities only. Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WEST OREM DR.

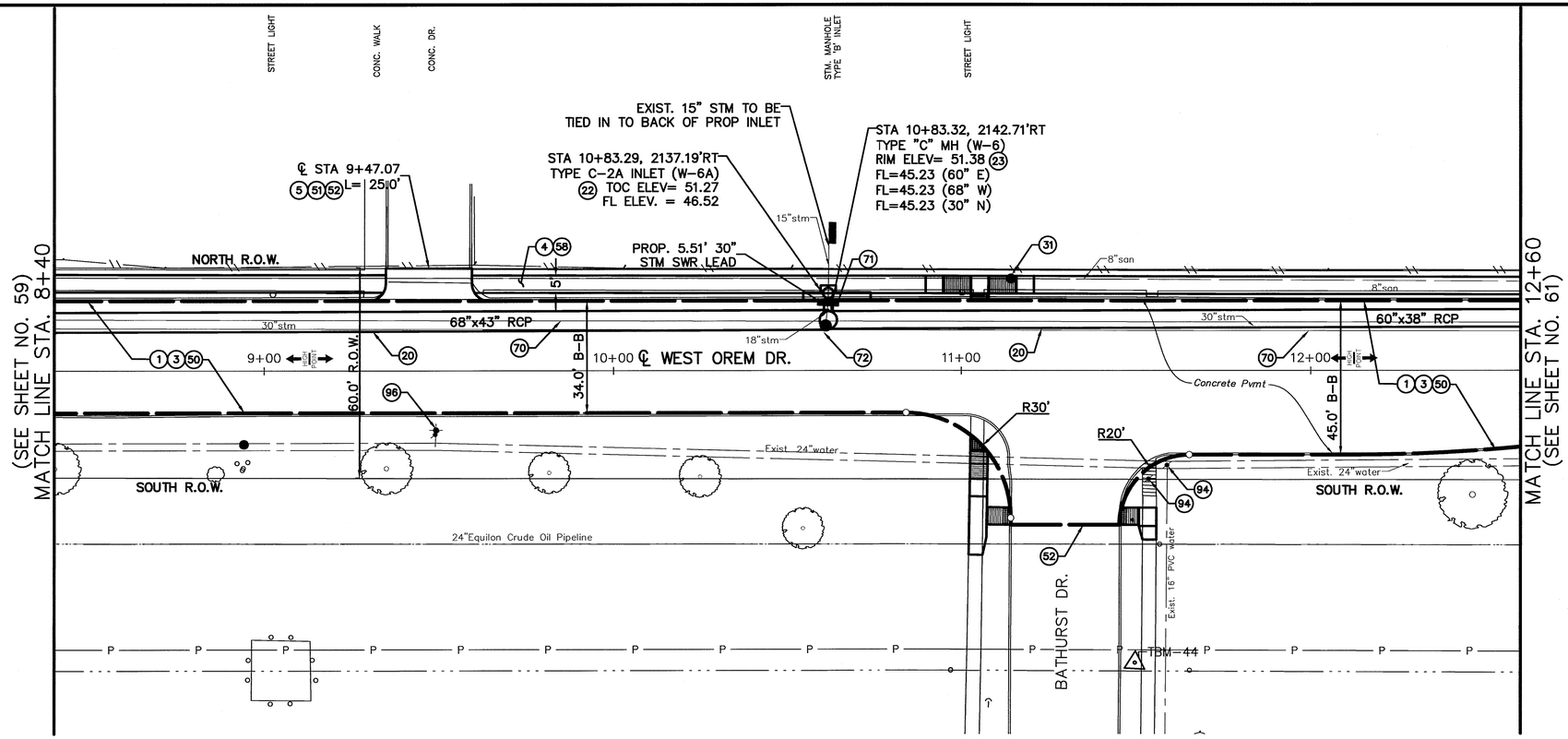
PLAN AND PROFILE
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 59 OF 191	

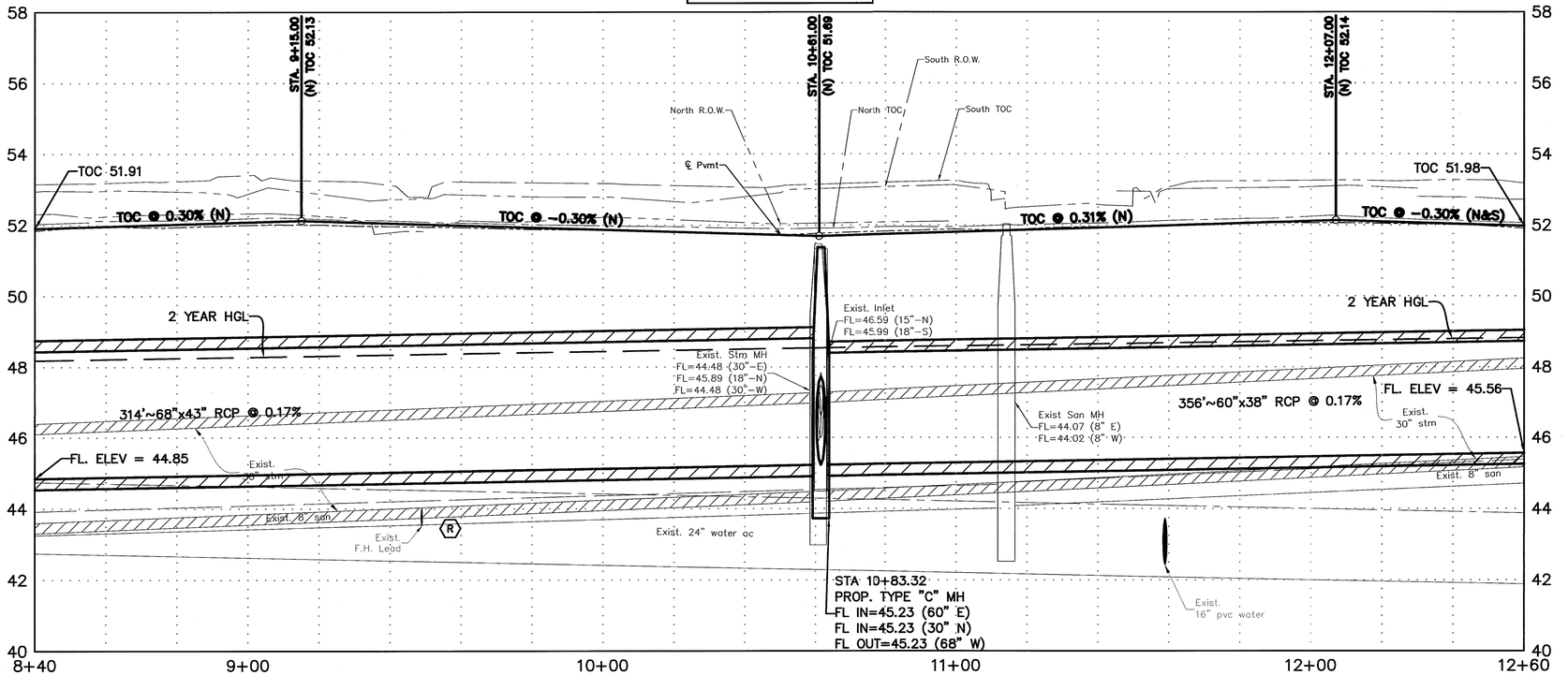
49219
04-12-12

PLOTTED ON: Thursday, April 12, 2012 10:10:57 AM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches



WEST OREM DR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 44 ELEVATION 53.52
WEST OREM DR. STA.11+49.76, 83.51' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR EXISTING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) SEE AT END OF REMARKS COLUMN — Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN — Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 4/12/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WEST OREM DR.

PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

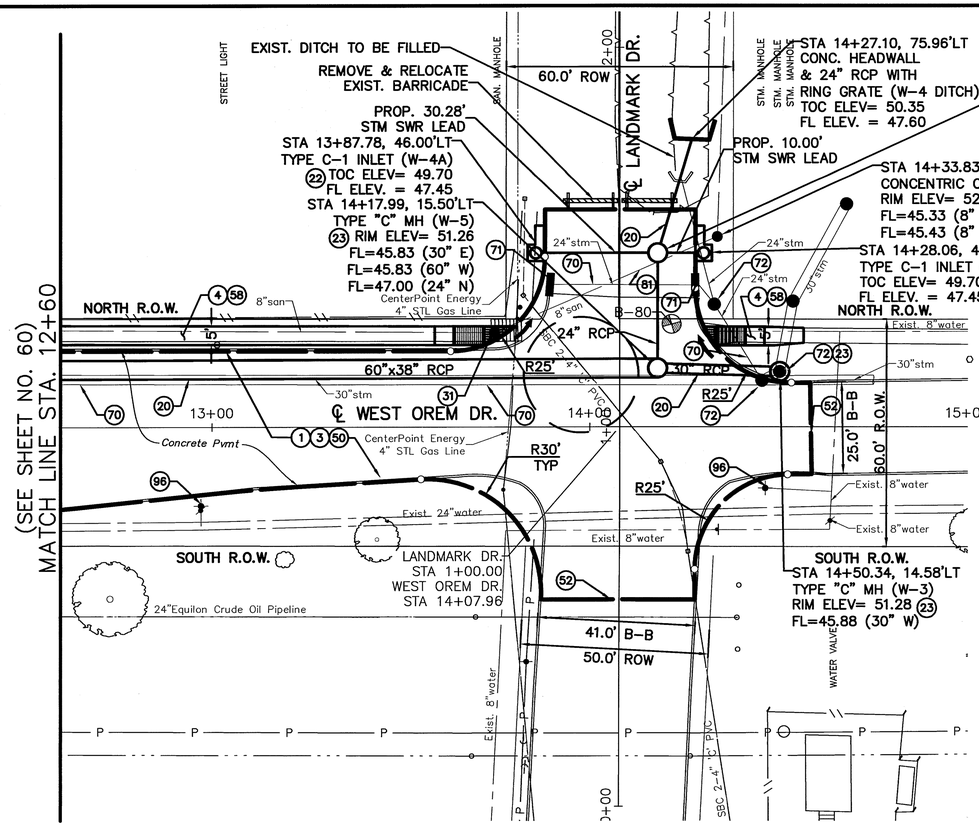
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FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 60 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

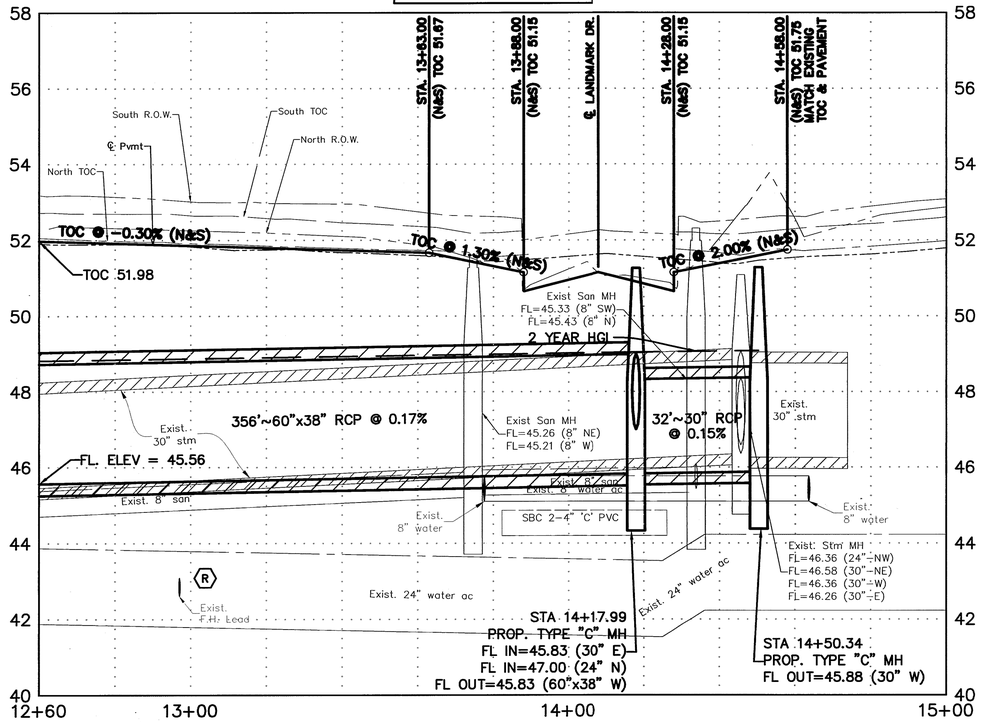
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FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 60)
MATCH LINE STA. 12+60



WEST OREM DR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 44 ELEVATION 53.52
WEST OREM DR. STA.11+49.76, 83.51' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
APPROVED ONLY FOR EXISTING FACILITIES SHOWN, OUTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY

CenterPoint Energy/ GAS FACILITIES — Date: 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

Date:
CABLE Approved for underground conduit facilities only.

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 4-12-12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WEST OREM DR.

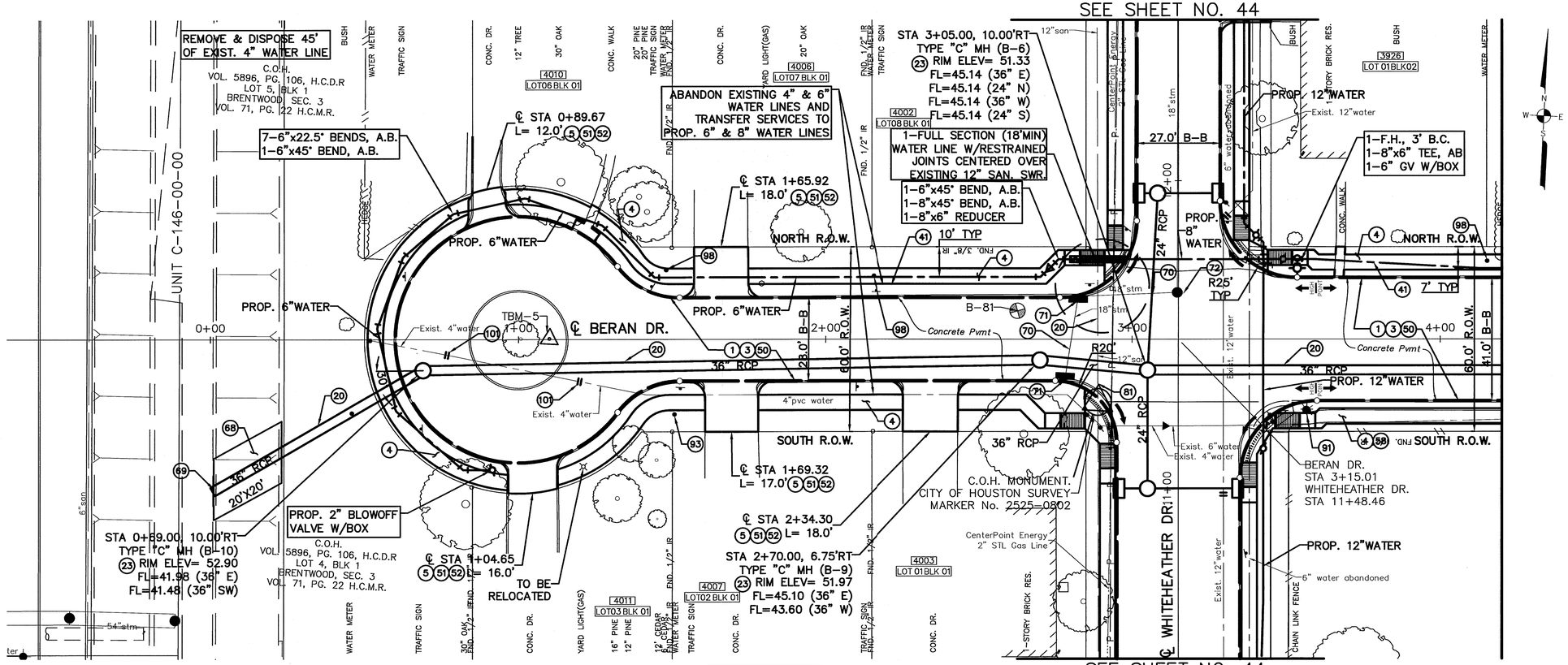
PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 15+00.00

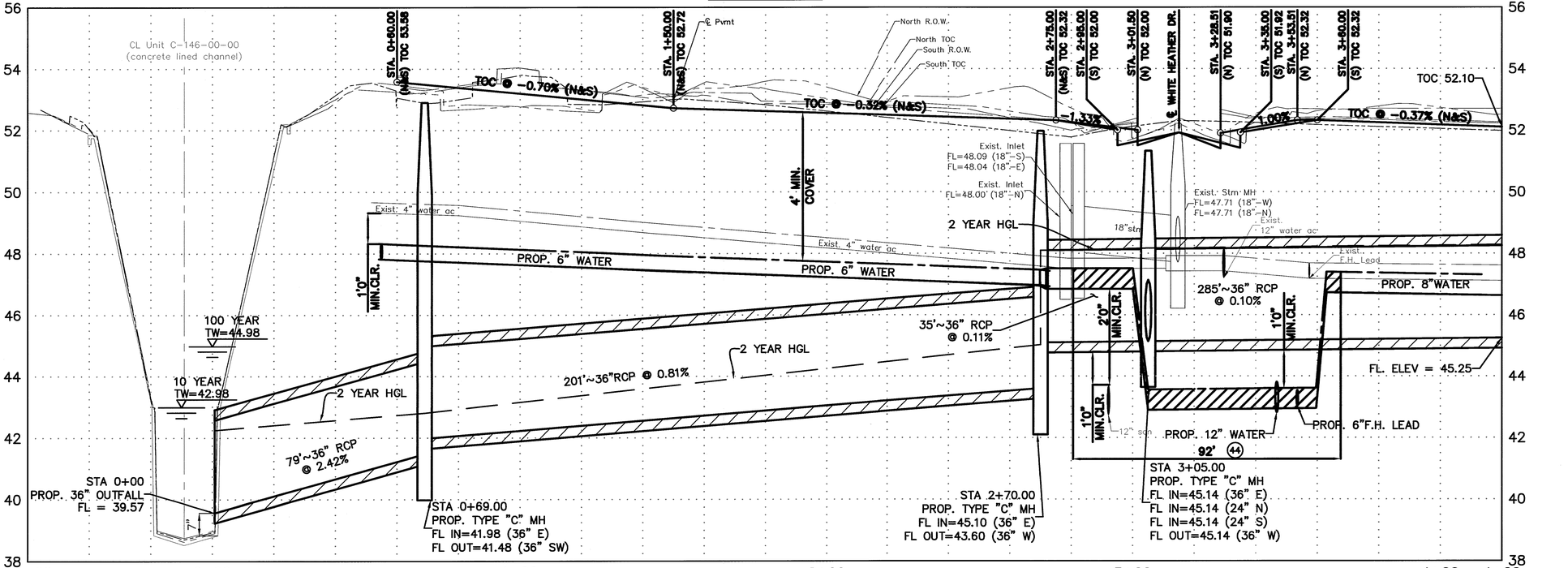
WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 61 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:23:36 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 5 ELEVATION 53.74'
BERAN DR. STA.1+10.06, 0.25' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) Date: 4-12-12
CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12
AT&T TEXAS/SBC UTILITY FACILITIES SHOWN Date: 4-17-12
Approved for AT&T Texas/SBCST underground conduit facilities only. Signature valid for one year.
CABLE Approved for underground conduit facilities only. Date:

SES HORIZON CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 4-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

BERAN DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.: M-000262-0004-4	
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2'
CITY OF HOUSTON	PM
ISAAC MUNIZ, E.I.T.	
SHEET NO. 62 OF 191	

CITY ENGINEER NO. 49210 — PUBLIC WORKS AND ENGINEERING — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 25, 2012 3:32:09 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 62)
MATCH LINE STA. 4+20

MATCH LINE STA. 8+40
(SEE SHEET NO. 64)

CONC. DR. | BUSH | TRAFFIC SIGN | BUSH | CONC. DR. | WATER METER | BUSH | CONC. DR. | YARD LIGHT(ELEC.) | 15" MAGNOLIA | BUSH | CONC. DR. | YARD LIGHT(ELEC.) | 35" OAK | WATER METER | CONC. DR. | YARD LIGHT(GAS) | 35" OAK | CONC. DR. | TYPE "BB" INLET | WATER METER | 24" TALLOW | CONC. DR.

3922 LOT02 BLK02 | 3918 LOT03 BLK02 | 3914 LOT04 BLK02 | 3910 LOT05 BLK02 | 3906 LOT06 BLK02 | 3902 LOT07 BLK02 | 3830 LOT08 BLK02

STA 5+90.00, 20.00'LT
TYPE C-2 INLET (B-5A)
TOC ELEV= 51.47
(22) FL ELEV. = 46.80

STA 5+90.00, 10.00'RT
TYPE "C" MH (B-5)
RIM ELEV= 51.17 (23)
FL=45.42 (45° E)
FL=45.42 (36" W)
FL=46.30 (24" N)
FL=46.30 (24" S)

STA 8+02.00, 20.00'LT
TYPE B-B INLET (B-4A)
(22) TOC ELEV= 50.69
FL ELEV. = 46.02

STA 8+02.00, 10.00'RT
(23) TYPE "C" MH (B-4)
RIM ELEV= 50.39
FL=45.63 (24" E)
FL=45.63 (45° W)
FL=45.63 (24" N)
FL=45.63 (24" S)

℄ STA 4+31.80
L= 17.0' (5)(51)(52)

℄ STA 5+25.99
(5)(51)(52) L= 17.0'

NORTH R.O.W.

℄ STA 5+62.88
(5)(51)(52) L= 17.0'

℄ STA 6+26.41
L= 17.0' (5)(51)(52)

℄ STA 6+94.64
L= 18.0' (5)(51)(52)

℄ STA 7+46.98
(5)(51)(52) L= 12.0'

℄ STA 8+30.47
L= 17.0'
(5)(51)(52)

PROP. 30.00' STM SWR LEAD

Concrete Pvmt

7' TYP

PROP. 8"WATER

PROP. 8"WATER

PROP. 30.00' STM SWR LEAD

5+00 | 6+00 | ℄ BERAN DR. | 7+00 | 8+00

60.0' R.O.W.

41'0" B-B

36" RCP

45"x29" RCP

18"stm

24" RCP

TBM-6

Exist. 6"water

SOUTH R.O.W.

PROP. 10.00' STM SWR LEAD

CHAIN LINK FENCE

PROP. 10.00' STM SWR LEAD

STA 5+90.00, 20.00'RT
TYPE C-2 INLET (B-5B)
TOC ELEV= 51.47
FL ELEV. = 46.80 (22)

ABANDON EXISTING 6" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

STA 8+02.00, 20.00'RT
TYPE B-B INLET (B-4B)
(22) TOC ELEV= 50.69
FL ELEV. = 46.02
FL ELEV. = 45.98

PROP. 10' OF 15" STM TO BE TIED IN TO BACK OF PROP INLET

15"stm

TRAFFIC SIGN | DOWN GUY | POWER POLE | CONC. WALK | TYPE "BB" INLET | CONC. WALK | POWER POLE UGLN(PHONE SCOPE)

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 4 ELEVATION 52.01
BERAN DR. STA.2+88.88, 20.35' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF ISSUANCE ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-13-12

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
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SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

BERAN DR.

PLAN AND PROFILE
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 63 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

BERAN DR.

TOC 52.10
TOC @ -0.37% (N&S)
2 YEAR HGL
Exist. 6" water C.I.
285~36" RCP @ 0.10%
FL. ELEV = 45.25

STA. 5+90.00 (N&S) TOC 51.47
STA. 8+02.00 (N&S) TOC 50.69

North TOC | South TOC | ℄ Pvmt | South R.O.W. | North R.O.W.

4' MIN. COVER

TOC @ -0.37% (N&S)
TOC 50.80
2 YEAR HGL
Exist. Inlet
FL=46.84 (18"-N)
FL=47.20 (15"-S)
212'~45"x29" RCP @ 0.10%
Exist. 6" water C.I.
PROP. 8" WATER
FL. ELEV = 45.71

STA 5+90.00
PROP. TYPE "C" MH
FL IN=45.42 (45° E)
FL IN=46.30 (24" N)
FL IN=46.30 (24" S)
FL OUT=45.42 (36" W)

STA 5+90.00
PROP. TYPE C-2 INLET
FL OUT=46.80 (24" S)

STA 8+02.00
PROP. TYPE B-B INLET
FL OUT=46.02 (24" S)

STA 8+02.00
PROP. TYPE "C" MH
FL IN=45.63 (24" E)
FL IN=45.63 (24" N)
FL IN=45.63 (24" S)
FL OUT=45.63 (45° W)

58 | 56 | 54 | 52 | 50 | 48 | 46 | 44 | 42 | 40

4+20 | 5+00 | 6+00 | 7+00 | 8+00 | 8+40

PLOTTED ON: Wednesday, April 11, 2012 11:25:35 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 63)
MATCH LINE STA. 8+40

MATCH LINE STA. 12+60
(SEE SHEET NO. 65)

YARD LIGHT(GAS) 24" TALLOW 24" HYDRANT FIRE HYDRANT TRAFFIC SIGN 25" OAK 25" PALM CONC. DR. WATER METER CONC. DR. BUSH 4"DRAIN 20" OAK 20" OAK TRAFFIC SIGN 40" OAK

3830 LOT08 BLK02 | 3826 LOT09 BLK02 | 3822 LOT10 BLK02 | 3818 LOT 11BLK02 | 3814 LOT12 BLK02 | 3810 LOT13 BLK02 | 3806 LOT14 BLK02

FND. 1/2" IR

1-F.H., 3' B.C.
1-8"x6" TEE, AB
1-6" GV W/BOX

℄ STA 9+16.62 (5)(51)(52) L= 18.0'

℄ STA 9+53.87 L= 18.0' (5)(51)(52)

℄ STA 10+19.90 L= 17.0' (5)(51)(52)

℄ STA 10+82.64 (5)(51)(52) L= 17.0'

STA 11+02.00, 20.00'LT
TYPE B-B INLET (B-3A)
(22) TOC ELEV= 51.59
FL ELEV. = 46.92

STA 11+02.00, 10.00'RT
TYPE "C" MH (B-3)
RIM ELEV= 51.29 (23)
FL=46.23 (24" E)
FL=46.23 (24" W)
FL=46.42 (24" N)
FL=46.42 (24" S)

℄ STA 11+49.37 L= 17.0' (5)(51)(52)

℄ STA 12+12.73 L= 17.0' (5)(51)(52)

NORTH R.O.W.

SOUTH R.O.W.

60.0' R.O.W.
41.0' B-B

Exist. 6"water

9+00 10+00 11+00 12+00

℄ BERAN DR.

Concrete Pvmt

24" RCP

PROP. 30.00' STM SWR LEAD

PROP. 10.00' STM SWR LEAD

7' TYP

B-82

Exist. 6"water ci

ABANDON EXISTING 6" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

℄ STA 10+53.23 (5)(51)(52) L= 26.0'

STA 11+02.00, 20.00'RT
TYPE B-B INLET (B-3B)
TOC ELEV= 51.59 (22)
FL ELEV. = 46.92

REMOVE & DISPOSE 40' OF EXIST. 6" WATER LINE

CONC. WALK TRAFFIC SIGN CONC. WALK DOWN GUY DOWN GUY POWER POLE CONC. DR. POWER POLE

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 6 ELEVATION 50.99
BERAN DR. STA.8+30.82, 21.81' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) Date: 4-12-12
GAS AT TIME OF REVIEW.

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

TCI PIPELINE/UTILITY LINES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

BERAN DR.

58 56 54 52 50 48 46 44 42 40

8+40 9+00 10+00 11+00 12+00 12+60

TOC 50.80

TOC @ 0.30% (N&S)

North TOC

South TOC

STA. 11+02.00 (N&S) TOC 51.59

North R.O.W.

South R.O.W.

℄ Pvmt

TOC @ 0.31% (N&S)

TOC 52.08

PROP. 3" PVC DRAIN

4' MIN. COVER

2 YEAR HGL

2 YEAR HGL

300~24" RCP @ 0.20%

Exist. 6" water C.I.

211~24" RCP @ 0.20%

Exist. 6" water C.I.

PROP. 8" WATER

Exist. F.H. Lead

PROP. 6"F.H. LEAD

FL. ELEV = 45.71

FL. ELEV = 46.54

STA 11+02.00
PROP. TYPE "C" MH
FL IN=46.23 (24" E)
FL IN=46.42 (24" N)
FL IN=46.42 (24" S)
FL OUT=46.23 (24" W)

STA 11+02.00
PROP. TYPE B-B INLET
FL OUT=46.92 (24" S)

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

BERAN DR.

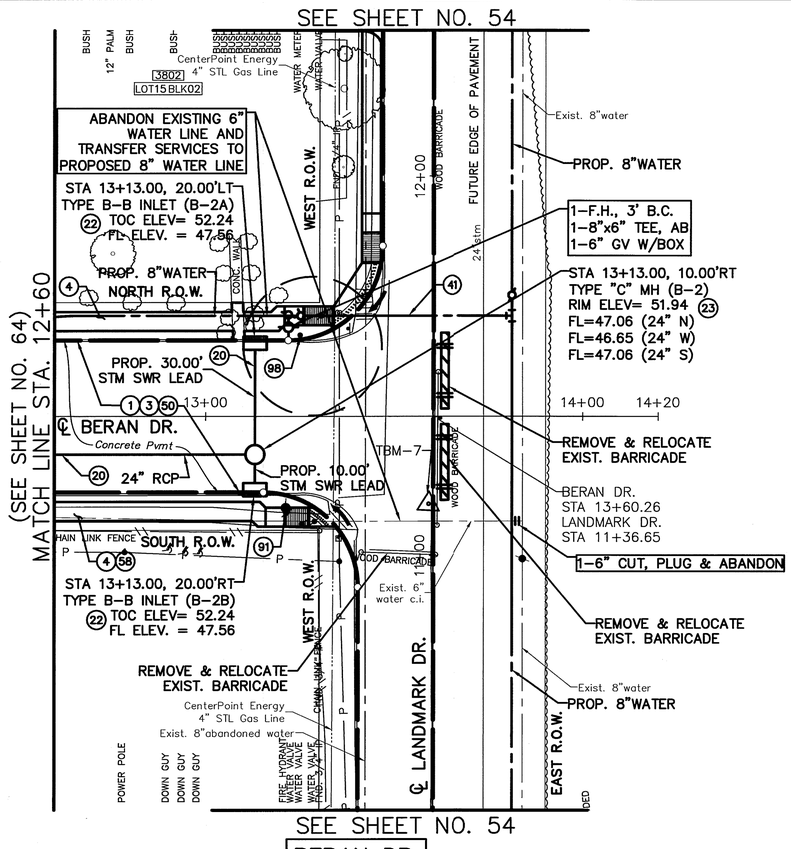
PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 64 OF 191	

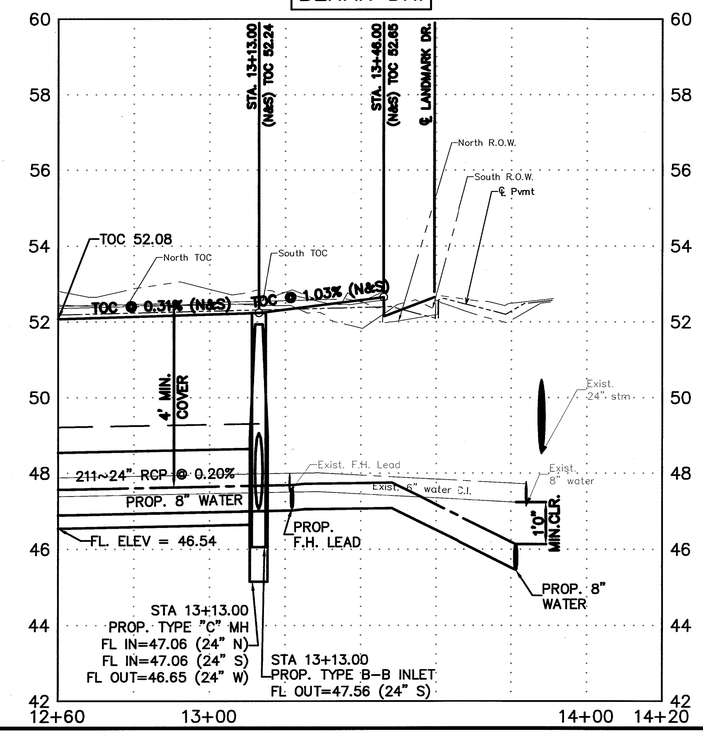
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

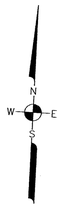
PLOTTED ON: Wednesday, April 11, 2012 11:26:30 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches



(SEE SHEET NO. 64)
MATCH LINE STA. 12+60





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 7 ELEVATION 52.65'
BERAN DR. STA.13+59.02, 23.05' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES Date: 4-12-12
APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY.

CenterPoint Energy/ GAS FACILITIES Date: 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

BERAN DR.

PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 14+20.00

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 65 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 11:52:45 AM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

1–8" WET CONNECTION
1–8" CUT, PLUG & ABANDON

ABANDON EXISTING 8" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

4–8"x45° BENDS, A.B.

℄ STA 1+97.54
(5)(51)(52) L= 18.0'

PROP. 8"WATER

℄ STA 2+53.56
L= 12.0' (5)(51)(52)

℄ STA 3+33.97
(5)(51)(52) L= 18.0'

10' TYP
PROP. 8"WATER

STA 1+55.00, 6.75'RT
TYPE "C" MH (E–6)
(23) RIM ELEV= 52.32
FL=42.07 (36" E)
FL=41.07 (36" W)
FL=44.11 (36" S)

℄ STA 1+99.31
(5)(51)(52) L= 12.0'

STA 1+16.54, 20.10'RT
TYPE "C" MH (E–7)
RIM ELEV= 48.37 (23)
FL=40.95 (36" E)

℄ STA 2+54.75
(5)(51)(52) L= 12.0'

STA 2+90.00, 6.75'RT
TYPE "C" MH (E–5)
RIM ELEV= 51.88 (23)
FL=43.98 (36" E)
FL=42.98 (36" W)

℄ STA 2+75.45
L= 18.0' (5)(51)(52)

℄ EBBTIDE DR.

REGG DR.

NORTH R.O.W.

SOUTH R.O.W.

60' R.O.W.
28.0' B-B

UNIT C-146-00-00

MATCH LINE STA. 3+60
(SEE SHEET NO. 67)

C.O.H.
VOL. 5896, PG. 106, H.C.D.R
LOT 1, BLK 5
BRENTWOOD, SEC. 3
VOL. 71, PG. 22 H.C.M.R.

C.O.H.
VOL. 5896, PG. 106, H.C.D.R
LOT 12, BLK 1
BRENTWOOD, SEC. 3
VOL. 71, PG. 22 H.C.M.R.

30' DRAINAGE EASEMENT VOL. 71, PG. 74, H.C.M.R. DEDICATED TO THE PUBLIC

30' DRAINAGE EASEMENT VOL. 71, PG. 22, H.C.M.R. DEDICATED TO THE PUBLIC

4010 LOT02 BLK05
4006 LOT03 BLK05
4002 LOT04 BLK05
4011 LOT 11BLK 01
4007 LOT10 BLK 01
4003 LOT09 BLK 01

TBM 11

B-83

Exist. 8"water ac
Exist. 8"water
Exist. 6"water
Exist. 36"stm
36" RCP
Concrete Pvmt
BUSH
WATER METER
SIGN, "NO PARKING 20' TALLOW"
STM. MANHOLE
MISC TEXT
12" TREE
20" OAK
30" OAK
40" OAK
6" CREPE MYRTLE
CONC. WALK
YARD LIGHT POLE

0+00 1+00 2+00 3+00 3+60

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252–0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 11 ELEVATION 53.40
EBBTIDE DR. STA.0+93.89, 19.41'RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713–223–4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-05-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

EBBTIDE DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 3+60.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 66 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

EBBTIDE DR.

PROP. PIPE GUARD (TYP) SEE COH STD. DETAIL 02502–01

LIMITS OF PROP. 8" AERIAL STEEL PIPE SEE WATER LINE AERIAL DETAILS
92'
CL Unit C–146–00–00
(concrete lined channel)

STA. 1+25.00 (N&S) TOC 52.78

STA. 2+90.00 (N&S) TOC 52.25

North TOC
North R.O.W.
℄ Pvmt
South R.O.W.
South TOC

TOC 52.02
TOC @ –0.32% (N&S)
TOC @ –0.32% (N&S)

1–8"X45°STL BEND
1–8"X45°STL BEND
1–8"X45°STL BEND
1–8"X45°STL BEND

PROP. 8" WATER
PROP. 2" AIR RELEASE VALVE

5' MIN. COVER

Exist. 8" water ac
Exist. 8" water ac
Exist. 8" water ac
Exist. 8" water ac
Exist. 36" stm
Exist. 36"stm

PROP. 8" WATER
PROP. 8" WATER

100 YEAR TW=45.33
10 YEAR TW=43.33

2 – 16"X16"X45' PRESTR. CONC. PILES

Exist. Stm MH
FL=43.99 (36"–E)
FL=39.79 (36"–W)

2 YEAR HGL
2 YEAR HGL
2 YEAR HGL

40'~36" RCP @ 0.30%
135'~36" RCP @ 0.67%
88'~36" RCP @ 0.50%

FL. ELEV = 44.33

STA 1+05.00, 20'RT
Exist. 36" Outfall
FL = 39.66
TO REMAIN

STA 1+16.54
PROP. TYPE "C" MH
FL IN=40.95 (36" E)

STA 1+55.00
PROP. TYPE "C" MH
FL IN=42.07 (36" E)
FL OUT=41.07 (36" W)
FL OUT=44.11 (36" S)

STA 2+90.00
PROP. TYPE "C" MH
FL IN=43.98 (36" E)
FL OUT=42.98 (36" W)

56 54 52 50 48 46 44 42 40 38

0+00 1+00 2+00 3+00 3+60

PLOTTED ON: Wednesday, April 11, 2012 11:28:18 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS original scale in inches

SEE SHEET NO. 46

(SEE SHEET NO. 66) MATCH LINE STA. 3+60

MATCH LINE STA. 8+40 (SEE SHEET NO. 68)

SEE SHEET NO. 44

STA 3+77.50, 13.50'LT (22) TYPE B-B INLET (E-4A) TOC ELEV= 51.97 FL ELEV. = 47.29

1-FULL SECTION (18'MIN) WATER LINE W/RESTRAINED JOINTS CENTERED OVER EXISTING 12" SAN. SWR.

PROP. 12"WATER

STA 4+20.00, 6.75'RT (23) TYPE "C" MH (E-3) RIM ELEV= 51.48 FL=44.86 (36"-S) FL=45.79 (24"-E) FL=45.79 (38"-W)

1-F.H., 3' B.C. 1-8"x6" TEE, AB 1-6" GV W/BOX

PROP. 8"WATER

PROP. 20.25' STM SWR LEAD

PROP. 6.75' STM SWR LEAD

Exist. 12"water

Exist. 8"water

Exist. 16"water

CenterPoint Energy 2" STL Gas Line

NORTH R.O.W.

SOUTH R.O.W.

℄ EBBTIDE DR.

℄ WHITEHEATHER DR.

PROP. 12"WATER

Concrete Pvmt

60.0' R.O.W.

28.0' B-B

12' TYP

R17' TYP

R25' TYP

38"x24" RCP

36" RCP

24" RCP

18"stm

24"stm

36"stm

12"san

15+00

14+00

4+00

5+00

6+00

7+00

8+00

℄ STA 5+39.18 L= 17.0' (5)(51)(52)

℄ STA 6+67.92 L= 17.0' (5)(51)(52)

℄ STA 6+02.99 L= 17.0' (5)(51)(52)

℄ STA 7+32.87 L= 17.0' (5)(51)(52)

STA 7+78.00, 13.50'LT (22) TYPE B-B INLET (E-2A) TOC ELEV= 50.90 FL ELEV. = 46.40

ABANDON EXISTING 8" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

℄ STA 7+97.49 L= 17.0' (5)(51)(52)

℄ STA 4+70.95 L= 17.0' (5)(51)(52)

STA 3+77.50, 6.75'RT (23) TYPE "C" MH (E-4) RIM ELEV= 51.60 FL=45.74 (38" E) FL=46.47 (24" N) FL=46.74 (24" S) FL=44.42 (36" W)

℄ STA 5+36.90 L= 17.0' (5)(51)(52)

℄ STA 6+02.83 L= 17.0' (5)(51)(52)

℄ STA 6+67.64 L= 17.0' (5)(51)(52)

℄ STA 7+32.72 L= 17.0' (5)(51)(52)

STA 7+78.00, 6.75'RT (23) TYPE "C" MH (E-2) RIM ELEV= 50.53 FL=46.30 (24" E) FL=46.30 (24" W) FL=46.30 (24" N) FL=46.30 (24" S)

℄ STA 7+97.91 L= 17.0' (5)(51)(52)

STA 3+77.50, 13.50'RT TYPE B-B INLET (E-4B) TOC ELEV= 51.97 (22) FL ELEV. = 47.29

STA 7+78.00, 13.50'RT TYPE B-B INLET (E-2B) (22) TOC ELEV= 50.90 FL ELEV. = 46.40

3922 LOT02 BLK03 | 3926 LOT01 BLK03 | 3918 LOT03 BLK03 | 3914 LOT04 BLK03 | 3906 LOT06 BLK03 | 3910 LOT05 BLK03 | 3914 LOT26 BLK02 | 3907 LOT25 BLK02 | 3915 LOT27 BLK02 | 3919 LOT28 BLK02 | 3923 LOT29 BLK02 | 3927 LOT30 BLK02

1-STORY BRICK RES. | HEDGE | 15" TREE | 24" OAK | 25" OAK | 12" MAGNOLIA | 24" PINE | BUSH | CONC. DRIVE | WOOD FENCE | WATER METER | 15" OAK | 24" STUMP | 14" CREPE MYRTLE | SIGN "NO PARKING" | YARD LIGHT 14" OAK | 20" TALLOW | 30" TALLOW | 20" COTTON WOOD | 20" WILLOW | TYPE "BB" INLET | 6" OAK | BASKETBALL GOAL | STA. MANHOLE

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 10 ELEVATION 52.33'
EBBTIDE DR. STA.3+98.41, 19.56' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

Centerpoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY — Date: 4-12-12

Centerpoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date: 4-12-12

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AT&T Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. — Date:

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SES HORIZON CONSULTING ENGINEERS, INC. TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 04-12-12

SURVEYED BY: LANDTECH CONSULTANTS, INC. FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

EBBTIDE DR.

PLAN AND PROFILE FROM STA. 3+60.00 TO STA. 8+40.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 67 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — NUMBER — HOUSTON, TEXAS

EBBTIDE DR.

58 56 54 52 50 48 46 44 42 40

3+60 4+00 5+00 6+00 7+00 8+00 8+40

STA. 3+60.00 (N&S) TOC 51.96 | STA. 4+06.50 (N&S) TOC 52.36 | ℄ WHITE HEATHER DR. | STA. 4+33.50 (N&S) TOC 52.36 | STA. 4+59.00 (N&S) TOC 51.96 | STA. 7+78.00 (N&S) TOC 50.90

℄ Pvmt | North R.O.W. | North TOC | South R.O.W. | South TOC

TOC @ -0.33% (N&S) | TOC @ 0.30% (N&S)

Exist. Inlet FL=45.32 (18"-S) FL=45.42 (18"-N)

Exist. Stm MH FL=44.64 (36"-E) FL=44.74 (36"-W) FL=44.84 (18"-N)

Exist. Inlet FL=45.51 (18"-S)

Exist. Stm MH FL=48.00 (18"-S) FL=45.00 (36"-W) FL=48.00 (18"-N) FL=45.00 (36"-E)

STA 4+20.00 PROP. TYPE "C" MH FL IN=44.86 (36" S) FL IN=45.79 (24" E) FL OUT=45.79 (38"x24" W)

2 YEAR HGL | 2 YEAR HGL

3' MIN COVER

Exist. F.H. Lead | Exist. 36" stm | Exist. 12" water ac | Exist. 8" water ac | Exist. 36" stm | Exist. 36" stm | Exist. 8" water ac

43~38"x24"RCP @ 0.12%

358'~24" RCP @ 0.14%

130'~24" RCP @ 0.20%

88'~36"RCP @ 0.50%

2' MIN COVER

PROP. 8" WATER | PROP. 8" WATER | PROP. 8" WATER

PROP. 6"F.H. LEAD

PROP. 12" WATER | PROP. 12" WATER

1'0" MIN.CLR. | 1'0" MIN.CLR.

PROP. 3" PVC DRAIN

FL. ELEV= 44.33

FL. ELEV = 46.43

Exist. 12" san

Exist. Inlet FL=46.08 (24"-S) FL=46.18 (24"-N)

Exist. Stm MH FL=46.05 (36"-W) FL=46.05 (36"-E) FL=46.25 (24"-N)

STA 3+77.50 PROP. TYPE "C" MH FL IN=45.74 (38" E) FL IN=46.47 (24" N) FL IN=46.74 (24" S) FL OUT=44.42 (36" W)

STA 3+77.50 PROP. TYPE B-B INLET FL OUT=47.29 (24" S)

STA 7+78.00 PROP. TYPE "C" MH FL IN=46.30 (24" E) FL IN=46.30 (24" N) FL IN=46.30 (24" S) FL OUT=46.30 (24" W)

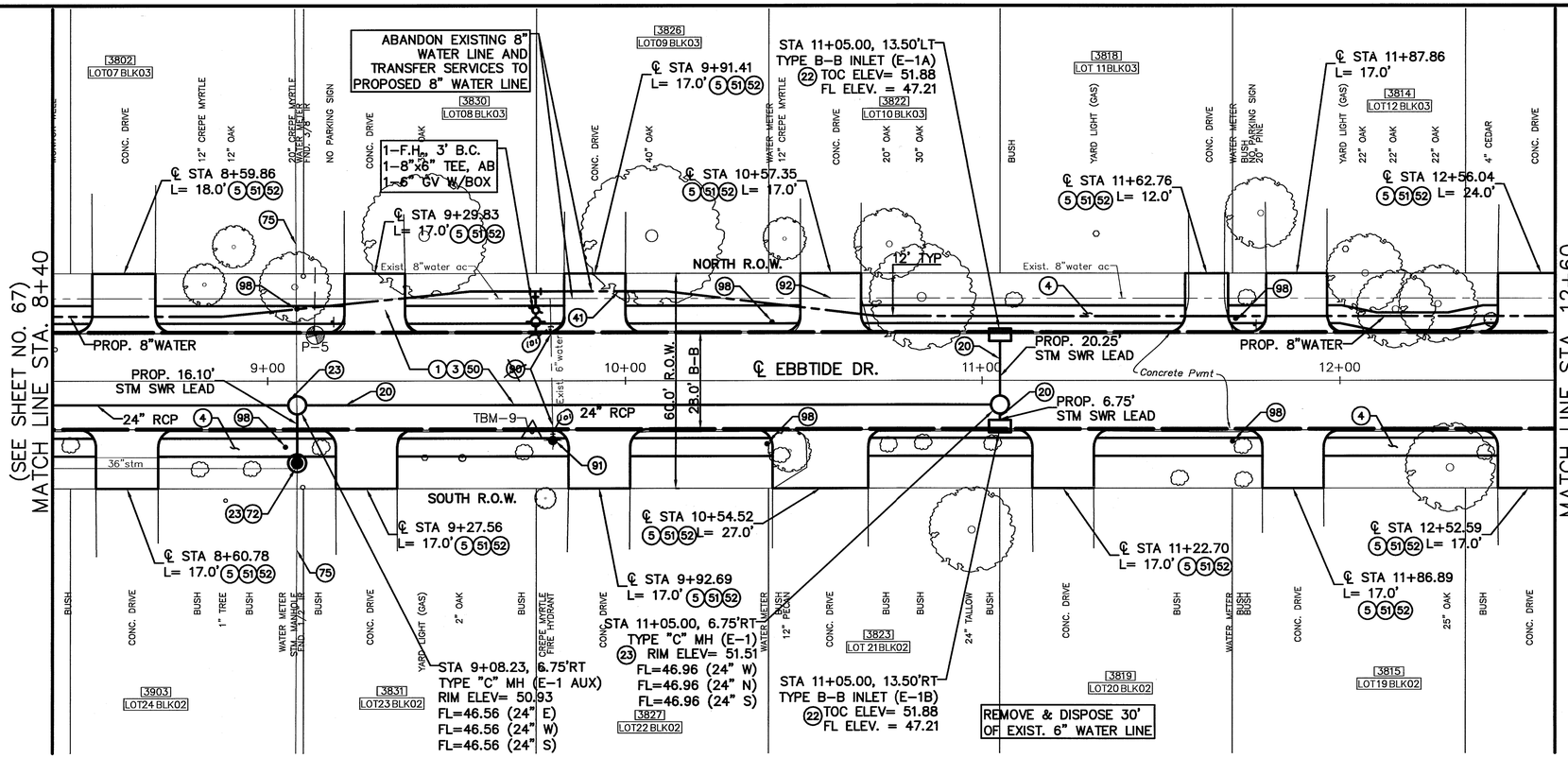
STA 7+78.00 PROP. TYPE B-B INLET FL OUT=46.40 (24" N)

PLOTTED ON: Wednesday, April 11, 2012 11:29:15 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 67)
MATCH LINE STA. 8+40

MATCH LINE STA. 12+60
(SEE SHEET NO. 69)



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 9 ELEVATION 51.75'
EBBTIDE DR. STA.9+73.84, 14.28' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

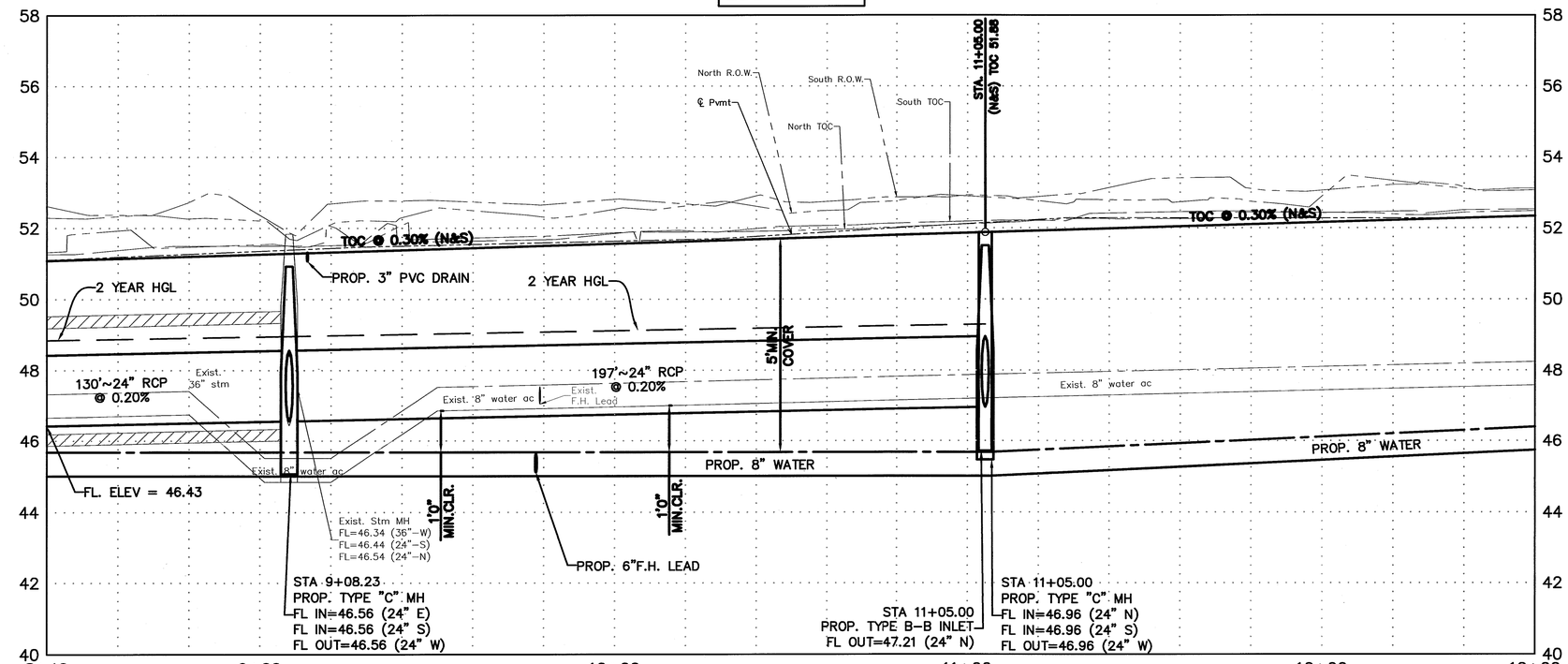
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

EBBTIDE DR.

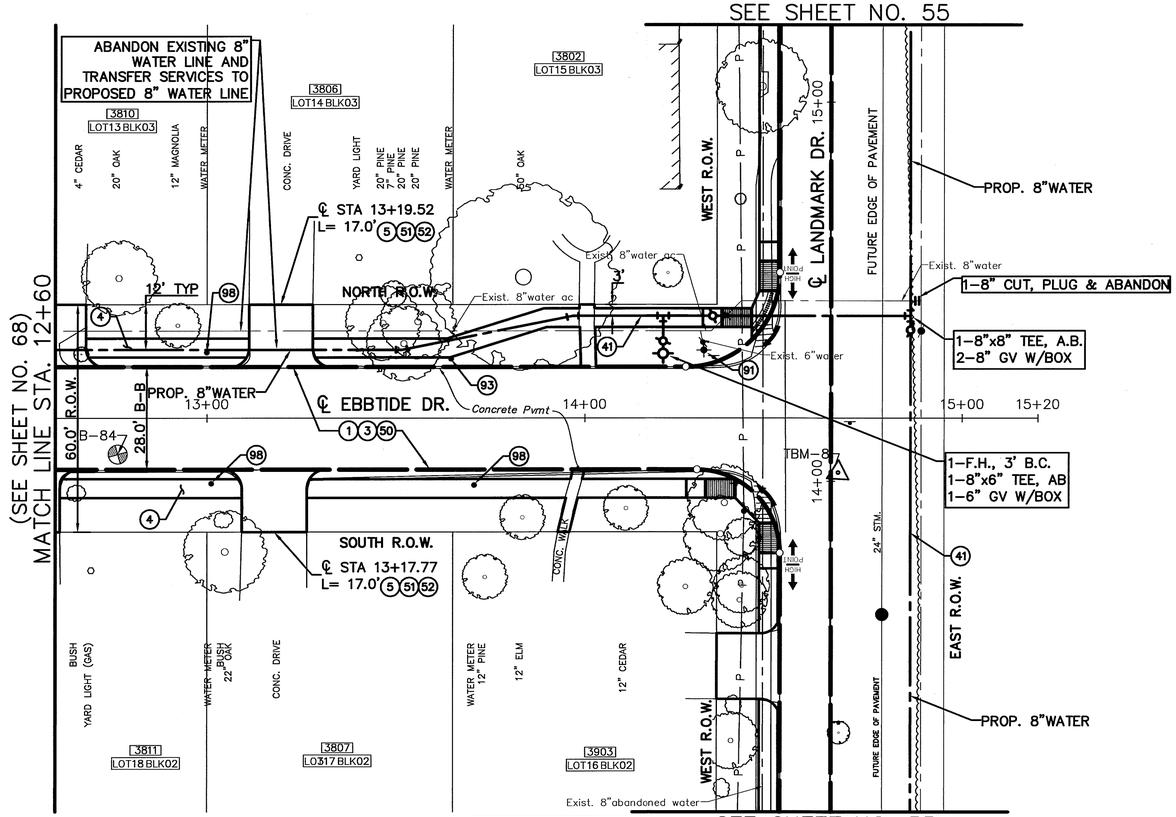
PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

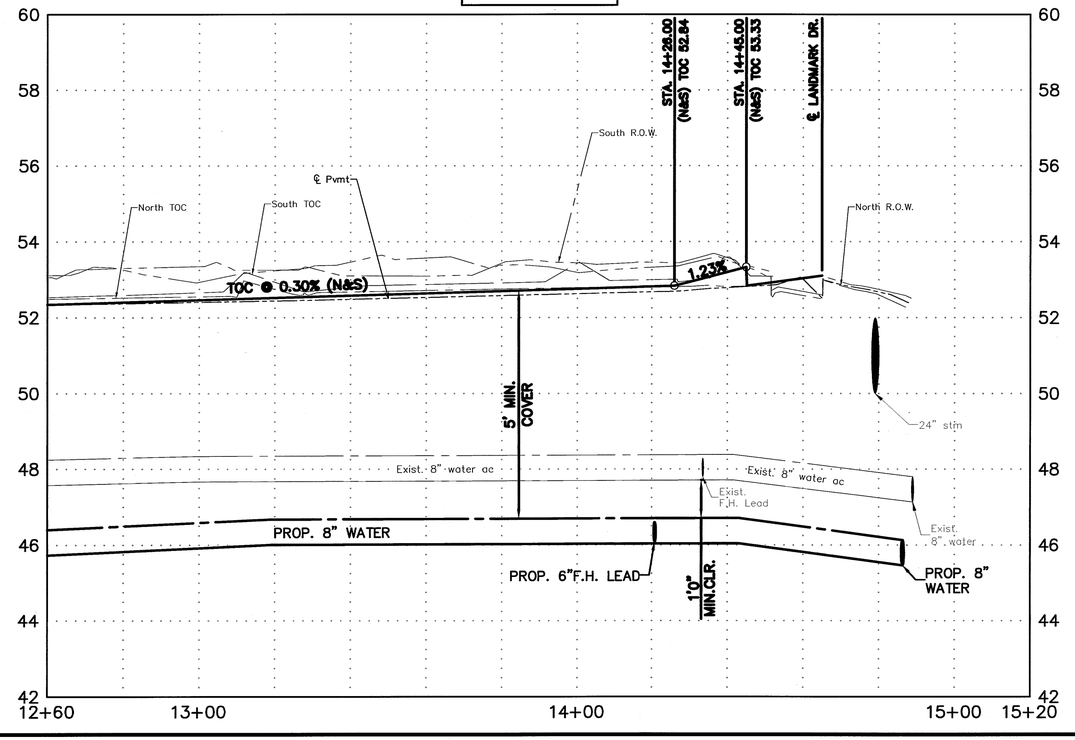
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 68 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:30:10 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 8 ELEVATION 52.91'
EBBTIDE DR. STA.14+67.21, 14.32' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES Date 4-12-12
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY.

CenterPoint Energy/ GAS FACILITIES Date 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

TEXAS/SWBT UTILITY LINES SHOWN Date 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

EBBTIDE DR.

PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 15+20.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 69 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 REGISTERED HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:31:05 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

C.O.H. MONUMENT
CITY OF HOUSTON SURVEY
MARKER No. 5252-7703

C.O.H.
VOL. 5836, PG. 310, H.C.D.R
LOT 9, BLK 5
BRENTWOOD, SEC. 3
VOL. 71, PG. 22 H.C.M.R.

℄ STA 0+99.72
L= 12.0' (5)(51)(52)

4012
LOT10 BLK05

4010
LOT 11BLK05

REMOVE & DISPOSE 40' OF EXIST. 4" WATER LINE

4006
LOT12 BLK03

ABANDON EXISTING 4" WATER LINE AND TRANSFER SERVICES TO PROPOSED 6" WATER LINE

PROP. 2" BLOWOFF VALVE W/BOX

PROP. 6"WATER

℄ STA 1+92.01
L= 14.0' (5)(51)(52)

NORTH R.O.W.

4"pvc water

Concrete Pvmt

TBM-12

-1+00

0+00

1+00

2+00

℄ KNOTTY OAKS TR.

60.0' R.O.W.

28.0' B-B

42" RCP

MATCH LINE STA. 2+80
(SEE SHEET NO. 71)

UNIT C-146-00-00

Exist. 6"water

25'X20'

STA 0+67.78, 7.15'RT
TYPE "C" MH (K-13)
(23) RIM ELEV= 51.48
FL=39.62 (42" SW)
FL=39.62 (42" E)

6-6"x45° BENDS, A.B.

CONC. WALK

℄ STA 1+49.83
(5)(51)(52) L= 14.0'

℄ STA 1+69.98
(5)(51)(52) L= 12.0'

SOUTH R.O.W.

PROP. 6"WATER

STA 1+82.00, 6.75'RT
TYPE "C" MH (K-12)
(23) RIM ELEV= 51.19
FL=39.79 (42" E)
FL=39.79 (42" W)

℄ STA 2+50.23
(5)(51)(52) L= 12.0'

4011
LOT07 BLK05

4007
LOT06 BLK05

C.O.H.
VOL. 5836, PG. 318, H.C.D.R
LOT 8, BLK 5
BRENTWOOD, SEC. 3
VOL. 71, PG. 22 H.C.M.R.

CHAIN LINK FENCE

WATER METER

MAIL BOX

CONC. DRIVE

MAILBOX

40" OAK

25" OAK

30" OAK

SIGN "NO PARKING"

WATER METER

FND. 1/2" IR

BRICK MAILBOX

5" MAGNOLIA

15" CREPE MYRTLE

20" STUMP

12" STUMP

WATER METER

4" MAGNOLIA

15" MAPLE

15" CREPE

35" OAK

SPRINKLER VALVE

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 12 ELEVATION 52.96'
KNOTTY OAKS TR. STA.0+99.72, 0.49' LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

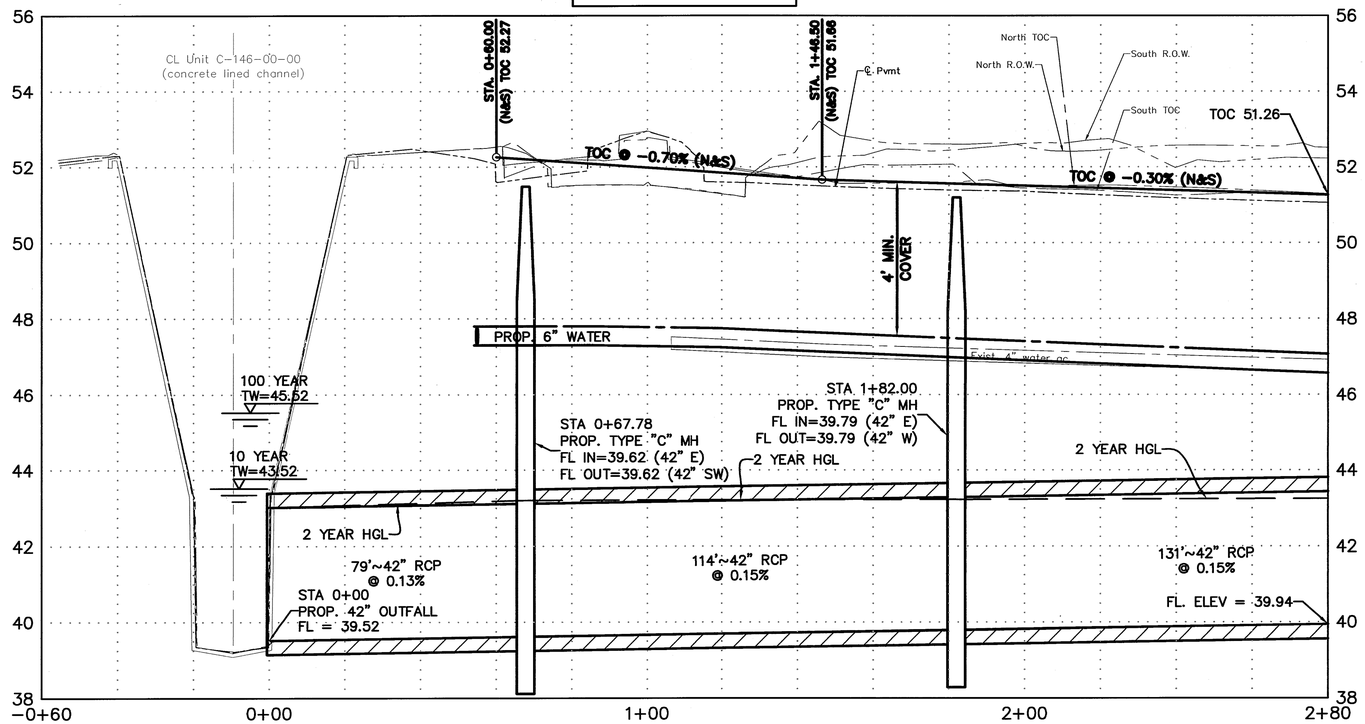
CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN Date 4-12-12
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KNOTTY OAKS TR.



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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 2+80.00

WBS NO.: M-000262-0004-4	CITY PROJECT NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 70 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 25, 2012 3:37:36 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

SEE SHEET NO. 48

SEE SHEET NO. 46

KNOTTY OAKS TR.

(SEE SHEET NO. 70) MATCH LINE STA. 2+80

MATCH LINE STA. 7+00 (SEE SHEET NO. 72)

4002 LOT12 BLK05

4003 LOT05 BLK05

3922 LOT01 BLK04

3918 LOT02 BLK04

3914 LOT03 BLK04

3910 LOT04 BLK04

3923 LOT29 BLK03

3919 LOT28 BLK03

3915 LOT27 BLK03

3911 LOT26 BLK03

STA 3+14.00, 13.50'LT
TYPE B–B INLET (K–11A)
TOC ELEV= 51.55 (22)
FL ELEV. = 46.48

STA 5+45.00, 13.50'LT
TYPE B–B INLET (K–6A)
TOC ELEV= 50.70 (22)
FL ELEV. = 46.78

STA 5+45.00, 13.50'RT
TYPE B–B INLET (K–6B)
TOC ELEV= 51.20 (22)
FL ELEV. = 46.78

STA 3+14.00, 13.50'RT
TYPE B–B INLET (K–11B)
TOC ELEV= 51.55 (22)
FL ELEV. = 46.48

STA 3+62.18, 7.46'RT (23)
TYPE "C" MH (K–10)
RIM ELEV= 51.22
FL=45.88 (24" N)
FL=42.06 (42" E)
FL=45.88 (24" S)
FL=40.06 (45" W)

STA 3+14.00, 6.75'RT (23)
TYPE "C" MH
RIM ELEV= 52.06
FL=39.99 (42" W)
FL=45.98 (24" N)
FL=45.98 (24" S)
FL=39.99 (45"E)

STA 6+36.65, 581.57'RT
TYPE "C" MH (K–7) (23)
RIM ELEV= 51.05
FL=42.43 (42" E)
FL=42.43 (42" W)

STA 5+45.00, 6.75'RT (23)
TYPE "C" MH (K–6)
RIM ELEV= 50.83
FL=42.80 (42" E)
FL=42.80 (42" W)
FL=46.28 (24" N)
FL=46.28 (24" S)

STA 4+88.22 L= 17.0' (5)(51)(52)

STA 4+83.24 L= 12.0' (5)(51)(52)

STA 5+64.83 L= 17.0' (5)(51)(52)

STA 5+66.18 L= 17.0' (5)(51)(52)

STA 6+23.76 L= 12.0' (5)(51)(52)

STA 6+32.87 L= 17.0' (5)(51)(52)

STA 6+96.55 L= 18.0' (5)(51)(52)

1–5'H. 3' B.B.
1–8"x6" TEE, AB
1–6" GV W/BOX

1–8"x22.5° BEND, A.B.

2–6"x45° BENDS, A.B.

1–20' JOINT CENTERED OVER EXIST. 12" SAN SWR W/RESTRAINED JOINTS

REMOVE & REPLACE SIDEWALK IN SAME LOCATION. (TYP)

ABANDON EXISTING 6" WATER LINE AND TRANSFER SERVICES TO PROPOSED 8" WATER LINE

PROP. 12"WATER

PROP. 6"WATER

PROP. 8"WATER

NORTH R.O.W.

SOUTH R.O.W.

℄ KNOTTY OAKS TR.

24" RCP

42" RCP

45"x29" RCP

Exist. 4"water

Exist. 6"water

Exist. 12"water

Exist. 12"water abandoned

Center Point Energy 2" STL Gas Line

1–STORY BRICK RES.

WHITE METER

WATER METER

CONC. DRIVE

YARD LIGHT (GAS)

BUSH

50" OAK

40" OAK

25" OAK

25" CREPE MYRTLE

6" CREPE MYRTLE

12" CREPE MYRTLE

12" STUMP

25" STUMP

WOOD FENCE

CHAIN LINK FENCE

TBM – Ia.
B–86

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252–0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 13 ELEVATION 51.37'
KNOTTY OAKS TR. STA.3+32.82, 18.09' RT

PRIVATE UTILITY LINES SHOWN

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CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF EXPORT ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

ALL OTHER PRIVATE UTILITY LINES SHOWN Date: 4-12-12

Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date:

CABLE Approved for underground conduit facilities only.

SES HORIZON CONSULTING ENGINEERS, INC.
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TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — LICENSED PROFESSIONAL ENGINEER — 04-12-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

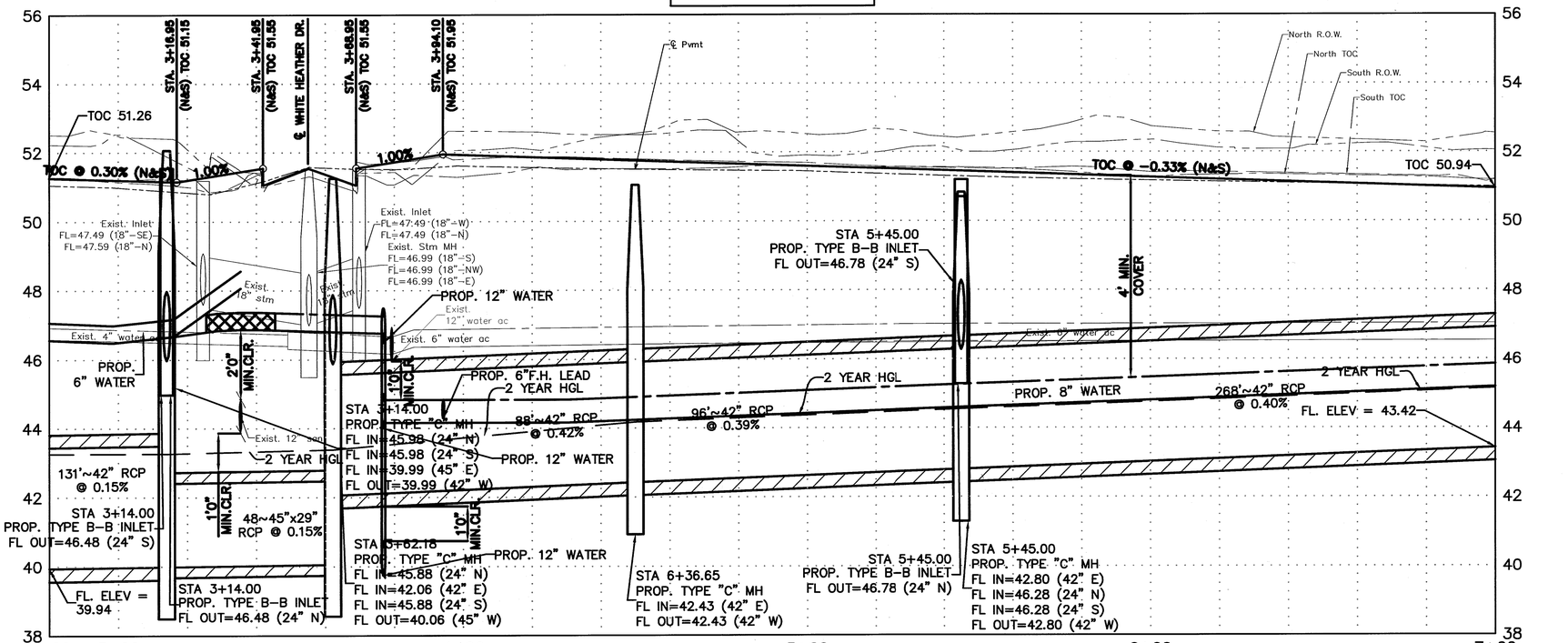
PLAN AND PROFILE
FROM STA. 2+80.00 TO STA. 7+00.00

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 71 OF 191	

PUBLIC WORKS & ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

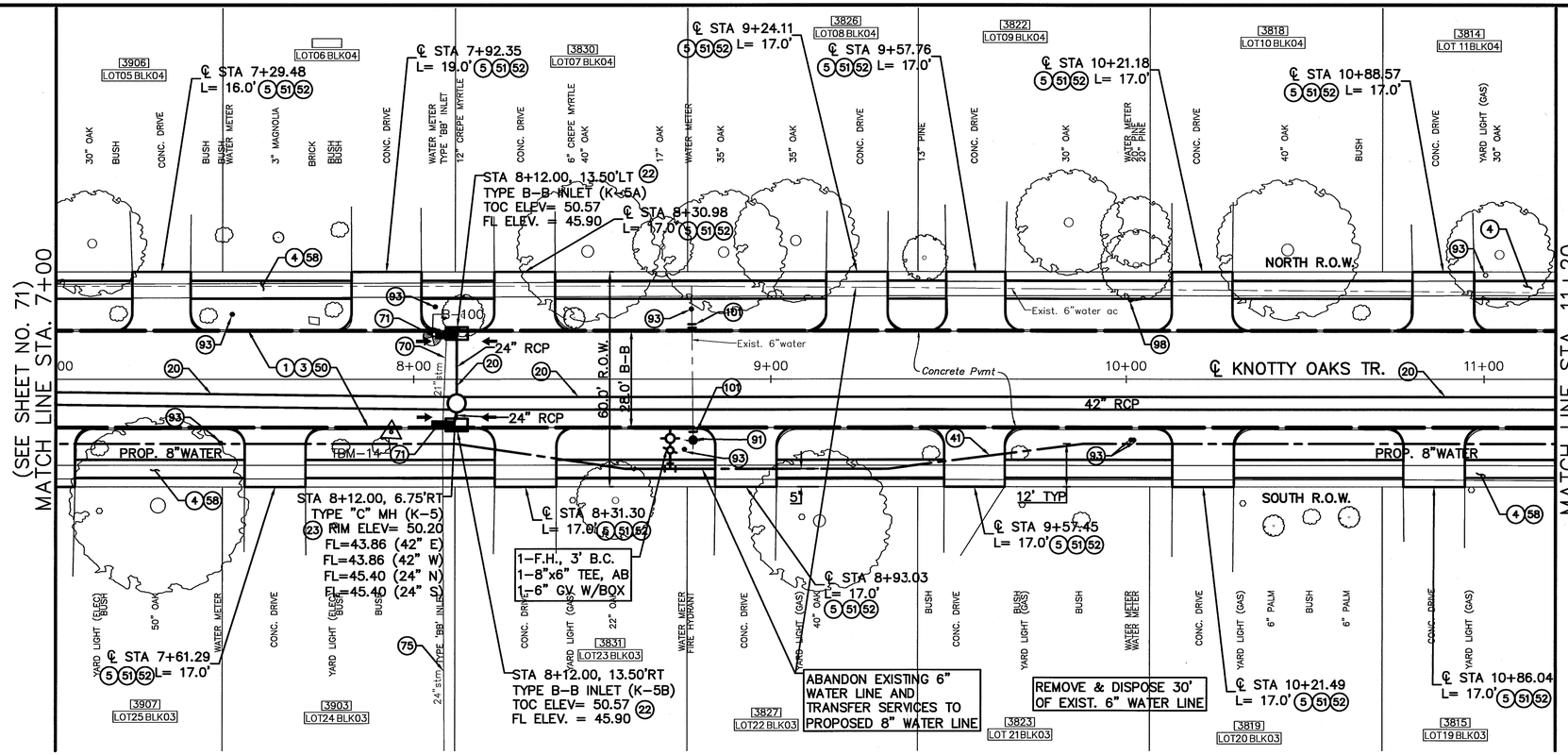
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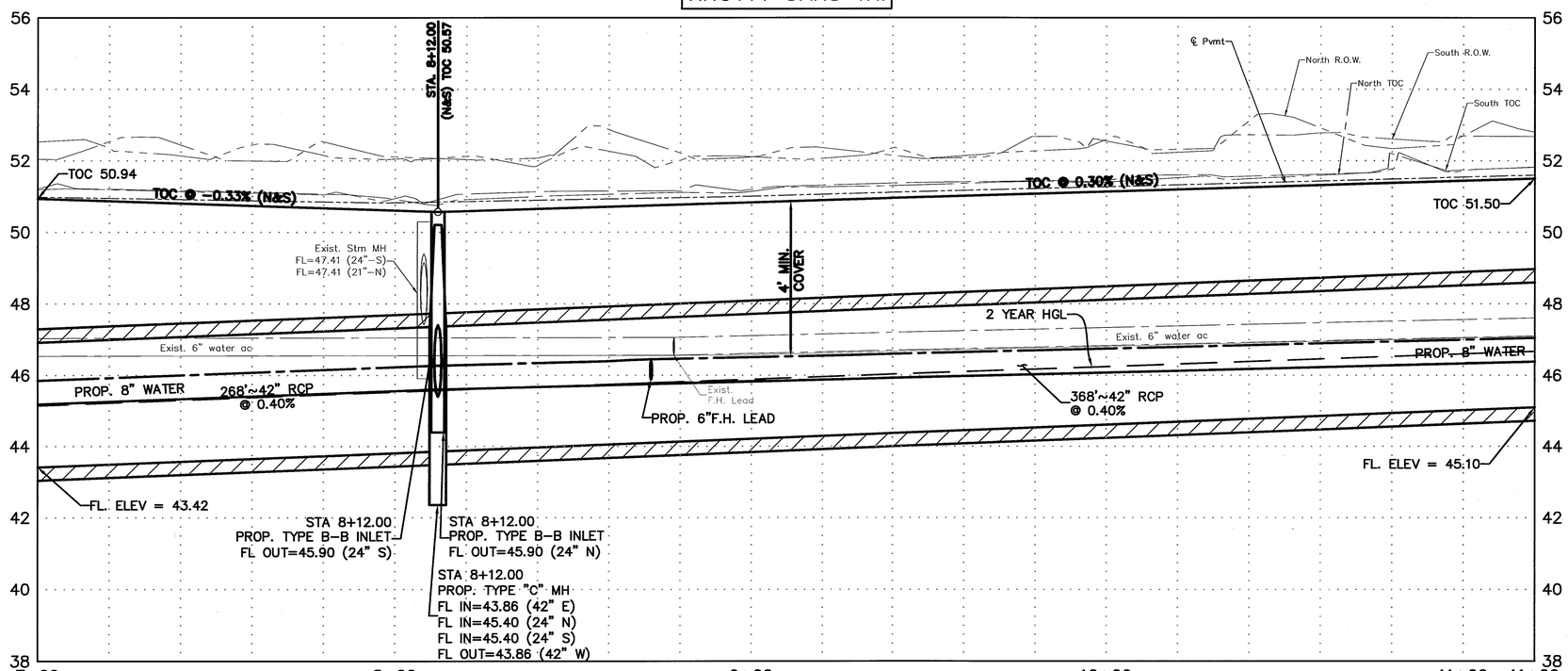
FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 71)
MATCH LINE STA. 7+00

MATCH LINE STA. 11+20
(SEE SHEET NO. 73)



KNOTTY OAKS TR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 14 ELEVATION 51.22'
KNOTTY OAKS TR. STA.7+93.76, 14.74' RT

PRIVATE UTILITY LINES SHOWN

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CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) Valid AT TIME OF REVIEW ONLY. Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Date 4-13-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-13-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

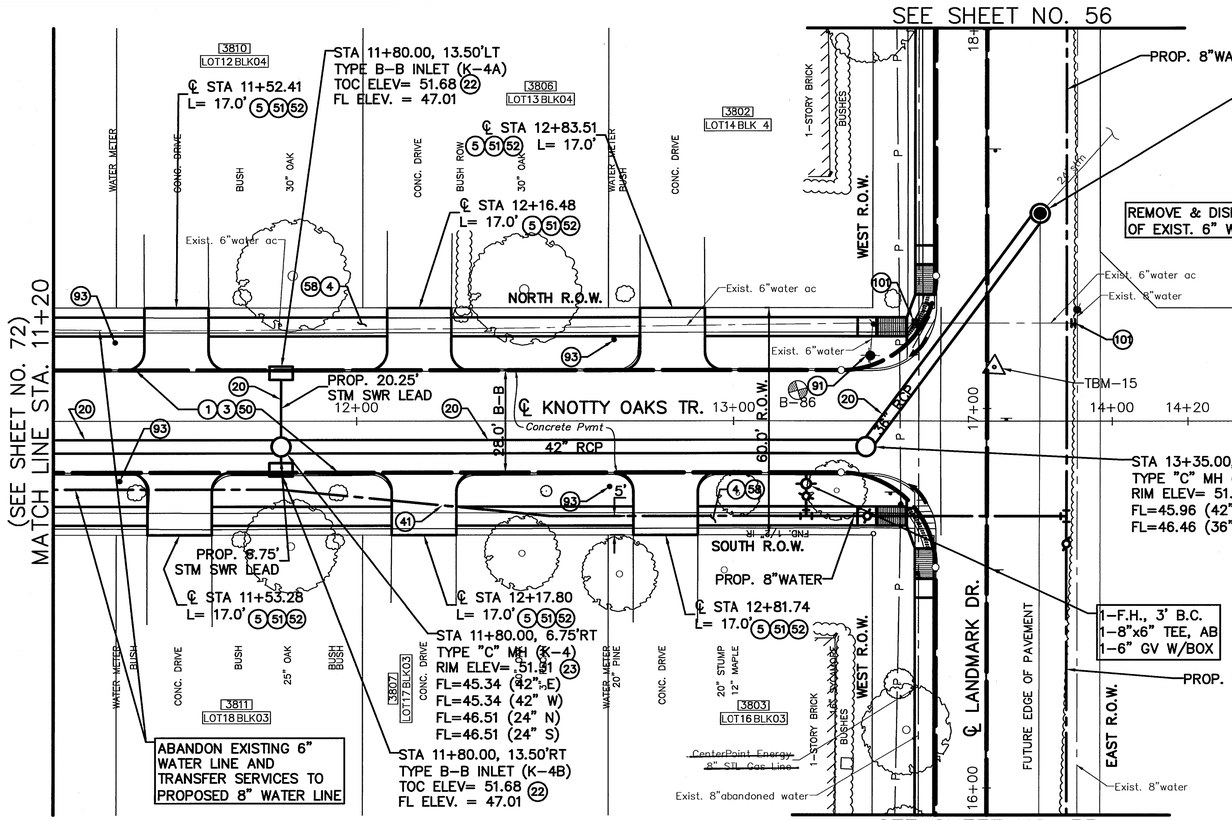
PLAN AND PROFILE
FROM STA. 7+00.00 TO STA. 11+20.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 72 OF 191	

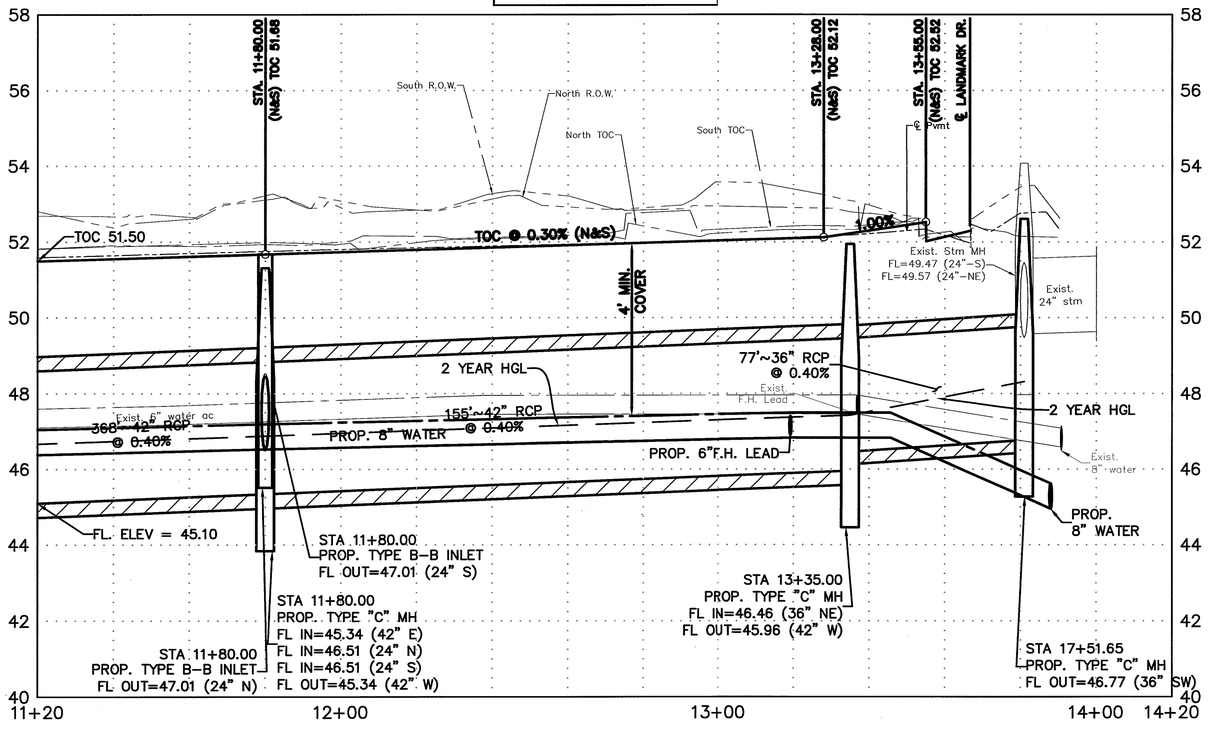
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:33:56 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches



KNOTTY OAKS TR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
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0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 15 ELEVATION 52.39'
KNOTTY OAKS TR. STA.13+68.88, 14.34' LT

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CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date: 4-12-12

AT&T/SWBT/ PRIVATE UTILITIES SHOWN
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. — Date: 4-12-12

CABLE Approved for underground conduit facilities only. — Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

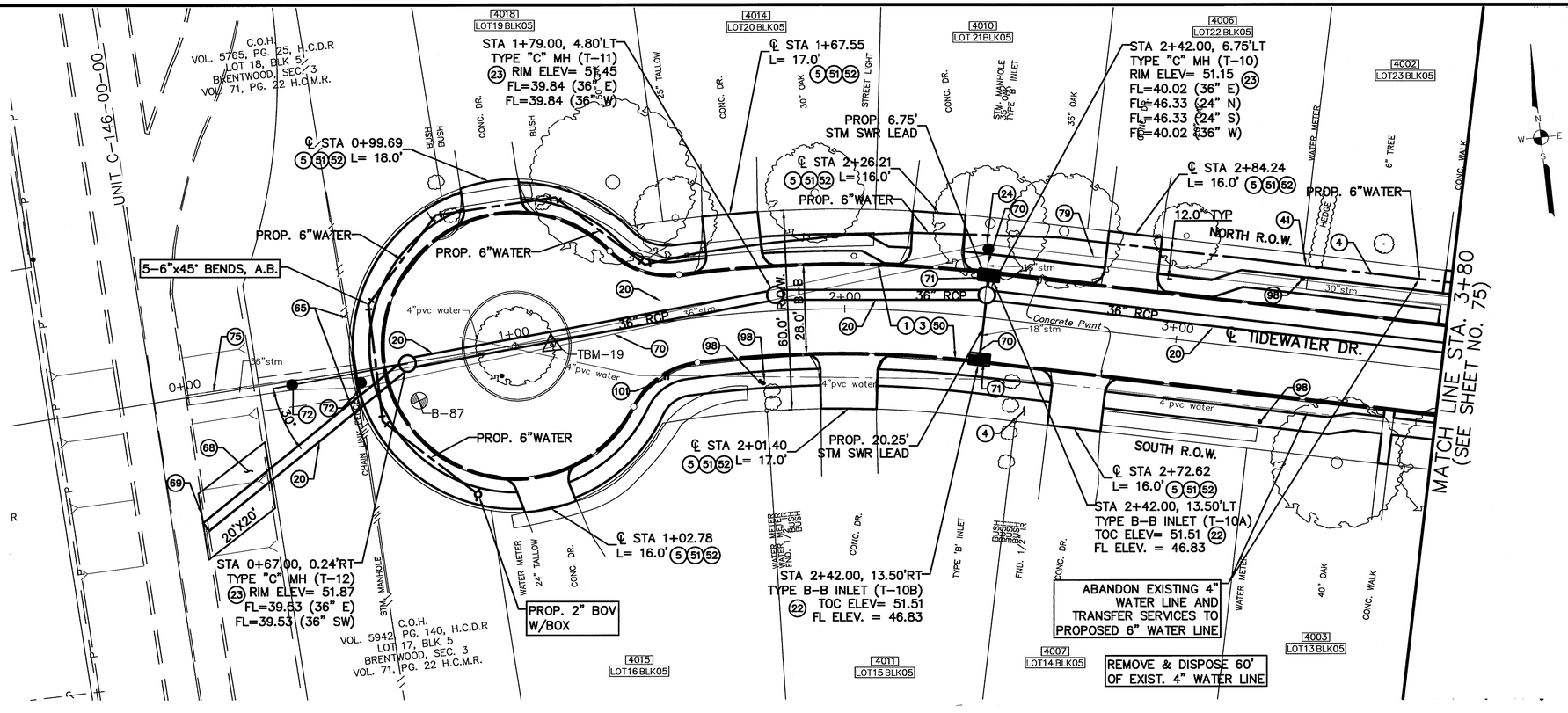
PLAN AND PROFILE
FROM STA. 11+20.00 TO STA. 14+20.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
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DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 73 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:34:51 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
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- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 19 ELEVATION 52.91'
TIDEWATER DR. STA.1+10.71, 1.58' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR OVERHEAD UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) SIGN AT TOP OF RISER ONLY — Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 4-12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

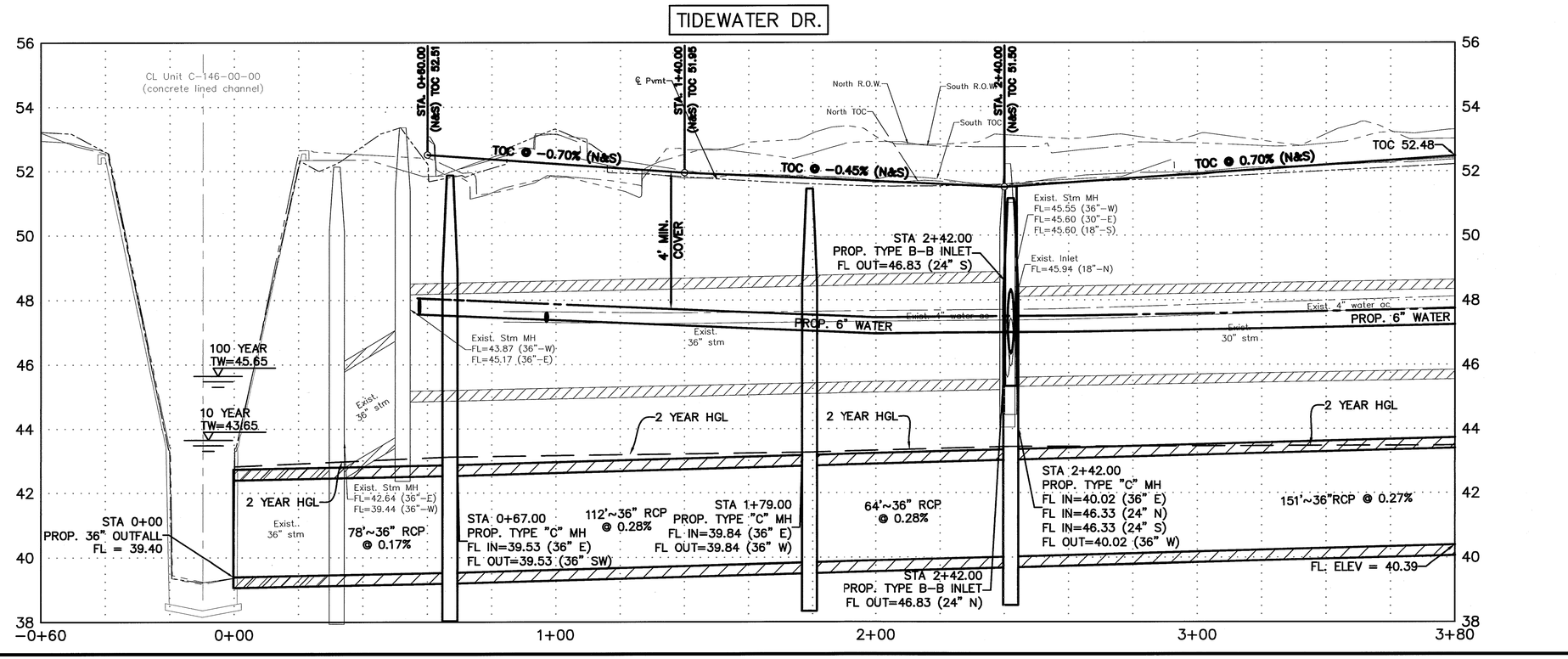
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TIDEWATER DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 3+80.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 74 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING — 49210 — REGISTERED — HOUSTON, TEXAS



PLOTTED ON: Wednesday, April 25, 2012 3:41:02 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS.DWG

SEE SHEET NO. 50

(SEE SHEET NO. 74) MATCH LINE STA. 3+80

MATCH LINE STA. 8+00 (SEE SHEET NO. 76)

SEE SHEET NO. 48

PROP. 12"WATER
1-FULL SECTION (18'MIN)
WATER LINE W/RESTRAINED
JOINTS CENTERED OVER
EXISTING 12" SAN. SWR.
STA 20+47.37, 6.75'LT
TYPE "C" MH (T-9)
RIM ELEV= 51.96 (23)
FL=40.53 (30" N)
FL=40.53 (45" W)
FL=42.06 (30" E)

STA 6+00.00, 13.50'LT
TYPE B-B INLET (T-8A)
(22) TOC ELEV= 52.21
FL ELEV. = 47.54

STA 6+00.00, 6.75'LT
TYPE "C" MH (T-8)
RIM ELEV= 51.85 (23)
FL=44.59 (24" E)
FL=44.59 (30" W)
FL=47.04 (24" N)
FL=47.04 (24" S)

℄ STA 7+68.35
(5)(51)(52) L= 17.0'

℄ STA 7+03.13
L= 17.0' (5)(51)(52)

℄ STA 6+36.05
L= 17.0' (5)(51)(52)

℄ STA 5+63.10
L= 17.0' (5)(51)(52)

PROP. 6.75'
STM SWR LEAD

1-8" GV W/BOX

℄ TIDEWATER DR.

PROP. 8"WATER

PROP. 20.25'
STM SWR LEAD

PROP. 12"WATER

SOUTH R.O.W.
℄ STA 5+57.59
L= 18.0' (5)(51)(52)

STA 3+93.00, 20.96'LT
TYPE "C" MH (T-9 CON)
RIM ELEV= 52.75 (23)
FL=45.84 (36" S)

STA 4+76.81, 21.29'LT
TYPE "C" MH (T-8 EX)
RIM ELEV= 52.90 (23)
FL=46.11 (30" S)

STA 4+77.00, 6.75'LT
TYPE "C" MH (T-8 AUX)
RIM ELEV= 52.22 (23)
FL=44.21 (30" E)
FL=42.15 (30" W)
FL=44.21 (30" N)

STA 3+93.00, 6.75'LT
TYPE "C" MH (T-9 AUX)
RIM ELEV= 51.92
FL=40.43 (45" E)
FL=40.43 (36" W)
FL=45.84 (36" N)

STA 6+00.00, 13.50'RT
TYPE B-B INLET (T-8B)
TOC ELEV= 52.21 (22)
FL ELEV. = 47.54

℄ STA 6+27.84
L= 17.0' (5)(51)(52)

ABANDON EXISTING 4"
WATER LINE AND
TRANSFER SERVICES TO
PROPOSED 6" WATER LINE

℄ STA 7+02.24
L= 17.0' (5)(51)(52)

℄ STA 7+65.84
L= 17.0' (5)(51)(52)

TBM 18

CenterPoint Energy
2" STL Gas Line

Exist. 6"water

Exist. 12"water

Exist. 6"water ac

12' TYP NORTH R.O.W.

60.0' R.O.W.
28.0' B-B

24" RCP

30" RCP

36" RCP

45"x29" RCP

36" RCP

R25' TYP

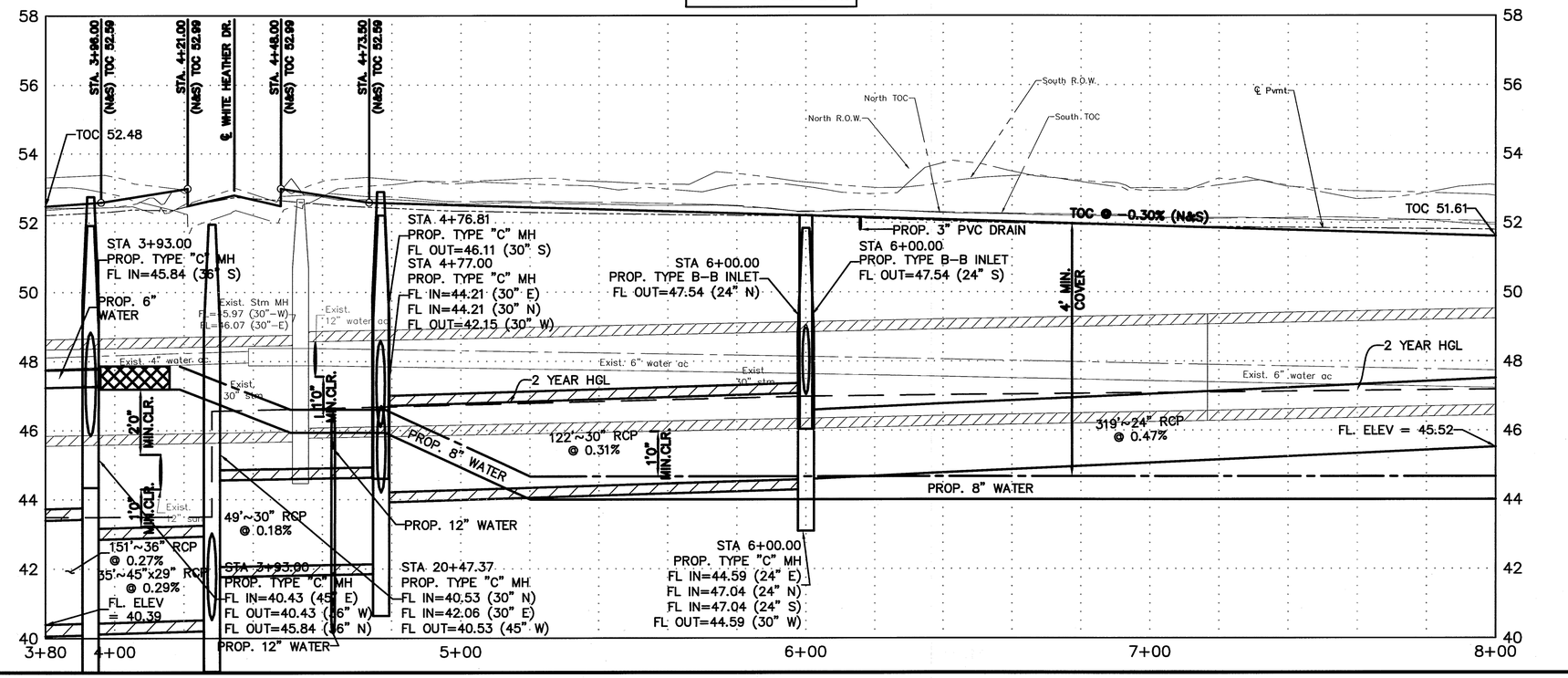
℄ WHITEHEATHER DR.

PROP. 12" WATER

Exist. 12"water

3914 LOT02 BLK06
3910 LOT03 BLK06
3906 LOT04 BLK06
3902 LOT05 BLK06
3918 LOT01 BLK06
3911 LOT25 BLK04
3907 LOT24 BLK04
3903 LOT23 BLK04
3919 LOT27 BLK04
3915 LOT26 BLK04

TIDEWATER DR.



LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 18 ELEVATION 52.03'
TIDEWATER DR. STA.4+16.60, 21.63' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) Valid at top of ground only. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR L. CORREDOR 47746 REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TIDEWATER DR.

PLAN AND PROFILE
FROM STA. 3+80.00 TO STA. 8+00.00

WBS NO.: M-000262-0004-4	CITY ENGINEER
FILE NO.: SM5056	49210 LICENSE NUMBER
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 75 OF 191	

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Wednesday, April 18, 2012 3:26:36 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 75)
MATCH LINE STA. 8+00

MATCH LINE STA. 12+00
(SEE SHEET NO. 77)

3830 LOT06 BLK06 | 3826 LOT07 BLK06 | 3822 LOT08 BLK06 | 3818 LOT09 BLK06 | 3814 LOT10 BLK06 | 3810 LOT 11 BLK06

STA 9+20.00, 6.75'LT
TYPE "C" MH (T-7)
(23) RIM ELEV= 50.88
FL=46.08 (24" E)
FL=46.08 (24" W)
FL=46.08 (24" N)
FL=46.08 (24" S)

STA 9+20.00, 13.50'LT
TYPE B-B INLET (T-7A)
(22) TOC ELEV= 51.25
FL ELEV = 46.58

℄ STA 10+26.89
(5)(51)(52) L= 19.0'

℄ STA 10+89.77
(5)(51)(52) L= 17.0'

STA 11+90.00, 13.50'LT
TYPE B-B INLET (T-6A)
(22) TOC ELEV= 52.08
FL ELEV. = 47.42

STA 11+90.00, 6.75'LT
TYPE "C" MH (T-6)
(23) RIM ELEV= 51.71
FL=46.92 (24" N)
FL=46.92 (24" W)
FL=46.92 (24" S)

℄ STA 8+33.84
L= 17.0'
(5)(51)(52)

℄ STA 8+97.92
(5)(51)(52) L= 18.0'

PROP. 15'
24" RCP

PROP. 6.75'
STM SWR LEAD

℄ STA 9+63.43
L= 16.0' (5)(51)(52)

ABANDON EXISTING 6"
WATER LINE AND
TRANSFER SERVICES TO
PROPOSED 8" WATER LINE

℄ STA 11+56.43
(5)(51)(52) L= 12.0'

NORTH R.O.W.

PROP. 8"WATER

24" RCP

PROP. 6.75'
STM SWR LEAD

PROP. 20.25'
STM SWR LEAD

PROP. 98"WATER

℄ TIDEWATER DR.

Concrete Pvmt

TBM-17

1-F.H., 3' B.C.
1-8"x6" TEE, AB
1-6" GV W/BOX

STA 9+40.70, 6.75'LT
TYPE "C" MH (T-6 AUX)
RIM ELEV= 50.95
FL=46.15 (24" E)
FL=46.15 (24" W)
FL=47.00 (24" N)

℄ STA 8+27.87
L= 17.0' (5)(51)(52)

℄ STA 10+26.47
L= 16.0' (5)(51)(52)

℄ STA 11+55.88
(5)(51)(52) L= 17.0'

℄ STA 10+87.96
L= 17.0' (5)(51)(52)

SOUTH R.O.W.

60.0' R.O.W.
28.0' B-B

Exist. 6" water ac

STA 9+20.00, 13.50'RT
TYPE B-B INLET (T-7B)
(22) TOC ELEV= 51.25
FL ELEV. = 46.58

℄ STA 9+36.47
L= 12.0' (5)(51)(52)

℄ STA 9+64.25
L= 17.0' (5)(51)(52)

STA 11+90.00, 13.50'RT
TYPE B-B INLET (T-6B)
(22) TOC ELEV= 52.08
FL ELEV. = 47.42

3831 LOT22 BLK04 | 3827 LOT 21 BLK04 | 3823 LOT20 BLK04 | 3819 LOT19 BLK04 | 3815 LOT18 BLK04 | 3811 LOT17 BLK04

TIDEWATER DR.

STA. 9+20.00 (N&S) TOC 51.25

North R.O.W.
South R.O.W.
℄ Pvmt
North TOC
South TOC

TOC 51.61
TOC @ 0.31% (N&S)
TOC 52.11

Exist. Inlet
FL=47.27 (21"-N)
Exist. Stm MH
FL=47.02 (30"-W)
FL=47.02 (21"-S)
FL=47.02 (24"-N)

4' MIN. COVER

2 YEAR HGL

21'~24" RCP
@ 0.34%

Exist. 30" stm
Exist. F.H. Lead
Exist. 6" water ac

PROP. 8" WATER

249'~24" RCP
@ 0.31%

FL. ELEV = 45.52
10" MIN.CLR.

319'~24" RCP
@ 0.47%

PROP. 6"F.H. LEAD

STA 9+20.00
PROP. TYPE B-B INLET
FL OUT=46.58 (24" N)

STA 9+20.00
PROP. TYPE "C" MH
FL IN=46.08 (24" E)
FL IN=46.08 (24" N)
FL IN=46.08 (24" S)
FL OUT=46.08 (24" W)

STA 9+40.70
PROP. TYPE "C" MH
FL IN=46.15 (24" E)
FL OUT=46.15 (24" W)
FL OUT=47.00 (24" N)

STA 11+90.00
PROP. TYPE B-B INLET
FL OUT=47.42 (24" S)

STA 11+90.00
PROP. TYPE "C" MH
FL IN=46.92 (24" N)
FL IN=46.92 (24" S)
FL OUT=46.92 (24" W)

58 56 54 52 50 48 46 44 42 40

8+00 9+00 10+00 11+00 12+00

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 17 ELEVATION 51.69'
TIDEWATER DR. STA.8+64.25, 14.90' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR ELECTRIC UNDERGROUND FACILITIES, UNLESS OTHERWISE NOTED) VOID AT END OF REVIEW DATE — Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) — Date: 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

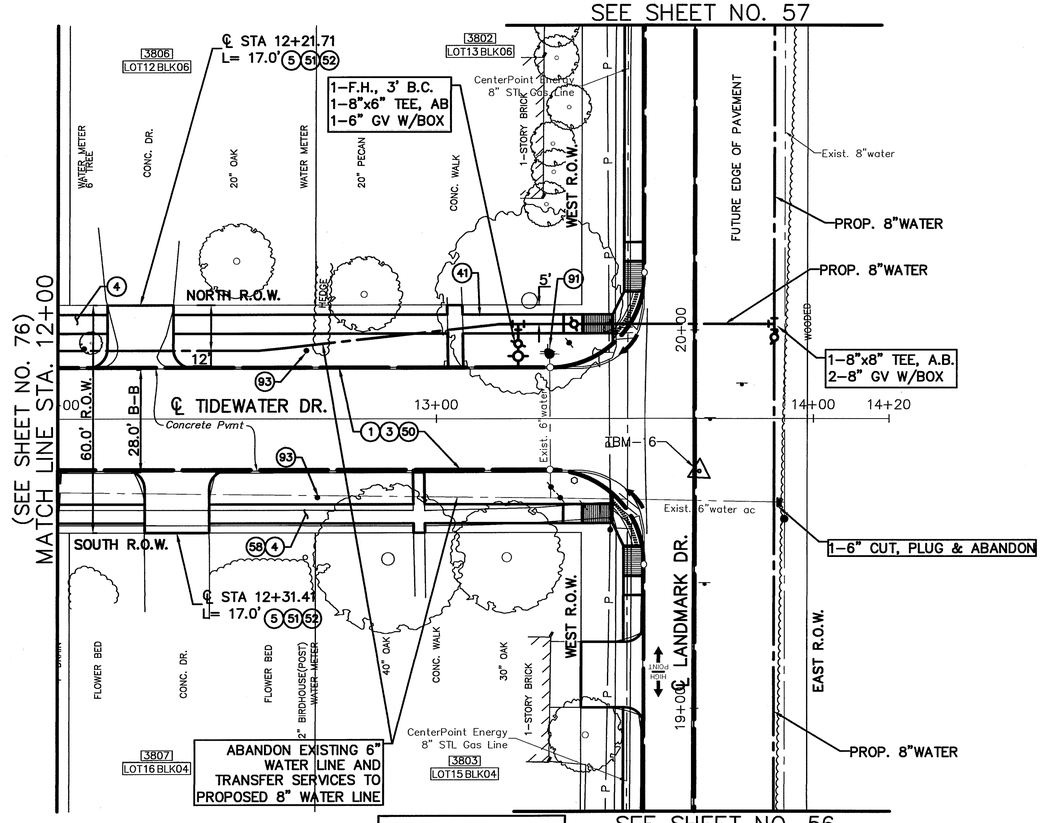
TIDEWATER DR.

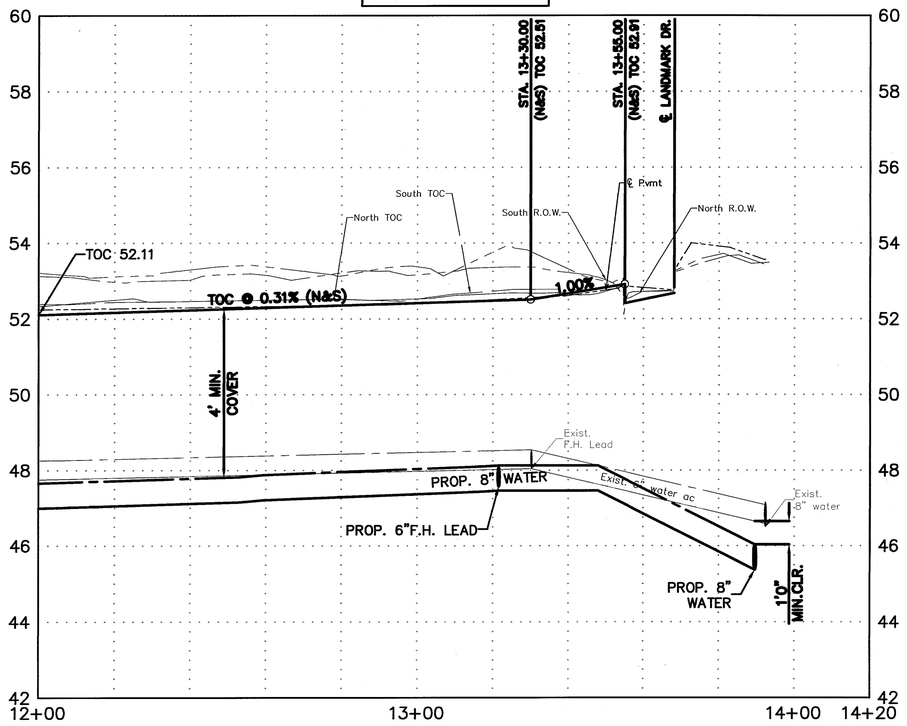
PLAN AND PROFILE
FROM STA. 8+00.00 TO STA. 12+00.00

WBS NO.: M-000262-0004-4	CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 76 OF 191	49210 CITY NUMBER HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 18, 2012 3:29:10 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 16 ELEVATION 53.20'
TIDEWATER DR. STA.13+69.85, 13.91' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LOCATE SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

CABLE Approved for underground conduit facilities only. Date:

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TIDEWATER DR.

PLAN AND PROFILE
FROM STA. 12+00.00 TO STA. 14+20.00

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 77 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:38:32 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

SEE SHEET NO. 52

STA 0+68.61, 21.99'RT
TYPE "C" MH (H-4)
RIM ELEV= 54.17
FL=46.34 (24" NE)
FL=40.52 (24" W)

ABANDON EXISTING 12" WATER LINE AND TRANSFER SERVICES TO PROPOSED 12" WATER LINE

4-12"x45° BENDS, A.B.

PROP. 12"WATER

TBM-20

1-12"X12" TS&V W/BOX
2-12"x45° BENDS, AB
1-12" CUT, PLUG, & ABANDON

1-F.H., 3' B.C.
1-12"x6" TEE, AB
1-6" GV W/BOX

℄ STA 1+54.65
L= 17.0'

STA 2+53.00, 13.50'LT
TYPE B-B INLET (H-2A)
TOC ELEV= 52.56
FL ELEV. = 47.84

PROP. 20.25'
STM SWR LEAD

STA 2+53.00, 6.75'RT
TYPE "C" MH (H-2)
RIM ELEV= 52.19
FL=47.04 (24" E)
FL=47.04 (24" W)
FL=47.34 (24" N)

PROP. 12"WATER

WUTHERING HEIGHTS DR.

℄ WHITEHEATHER DR

1-FULL SECTION (18'MIN) WATER LINE W/RESTRAINED JOINTS CENTERED OVER EXISTING 12" SAN. SWR.

STA 3+47.00, 20.00'LT
TYPE B-B INLET (H-1A)
TOC ELEV= 52.65
FL ELEV. = 47.84

PROP. 12"WATER

1-12"x11.25° BEND, A.B.

PROP. 55.00'
STM SWR LEAD

℄ STA 2+02.04
L= 24.0'

℄ STA 2+58.93
L= 17.0'

PROP. 13.25'
STM SWR LEAD

℄ STA 3+35.21
L= 17.0'

STA 1+05.00, 6.75'RT
TYPE "C" MH (H-3)
RIM ELEV= 53.11
FL=46.50 (24" E)
FL=46.50 (24" SW)

STA 3+00.00, 8.00'RT
TYPE "C" MH (H-1)
RIM ELEV= 52.33
FL=47.34 (24" E)
FL=47.20 (24" W)
FL=47.20 (24" S)

STA 3+00.00, 16.75'RT
TYPE B-B INLET (H-1B)
TOC ELEV= 52.99
FL ELEV. = 47.70
FL ELEV. = 47.95

MATCH LINE STA. 4+20
(SEE SHEET NO. 79)

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 21 ELEVATION 52.49'
WUTHERING HEIGHTS DR. STA.3+00.07, 0.07' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T Texas/SWBT UTILITY LINES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

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(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

PLAN AND PROFILE
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.: M-000262-0004-4	CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	49210 LICENSE NUMBER HOUSTON, TEXAS
SHEET NO. 78 OF 191	

WUTHERING HEIGHTS DR.

PROP. PIPE GUARD (TYP.) SEE COH STD. DETAIL 02502-01

LIMITS OF PROP. 12" AERIAL STEEL PIPE SEE WATER LINE AERIAL DETAILS

1-12"X45°STL BEND

PROP. 12" WATER

PROP. 2" AIR RELEASE VALVE

2 YEAR HGL

4' MIN. COVER

5' MIN. COVER

39'~24" RCP @ 0.41%

147'~24" RCP @ 0.37%

47'~24" RCP @ 0.34%

55'~24" RCP @ 0.91%

TOC @ -0.62% (N&S)

TOC @ -0.36% (S)

TOC @ 0.35% (S)

TOC @ 0.35% (N&S)

TOC 52.80

1.00%

-1.00%

100 YEAR TW=45.80

10 YEAR TW=43.80

2 - 16"x16"x45' PRESTR. CONC. PILES

1'0" MIN.CLR.

2'0" MIN.CLR.

PROP. 8" WATER

PROP. 12" WATER

CL Unit C-146-00-00 (concrete lined channel)

Exist. 12" water ac

Exist. Stm MH FL=40.14 (24"-E) FL=43.04 (24"-W)

Exist. Stm MH FL=46.87 (18"-E) FL=40.52 (24"-W)

Exist. Inlet FL=48.55 (18"-SE)

Exist. Stm MH FL=48.69 (18"-NW) FL=48.44 (18"-NE) FL=48.39 (18"-S) FL=48.39 (18"-W)

Exist. Inlet FL=48.35 (18"-SW) FL=49.75 (12"-N)

Exist San MH FL=45.23 (12" N) FL=45.13 (12" E)

STA. 0+58.50
Exist. 24" Outfall
FL=40.04
TO REMAIN

STA 1+05.00
PROP. TYPE "C" MH
FL IN=46.50 (24" E)
FL OUT=46.50 (24" SW)

STA 0+68.61
PROP. TYPE "C" MH
FL IN=46.34 (24" NE)
FL OUT=40.52 (24" W)

STA 2+53.00
PROP. TYPE B-B INLET
FL OUT=47.84 (24" S)

STA 2+53.00
PROP. TYPE "C" MH
FL IN=47.04 (24" E)
FL IN=47.34 (24" N)
FL OUT=47.04 (24" W)

STA 3+00.00
PROP. TYPE "C" MH
FL IN=47.34 (24" E)
FL IN=47.20 (24" S)
FL OUT=47.20 (24" W)

STA 3+00.00
PROP. TYPE B-B INLET
FL OUT=47.70 (24" N)
FL OUT=47.95 (18" S)

STA 3+47.00
PROP. TYPE B-B INLET
FL OUT=47.84 (24" W)

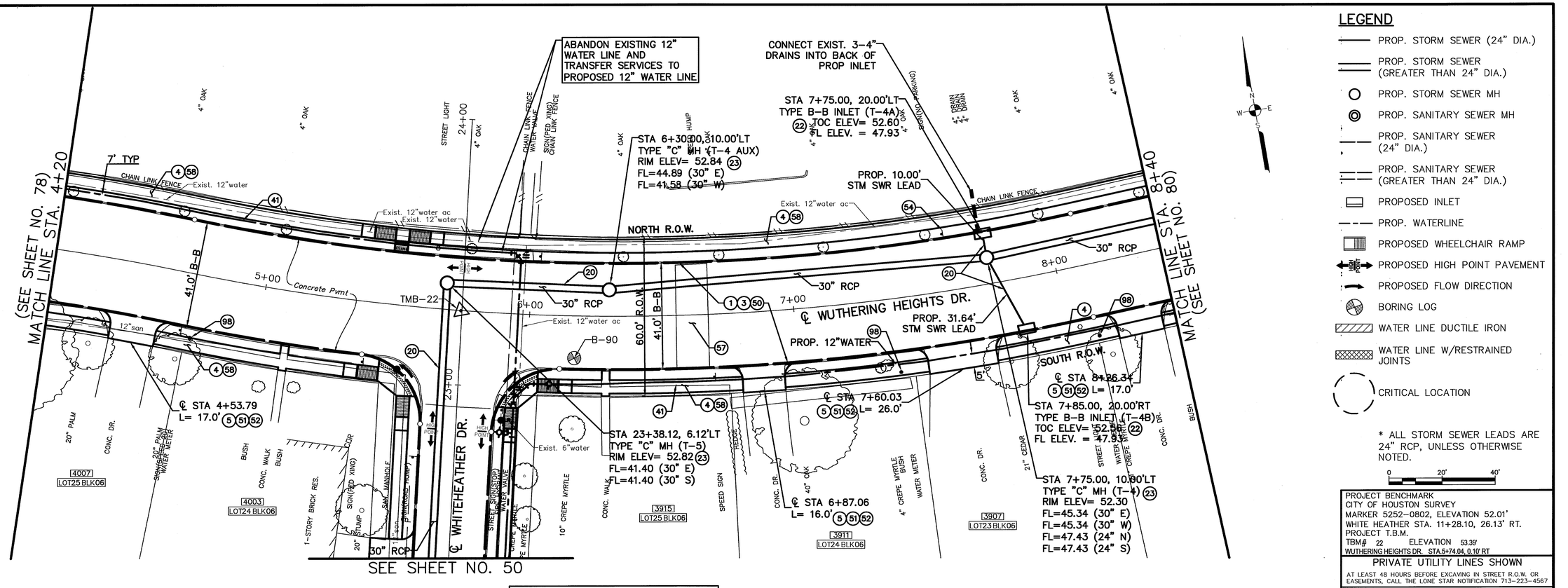
STA. 0+77.00 (N&S) TOC 53.65
STA. 2+56.00 (N&S) TOC 52.54
STA. 2+61.00 (N) TOC 52.94
STA. 3+00.00 (S) TOC 52.35
STA. 3+21.00 (N) TOC 52.94
STA. 3+46.00 (N&S) TOC 52.54

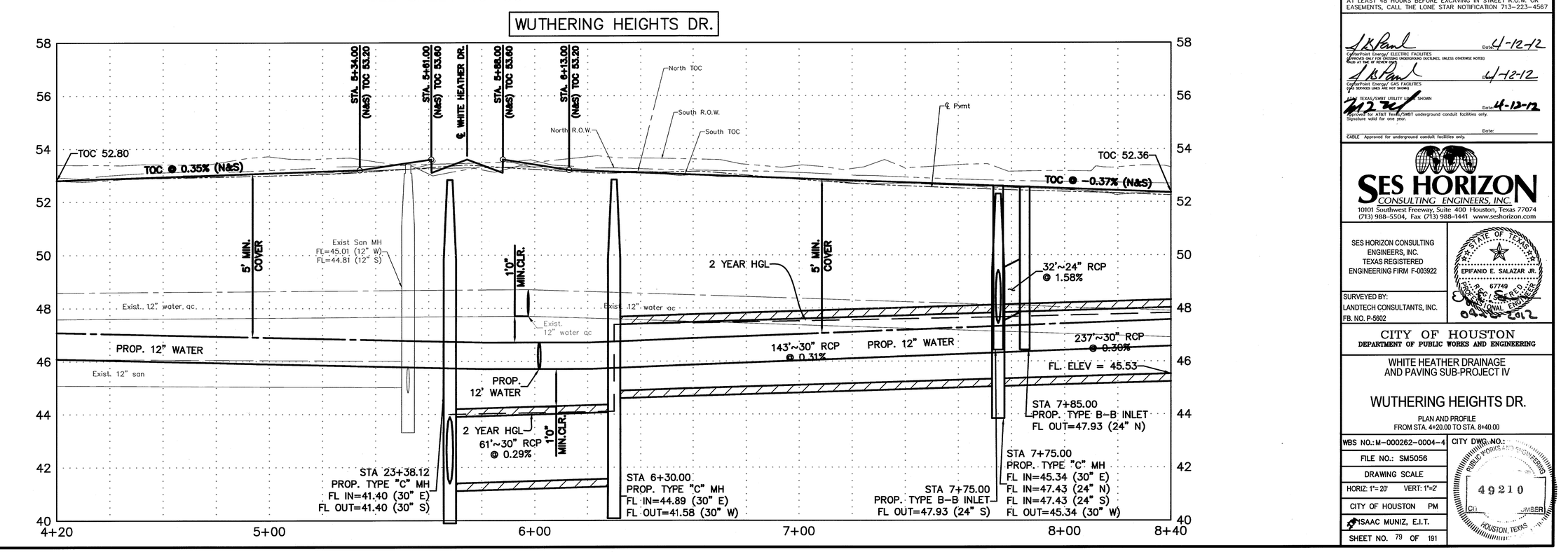
℄ Pvmt
North TOC
North R.O.W.
South R.O.W.
South TOC

0+40 0+00 1+00 2+00 3+00 4+00 4+20

PLOTTED ON: Thursday, April 12, 2012 1:07:48 PM
FILE NAME: F:\WHB-SG4\CAD\P&PS\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 22 ELEVATION 53.39'
WUTHERING HEIGHTS DR. STA.5+74.04, 0.10' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY

CenterPoint Energy/ GAS FACILITIES — Date: 4-12-12
(GAS SERVICES LINES ARE NOT SHOWN)

TEXAS/SWBT UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

CABLE Approved for underground conduit facilities only. — Date:

SES HORIZON
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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

PLAN AND PROFILE
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=2'
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 79 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 12:23:54 PM
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FOR REDUCED PLANS
original scale in inches

(SEE SHEET NO. 79)
MATCH LINE STA. 8+40

MATCH LINE STA. 12+60
(SEE SHEET NO. 81)

STA 10+12.00, 20.00'LT
TYPE B-B INLET (T-3A)
(22) TOC ELEV= 51.72
FL ELEV. = 47.05

STA 10+12.00, 20.00'RT
TYPE B-B INLET (T-3B)
(22) TOC ELEV= 51.72
FL ELEV. = 47.05

1-2" WET CONNECTION
1-12"x2" TEE, AB
1-2" GV W/BOX
2-2"x45° BENDS, AB
1-2" CUT & PLUG

REMOVE & DISPOSE 40'
OF EXIST. 6" WATER LINE

ABANDON EXISTING 12"
WATER LINE AND
TRANSFER SERVICES TO
PROPOSED 12" WATER LINE

CHAIN LINK FENCE
20" TALLOW
12" TALLOW
WATER METER
STREET LIGHT
TYPE "BB" INLET
20" TALLOW
SIGN(4" WOOD)
SIGN(4" WOOD)
12" TALLOW
14" TALLOW
14" TALLOW
SPEED HUMP
14" OAK

Exist. 12"water ac
Exist. 2" water
Exist. 6"water
Exist. 12"water ac
ASPH.
NORTH R.O.W.
30" RCP
24" RCP
24"stm
Concrete Pvmt
41.0' B-B
60.0' R.O.W.
SOUTH R.O.W.

PROP. 10.00'
STM SWR LEAD
PROP. 30.00'
STM SWR LEAD
PROP. 2"WATER
PROP. 12"WATER
PROP. 12"WATER

℄ WUTHERING HEIGHTS DR.

9+00
10+00
11+00
12+00

TBM-23

5' TYP

HEDGE
HEDGE
HEDGE

BUSH
BUSH
BUSH
CONC. DR.
BUSH
4" CREPE MYRTLE
4" CREPE MYRTLE
FIRE HYDRANT
WATER METER
BUSH
25" OAK
CONC. DR.
TYPE "BB" INLET
END 1.2" IP
24"stm
CONC. DR.
WATER METER
BUSH
CONC. DR.
BUSH
END 1.2" IP
15" CEDAR
CONC. DR.
BUSH
STREET LIGHT
20" CEDAR
WATER METER
CONC. DR.

℄ STA 8+90.36
L= 17.0' (5)(51)(52)

℄ STA 9+85.64
(5)(51)(52) L= 17.0'

℄ STA 10+25.61
L= 17.0' (5)(51)(52)

STA 10+12.00, 10.00'LT
(23) TYPE "C" MH (T-3)
RIM ELEV= 51.42
FL=46.04 (30" W)
FL=46.04 (24" E)
FL=46.55 (24" N)
FL=46.55 (24" S)

℄ STA 10+85.06
L= 17.0' (5)(51)(52)

℄ STA 11+49.71
L= 18.0' (5)(51)(52)

℄ STA 12+46.84
(5)(51)(52) L= 17.0'

1-F.H., 3' B.C.
1-12"x6" TEE, AB
1-6" GV W/BOX

3903 LOT22 BLK06
3831 LOT 21BLK06
3827 LOT20 BLK06
3823 LOT19 BLK06
3819 LOT18 BLK06
3815 LOT17 BLK06
3811 LOT16 BLK06

LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
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- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 23 ELEVATION 51.94'
WUTHERING HEIGHTS DR. STA.9+18.67, 0.02' RT

PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR EXISTING UNDERGROUND FACILITIES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date: 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date: 4-12-12

AT&T TEXAS/SWBT UTILITY LINES SHOWN Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date: 4-12-12

CABLE Approved for underground conduit facilities only. Date:

WUTHERING HEIGHTS DR.

STA. 10+12.00 (N&S) TOC 51.72

North R.O.W.
South R.O.W.
℄ Pvmt
North TOC
South TOC

TOC 52.36
TOC 52.52
TOC @ 0.31% (N&S)

Exist. Inlet FL=47.33 (24"-N) FL=47.23 (24"-S)
Exist. Inlet FL=47.80 (24"-S)
Exist. F.H. Lead

4' MIN. COVER

2 YEAR HGL
2 YEAR HGL

Exist. 12" water ac
237'~30" RCP @ 0.50%
PROP. 12" WATER
PROP. 2" WATER
PROP. 6"F.H. LEAD
Exist. 12" water ac
Exist. 12" water ac
368'~24" RCP @ 0.46%
PROP. 12" WATER

FL. ELEV = 45.53
FL. ELEV = 47.19

1'-0" MIN. CLR.
PROP. 2"WATER

STA 10+12.00
PROP. TYPE "C" MH
FL IN=46.04 (24" E)
FL IN=46.55 (24" N)
FL IN=46.55 (24" S)
FL OUT=46.04 (30" W)

STA 10+12.00
PROP. TYPE B-B INLET
FL OUT=47.05 (24" N)

58 56 54 52 50 48 46 44 42 40

8+40 9+00 10+00 11+00 12+00 12+60

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

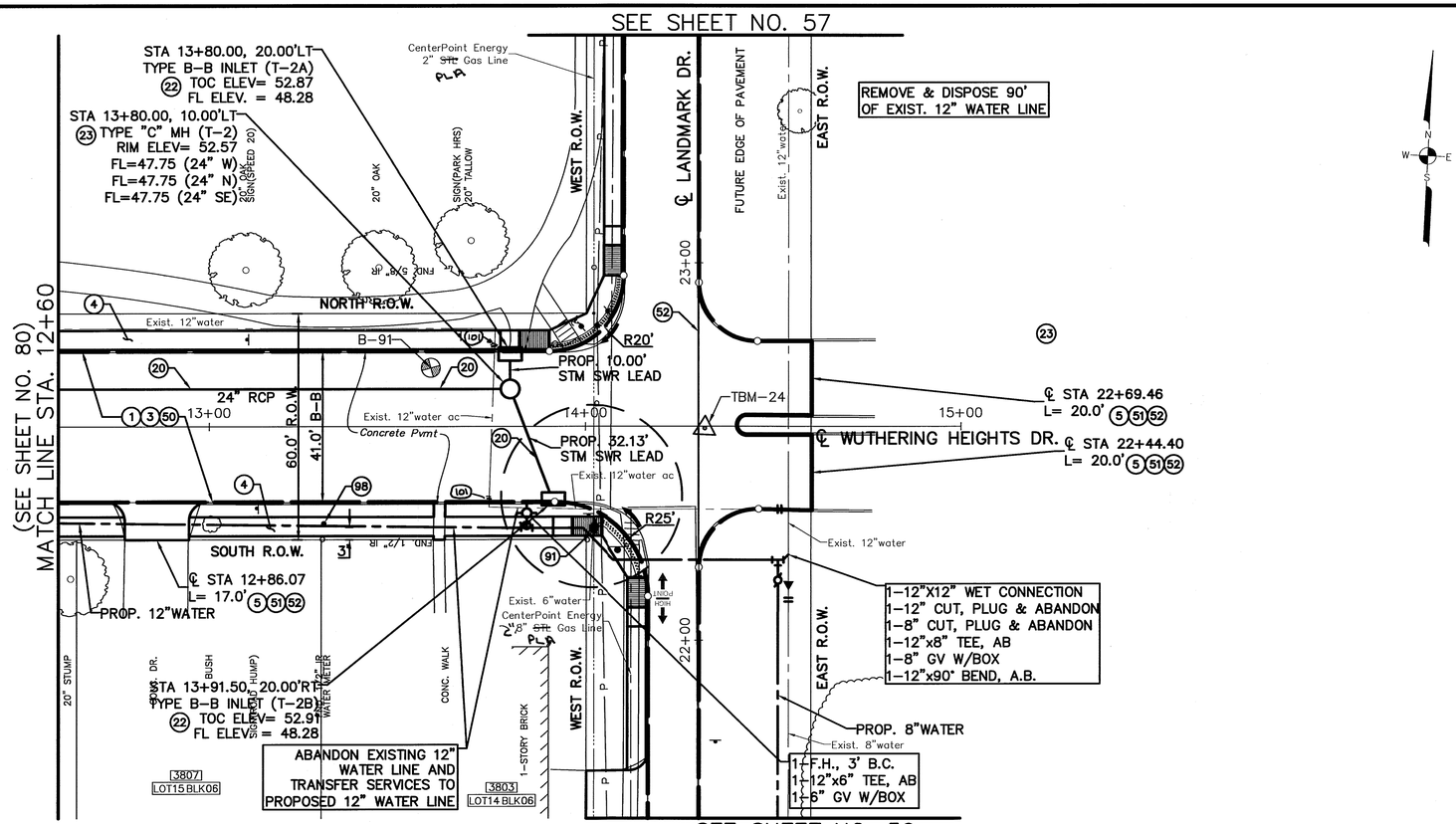
PLAN AND PROFILE
FROM STA. 8+40.00 TO STA. 12+60.00

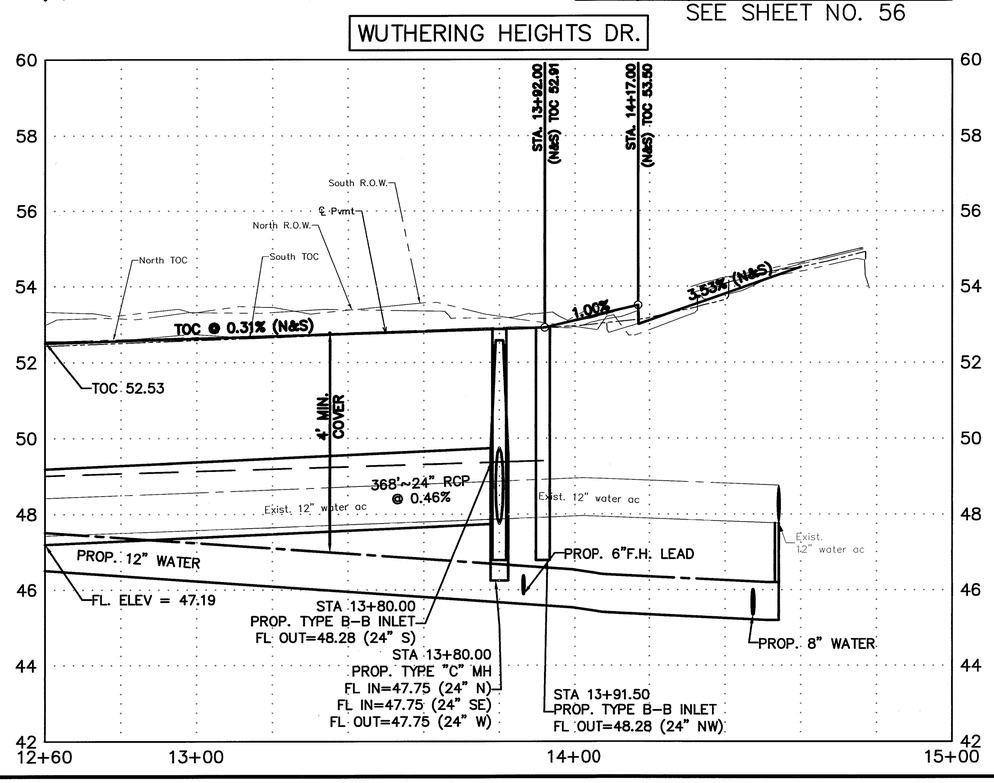
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FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 80 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 11, 2012 11:39:17 PM
FILE NAME: F:\WHB-SG4\CAD\P&P'S\WH-SG4_P&PS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- PROP. STORM SEWER (24" DIA.)
- PROP. STORM SEWER (GREATER THAN 24" DIA.)
- PROP. STORM SEWER MH
- PROP. SANITARY SEWER MH
- PROP. SANITARY SEWER (24" DIA.)
- PROP. SANITARY SEWER (GREATER THAN 24" DIA.)
- PROPOSED INLET
- PROP. WATERLINE
- PROPOSED WHEELCHAIR RAMP
- PROPOSED HIGH POINT PAVEMENT
- PROPOSED FLOW DIRECTION
- BORING LOG
- WATER LINE DUCTILE IRON
- WATER LINE W/RESTRAINED JOINTS
- CRITICAL LOCATION

* ALL STORM SEWER LEADS ARE 24" RCP, UNLESS OTHERWISE NOTED.

0 20' 40'

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 24 ELEVATION 53.43'
WUTHERING HEIGHTS DR. STA.14+31.98, 0.47' RT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY. Date 4-12-12

CenterPoint Energy/ GAS FACILITIES (GAS SERVICES LINES ARE NOT SHOWN) Date 4-12-12

AT&T TEXAS/SWBT UTILITY FACILITIES SHOWN
Approved for AT&T Texas/SWBT underground conduit facilities only. Signature valid for one year. Date 4-12-12

CABLE Approved for underground conduit facilities only. Date:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

PLAN AND PROFILE
FROM STA. 12+60.00 TO STA. 15+00.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=2	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 81 OF 191	

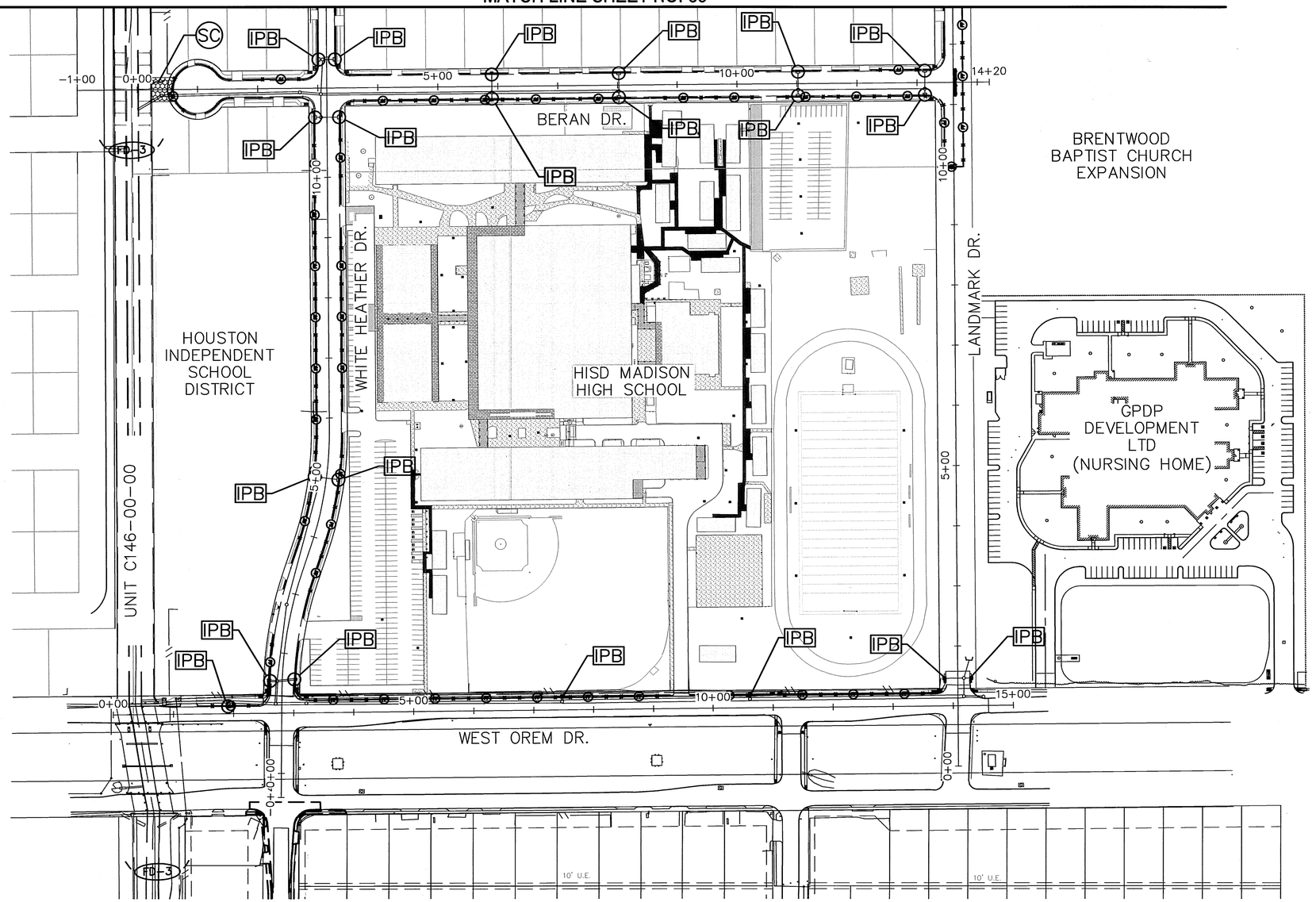
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

0 1 2 3

MATCH LINE SHEET NO. 83



IPB INLET PROTECTION BARRIER

RFB REINFORCED FILTER FABRIC FENCE

FF FILTER FABRIC FENCE

SC STABILIZED CONSTRUCTION

FD-3 FILTER DAM

0 20' 40'

PLOTTED ON: Thursday, April 12, 2012 10:01:23 AM
FILE NAME: F:\WHB-SG4\CAD\SW3P\WH-SG4-SW3P-SHEETS.DWG

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

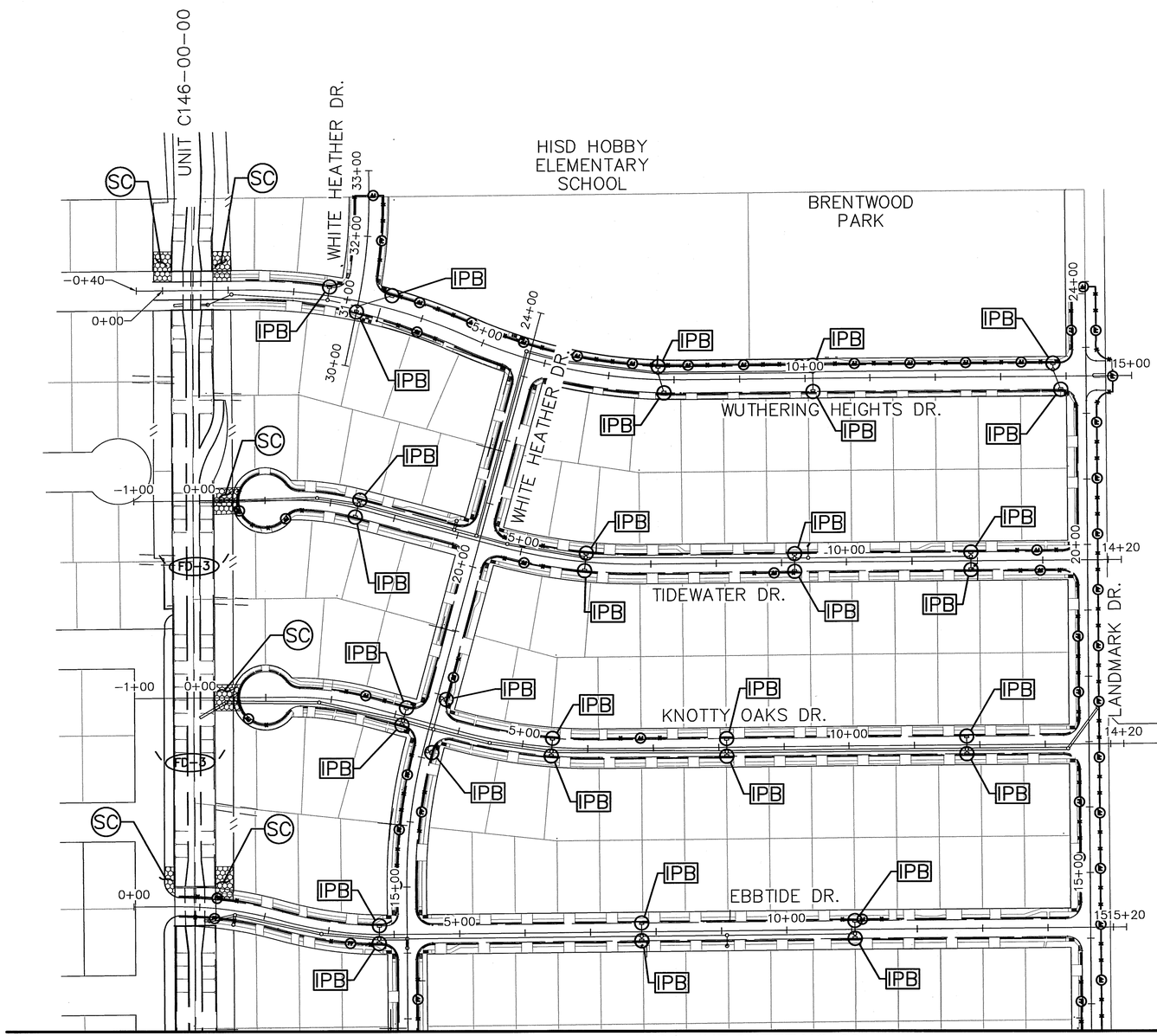
STORM WATER POLLUTION PREVENTION PLAN

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 82 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches



MATCH LINE SHEET NO. 82

BRENTWOOD
BAPTIST CHURCH

BRENTWOOD
BAPTIST CHURCH
EXPANSION

IPB INLET PROTECTION BARRIER
RFB REINFORCED FILTER FABRIC FENCE
FF FILTER FABRIC FENCE
SC STABILIZED CONSTRUCTION
FD-3 FILTER DAM

0 20' 40'

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STATE OF TEXAS

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

STORM WATER POLLUTION PREVENTION PLANS

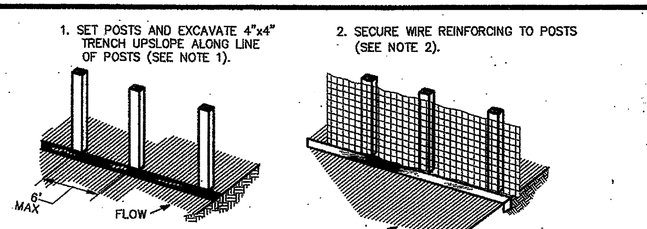
2 OF 2

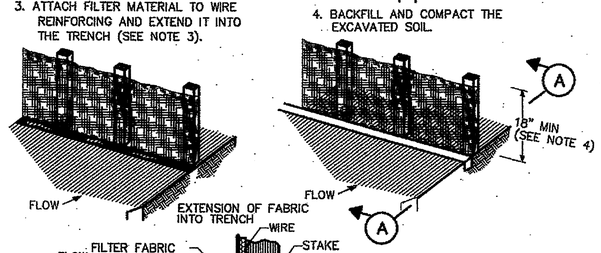
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FILE NO.: SM5056	
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1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 83 OF 191	

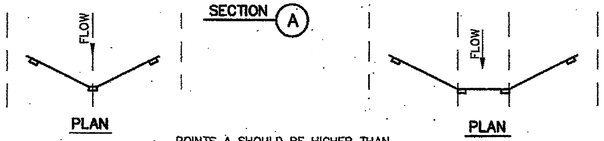
CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

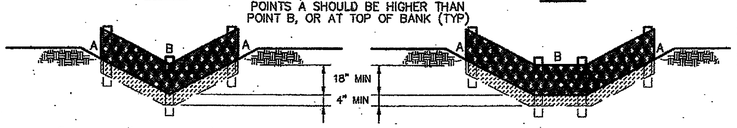
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FOR REDUCED PLANS
original scale in inches







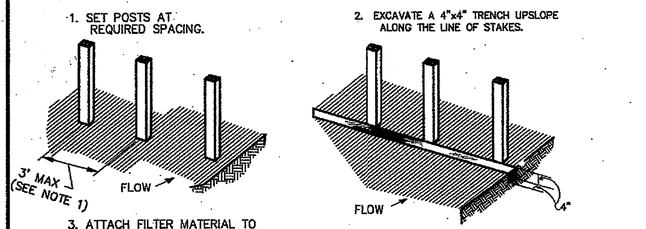


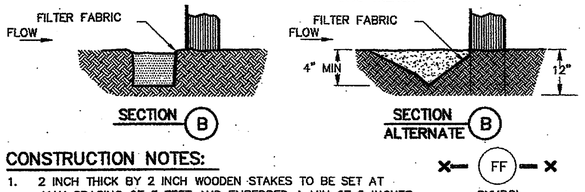
CONSTRUCTION NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
6. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

X—(RFB)—X
SYMBOL

REINFORCED FILTER FABRIC BARRIER



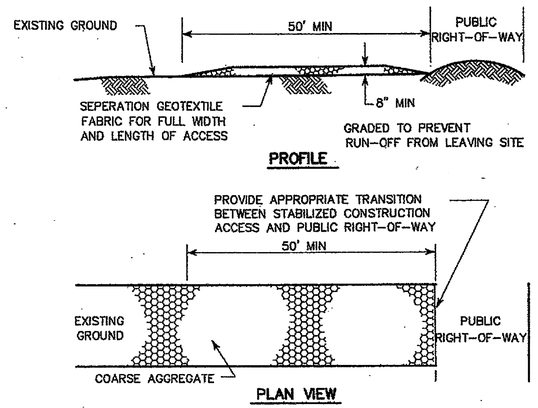


CONSTRUCTION NOTES:

1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

X—(FF)—X
SYMBOL

FILTER FABRIC BARRIER

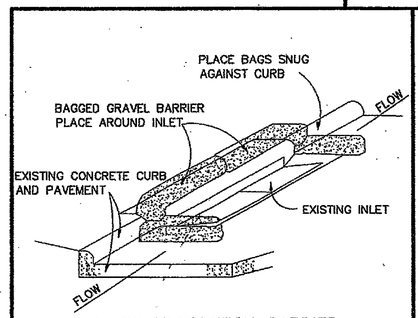


CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
6. COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
7. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

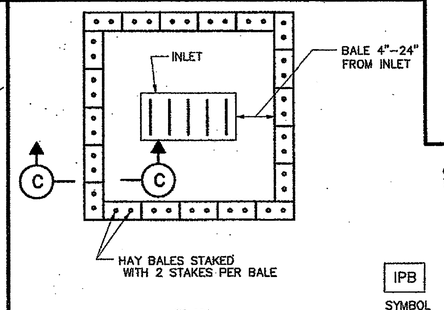
(SC)
SYMBOL

STABILIZED CONSTRUCTION ACCESS

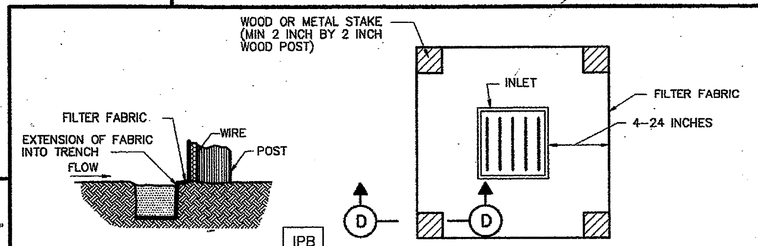


INLET PROTECTION BARRIER

(FOR STAGE II INLETS)
BAGGED GRAVEL BARRIER



HAY BALE INLET PROTECTION BARRIER



SILT FENCE INLET PROTECTION BARRIER

CONSTRUCTION NOTE:

1. SEE CONSTRUCTION NOTES FOR RFB.

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — LICENSED PROFESSIONAL ENGINEER — 2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010
DWG NO: 01571-01

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

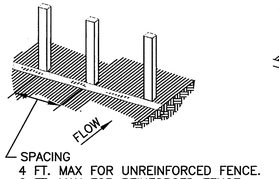
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

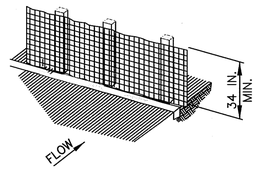
STORM WATER POLLUTION PREVENTION PLAN DETAILS

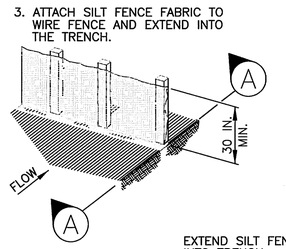
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 83A OF 191	

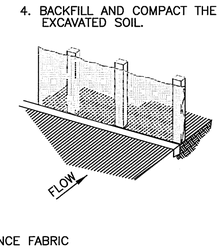
PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

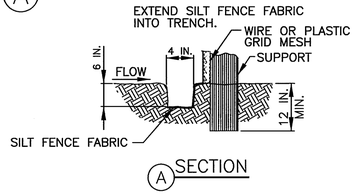
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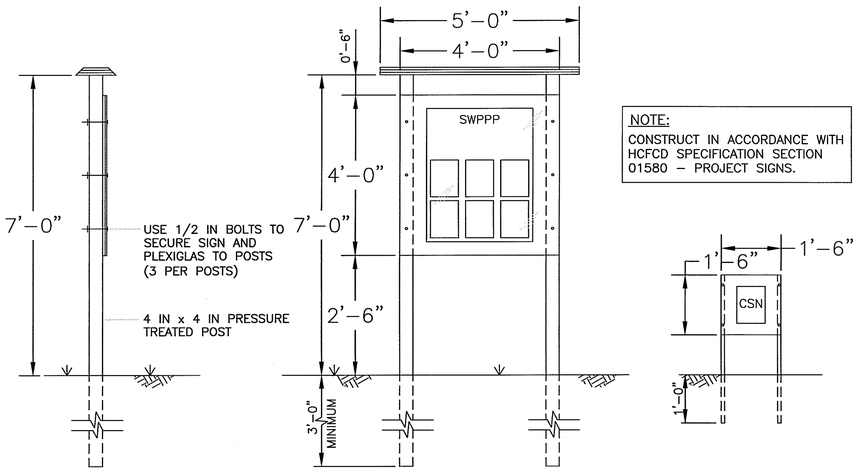
CONSTRUCTION NOTES:

1. SEE SPECIFICATION SECTION NO. 02361–SILT FENCES.

RSF SYMBOL — REINFORCED SILT FENCE

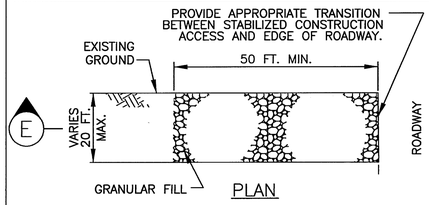
SF SYMBOL — SILT FENCE

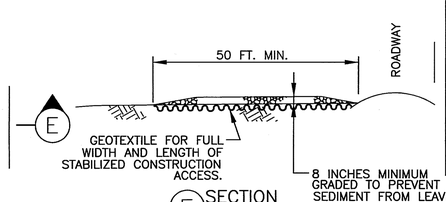
SILT FENCE



NOTE:
CONSTRUCT IN ACCORDANCE WITH HCFCD SPECIFICATION SECTION 01580 – PROJECT SIGNS.

SWPPP / BMP SIGN AND CONSTRUCTION SITE NOTICE HOLDER DETAILS



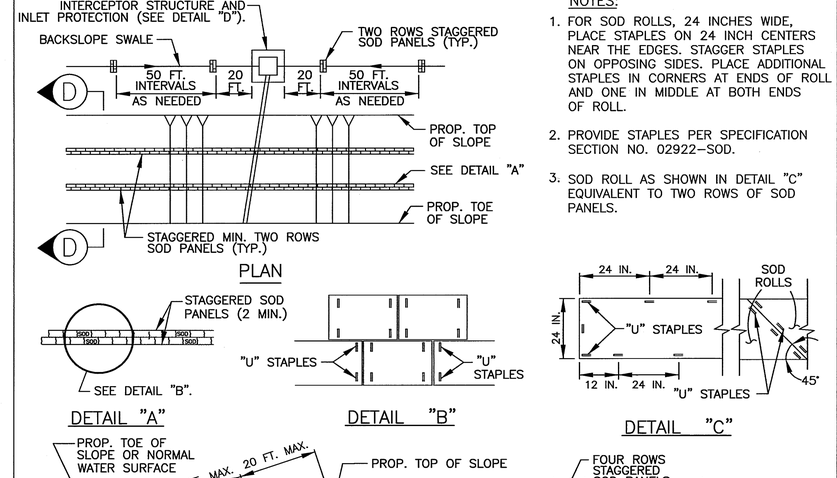


CONSTRUCTION NOTES:

1. SEE SPECIFICATION SECTION NO. 02365–STABILIZED CONSTRUCTION ACCESS.

SCA SYMBOL

STABILIZED CONSTRUCTION ACCESS



NOTES:

1. FOR SOD ROLLS, 24 INCHES WIDE, PLACE STAPLES ON 24 INCH CENTERS NEAR THE EDGES. STAGGER STAPLES ON OPPOSING SIDES. PLACE ADDITIONAL STAPLES IN CORNERS AT ENDS OF ROLL AND ONE IN MIDDLE AT BOTH ENDS OF ROLL.
2. PROVIDE STAPLES PER SPECIFICATION SECTION NO. 02922–SOD.
3. SOD ROLL AS SHOWN IN DETAIL "C" EQUIVALENT TO TWO ROWS OF SOD PANELS.

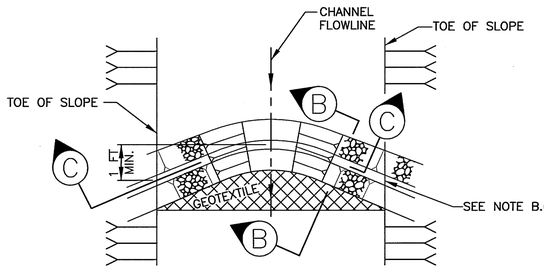
SOD SYMBOL — IP SYMBOL

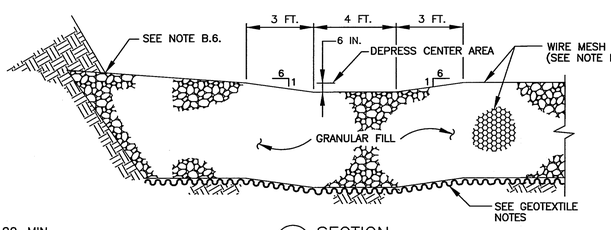
SODDING

FILTER DAM NOTES:

A. TYPES OF FILTER DAMS
   1. TYPE 1 (NON–REINFORCED)
      a. HEIGHT – 18–24 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
      b. TOP WIDTH – 2 FEET (MINIMUM)
      c. SLOPES – 2:1 (MAXIMUM).
   2. TYPE 2 (REINFORCED).
      a. HEIGHT – 18–36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
      b. TOP WIDTH – 2 FEET (MINIMUM).
      c. SLOPES – 2:1 (MAXIMUM).
   3. TYPE 3 (REINFORCED)
      a. HEIGHT – 36–48 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
      b. TOP WIDTH – 2 FEET (MINIMUM).
      c. SLOPES – 3:1 (MAXIMUM).
   4. TYPE 4 (GABION)
      a. HEIGHT – 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
      b. TOP WIDTH – 2 FEET (MINIMUM).
   5. TYPE 5. AS SHOWN ON THE PLANS.

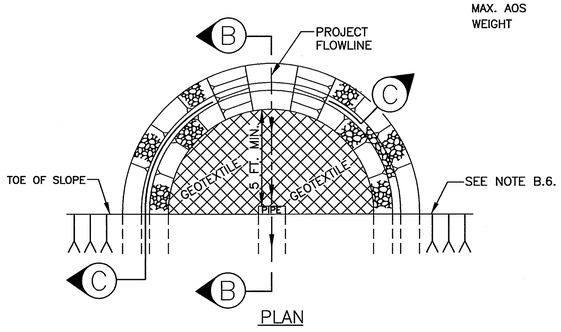
B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.
   1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
   2. GRANULAR FILL:
      a. PLACE ON MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
      b. 3–5 INCHES FOR ROCK FILTER DAM TYPES 1,2, AND 4 AND 4–8 INCHES FOR ROCK FILTER DAM TYPE 3 REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378–RIPRAP AND GRANULAR FILL.
   3. WIRE MESH: FOLD AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURE TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
   4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
   5. SEE SPECIFICATION SECTION NO. 02364–FILTER DAMS.
   6. EMBED ONE FOOT MINIMUM INTO SLOPE AND AT SLOPE RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA.

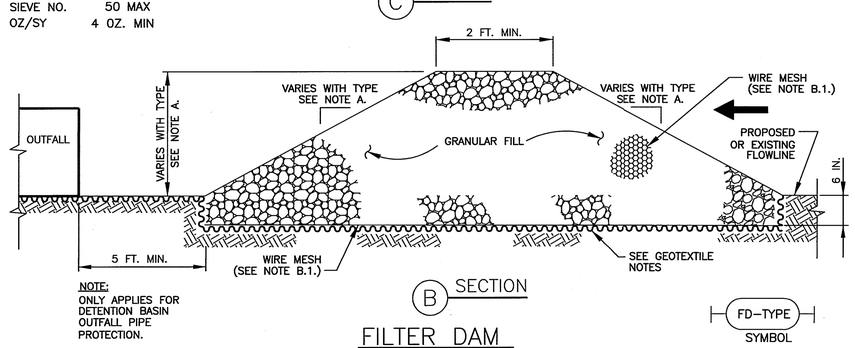




GEOTEXTILE NOTES:

MIN. AOS	SIEVE NO.	120 MIN
MAX. AOS	SIEVE NO.	50 MAX
WEIGHT	OZ/SY	4 OZ. MIN





NOTE:
ONLY APPLIES FOR DETENTION BASIN OUTFALL PIPE PROTECTION.

FD–TYPE SYMBOL

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD WHEN COMPLETED BY OTHERS. AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE §137.33 (b) AND (c) OF THE TEXAS STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS.

P.E. SEAL AND SIGNATURE

PUBLIC WORKS AND ENGINEERING — 49210 — CH — JMBH — HOUSTON, TEXAS

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 6-26-2012

SES HORIZON CONSULTING ENGINEERS, INC. TEXAS REGISTERED ENGINEERING FIRM F-003922

DESCRIPTION	DATE	APPR

WHITEHEATHER DRAINAGE AND PAVING SUB–PROJECT IV

HCFCD STORM WATER POLLUTION PREVENTION DETAILS

PREPARED:	CHECKED:	APPROVED:
JOC	EES	EES

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 500, Houston, Texas 77074
(713) 988-5304, Fax (713) 988-1441 www.seshorizon.com

Harris County Flood Control District
9900 Northwest Freeway
Houston, Texas 77092

DATE: April, 2012
SCALE: N.T.S.
SHEET NUMBER: 838 OF 191

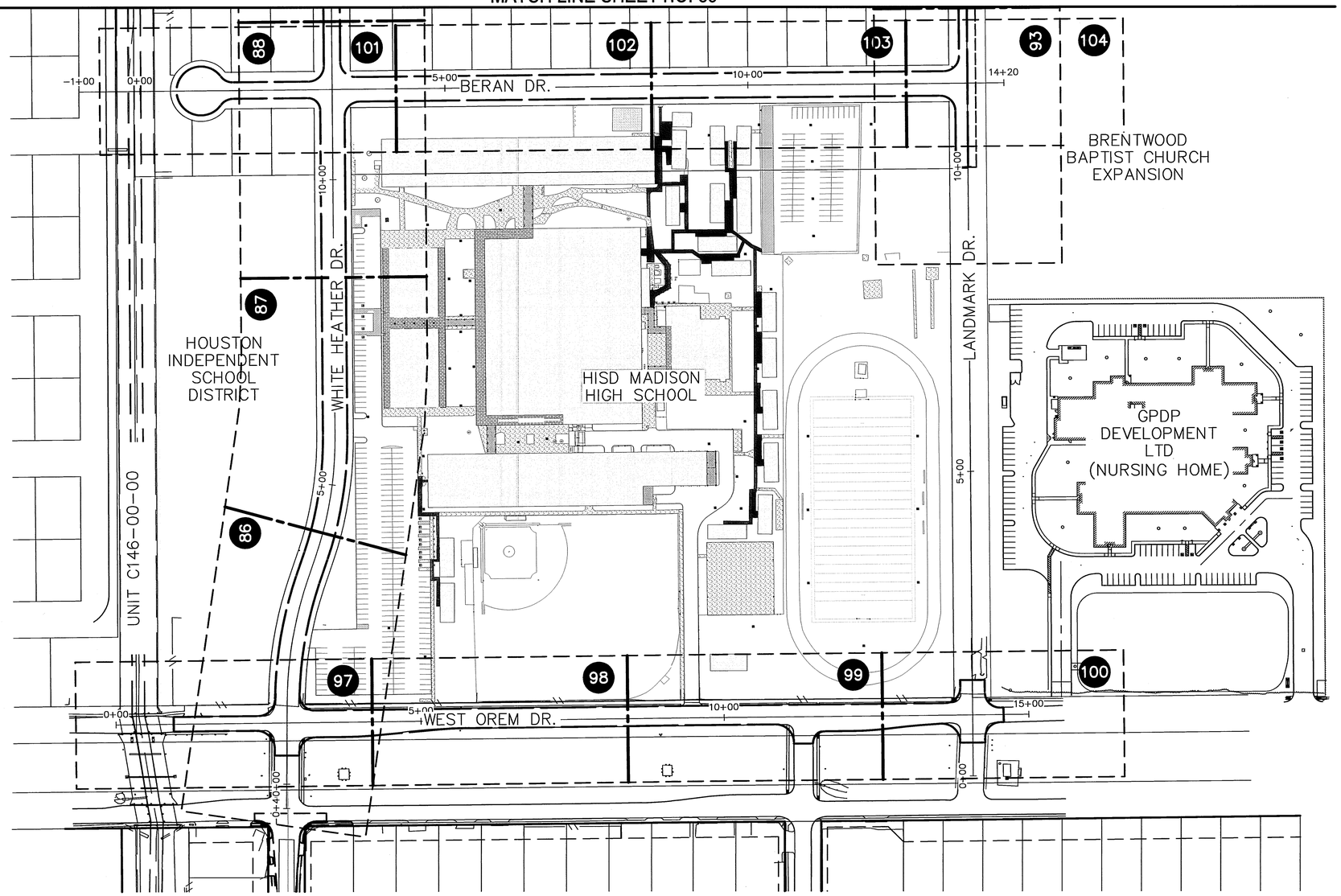
FOR REDUCED PLANS original scale in inches

PLOTTED ON: Tuesday, April 10, 2012 8:22:00 AM
FILE NAME: F:\WHB-SG4\CAD\STD\HCFCD STORM WATER POLLUTION PREVENTION DETAILS.DWG

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Tuesday, April 10, 2012 8:50:36 AM
FILE NAME: F:\WHB-SG4\CAD\TPP\WHB-SG4-OVERALL_TREE_LAYOUT.DWG

MATCH LINE SHEET NO. 85



LEGEND

- PLAN AND PROFILE SHEET NUMBER
- LIMITS OF PROPOSED PAVEMENT
- LIMITS OF PLAN AND PROFILE SHEETS

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CONSULTING ENGINEERS, INC.
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(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-27-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

OVERALL TREE PROTECTION LAYOUT

1 OF 2

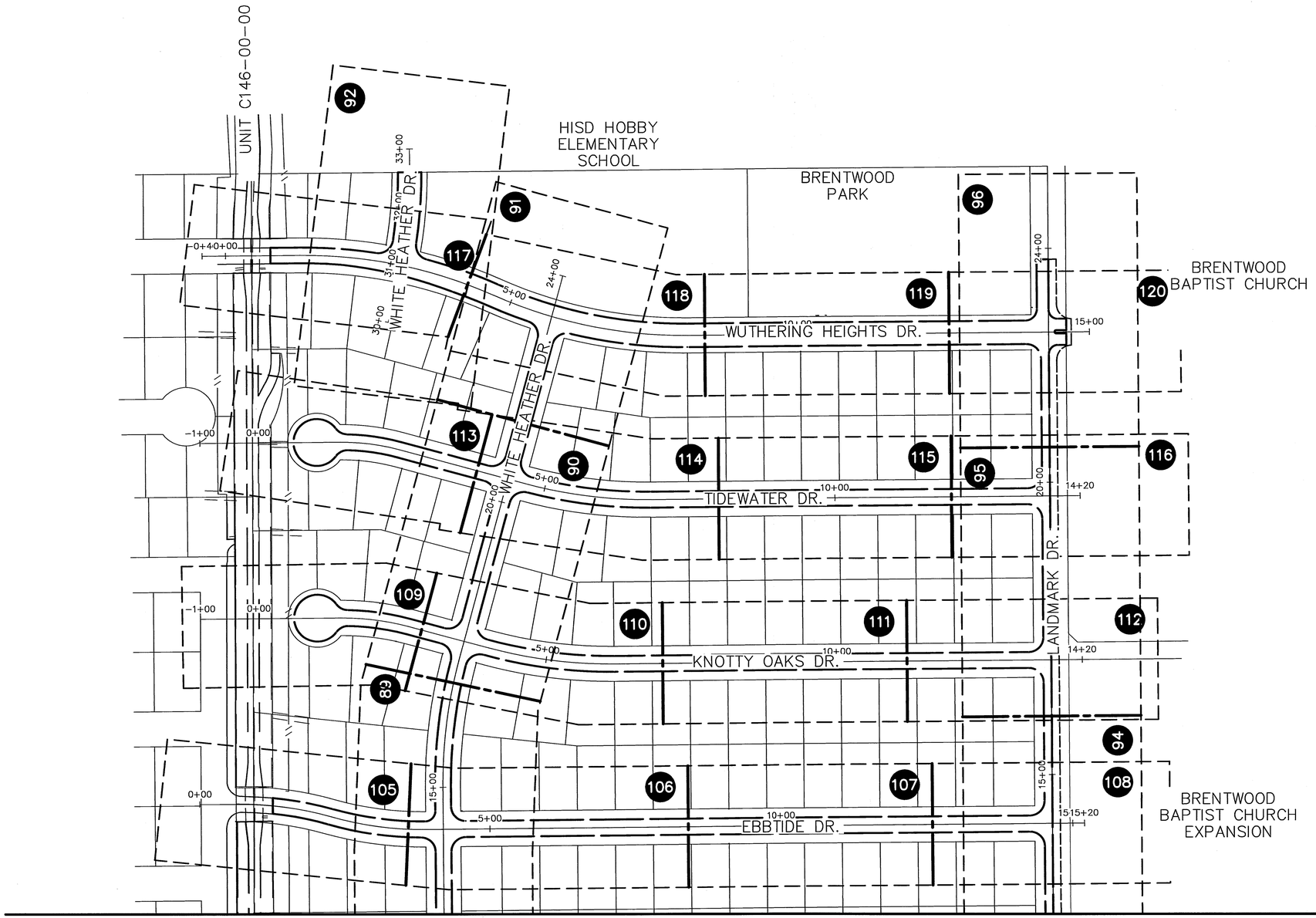
WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 84 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

3 2 1 0

PLOTTED ON: Tuesday, April 10, 2012 8:50:50 AM
FILE NAME: F:\WHB-SG4\CAD\TPP\WHB-SG4-OVERALL_TREE_LAYOUT.DWG



MATCH LINE SHEET NO. 84

LEGEND

- PLAN AND PROFILE SHEET NUMBER
- LIMITS OF PROPOSED PAVEMENT
- LIMITS OF PLAN AND PROFILE SHEETS

N W E S

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04 APR 2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

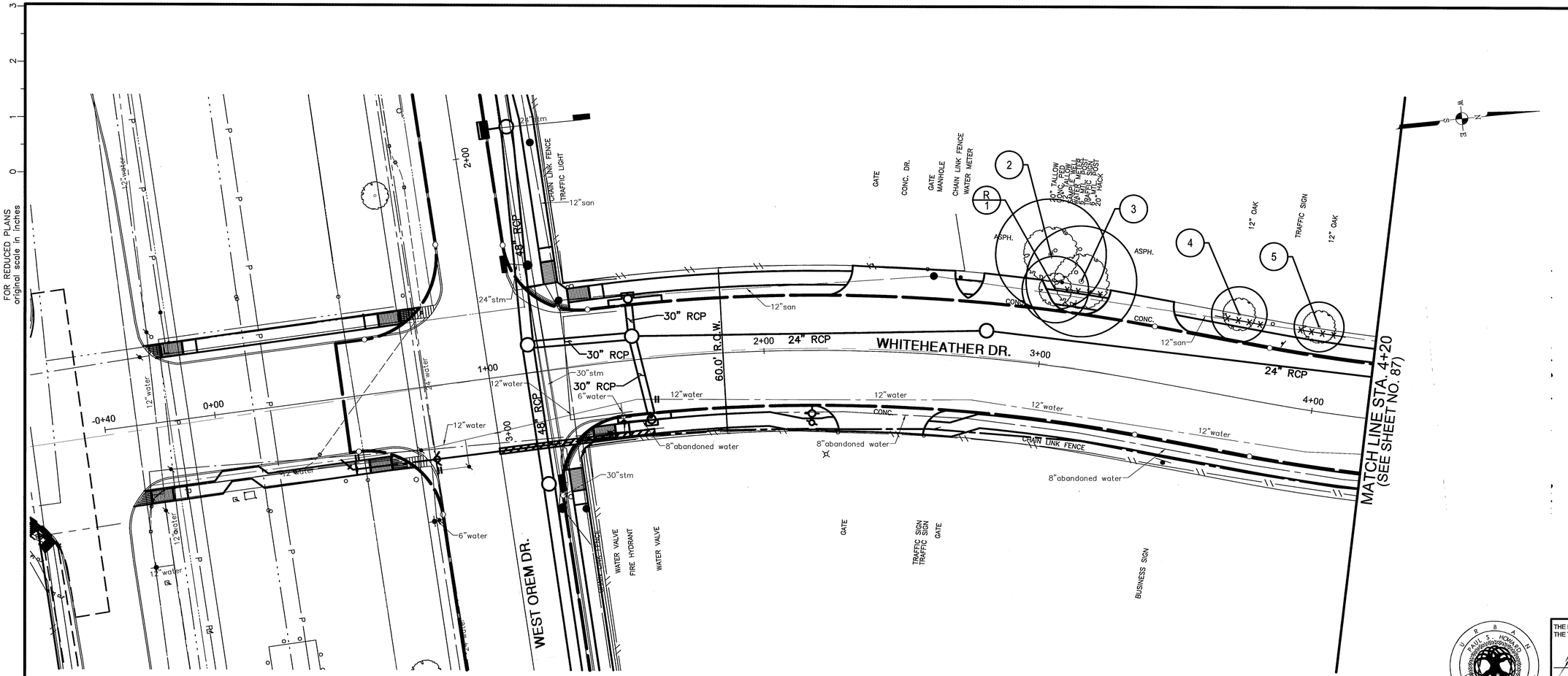
OVERALL TREE PROTECTION LAYOUT

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 85 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -X-X-X- TREE PROTECTION FENCING (SEE DETAIL)
- -X-X-X- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012
(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
1	WHITEHEATHER	TALLOW	8	POOR	REMOVE	A	NONE	REMOVE DUE TO POOR CONDITION
2	WHITEHEATHER	TALLOW	20	FAIR	PRESERVE	NONE	NONE	MULTISTEMMED
3	WHITEHEATHER	HACKBERRY	18	FAIR	PRESERVE	DM	NONE	
4	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE	
5	WHITEHEATHER	LIVE OAK	9	GOOD	PRESERVE	DM	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

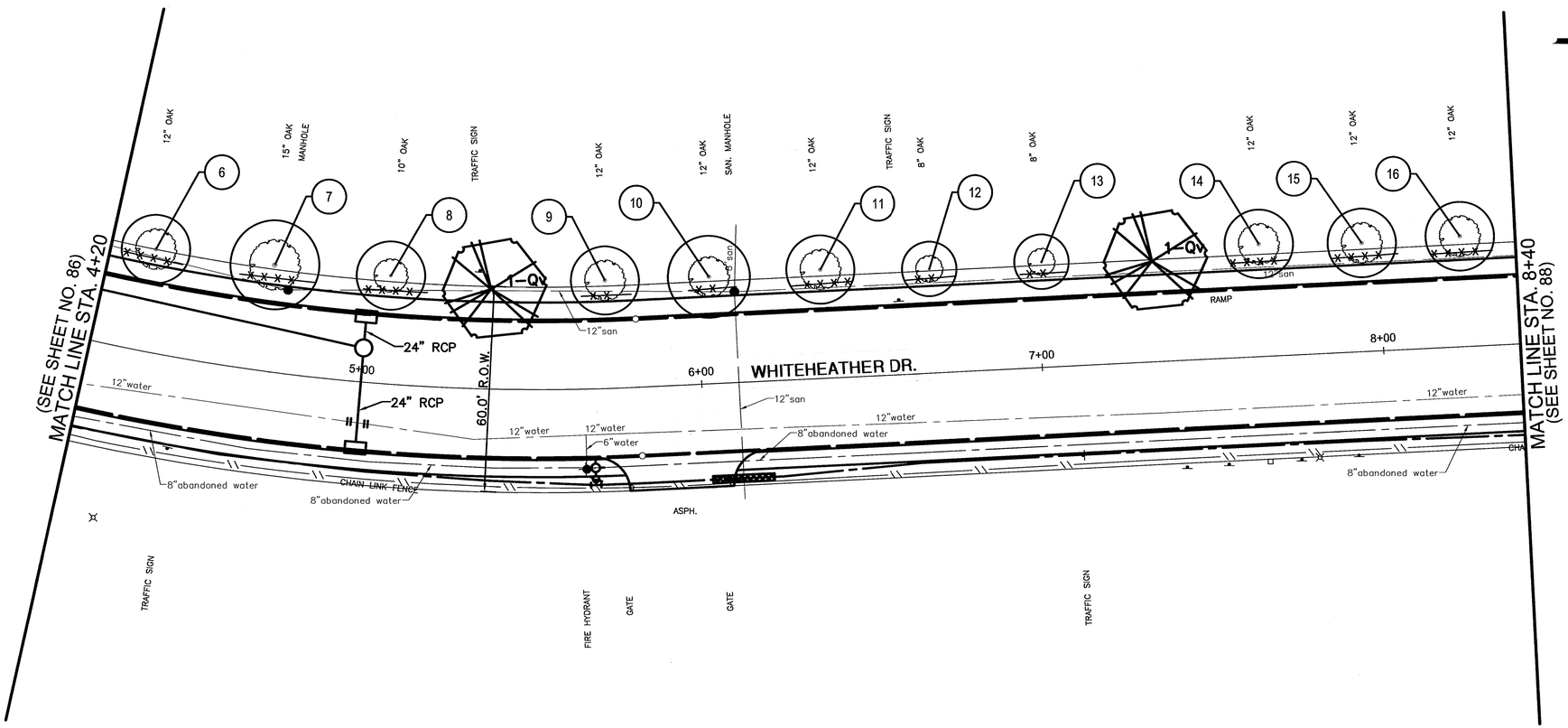
WHITEHEATHER DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.:	M-000262-0004-4
FILE NO.:	SM5056
DRAWING SCALE	1" = 20'
CITY OF HOUSTON PM	ISAAC MUNIZ, E.I.T.
SHEET NO.	86 OF 191

CITY DRAWING NO.:
PUBLIC WORKS AND ENGINEERING
49210
DRAWING NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 9:11:09 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS	TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
6	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
7	WHITEHEATHER	LIVE OAK	13	GOOD	PRESERVE	DM	NONE										
8	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
9	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
10	WHITEHEATHER	LIVE OAK	12	GOOD	PRESERVE	DM	NONE										
11	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
12	WHITEHEATHER	LIVE OAK	8	GOOD	PRESERVE	DM	NONE										
13	WHITEHEATHER	LIVE OAK	8	GOOD	PRESERVE	DM	NONE										
14	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
15	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										
16	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE										

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

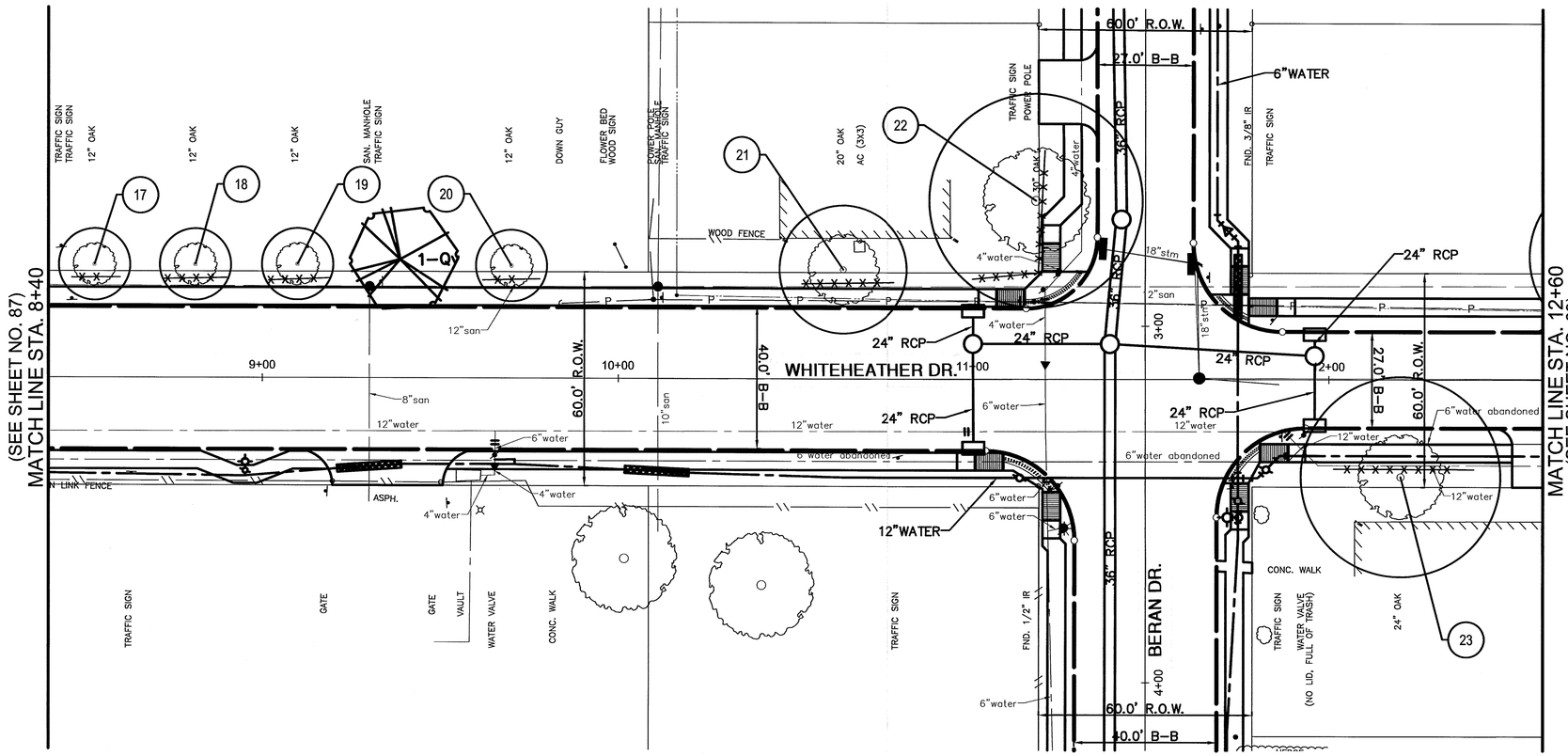
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T	
SHEET NO. 87 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 3:32:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
- -x-x-x- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
17	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE	
18	WHITEHEATHER	LIVE OAK	10	GOOD	PRESERVE	DM	NONE	
19	WHITEHEATHER	LIVE OAK	10	FAIR	PRESERVE	DM	NONE	
20	WHITEHEATHER	LIVE OAK	10	FAIR	PRESERVE	DM	NONE	
21	WHITEHEATHER	WATER OAK	18	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE
22	WHITEHEATHER	ASH	30	FAIR	PRESERVE	BDM	NONE	CLEARANCE PRUNE
23	WHITEHEATHER	ASH	28	GOOD	PRESERVE	BDHM	NONE	MULTISTEMMED, TALL TREE

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
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OMAR J. CORREDOR
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SURVEYED BY:
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FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

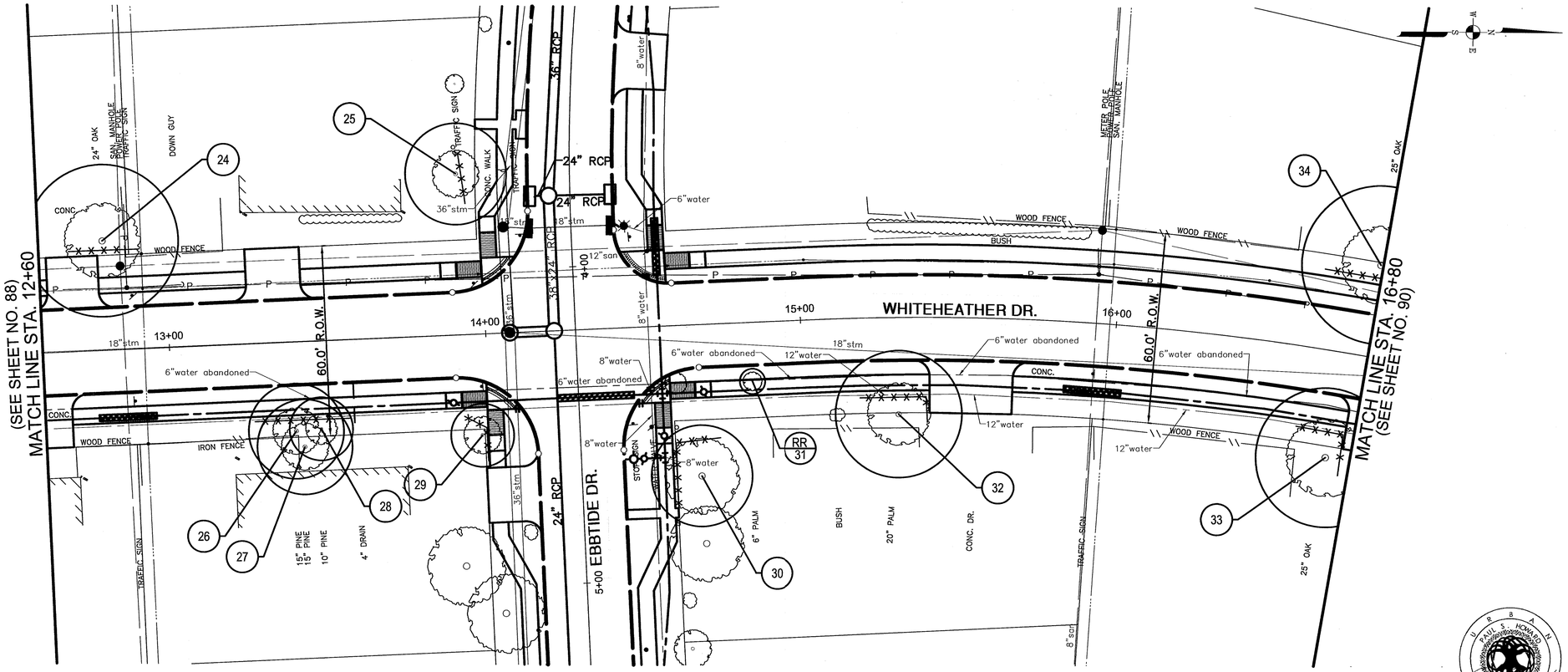
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 88 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 3:33:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
24	WHITEHEATHER	TALLOW	24	FAIR	PRESERVE	DM	NONE	
25	WHITEHEATHER	MULBERRY	16	FAIR	PRESERVE	DM	NONE	MULTISTEMMED
26	WHITEHEATHER	PINE	15	POOR	PRESERVE	DHM	NONE	
27	WHITEHEATHER	PINE	15	FAIR	PRESERVE	DHM	NONE	
28	WHITEHEATHER	PINE	10	GOOD	PRESERVE	DHM	NONE	
29	WHITEHEATHER	LOQUAT	10	GOOD	PRESERVE	DM	NONE	
30	WHITEHEATHER	LIVE OAK	16	GOOD	PRESERVE	DM	NONE	
31	WHITEHEATHER	PALM	4	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
32	WHITEHEATHER	PALM	20	GOOD	PRESERVE	DM	NONE	
33	WHITEHEATHER	WATER OAK	22	GOOD	PRESERVE	DHM	NONE	
34	WHITEHEATHER	ASH	25	POOR	PRESERVE	CDM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS OMAR J. CORREDOR 47746 REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

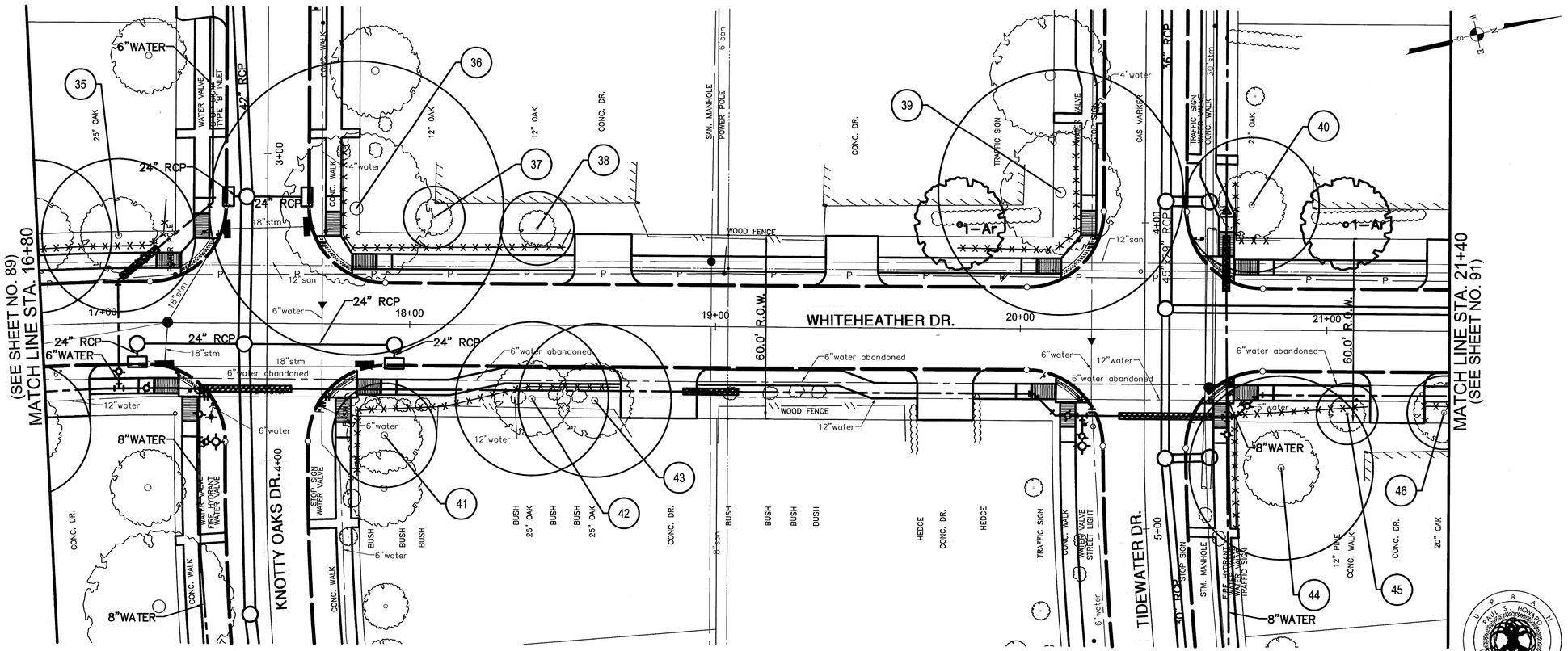
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+60.00 TO STA. 16+80.00

WBS NO.:M-000262-0004-4
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 89 OF 191

CITY DWG NO.:
PUBLIC WORKS AND ENGINEERING 49210 JMBER HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 3:34:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

PAUL S. HOMBURG
ISA CERTIFIED ARBORIST
SO-1340A

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
35	WHITEHEATHER	ASH	25	POOR	PRESERVE	CDM	NONE	
36	WHITEHEATHER	ASH	48	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE
37	WHITEHEATHER	LIGUSTRUM	10	FAIR	PRESERVE	D	NONE	
38	WHITEHEATHER	LIGUSTRUM	12	FAIR	PRESERVE	D	NONE	
39	WHITEHEATHER	ASH	40	GOOD	PRESERVE	DHM	NONE	
40	WHITEHEATHER	BRADFORD PEAR	22	GOOD	PRESERVE	DM	NONE	
41	WHITEHEATHER	LIVE OAK	17	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
42	WHITEHEATHER	ASH	25	FAIR	PRESERVE	DHM	NONE	SOME DECAY
43	WHITEHEATHER	ASH	25	FAIR	PRESERVE	DHM	NONE	CAVITIES
44	WHITEHEATHER	ASH	30	GOOD	PRESERVE	DHM	NONE	MULTISTEMMED
45	WHITEHEATHER	PINE	10	GOOD	PRESERVE	DHM	NONE	
46	WHITEHEATHER	LIVE OAK	12	GOOD	PRESERVE	DHM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
4/13/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 16+80.00 TO STA. 21+40.00

WBS NO.:	M-000262-0004-4
FILE NO.:	SM5056
DRAWING SCALE	1" = 20'
CITY OF HOUSTON PM	ISAAC MUNIZ, E.I.T.
SHEET NO.	90 OF 191

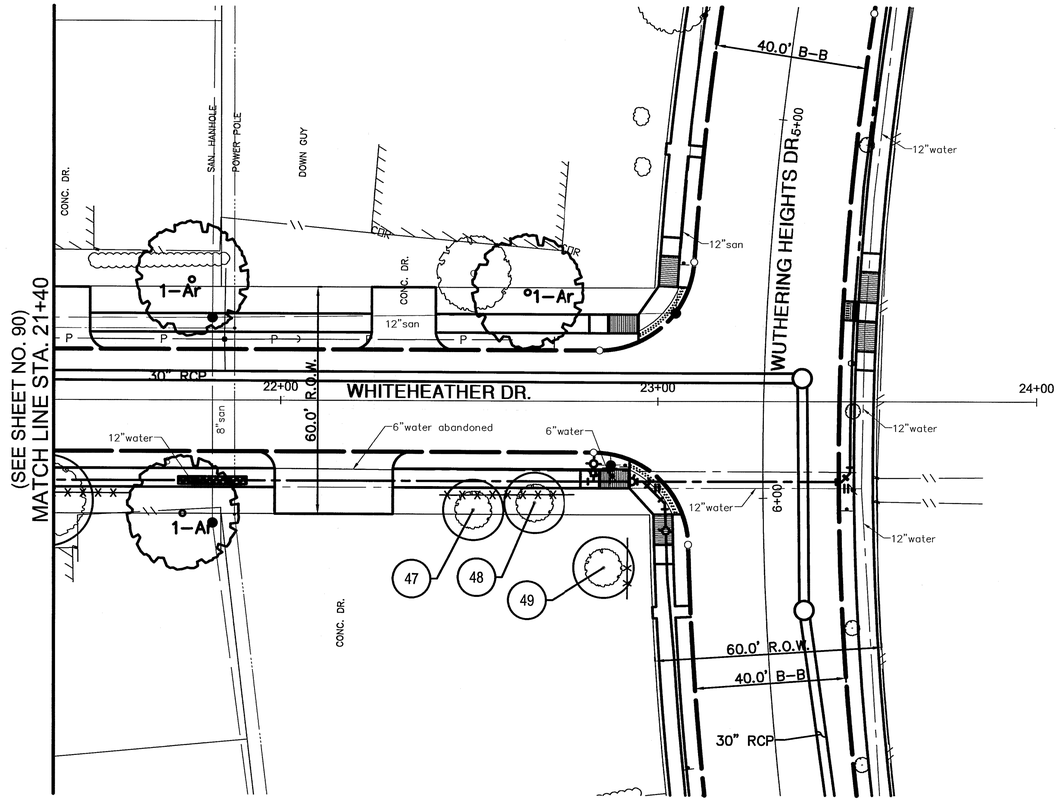
CITY DWG. NO.:

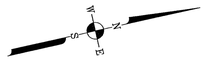
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 3:35:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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47	WHITEHEATHER	CREPEMYRTLE	8	GOOD	PRESERVE	DM	NONE	MULTISTEMMED
48	WHITEHEATHER	CREPEMYRTLE	8	GOOD	PRESERVE	DM	NONE	MULTISTEMMED
49	WHITEHEATHER	CREPEMYRTLE	8	GOOD	PRESERVE	DM	NONE	MULTISTEMMED

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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WHITE HEATHER DRAINAGE
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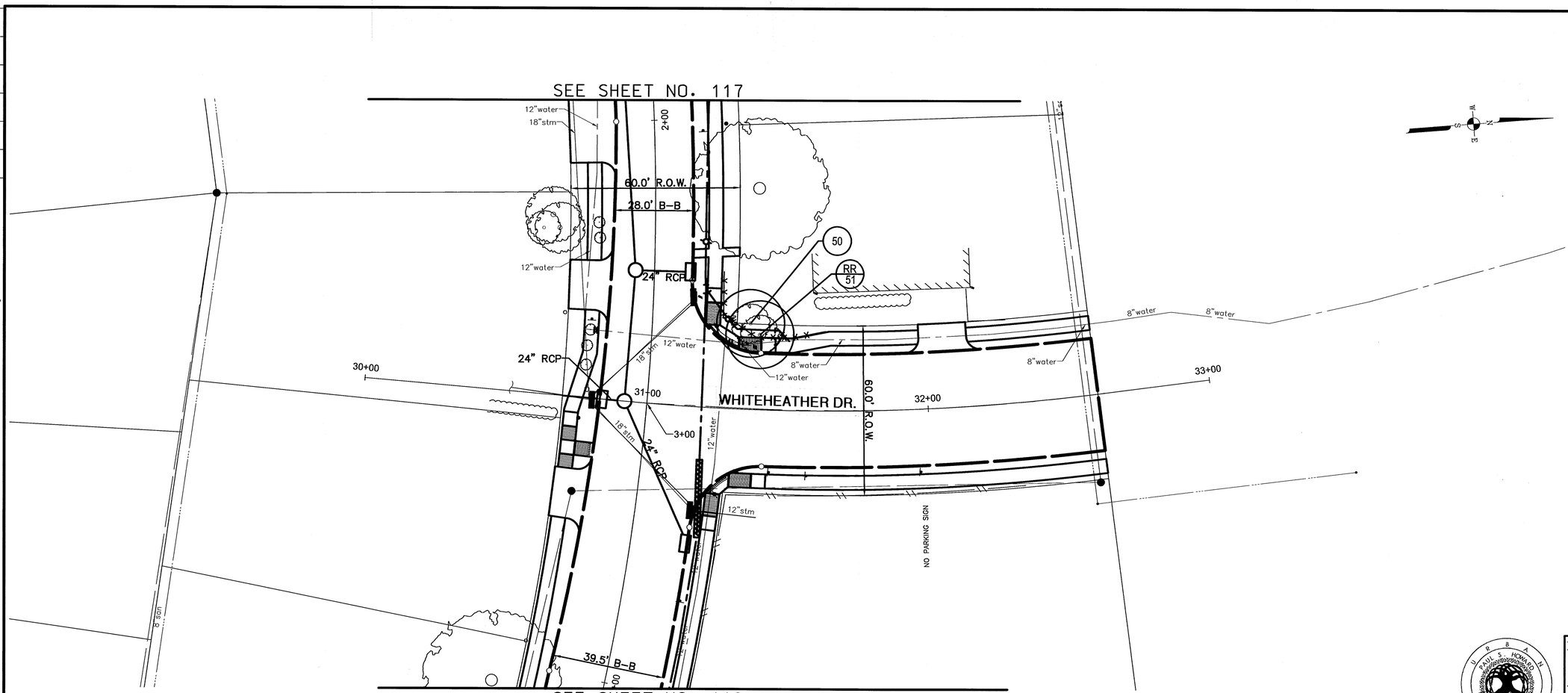
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FROM STA. 21+40.00 TO STA. 24+00.00

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ISAAC MUNIZ, E.I.T.
SHEET NO. 91 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 3:36:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R / #) REMOVAL TREE
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FOR REDUCED PLANS
original scale in inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 3:37:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

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50	WHITEHEATHER	PINE	12	FAIR	PRESERVE	DHM	NONE	
51	WHITEHEATHER	PINE	12	FAIR	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

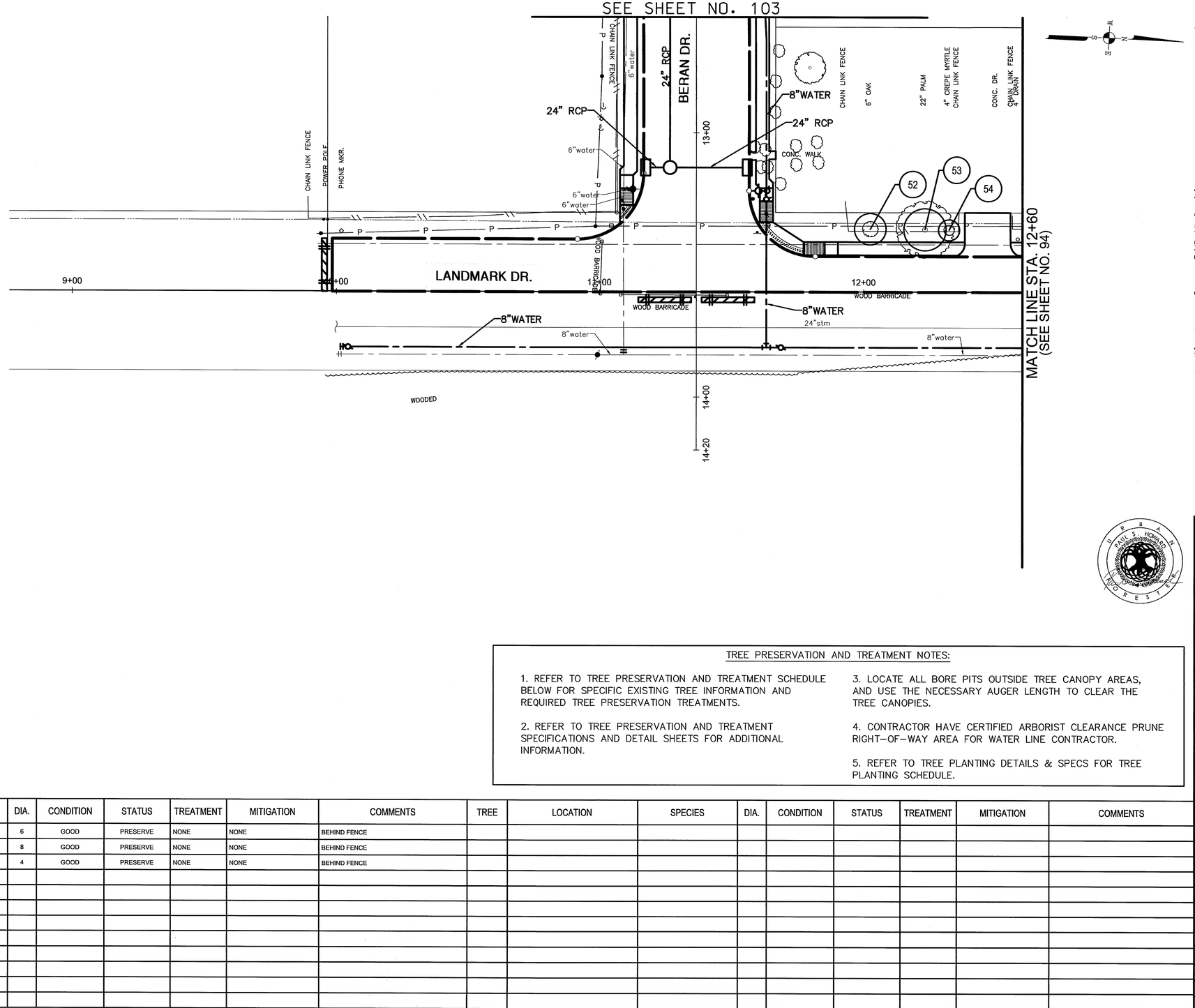
WHITEHEATHER DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 30+00.00 TO STA. 33+00.00

WBS NO.: M-000262-0004-4	CITY DWG. NO.
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 92 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
- -x-x-x- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

PAUL S. HOWARD — URBAN FORESTER

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS	TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
52	LANDMARK	LIVE OAK	6	GOOD	PRESERVE	NONE	NONE	BEHIND FENCE									
53	LANDMARK	PALM	8	GOOD	PRESERVE	NONE	NONE	BEHIND FENCE									
54	LANDMARK	CREPEMYRTLE	4	GOOD	PRESERVE	NONE	NONE	BEHIND FENCE									

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 4/13/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

LANDMARK DR.

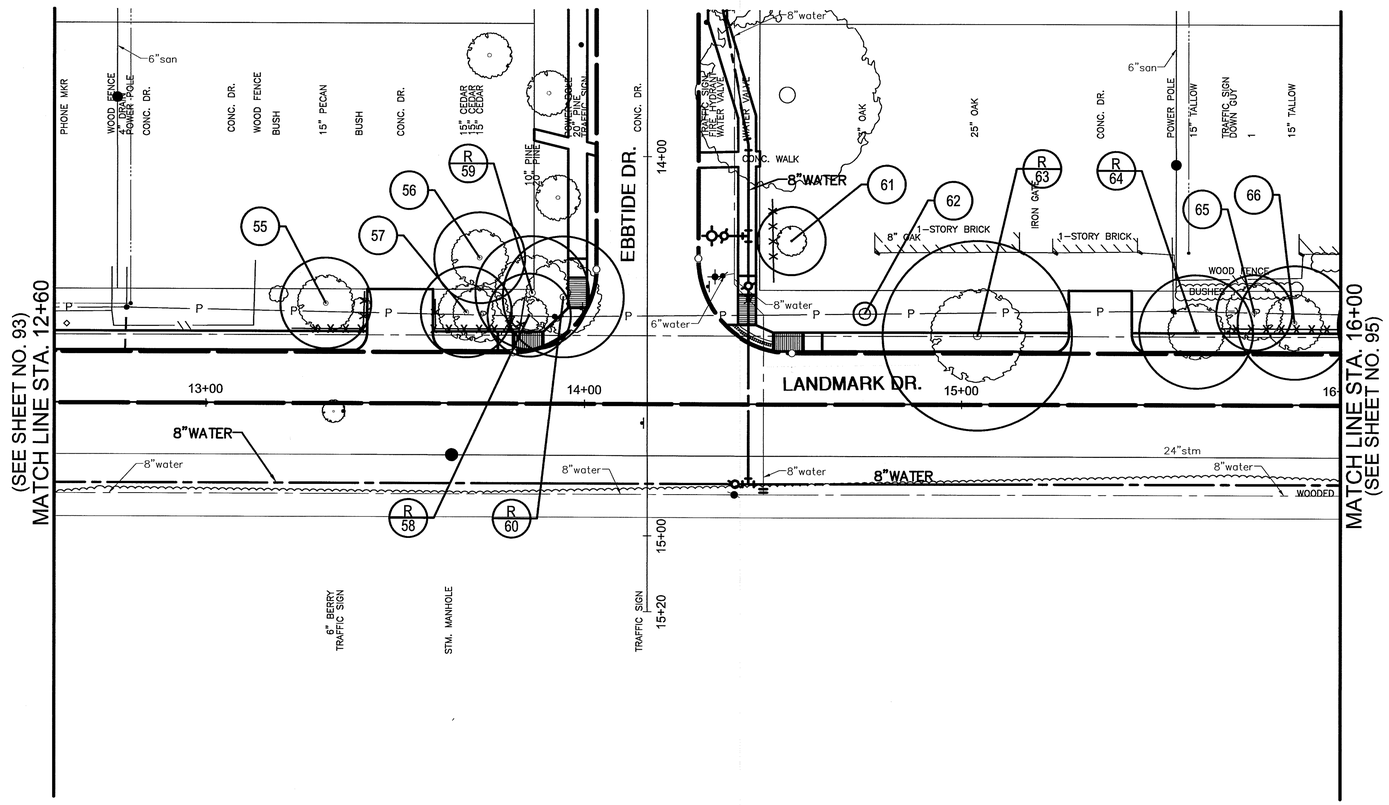
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.:M-000262-0004-4
CITY DWG. NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T
SHEET NO. 93 OF 191

PUBLIC WORKS AND ENGINEERING — 49210 — LICENSED — HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 3:38:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
- -x-x-x- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
55	LANDMARK	PECAN	12	GOOD	PRESERVE	DHM	NONE	
56	LANDMARK	PALM	12	GOOD	PRESERVE	NONE	NONE	NO CONFLICTS
57	LANDMARK	BALDCYPRESS	12	GOOD	PRESERVE	DHM	NONE	
58	LANDMARK	PINE	11	DEAD	REMOVE	A	NONE	REMOVE DEAD TREE
59	LANDMARK	PINE	15	DEAD	REMOVE	A	NONE	REMOVE DEAD TREE
60	LANDMARK	PINE	16	DEAD	REMOVE	A	NONE	REMOVE DEAD TREE
61	LANDMARK	LIVE OAK	9	GOOD	PRESERVE	D	NONE	
62	LANDMARK	PECAN	3	GOOD	PRESERVE	NONE	NONE	
63	LANDMARK	TALLOW	25	FAIR	REMOVE	A	REPLACE INCH FOR INCH	CAVITIES, REMOVE FOR CONSTRUCTION
64	LANDMARK	TALLOW	15	FAIR	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
65	LANDMARK	CREPEMYRTLE	10	GOOD	PRESERVE	DHM	NONE	
66	LANDMARK	TALLOW	15	GOOD	PRESERVE	DHM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

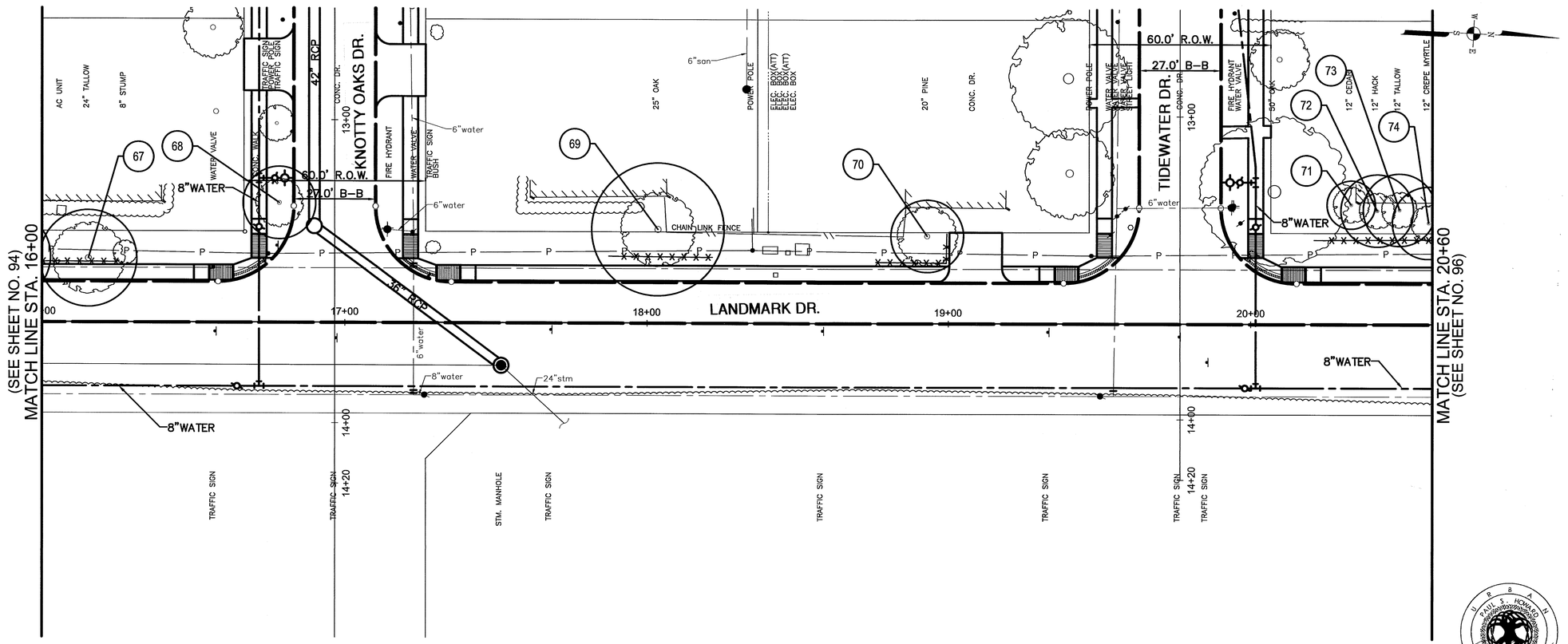
LANDMARK DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+60.00 TO STA. 16+00.00

WBS NO.: M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 94 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012, 3:39:04 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
- -x-/-x- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
67	LANDMARK	TALLOW	16	GOOD	PRESERVE	DHM	NONE	
68	LANDMARK	SWEETGUM	12	POOR	PRESERVE	DHM	NONE	RELOCATE FIRE HYDRANT OR REMOVE TREE
69	LANDMARK	LIVE OAK	22	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
70	LANDMARK	PINE	12	FAIR	PRESERVE	DHM	NONE	UTILITY PRUNED
71	LANDMARK	EASTERN REDCEDAR	8	GOOD	PRESERVE	D	NONE	
72	LANDMARK	ASH	12	GOOD	PRESERVE	D	NONE	
73	LANDMARK	TALLOW	12	GOOD	PRESERVE	D	NONE	
74	LANDMARK	CREPEMYRTLE	12	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
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SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

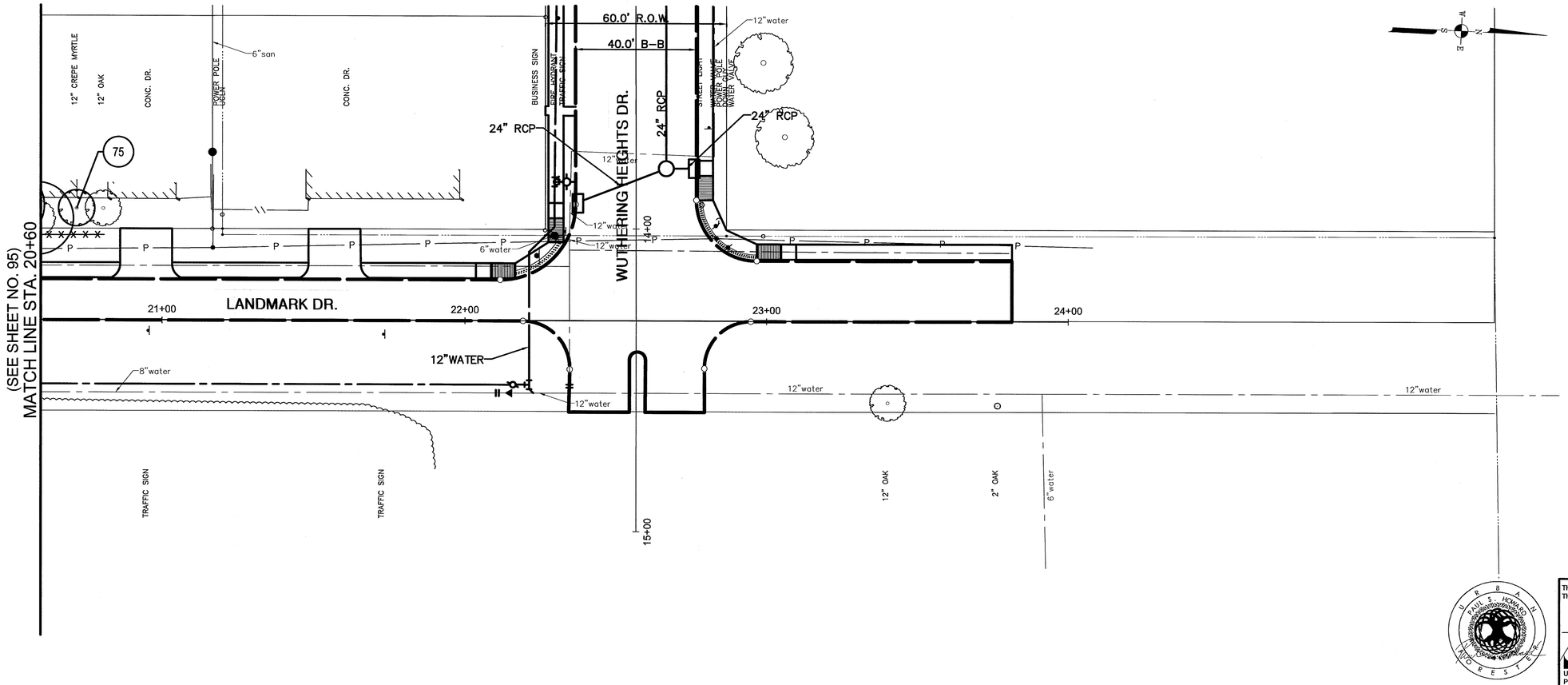
LANDMARK DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 16+00.00 TO STA. 20+60.00

WBS NO.:M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T
SHEET NO. 95 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 3:40:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
75	LANDMARK	CREPEMYRTLE	6	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
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STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

LANDMARK DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 20+60.00 TO STA. 24+00.00

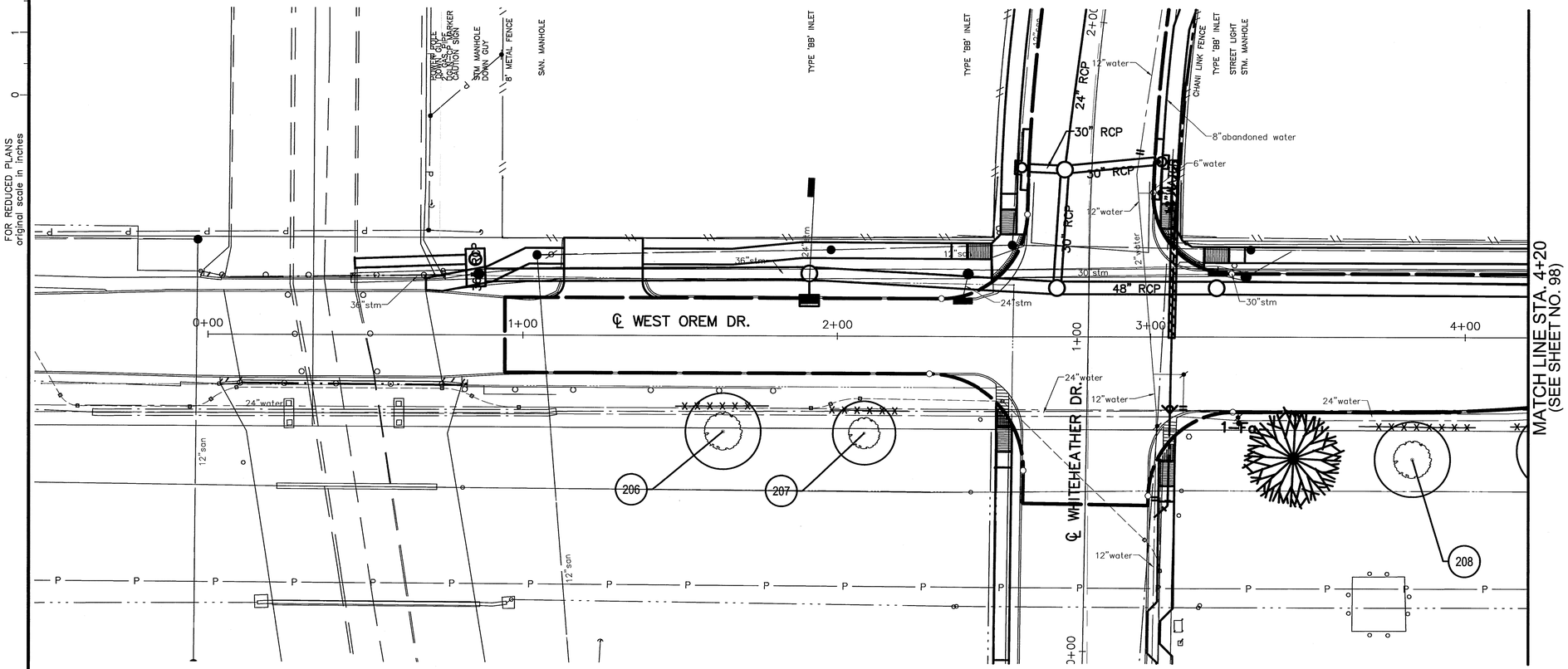
WBS NO.:M-000262-0004-4
CITY DWG. NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 96 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 3:41:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-V SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
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0 20' 40'

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
206	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE	
207	WEST OREM	ASH	10	GOOD	PRESERVE	D	NONE	
208	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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WEST OREM DR.

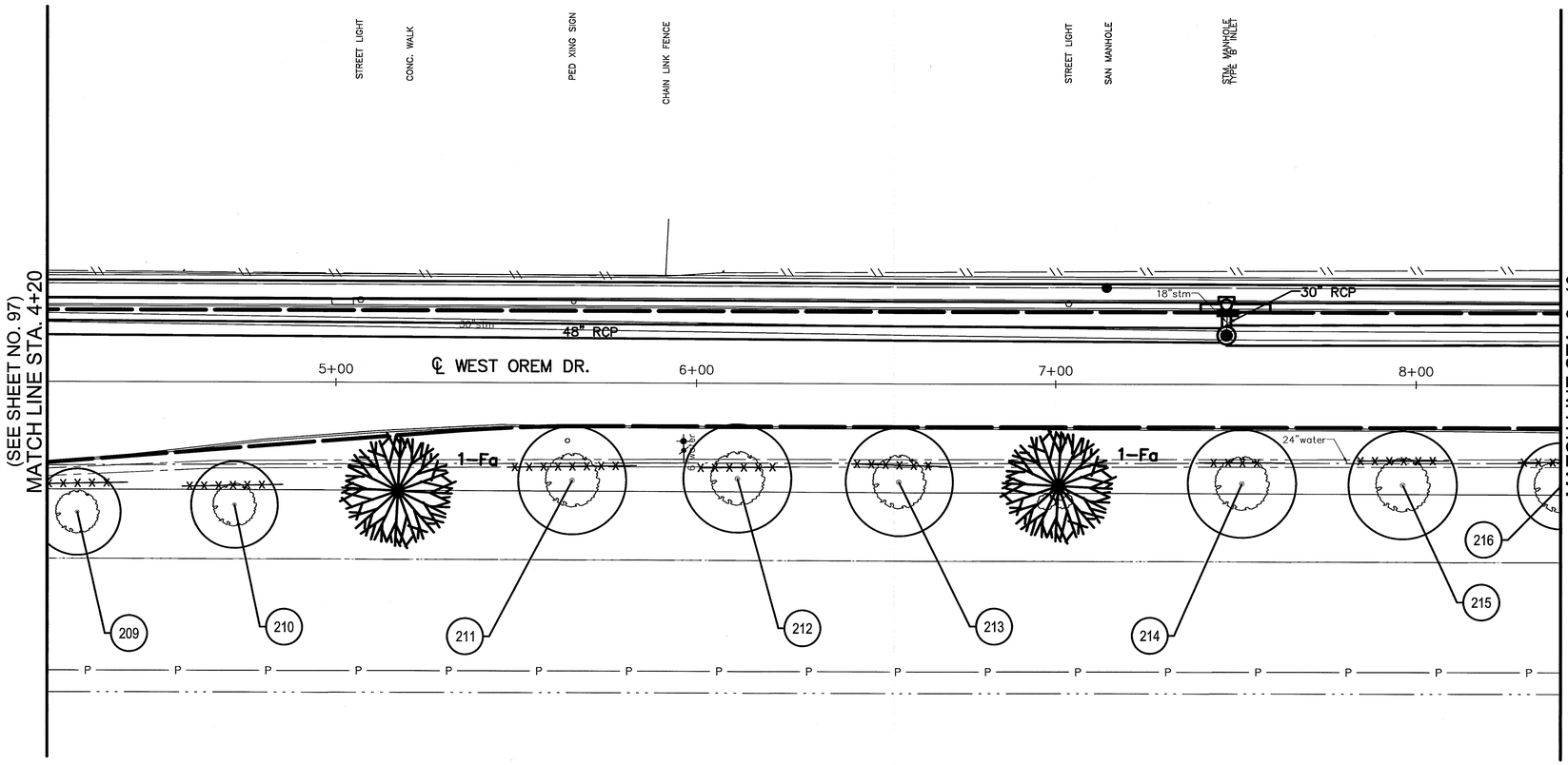
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T	
SHEET NO. 97 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CERTIFICATE NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:45:16 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
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0 20' 40'

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4/13/2012 (DATE)

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209	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE										
210	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE										
211	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
212	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
213	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
214	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
215	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
216	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE										

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
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TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WEST OREM DR.

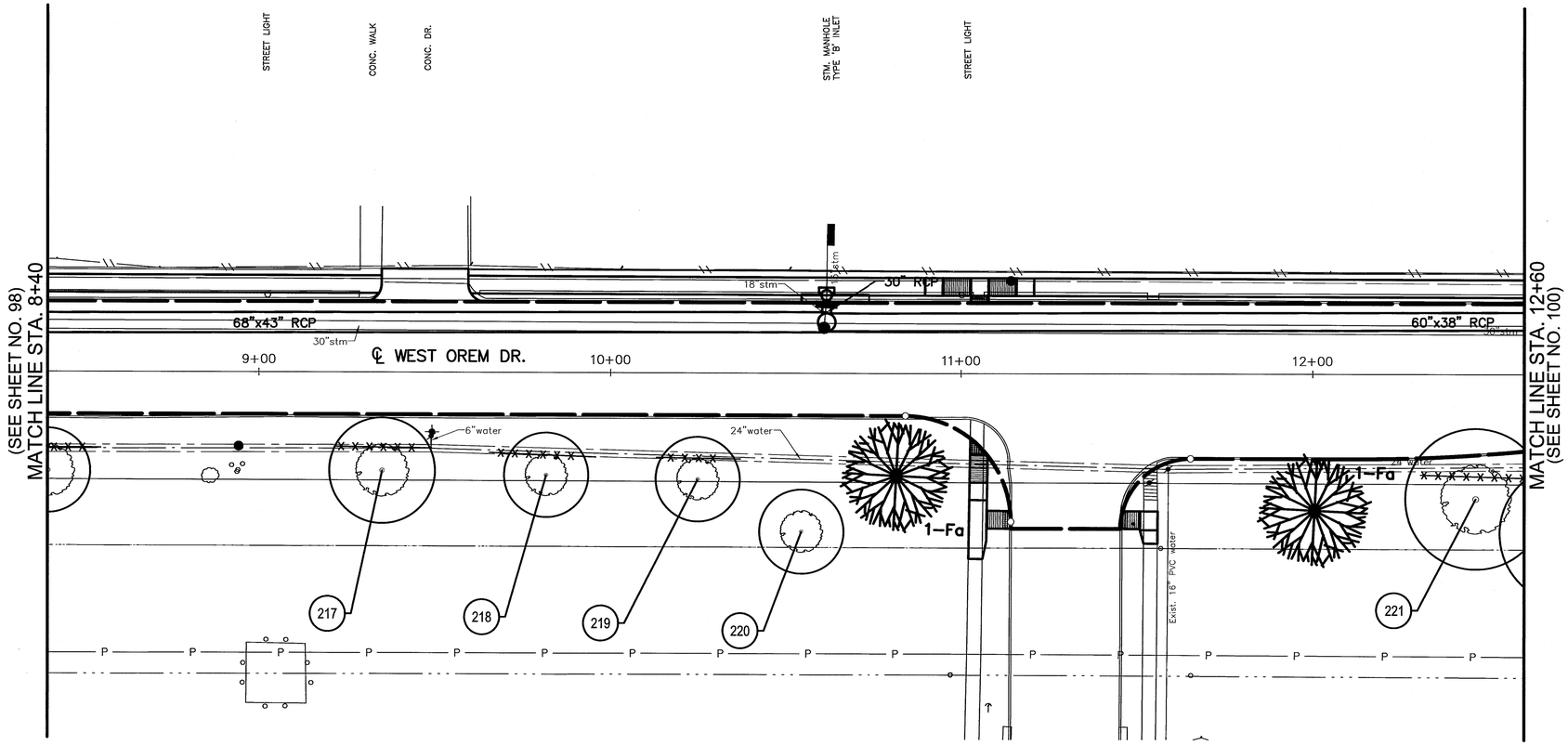
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 4+20.00 TO STA. 8+40.00

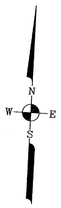
WBS NO.:M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 98 OF 191

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:46:07 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS	TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
217	WEST OREM	ASH	15	GOOD	PRESERVE	D	NONE										
218	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE										
219	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE										
220	WEST OREM	TALLOW	12	GOOD	PRESERVE	NONE	NONE										
221	WEST OREM	ASH	20	POOR	PRESERVE	D	NONE										

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/12/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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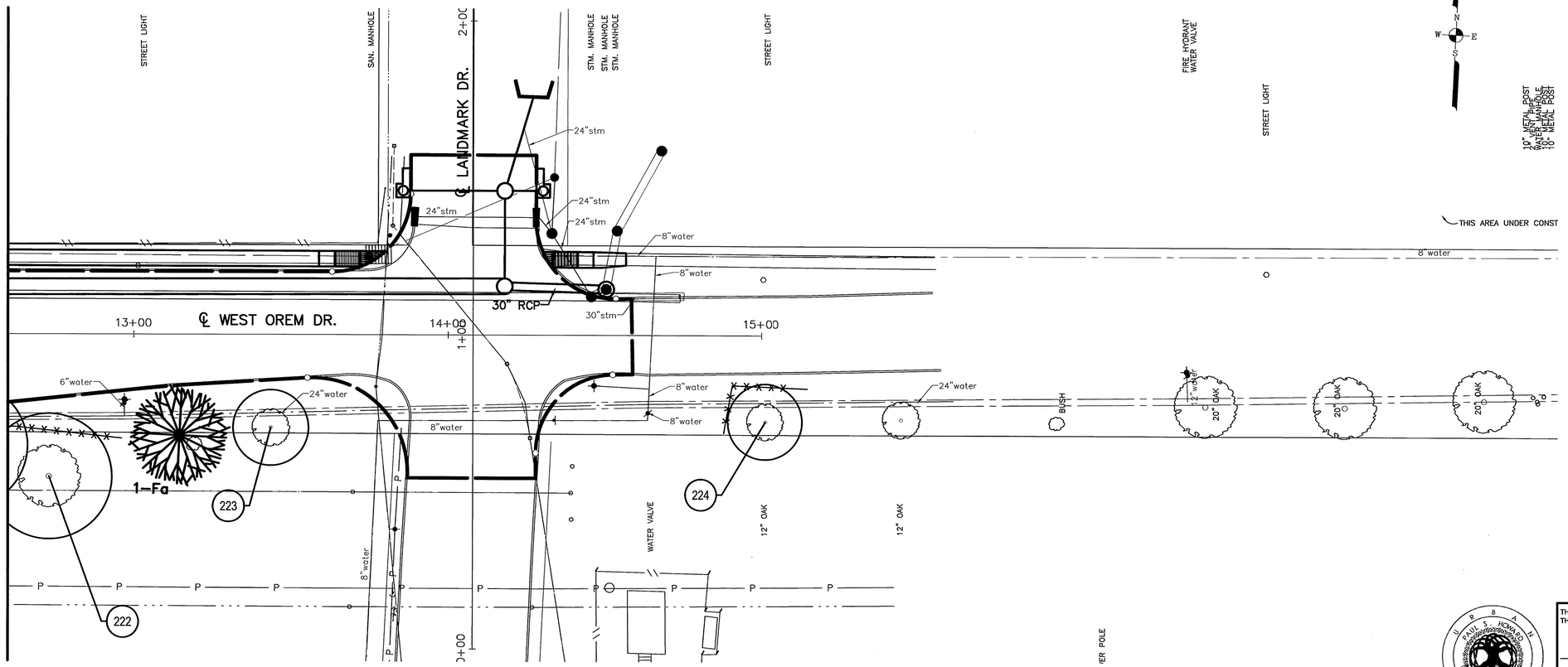
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 99 OF 191	

49210
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:47:08 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
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- TREE PROTECTION FENCING (SEE DETAIL)
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4/19/2012 (DATE)

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P.O. BOX 1424
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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
222	WEST OREM	TALLOW	20	FAIR	PRESERVE	D	NONE	
223	WEST OREM	ASH	12	DEAD	REMOVE	A	NONE	REMOVE, DEAD TREE
224	WEST OREM	ASH	12	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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TREATMENT E - MULCHING OPERATION
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TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+60.00 TO STA. 15+00.00

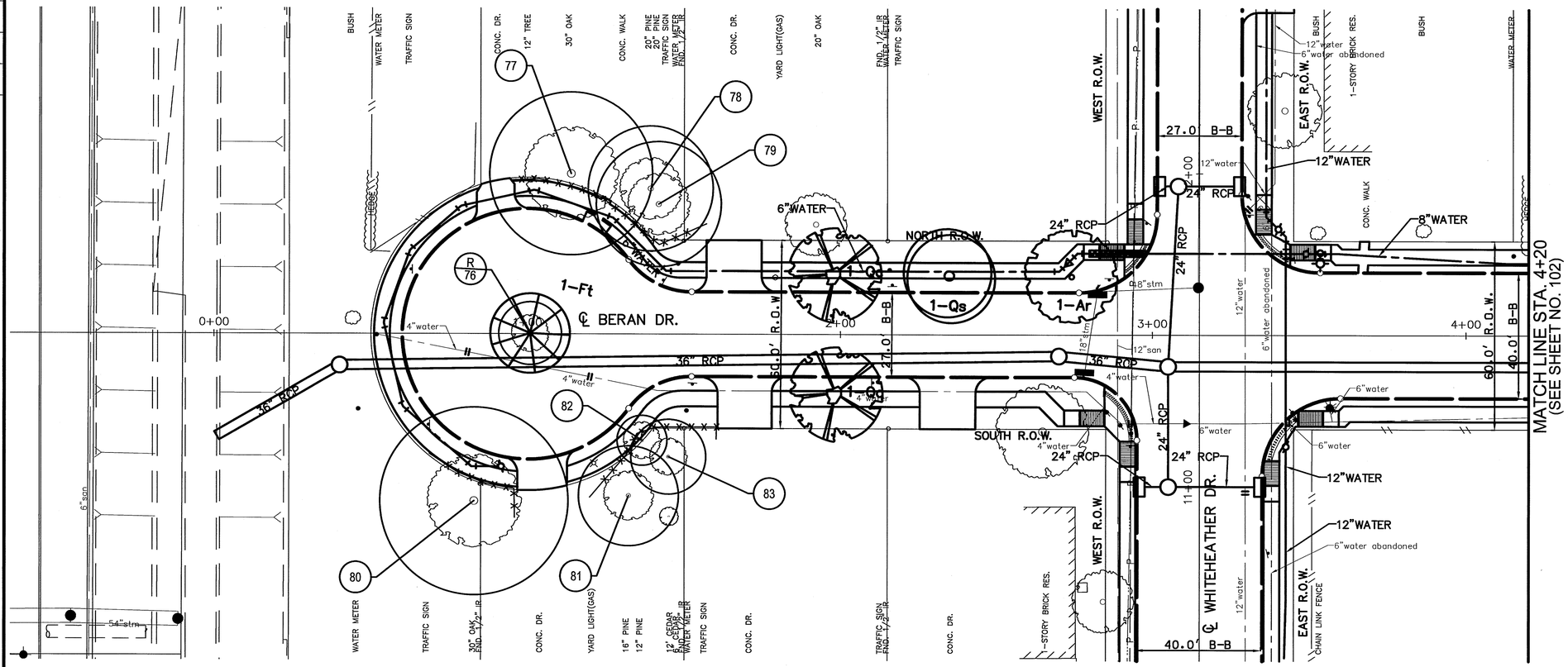
WBS NO.:M-000262-0004-4
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 100 OF 191

CITY DWG NO.:

49210 PUBLIC WORKS AND ENGINEERING CITY ENGINEER HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:48:04 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

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- (R/#) REMOVAL TREE
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- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
- ×–×–× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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(DATE)

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CONROE, TX 77305
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76	BERAN	CHINABERRY	10	FAIR	REMOVE	A	NONE	
77	BERAN	ASH	26	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
78	BERAN	PINE	20	FAIR	PRESERVE	DHM	NONE	
79	BERAN	PINE	20	FAIR	PRESERVE	DHM	NONE	
80	BERAN	ASH	30	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
81	BERAN	PINE	16	GOOD	PRESERVE	DHM	NONE	
82	BERAN	PINE	8	GOOD	PRESERVE	DHM	NONE	
83	BERAN	ARBORVITAE	12	GOOD	PRESERVE	DHM	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
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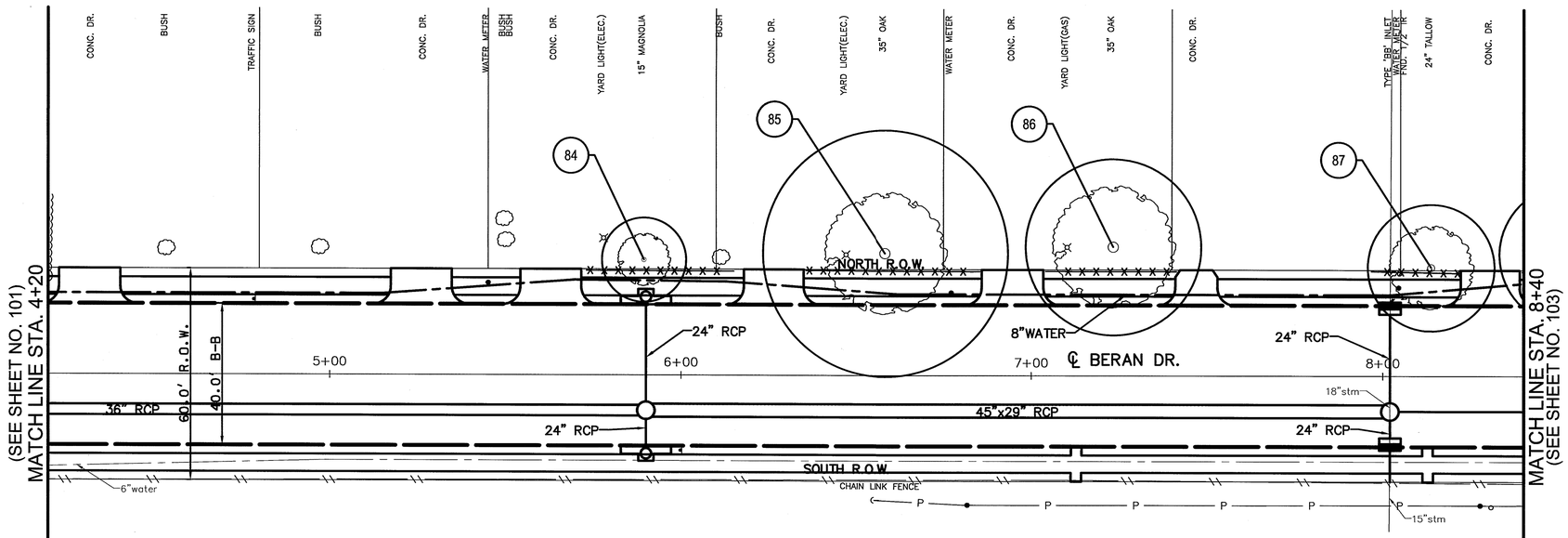
BERAN DR.

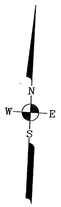
TREE PRESERVATION PLAN
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 101 OF 191	

49210
JAMES MUNIZ
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:49:04 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×—×—× TREE PROTECTION FENCING (SEE DETAIL)
- ×—×—× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

TRAFFIC SIGN
DOWN GUY
POWER POLE
CONC. WALK
TYPE 'BB' INLET
CONC. WALK
POWER POLE UGLN(PHONE SCOPE)

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

(DATE) 4/13/2012

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS	TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
84	BERAN	PEAR	12	GOOD	PRESERVE	DHM	NONE										
85	BERAN	ASH	35	FAIR	PRESERVE	DHM	NONE	TOPPED									
86	BERAN	ASH	225	GOOD	PRESERVE	DHM	NONE										
87	BERAN	TALLOW	18	GOOD	PRESERVE	DHM	NONE										

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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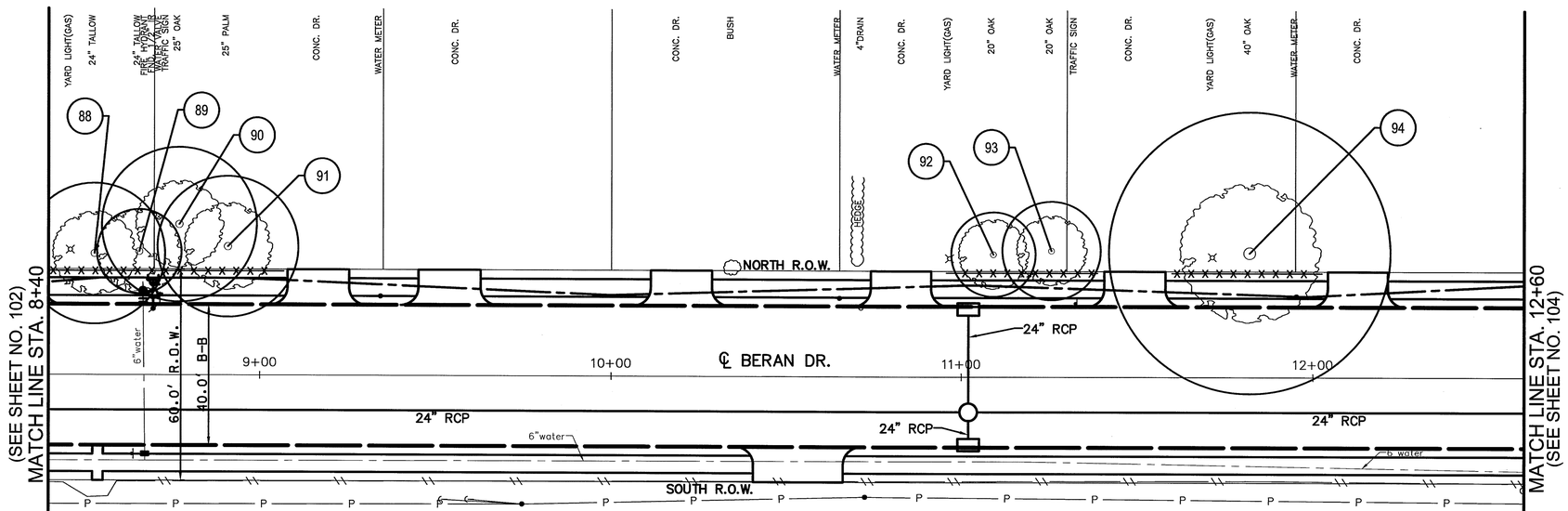
TREE PRESERVATION PLAN
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.:M-000262-0004-4
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DRAWING SCALE
1" = 20'
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ISAAC MUNIZ, E.I.T.
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PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
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FOR REDUCED PLANS
original scale is inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 5:50:06 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG



LEGEND

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- (R/#) REMOVAL TREE
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- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
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0 20' 40'

FOR REDUCED PLANS
original scale in inches

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(DATE)

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88	BERAN	TALLOW	20	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
89	BERAN	TALLOW	12	GOOD	PRESERVE	DHM	NONE	
90	BERAN	CHINKAPIN OAK	22	GOOD	PRESERVE	DHM	NONE	
91	BERAN	PALM	20	GOOD	PRESERVE	DHM	NONE	
92	BERAN	LIVE OAK	12	GOOD	PRESERVE	BDHM	NONE	CLEARANCE PRUNE
93	BERAN	LIVE OAK	14	GOOD	PRESERVE	DHM	NONE	
94	BERAN	ASH	40	FAIR	PRESERVE	BDHM	NONE	CLEARANCE PRUNE

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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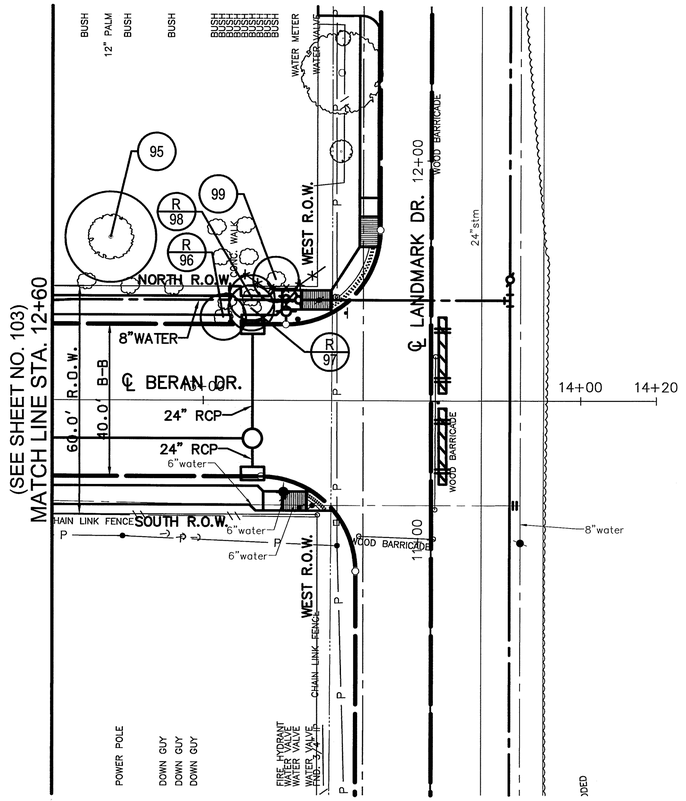
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FOR REDUCED PLANS
original scale in inches





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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
95	BERAN	EASTERN RED CEDAR	12	GOOD	PRESERVE	NONE	NONE	
96	BERAN	EASTERN RED CEDAR	6	GOOD	REMOVE	A	NONE	TALL & SKINNY, REMOVE FOR CONSTRUCTION
97	BERAN	EASTERN RED CEDAR	6	GOOD	REMOVE	A	NONE	TALL & SKINNY, REMOVE FOR CONSTRUCTION
98	BERAN	EASTERN RED CEDAR	6	GOOD	REMOVE	A	NONE	TALL & SKINNY, REMOVE FOR CONSTRUCTION
99	BERAN	EASTERN RED CEDAR	6	GOOD	PRESERVE	DHM	NONE	TALL & SKINNY

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

BERAN DR.

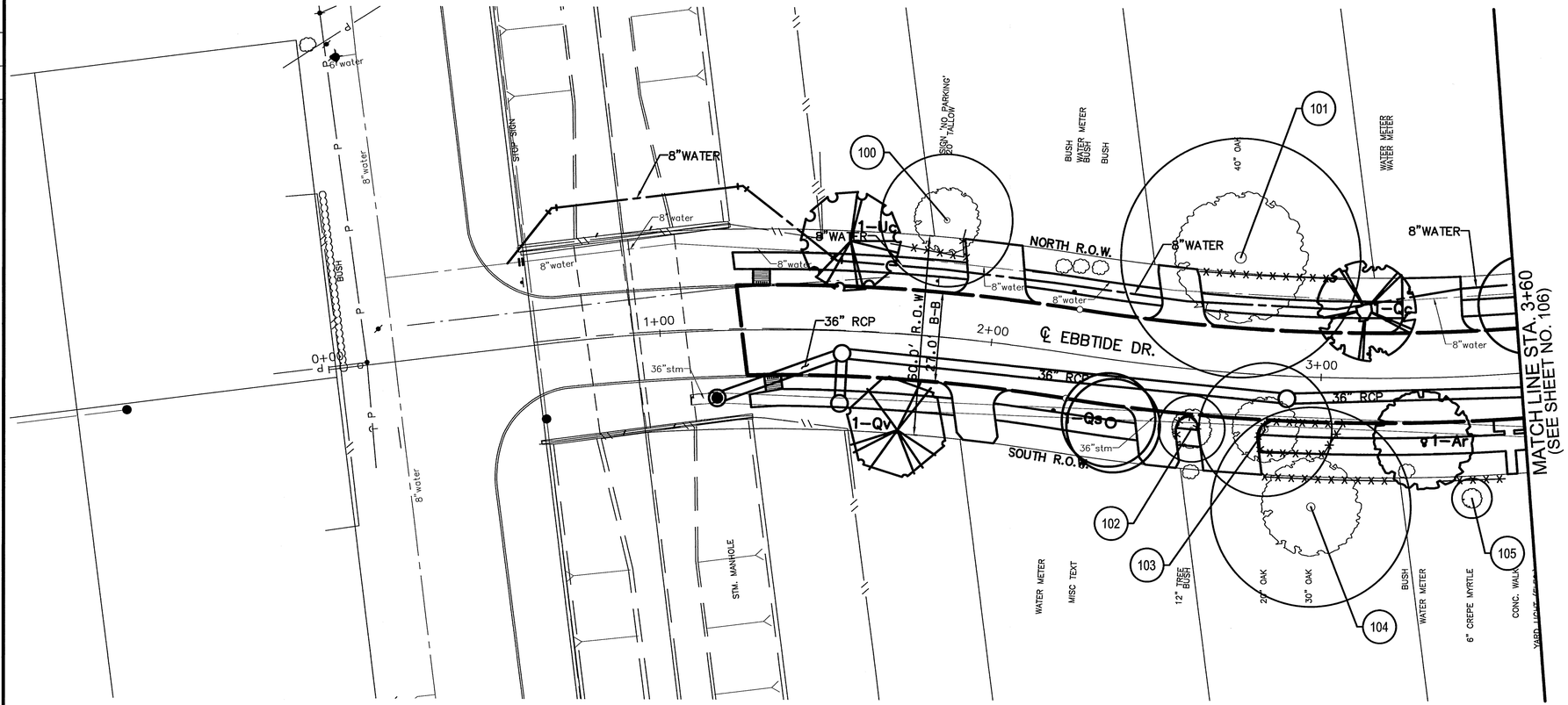
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+60.00 TO STA. 14+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 104 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:52:04 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
- ×–×–× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

TREE PRESERVATION AND TREATMENT NOTES:

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2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT–OF–WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
100	EBBTIDE	TALLOW	20	GOOD	PRESERVE	DHM	NONE	
101	EBBTIDE	ASH	36	GOOD	PRESERVE	DHM	NONE	
102	EBBTIDE	LIGUSTRUM	10	GOOD	PRESERVE	DM	NONE	
103	EBBTIDE	LIVE OAK	20	GOOD	PRESERVE	DIM	NONE	GROWN INTO CURB
104	EBBTIDE	CATALPA	30	FAIR	PRESERVE	DM	NONE	
105	EBBTIDE	CREPEMYRTLE	6	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
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TREATMENT I - ZERO CURB CUT OPERATION
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TREATMENT M - SIDEWALK INSTALLATION

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS 4/13/12 OMAR J. CORREDOR 47746 LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

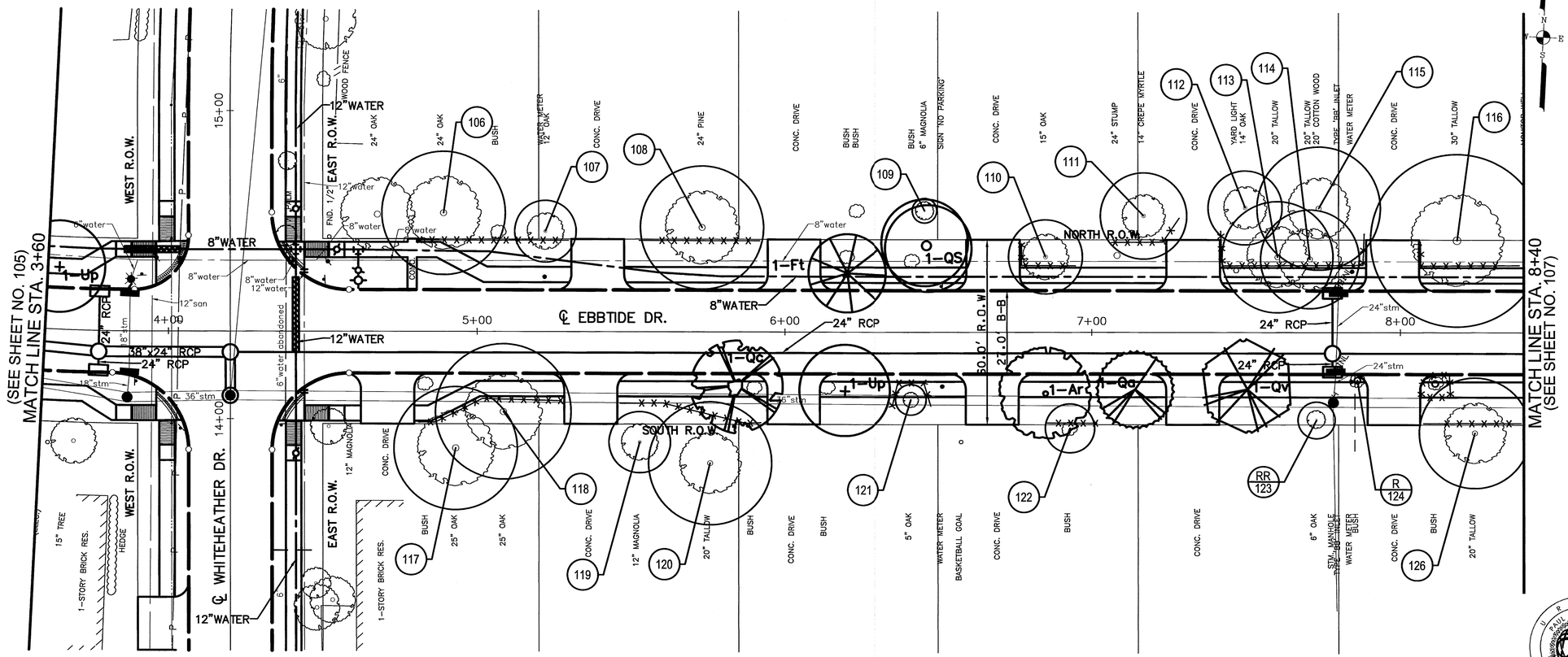
EBBTIDE DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 3+60.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 105 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 CITY ENGINEER HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:52:58 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- TREE PROTECTION FENCING (SEE DETAIL)
- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
106	EBBTIDE	LIVE OAK	20	GOOD	PRESERVE	DM	NONE	
107	EBBTIDE	ASH	10	POOR	PRESERVE	DM	NONE	
108	EBBTIDE	PINE	20	FAIR	PRESERVE	DM	NONE	
109	EBBTIDE	LOQUAT	4	GOOD	PRESERVE	NONE	NONE	
110	EBBTIDE	SAWTOOTH OAK	12	GOOD	PRESERVE	DHM	NONE	
111	EBBTIDE	CREPEMYRTLE	14	GOOD	PRESERVE	D	NONE	
112	EBBTIDE	LIVE OAK	12	GOOD	PRESERVE	NONE	NONE	
113	EBBTIDE	TALLOW	18	GOOD	PRESERVE	DHM	NONE	
114	EBBTIDE	TALLOW	16	GOOD	PRESERVE	DHM	NONE	
115	EBBTIDE	PEAR	20	GOOD	PRESERVE	NONE	NONE	
116	EBBTIDE	TALLOW	28	GOOD	PRESERVE	DHM	NONE	
117	EBBTIDE	WATER OAK	20	GOOD	PRESERVE	DM	NONE	
118	EBBTIDE	WATER OAK	22	GOOD	PRESERVE	DM	NONE	
119	EBBTIDE	MAGNOLIA	10	GOOD	PRESERVE	NONE	NONE	
120	EBBTIDE	TALLOW	20	FAIR	PRESERVE	DM	NONE	ONE TRUNK MISSING
121	EBBTIDE	RED MAPLE	5	GOOD	PRESERVE	DM	NONE	
122	EBBTIDE	MIMOSA	8	GOOD	PRESERVE	DM	NONE	
123	EBBTIDE	LIVE OAK	6	GOOD	REMOVE	A	REPLACE INCH FOR INCH	
124	EBBTIDE	CREPEMYRTLE	1	GOOD	REMOVE	A	NONE	
125	EBBTIDE	CREPEMYRTLE	1	GOOD	PRESERVE	D	NONE	
126	EBBTIDE	TALLOW	18	GOOD	PRESERVE	DM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
12/31/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

EBBTIDE DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 3+60.00 TO STA. 8+40.00

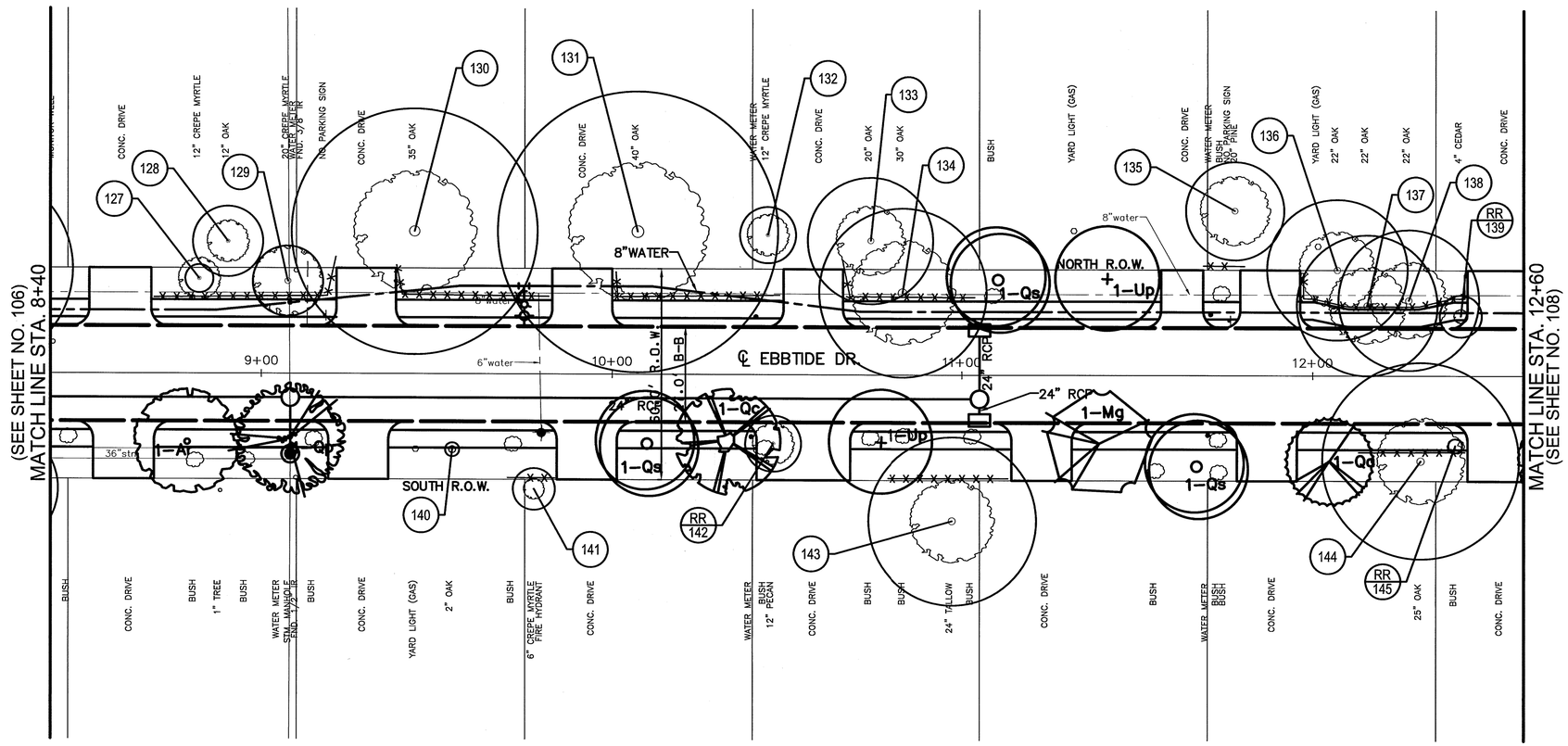
WBS NO.:M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 106 OF 191

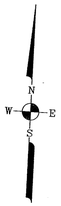
PUBLIC WORKS AND ENGINEERING
49210
CERTIFICATE NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:54:19 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches

FOR REDUCED PLANS
original scale in inches





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
127	EBBTIDE	CREPEMYRTLE	4	GOOD	PRESERVE	D	NONE	
128	EBBTIDE	PEAR	10	FAIR	PRESERVE	NONE	NONE	
129	EBBTIDE	CREPEMYRTLE	10	GOOD	PRESERVE	DM	NONE	
130	EBBTIDE	ASH	35	GOOD	PRESERVE	DM	NONE	
131	EBBTIDE	ASH	40	GOOD	PRESERVE	DM	NONE	
132	EBBTIDE	CREPEMYRTLE	8	GOOD	PRESERVE	NONE	NONE	
133	EBBTIDE	ASH	18	FAIR	PRESERVE	NONE	NONE	
134	EBBTIDE	ASH	24	GOOD	PRESERVE	DM	NONE	
135	EBBTIDE	PINE	14	POOR	PRESERVE	D	NONE	
136	EBBTIDE	ASH	20	FAIR	PRESERVE	DM	NONE	TOPPED
137	EBBTIDE	LIVE OAK	20	GOOD	PRESERVE	DM	NONE	TOPPED
138	EBBTIDE	LIVE OAK	20	GOOD	PRESERVE	DM	NONE	TOPPED
139	EBBTIDE	JUNIPER	6	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	TALL & SKINNY, REMOVE FOR CONSTRUCTION
140	EBBTIDE	LIVE OAK	2	GOOD	PRESERVE	DM	NONE	
141	EBBTIDE	CREPEMYRTLE	6	GOOD	PRESERVE	DM	NONE	
142	EBBTIDE	PECAN	8	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
143	EBBTIDE	TALLOW	24	GOOD	PRESERVE	DM	NONE	
144	EBBTIDE	ASH	28	GOOD	PRESERVE	DM	NONE	CLEARANCE PRUNE
145	EBBTIDE	JUNIPER	2	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	LOW FORM, REMOVE FOR CONSTRUCTION

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED ENGINEER
4/13/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

EBBTIDE DR.

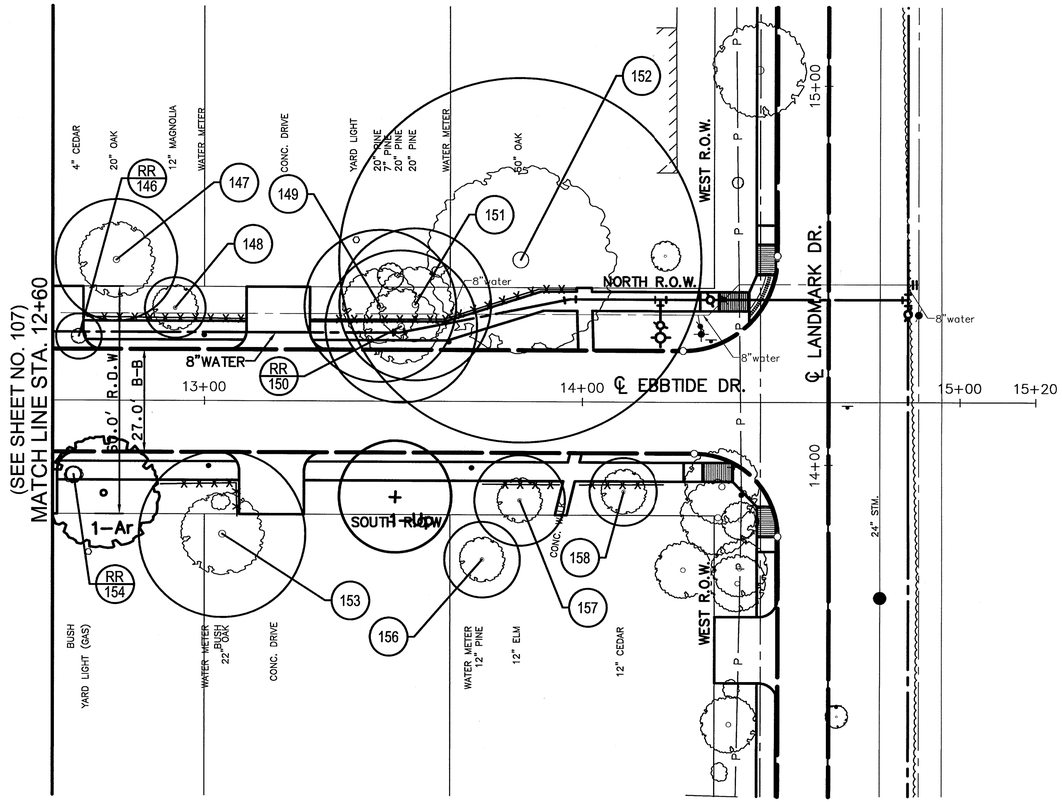
TREE PRESERVATION PLAN
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 107 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:55:52 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
- ×–×–× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

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URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
146	EBBTIDE	JUNIPER	6	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	TALL & SKINNY, REMOVE FOR CONSTRUCTION
147	EBBTIDE	LIVE OAK	16	GOOD	PRESERVE	D	NONE	
148	EBBTIDE	MAGNOLIA	8	GOOD	PRESERVE	DM	NONE	
149	EBBTIDE	PINE	20	FAIR	PRESERVE	DM	NONE	
150	EBBTIDE	PINE	20	FAIR	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
151	EBBTIDE	PINE	20	FAIR	PRESERVE	DM	NONE	
152	EBBTIDE	ASH	48	FAIR	PRESERVE	DM	NONE	
153	EBBTIDE	LIVE OAK	22	GOOD	PRESERVE	D	NONE	
154	EBBTIDE	JUNIPER	2	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	LOW FORM, REMOVE FOR CONSTRUCTION
155	EBBTIDE	OLEANDER	10	GOOD	PRESERVE	D	NONE	
156	EBBTIDE	PINE	10	FAIR	PRESERVE	NONE	NONE	
157	EBBTIDE	CHINKAPIN OAK	12	GOOD	PRESERVE	DM	NONE	
158	EBBTIDE	BALDCYPRESS	9	GOOD	PRESERVE	DM	NONE	

TREATMENT A - REMOVAL OPERATIONS
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 4/12/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

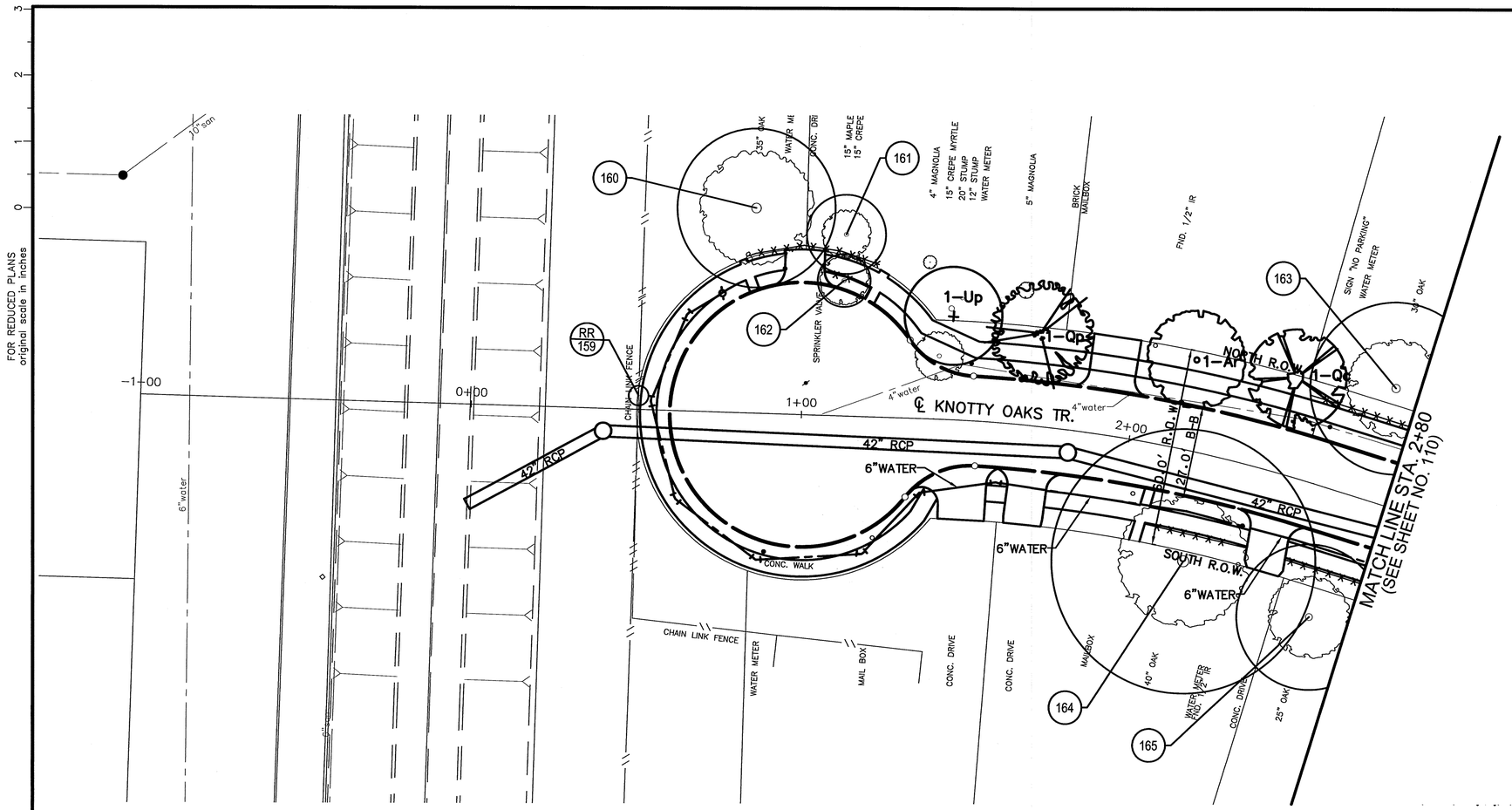
EBBTIDE DR.

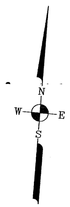
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+60.00 TO STA. 15+20.00

WBS NO.: M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T
SHEET NO. 108 OF 191

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:57:15 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -X-X-X- TREE PROTECTION FENCING (SEE DETAIL)
- -X-X-X- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012 (DATE)

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URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
159	KNOTTY OAKS	PECAN	3	FAIR	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
160	KNOTTY OAKS	ASH	24	GOOD	PRESERVE	DM	NONE	
161	KNOTTY OAKS	SILVER MAPLE	12	POOR	PRESERVE	CDM	NONE	ALMOST DEAD
162	KNOTTY OAKS	CREPEMYRTLE	8	GOOD	PRESERVE	DM	NONE	
163	KNOTTY OAKS	ASH	26	FAIR	PRESERVE	DHM	NONE	CAVITIES
164	KNOTTY OAKS	ASH	40	FAIR	PRESERVE	DHM	NONE	LIONTAILED
165	KNOTTY OAKS	LIVE OAK	22	FAIR	PRESERVE	DHM	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 2+80.00

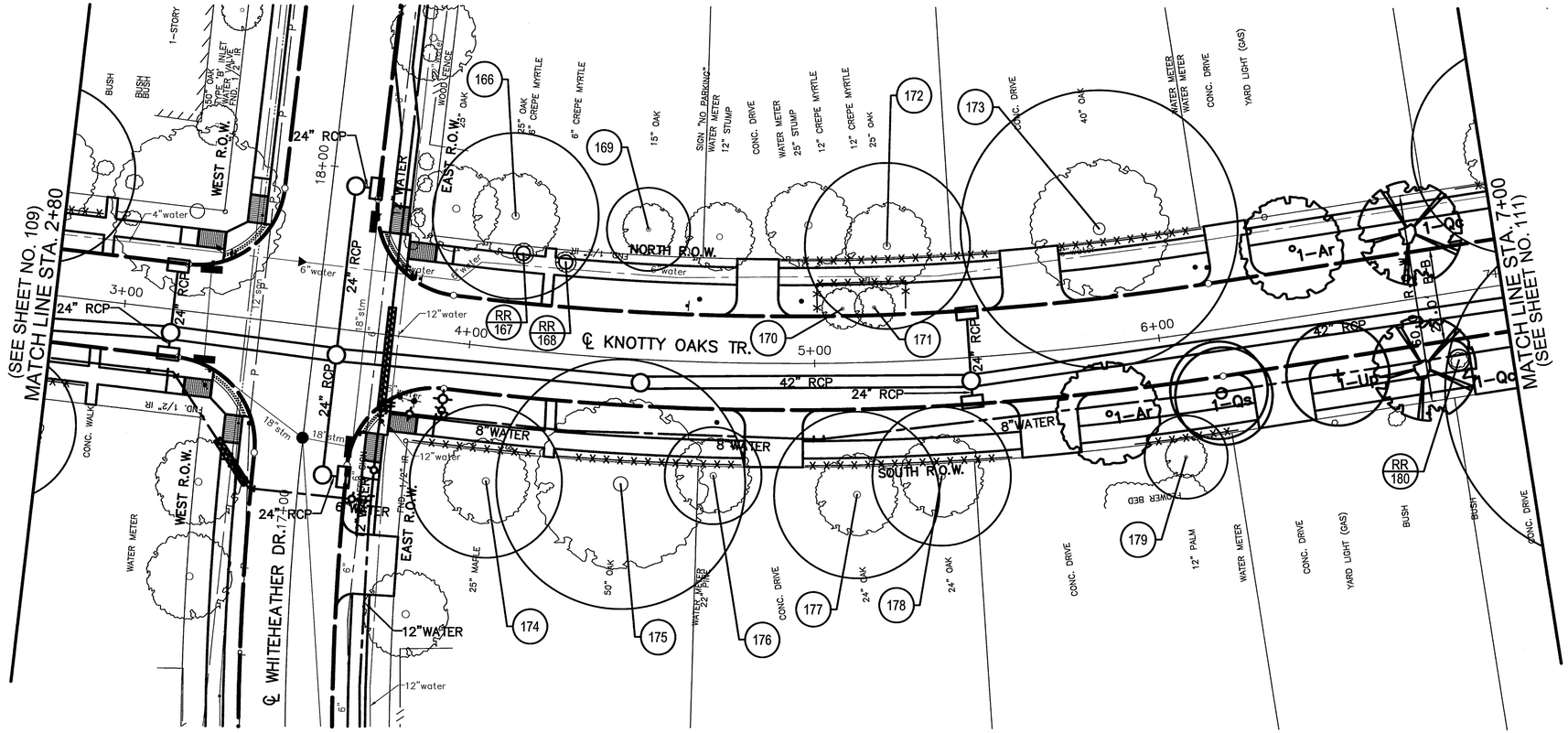
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 109 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:58:08 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches
0 1 2 3 4 5

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- -x-x-x- TREE PROTECTION FENCING (SEE DETAIL)
- -x-–x-x- TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
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5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
166	KNOTTY OAKS	LIVE OAK	24	GOOD	PRESERVE	DM	NONE	CLEARANCE PRUNE
167	KNOTTY OAKS	CREPEMYRTLE	2	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
168	KNOTTY OAKS	CREPEMYRTLE	2	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
169	KNOTTY OAKS	LIVE OAK	12	GOOD	PRESERVE	DM	NONE	
170	KNOTTY OAKS	CREPEMYRTLE	6	GOOD	PRESERVE	DMI	NONE	
171	KNOTTY OAKS	CREPEMYRTLE	6	GOOD	PRESERVE	DMI	NONE	
172	KNOTTY OAKS	ASH	24	GOOD	PRESERVE	DM	NONE	
173	KNOTTY OAKS	ASH	40	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE
174	KNOTTY OAKS	SYCAMORE	22	FAIR	PRESERVE	DHM	NONE	
175	KNOTTY OAKS	WATER OAK	36	GOOD	PRESERVE	DHM	NONE	
176	KNOTTY OAKS	PINE	14	FAIR	PRESERVE	DM	NONE	
177	KNOTTY OAKS	LIVE OAK	24	GOOD	PRESERVE	DHM	NONE	
178	KNOTTY OAKS	LIVE OAK	20	FAIR	PRESERVE	DHM	NONE	TOPPED
179	KNOTTY OAKS	PALM	12	GOOD	PRESERVE	DM	NONE	
180	KNOTTY OAKS	YEW	3	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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KNOTTY OAKS TR.

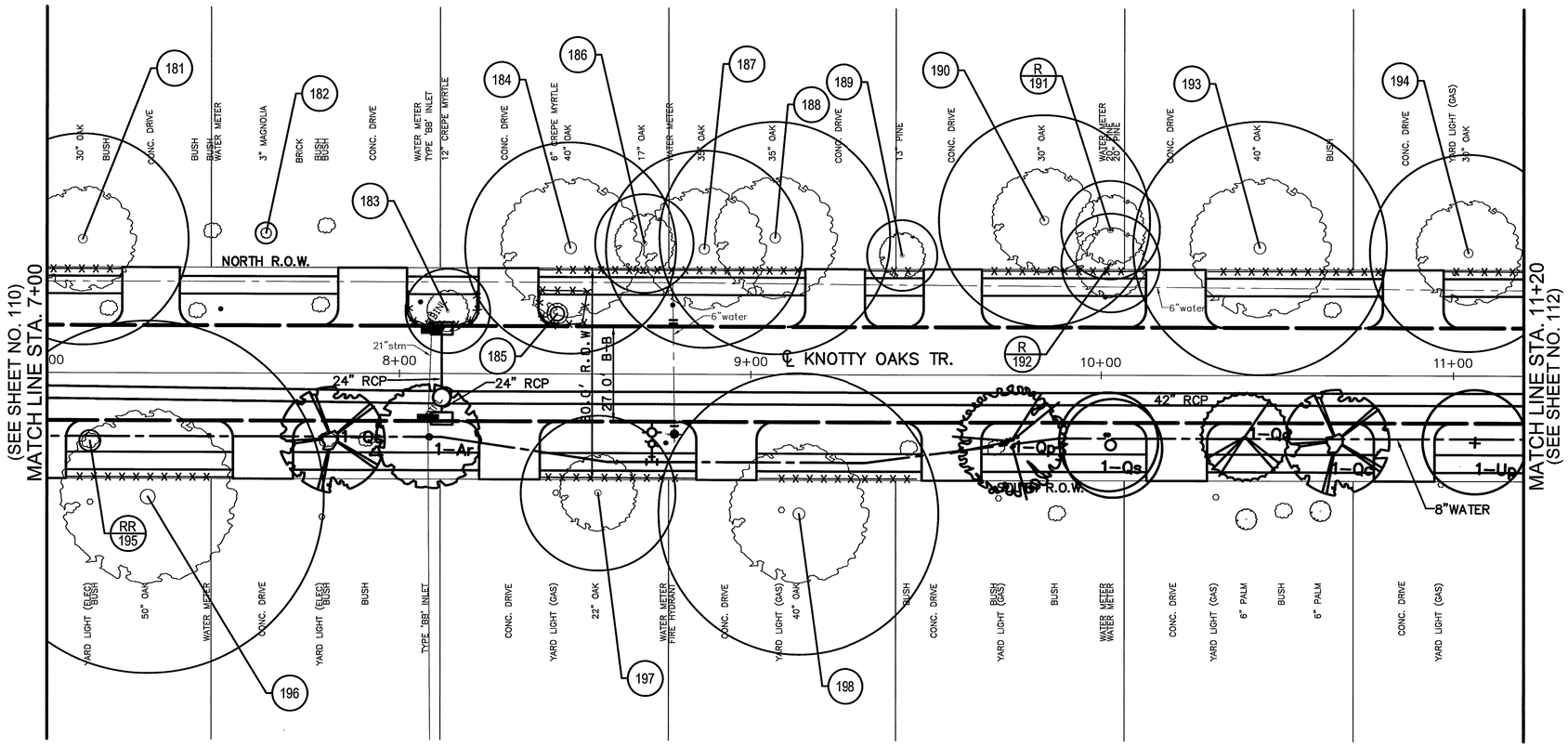
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 2+80.00 TO STA. 7+00.00

WBS NO.:M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 110 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 5:59:35 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
- ×–×–× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

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4/13/2012
(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
181	KNOTTY OAKS	ASH	30	POOR	PRESERVE	DM	NONE	STUMP
182	KNOTTY OAKS	LOQUAT	3	GOOD	PRESERVE	NONE	NONE	
183	KNOTTY OAKS	CREPEMYRTLE	12	GOOD	PRESERVE	DMI	NONE	
184	KNOTTY OAKS	ASH	30	FAIR	PRESERVE	DM	NONE	
185	KNOTTY OAKS	CREPEMYRTLE	2	GOOD	PRESERVE	DM	NONE	
186	KNOTTY OAKS	ASH	14	FAIR	PRESERVE	DM	NONE	
187	KNOTTY OAKS	ASH	28	POOR	PRESERVE	DM	NONE	TALL STUMP
188	KNOTTY OAKS	WATER OAK	33	GOOD	PRESERVE	DM	NONE	
189	KNOTTY OAKS	PINE	10	FAIR	PRESERVE	DM	NONE	
190	KNOTTY OAKS	ASH	30	GOOD	PRESERVE	DM	NONE	
191	KNOTTY OAKS	PINE	14	DEAD	REMOVE	A	NONE	REMOVE,DEAD, HAZARD TREE
192	KNOTTY OAKS	PINE	14	DEAD	REMOVE	A	NONE	REMOVE,DEAD, HAZARD TREE
193	KNOTTY OAKS	ASH	36	GOOD	PRESERVE	BDMI	NONE	CLEARANCE PRUNE
194	KNOTTY OAKS	ASH	28	FAIR	PRESERVE	DM	NONE	TOPPED
195	KNOTTY OAKS	YEW	3	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
196	KNOTTY OAKS	ASH	50	FAIR	PRESERVE	DHMI		TOPPED
197	KNOTTY OAKS	LIVE OAK	22	GOOD	PRESERVE	DHM	NONE	
198	KNOTTY OAKS	ASH	40	FAIR	PRESERVE	DHM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

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FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

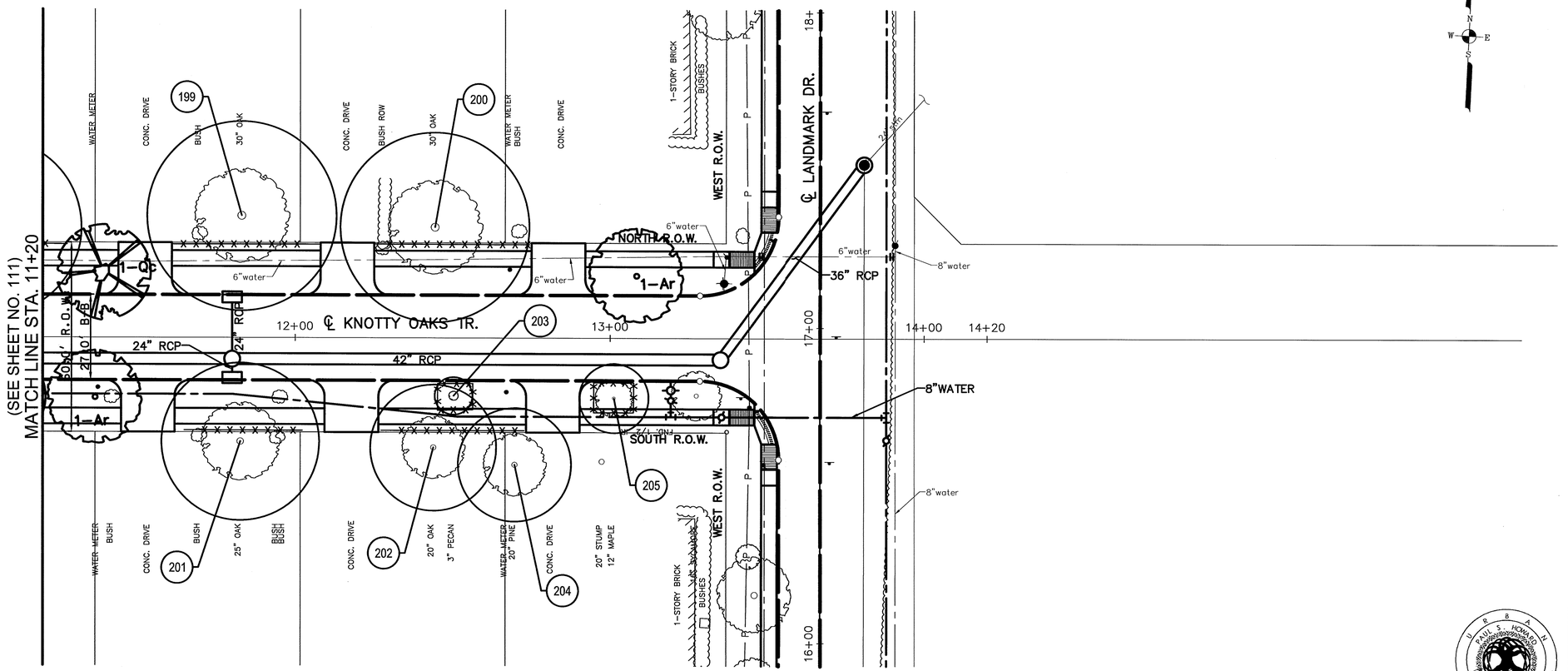
KNOTTY OAKS TR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 7+00.00 TO STA. 11+20.00

WBS NO.:M-000262-0004-4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 111 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:00:54 PM
FILE NAME: F:\WHB–SG4\CAD\TPP\WH–SG4–TPP–H SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
- ×–×–×– TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

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(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
199	KNOTTY OAKS	ASH	30	POOR	PRESERVE	DM	NONE	TALL STUMP
200	KNOTTY OAKS	ASH	30	FAIR	PRESERVE	BDMI	NONE	CLEARANCE PRUNE
201	KNOTTY OAKS	ASH	25	POOR	PRESERVE	DHM	NONE	TOPPED
202	KNOTTY OAKS	ASH	20	FAIR	PRESERVE	DHM	NONE	TOPPED
203	KNOTTY OAKS	PECAN	6	GOOD	PRESERVE	DH	NONE	
204	KNOTTY OAKS	PINE	18	GOOD	PRESERVE	DHM	NONE	
205	KNOTTY OAKS	SWEETGUM	11	FAIR	PRESERVE	DHM	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
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STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED
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SURVEYED BY:
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

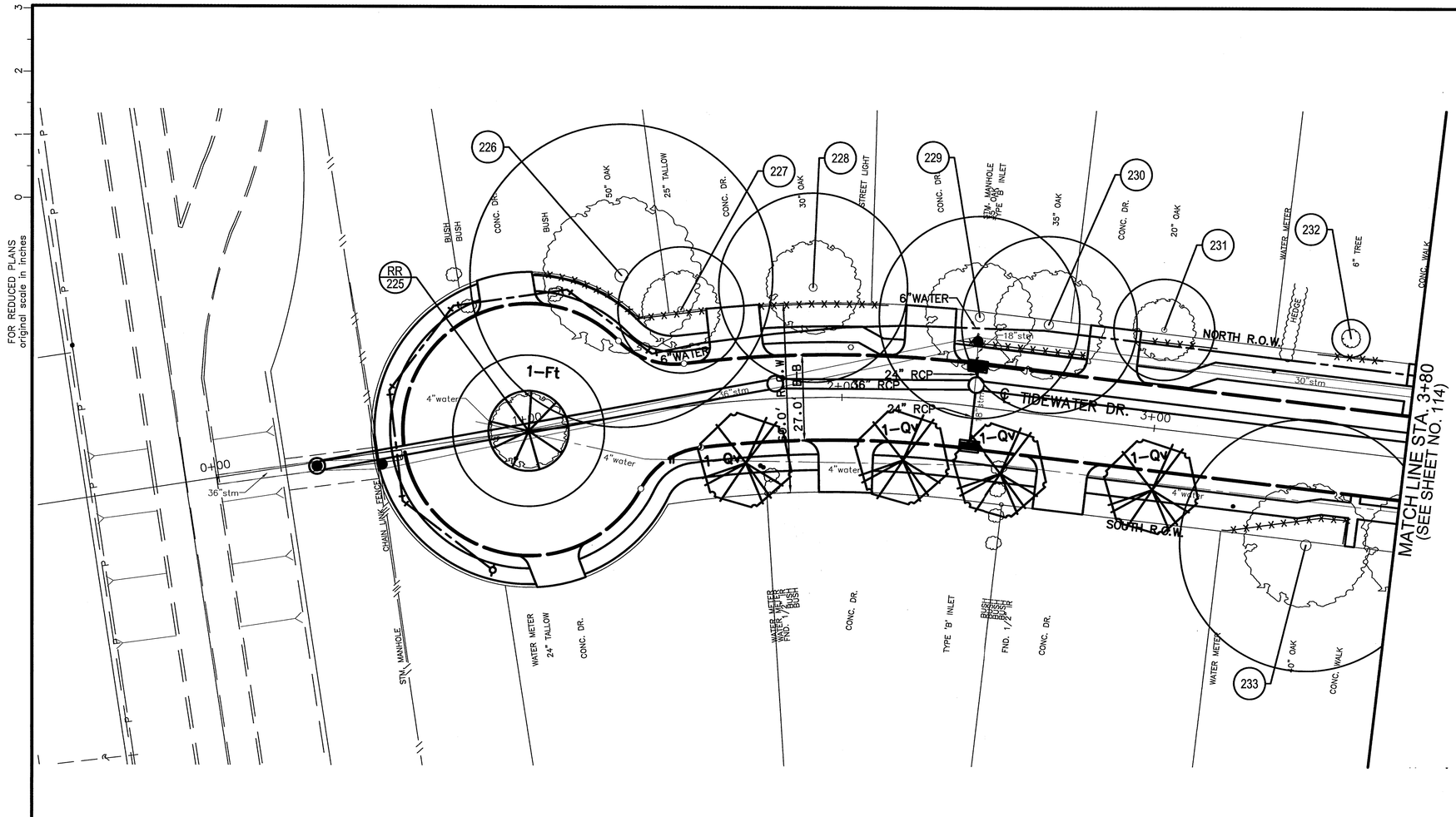
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 11+20.00 TO STA. 14+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T	
SHEET NO. 112 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CIT
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches
0 1 2 3

PLOTTED ON: Thursday, April 12, 2012 6:01:48 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

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(DATE) 4/12/2012

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
225	TIDEWATER	TALLOW	24	GOOD	REMOVE	A	REPLACE INCH FOR INCH	
226	TIDEWATER	ASH	48	GOOD	PRESERVE	DHM	NONE	
227	TIDEWATER	PINE	20	GOOD	PRESERVE	DHM	NONE	
228	TIDEWATER	LIVE OAK	30	GOOD	PRESERVE	DHM	NONE	
229	TIDEWATER	LIVE OAK	32	GOOD	PRESERVE	BDHMI	NONE	CLEARANCE PRUNE
230	TIDEWATER	LIVE OAK	28	GOOD	PRESERVE	BDHMI	NONE	CLEARANCE PRUNE
231	TIDEWATER	LIVE OAK	16	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE
232	TIDEWATER	PEAR	6	GOOD	PRESERVE	D	NONE	
233	TIDEWATER	LIVE OAK	40	GOOD	PRESERVE	BDHMI	NONE	CLEARANCE PRUNE

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TIDEWATER DR.

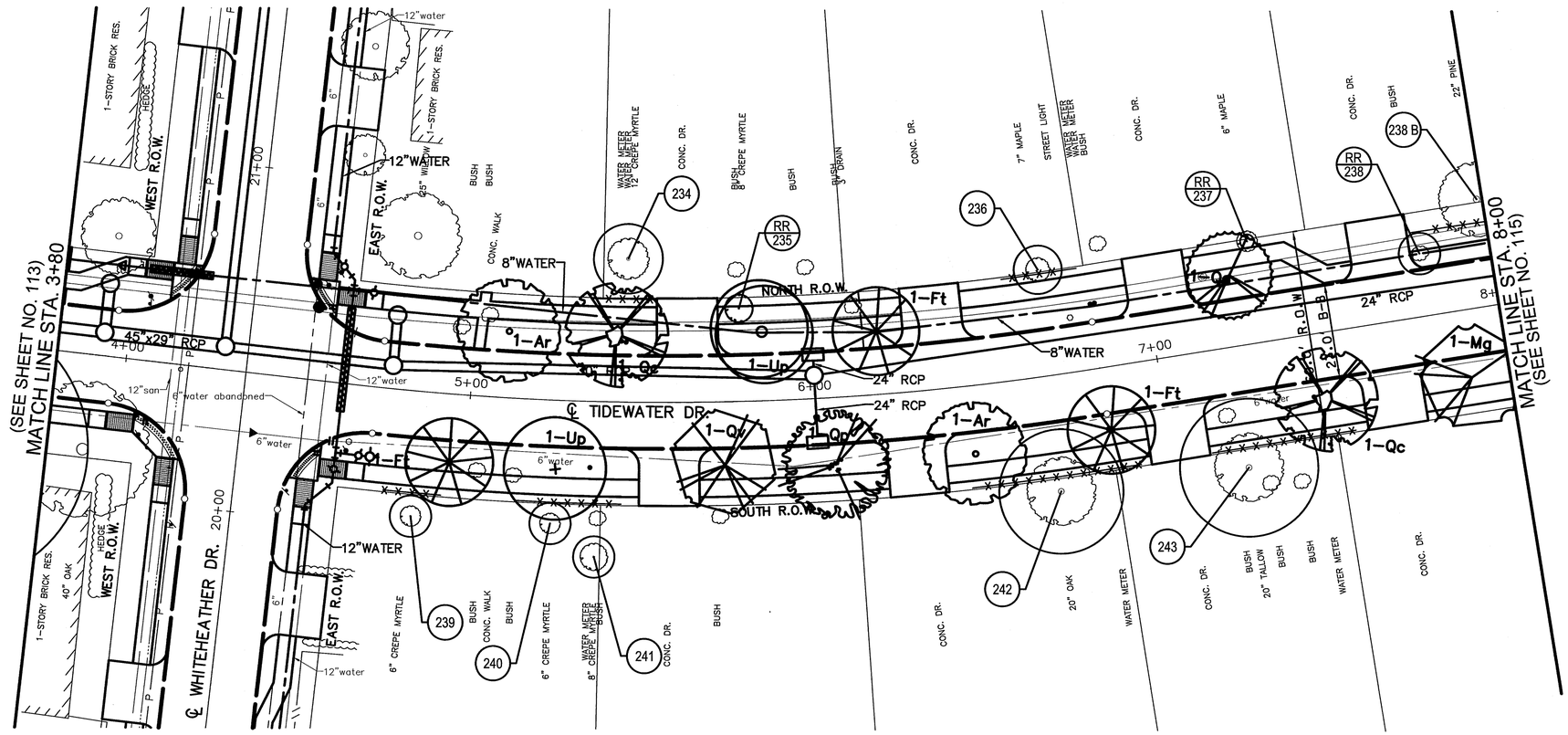
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 3+80.00

WBS NO.:M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T	
SHEET NO. 113 OF 191	

49210
PUBLIC WORKS AND ENGINEERING
CITY ENGINEER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:02:53 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
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- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
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0 20' 40'

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4/13/2012 (DATE)

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URBAN FORESTER
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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
234	TIDEWATER	MAGNOLIA	10	GOOD	PRESERVE	D	NONE	
235	TIDEWATER	CREPEMYRTLE	4	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
236	TIDEWATER	MAPLE	7	FAIR	PRESERVE	DM	NONE	
237	TIDEWATER	PEAR	2	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
238	TIDEWATER	JUNIPER	6	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
238B	TIDEWATER	PINE	14	GOOD	PRESERVE	DHM	NONE	
239	TIDEWATER	LOQUAT	6	GOOD	PRESERVE	D	NONE	
240	TIDEWATER	MAGNOLIA	6	GOOD	PRESERVE	D	NONE	
241	TIDEWATER	CREPEMYRTLE	6	GOOD	PRESERVE	NONE	NONE	
242	TIDEWATER	MAPLE	18	POOR	PRESERVE	DM	NONE	
243	TIDEWATER	TALLOW	20	FAIR	PRESERVE	DM	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED ENGINEER
12-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TIDEWATER DR.

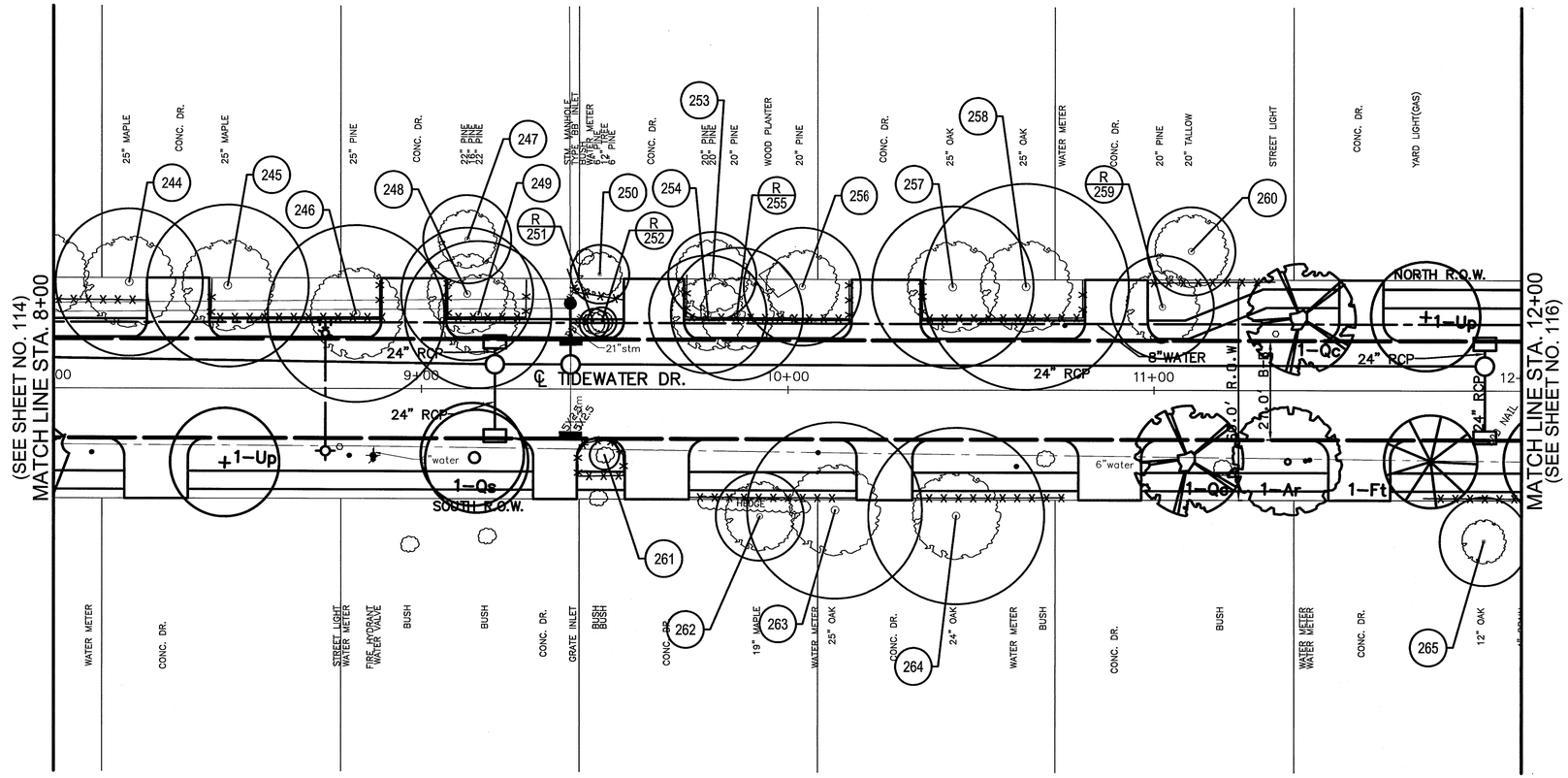
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 3+80.00 TO STA. 8+00.00

WBS NO.:M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	1" = 20'
CITY OF HOUSTON	PM
ISAAC MUNIZ, E.I.T	
SHEET NO. 114 OF 191	

PREPARED FOR THE CITY OF HOUSTON
49210
JAMES
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:03:44 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



FOR REDUCED PLANS
original scale in inches

0 1 2 3

LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012
(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
244	TIDEWATER	SYCAMORE	20	GOOD	PRESERVE	DHM	NONE	
245	TIDEWATER	SYCAMORE	22	GOOD	PRESERVE	DHM	NONE	
246	TIDEWATER	PINE	24	GOOD	PRESERVE	DHMI	NONE	
247	TIDEWATER	PINE	12	GOOD	PRESERVE	NONE	NONE	
248	TIDEWATER	PINE	18	GOOD	PRESERVE	DHMI	NONE	
249	TIDEWATER	PINE	20	GOOD	PRESERVE	DHMI	NONE	
250	TIDEWATER	LIGUSTRUM	8	GOOD	PRESERVE	D	NONE	
251	TIDEWATER	PINE	4	DEAD	REMOVE	A	NONE	REMOVE, DEAD TREE
252	TIDEWATER	PINE	4	DEAD	REMOVE	A	NONE	REMOVE, DEAD TREE
253	TIDEWATER	PINE	12	FAIR	PRESERVE	NONE	NONE	
254	TIDEWATER	PINE	16	FAIR	PRESERVE	DHMI	NONE	
255	TIDEWATER	PINE	18	DEAD	REMOVE	A	NONE	REMOVE, DEAD TREE
256	TIDEWATER	PINE	16	FAIR	PRESERVE	BDHM	NONE	
257	TIDEWATER	LIVE OAK	22	GOOD	PRESERVE	BDHMI	NONE	CLEARANCE PRUNE
258	TIDEWATER	LIVE OAK	28	GOOD	PRESERVE	BDHMI	NONE	CLEARANCE PRUNE
259	TIDEWATER	PINE	14	DEAD	REMOVE	A	NONE	REMOVE, DEAD TREE
260	TIDEWATER	TALLOW	12	FAIR	PRESERVE	D	NONE	
261	TIDEWATER	JUNIPER	4	GOOD	PRESERVE	DM	NONE	
262	TIDEWATER	SWEETGUM	12	GOOD	PRESERVE	DM	NONE	
263	TIDEWATER	ASH	24	GOOD	PRESERVE	DM	NONE	
264	TIDEWATER	ASH	24	GOOD	PRESERVE	DM	NONE	
265	TIDEWATER	PEAR	12	GOOD	PRESERVE	D	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
4/12/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TIDEWATER DR.

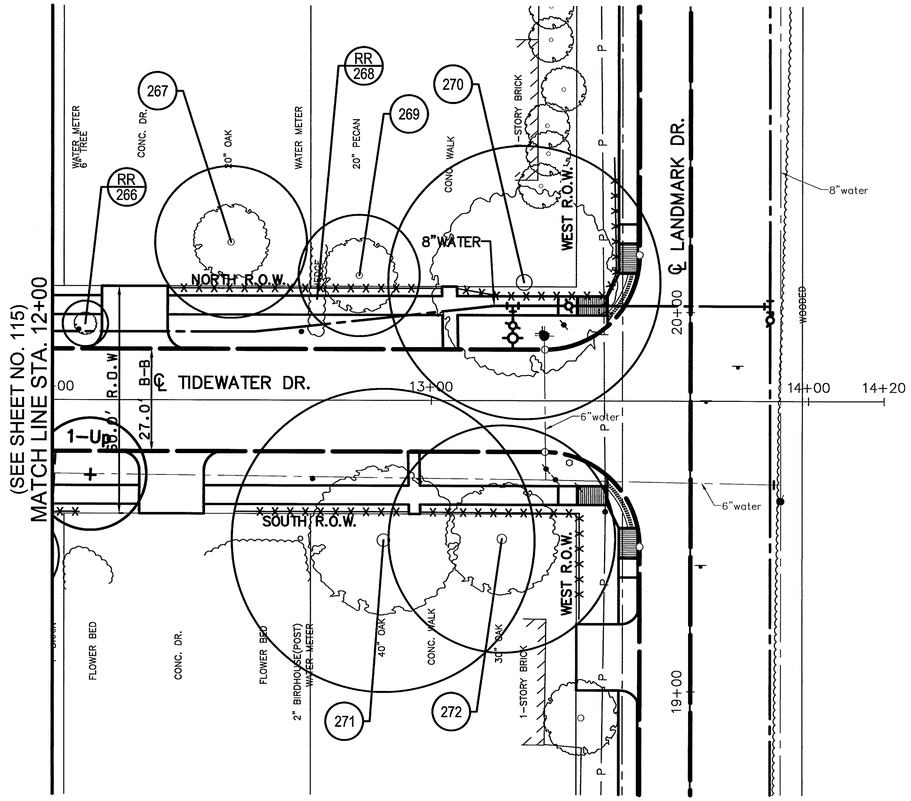
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 8+00.00 TO STA. 12+00.00

WBS NO.:M-000262-0004-4
CITY DWG. NO.:
FILE NO.: SM5056
DRAWING SCALE
1" = 20'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T
SHEET NO. 115 OF 191

PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:05:04 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R/#) REMOVAL TREE
- (RR/#) REMOVE AND REPLACE
- (T/#) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
266	TIDEWATER	LOQUAT	6	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
267	TIDEWATER	ASH	20	GOOD	PRESERVE	DM	NONE	
268	TIDEWATER	CREPEMYRTLE	4	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
269	TIDEWATER	PECAN	16	POOR	PRESERVE	DM	NONE	STUMP SPROUTS
270	TIDEWATER	ASH	36	FAIR	PRESERVE	DHMI	NONE	
271	TIDEWATER	ASH	40	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE
272	TIDEWATER	ASH	30	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS 47746 REGISTERED OMAR J. CORREDOR PROFESSIONAL ENGINEER 4/13/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TIDEWATER DR.

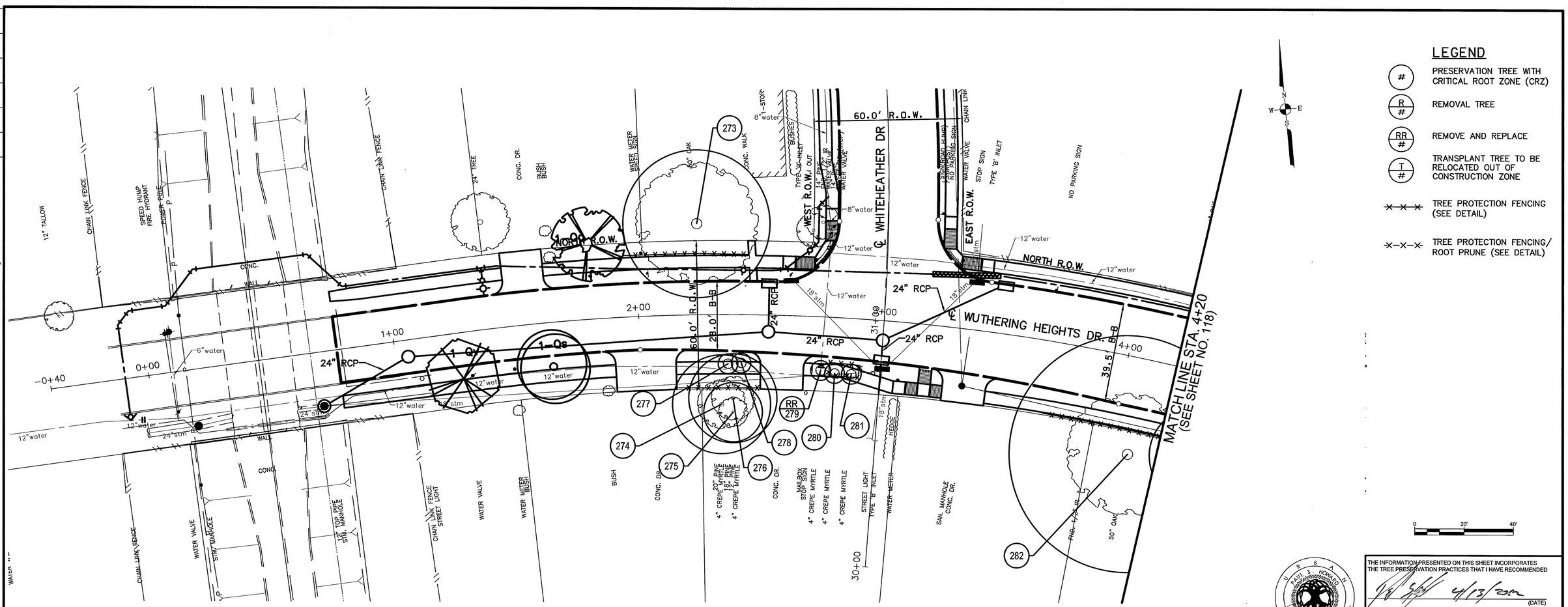
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 12+00.00 TO STA. 14+20.00

WBS NO.: M-000262-0004-4	CITY PROJ. NO.
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 116 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 REGISTERED ENGINEER HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:05:58 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012
(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
273	WUTHERING HEIGHTS	ASH	30	GOOD	PRESERVE	DHM	NONE	
274	WUTHERING HEIGHTS	PINE	20	GOOD	PRESERVE	DM	NONE	
275	WUTHERING HEIGHTS	PINE	12	GOOD	PRESERVE	DM	NONE	
276	WUTHERING HEIGHTS	PINE	18	GOOD	PRESERVE	DM	NONE	
277	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	PRESERVE	DM	NONE	
278	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	PRESERVE	DM	NONE	
279	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
280	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	PRESERVE	DM	NONE	
281	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	PRESERVE	DM	NONE	
282	WUTHERING HEIGHTS	ASH	48	GOOD	PRESERVE	BDM	NONE	CLEARANCE PRUNE

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
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TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
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TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

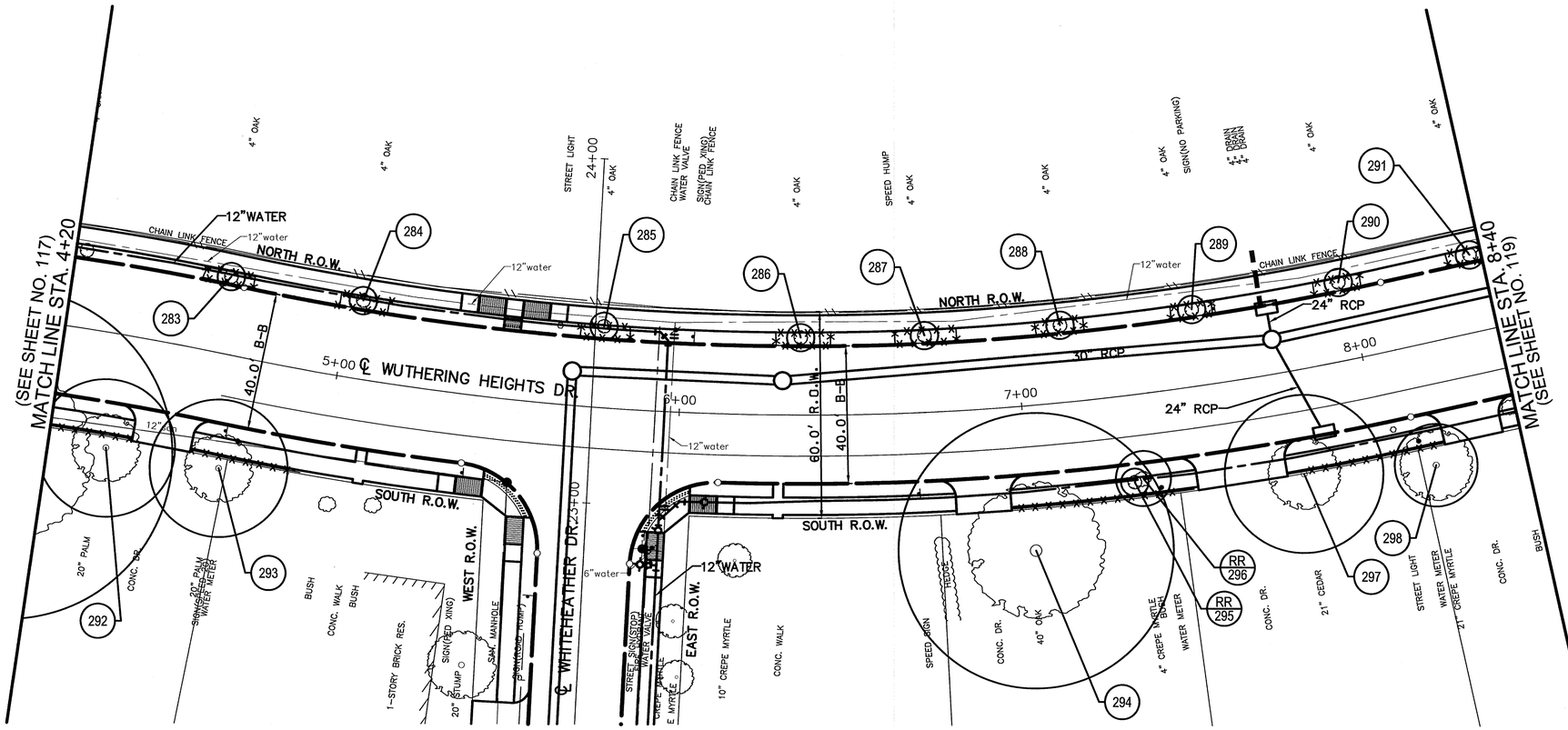
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 0+00.00 TO STA. 4+20.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 20'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T	
SHEET NO. 117 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:07:03 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG

FOR REDUCED PLANS
original scale in inches



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012
(DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
283	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
284	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
285	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
286	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
287	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
288	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
289	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
290	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
291	WUTHERING HEIGHTS	LIVE OAK	4	FAIR	PRESERVE	DM	NONE	
292	WUTHERING HEIGHTS	PALM	20	GOOD	PRESERVE	DM	NONE	
293	WUTHERING HEIGHTS	PALM	20	GOOD	PRESERVE	DM	NONE	
294	WUTHERING HEIGHTS	ASH	40	FAIR	PRESERVE	DHM	NONE	DECAY

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
295	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
296	WUTHERING HEIGHTS	ARBORVITAE	8	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NONE	REMOVE FOR CONSTRUCTION
297	WUTHERING HEIGHTS	ARBORVITAE	23	GOOD	PRESERVE	DHMI	NONE	
298	WUTHERING HEIGHTS	MAGNOLIA	12	GOOD	PRESERVE	DHMI	NONE	

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
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OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
4/13/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

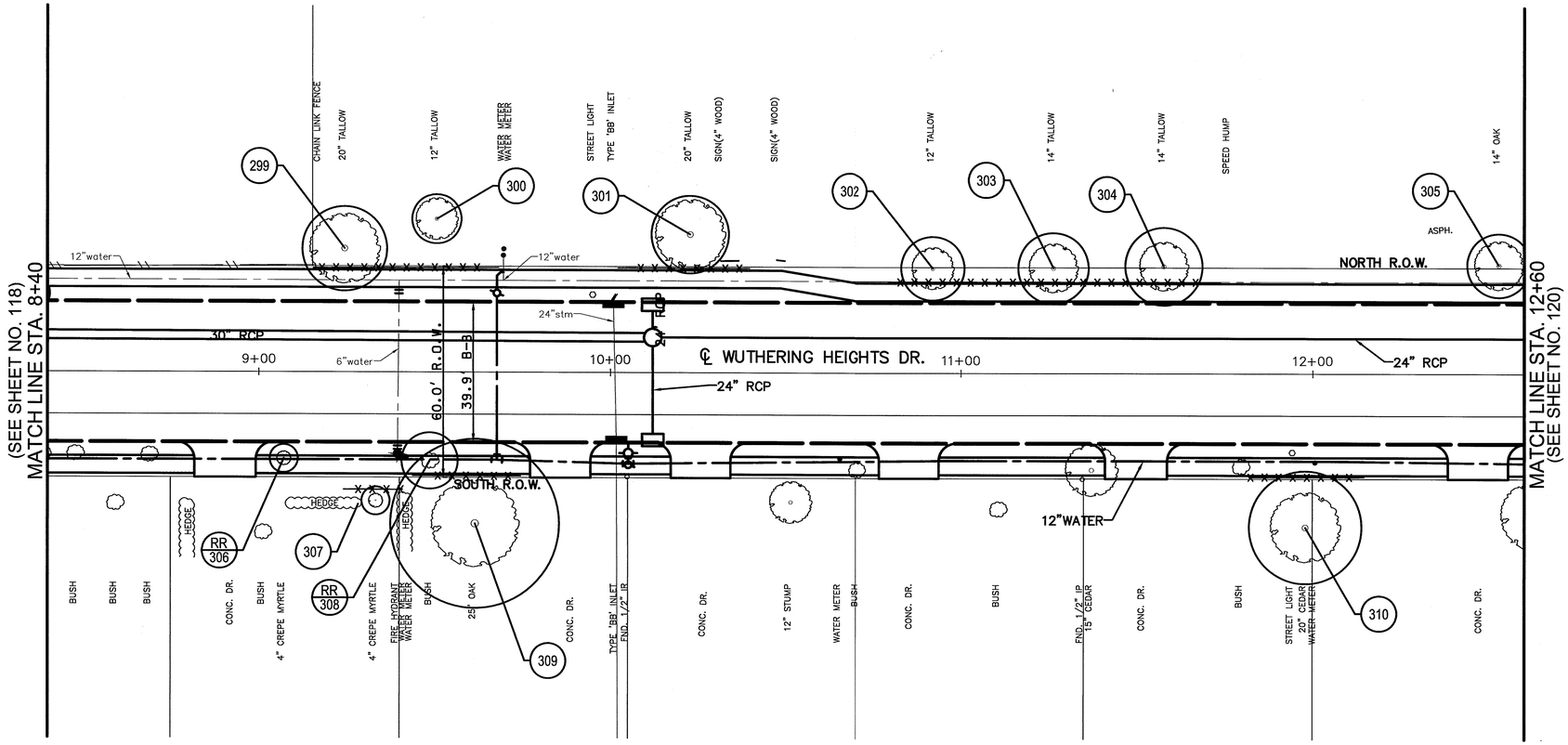
WUTHERING HEIGHTS DR.

TREE PRESERVATION AND PLANTING PLAN
FROM STA. 4+20.00 TO STA. 8+40.00

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	1" = 20'
CITY OF HOUSTON PM	ISAAC MUNIZ, E.I.T.
SHEET NO. 118 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:08:26 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG



LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
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- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×–×–× TREE PROTECTION FENCING (SEE DETAIL)
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0 20' 40'

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/17/2012 (DATE)

BURDITT
URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
299	WUTHERING HEIGHTS	TALLOW	12	FAIR	PRESERVE	DM	NONE	
300	WUTHERING HEIGHTS	TALLOW	7	FAIR	PRESERVE	D	NONE	
301	WUTHERING HEIGHTS	TALLOW	11	FAIR	PRESERVE	DM	NONE	
302	WUTHERING HEIGHTS	TALLOW	9	POOR	PRESERVE	DM	NONE	LARGE CAVITY
303	WUTHERING HEIGHTS	TALLOW	10	GOOD	PRESERVE	DM	NONE	
304	WUTHERING HEIGHTS	TALLOW	11	GOOD	PRESERVE	DM	NONE	
305	WUTHERING HEIGHTS	ASH	9	GOOD	PRESERVE	DM	NONE	
306	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	REMOVE	A	REPLACE INCH FOR INCH	REMOVE FOR CONSTRUCTION
307	WUTHERING HEIGHTS	CREPEMYRTLE	4	GOOD	PRESERVE	D	NONE	
308	WUTHERING HEIGHTS	OLEANDER	8	GOOD	REMOVE	A	~~REPLACE INCH FOR INCH~~ NO MIT.	REMOVE FOR CONSTRUCTION
309	WUTHERING HEIGHTS	ELM	24	POOR	REMOVE	DHM	NONE	
310	WUTHERING HEIGHTS	EASTERN REDCEDAR	16	GOOD	PRESERVE	DM	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

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TREATMENT C - FERTILIZATION TREATMENT
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TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

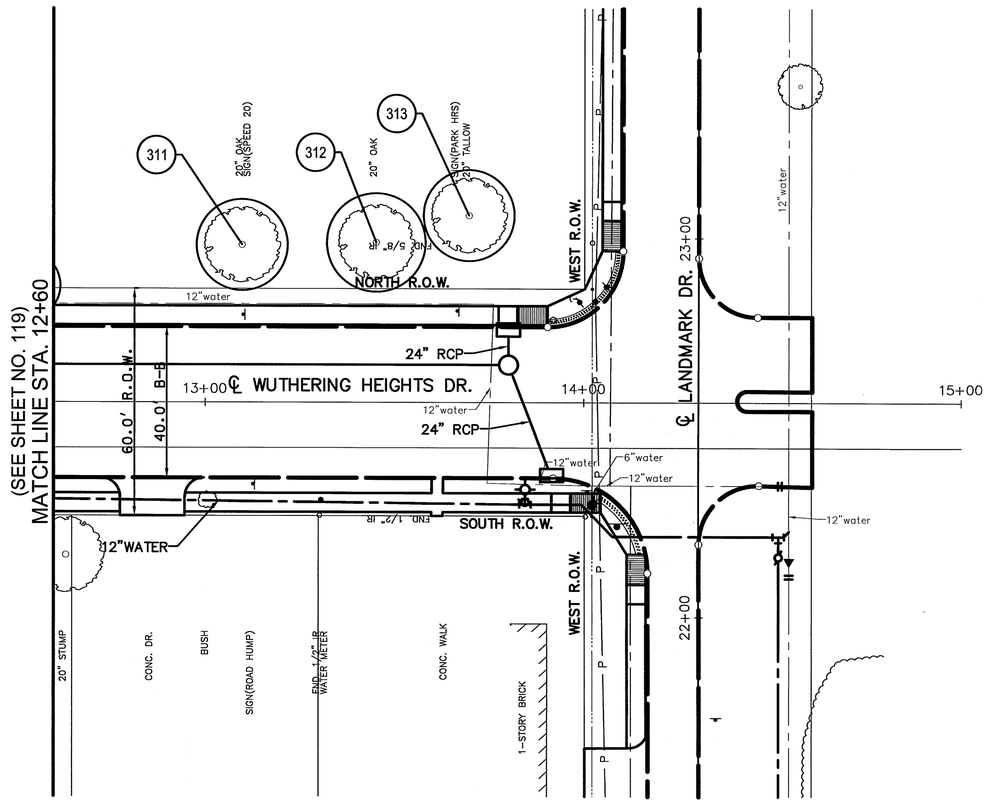
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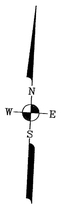
TREE PRESERVATION AND PLANTING PLAN
FROM STA. 8+40.00 TO STA. 12+60.00

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	1" = 20'
CITY OF HOUSTON PM	ISAAC MUNIZ, E.I.T.
SHEET NO. 119 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
LICENSE NUMBER
HOUSTON, TEXAS

PLOTTED ON: Thursday, April 12, 2012 6:09:19 PM
FILE NAME: F:\WHB-SG4\CAD\TPP\WH-SG4-TPP-H SHTS.DWG





LEGEND

- (#) PRESERVATION TREE WITH CRITICAL ROOT ZONE (CRZ)
- (R #) REMOVAL TREE
- (RR #) REMOVE AND REPLACE
- (T #) TRANSPLANT TREE TO BE RELOCATED OUT OF CONSTRUCTION ZONE
- ×-×-× TREE PROTECTION FENCING (SEE DETAIL)
- ×-×-× TREE PROTECTION FENCING/ ROOT PRUNE (SEE DETAIL)

0 20' 40'

SUMMARY OF TREATMENTS		
TREATMENT	QUANTITY	UNIT
REMOVE AND REPLACE	27	PER TREE
REMOVAL	16	PER TREE
MAINTENANCE PRUNING	24	PER TREE
TREE PROTECTION FENCING	4,480	LINEAR FEET
UTILITY BORING	1989	LINEAR FEET
ZERO CURB CUT OPERATION	409	LINEAR FEET
SIDEWALK INSTALLATION PROCEDURES	3842	LINEAR FEET

TREE PRESERVATION AND TREATMENT NOTES:

1. REFER TO TREE PRESERVATION AND TREATMENT SCHEDULE BELOW FOR SPECIFIC EXISTING TREE INFORMATION AND REQUIRED TREE PRESERVATION TREATMENTS.
2. REFER TO TREE PRESERVATION AND TREATMENT SPECIFICATIONS AND DETAIL SHEETS FOR ADDITIONAL INFORMATION.
3. LOCATE ALL BORE PITS OUTSIDE TREE CANOPY AREAS, AND USE THE NECESSARY AUGER LENGTH TO CLEAR THE TREE CANOPIES.
4. CONTRACTOR HAVE CERTIFIED ARBORIST CLEARANCE PRUNE RIGHT-OF-WAY AREA FOR WATER LINE CONTRACTOR.
5. REFER TO TREE PLANTING DETAILS & SPECS FOR TREE PLANTING SCHEDULE.

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS
311	WUTHERING HEIGHTS	LIVE OAK	12	GOOD	PRESERVE	D	NONE	
312	WUTHERING HEIGHTS	LIVE OAK	13	GOOD	PRESERVE	D	NONE	
313	WUTHERING HEIGHTS	TALLOW	12	GOOD	PRESERVE	D	NONE	

TREE	LOCATION	SPECIES	DIA.	CONDITION	STATUS	TREATMENT	MITIGATION	COMMENTS

TREATMENT A - REMOVAL OPERATIONS
TREATMENT B - MAINTENANCE PRUNING
TREATMENT C - FERTILIZATION TREATMENT
TREATMENT D - TREE PROTECTION FENCING
TREATMENT E - MULCHING OPERATION
TREATMENT F - ROOT PRUNING TREATMENT
TREATMENT G - ROOT PRUNING/CHEM. BARRIER INSTALLATION
TREATMENT H - UTILITY BORING OPERATION
TREATMENT I - ZERO CURB CUT OPERATION
TREATMENT J - TRANSPLANT OPERATION
TREATMENT M - SIDEWALK INSTALLATION

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

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FOR REDUCED PLANS
original scale in inches
0 1 2 3

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FOR REDUCED PLANS
original scale in inches

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FILE NAME: F:\WHB-SG4\CAD\STD\TREE PRESERVATION PLAN SPECIFICATION.DWG

TREE PRESERVATION AND TREATMENT SPECIFICATIONS

These Specifications are supplemental to the City of Houston Standard Specifications, Section 01562-Tree and Plant Protection and Harris County Specification, Item 501-Tree Protection and Trimming.

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Removal operation.
2. Maintenance pruning.
3. Fertilization treatment.
4. Tree protection fencing installation.
5. Mulching operation.
6. Root pruning operation.
7. Root pruning/chemical barrier operation.
8. Utility boring operation.
9. Zero curb cut operation.
10. Transplant operation.
11. Replacement planting.
12. Repair/replacement operation.
13. Sidewalk Installation.

B. All Contractors shall meet with the Urban Forester or Owner's Representative to review the Tree Preservation Plan for the site before startup of site work.

C. No site construction shall begin in any areas where tree preservation and treatment measures have not been implemented and approved.

D. Tree preservation and treatment measures shall be reviewed and approved by the Urban Forester or Owner's Representative prior to and immediately following installation.

E. Contractor shall be responsible for compliance to and maintenance of the Tree Preservation Plan.

F. The areas protected by the tree protection fencing are the tree preservation areas. No access to these areas shall be permitted during the construction period without first consulting with the Urban Forester or Owner's Representative.

G. Any roots of preservation trees exposed by construction activity shall be covered with a layer of light topsoil or 10 mil. polyethylene sheeting to prevent desiccation and loss of exposed roots.

H. Any work, excavation, or grading required by construction within the tree preservation areas shall be limited to 2' cut or fill with no roots over 1/2" being cut. This work shall be by hand or with approved equipment and root protection.

I. Trees damaged or lost due to Contractor's negligence during the construction period shall be appraised by the Urban Forester or Owner's Representative and the Owner compensated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fertilizer - "XL Injecto Feed" (32-7-7), a product of Dogget Corporation, Lebanon, NJ, (800) 448-1862.

B. Mycorrhizal Fungi - MycorTree Ecto-Injectable, a product of Plant Health Care, Inc., (800) 421-9051.

C. Tree Protection Fencing:

1. 4' tall plastic, 1" mesh fence.
2. Iron T-bar posts, 6' tall.
3. Wire, 16 gauge ties.

D. Polyethylene Sheeting: minimum 10 mil. thickness, clear.

E. Mulch: First run mulch or site generated mulch.

F. Products of the same type from other sources shall not be excluded, provided they have like physical and functional characteristics and are approved by the Urban Forester or Owner's Representative.

G. Every effort shall be made to utilize chemicals of an organic or biogradable nature in order to offer the least impact to the environment.

PART 3 - IMPLEMENTATION

3.1 TREATMENTS

A. Removal Operation: (Treatment A).

1. Trees designated to be removed by hand on the Tree Preservation Plan shall be painted with an "X" by the Urban Forester or Owner's Representative.
2. Designated removal trees shall be replaced on an inch for inch basis for the total diameter inches removed.
3. Plant replacement trees as near as possible to their original location (See planting procedure).
4. All tree removals shall be done by a certified Arborist by hand work.
5. All wood and debris from tree removal shall be removed from the site immediately.
6. All stumps shall be ground down to 12" below grade.
7. Any damage to preservation trees occurring during the removal operation shall be repaired.

B. Maintenance Pruning: (Treatment B).

1. Trees to be pruned are designated on the Tree Treatment Schedule and will be identified by the Urban Forester or Owner's Representative.
2. All maintenance pruning work shall be done by a certified Arborist.
3. A Tree Treatment Schedule listing the preservation trees and treatments will be provided.
4. Pruning shall consist of the following method:

(a) Pruning as defined by the American National Standard for Tree Care Operations - Tree Shrub and Other Woody Plant Maintenance Standards. This would include:

(1) Crown raising or clearance pruning shall consist of the removal of the lower branches of a tree to provide clearance for streets and sidewalks while maintaining a balanced form.

(b) All pruning cuts on Oak trees shall be covered with a thin coat of water-based black paint approved by Urban Forester or Owner's Representative if pruning is to occur in April, May, or June.
(c) All wood and debris from pruning operations shall be removed from the site.

C. Fertilization Treatment - (Treatment C).

1. Preservation trees shall be treated as designated on the Tree Treatment Schedule.
2. Injection of the fertilizer into the root zone of a tree shall consist of the following methods:

(a) Mix in a tank with agitation capability:

(1) Fertilizer - 9 pounds by weight per 100 gallons water.
(2) Mycorrhizal Fungi - 1 lb. per 100 gallons water.

(b) Inject the Mixture on a 2.5 ft. square grid at 1/2 gallon of mix per hole or 8 gallons per 100 square feet.
(c) Injection pressure shall be 100-150 PSI as soil conditions warrant.
(d) Depth of injection shall be 6 - 12 inches.
(e) Inject the root zone areas, where possible, in the available canopy areas plus 10 feet beyond dripline, but not in root loss zone.

3. Contractor is responsible for mixing, applying and disposal of all chemicals in accordance with strict adherence to manufacturer's directions and/or State and Federal Regulations.

D. Tree Protection Fencing Installation (Treatment D - refer to Tree Preservation Details).

1. Tree protection fencing is designated in the Tree Preservation Plan.
2. Fencing as follows:

(a) Fabric, 4' tall plastic fence.
(b) Iron T-bar posts, 6' tall, placed 8' - 0" on center, 24" into the ground.
(c) Fence is to be attached to posts with wire ties placed every 24" on center.
(d) Fence is to be placed a minimum of 1 foot from all root prune lines.

3. No access to fenced areas shall be permitted without prior approval of the Urban Forester or Owner's Representative.
4. Contractor shall provide for maintenance and repair of fencing during site work construction.
5. Contractor shall remove fence after completion of the site work unless otherwise notified by the Owner.

E. Mulching Operations (Treatment E).

1. A 4" layer of mulch shall be placed in the canopy area of trees where exposed soil or roots are present.
2. Approved access through the canopy areas foar construction equipment or vehicles shall be covered with 6" of mulch covered by 3/4" plywood.

F. Root Pruning Operation (Treatment F - refer to Tree Preservation Details).

1. Trenching areas are designated in the Tree Preservation Plan and exact locations will be marked in the field by the Urban Forester or Owner's Representative.
2. All encroachments located in the canopy of trees shall have the tree side of the excavation root pruned before excavation.
3. Trenching shall be backfilled and compacted immediately after trenching.
4. Trenching shall be backfilled and compacted immediately after trenching.
5. All excavated material shall be placed outside the canopy of the tree or on plywood cover under the canopy of the tree to protect the root zone area.
6. Topsoil should be kept aside so as not to mix with sub grade material and placed back in the pit on the top of the backfill.

G. Root Pruning/Chemical Barrier Installation (Treatment G-refer to Tree Treatment Details).

1. Root Pruning Chemical barrier shall be installed where root pruning is scheduled to be done at the back of curb line for the new curb line.
2. All specifications for root pruning trenching shall apply to this installation with the following additional requirements:
(a) 10 mil Polyethylene sheeting shall be placed in the trench to the bottom of the trench.
(b) Anchor sheeting at the top of the trench in order to backfill the trench.
(c) Cover the top of the sheeting so that no sheeting is exposed.

H. Utility Boring (Treatment H.).

1. All utilities will be bored through the Critical Root Zone (CRZ) of all protected trees.
2. Bore pits will be outside the CRZ of each protected tree.
3. Bore layout must be approved in the field by the Urban Forester or Owner's Representative.
4. Any necessary excavations within the CRZ of protected trees will require the approval of the Urban Forester or Owner's Representative.

I. Zero Curb Cut Operation (Treatment I-refer to Tree Treatment Details).

1. Removal of the old curb located within the canopy area of preservation trees will be done in the following manner:
(a) Dig our the existing street in front of curb to the bottom of existing curb.
(b) Remove existing curb by pulling it into the street excavation without digging or clawing behind the curb.
(c) Cover the exposed soil and roots immediately with 10 mil clear plastic to prevent desiccation of roots.
(d) Anchor the plastic cover with wooden stakes driven into the soil (avoiding tree roots) behind the old curb edge.
(e) Plastic shall be removed at the same time as backfill is being placed so that the roots are not exposed to air.
(f) New curb installation shall be formed and poured without disturance or damage to the exposed roots located at the edge of the oldremoved curb.
(g) Where necessary, backfill between the old and new curb area shall consit of:
(1) Backfill void up to within 6" of the top of the curb with a material acceptable to engineering standards. This material shall be clean and free of rocks, debris, or chemical residues that pose a threat to the root environment.
(2) The remaining 6" of fill behind the curb shall be of the specified topsoil mix.
(h) Back fill behind the old curb area (Tree Preservation Area) shall consist of the specified topsoil mix. This mix shall be applied in depths of no greater than 3" to the critical root zones of the protected trees by hand.

J. Transplant Operation (Treatment J refer to Tree Treatment Details).

1. Trees designated for transplanting are designated in the Tree Treatment Schedule.
2. Transplants are to be relocated to a location determined by the Urban Forester or Owner's Representative.
3. Contractor shall be responsible for proper relocation, planting, and maintenance of the transplanted trees for one (1) year.

K. Replacement Planting (Refer to Tree Treatment Details).

1. Replacement tree planting locations shall be indicated by the owner's representative.
2. Contractor is responsible for verifying locations of underground utilities prior to construction.
3. Trees shall be planted at least five (5') feet from any utility line, curb or sidewalk and outside all utility easements.
4. All plant material shall be maintained in a healthy growing condition, and must be replaced with plant material of similar variety and size if damaged, destroyed, diseased, or removed.
5. Measurement: Dimensions of trees and shrubs shall conform to the American Standard for Nursery Stock, latest edition (ANSI Z-60).
6. All trees shall be staked and secured according to accepted industry practice and details.
7. Each newly planted tree and shrub shall be pruned in accordance with the American Association of Nurserymen Standards or as directed by owner's representative to preserve the natural character of the plant. All dead wood, sucker, and broken or badly bruised branches shall be removed.
8. Guarantee: All plant material shall be guaranteed by the contractor for one full year from the date of installation. The owner shall be responsible for maintenance unless otherwise agreed with contractor. It shall be the contractor's responsibility to monitor the project during the guarantee period and inform the owner if problems develop with the plant material. A plant shall be considered dead if 25% or more of the crown, or main leader has died.

L. Repair/Replacement Operations

1. If any damage to preservation trees should occur beyond what is expected during the construction period, the Urban Forester or Owner's Representative shall appraise the damage and order the repair by the contractor or responsible party.
2. Trees other than those designated for removal that are destroyed or irreparably damaged as a result of construction operations, shall be removed and replaced with the same size species and variety up to and including 8 inches in 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 as determined by a qualified appraiser using the Guide for Plant Appraisal published by the International Society of Arboriculture (9th Edition 2000).
3. Owner shall be compensated for all costs involved in mitigation of damages and the appraisal thereof by the Urban Forester or Owner's Representative.

M. Sidewalk Installation (Treatment M)

1. Route new sidewalks as far away from tree trunks as possible.
2. New sidewalks to be installed in the Critical Root Zone of protected trees shall be installed without excavating into grade and destroying vital roots.
3. Where possible, install new sidewalks in the footprint of the old sidewalks without disturbing underlying roots or existing grade.
4. Demolition of old sidewalks shall be done without disturbing underlying roots or existing grade.
5. All roots exposed from either demolition of an existing sidewalk or removal of vegetation cover shall be covered with 10 millimeter plastic sheeting or 2 inches of sand to prevent desiccation of roots.
6. No stabilized sand shall be used for sidewalks or in the Critical Root Zonees of protected trees. Substitute geo-textile fabric for stabilized base.
7. Positive drainage must be maintained or provided in the Critical Root Zone where new sidewalks are to be installed.

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4/13/2012 (DATE)

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LICENSED PROFESSIONAL ENGINEER
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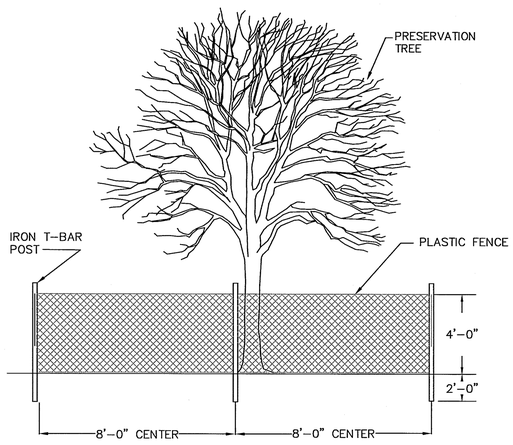
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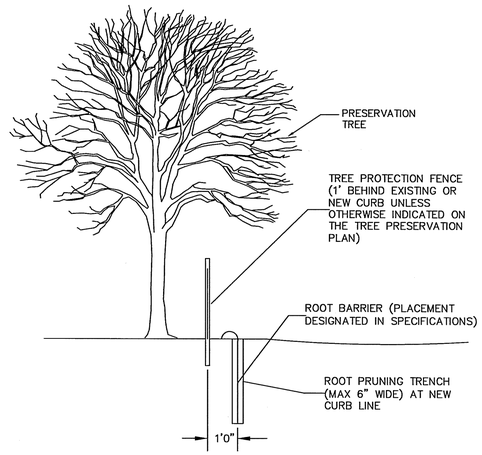
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original scale in inches

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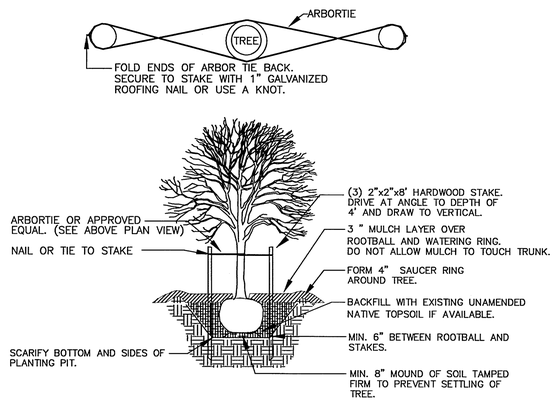
1 FRONT VIEW – TREE PROTECTION FENCING DETAIL

NOT TO SCALE



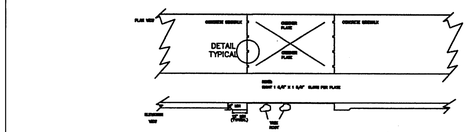
2 SIDEVIEW – ROOT PRUNING DETAIL INCLUDING CHEMICAL BARRIER DETAIL

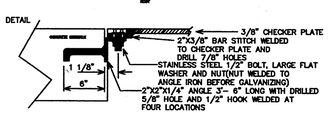
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3 TREE PLANTING DETAIL

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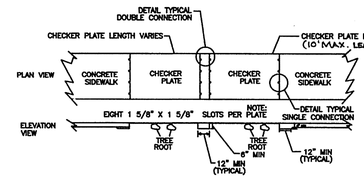


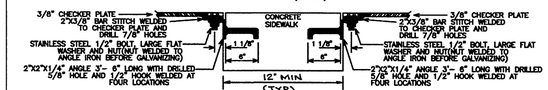


CHECKERPLATE DETAIL-SINGLE CONNECTION

NOT TO SCALE

NOTE:
ALL IRONWORK TO BE HOT DIPPED GALVNIZED EXCEPT AS NOTED.





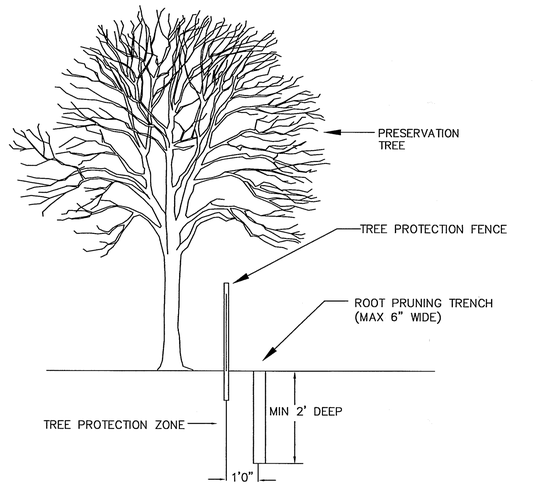
CHECKERPLATE DETAIL-DOUBLE CONNECTION

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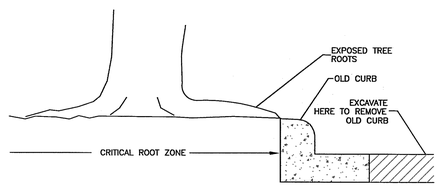
7 CHECKER PLATE TREE ROOT PROTECTION SIDEWALK

NOT TO SCALE

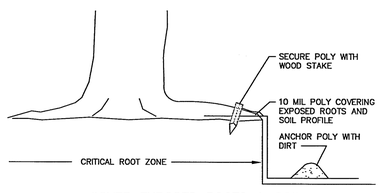


4 SIDEVIEW – ROOT PRUNING DETAIL

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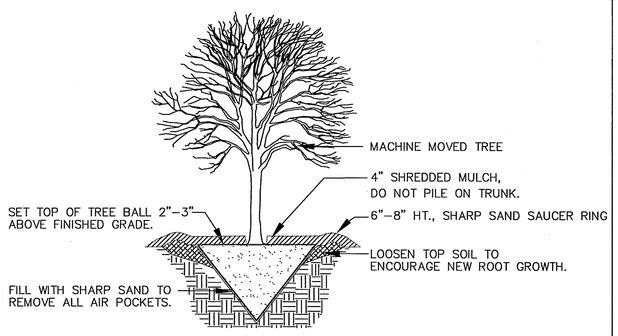
OLD CURB REMOVAL



COVER EXPOSED ROOTS & SOIL

5 SIDEVIEW – ZERO CURB CUT DETAIL

NOT TO SCALE



6 TRANSPLANT DETAIL

NOT TO SCALE

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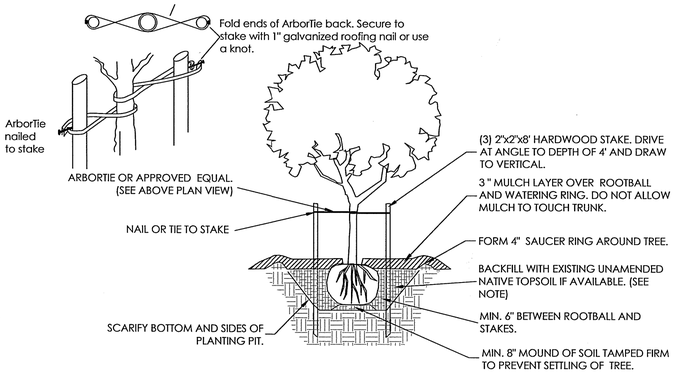
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FOR REDUCED PLANS
original scale in inches

PLANT SCHEDULE

Symbol	Size / Type	Description	Qty.
#-Qv	3" 1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	LIVE OAK Quercus virginiana (spacing as shown)	4
#-Ar	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	RED MAPLE Acer rebrum (spacing as shown)	
#-Qc	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	CANBY OAK Quercus canbyi (spacing as shown)	
#-Qs	3" 1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	SHUMARD OAK Quercus shumardii (spacing as shown)	5
#-Uc	3" 1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	CEDAR ELM Ulmus crassifolia (spacing as shown)	5
#-Up	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	DRUKE ELM Ulmus parvifolia (spacing as shown)	
#-Qa	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	SAWTOOTH OAK Quercus acutissima (spacing as shown)	
#-Fl	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	TEXAS ASH Fraxinus texensis (spacing as shown)	
#-Qp	3" 1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	MONTERREY OAK Quercus polymorpha (spacing as shown)	5
#-Mg	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	SOUTHERN MAGNOLIA Magnolia grandiflora (spacing as shown)	
#-Fa	1 1/2" Cal. 15 Gal. 6-8' Ht., 3-4' Ct.	WHITE ASH Fraxinus americana (spacing as shown)	
		TOTAL: INCHES	58
		TOTAL TREES	19

TOTAL INCHES TO MITIGATE	58
TOTAL INCHES PLANTED	58



DETAIL NOTES:
1. PLANT TREE WITH 1.5"-2" OF ROOTBALL ABOVE FINISHED GRADE.
2. SET STAKES WITHIN MULCH BED OF TREE.
3. PLACE STAKES AT EQUAL DISTANCES AROUND TREE.
4. PLACE MULCH AND WATER TREE THOROUGHLY AFTER PLANTING.
5. PLANTING PIT SHALL BE A MINIMUM OF TWICE THE DIAMETER OF THE ROOTBALL.
6. IF EXISTING NATIVE TOPSOIL IS NOT AVAILABLE USE APPROVED TOPSOIL.
7. REMOVE STAKING AFTER ONE YEAR.

1 TREE PLANTING DETAIL

NOT TO SCALE

GENERAL NOTES

1. CONTRACTOR TO VERIFY CITY, COUNTY, AND STATE SITE INFORMATION, INCLUDING PROPERTY LINES, EASEMENTS, R.O.W.S, BUILDINGS, ROADWAY CURB AND GUTTERS, UTILITIES AND OTHER INFORMATION AFFECTING THE SCOPE OF WORK INCLUDED ON THESE DRAWINGS. MORE SPECIFIC UTILITY INFORMATION IS INDICATED ON THE CIVIL DRAWINGS. CONTRACTOR SHALL CONTACT THE OWNER OR OWNER'S REPRESENTATIVE FOR DIRECTION ON HOW TO PROCEED IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE CIVIL OR LANDSCAPE PLANS.
2. EXCAVATION IN THE VICINITY OF UTILITIES SHALL BE UNDERTAKEN WITH CARE. THE CONTRACTOR BEARS FULL RESPONSIBILITY FOR THIS WORK. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL SITE UTILITIES PRIOR TO BEGINNING EXCAVATION. ANY DAMAGE TO UTILITIES THAT ARE TO REMAIN CAUSED BY ANY PERSON, VEHICLE, EQUIPMENT, OR TOOL RELATED TO THE EXECUTION OF THE CONTRACT SHALL BE REPAIRED IMMEDIATELY AT NO EXPENSE TO THE OWNER.
3. BASE INFORMATION INCLUDING THE LOCATION OF PROPERTY LINES, EASEMENTS, BUILDINGS, ROADS AND CURBS HAVE BEEN TAKEN FROM THE ARCHITECTS DRAWINGS. FOR ADDITIONAL INFORMATION REFER TO CIVIL DRAWINGS.
4. BUILDING FOOTPRINTS HAVE BEEN TAKEN FROM THE ARCHITECTURAL DRAWINGS. FOR ADDITIONAL INFORMATION REFER TO ARCHITECTURAL DRAWINGS.
5. THE CONTRACTOR SHALL NOTIFY LOCAL AUTHORITIES AND THE GENERAL CONTRACTOR FOR LOCATION OF EXISTING UNDERGROUND UTILITIES AND EASEMENTS. EXCAVATE AS NECESSARY TO CONFIRM LOCATIONS PRIOR TO EXCAVATION.
6. DO NOT SCALE OFF OF DRAWINGS FOR DIMENSIONS. CONTRACTOR WILL ENGAGE A PROFESSIONAL LAND SURVEYOR TO PROPERLY LAY OUT CONSTRUCTION SITE HARDSCAPE FEATURES. IF REQUIRED DIMENSIONAL INFORMATION IS NOT OBTAINABLE FROM DRAWINGS IT IS CONTRACTOR'S RESPONSIBILITY TO NOTIFY LANDSCAPE ARCHITECT OF THIS NEED SO ADDITIONAL INFORMATION MAY BE FURNISHED TO CONTRACTOR.

GRADING AND EXCAVATION NOTES:

1. ANY EXISTING AND / OR ON-SITE CONDITIONS WHICH VARY FROM THOSE SHOWN ON DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE.
2. FOR EXISTING UNDERGROUND UTILITIES REFER TO CIVIL DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION AND ELEVATION IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION OF THE NEW AMENITIES. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION.
3. THE DEBRIS CREATED BY REMOVAL OPERATIONS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LEGALLY DISPOSED OF AWAY FROM THE JOB SITE. SUBSOIL SHALL NOT BE REUSED FOR TOPSOIL.
4. REFER TO CIVIL DRAWINGS FOR ALL DRAINAGE STRUCTURES AND EROSION CONTROL.
5. FOR ROUGH GRADING REFER TO CIVIL DRAWINGS.
6. GENERAL CONTRACTOR SHALL LEAVE LANDSCAPE CONTRACTOR SITE AT APPROXIMATELY FINAL GRADE, (SEE 8). LANDSCAPE CONTRACTOR SHALL ESTABLISH SMOOTH AND UNIFORM GRADES WITH A MAXIMUM SLOPE OF 3:1 UNLESS OTHERWISE NOTED. TIE INTO EXISTING ADJACENT GRADES SMOOTHLY AND FINE GRADE FOR POSITIVE DRAINAGE AND TO PREVENT WATER FROM STANDING. CUT SWALES TO DIRECT WATER AWAY FROM ALL STRUCTURES AND PROPERTY LINES, AND TOWARDS STORM SEWER INLETS. DO NOT DRAIN ANY WATER TOWARDS LOTS, EASEMENTS, OR BUILDINGS. FINAL LOCATION AND HEIGHT OF BERMS AND PLANTING BEDS TO BE APPROVED BY LANDSCAPE ARCHITECT.
7. FINAL GRADE AT TOP OF MULCH OF PLANTING BEDS DIRECTLY ABUTTING TO ANY BUILDING WILL BE A MINIMUM OF 6" BELOW FINISHED FLOOR ELEVATION AND GRADED AWAY FROM BUILDINGS FOR POSITIVE DRAINAGE. IN ADDITION, ANY WEEP HOLES IN BRICK OR MASONRY FASCIA OF WALLS SHALL NOT BE COVERED UP, BURIED, OR BLOCKED FROM ALLOWING THEM TO FUNCTION PROPERLY.
8. GENERAL CONTRACTOR TO LEAVE FINISHED GRADES FOR LANDSCAPE CONTRACTOR, AS FOLLOWS:
   AREAS WITH SOLID SOD ADJACENT TO CURB/SIDEWALK = FINISHED GRADE 2" BELOW TOP OF CURB/SIDEWALK
   AREAS WITH HYDROMULCH ADJACENT TO CURB/SIDWALK = FINISHED GRADE 1" BELOW TOP OF CURB/SIDEWALK
   AREAS WITH PLANTING BEDS ADJACENT TO CURB/SIDEWALK = FINISHED GRADE 6" BELOW TOP OF CURB/SIDEWALK
   FINISHED GRADE ADJACENT TO BUILDING STRUCTURE = MIN. 9" BELOW F.F.E. FOR POSITIVE DRAINAGE

PLANTING NOTES:

1. FINAL GRADING SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE IN THE FIELD PRIOR TO PLANTING OR PLANTING LAYOUT.
2. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATIONS OF UNDERGROUND UTILITIES AND R.O.W.'S PRIOR TO CONSTRUCTION.
3. TREES SHALL BE PLANTED AT LEAST FIVE (5') FEET FROM ANY UTILITY LINE AND OUTSIDE ALL UTILITY EASEMENTS.
4. ALL PLANT MATERIAL SHALL BE MAINTAINED IN A HEALTHY GROWING CONDITION, AND MUST BE REPLACED WITH PLANT MATERIAL OF SIMILAR VARIETY AND SIZE IF DAMAGED, DESTROYED, DISEASED, OR REMOVED.
5. LANDSCAPED AREAS SHALL BE KEPT FREE OF TRASH, LITTER, AND WEEDS AT ALL TIMES DURING CONSTRUCTION.
6. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR FINE GRADING, REMOVAL OF MISCELLANEOUS DEBRIS AND ANY ADDITIONAL FILL REQUIRED TO CREATE A SMOOTH CONDITION PRIOR TO PLANTING IN ALL PLANTING AREAS.
7. THE QUANTITIES SHOWN ON THE PLAN ARE FOR THE CONTRACTOR'S CONVENIENCE. CONTRACTOR SHALL VERIFY QUANTITIES.
8. CONTRACTOR SHALL PROVIDE SAMPLES OF COMPOST, PLANTING SOIL, AND COMPOST MULCH MIX TO THE OWNER'S REPRESENTATIVE ALONG WITH SOIL TESTING DATA.
9. EXCESS SOIL FROM LANDSCAPE GRADING TO BE REMOVED AND DISPOSED OFF-SITE BY CONTRACTORS.
10. FINISH GRADE OF PLANTING BED AREA SHALL BE (2") BELOW ADJACENT CURB, PAVEMENT OR HEADER IN AREAS WHERE (3") MULCH IS TO BE APPLIED. FINISHED ELEVATION OF PLANTING BEDS AND SOLID SOD ADJACENT TO CURBING, SIDEWALKS, ETC. SHOULD BE FLUSH WITH THESE STRUCTURES TO ENSURE PROPER DRAINAGE OVER AND OFF THE BEDS AND OVER THE ADJACENT CURBING, SIDEWALK, ETC.
11. ALL PLANTS SHALL BE NURSERY GROWN OR TRANSPLANTED ON SITE AND IN ACCORDANCE WITH THE AMERICAN STANDARD FOR NURSERY STOCK LATEST EDITION (ANSI Z-60).
12. ALL PLANTS SHALL BE HARDY UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT.
13. ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY AND SHALL HAVE A NORMAL GROWTH HABIT. THEY SHALL BE SOUND, HEALTHY AND VIGOROUS, WELL BALANCED AND DENSELY FOLIATED WHEN IN LEAF. THEY SHALL BE FREE OF DISEASE AND INSECT PESTS, EGGS OR LARVAE. PLANTS SHALL HAVE HEALTHY, WELL-DEVELOPED ROOT SYSTEMS.
14. SUBSTITUTIONS: WHEN PLANTS OF A SPECIFIED KIND OR SIZE ARE NOT AVAILABLE WITHIN A REASONABLE DISTANCE, SUBSTITUTIONS MAY BE MADE, UPON REQUEST BY THE CONTRACTOR, IF APPROVED BY THE OWNER OR THEIR REPRESENTATIVE.
15. MEASUREMENT: DIMENSIONS OF TREES AND SHRUBS SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK, LATEST EDITION (ANSI Z-60).
16. SIZE: ALL PLANTS SHALL CONFORM TO THE MEASUREMENTS SPECIFIED ON THE PLANT MATERIAL SCHEDULE UNLESS AUTHORIZED, IN WRITING, BY THE OWNER OR THEIR REPRESENTATIVE.
17. BALLED PLANTS SHALL BE DUG WITH FIRM, NATURAL BALLS OF EARTH OF A DIAMETER AND DEPTH TO INCLUDE MOST OF THE FIBROUS ROOTS. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE SUFFICIENTLY DEVELOPED TO HOLD ITS SOIL TOGETHER FIRM AND WHOLE. NO PLANTS SHALL BE LOOSE IN THE CONTAINER OR ROOT BOUND.
18. ROOT BALLS AND CANOPIES OF ALL PLANTS SHALL BE ADEQUATELY PROTECTED AT ALL TIMES FROM SUN AND DRYING WINDS OR FROST.
19. THE OWNER OR THEIR REPRESENTATIVE SHALL BE NOTIFIED PRIOR TO BEGINNING PLANTING OPERATIONS.
20. PLANTS WITH BROKEN ROOT BALLS, EXCESSIVE DAMAGE TO THE CROWN, OR GIRDLING ROOTS SHALL BE REPLACED PRIOR TO PLANTING.
21. ALL TREES SHALL BE STAKED AND GUY-WIRED ACCORDING TO ACCEPTED INDUSTRY PRACTICE AND DETAILS.
22. EACH NEWLY PLANTED TREE AND SHRUB SHALL BE PRUNED IN ACCORDANCE WITH THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS OR AS DIRECTED BY OWNER'S REPRESENTATIVE TO PRESERVE THE NATURAL CHARACTER OF THE PLANT. ALL DEAD WOOD, SUCKER, AND BROKEN OR BADLY BRUISED BRANCHES SHALL BE REMOVED.
23. MULCH: IMMEDIATELY AFTER PLANTING OPERATIONS ARE COMPLETED ALL TREES AND SHRUB PLANTING PITS SHALL BE COVERED WITH A 3" LAYER OF SHREDDED DECOMPOSED HARDWOOD MULCH OR OTHER MATERIAL APPROVED BY THE OWNER OR THEIR REPRESENTATIVE. MULCH LIMITS FOR TREES SHALL BE THE AREA OF THE PIT; MULCH LIMITS FOR SHRUBS IN BEDS SHALL BE THE ENTIRE AREA OF THE SHRUB BED. KEEP MULCH OFF TRUNKS AND STEMS OF PLANTS.
24. PLANTING SOIL FOR TREES IF NATIVE TOPSOIL IS NOT AVAILABLE SHALL CONSIST OF 20% TO 30% ORGANIC MATERIAL MIXED WITH EXISTING SOIL AT A RATE OF 1/3 PLANTING SOIL TO 2/3 EXISTING SOIL FOR BEDDING PLANTS.
25. PLANTING SOIL FOR SHRUB BEDS CONSISTS OF 100% MIX SOIL WITH COMPOST WITH HIGH AMOUNTS OF DECOMPOSING ORGANICS.
26. FERTILIZER: OSMOCOTE 18-6-12 FOR WOODY ORNAMENTAL SHRUBS, COLOR STAR FOR ANNUAL COLOR, ADD SUPERTHRIVE ROOTING HORMONE TO ALL NEW PLANTINGS OR APPROVED EQUAL.
27. WARRANTY: ALL PLANT MATERIAL SHALL BE WARRANTED BY THE CONTRACTOR FOR ONE FULL YEAR FROM THE DATE OF INSTALLATION. THE OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE UNLESS OTHERWISE AGREED WITH CONTRACTOR. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MONITOR THE PROJECT DURING THE WARRANTY PERIOD AND INFORM THE OWNER IF PROBLEMS DEVELOP WITH THE PLANT MATERIAL. A PLANT SHALL BE CONSIDERED DEAD IF 25% OR MORE OF THE CROWN, OR MAIN LEADER HAS DIED.
28. ALL PLANTING SHALL BE AT THE LOCATIONS INDICATED ON THE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANTING AT THE CORRECT GRADES TO ENSURE POSITIVE DRAINAGE, AND FOR ESTABLISHING PLANTING BEDS AS INDICATED.
29. LANDSCAPE CONTRACTOR RESPONSIBLE FOR SMOOTHING OUT FINE GRADES BEFORE PLANING LANDSCAPING. THIS INCLUDES SMOOTHING OUT GROOVES MADE BY EQUIPMENT TIRE TRACKS AND FILLING IN AND SMOOTHING OVER EROSION CHANNELS AND VEINS FOR PROFESSIONAL INSTALLATION.
30. LANDSCAPE CONTRACTOR RESPONSIBLE FOR HAND WATERING PLANTS AS NECESSARY UNTIL IRRIGATION SYSTEM IS OPERATIONAL TO PROPERLY IRRIGATE TREES AND SHRUBS. ANY DAMAGE TO VEGETATION DUE TO INSUFFICIENT WATERING DURING CONSTRUCTION WILL BE THE RESPONSIBILITY OF THE CONTRATOR TO REPLACE WITH LIKE PLANT MATERIAL IN ACCORDANCE WITH THE WARRANTY. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE LANDSCAPING AS NECESSARY UNTIL FINAL COMPLETION OF THE PROJECT AND "HAND OVER" TO THE CLIENT.
31. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR PROTECTING PLANT MATERIAL ON SITE, WHETHER INSTALLED OR NOT, FROM FROST DAMAGE IN THE EVENT SUB-FREEZING TEMPERATURES ARE FORECASTED. ANY FROST DAMAGE TO THE PLANT MATERIAL DURING CONSTRUCTION BY LACK OF PROTECTION BY THE CONTRACTOR WILL RESULT IN REPLACMENT AT CONTRACTOR'S EXPENSE. FREEZE PROTECTION MAY INCLUDE WRAPPING THE TRUNKS AND ROOTBALLS OF TREES WITH BLANKETS, COVERING SHRUB GROUPINGS WITH BLANKETS AND/OR PLASTIC, ETC., ETC., ETC.
32. CONTRACTOR RESPONSIBLE FOR FILLING TOPSOIL BEHIND CURBS AND AGAINST EDGES OF SIDEWALKS TO BRING GRADE UP TO THE TOP OF THE CONCRETE IN PREPARATION FOR LANDSCAPING INSTALLATION.
33. AN INDEPENDENT SOIL AND MATERIALS TESTING FIRM WILL BE REQUIRED TO TEST SOIL FOR COMPACTION, DENSITY, MOISTURE CONTENT, WORKMANSHIP TECHNIQUES, ETC. AS WELL AS FOR THE TESTING OF ALL CONCRETE AT 7, 14, 21, AND 28 DAY COMPRESSIVE STRENGTHS. REPORTS SHOULD BE PROVIDED TO BURDITT CONSULTANTS WITHIN 24 HOURS OF SOILS TESTING AND AS SOON AS AVAILABLE FOR CONCRETE AND ASPHALT TESTING.

58

34. PLANTING LOCATIONS WILL BE IDENTIFIED BY CONTRACTOR'S ARBORISTS AND REVIEWED AND APPROVED BY HPARD, URBAN FORESTRY & CITY ENGINEER BEFORE PLANTING.

35. TWO YEAR WARRANTY REQUIRED INCLUDING WATERING FOR ALL NEW TREES

USDA FOREST SERVICE PAUL S. HOWARD

THE INFORMATION PRESENTED ON THIS SHEET INCORPORATES THE TREE PRESERVATION PRACTICES THAT I HAVE RECOMMENDED

4/13/2012 (DATE)

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URBAN FORESTER
P.O. BOX 1424
CONROE, TX 77305
TEL NO: 281.447.2111

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-13-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TREE PLANTING DETAILS & SPECS

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	PUBLIC WORKS AND ENGINEERING 49210
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 123 OF 191	

PLOTTED ON: Tuesday, April 10, 2012 1:13:24 PM
FILE NAME: F:\WHB-SG4\CAD\STD\TREE PLANTING DETAILS & SPECS.DWG

FOR REDUCED PLANS
original scale in inches

3 2 1 0

GENERAL NOTES FOR TRAFFIC HANDLING

1. THE CONSTRUCTION TRAFFIC CONTROL SIGNS, DEVICES, AND BARRICADES ON THESE DRAWINGS CONSTITUTE MINIMUM REQUIREMENTS AND ARE NOT INTENDED TO COVER SPECIAL CIRCUMSTANCES OR OTHER CONDITIONS THAT MAY ARISE DUE TO UNFORESEEN FIELD CONDITIONS. THE CONTRACTOR SHALL PLACE AND MAINTAIN SUFFICIENT ADDITIONAL SIGNS, BARRICADES, AND WARNING DEVICES TO WARN THE PUBLIC AND PROVIDE FOR THE SAFE MOVEMENT OF TRAFFIC AND THE CONSTRUCTION ZONE SAFETY WHERE PROJECT REQUIREMENTS ARE NOT FULLY SATISFIED BY THE STANDARDS SHOWN HEREON. "THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL GOVERN.

2. CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (T.M.U.T.C.D), MOST RECENT EDITION WITH REVISIONS, DURING CONSTRUCTION.

3. ALL SIGNS AND MARKINGS SHALL COMPLY WITH THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES FOR STREETS AND HIGHWAYS, UNLESS SPECIFICALLY DIRECTED BY THE TRAFFIC ENGINEER OR SPECIFIED ON THE PLANS.

4. BARRICADES, SIGNS, CHANNELIZING DEVICES, AND TRAFFIC HANDLING DEVICES AS SHOWN SHALL BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.

5. NO LANES SHALL BE BLOCKED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND FROM 4:00 PM TO 6:00 PM (MONDAY THRU FRIDAY) ON MAJOR THOROUGHFARES, UNLESS NOTED OTHERWISE.

6. CONTRACTOR SHALL MAKE EVERY EFFORT TO MAINTAIN ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS.

7. CONTRACTOR SHALL PROVIDE ACCESS TO ALL BUSINESSES AND HOMES ALONG THIS PROJECT AT ALL TIMES DURING CONSTRUCTION UNLESS OTHERWISE AUTHORIZED SPECIFICALLY BY THE ENGINEER.

8. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING STOP SIGNS, STREET NAME SIGNS, AND WARNING SIGNS IN PLACE DURING THE ENTIRE PERIOD OF CONSTRUCTION BY THE CONTRACTOR.

9. OMITTED.

10. THE ENGINEER MAY DIRECT THE CONTRACTOR TO FURNISH ADDITIONAL SIGNS, BARRICADES, AND CHANNELIZING DEVICES AS REQUIRED TO MAINTAIN TRAFFIC AND CONSTRUCTION ZONE SAFETY DURING CONSTRUCTION. ANY SUCH ADDITIONAL SIGNS, BARRICADES, ETC. SHALL BE CONSIDERED A PART OF THE LUMP SUM PAY ITEM.

11. WHEN DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE FLAGGERS TO DIRECT TRAFFIC. THIS DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY OR TAKING OTHER STEPS AND PROVIDING OTHER PERSONNEL WHICH THE CONTRACTOR MAY DEEM NECESSARY FOR PROTECTION OF WORK AND THE PUBLIC.

12. CONTRACTOR SHALL INSURE THAT ALL BARRICADES, SIGNS, CHANNELIZING DEVICES, WARNING LIGHTS, AND TRAFFIC HANDLING DEVICES ARE MAINTAINED IN A CLEAN FUNCTIONAL CONDITION AT ALL TIMES.

13. ALL SIGNS, WARNING DEVICES, AND BARRICADES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, INCLUDING ACTS OF VANDALISM OR ACCIDENT.

14. ALL CONSTRUCTION SIGNS MOUNTED ON BARRICADES SHALL BE EQUIPPED WITH TYPE A WARNING LIGHTS (TWO PER STRUCTURE).

15. PORTABLE SIGNS MAY BE PROVIDED BETWEEN LOCATIONS AS REQUIRED FOR CONSTRUCTION. THESE HAVE TO BE APPROVED BY THE TRAFFIC ENGINEER.

16. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE TEMPORARY AND EXISTING PAVEMENT MARKINGS IN A GOOD VISIBLE CONDITION THROUGHOUT THE LENGTH OF THE PROJECT.

17. THE CONTRACTOR SHALL SEQUENCE THE CONSTRUCTION IN SUCH A MANNER THAT NO ADJACENT CROSS STREETS AND MEDIAN OPENINGS ARE CLOSED AT THE SAME TIME.

18. THE CONTRACTOR SHALL MAINTAIN BARRICADES AND SAFETY FENCES AT EACH SITE WHERE PEDESTRIAN TRAFFIC IS EVIDENT.

19. THE TRAFFIC SIGNAL SHALL REMAIN IN OPERATION DURING THE ENTIRE PERIOD OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE SIGNAL IN PROPER AND SAFE OPERATION. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADJUSTING, RELOCATING, AND/OR PROVIDING TEMPORARY SIGNALS AND POLES, IF REQUIRED, TO FACILITATE THE VARIOUS TRAFFIC HANDLING SEQUENCES. IMMEDIATELY CALL THE CITY OF HOUSTON, SIGNAL SHOP DISPATCHER AT (832) 395–3000.

20. CONTRACTOR SHALL REALIGN AND READJUST SIGNAL HEADS AS REQUIRED AND DIRECTED BY THE CITY OF HOUSTON AND THE FIELD ENGINEER DURING ENTIRE CONSTRUCTION ACTIVITY. IMMEDIATELY CALL THE CITY OF HOUSTON SIGNAL DISPATCHER AT (832) 395–3000.

21. ALL TEMPORARY SIGNAL WORK AND REPAIR SHALL BE COMPLETED IN CONFORMANCE WITH TRAFFIC AND TRANSPORTATION BOOKLET 202 SPECIFICATIONS AND C–3900 SERIES STANDARD DRAWINGS AND CALL IMMEDIATELY THE CITY OF HOUSTON'S SIGNAL DISPATCHER AT (832) 395–3000.

22. THE CONTRACTOR SHALL CALL THE CITY OF HOUSTON TRAFFIC SIGNAL SHOP WHEN WORK IS SCHEDULED NEAR SIGNAL CONDUIT AT (832) 395–3000. CALL AT LEAST FIVE (5) WORKING DAYS IN ADVANCE.

23. THE CONTRACTOR SHALL REMOVE ALL EXISTING SIGNS AND STRIPING WHICH ARE IN CONFLICT WITH THE CONSTRUCTION SIGNS AND STRIPING. EXISTING PAVEMENT MARKINGS SHALL BE REMOVED IN AREAS WHERE TRAFFIC IS DIRECTED TO CROSS THEM. THE SIGNS SHALL BE PROPERLY STORED IN A SAFE PLACE UNTIL THE CONSTRUCTION HAS BEEN COMPLETED.

24. ALL CONSTRUCTION SIGNS, WARNING DEVICES AND BARRICADES SHALL REMAIN IN PLACE UNTIL THEIR REMOVAL IS DIRECTED BY THESE PLANS OR BY THE ENGINEER.

25. AT THE CONCLUSION OF CONSTRUCTION, THE CONTRACTOR SHALL RESTORE ALL PAVEMENT MARKINGS TO THEIR ORIGINAL CONDITION WITH TRAFFIC PAINT STRIPES RAISED PAVEMENT MARKER BUTTONS AND REINSTALL THE SIGNS AT THEIR EXISTING LOCATION.

26. CONSTRUCTION IN ANY AREA, THAT IS ADVERSELY AFFECTING TRAFFIC FLOW AND SAFETY MUST BE PURSED DILIGENTLY BY THE CONTRACTOR IF, IN THE OPINION OF THE ENGINEER, THE CONTRACTOR IS NOT DIRECTLY PURSUING THE CONSTRUCTION IN THOSE AREAS, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO CHANGE HIS/HER WORK SCHEDULE TO EXPEDITE COMPLETION IN THOSE AREAS OF CONCERN.

27. THE "TRAFFIC CONTROL PLANS" EXIST AS A PART OF THE CONTRACT DRAWINGS. THE OBJECTIVE IS TO MAINTAIN A SAFE AND EFFICIENT FLOW OF TRAFFIC THROUGH THE CONSTRUCTION AREA. SHOULD THE CONTRACTOR ELECT TO USE A DIFFERENT PLAN OF TRAFFIC CONTROL, HE/SHE SHALL PREPARE AND SUBMIT AN ALTERNATE SET OF PLANS TO THE TRAFFIC MANAGEMENT AND MAINTENANCE DIVISION, PUBLIC WORKS AND ENGINEERING DEPARTMENT, FOR REVIEW AND APPROVAL 10 WORKING DAYS PRIOR TO PROCEEDING WITH THE WORK. THESE PLANS SHALL BE PREPARED BY A REGISTERED PROFESSIONAL ENGINEER AND DRAWN TO AN ACCEPTABLE SCALE, ON REPRODUCIBLE MYLARS, AND SHALL BECOME PART OF THE CONTRACT DRAWING.

28. OMITTED.

29. CONTRACTOR SHALL MAINTAIN TRAFFIC LAW(S) ACCORDING TO TRAFFIC CONTROL PLAN(S) DURING WORKING HOURS.

30. CONTRACTOR SHALL COVER OPEN UTILITY EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON–WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW.

31. OFF–DUTY UNIFORMED POLICE OFFICER(S)/FLAGGER(S) IS/ARE REQUIRED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED.

32. APPROVED COPIES OF "TRAFFIC CONTROL PLANS" AND LANE/SIDEWALK CLOSURE PERMITS **SHALL BE AVAILABLE FOR INSPECTION AT JOB SITE AT ALL TIMES.

    **CONTRACTOR MUST SECURE "LANE/SIDEWALK CLOSURE PERMITS" FROM CITY'S TRAFFIC MANAGEMENT AND MAINTENANCE BRANCH BEFORE CLOSING A LANE/SIDEWALK. THE REQUEST MUST BE MADE AT LEAST TEN BUSINESS DAYS PRIOR TO THE DATE FOR WHICH THE CLOSURE IS SOUGHT. NOTE THAT WORKING HOURS MAY BE RESTRICTED OR THE REQUEST MAY BE DENIED. CALL (832) 394–9106 FOR AN APPLICATION.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
OF 2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC GENERAL NOTES

WBS NO.:M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 124 OF 191	

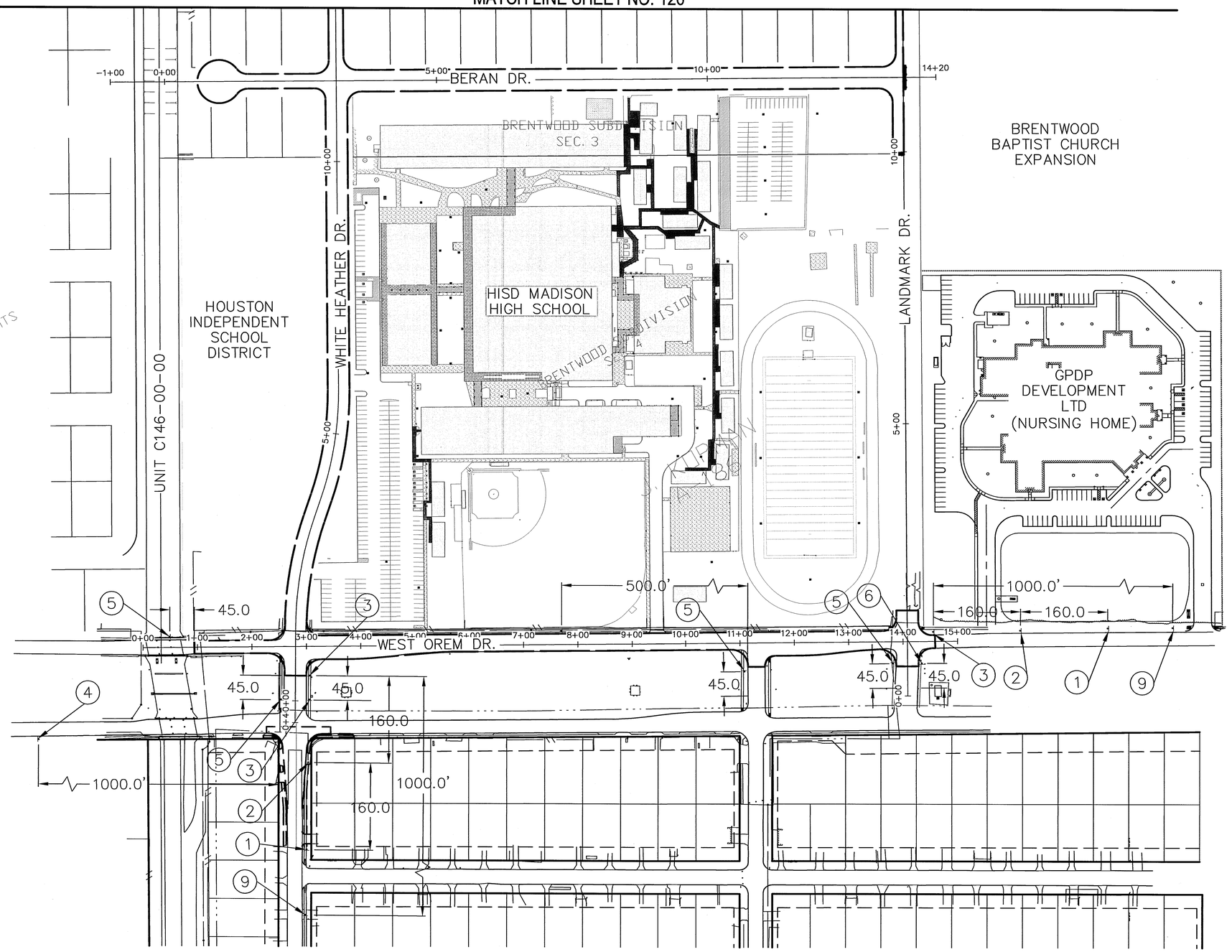
PUBLIC WORKS AND ENGINEERING
49210
CITY OF HOUSTON
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 2:15:45 PM
FILE NAME: F:\WHB–SG4\CAD\TCP\WHB–SG4–TRAFFIC GENERAL NOTES.DWG

FOR REDUCED PLANS
original scale in inches

0 1 2 3

MATCH LINE SHEET NO. 126



LEGEND

1. Working For You Give Us A BRAKE — G20-7
2. WORK ZONE — EG20-9; TRAFFIC FINES DOUBLE — ER20-5; WHEN WORKERS ARE PRESENT — ER20-5 PLAQUE
3. BEGIN ROAD WORK NEXT 0.8 MILES — SG 20-1 W/ PLAQUE OR SG 20-ST; NAME ADDRESS CITY STATE CONTRACTOR — SG 20-6
4. ROAD WORK NEXT 0.6 MILES ⇦ — G20-1bL
5. END ROAD WORK — G20-2a
6. ROAD WORK AHEAD — CW20-1D
7. ROAD WORK NEXT 0.6 MILES ⇨ — G20-1bR
8. ROAD WORK ⇦ NEXT X.X MILES NEXT X.X MILES ⇨ — G20-1a
9. ROAD WORK NEXT X.X MILES — G20-1

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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER — 04-12-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

ADVANCED WARNING SIGN LAYOUT

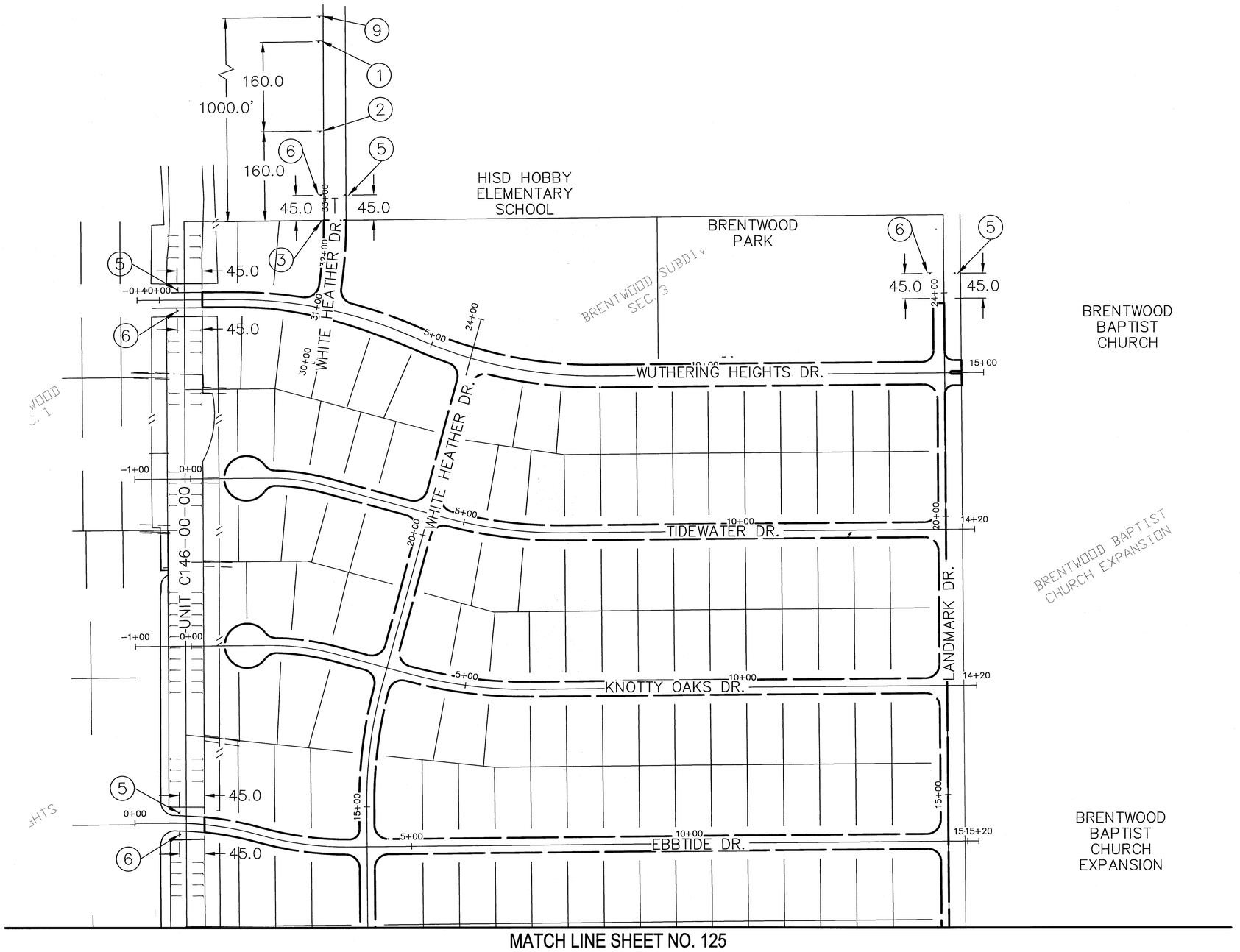
1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 125 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — HOUSTON, TEXAS

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FILE NAME: F:\WHB-SG4\CAD\TCP\WHB-SG4-ADVANCED WARNING SIGN LAYOUT.DWG

FOR REDUCED PLANS
original scale in inches



MATCH LINE SHEET NO. 125

LEGEND

1. Working For You / Give Us A BRAKE — G20-7
2. WORK ZONE / TRAFFIC FINES DOUBLE / WHEN WORKERS ARE PRESENT — EG20-9 / ER20-5 / ER20-5 PLAQUE
3. BEGIN ROAD WORK NEXT 0.8 MILES / NAME ADDRESS CITY STATE CONTRACTOR — SG 20-1 W/ PLAQUE OR SG 20-ST / SG 20-6
4. ROAD WORK NEXT 0.6 MILES ⇦ — G20-1bL
5. END ROAD WORK — G20-2a
6. ROAD WORK AHEAD — CW20-1D
7. ROAD WORK NEXT 0.6 MILES ⇨ — G20-1bR
8. ROAD WORK ⇦ NEXT X.X MILES / NEXT X.X MILES ⇨ — G20-1a
9. ROAD WORK NEXT X.X MILES — G20-1

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TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
OCTOBER 2012

SURVEYED BY:
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

ADVANCED WARNING SIGN LAYOUT

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 126 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

CITY OF HOUSTON

TRAFFIC ENGINEERING DESIGN REVIEW SECTION

1. Contractor shall provide and install traffic control devices in conformance with part VI of the Texas Manual on Uniform Traffic Control Devices (Texas MUTCD, most recent edition with revisions) during construction.
2a. 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 unless approved by Traffic Operations Division.
2b. No work shall be performed in residential areas from 7:00 PM to 7:00 AM.
3a. Contractor shall maintain at least one lane of traffic in each direction during working hours unless approved Traffic Control Plans include "One–Way" and/or "Detour" Plans.
3b. Contractor shall maintain traffic lane(s) according to traffic control plan(s) during working hours.
4. 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.
5. An off–duty Uniformed Police Officer is required to direct traffic when lanes are blocked on a major thoroughfare. A COH certified flagman shall direct traffic on residential streets.
6. If the contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, (s)he shall be responsible to prepare and submit an alternate set of plans* to Plan Review Section for approval ten working days prior to implementation.

***These plans shall be drawn to scale on reproducible mylars and sealed by a Licensed Engineer in the State of Texas. Plans will become a part of the contract drawings.**

7. Approved copies of Traffic Control Plans and lane/sidewalk closure permits shall be available for inspection at job site at all times.

***Contractor must secure 'Lane/Sidewalk Closure Permits' from City's Traffic Management and Maintenance Branch before closing a lane/sidewalk. The request must be made at least ten (10) business days prior to the date for which the closure is sought.**

Note that working hours may be restricted or the request may be denied. Call 832–395–3020 for an application.

8. Contractor will be responsible for replacing and maintaining pavement markings which include centerline, barrier lines, lane lines and raised pavement markings.
9. This traffic control plan represents the minimum required by traffic conditions in the field.
10. Contractor shall not block ingress or egress to private property at any time without coordination with the property owner.
11. Lanes shall be kept closed during pavement surface restoration and opened only after pavement is restored completely.
12. All channelizing devices shall conform to the most current TMUTCD
13. All Type III Barricades shall be equipped with two (2) approved flashers.
14. All flashing devices shall meet the requirements of the MUTCD in type and use.

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 @ 35' c–c (Return taper and barricade are optional in divided roadway section)
C. Plastic drums on radii @ 5' c–c
D. Plastic drums on tangent @ 35' c– c with vertical panel @ 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 @ 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 more than twelve inches (12") or
G. Plastic Drums w/Guard Rail mounted.
H. Self–Righting
   1. 4 lanes to 2 lanes undivided roadway sections @ 20' c–c.
   2. 4 lanes divided roadway to one side two way road @ 20' c–c.
   3. Left lane and right lane storage bays @15' c–c.

Note: Spacing shown on traffic control plans shall supersede the above spacings. Spacing may be adjusted to provide driveways, intersections and/or median openings.

TRAFFIC NOTE:

POSTED SPEED LIMITS:

WEST OREM: 40 MPH

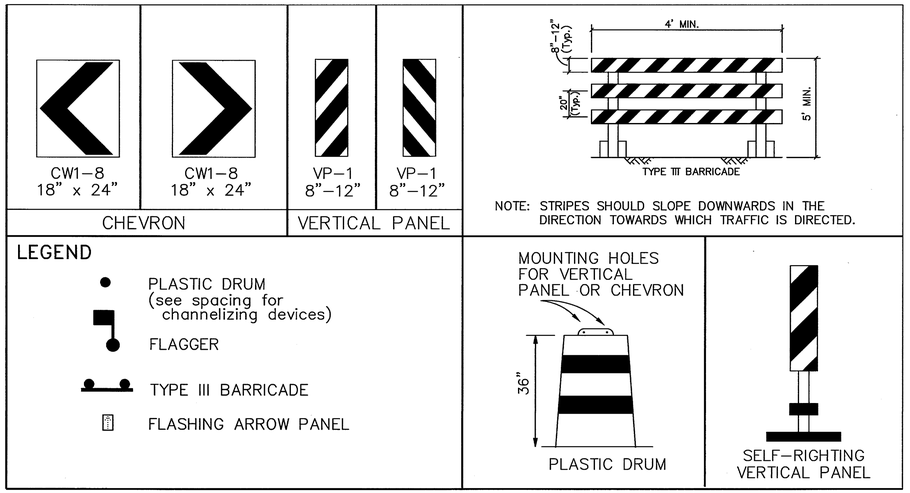
ALL OTHER STREETS: 30 MPH

TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES

		Min. Desirable Taper Length "L"			Suggested Maximum Spacing Of Device	
Posted Speed (mph)	Sign Spacing "X"	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

CHANNELIZATION AND BARRICADES



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STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY: LANDTECH CONSULTANTS, INC. FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

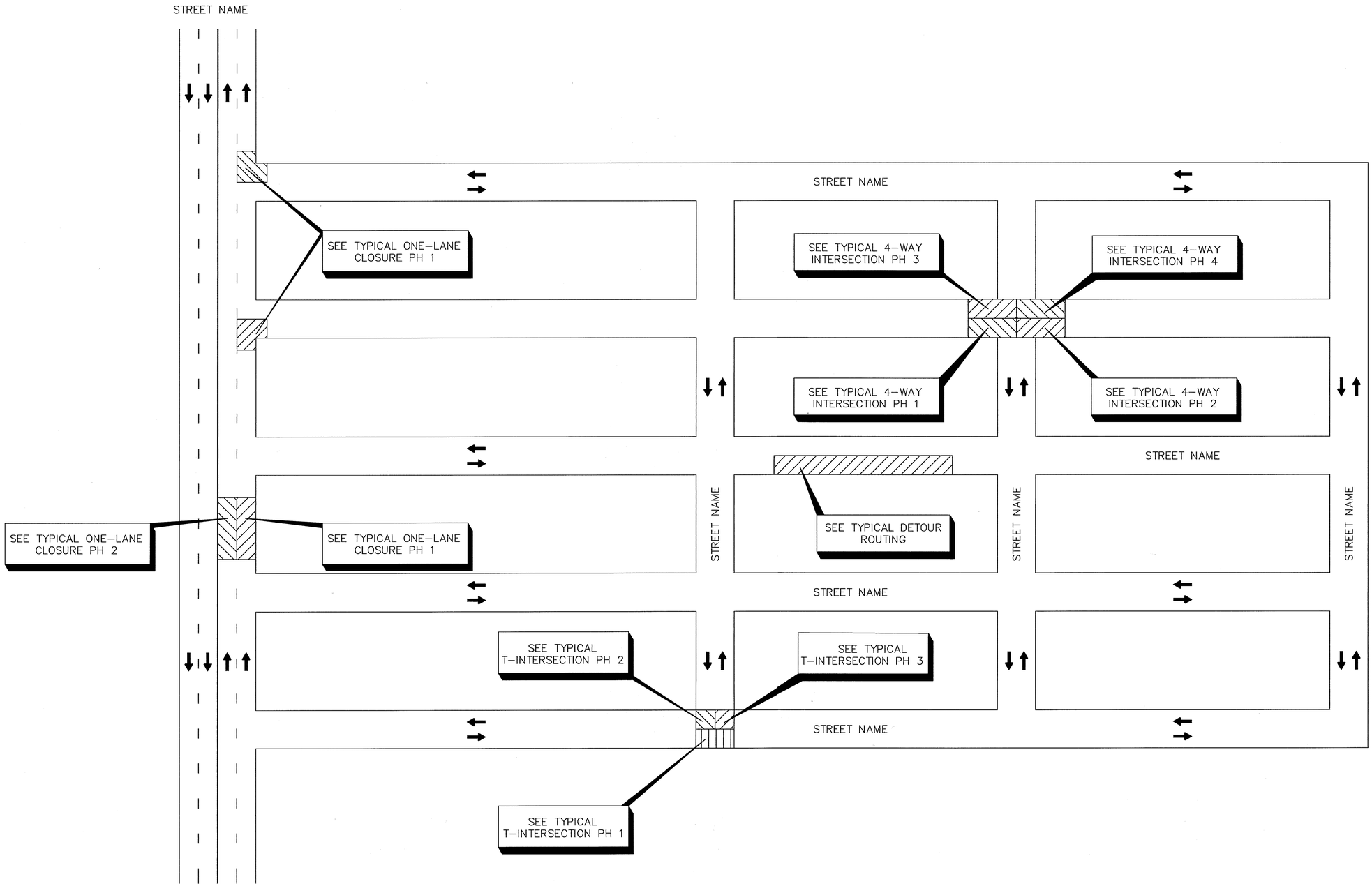
TRAFFIC CONTROL PLAN

TRAFFIC CONTROL NOTES
CHANNELIZING DEVICES & BARRICADES
TCP SHEET 1 OF 12

WBS NO.: M–000262–0004–4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 127 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

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FOR REDUCED PLANS
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0 1 2 3

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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-09-2012

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN

OVERALL TRAFFIC CONTROL LAYOUT

TCP SHEETS 2 OF 12

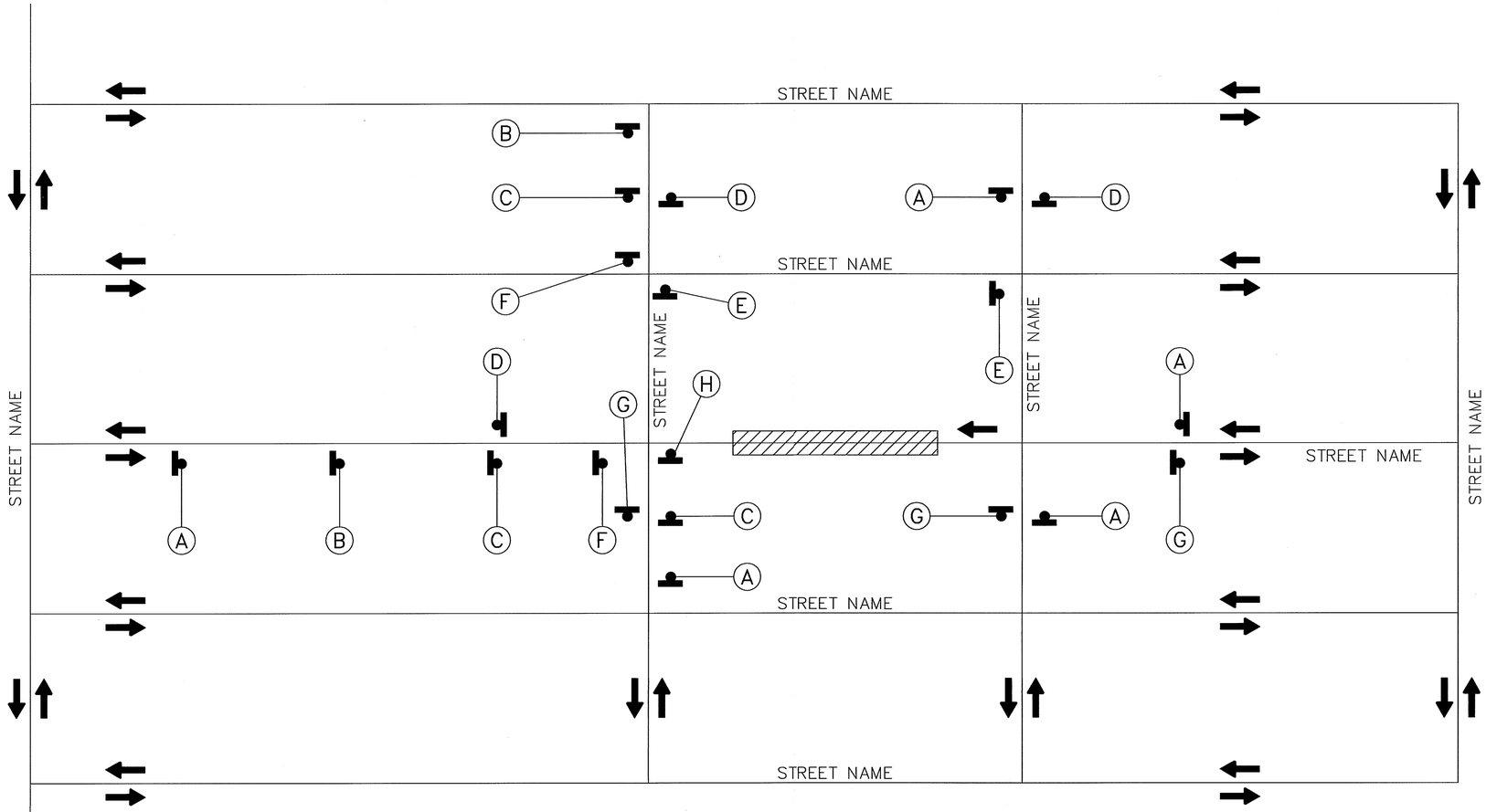
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FILE NO.: SM5056	
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N.T.S.	
CITY OF HOUSTON PM	
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SHEET NO. 128 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

A	B	C	D	E	F	G	H
ROAD WORK AHEAD	ROAD CLOSED AHEAD	DETOUR AHEAD	END ROAD WORK	STREET NAME DETOUR →	STREET NAME DETOUR ←	END DETOUR	STREET NAME DETOUR ↑
CW20-1D 48" X 48"	CW20-4D 48" X 48"	CW20-2D 36" X 36"	G20-2a 48" X 24"	M4-9R	M4-9L	M4-8A 48" X 24"	M4-9

LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- CONSTRUCTION AREA



FOR REDUCED PLANS
original scale in inches

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04-09-2012

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN

TYPICAL OVERALL DETOUR

TCP SHEET 3 OF 12

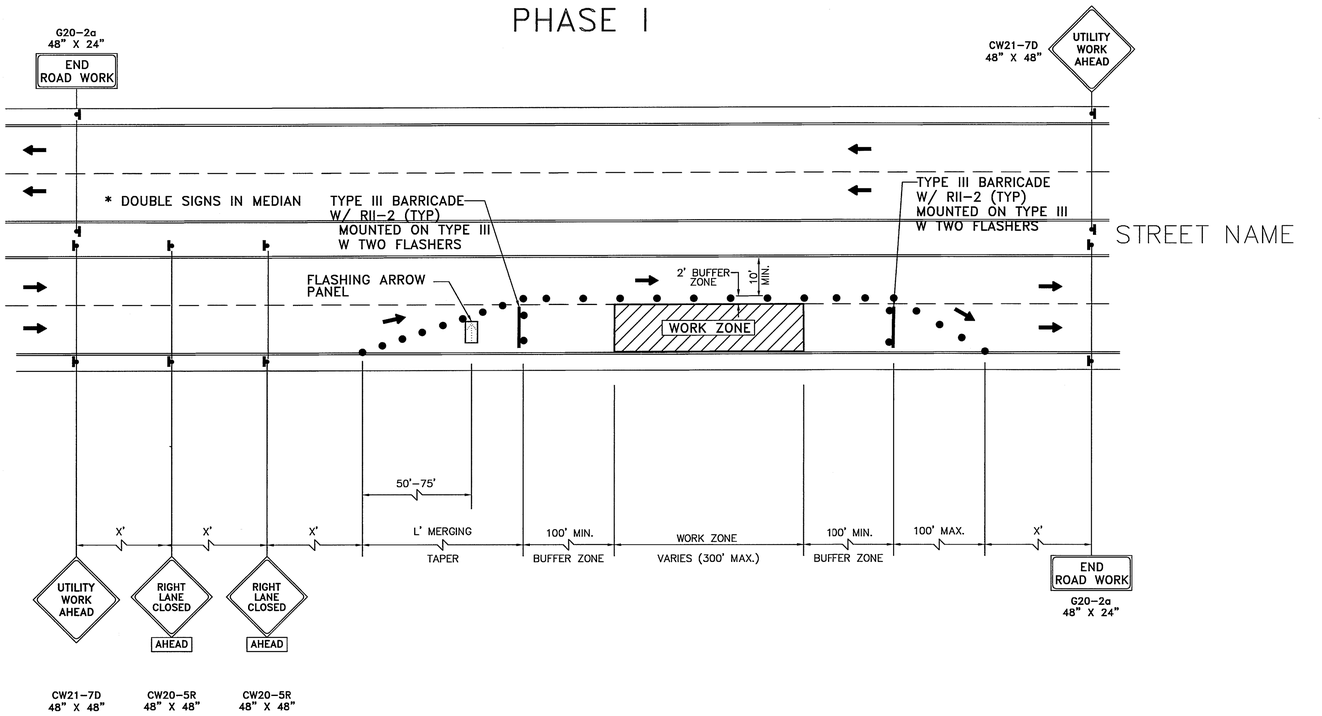
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FILE NO.: SM5056	
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N.T.S.	
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SHEET NO. 129 OF 191	

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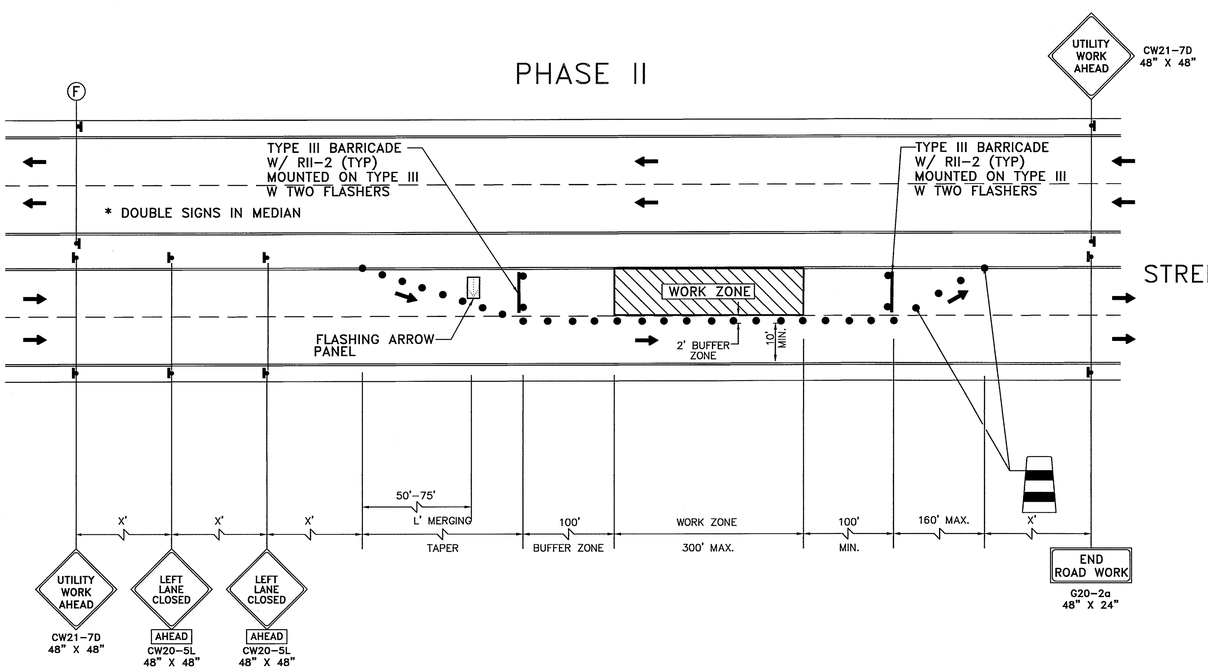
FOR REDUCED PLANS
original scale in inches

0 1 2 3

PHASE I



PHASE II



TRAFFIC NOTE:

* NOTE:

1. RETURN TAPERS AND DOWNSTREAM BARRICADES ARE OPTIONAL IN A DIVIDED ROADWAY SECTION
2. ALL FLASHERS TO CONFORM TO MUTCD FOR USE AND TYPE

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67749
LICENSED
PROFESSIONAL
ENGINEER
STATE OF TEXAS
10-02-12

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN

ONE-LANE CLOSURE

TCP SHEET 4 OF 12

WBS NO.: M-000262-0004-4	CITY DWG NO.:
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49210
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

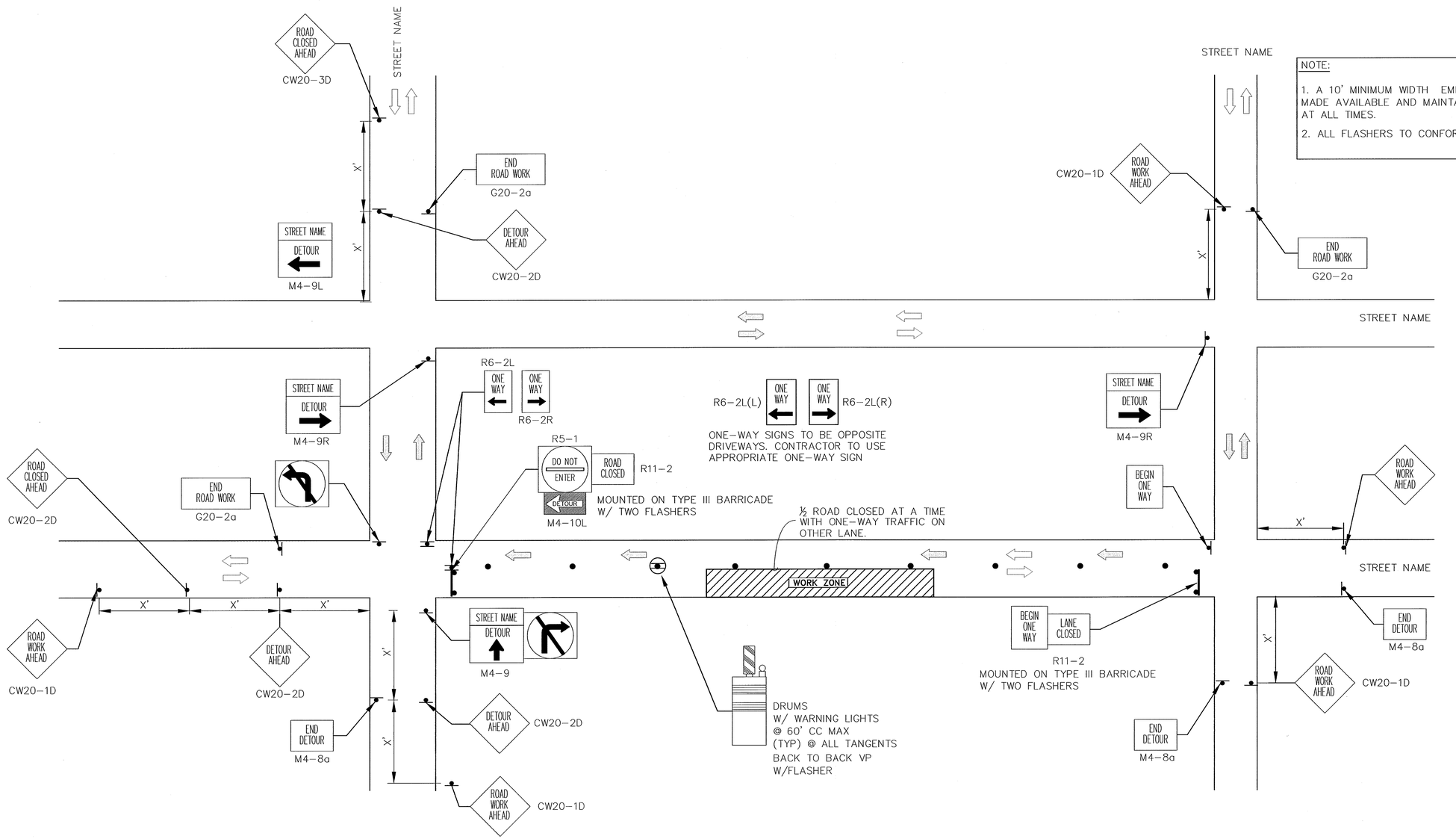
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FOR REDUCED PLANS
original scale in inches

0 1 2 3

LEGEND

- TYPE III BARRICADE
- AREA UNDER CONSTRUCTION
- EXISTING TRAVELWAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY



TYPICAL NEIGHBORHOOD STREET DETOUR

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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-27-12

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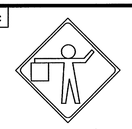
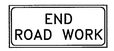
TRAFFIC CONTROL PLAN

TYPICAL NEIGHBORHOOD STREET DETOUR
TCP SHEET 5 OF 12

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FILE NO.: SM5056	
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PUBLIC WORKS AND ENGINEERING
49210
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HOUSTON, TEXAS

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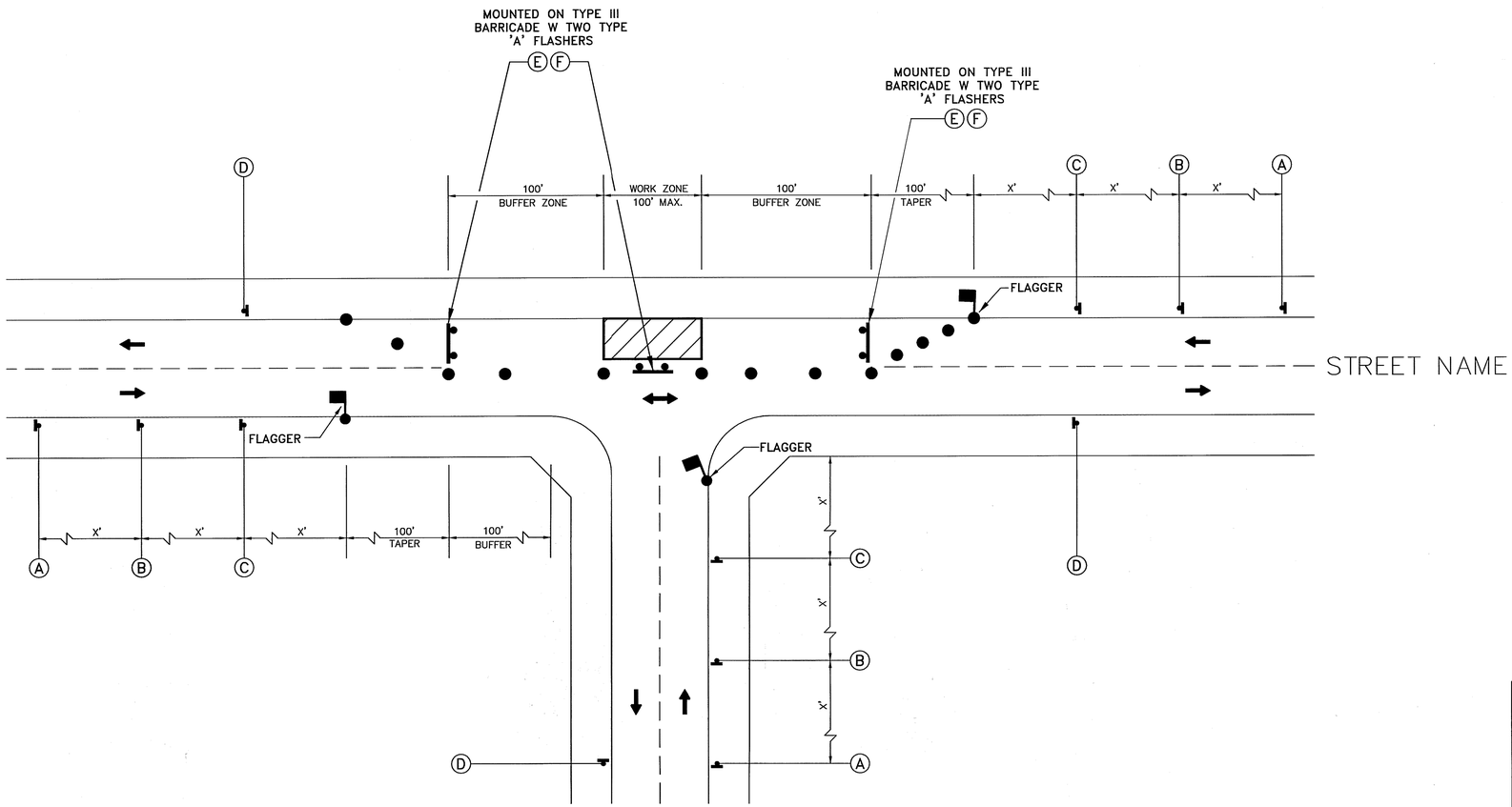
E	F
R5–1 48" X 48"	R11–2 48" X 30"

FOR REDUCED PLANS
original scale in inches

3 2 1 0

LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE



PHASE 1 OF 3
TYPICAL CONSTRUCTION ZONE FOR CONSTRUCTION AT A T–INTERSECTION
PHASE 1

TRAFFIC NOTE:

* NOTE:

1. MINOR WORK ONLY.
2. CONTRACTOR TO USE ONE–LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS.
3. SEE TYPICAL OVERALL DETOUR AND TYPICAL NEIGHBORHOOD STREET DETOUR PLAN SHEETS FOR INFORMATION AND USE.
4. THIS TRAFFIC CONTROL PHASE IS FOR DAYTIME USE ONLY. THE CONTRACTOR IS REQUIRED TO STEEL PLATE ALL OPEN EXCAVATIONS AT NIGHT AND/OR ON WEEKENDS.

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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
2012

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FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN

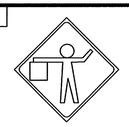
TYP 3-WAY INTERSECTION
PHASE 1 OF 3
TCP SHEET 6 OF 12

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
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HOUSTON, TEXAS

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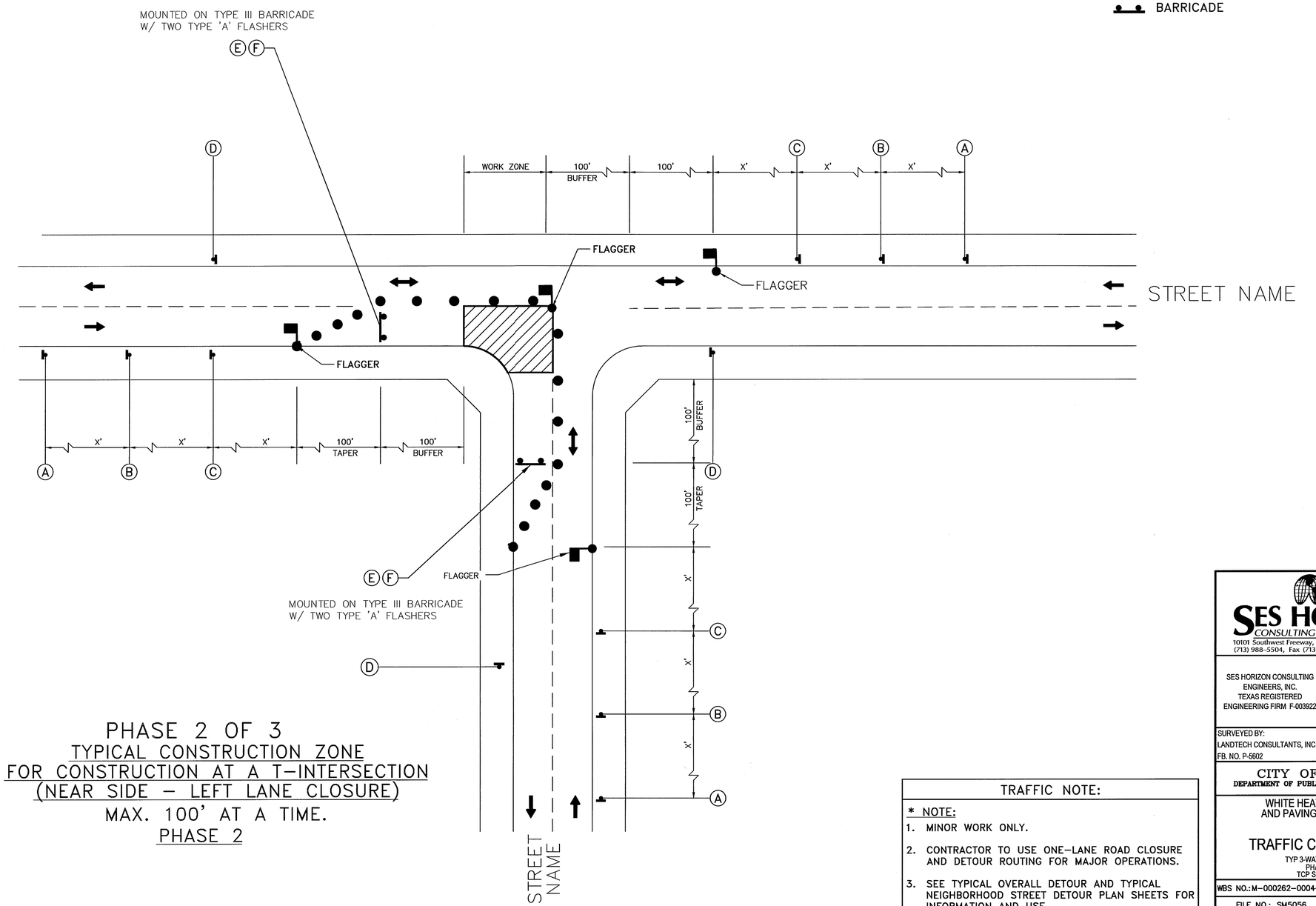
FOR REDUCED PLANS
original scale in inches

A	B	C	D
 CW21-7D 48" X 48"	 CW20-4D 48" X 48"	 CW20-7a 36" X 36"	 G20-2a 48" X 24"

E	F
 R5-1 48" X 48"	 R11-2 48" X 30"

LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE



PHASE 2 OF 3
TYPICAL CONSTRUCTION ZONE
FOR CONSTRUCTION AT A T-INTERSECTION
(NEAR SIDE - LEFT LANE CLOSURE)
MAX. 100' AT A TIME.
PHASE 2

TRAFFIC NOTE:

* NOTE:

1. MINOR WORK ONLY.
2. CONTRACTOR TO USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS.
3. SEE TYPICAL OVERALL DETOUR AND TYPICAL NEIGHBORHOOD STREET DETOUR PLAN SHEETS FOR INFORMATION AND USE.
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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04 APR 2012

SURVEYED BY:
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FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

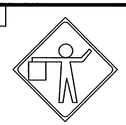
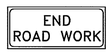
TRAFFIC CONTROL PLAN
TYP 3-WAY INTERSECTION
PHASE 2 OF 3
TCP SHEET 7 OF 12

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 133 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 3:17:09 PM
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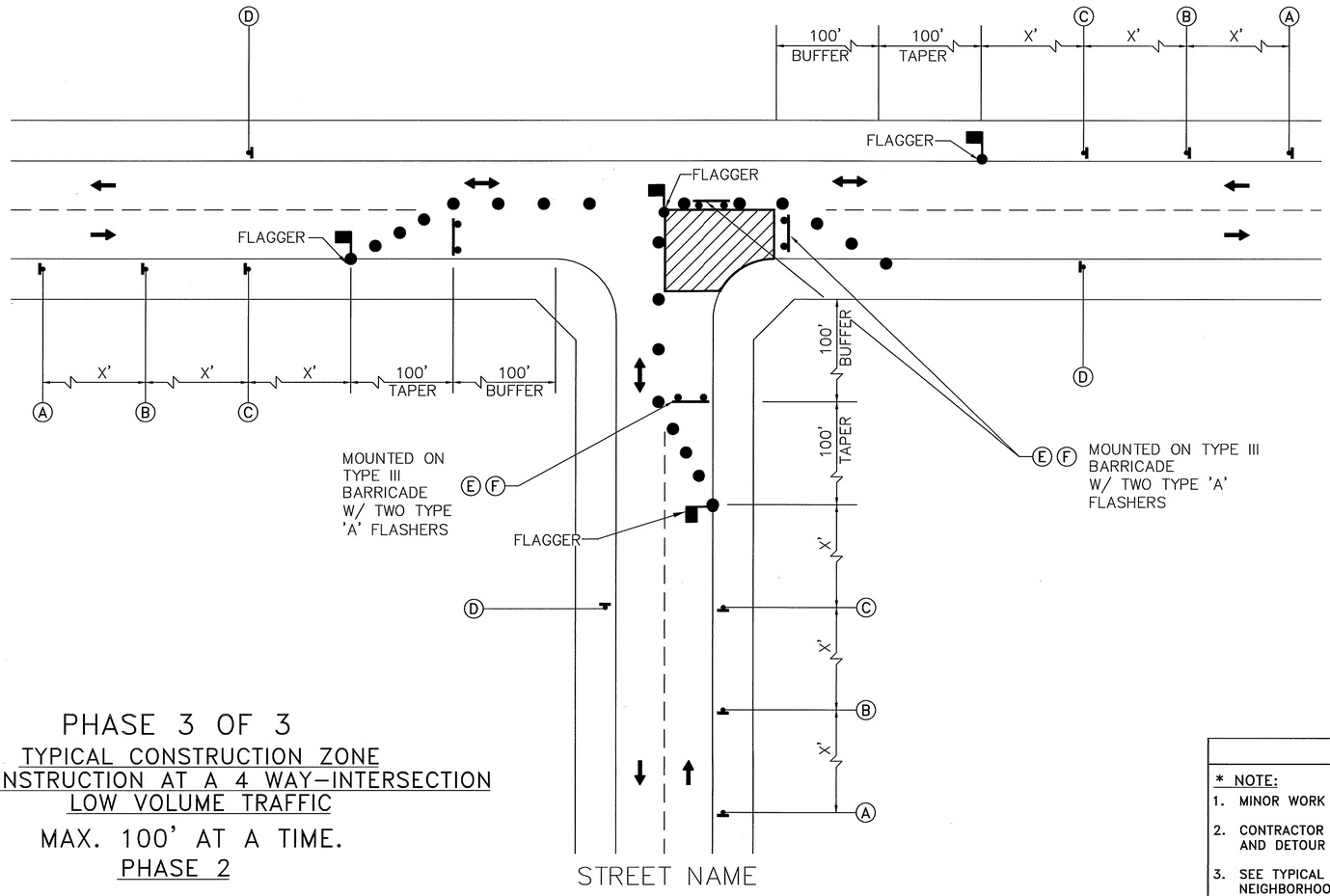
FOR REDUCED PLANS
original scale in inches
3 2 1 0

A	B	C	D
			
CW21-7D 48" X 48"	CW20-4D 48" X 48"	CW20-7a 36" X 36"	G20-2a 48" X 24"

E	F
	
R5-1 48" X 48"	R11-2 48" X 30"

LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE



PHASE 3 OF 3

TYPICAL CONSTRUCTION ZONE
FOR CONSTRUCTION AT A 4 WAY–INTERSECTION
LOW VOLUME TRAFFIC

MAX. 100' AT A TIME.

PHASE 2

TRAFFIC NOTE:
* NOTE: 1. MINOR WORK ONLY. 2. CONTRACTOR TO USE ONE–LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS. 3. SEE TYPICAL OVERALL DETOUR AND TYPICAL NEIGHBORHOOD STREET DETOUR PLAN SHEETS FOR INFORMATION AND USE. 4. THIS TRAFFIC CONTROL PHASE IS FOR DAYTIME USE ONLY. THE CONTRACTOR IS REQUIRED TO STEEL PLATE ALL OPEN EXCAVATIONS AT NIGHT AND/OR ON WEEKENDS.

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN

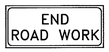
TYP 3-WAY INTERSECTION
PHASE 3 OF 3
TCP SHEET 8 OF 12

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 134 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

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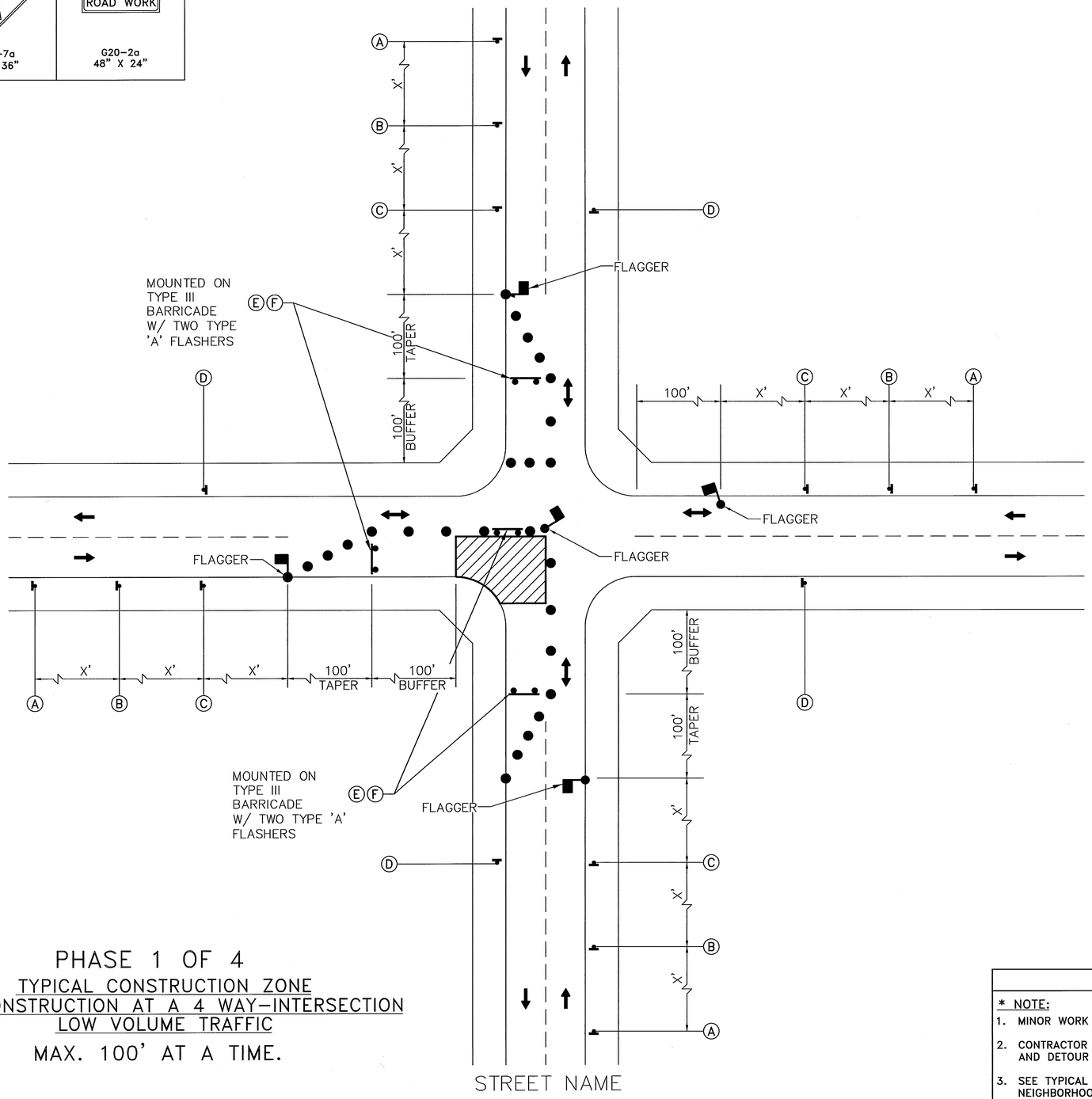
FOR REDUCED PLANS
original scale in inches

A	B	C	D
 CW21-7D 48" X 48"	 CW20-4D 48" X 48"	 CW20-7a 36" X 36"	 G20-2a 48" X 24"

E	F
 R5-1 48" X 48"	 R11-2 48" X 30"

LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE



PHASE 1 OF 4

TYPICAL CONSTRUCTION ZONE FOR CONSTRUCTION AT A 4 WAY-INTERSECTION LOW VOLUME TRAFFIC

MAX. 100' AT A TIME.

TRAFFIC NOTE:

* NOTE:

1. MINOR WORK ONLY.
2. CONTRACTOR TO USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS.
3. SEE TYPICAL OVERALL DETOUR AND TYPICAL NEIGHBORHOOD STREET DETOUR PLAN SHEETS FOR INFORMATION AND USE.
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TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
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REGISTERED PROFESSIONAL ENGINEER
04-30-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

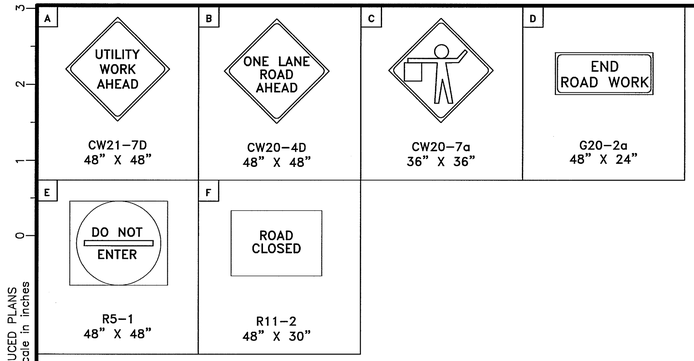
TRAFFIC CONTROL PLAN

TYP 4-WAY INTERSECTION
PHASE 1 OF 4
TCP SHEET 9 OF 12

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 135 OF 191	

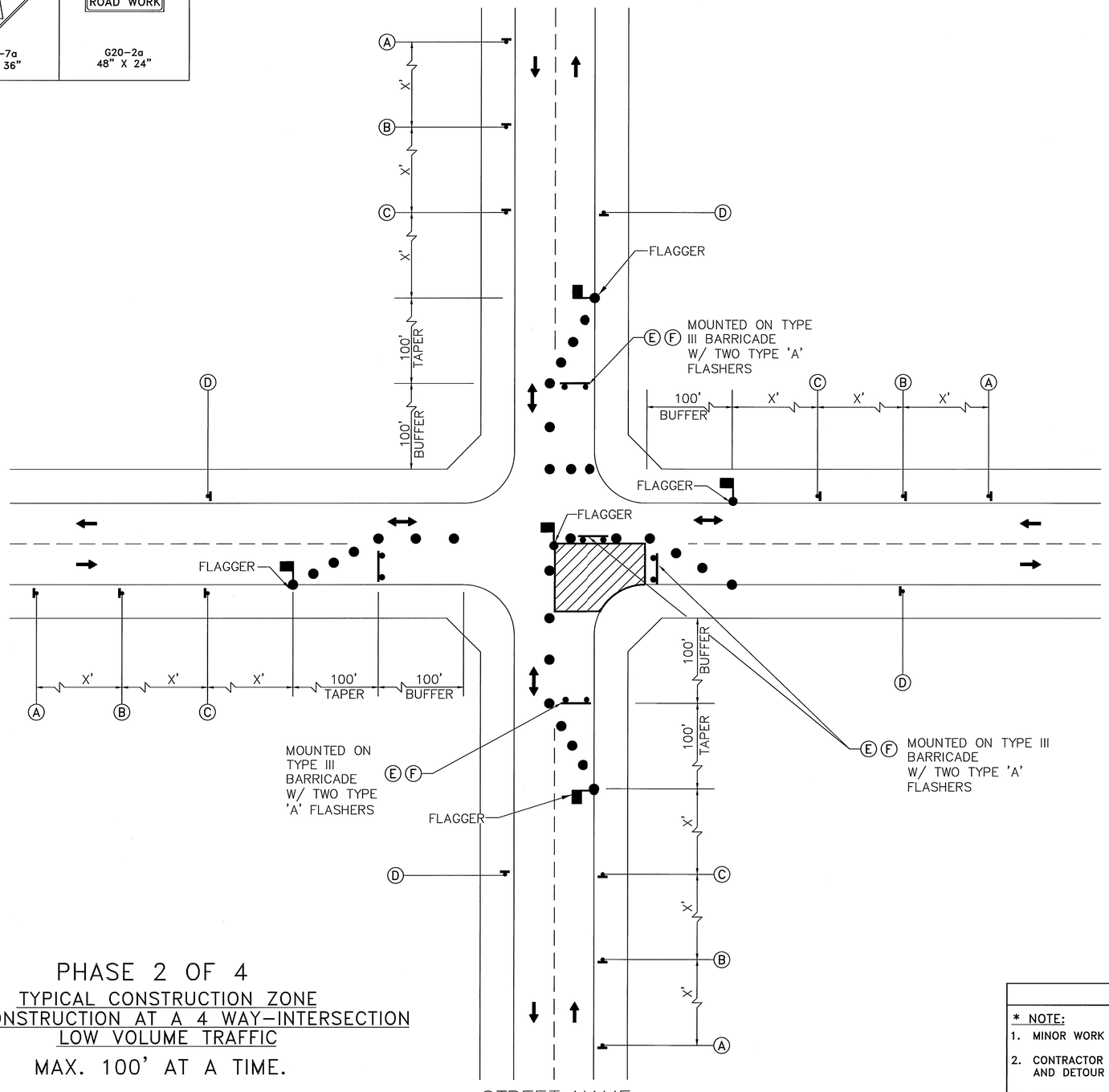
PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

3 2 1 0



LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE

PHASE 2 OF 4

TYPICAL CONSTRUCTION ZONE
FOR CONSTRUCTION AT A 4 WAY–INTERSECTION
LOW VOLUME TRAFFIC

MAX. 100' AT A TIME.

TRAFFIC NOTE:

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EPIFANIO E. SALAZAR JR.
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09-07-12

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

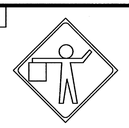
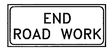
TRAFFIC CONTROL PLAN
TYP 4-WAY INTERSECTION
PHASE 2 OF 4
TCP SHEET 10 OF 12

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
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N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 136 OF 191	

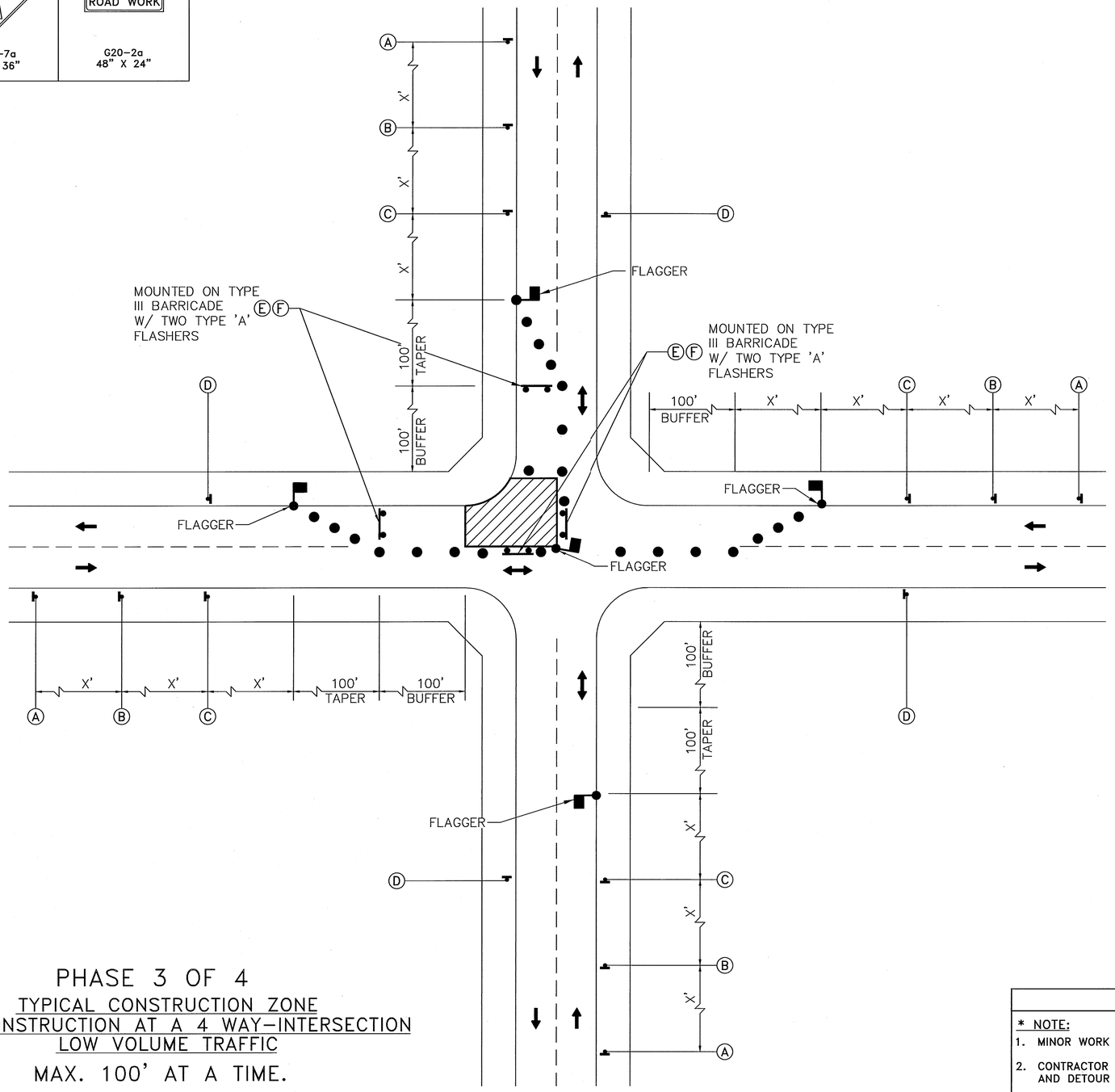
PUBLIC WORKS & ENGINEERING
49210
HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

A	B	C	D
			
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E	F
	
R5-1 48" X 48"	R11-2 48" X 30"



LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE

PHASE 3 OF 4

TYPICAL CONSTRUCTION ZONE
FOR CONSTRUCTION AT A 4 WAY–INTERSECTION
LOW VOLUME TRAFFIC

MAX. 100' AT A TIME.

TRAFFIC NOTE:

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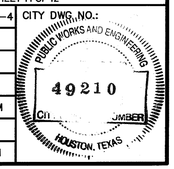
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

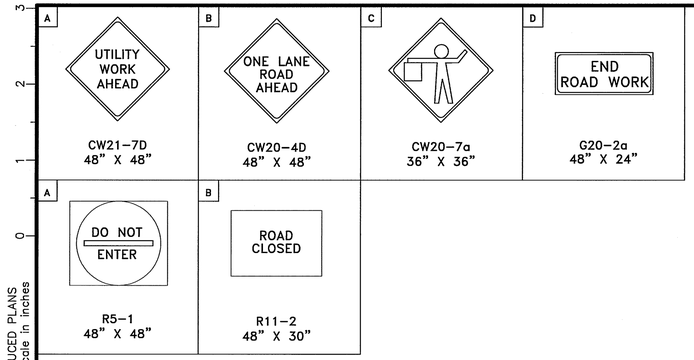
TRAFFIC CONTROL PLAN

TYP 4-WAY INTERSECTION
PHASE 3 OF 4
TCP SHEET 11 OF 12

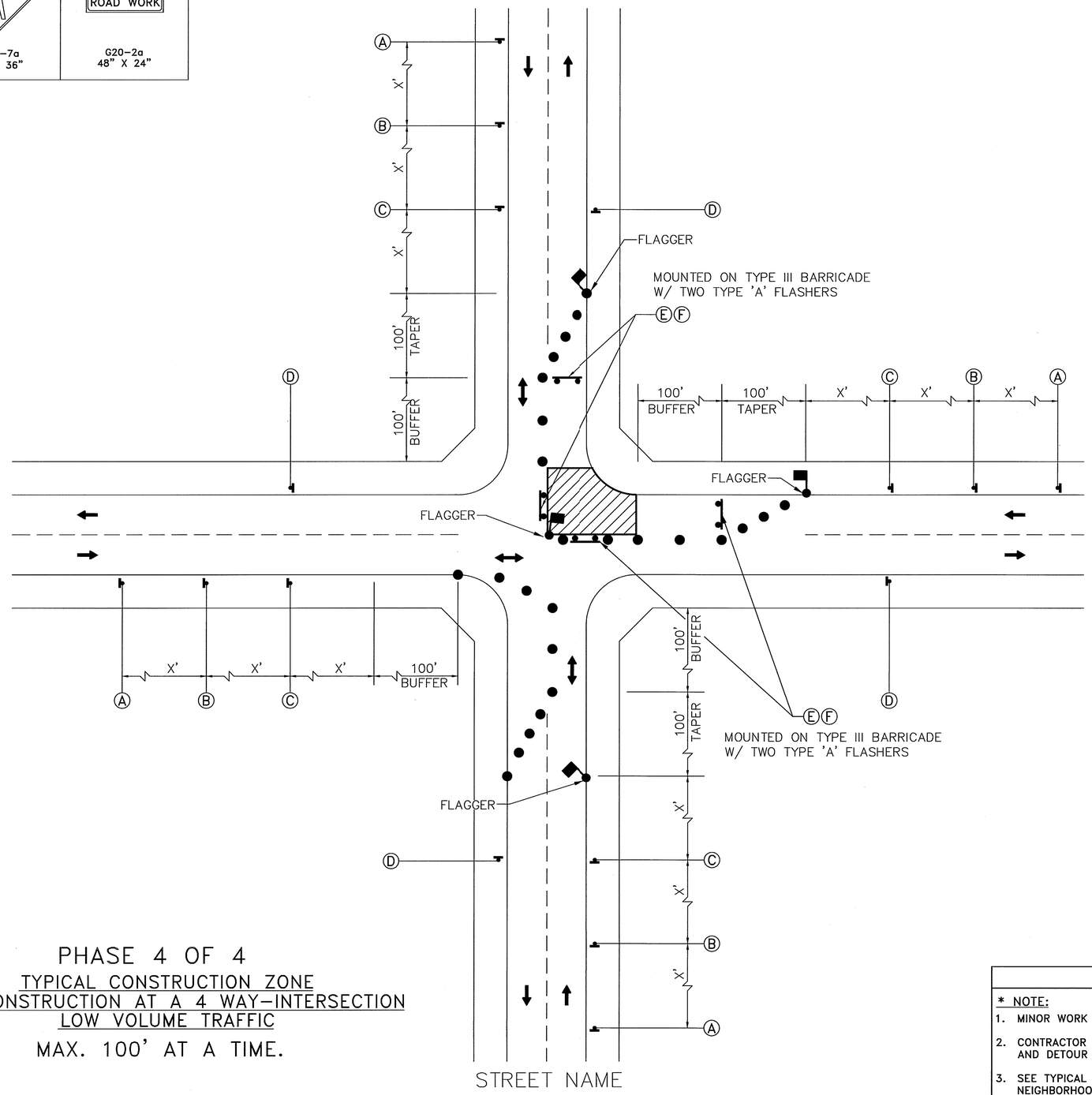
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FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 137 OF 191	



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FILE NAME: F:\WHB–SG4\CAD\TCP\WHB–SG4–TCP– ALL SHEETS.DWG



FOR REDUCED PLANS
original scale in inches



PHASE 4 OF 4

TYPICAL CONSTRUCTION ZONE FOR CONSTRUCTION AT A 4 WAY–INTERSECTION LOW VOLUME TRAFFIC

MAX. 100' AT A TIME.

TRAFFIC NOTE:

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-06-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

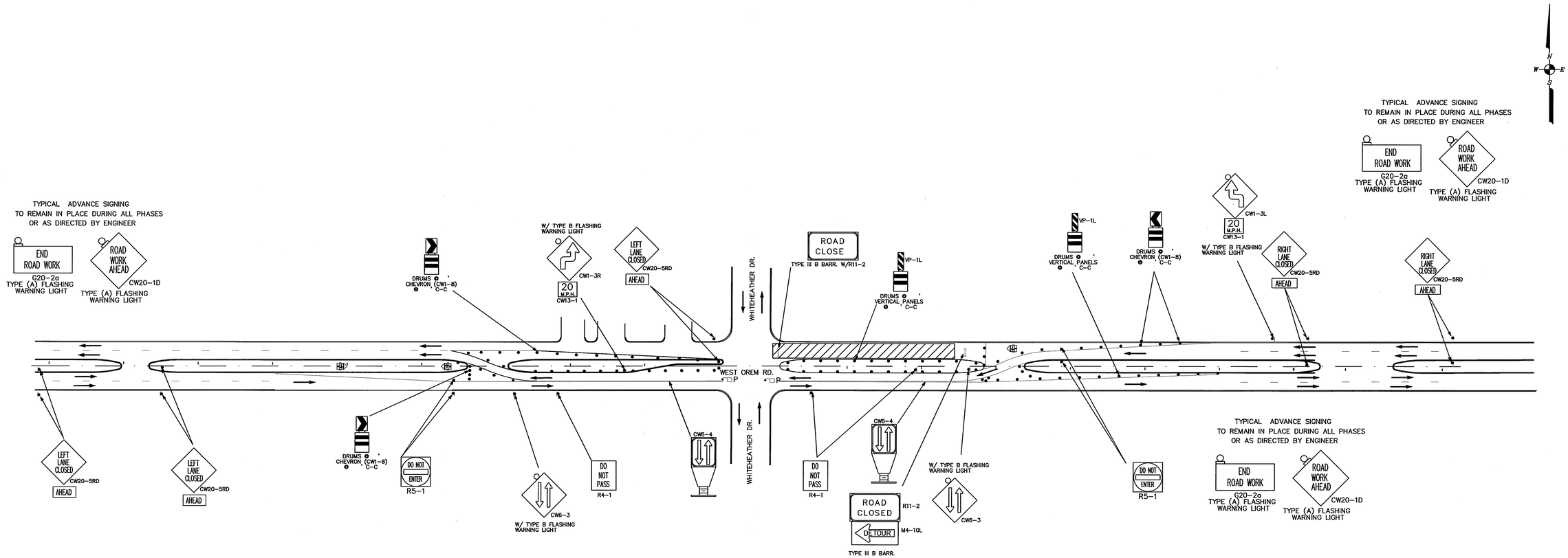
TRAFFIC CONTROL PLAN

TYP 4-WAY INTERSECTION
PHASE 4 OF 4
TCP SHEET 12 OF 12

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	49-210
ISAAC MUNIZ, E.I.T.	
SHEET NO. 138 OF 191	

PLOTTED ON: Monday, April 09, 2012 3:18:03 PM
FILE NAME: F:\WHB-SG4\CAD\TCP\WHB-SG4-TCP- ALL SHEETS.DWG

FOR REDUCED PLANS
original scale in inches



WESTBOUND LANE CLOSURES

TRAFFIC CONTROL PLAN GENERAL NOTES:

1. THE CONTRACTOR IS REQUIRED TO COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY, OR PROVIDE A PHYSICAL BARRIER SUCH AS CTB, DURING NON-WORKING HOURS.

2. IF THE CONTRACTOR ELECTS TO UTILIZE A TRAFFIC CONTROL PLAN THAT DIFFERS FROM THAT IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT, THE CONTRACTOR IS RESPONSIBLE FOR PREPARING AND SUBMITTING AN ALTERNATE PLAN AND OBTAINING APPROVALS FROM THE CITY OF HOUSTON.

3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL PERMITS EXCEPT WHERE EXPLICITLY STATED FOR THIS PROJECT.

4. THE CONTRACTOR IS REQUIRED TO KEEP STREETS OPEN TO TRAFFIC AT ALL TIMES EXCEPT AS DIRECTED BY THE ENGINEER AND ACCESS TO ALL DRIVES AND SIDE STREETS BOTH PUBLIC AND PRIVATE.

5. THIS TRAFFIC CONTROL PLAN CAN ONLY BE USED MONDAY THRU FRIDAY 9:00AM TO 3:00PM AND SATURDAY & SUNDAY 8:00AM TO 5:00PM.

6. THIS TRAFFIC CONTROL PLAN REQUIRES TWO OFF DUTY POLICE OFFICERS TO CONTROL WEST OREM DR. & WHITE HEATHER DR. SIGNALIZED INTERSECTIONS.

7. CONTRACTOR MUST MAINTAIN ACCESS TO ALL EXISTING COMMERCIAL BUSINESSES AND APARTMENT COMPLEXES IMPACTED BY THIS TRAFFIC CONTROL PLAN.

8. CONSTRUCTION COSTS FOR TEMPORARY TRAFFIC SIGNAL HEADS, TEMPORARY TRAFFIC SIGNAL POLES AND ALL RELATED APPURTENANCES ARE INCIDENTAL TO ALL OTHER CONSTRUCTION PAY ITEMS.

SPACING FOR CHANNELIZING DEVICES

i. PLASTIC DRUMS ON MERGING TAPER @ 30' C-C WITH CHEVRON SIGN @ 60' C-C AND TYPE 'C' WARNING LIGHT (OPTIONAL)

ii. PLASTIC DRUMS ON DOWNSTREAM TAPER @ 35' C-C

iii. PLASTIC DRUMS ON RADII @ 5' C-C

iv. PLASTIC DRUMS ON TANGENT @ 30' C-C WITH VERTICAL PANEL @ 60' C-C AND TYPE 'C' WARNING LIGHT (OPTIONAL)

v. PLASTIC DRUMS IN FRONT OF CONSTRUCTION ZONE @ 20' C-C WITH VERTICAL PANEL @ 40' C-C AND TYPE 'A' WARNING LIGHT (OPTIONAL)

vi. SELF RIGHTING VERTICAL PANELS @ 30' C-C.

vii. CONCRETE TRAFFIC BARRIER (CTB) OR LOW PROFILE CONCRETE TRAFFIC BARRIER (LPCTB) WITH REFLECTORS @ 10' C-C, IF PAVEMENT DROP IS MORE THAN TWELVE INCHES (12")

viii. OPTIONAL WARNING LIGHTS: WARNING LIGHTS MAY BE ADDED TO CHANNELIZING DEVISED IN AREAS WITH FREQUENT FOG, SNOW OR SEVERE ROADWAY CURVATURE, OR WHERE VISUAL DISTRACTIONS ARE PRESENT.

LEGEND

- CONSTRUCTION AREA
- OPEN TO TRAFFIC
- HEAVY WORK VEHICLE
- FLASHING ARROW BOARD
- SIGN POST
- TUBULAR MARKERS ,CONES OR DRUMS
- FLAGGER
- X = SIGN SPACING
- L = TAPER LENGTH
- FLAGGER WITH UNIFORMED POLICE OFFICER
- CDs = 35 MPH
- X = 160'
- L = 245'

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TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

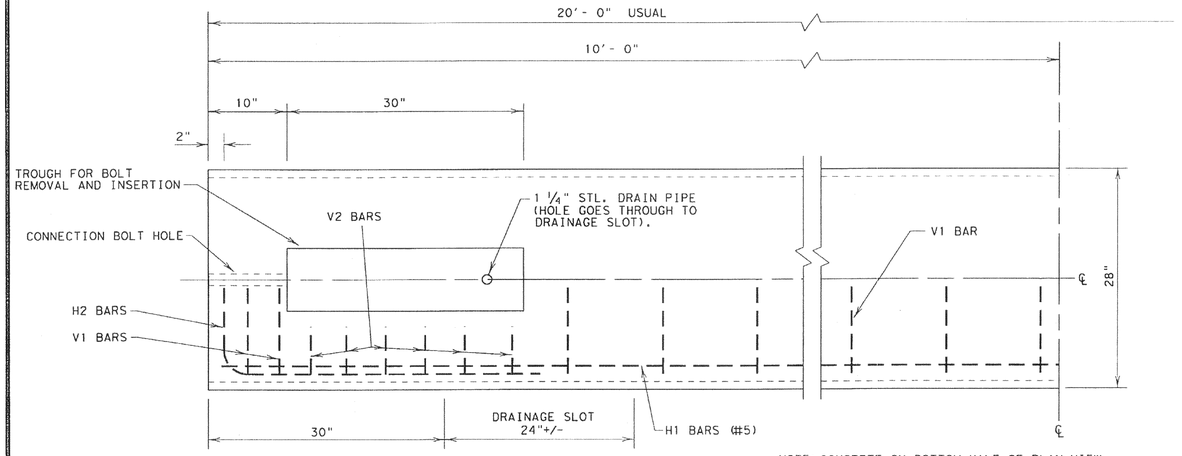
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN FOR BOULEVARD CLOSURES

WBS NO.:M-000262-0004-4	CITY DWG NO.: 49210
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 138A OF 191	

PLOTTED ON: Tuesday, April 10, 2012 10:25:11 AM
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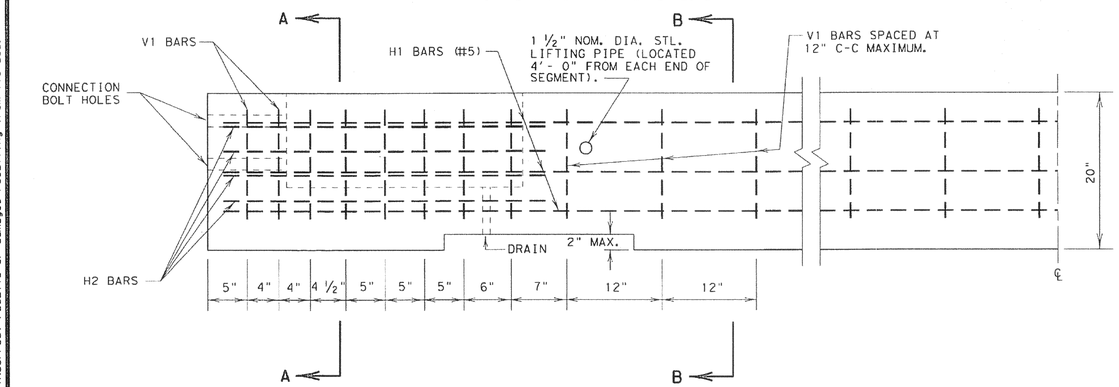
FOR REDUCED PLANS
original scale in inches
0 1 2 3



NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

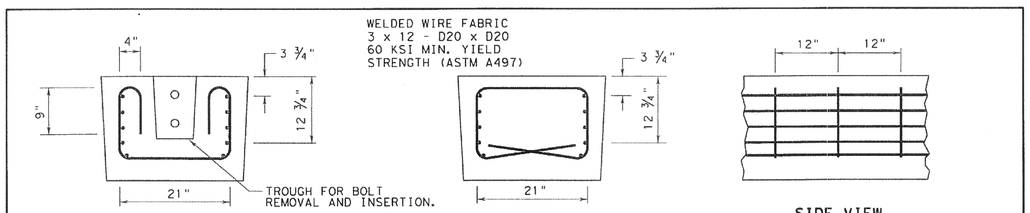
PLAN VIEW - TYPE 1

(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION - TYPE 1

(SYMMETRICAL ABOUT CENTER LINES)



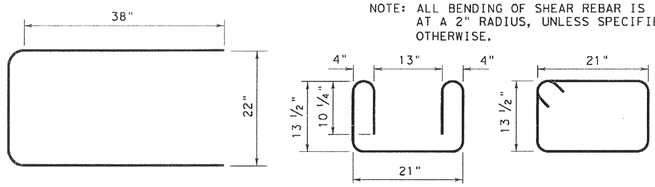
SECTION A-A

SECTION B-B

SIDE VIEW

NOTE: THIS FABRIC OPTION CAN BE USED IN PLACE OF V1, V2 AND H1 BARS. THE H2 BARS SPECIFIED ARE STILL REQUIRED.

WELDED WIRE FABRIC OPTIONAL REINFORCING



H2 BAR (#5)
(GRADE 60 MIN.)

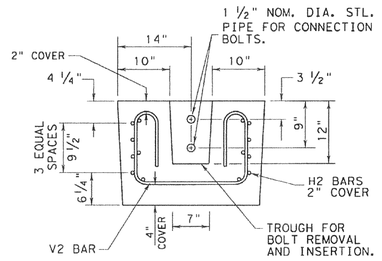
V2 BAR (#4)

V1 BAR (#4)

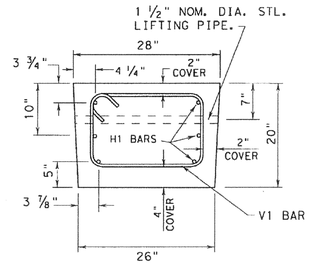
NOTE: ALL BENDING OF SHEAR REBAR IS AT A 2" RADIUS, UNLESS SPECIFIED OTHERWISE.

NOTE: H2 REBAR IS TO BE BENT AT A 3" RADIUS.

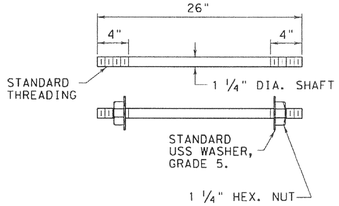
REINFORCING STEEL DETAILS



SECTION A-A



SECTION B-B



CONNECTION BOLT

GENERAL NOTES

1. BARRIER LENGTH SHALL BE 20 FEET (+/- 1 INCH) UNLESS OTHERWISE SPECIFIED IN THE PLANS.
2. ALL CONCRETE, REINFORCEMENT, ANCHOR BOLTS, BLOCKING, ETC., AS SHOWN ARE CONSIDERED AS PART OF THE BARRIER FOR PAYMENT.
3. ALL CONCRETE SHALL BE CLASS A, C, OR H, UNLESS OTHERWISE SPECIFIED.
4. ALL REINFORCING STEEL SHALL BE GRADE 40, UNLESS OTHERWISE SPECIFIED.
5. CHAMFER ALL EDGES ¾ INCH, AS DIRECTED BY THE ENGINEER.
6. STEEL PIPE SHALL BE HOT DIP GALVANIZED IN CONFORMANCE TO ASTM DESIGNATION A123. BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED TO ASTM DESIGNATION A153.
7. BOLTS SHALL CONFORM TO ASTM A36. NUTS SHALL CONFORM TO A307 REQUIREMENTS AND SHALL BE TAPPED OR CHASED AFTER GALVANIZING. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES.
8. THE BARRIER SHOULD BE LIGHT IN COLOR AND SHOULD BE SUPPLEMENTED BY DELINEATION AS DETAILED ELSEWHERE IN THE PLANS.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000

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LEVELS DISPLAYED

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CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5304, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

Texas Department of Transportation
Design Division (Roadway)

LOW PROFILE CONCRETE BARRIER

(PORTABLE AND PRECAST)

LPCB(1)-92

SHEET 1 OF 2

FILE: lpcb192.dgn	DN:	CK:	DW:	CK:	
©TxDOT September 1992	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS					
	COUNTY		CONTROL	SECT	JOB	HIGHWAY

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

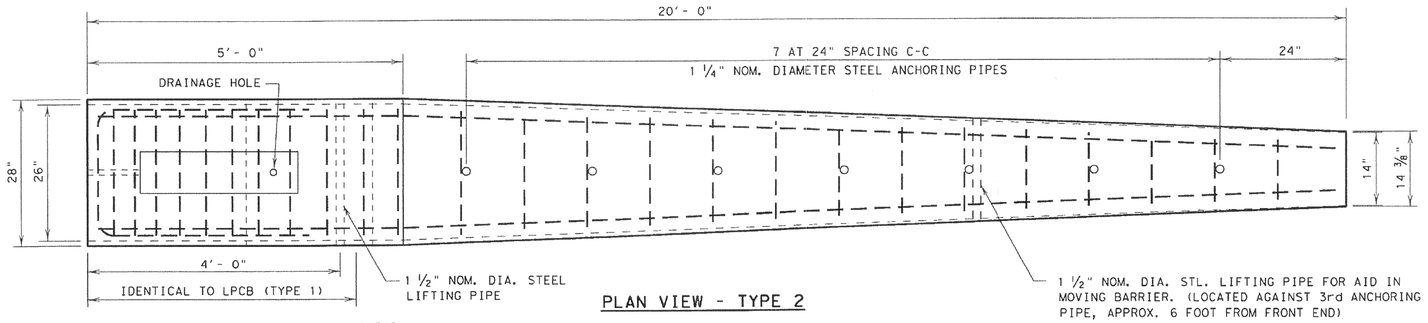
TRAFFIC CONTROL PLAN PROFILE CONCRETE BARRIER

1 OF 2

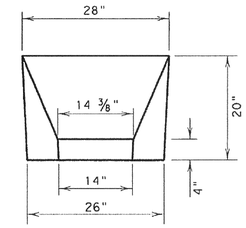
WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 139 OF 191	

PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

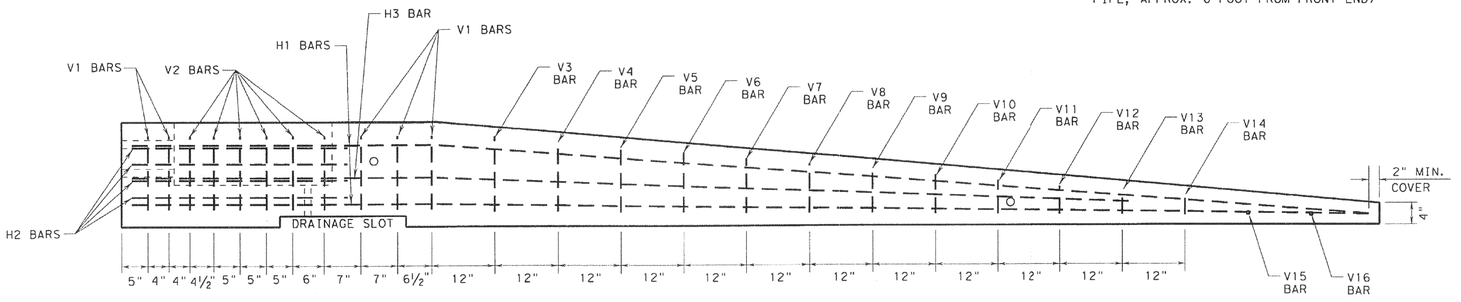
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PLAN VIEW - TYPE 2



APPROACH VIEW

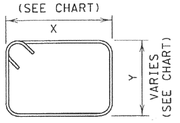


ELEVATION - TYPE 2

NOTE: ANCHORING PIPES NOT SHOWN IN ELEVATION.

GENERAL NOTES

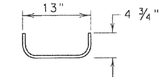
1. TYPE 2 BARRIER SHALL BE USED AS AN END TREATMENT FOR TYPE 1 BARRIER WHEN APPROPRIATE.
2. THE ANCHORAGE PINS ARE ALL THE SAME LENGTH AND ARE INTENDED TO BE DRIVEN FLUSH WITH THE TOP OF THE BARRIER SURFACE.
3. THE BENDS IN THE H3 AND H1 BARS ARE SLIGHT, NO FORMAL BEND IS NECESSARY.
4. TYPE 2 BARRIER MUST BE LIFTED FROM REAR FIRST TO PREVENT CRACKING OF SLOPED SECTION.
5. SEE SHEET 1 OF 2 FOR ADDITIONAL INFORMATION.



V 3-11 BARS (#4)

BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 1/4	14 1/2
V4 BAR	19 1/2	13 1/2
V5 BAR	18 1/2	12 1/4
V6 BAR	17 1/2	11 1/4
V7 BAR	17	10 1/4
V8 BAR	16 1/4	9
V9 BAR	15 1/2	8
V10 BAR	14 1/2	7
V11 BAR	13 3/4	6

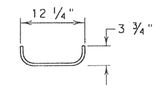
NOTE: ALL BENDING OF SHEAR REBAR IS AT A 2" RADIUS, UNLESS SPECIFIED OTHERWISE.



V12 BAR (#4)



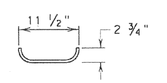
V15 BAR (#4)



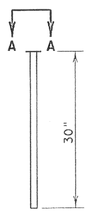
V13 BAR (#4)



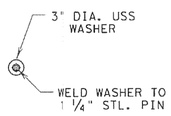
V16 BAR (#4)



V14 BAR (#4)



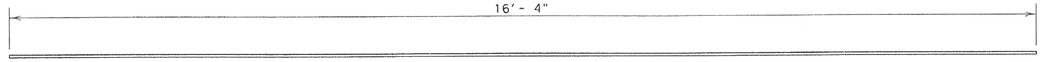
ANCHORING PIN
(1 1/4"DIA., A36 STL.)



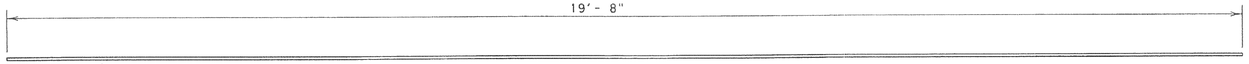
A-A
(HEAD OF ANCHORING PIN)

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES	20 FT. SECTION	
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000



H3 BARS (#5)
(GRADE 60)



H1 BARS (#5)
(GRADE 60)

Texas Department of Transportation
Design Division (Roadway)

LOW PROFILE CONCRETE BARRIER
(PORTABLE AND PRECAST)

LPCB(2)-92

SHEET 2 OF 2

FILE: lpcb192.dgn	DN:	CK:	DW:	CK:	
© TxDOT September 1992	DISTRICT	FEDERAL AID PROJECT			SHEET
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	COUNTY		CONTROL	SECT	JOB	HIGHWAY

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
OCTOBER 2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TRAFFIC CONTROL PLAN PROFILE CONCRETE BARRIER

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 140 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER NUMBER
HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

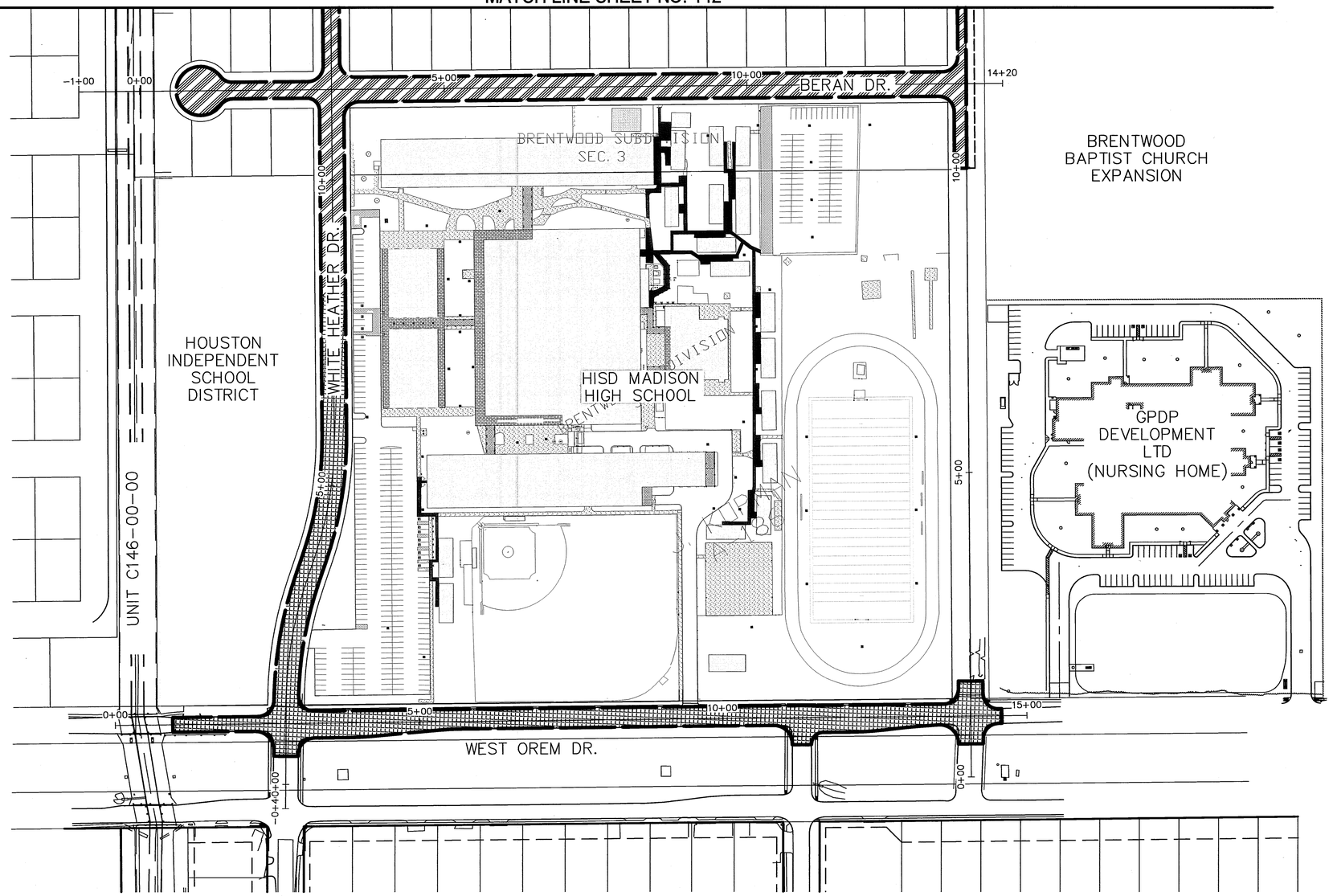
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LEVELS DISPLAYED

FOR REDUCED PLANS
original scale in inches

3 2 1 0

MATCH LINE SHEET NO. 142



LEGEND

- PHASE I
- PHASE II
- PHASE III
- PHASE IV
- PHASE V
- PHASE VI

N
W E
S

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
07-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

CONSTRUCTION PHASE PLAN LAYOUT

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 141 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

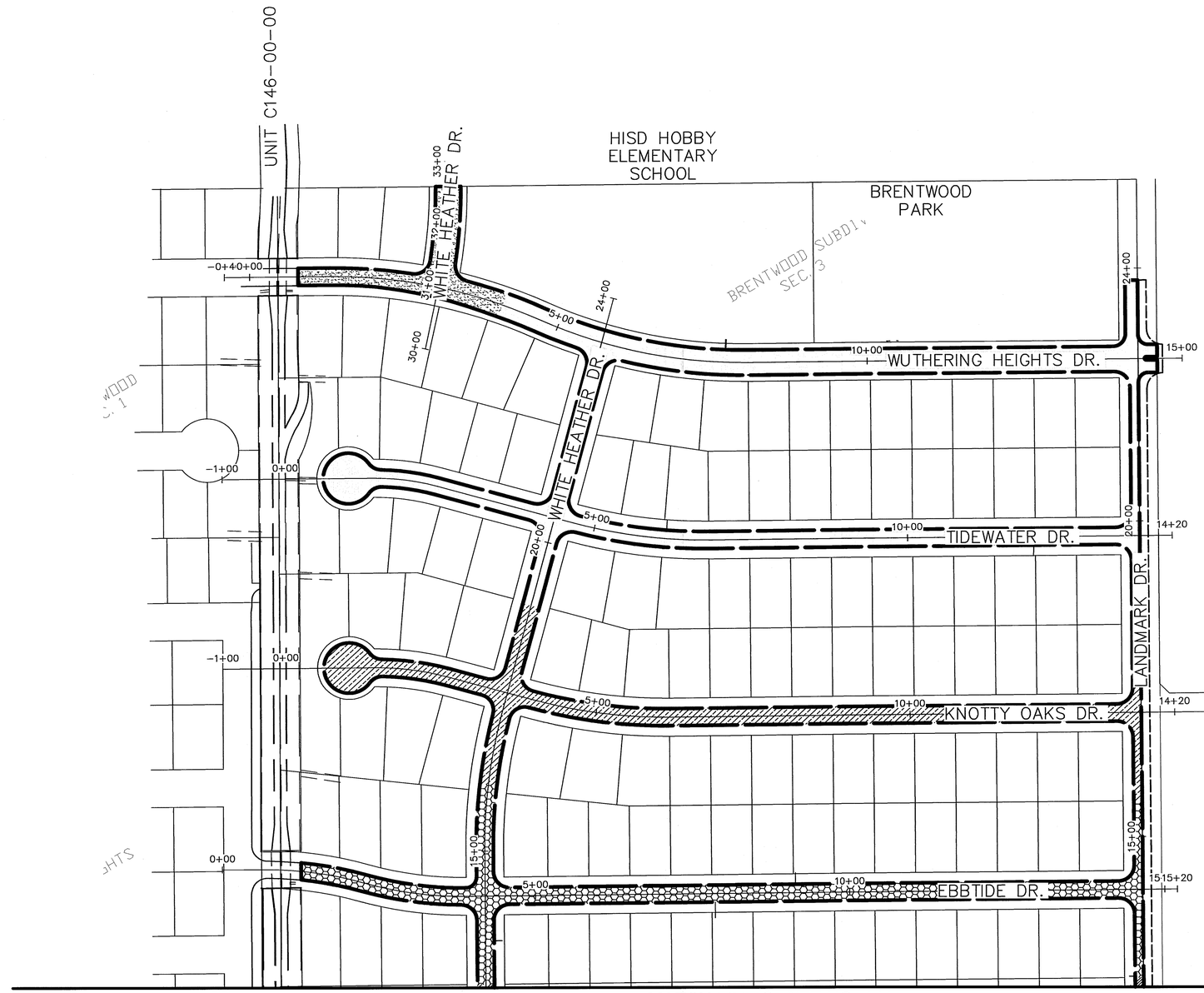
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FOR REDUCED PLANS
original scale in inches

3 2 1 0

LEGEND

- PHASE I
- PHASE II
- PHASE III
- PHASE IV
- PHASE V
- PHASE VI



MATCH LINE SHEET NO. 141

N
W E
S

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STATE OF TEXAS
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

CONSTRUCTION PHASE PLAN LAYOUT

2 OF 2

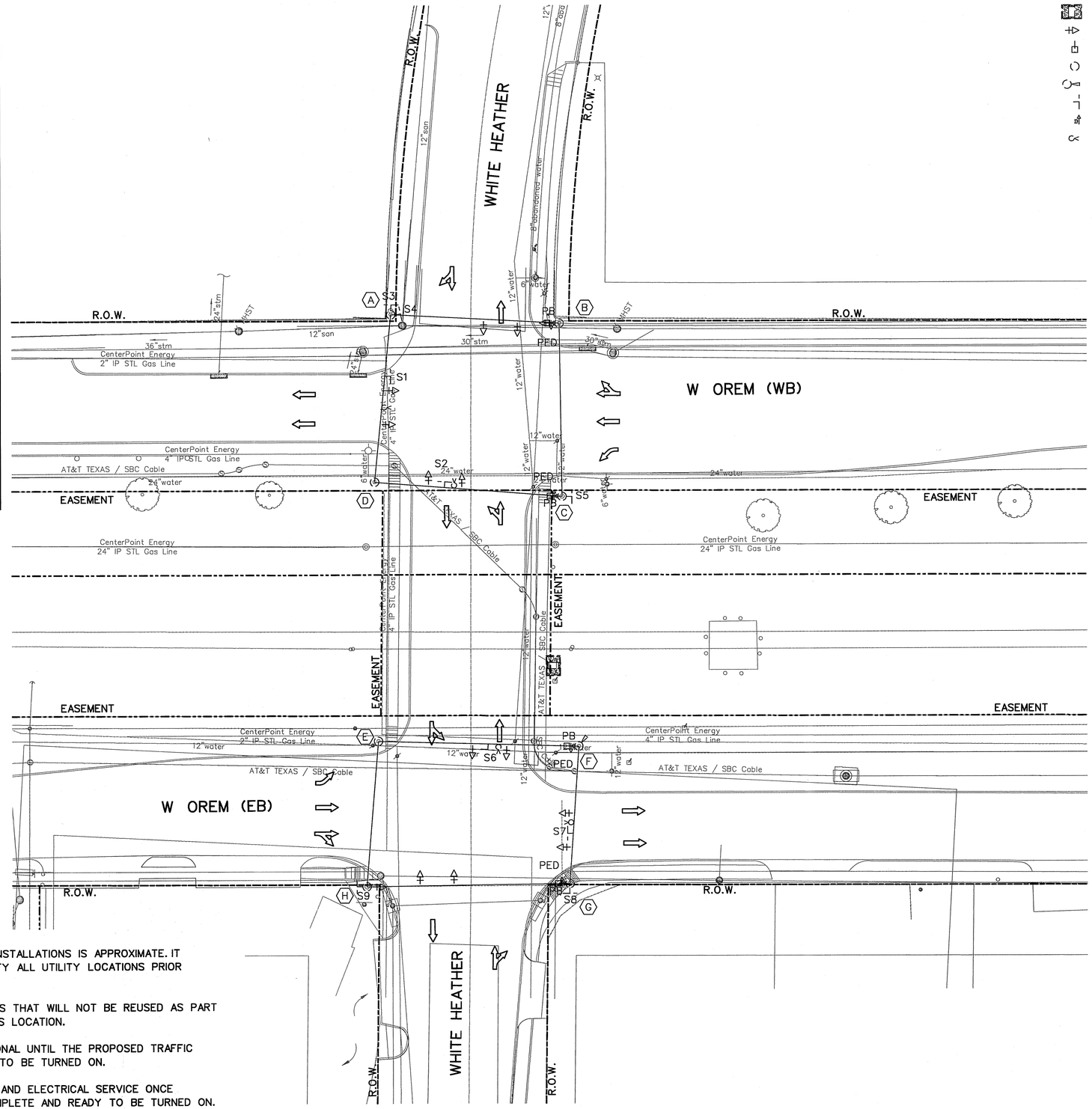
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FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 142 OF 191	

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49210
HOUSTON, TEXAS

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FILE NAME: F:\WHB-SG4\CAD\TCP\WHB-SG4-CONSTRUCTION-PHASE-LAYOUT.DWG

FOR REDUCED PLANS
original scale in inches

POLE SCHEDULE (TO BE REMOVED)		
POLE NUMBER	POLE TYPE	SIGNALS
(A)	EXISTING	2-H3
(B)	EXISTING	2-H3 1-V3 1-PED
(C)	EXISTING	1-PED
(D)	EXISTING	2-H3
(E)	EXISTING	-
(F)	EXISTING	2-H3 1-PED
(G)	EXISTING	2-H3 1-PED
(H)	EXISTING	2-H3 1-V3



LEGEND

- EXISTING CONTROLLER W/ CABINET
- EXISTING HORIZONTAL TRAFFIC SIGNAL HEAD
- EXISTING PEDESTRIAN SIGNAL HEAD
- EXISTING STRAIN POLE
- EXISTING ELECTRICAL SERVICE
- EXISTING SMALL SIGN
- EXISTING PEDESTRIAN PUSH BUTTON
- EXISTING OPTICOM

0 20 40

EXISTING SIGNS TO BE REMOVED
S1- D3-1
S2-D3-1
S3-W11-2
S4-R7-1
S5-W11-2
S6-D3-1
S7-D3-1
S8-W11-2
S9-W11-2

NOTES:

1. LOCATION OF UNDERGROUND AND ABOVEGROUND INSTALLATIONS IS APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS PRIOR TO ANY CONSTRUCTION.
2. ABANDON ALL CONDUIT, CABLE AND GROUND BOXES THAT WILL NOT BE REUSED AS PART OF THE PROPOSED SIGNAL INSTALLATION AT THIS LOCATION.
3. EXISTING TRAFFIC SIGNAL IS TO REMAIN OPERATIONAL UNTIL THE PROPOSED TRAFFIC SIGNAL INSTALLATION IS COMPLETE AND READY TO BE TURNED ON.
4. DISCONNECT AND REMOVE EXISTING CONTROLLER AND ELECTRICAL SERVICE ONCE PROPOSED TRAFFIC SIGNAL INSTALLATION IS COMPLETE AND READY TO BE TURNED ON.

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 2 ELEVATION 51.73'
WHITEHEATHER DR. STA. 3+79.01, 24.69'LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

CenterPoint Energy/ ELECTRIC FACILITIES — Date: 4-12-12
CenterPoint Energy/ GAS FACILITIES — Date: 4-12-12
AT&T TEXAS/SBC UTILITY LINES SHOWN — Date: 4-12-12
Approved for AT&T Texas/SBC underground conduit facilities only. Signature valid for one year.
CABLE Approved for underground conduit facilities only. — Date:

AECOM TECHNICAL SERVICES, INC.
5757 WOODWAY, SUITE 101 WEST
HOUSTON, TEXAS 77057-1599
WWW.AECOM.COM
TBPE REG. NO. F-3580

SES HORIZON CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

AECOM TECHNICAL SERVICES, INC.
TEXAS REGISTERED ENGINEERING FIRM F-3580

BRIAN G. CASTILLE 98414 LICENSED PROFESSIONAL ENGINEER — 4-9-12

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FB. NO. P-5602

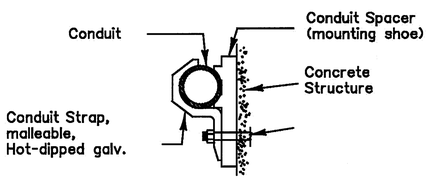
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

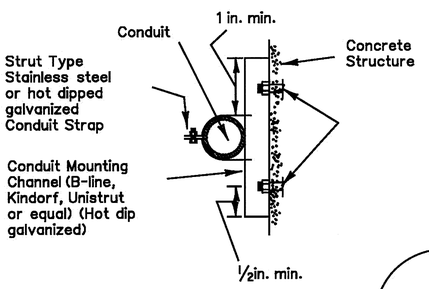
WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

EXISTING TRAFFIC SIGNAL
PLAN SHEET

WBS NO.: M-000262-0004-4	CITY DWG. NO.: 49210
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"=20' VERT: N/A	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 143 OF 191	

PLOTTED ON: Tuesday, November 29, 2011 2:45:05 PM
FILE NAME: T:\CASTILLE\PROJECTS\WHITEHEATHER AT W OREM\000_CADD\A_CSJ_HWY\99_REF_BASE\WH-SG4-BORDER.DWG





CONDUIT MOUNTING OPTIONS

(Attachment to concrete surfaces)
(See para. II.B.2)

COUNDUIT MOUNTING NOTES:

1. CONDUIT SUPPORTS SHALL BE SPACED AT MAXIMUM INTERVALS OF 5 FEET. CONDUIT SPACERS SHALL BE USED WITH METAL CONDUIT PLACED ON SURFACES OF CONCRETE STRUCTURES (SEE CONDUIT MOUNTING OPTIONS).

2. CONDUIT SUPPORTS SHALL NOT BE ATTACHED DIRECTLY TO PRESTRESSED CONCRETE BEAMS EXCEPT AS SHOWN SPECIFICALLY IN THE PLANS AND PPROVED BY THE ENGINEER.

PROPOSED TRAFFIC SIGNAL PHASING

ϕ4+ϕ10	ϕ6+ϕ10	ϕ14+ϕ8	ϕ14+ϕ2
ϕ4, ϕ4 PED, ϕ10	ϕ6, ϕ6 PED, ϕ10	ϕ14, ϕ8, ϕ8 PED	ϕ14, ϕ2, ϕ2 PED

PROPOSED SIGNS:
S1- D3-1
S2-R6-1L
S3-D3-1
S4-R6-1R
S5-D3-1
S6-R6-1R
S7-D3-1
S8-D3-1
S9-R6-1L
S10-D3-1

6' X 6' PRESENCE SAW CUT LOOP DETECTORS:
4' IN BACK OF STOP LINE,
CENTERED IN LANE

6' X 10' PRESENCE SAW CUT LOOP DETECTORS:
BEGINNING AT STOP LINE,
CENTERED IN LANE (OUTSIDE LANES ONLY)

6' X 50' PRESENCE SAW CUT LOOP DETECTORS:
4' IN FRONT OF STOP LINE,
CENTERED IN LANE

337' TO STOP LINE,
CENTERED IN LANE

NOTES:

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2. ABANDON ALL CONDUIT, CABLE AND GROUND BOXES THAT WILL NOT BE REUSED AS PART OF THE PROPOSED SIGNAL INSTALLATION AT THIS LOCATION.

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4. DISCONNECT AND REMOVE EXISTING CONTROLLER AND ELECTRICAL SERVICE ONCE PROPOSED TRAFFIC SIGNAL INSTALLATION IS COMPLETE AND READY TO BE TURNED ON.

5. SEE "CONDUIT MOUNTING OPTIONS" FOR MOUNTING LOOP DETECTOR CONDUIT ON BRIDGE 200' WEST OF WHITE HEATHER DR.

LEGEND

- PROPOSED CONTROLLER CABINET
- PROPOSED CONDUIT,COMPLETE-IN-PLACE
- PROPOSED PULL BOX - TYPE A
- PROPOSED PULL BOX - TYPE B
- PROPOSED HORIZONTAL TRAFFIC SIGNAL HEAD
- PROPOSED PEDESTRIAN SIGNAL HEAD
- PROPOSED PRESENCE SAW CUT LOOP DETECTOR
- PROPOSED PULSE SAW CUT LOOP DETECTOR
- PROPOSED MAST ARM AND POLE
- PROPOSED SMALL SIGN
- PROPOSED PEDESTRIAN PUSH BUTTON
- PROPOSED PRE-EMPT SENSOR
- PROPOSED POWER PEDESTAL
- (B) PROPOSED POLE IDENTIFICATION
- (XX) PROPOSED RUN NUMBER

0 20 40

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
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Date 4-12-12
Date 4-12-12
Date 4-12-12
Date
CABLE Approved for underground conduit facilities only.

AECOM TECHNICAL SERVICES, INC.
5757 WOODWAY, SUITE 101 WEST
HOUSTON, TEXAS 77057-1599
WWW.AECOM.COM
TBPE REG. NO. F-3580

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AECOM TECHNICAL SERVICES, INC.
TEXAS REGISTERED
ENGINEERING FIRM F-3580

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED PROFESSIONAL ENGINEER
7-9-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

PROPOSED TRAFFIC SIGNAL
PLAN SHEET

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"=20' VERT: N/A	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 144 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Tuesday, November 29, 2011 2:45:05 PM
FILE NAME: T:\CASTILLE\PROJECTS\WHITEHEATHER AT W OREM\000_CADD\A_CSJ_HWY\99_REF_BASE\WH-SG4-BORDER.DWG

FOR REDUCED PLANS
original scale in inches

POLE SCHEDULE

POLE NUMBER	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE	PED PB	REMARKS	LOCATION	STANDARDS
		SIGNAL	LUMIN	MTG.	FACE	TYPE	TYPE/SIGN			
(A)	TYPE 1	30'	-	3-ASTROBRAC 1-PED	2-H3 1-CDP	-	POLARA NAVIGATOR R10-3ER	PRE-EMPT SENSOR STREET NAME SIGN	BY ENGINEER IN FIELD AT APPROX POLE A: STA 1+22.7, 41.5' L WHITE HEATHER DR	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(E) (L)	5'	-	-	1-PED	1-CDP	-	POLARA NAVIGATOR R10-3ER		BY ENGINEER IN FIELD AT APPROX POLE E: STA 0+48.3, 22.6' R POLE L: STA (-0+63.3), 45.7' L WHITE HEATHER DR	02893-02 02893-03 02893-07
(C)	TYPE 1	30'	-	2-ASTROBRAC 1-PED	2-H3 1-CDP	-	POLARA NAVIGATOR R10-3ER	PRE-EMPT SENSOR STREET NAME SIGN R6-1L	BY ENGINEER IN FIELD AT APPROX POLE C: STA 1+43.6, 30.8' R WHITE HEATHER DR	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(B) (D) (G) (J)	5'	-	-	1-PED	1-CDP	-	POLARA NAVIGATOR R10-3EL		BY ENGINEER IN FIELD AT APPROX POLE B: STA 1+42.3, 22.7' L POLE D: STA 1+30.0, 47.0' R POLE G: STA (-0+5.7), 22.7 L POLE J: STA (-0+90.6), 29.1' R WHITE HEATHER DR	02893-02 02893-03 02893-07
(F) (H)	TYPE 1	25'	-	2-ASTROBRAC 1-PED	2-H3 1-CDP	-	POLARA NAVIGATOR R10-3ER	PRE-EMPT SENSOR STREET NAME SIGN R6-1R	BY ENGINEER IN FIELD AT APPROX POLE F: STA 0+73.3, 30.2' L POLE H: STA (-0+24.1), 29.5' R WHITE HEATHER DR	02893-02 02893-03 08293-04A 02893-04B 02893-05 02893-09
(I)	TYPE 1	25'	-	3-ASTROBRAC 1-PED	2-H3 1-CDP	-	POLARA NAVIGATOR R10-3EL	PRE-EMPT SENSOR STREET NAME SIGN	BY ENGINEER IN FIELD AT APPROX POLE I: STA (-0+63.8), 47.3' R WHITE HEATHER DR	02893-02 02893-03 08293-04A 02893-04B 02893-05 02893-09
(K)	TYPE 1	30'	-	2-ASTROBRAD 1-PED	2-H3 1-CDP	-	POLARA NAVIGATOR R10-3ER	PRE-EMPT SENSOR STREET NAME SIGN R6-1L	BY ENGINEER IN FIELD AT APPROX POLE K: STA (-0+78.6), 28.9' L WHITE HEATHER DR	02893-02 02893-03 08293-04A 02893-04B 02893-05 02893-09

TRAFFIC SIGNAL CONTROLLER

CABINET	TYPE	CONTROLLER	AUX. CONTROL	REMARKS	LOCATION	STANDARDS
	UL TYPE 3R	METERED SERVICE PEDESTAL WITH TWO SINGLE POLE 40 AMP CIRCUIT BREAKERS			BY ENGINEER IN FIELD AT APPROX. STA (-0+16.1), 31.1' R (TO CENTER OF THE PEDESTAL) WHITE HEATHER DR.	02893-14
	TYPE 340	2070L WITH GPS SERIAL COMMUNICATION	THREE POLE STREET LIGHTING CONTACTOR	STANDARD SPECIFICATION 16730 & 16731	BY ENGINEER IN FIELD AT APPROX. STA (0+6.4, 26.8' R (TO CENTER OF THE CABINET) WHITE HEATHER DR.	02893-10C

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 2 ELEVATION 51.73'
WHITEHEATHER DR. STA. 3+79.01, 24.69'LT

PRIVATE UTILITY LINES SHOWN

AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

N/A Date
Centerpoint Energy/ ELECTRIC FACILITIES
N/A Date
Centerpoint Energy/ GAS FACILITIES
AT&T SOUTHWEST UTILITY LINE LOCATION Date 11-21-12
Approval for AT&T SOUTHWEST underground conduit facilities only.
Signature valid for one year.
CABLE Approval for underground conduit facilities only. Date

AECOM
AECOM TECHNICAL SERVICES, INC.
5757 WOODWAY, SUITE 101 WEST
HOUSTON, TEXAS 77057-1599
WWW.AECOM.COM
TBPE REG. NO. F-3580

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-9304, Fax (713) 988-1441 www.seshorizon.com

AECOM TECHNICAL SERVICES, INC.
TEXAS REGISTERED ENGINEERING FIRM F-3580

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED PROFESSIONAL ENGINEER
11-21-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

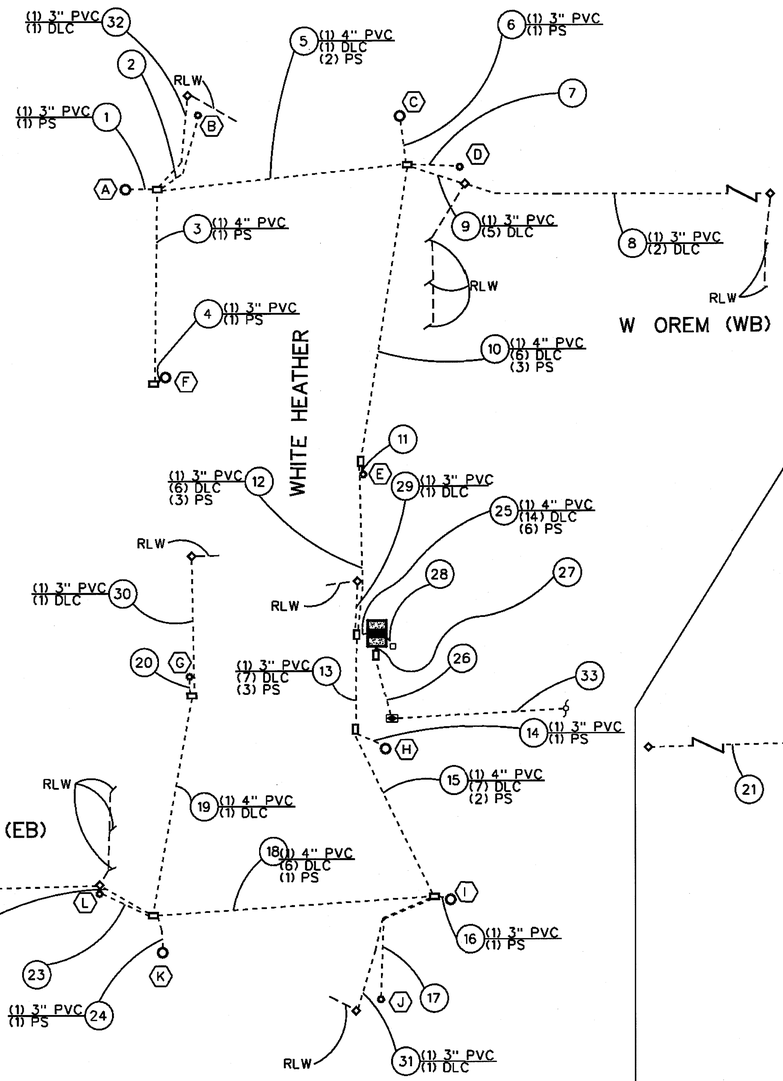
POLE SCHEDULE SHEET

WBS NO.:M-000282-0004-4
FILE NO.: SM5056
DRAWING SCALE
HORIZ: N/A VERT: N/A
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.

CITY DWG. NO.:
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

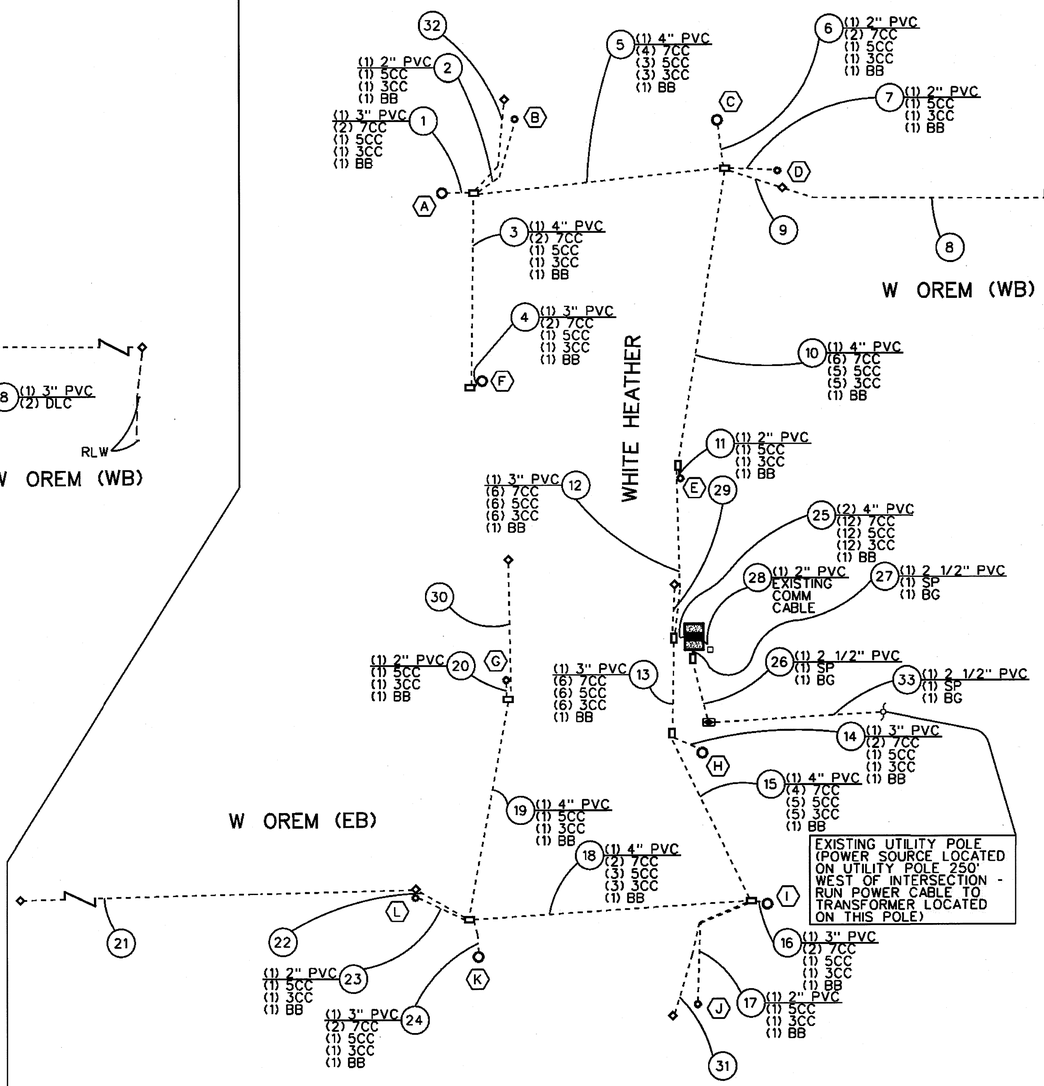
PLOTTED ON: Tuesday, November 29, 2011 2:45:05 PM
FILE NAME: T:\CASTILLE\PROJECTS\WHITEHEATHER AT W OREM\000_CADD\A_CSJ_HWY\99_REF_BASE\WH-SG4-BORDER.DWG

FOR REDUCED PLANS
original scale in inches



LOW VOLTAGE CIRCUIT

(X)Y"C = NUMBER, SIZE, AND TYPE OF CONDUIT
DLC - DETECTOR LEAD-IN CABLE, 14 AWG (I.M.S.A. 50-2-1984)
PS - PRE-EMPT SENSOR, OPTICOM, 20 3CC-SHIELDED CABLE (3M MODEL 138)
RLW - ROADWAY LOOP DETECTOR WIRE, 14 AWG (I.M.S.A. 51-5-1985)



HIGH VOLTAGE CIRCUIT

(X)Y"C = NUMBER, SIZE, AND TYPE OF CONDUIT
(X) = NUMBER OF CABLES (SIGNAL)
CC = 14 AWG SOLID CONDUCTOR CABLE
BB = BARE BOND 8 AWG SOLID
BG = BARE GROUND, 4 AWG SOLID
SP = SIGNAL POWER, 4 AWG THW

NOTES:
SP SHALL CONSIST OF: 4 AWG THW
2 - WHITE,
1 - BLACK,
1 - RED,
1 - GREEN

RUN 28 CONTAINS EXISTING COMMUNICATIONS CABLE THAT WILL BE DISCONNECTED FROM EXISTING CONTROLLER AND PLUGGED INTO PROPOSED CONTROLLER

0 20 40

PROJECT BENCHMARK
CITY OF HOUSTON SURVEY
MARKER 5252-0802, ELEVATION 52.01'
WHITE HEATHER STA. 11+28.10, 26.13' RT.
PROJECT T.B.M.
TBM# 2 ELEVATION 51.73'
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PRIVATE UTILITY LINES SHOWN
AT LEAST 48 HOURS BEFORE EXCAVING IN STREET R.O.W. OR EASEMENTS, CALL THE LONE STAR NOTIFICATION 713-223-4567

N/A
Date:
N/A
Date:
Date: 4-12-12
Date:

AECOM TECHNICAL SERVICES, INC.
5757 WOODWAY, SUITE 101 WEST
HOUSTON, TEXAS 77057-1599
WWW.AECOM.COM
TBPE REG. NO. F-3580

SES HORIZON CONSULTING ENGINEERS, INC.
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TEXAS REGISTERED ENGINEERING FIRM F-3580

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED PROFESSIONAL ENGINEER
7-9-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

CABLE SCHEMATIC SHEET

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"=20' VERT: N/A	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 146 OF 191	

49210 LICENSED PROFESSIONAL ENGINEER HOUSTON, TEXAS

PLOTTED ON: Tuesday, November 29, 2011 2:45:05 PM
FILE NAME: I:\CASTILLE\PROJECTS\WHITEHEATHER AT W OREM\000_CADD\A_CSJ_HWY\99_REF_BASE\WH-SG4-BORDER.DWG

FOR REDUCED PLANS
original scale in inches

TRAFFIC SIGNAL GENERAL NOTES:

1. ALL EQUIPMENT / MATERIALS AND CONSTRUCTION SHALL MEET OR EXCEED THE REQUIREMENTS CONTAINED IN THE CURRENT CITY OF HOUSTON STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, THE PROJECT SPECIFIC SPECIFICATIONS AND THE PLANS.

2. ALL ELECTRICAL WORK SHALL BE IN CONFORMANCE WITH THE PROVISIONS AND REQUIREMENTS OF THE CITY ELECTRICAL CODE.

3. ALL SIGNS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

4. THE CONTRACTOR SHALL ARRANGE THE INSTALLATION OF SIGNALS, POLES AND CONDUIT SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL DIRECTIONS AT ALL TIMES. THE CONTRACTOR SHALL NOT CLOSE MORE THAN ONE LANE OF A ROADWAY AT ONE TIME WITHOUT PRIOR APPROVAL OF THE CITY.

5. THE CONTRACTOR SHALL CLEAN UP AND REMOVE FROM THE WORK AREA ALL LOOSE MATERIAL RESULTING FROM CONTRACT OPERATIONS EACH DAY PRIOR TO WORK BEING SUSPENDED FOR THAT DAY.

6. THE CONTRACTOR SHALL ARRANGE FOR METER AND ELECTRICAL SERVICE CONNECTION FROM THE POWER COMPANY.

7. ALL PEDESTRIAN PUSH BUTTON ASSEMBLIES SHALL MEET ADA REQUIREMENTS. THE SIGNS THAT SHALL BE USED ARE IDENTIFIED IN THE TMUTCD AS R10-3E.

8. OVERHEAD STREET NAME SIGNS SHALL BE INSTALLED SUCH THAT THE BOTTOM OF THE SIGN IS NO LESS THAN 17 FEET ABOVE THE ROADWAY PAVEMENT OR NO LESS THAN 16 FEET ABOVE THE FINISHED GRADE BEYOND THE SHOULDER.

9. THE LOCATION OF EACH NEW POLE FOUNDATION, PULL BOX, CONTROLLER CABINET FOUNDATION, UPS CABINET FOUNDATION AND ELECTRIC SERVICE PEDESTAL FOUNDATION SHALL BE MARKED IN THE FIELD AS SHOWN ON THE PLANS. THE EXACT LOCATION SHALL BE APPROVED BY THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE PRIOR TO BEGINNING INSTALLATION OF THE FOUNDATION.

10. THE TOP OF THE POLE FOUNDATION SHALL BE LEVEL WITH THE FINISHED GRADE. IF THE SLOPE OR SHOULDER DROPS OFF FROM FINISHED GRADE, THE CONTRACTOR SHALL GRADE AROUND POLE FOUNDATION. THE TOP OF THE FOUNDATION SHALL EXTEND NO MORE THAN 4 INCHES ABOVE SURROUNDING GRADE.

11. ALL CONCRETE USED FOR TRAFFIC SIGNAL POLE AND CABINET FOUNDATIONS SHALL BE CLASS "A"(REFER TO THE CITY OF HOUSTON SPECIFICATION FOR CONCRETE).

12. MAST ARM POLES SHALL NOT BE INSTALLED ON THE FOUNDATIONS LESS THAN SEVEN DAYS AFTER THE PLACEMENT OF THE CONCRETE FOR THE FOUNDATION.

13. ANCHOR BOLTS FOR SIGNAL POLES SHALL BE SET SO THAT TWO ARE IN COMPRESSION AND TWO ARE IN TENSION. PRIOR TO THE INSTALLATION OF THE NUT, THE THREADS OF THE ANCHOR BOLT SHALL BE COATED WITH PIPE JOINT COMPOUND.

14. ALL UNDERGROUND CONSTRUCTION (CONDUIT, FOUNDATIONS AND PULL BOXES) FOR THE INTERSECTION SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF POLES, SIGNALS AND CABINETS. THE CONTRACTOR SHALL NOT PROCEED TO ABOVE GROUND WORK UNTIL THE ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE HAD CONFIRMED THAT THE MATERIALS FOR A COMPLETE INSTALLATION ARE AVAILABLE.

15. UNDERGROUND CONDUIT FOR SIGNAL CABLE SHALL BE SCHEDULE 80 ELECTRICAL PVC CONDUIT OF THE DIAMETER SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.

16. ALL ABOVE GROUND CONDUIT FOR SIGNAL CABLE AND INTERCONNECT MEDIA SHALL BE HOT DIPPED GALVANIZED STEEL RIGID METAL CONDUIT OF THE DIAMETERS SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.

17. ONLY NEW CONDUIT AND CABLE SHALL BE INSTALLED.

18. CONDUIT INSTALLED UNDER EXISTING PAVED DRIVEWAYS, ROADWAYS OR SIDEWALKS, WHICH ARE NOT SCHEDULED TO BE RECONSTRUCTED AS PART OF THIS PROJECT, SHALL BE INSTALLED BY MEANS OF BORING. THE CONTRACTOR SHALL NOT CUT OPEN ANY STREET OR DRIVEWAY FOR CONDUIT INSTALLATION WITHOUT THE PRIOR APPROVAL OF THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE.

19. CONDUIT NOT PLACED UNDER PAVED DRIVEWAYS, ROADWAY PAVEMENT OR SIDEWALK MAY BE PLACED BY CUTTING A TRENCH, INSTALLING THE CONDUIT AND BACKFILLING. ANY TRENCHING FOR CONDUIT WIDER THAN THEE (3) INCHES SHALL BE RESODDED.

20. PULL BOXES SHALL NOT BE INSTALLED WITHIN CONCRETE CURB ACCESS RAMPS. IN ADDITION, ANY PULL BOXES INSTALLED BEHIND CURBS SHALL BE INSTALLED BETWEEN THE CURB AND THE PROPOSED / FUTURE SIDEWALK OR BEYOND THE PROPOSED / FUTURE SIDEWALK. AN EXCEPTION TO THIS NOTE WOULD BE PULL BOXES INSTALLED IN A MEDIAN. ANY PULL BOXES INSTALLED ALONG AN UNCURBED ROADWAY SHALL BE INSTALLED ADJACENT TO, BUT NOT WITHIN, THE SHOULDER.

21. A 5/8 IN. X 10 FT. GROUND ROD SHALL BE INSTALLED IN THE TYPE B PULL BOX LOCATED ON EACH CORNER. TWO GROUND ROD CLAMPS SHALL BE FURNISHED FOR GROUNDING THE GROUND WIRE.

22. ALL CONDUITS SHALL BE CLEANED BY COMPRESSED AIR AND A PROPERLY SIZED CONDUIT PISTON OR MANDREL SHALL BE PULLED THROUGH THE CONDUIT PRIOR TO CABLE INSTALLATION.

23. WHEN PULLING TRAFFIC SIGNAL SYSTEM CABLES THROUGH CONDUIT, THE CABLES SHALL BE LUBRICATED WITH A LUBRICANT NORMALLY USED FOR THIS PURPOSE. ANY ABRASION TO ANY CONDUCTOR INSULATION WHICH OCCURS WHILE PULLING CABLE FOR THE TRAFFIC SIGNAL SYSTEM WILL BE CAUSE FOR THE IMMEDIATE REJECTION OF THE CABLE. IF THIS OCCURS, THE CONTRACTOR SHALL REMOVE AND REPLACE THE ENTIRE CABLE RUN AT THEIR EXPENSE.

24. A MINIMUM OF THREE (3) FEET OF EACH WIRE AND CABLE MEASURED FROM THE TOP OF THE PULL BOX SHALL BE LEFT IN EACH PULL BOX AND AT EACH POLE BASE.

25. ALL CABLES SHALL BE STRIPPED, FORMED AND TERMINATED IN A NEAT AND UNIFORM MANNER WHETHER IN THE SIGNAL HEAD OR CONTROLLER CABINET. ALL CABLE SHALL BE BROUGHT INTO THE TERMINAL HOUSING OF SIGNALS AND/OR CONTROLLER CABINETS AND A SUFFICIENT LENGTH OF CABLE SHALL BE LEFT SO THAT ALL TERMINAL CONNECTIONS MAY BE MADE WITHOUT THE NECESSITY OF SPLICING THE CABLE.

26. THE HIGH VOLTAGE CABLES SHOULD BE SEPARATED FROM THE LOW VOLTAGE CABLES AS MUCH AS POSSIBLE.

27. NO LOOP DETECTOR SHALL BE CUT IN A PARALLEL EXPANSION JOINT. LOOPS CUT ACROSS EXPANSION JOINTS SHALL HAVE A SLACK IN THE CABLE FOR EXPANSION.

28. ALL VEHICLE ROADWAY DETECTION LOOP CABLES SHALL BE #14 AWG IMSA 51-5-1985 CABLE. LEAD-IN CABLES SHALL BE #16 AWG IMSA 50-2-1984 CABLE. NO SPLICES SHALL BE ALLOWED IN THE ROADWAY DETECTION LOOP CABLE EXCEPT AT THE PULL BOX ADJACENT TO LOOP. THE DETECTOR LEAD-IN CABLE SHALL NOT BE SPLICED.

29. DETECTION LOOP SAW CUTS SHALL BE FLUSHED WITH WATER UNDER PRESSURE AND THEN DRIED WITH AIR UNDER PRESSURE.

30. THERE SHALL BE NO SPLICING IN CONDUCTORS EXCEPT FOR THE NECESSARY SPLICE BETWEEN ROADWAY LOOP WIRE AND DETECTOR LEAD-IN CABLE IN THE PULL BOX ADJACENT TO THE DETECTOR. THESE SPLICES SHALL BE WATERPROOF AND SHALL BE IN COMPLIANCE WITH THE CITY OF HOUSTON STANDARD DRAWINGS FOR TRAFFIC SIGNAL CONSTRUCTION. THESE SPLICES SHALL BE MADE BY THE CONTRACTOR. DO NOT GROUND THE CABLE SHIELD AT THE PULL BOX.

31. ALL CONSTRUCTION SIGNING AND CONSTRUCTION TRAFFIC CONTROL DEVICES SHALL BE IN CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

32. THE EMERGENCY VEHICLE PRE-EMPTION SENSOR CABLE SHALL BE OPTICOM DETECTOR CABLE MODEL NO. 138. THE CABLE SHALL NOT BE SPLICED.

33. ALL VEHICLE AND PEDESTRIAN INDICATIONS SHALL BE LED.

34. THE CONTRACTOR SHALL BAG ALL NEWLY INSTALLED VEHICULAR AND/OR PEDESTRIAN TRAFFIC SIGNAL HEADS WITH BURLAP OR OTHER APPROVED MATERIAL UNTIL THE FINAL INSPECTION AND ACCEPTANCE BY THE CITY TRAFFIC ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE. THE BURLAP OR OTHER APPROVED MATERIAL/DEVICE SHALL COMPLETELY COVER THE TRAFFIC SIGNAL HEAD AND SHALL OBSCURE THE VIEW OF THE TRAFFIC SIGNAL INDICATIONS SO THAT THEY CANNOT BE SEEN UNTIL THE TRAFFIC SIGNAL IS PLACED IN OPERATION. DURING CONSTRUCTION, THE TRAFFIC SIGNAL WILL BE DE-ENERGIZED WHILE NOT IN USE FOR TESTING.

35. THE TRAFFIC SIGNAL OPERATION AT EXISTING SIGNALIZED INTERSECTIONS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.

36. ALL STRIPING AND PAVEMENT MARKINGS ARE TO BE DONE UNDER THIS CONTRACT AND SHALL BE IN PLACE PRIOR TO THE ACTIVATION OF THE TRAFFIC SIGNAL. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL STOP LINES PRIOR TO THE INSTALLATION OF LOOP DETECTORS.

RESPONSIBILITIES:

1. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE FOLLOWING EQUIPMENT AND MATERIALS AS SPECIFIED IN THE PLANS: STEEL POLE ANCHOR BOLTS (WITH NUTS AND WASHERS), CONCRETE POLE FOUNDATIONS WITH REINFORCEMENT (WHERE SPECIFIED), TRAFFIC SIGNAL CONTROLLER CABINETS WITH CONTROLLERS AND ALL AUXILIARY EQUIPMENT, CONTROLLER CABINET CONCRETE FOUNDATIONS, CONCRETE PULL BOXES, ELECTRICAL CONDUIT, GROUND RODS AND CONNECTORS, BARE BOND WIRE AND ALL OTHER CONDUCTORS, POLES, MAST ARMS, TRAFFIC SIGNALS AND MOUNTING ASSEMBLIES, PEDESTRIAN SIGNALS AND MOUNTING ASSEMBLIES, PEDESTRIAN PUSH BUTTON STATIONS WITH SIGNS, ELECTRIC SERVICE PEDESTALS AND CONCRETE FOUNDATION(S), AND ALL OTHER APPURTENANCES NECESSARY FOR THE OPERATION OF THE TRAFFIC SIGNAL INSTALLATIONS, EXCEPT AS MODIFIED IN THE PLANS.
2. THE CONTRACTOR SHALL DELIVER THE CONTROLLER CABINETS WITH THE CONTROLLERS AND AUXILIARY EQUIPMENT SPECIFIED IN THE PLANS TO THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER, 2200 PATTERSON STREET FOR TESTING, A MINIMUM OF THREE WEEKS PRIOR TO THE INSTALLATIONS AT THE INTERSECTIONS. CONTACT THE SIGNAL SHOP ELECTRICAL SUPERVISOR (713-803-3033) AT LEAST 2 WORKING DAYS PRIOR TO THE DELIVERY OF THE CONTROLLER CABINETS TO THE CITY OF HOUSTON. THE CONTRACTOR SHALL PICK UP AND TRANSPORT THE CONTROLLER CABINETS FROM THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER TO THE INTERSECTIONS AFTER CITY OF HOUSTON STAFF HAS TESTED THE EQUIPMENT AND APPROVED IT FOR INSTALLATION.
3. THE CONTRACTOR SHALL INSTALL EACH TRAFFIC CONTROLLER CABINET ON ITS FOUNDATION AND ROUTE ALL OF THE CONDUCTORS INTO THE CONTROLLER CABINET. CONDUCTORS SHALL BE TERMINATED IN THE CABINET BY THE CONTRACTOR UNDER THE OBSERVATION OF AN APPROVED CITY OF HOUSTON REPRESENTATIVE.
4. THE CONTRACTOR SHALL CAREFULLY DISASSEMBLE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT THAT IS NOT TO REMAIN OR BE RELOCATED. THESE SALVAGED MATERIALS ARE THE PROPERTY OF THE CITY OF HOUSTON AND ARE TO BE DELIVERED AND UNLOADED TO THE LOCATION OR LOCATIONS DESIGNATED BY THE CITY OF HOUSTON INSPECTOR. (SIGNAL)
5. THE CONTRACTOR SHALL SALVAGE AND REPLANT ANY LANDSCAPING VEGETATION THAT MAY BE DAMAGED BY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM AN APPROVED CITY OF HOUSTON REPRESENTATIVE BEFORE ANY PLANTS ARE MOVED.
6. THE CONTRACTOR SHALL REPAIR/RESTORE ANY LANDSCAPE IRRIGATION COMPONENTS DAMAGED BY CONSTRUCTION ACTIVITY TO THEIR ORIGINAL CONDITION.
7. THE LOCATION OF PUBLIC AND PRIVATE UTILITIES IS SHOWN IN AN APPROXIMATE LOCATION ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES TO UTILITIES THAT ARE THE RESULT OF HIS FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND FACILITIES.

PRIVATE UTILITY NOTES:

AT&T TEXAS/SWBT FACILTITES

1. THE LOCATIONS OF AT&T/SWBT 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/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
4. WHEN AT&T TEXAS/SWBT 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/SWBT UNDERGROUND CONDUIT FACILITIES SHOWN 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 E-MAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

CAUTION: UNDERGROUND GAS FACILITIES:

1. LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELEINE, 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 UTILITIY 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.
2. WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 967-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON- MECHANIZED EXCAVATION PROCEDURES.
4. WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
5. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL FACILITIES

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF THE 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 AND 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.
2. 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 ELECTRIC FACILITIES AT 713-207-2222.
3. CONTRACTOR TO NOTIFY LONE STAR NOTIFICATION CENTER AT (713) 223-4567, 48 HOURS BEFORE STARTING WORK IN STREET RIGHT-OF-WAY OR EASEMENTS.
4. ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO 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.

ELECTRICAL SERVICE:

CONTRACTOR WILL BE RESPONSIBLE FOR CONNECTING THE PROPOSED METERED POWER PEDESTAL TO THE CENTERPOINT ENERGY SERVICE POINT. CONTRACTOR TO VERIFY CENTERPOINT SERVICE POLE AND INSTALL CONDUIT BETWEEN THE METERED PEDESTAL AND THE CENTERPOINT SERVICE POLE, INCLUDING RISER WIRING AND WEATHERHEAD AS REQUIRED BY THE POWER COMPANY. ANY AND ALL COST ASSOCIATED WITH THIS CONNECTION, INCLUDING ALL MATERIALS AND LABOR REQUIRED WILL BE CONTRACTORS RESPONSIBILITY. NO SEPARATE PAYMENT WILL BE MADE FOR THIS AND THE COST WILL BE SUBSIDIARY TO TRAFFIC SIGNAL BID ITEMS.

ADDITIONAL NOTE

1. THE CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS AND MONTHLY ELECTRICITY BILLS UNTIL THE CITY ACCEPTS THE TRAFFIC SIGNAL.

AECOM
AECOM TECHNICAL SERVICES, INC.
5757 WOODWAY, SUITE 101 WEST
HOUSTON, TEXAS 77057-1599
WWW.AECOM.COM
TBPE REG. NO. F-3580

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-7804, Fax (713) 988-1441 www.seshorizon.com

AECOM TECHNICAL SERVICES, INC.
TEXAS REGISTERED ENGINEERING FIRM F-3580

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED PROFESSIONAL ENGINEER
4-9-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TRAFFIC SIGNAL
GENERAL NOTES

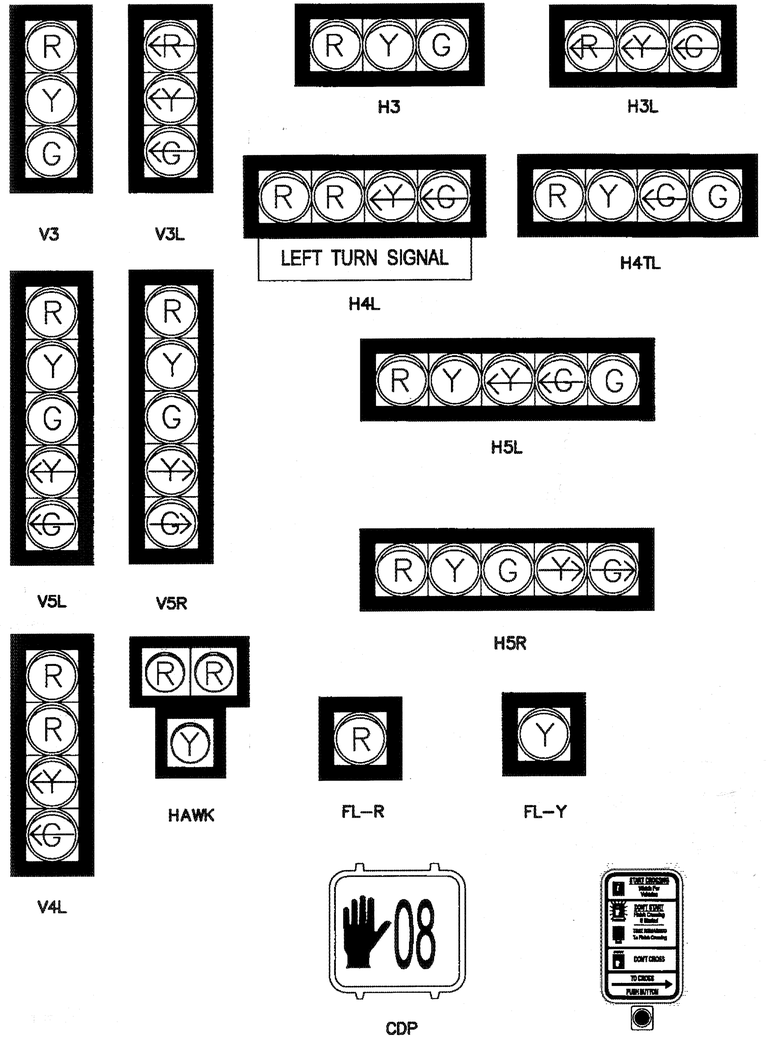
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FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: N/A VERT: N/A	
CITY OF HOUSTON PM	
I.M. ISAAC MUNIZ, E.I.T.	
SHEET NO. 147 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

PLOTTED ON: Tuesday, November 29, 2011 2:45:05 PM
FILE NAME: T:\CASTILLE\PROJECTS\WHITEHEATHER AT W OREM\000_CADD\A_CSJ_HWY\99_REF_BASE\WH-SG4-BORDER.DWG

	NEW	EXISTING
TRAFFIC SIGNAL POLE		
PEDESTAL POLE		
POLE W/MAST ARM		
VEHICLE SIGNAL HEAD		
VEHICLE SIGNAL HEAD W/BACK PLATE		
PEDESTRIAN SIGNAL HEAD		
PEDESTRIAN PUSH BUTTON		
PULL BOX – TYPE A		
PULL BOX – TYPE B		
PULL BOX – TYPE C		
PULL BOX – TYPE B W/EXTENSION		
CONDUIT		
VIDEO DETECTION CAMERA		
PRE–EMPT SENSOR		
LUMINAIRE		
LUMINAIRE W/PHOTO CELL		
CONTROLLER CABINET		
METERED POWER PEDESTAL		
POLE MOUNTED METER		
FIBER OPTIC CONDUIT	—FO—	— FO—
MAST ARM SIGN		

SIGNAL TYPES



BRIAN G. CASTILLE
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STATE OF TEXAS
4-9-12

NOTE:

ALL VEHICULAR TRAFFIC SIGNAL HEAD TYPES HAVE 12–INCH LENSES.

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

NO.	DATE	REVISION	BY:	CHKD:	APPROVAL (SIGNATURE):

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PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

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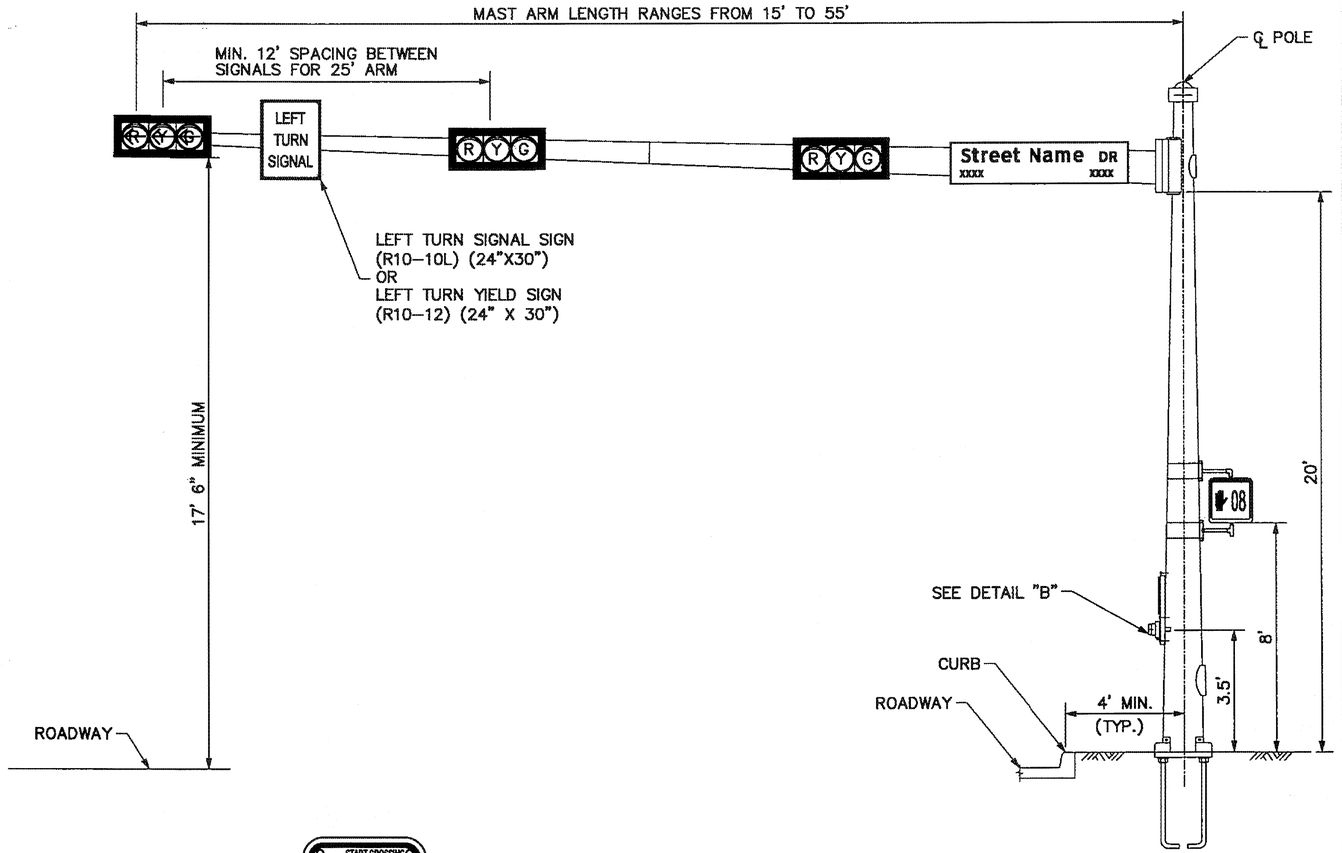
CITY OF HOUSTON TEXAS

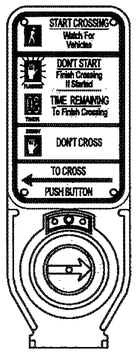
TRAFFIC SIGNAL DETAILS

HARDWARE LEGENDS

DWG. NO. 02893–02

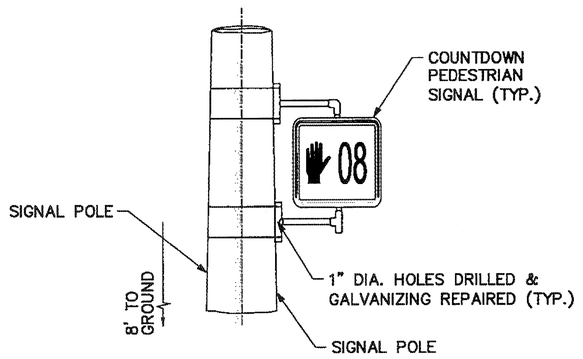
SHEET NO. 148 OF 191





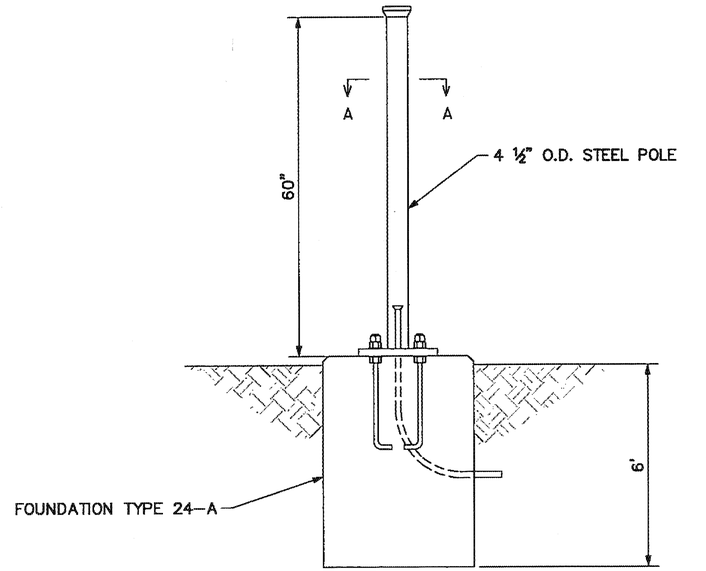
DETAIL "B"

2-WIRE POLARA NAVIGATOR PUSH BUTTON STATION WITH R10-3e SIGN

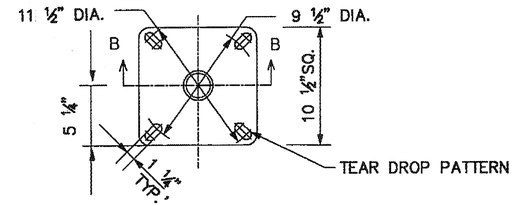


DETAIL "A"

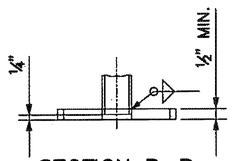
TYPICAL PEDESTRIAN SIGNAL HEAD ON TRAFFIC POLE



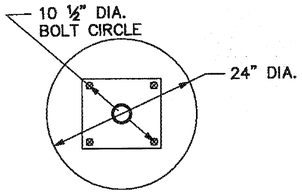
PEDESTRIAN PUSH BUTTON POLE



SECTION A-A



SECTION B-B



FOUNDATION PLAN



NOTE:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS STATED ON "PEDESTAL POLE WITH DRILLED SHAFT FOUNDATION" STANDARD.
2. REFER TO "PEDESTAL POLE WITH DRILLED SHAFT FOUNDATION" STANDARD DETAIL FOR ANCHOR BOLT DETAILS.



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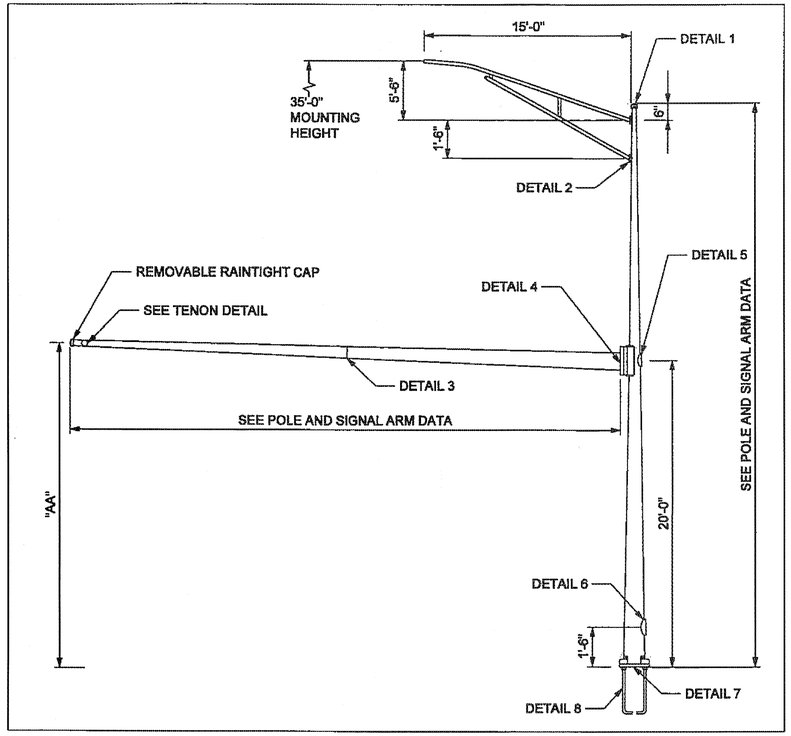
PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

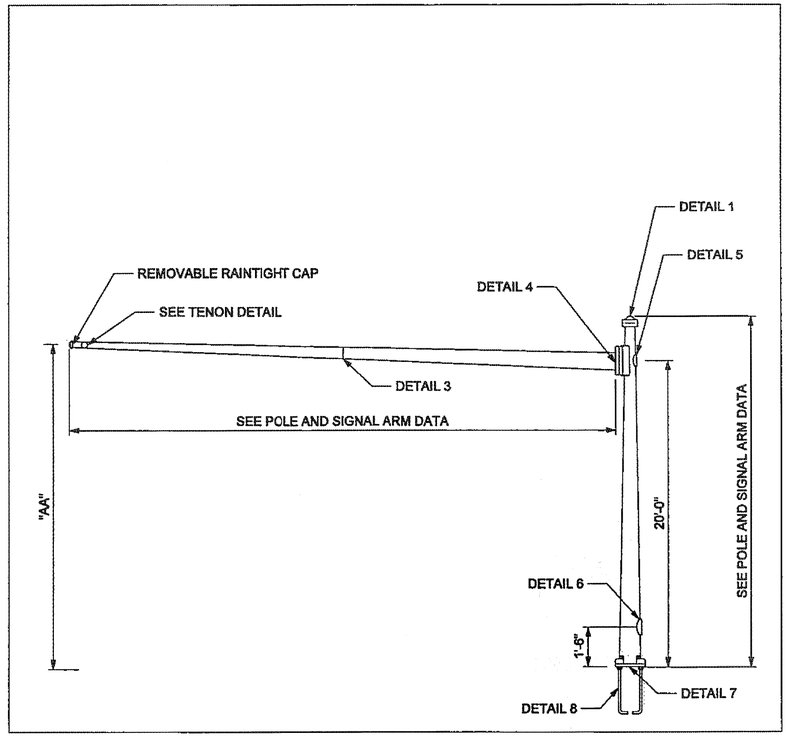
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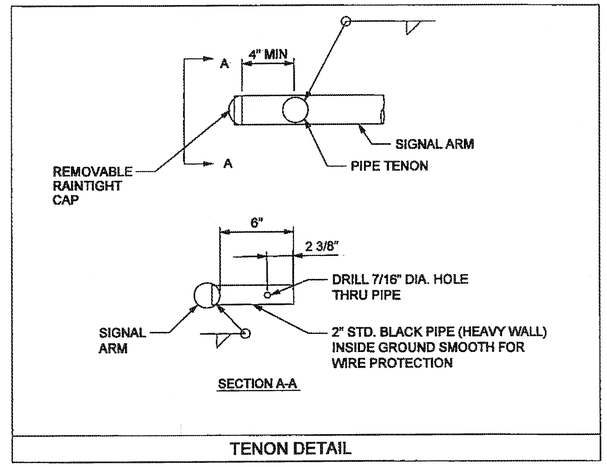
TRAFFIC SIGNAL DETAILS

TYPICAL MAST ARM / POLE FIXTURE CONFIGURATION

DWG. NO. 02893-03





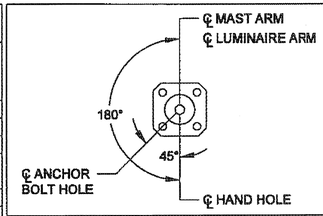


TENON DETAIL

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFT - 3 GAUGE	A595 GR.A	55	MAST ARM CONN. BOLTS	A325*	
POLE SHAFT - 0.375"	A572 GR.55	55	LUM. ARM CONN. BOLTS	SAE GR.5	36
MAST ARM SHAFT	A595 GR.A	55	ANCHOR BOLTS	F1554 GR.55	55
LUMINAIRE ARM SHAFT	2" SCH.80 PIPE		GALVANIZING	A123 & A153	
ARM ATTACHMENT PLATE	A36	36			
BASEPLATE	A36	36			

*LUBRICATE IN FIELD IF NECESSARY IN LIEU OF THE REQUIREMENTS IN A325.



ALL ANGLES MEASURED CLOCKWISE FROM HAND-HOLE AS VIEWED FROM SMALL END OF POLE

RADIAL INDEX

ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. ARMS SHALL BE VISUALLY INSPECTED IN 5 TO 20 MPH WIND CONDITIONS AFTER SIGNAL HEAD INSTALLATION AND, IF VERTICAL MOVEMENTS WITH A TOTAL EXCURSION (MAXIMUM POSITIVE TO MAXIMUM NEGATIVE) OF MORE THAN APPROXIMATELY 8 INCHES ARE OBSERVED AT ARM TIP, DAMPING DEVICES OR OTHER MEANS SHALL BE FITTED TO THE ARM (S). THE NECESSARY DAMPING DEVICE (S) OR OTHER REMEDIAL MEASURES SHALL BE AS RECOMMENDED BY THE CONTRACTOR. EXCESSIVE VIBRATIONS SHALL NOT BE ALLOWED TO CONTINUE FOR MORE THAN 2 DAYS.

VIBRATION DISCLAIMER

POLE AND MAST ARM DATA

DESIGNATION KEY			POLE TUBE						POLE BASE				ANCHOR BOLT				SIGNAL ARM TUBE				
POLE SERIES	POLE TYPE	SIGNAL ARM SPAN (FT)	BASE DIA. (IN)	TOP DIA. (IN) WITH LUM ARM	TOP DIA. (IN) WITHOUT LUM ARM	LENGTH (FT) WITH LUM ARM	LENGTH (FT) WITHOUT LUM ARM	GAUGE OR THK. (IN)	SQUARE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE / SLOT "Z" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	SPAN (FT)	TIP HEIGHT "AA" (FT)
HOU	1	25	13.00	8.80	10.00	30.00	21.50	3	19.00	18.00	2.25	2.50	2.25	89.00	7.00	12.00	8.00	3.50	7	25.00	20.2
		30															9.00	4.80	7	30.00	20.3
		35															10.00	5.10	7	35.00	20.3
HOU	2	40	13.00	8.80	10.00	30.00	21.50	0.375									10.50	4.90	7	40.00	20.3
		45															10.14	3.84	3	45.00	20.4
		50															11.00	4.00	3	50.00	20.4
		55															11.50	4.16	DET 3	55.00	20.5

STATE OF TEXAS
BRIAN G. CASTILLE
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PROFESSIONAL ENGINEER
9-9-12

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TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

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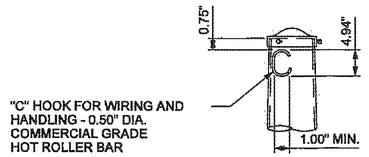
TRAFFIC SIGNAL STRUCTURES

TRAFFIC SIGNAL STRUCTURES

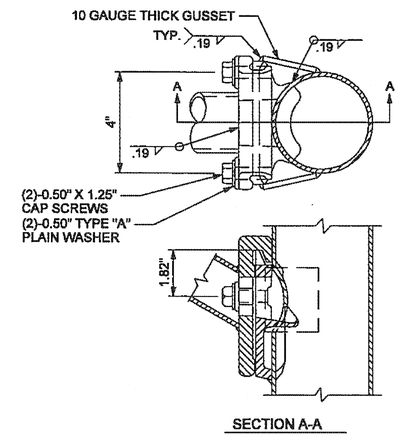
SHEET 1 OF 2

DWG. NO. 02893-04A

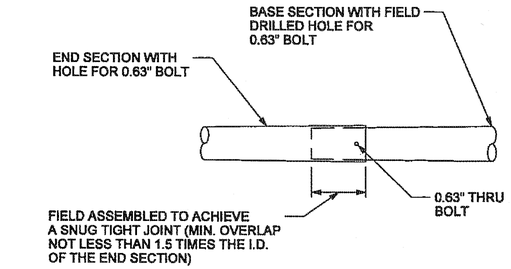
SHEET NO. 150 OF 191



DETAIL 1 | POLE TOP

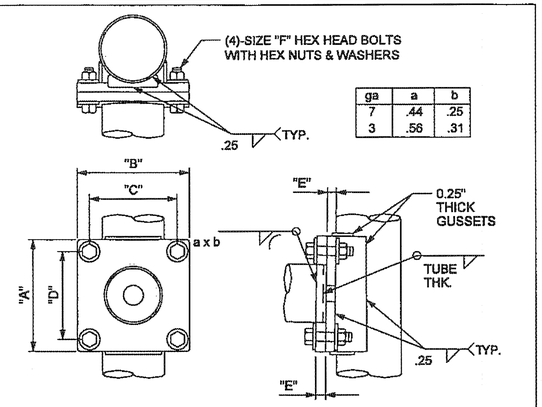


DETAIL 2 | LUMINAIRE ARM ATTACHMENT



ITEM	BASE SECTION		END SECTION	
	LENGTH	GAUGE	LENGTH	GAUGE
55.00'	26.42'	3	30.71'	7

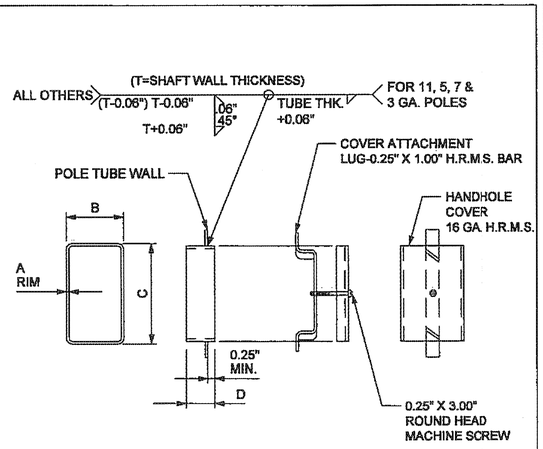
DETAIL 3 | SIGNAL ARM SLIP JOINT



ga	a	b
7	.44	.25
3	.56	.31

POLE TYPE	"A"	"B"	"C"	"D"	"E"	"F"
1	17.75"	17.75"	14.50"	14.50"	1.50"	1.25" X 4.50"
2	18.75"	18.75"	15.00"	15.00"	1.75"	1.50" X 5.25"

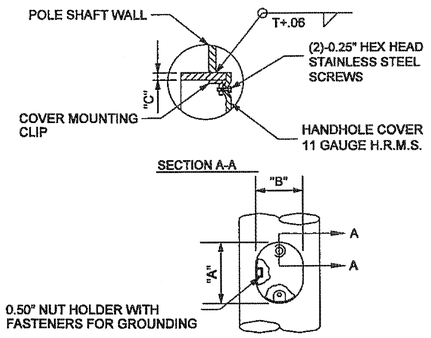
DETAIL 4 | SIGNAL ARM ATTACHMENT



POLE TYPE	A	B	C	D
1	7 GA.	3.00"	5.00"	1.50"
2	0.50"	4.00"	6.00"	2.50"

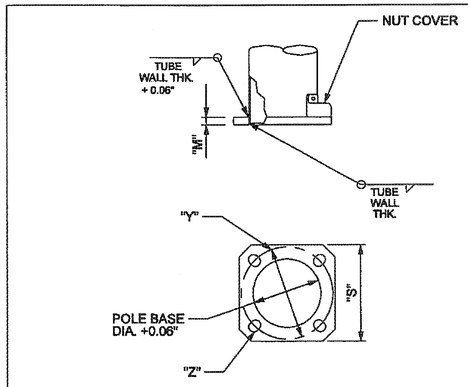
DETAIL 5 | HANDHOLE

(T = SHAFT WALL THICKNESS)

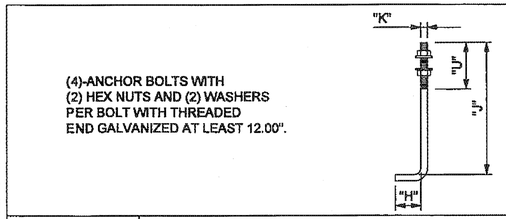


POLE TYPE	A	B	C
1	7.56"	5.19"	0.280"
2	7.31"	5.63"	0.432"

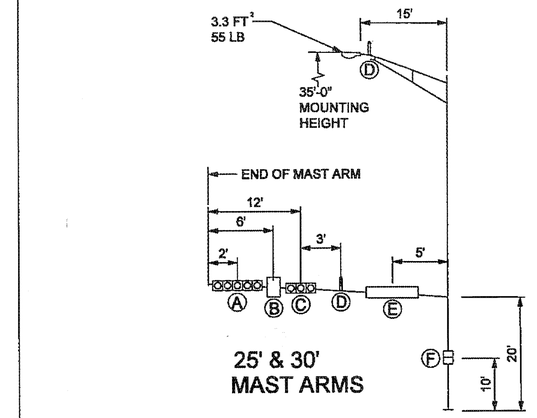
DETAIL 6 | HANDHOLE

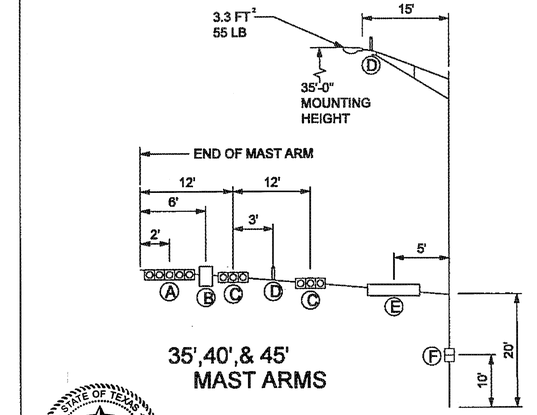


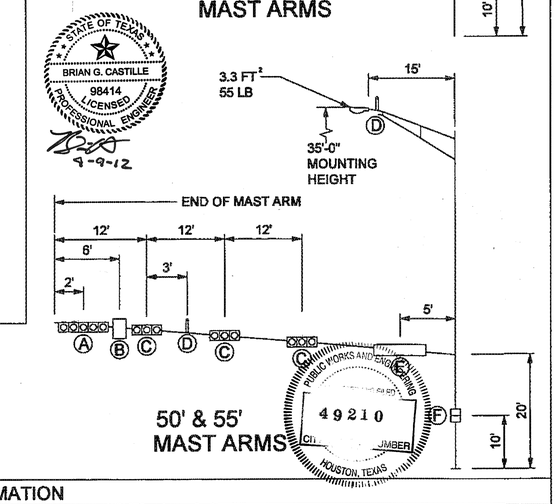
DETAIL 7 | POLE BASE



DETAIL 8 | ANCHOR BOLT







STATE OF TEXAS
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9-9-12

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DESIGN NOTE:

DESIGNS ARE BASED ON THE LOADING CHART SHOWN ON THIS DRAWING AND ARE IN ACCORDANCE WITH MATERIALS AND ALLOWABLE STRESS REQUIREMENTS OF THE 1994 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS,LUMINAIRES AND TRAFFIC SIGNALS" FOR A 90 MPH WIND ZONE WITH A 1.3 GUST FACTOR.

DEVICE	DESCRIPTION	PROJ. AREA (FT²)	WEIGHT (LBS)
Ⓐ	12"-5 SEC. SIGNAL WITH BACKPLATES	13.33	96
Ⓑ	30" X 36" SIGNAL ARM MOUNTED SIGN	7.50	15
Ⓒ	12"-3 SEC. SIGNAL WITH BACKPLATES	8.67	53
Ⓓ	VIVDS CAMERA	1.00	15
Ⓔ	24" X 72" STREET NAME SIGN	12.00	30
Ⓕ	PEDESTRIAN SIGNAL	4.00	40

MAXIMUM LOADING INFORMATION

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TRAFFIC SIGNAL STRUCTURES

TRAFFIC SIGNAL STRUCTURES

SHEET 2 OF 2

DWG. NO. 02893-04B | SHEET NO. 151 OF 191

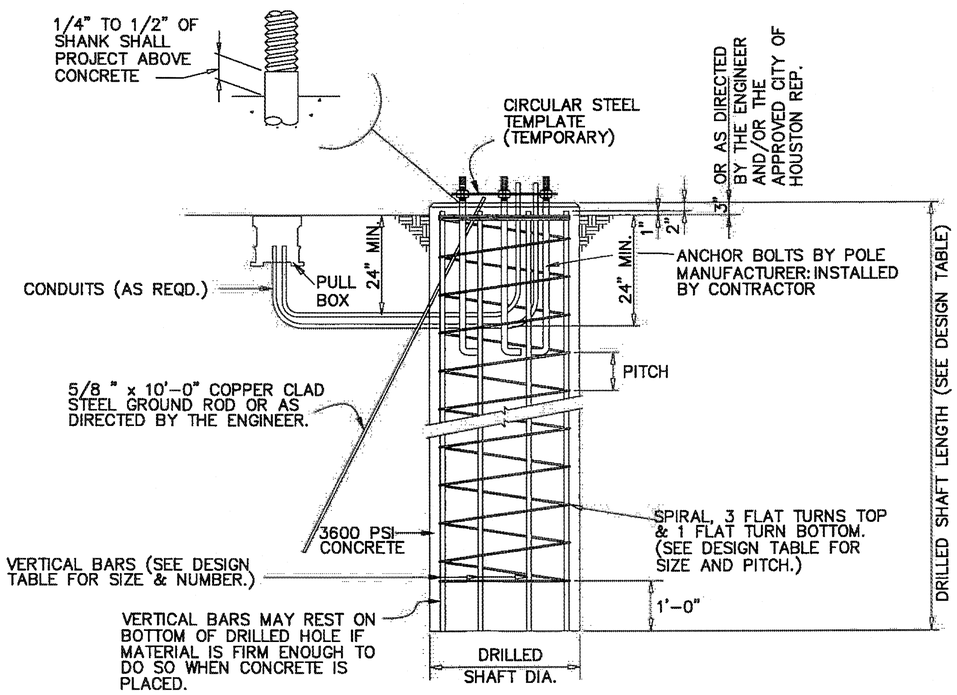
FOUNDATION DESIGN TABLE									
POLE MARK	DRILLED SHAFT DIA.	REINFORCING STEEL		DRILLED SHAFT LENGTH –feet	BOLT CIRCLE DIA.	FOUNDATION DESIGN LOADS (1)			TYPICAL APPLICATION
		VERT. BARS	SPIRAL & PITCH			MOMENT K–ft.	SHEAR KIPS	TORQUE K–ft.	
HOU 1	30"	8–#9	#3 @ 9"	14'–0"	18"	72.2	3.4	51.9	MAST ARM ASSEMBLY (25'–35') IN COHESIVE SOILS
HOU 2	30"	8–#9	#3 @ 9"	18'–0"	18"	89.9	4.0	98.0	MAST ARM ASSEMBLY (40'–55') IN COHESIVE SOILS MAST ARM ASSEMBLY (25'–55') IN NON–COHESIVE SOILS

FOUNDATION DESIGN TABLE NOTES:

(1) FOUNDATION DESIGN LOADS ARE THE ALLOWABLE MOMENTS, SHEARS AND TORQUES AT THE TOP OF THE FOUNDATION.

(2) CONSTRUCT IN ACCORDANCE WITH CITY OF HOUSTON SPECIFICATION SECTION 02465, "DRILLED SHAFT FOUNDATIONS".

(3) FOUNDATION DESIGN IS BASED UPON AN UNDRAINED SHEAR STRENGTH OF 1500 PSF FOR COHESIVE SOILS AND A TEXAS CONE PENETROMETER MINIMUM OF 10 BLOWS/FOOT IN NON–COHESIVE SOILS. WHERE COHESIVE AND NON–COHESIVE LAYERS EXIST WITHIN THE SPECIFIED SHAFT LENGTH, THE NON–COHESIVE SOILS SHALL GOVERN. LOWER SOIL PARAMETERS WILL REQUIRE A SPECIAL DESIGN.



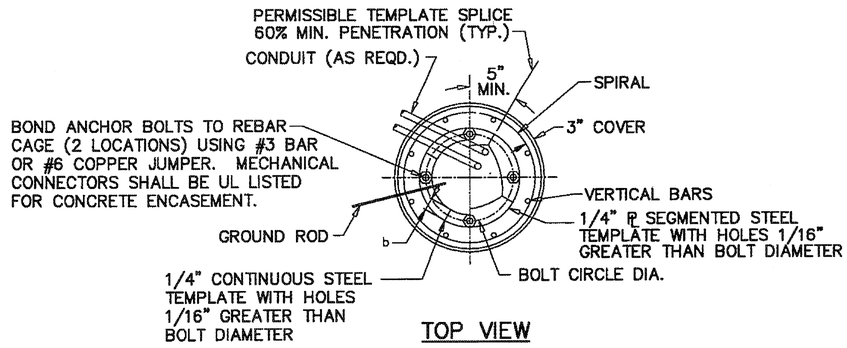
FOUNDATION DETAILS

GENERAL NOTES:

1. DESIGN IS FOR CITY OF HOUSTON STANDARD TRAFFIC SIGNAL MAST ARM SUPPORT STRUCTURES BY VALMONT INDUSTRIES, INC.
2. DESIGN CONFORMS TO 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" AND INTERIM REVISIONS THERETO FOR A 90 MPH WIND ZONE WITH A 1.3 GUST FACTOR AND ACI "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318–02)".
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
4. CONCRETE SHALL BE 6 SACK, 3600 PSI.
5. ALL ANCHOR BOLTS SHALL BE GALVANIZED THE ENTIRE LENGTH OF BOLT. EXPOSED NUTS AND WASHERS SHALL ALSO BE GALVANIZED.

INSTALLATION PROCEDURE

THREADS OF ANCHOR BOLTS SHALL BE COATED WITH PIPE JOINT COMPOUND PRIOR TO INSTALLATION OF UPPER NUTS WHEN ERECTING POLE. AFTER POLE IS PLUMBED AND IN PERMANENT ALIGNMENT, THE EXPOSED THREADS OF PAINTED BOLTS SHALL BE CLEANED AND AN ADDITIONAL COATING OF ZINC–RICH PAINT APPLIED TO SEAL THE BOLT THREAD–NUT JOINT.



TOP VIEW

STATE OF TEXAS
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PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

NOTE:

1. b = MINIMUM STEEL TEMPLATE WIDTH EQUAL TO TWO TIMES ANCHOR BOLT DIAMETER.
2. STEEL TEMPLATE MAY BE OF CONTINUOUS WIDTH OR SEGMENTED WIDTH.
3. SEE FOUNDATION DESIGN TABLE FOR BOLT CIRCLE DIAMETER.
4. BOLTS SHOULD BE CHECKED FOR PLUMB AFTER CONCRETE IS POURED AND BEFORE INITIAL SET.

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TRAFFIC SIGNAL DETAILS

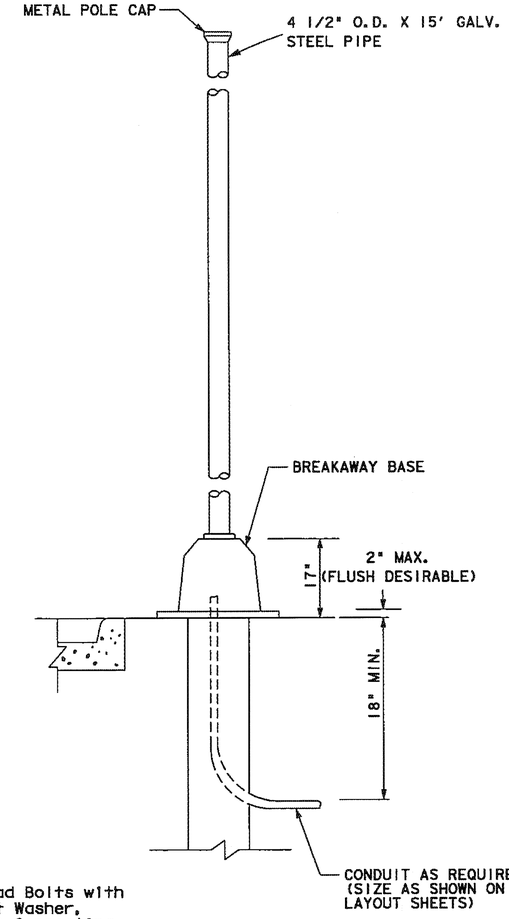
POLE FOUNDATION DETAILS

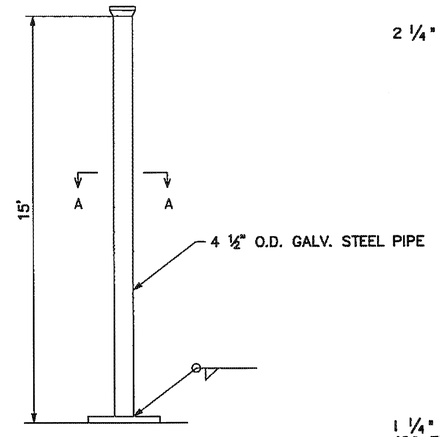
DWG. NO. 02893–05

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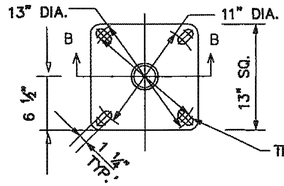
NOTES:

1. DETAILS DEPICTED ON THIS SHEET SHOW A TYPICAL PEDESTAL POLE ASSEMBLY WITH SCREW-IN ANCHOR FOUNDATION TO BE UTILIZED FOR SCHOOL ZONE FLASHERS ONLY.
2. THE PEDESTAL POLE ASSEMBLY DEPICTED ON THIS SHEET IS DESIGNED FOR SIGNAL HEADS WHERE ELECTRICAL POWER IS NEEDED WITH A BREAKAWAY POLE.
3. PROVIDE BREAKAWAY FUSE HOLDER WITH DOUBLE-POLE HOUSING. ENSURE FUSE HOLDER IS POLARIZED, WATER-RESISTANT, UL RECOGNIZED, AND RATED FOR 30A MAXIMUM CURRENT CAPACITY AT 600V OR LESS. PROVIDE BREAKAWAY FUSE HOLDER FROM MANUFACTURERS PRE-QUALIFIED BY THE TRAFFIC OPERATIONS DIVISION. SEE HTTP://WWW.DOT.STATE.TX.US/BUSINESS/PRODUCER LIST.HTM FOR LIST OF PRE-QUALIFIED MANUFACTURERS. CATEGORY IS "ROADWAY ILLUMINATION AND ELECTRICAL SUPPLIES." PROVIDE 10 AMP TIME DELAY FUSES.
4. UNLESS OTHERWISE SHOWN ON THE PLANS, PROVIDE POLE SHAFT AND BREAKAWAY BASE IN ACCORDANCE WITH THE REQUIREMENTS LISTED IN TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT) STANDARD SPECIFICATION ITEM "PEDESTAL POLE ASSEMBLIES".
5. SEE TxDOT SPECIAL SPECIFICATION 4923 (SS 4923), "SCREW-IN TYPE ANCHOR FOUNDATIONS" FOR FURTHER REQUIREMENTS.
6. PROVIDE SIGNAL HEADS AND MOUNTING AS SHOWN ELSEWHERE ON THE PLANS.
7. CONDUIT IN FOUNDATION AND WITHIN 6 IN. OF FOUNDATION IS SUBSIDIARY TO STANDARD SPECIFICATION ITEM, "PEDESTAL POLE ASSEMBLIES".
8. POLE SHAFT SHALL BE ONE PIECE. ALUMINUM CONDUIT WILL NOT DEVELOP THE NECESSARY STRENGTH AND WILL NOT BE ALLOWED. IN HIGH WINDS, USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING ON CONNECTION.
9. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO BASE.
10. PROVIDE NON-FUSED WATERTIGHT BREAKAWAY ELECTRICAL CONNECTORS FOR BREAKAWAY POLES. (BUSSMANN HET, LITTELFUSE LET, FERRAZ-SHAWMUT FEBN, OR APPROVED EQUAL).

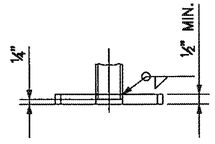




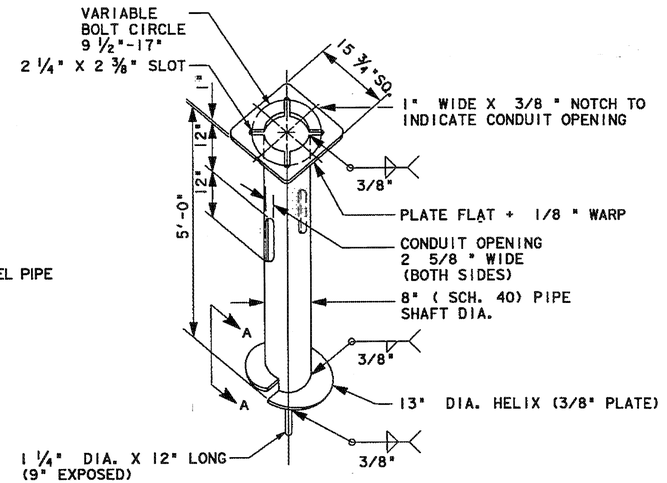
PEDESTAL POLE



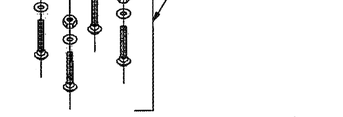
SECTION A-A



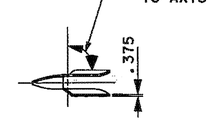
SECTION B-B



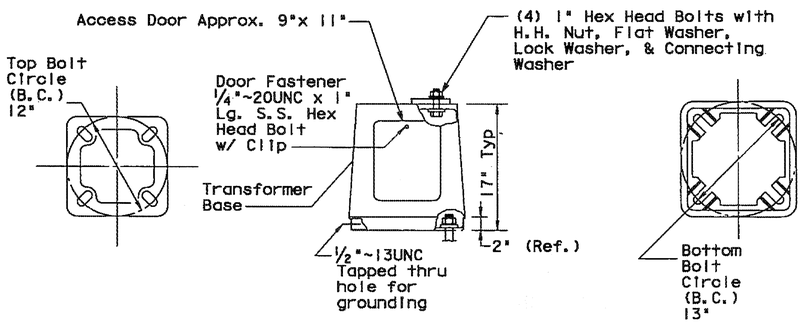
SCREW ANCHOR FOUNDATION DETAIL



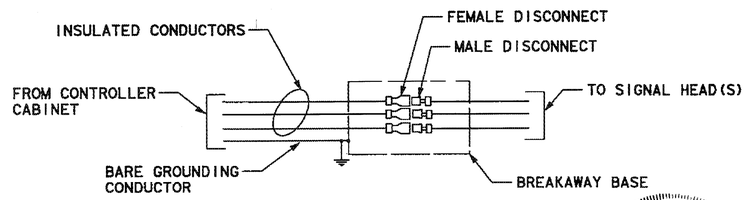
HARDWARE DETAIL



VIEW A-A



BREAKAWAY BASE DETAILS



BREAKAWAY IN-LINE FUSE HOLDERS

STATE OF TEXAS — BRIAN G. CASTILLE — 98414 — LICENSED PROFESSIONAL ENGINEER — 4-9-12

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

NO.	DATE	REVISION	BY:	CHKD:	APPROVAL (SIGNATURE):

CITY OF HOUSTON

PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

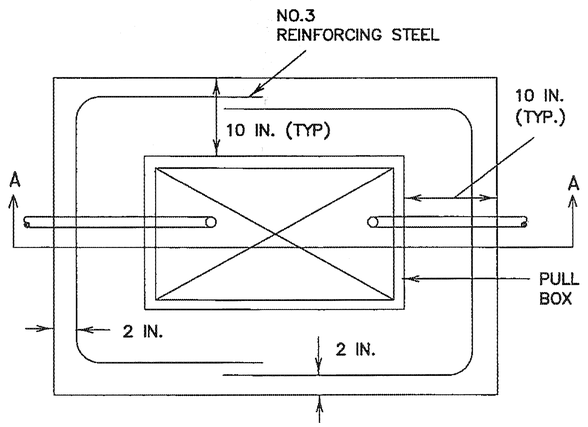
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TRAFFIC SIGNAL DETAILS

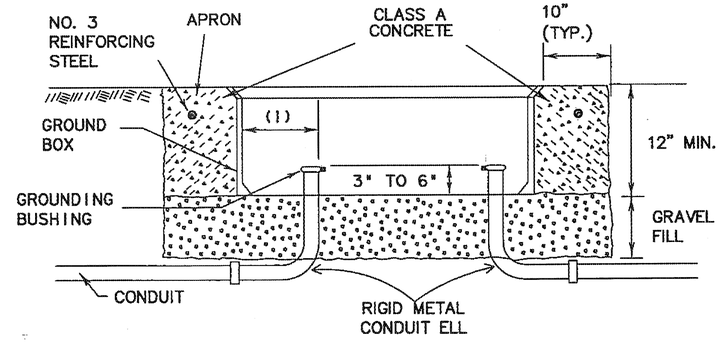
PEDESTAL POLE WITH SCREW-IN ANCHOR FOUNDATION

(FOR SCHOOL ZONE FLASHERS ONLY)

DWG. NO. 02893-06



PLAN VIEW

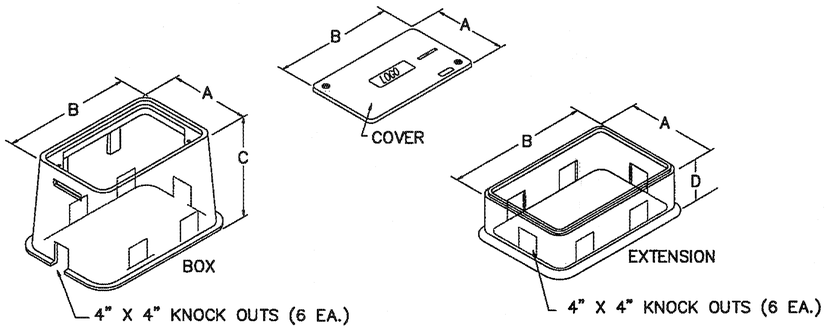


SECTION A – A

APRON FOR PULL BOXES

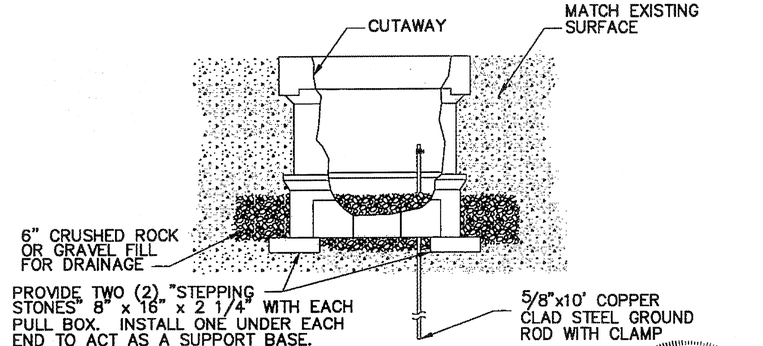
(PREFERRED)

(1) FINAL POSITION OF END OF CONDUIT SHALL NOT EXCEED ONE–HALF THE DISTANCE TO THE SIDE OF BOX OPPOSITE THE CONDUIT ENTRY.
(2) PLACE GRAVEL "UNDER" THE BOX, NOT "IN" THE BOX. GRAVEL SHOULD NOT ENCROACH ON THE INTERIOR VOLUME OF THE BOX.
(3) INSTALL BUSHING ON THE UPPER END OF ALL ELLS.
(4) WHERE A GROUND ROD IS PRESENT IN THE GROUND BOX, CONNECT IT TO ANY AND ALL EQUIPMENT GROUNDING CONDUCTORS USING A LISTED CONNECTOR.
(5) MAINTAIN SUFFICIENT SPACE BETWEEN ALL CONDUITS SO AS TO ALLOW FOR PROPER INSTALLATION OF BUSHINGS.
(6) ALL CONDUITS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER.
(7) ALL CONDUITS INSTALLED IN THE GROUND BOX SHALL BE SEALED AFTER COMPLETION OF CONDUCTOR INSTALLATION AND ANY REQUIRED PULL TESTS. SILICONE SHALL NOT BE USED AS THE SEALANT.



NOMINAL DIMENSIONS FOR TRAFFIC SIGNAL PULL BOXES				
Type	A	B	C	D
DETECTOR TYPE A	13"	18"	24"	12"
TRAFFIC SIGNAL TYPE B	17"	30"	24"	12"
COMMUNICATION TYPE C	26"	38"	24"	12"

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED
PROFESSIONAL ENGINEER
9-9-12



SIDE VIEW

ELECTRICAL PULL BOX ASSEMBLY

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER

NO.	DATE	REVISION	BY:	CHKD:	APPROVAL (SIGNATURE):

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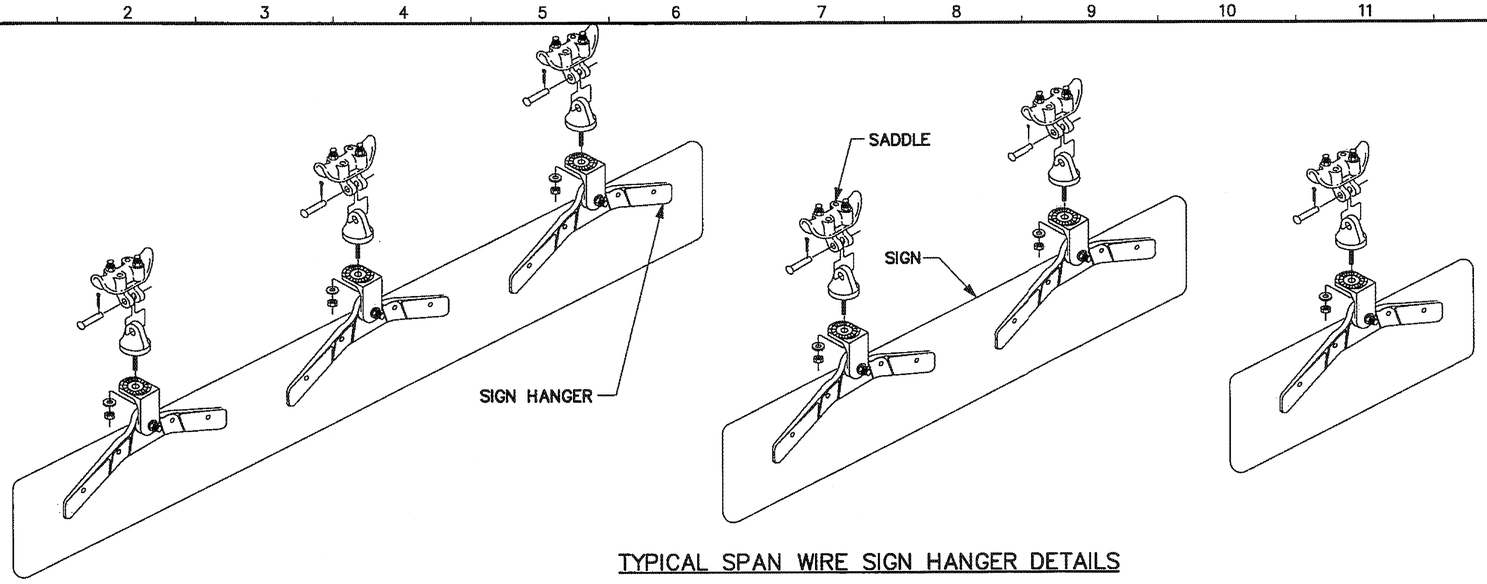
PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

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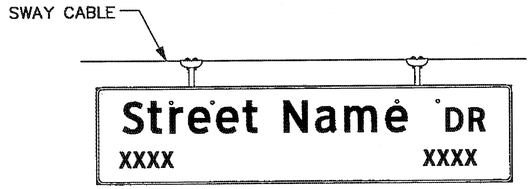
TRAFFIC SIGNAL DETAILS

PULL BOXES

DWG. NO. 02893–08



TYPICAL SPAN WIRE SIGN HANGER DETAILS

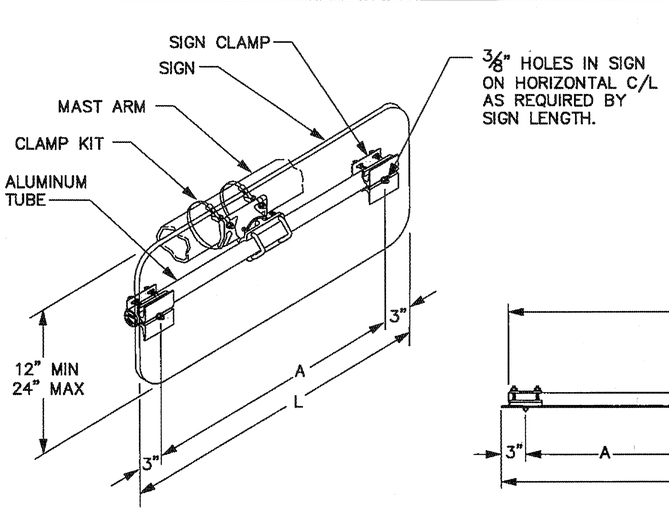


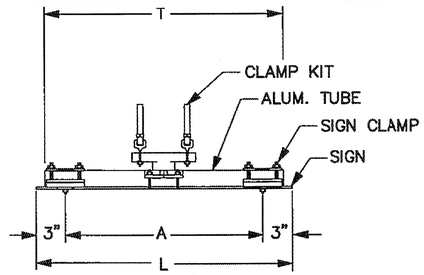
1) CONTRACTOR SHALL USE PELCO PARTS OR AN APPROVED EQUAL.

2) CONTRACTOR SHALL FURNISH ALL HARDWARE FOR A COMPLETE INSTALLATION.

3) THE 90 DEGREE SPAN WIRE CLAMPS (SADDLES) ARE ATTACHED TO TETHERS (SWAY CABLES).

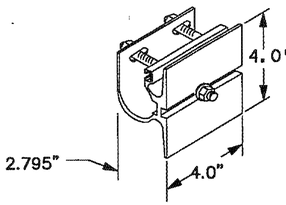
4) CONTRACTOR SHALL FURNISH ONE (1) ADJUSTABLE FREE SWINGING SIGN HANGERS PER STREET NAME SIGN SMALLER THAN 3'–0". SIGNS 3'–0" TO 6'–0" REQUIRE TWO (2) HANGERS. SIGNS LARGER THAN 6'–0" REQUIRE THREE (3) HANGERS.





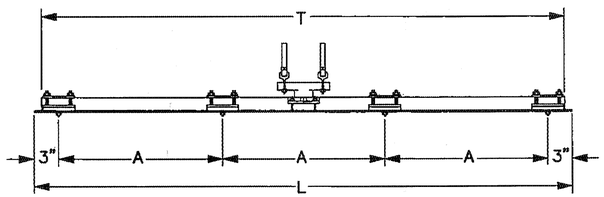
SIGNS (1'–6" TO 3'–0" LONG)

SIGN LENGTH (L)	TUBE LENGTH (T)	A
1'–6"	16"	12"
2'–0"	22"	18"
2'–6"	28"	24"
3'–0"	34"	30"



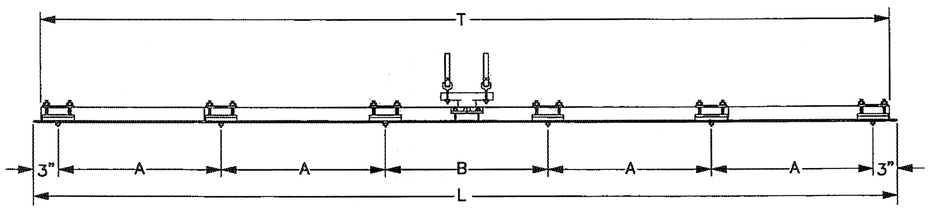
GUSSETED TUBE CROSS SECTION

SIGN CLAMP DETAIL



SIGNS (3'–6" TO 8'–0" LONG)

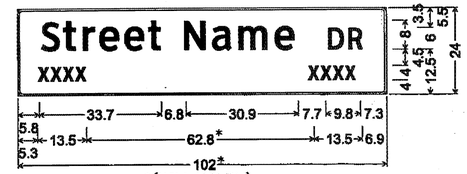
SIGN LENGTH (L)	TUBE LENGTH (T)	A
3'–6"	40"	12"
4'–0"	46"	14"
4'–6"	52"	16"
5'–0"	58"	18"
5'–6"	64"	20"
6'–0"	70"	22"
6'–6"	76"	24"
7'–0"	82"	26"
7'–6"	88"	28"
8'–0"	94"	30"



SIGNS (8'–6" TO 10'–0" LONG)

SIGN LENGTH (L)	TUBE LENGTH (T)	A	B
8'–6"	100"	19"	20"
9'–0"	106"	20"	22"
9'–6"	112"	21"	24"
10'–0"	118"	22"	26"

TYPICAL MAST ARM SIGN MOUNT DETAILS



*(WILL VARY)

DIMENSIONS IN INCHES
VARIES x 24"
LETTERS – WHITE REFLECTIVE
BORDER – WHITE REFLECTIVE
BACKGROUND – GREEN REFLECTIVE
(ALL MATERIAL SHALL BE DIAMOND GRADE VIP SHEETING)

STREET NAME SIGN DETAIL

NO.	DATE	REVISION	BY:	CHKD:	APPROVAL (SIGNATURE):

CITY OF HOUSTON

PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
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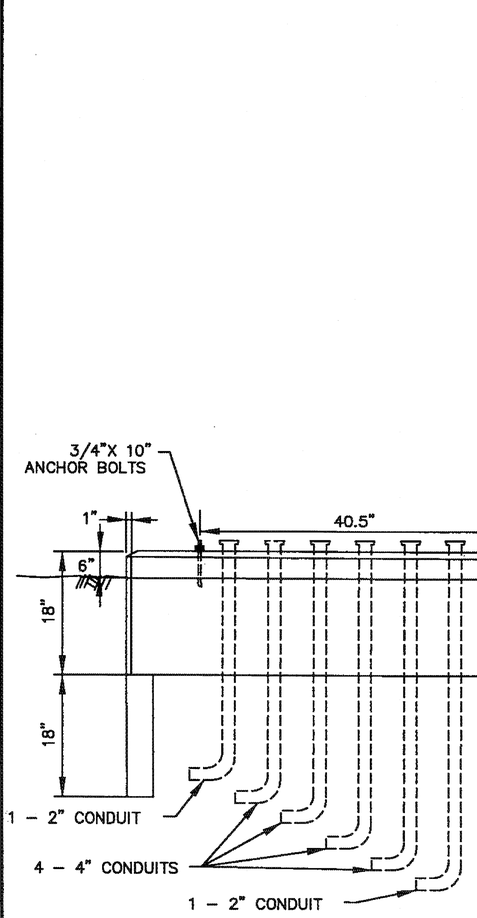
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TRAFFIC SIGNAL DETAILS

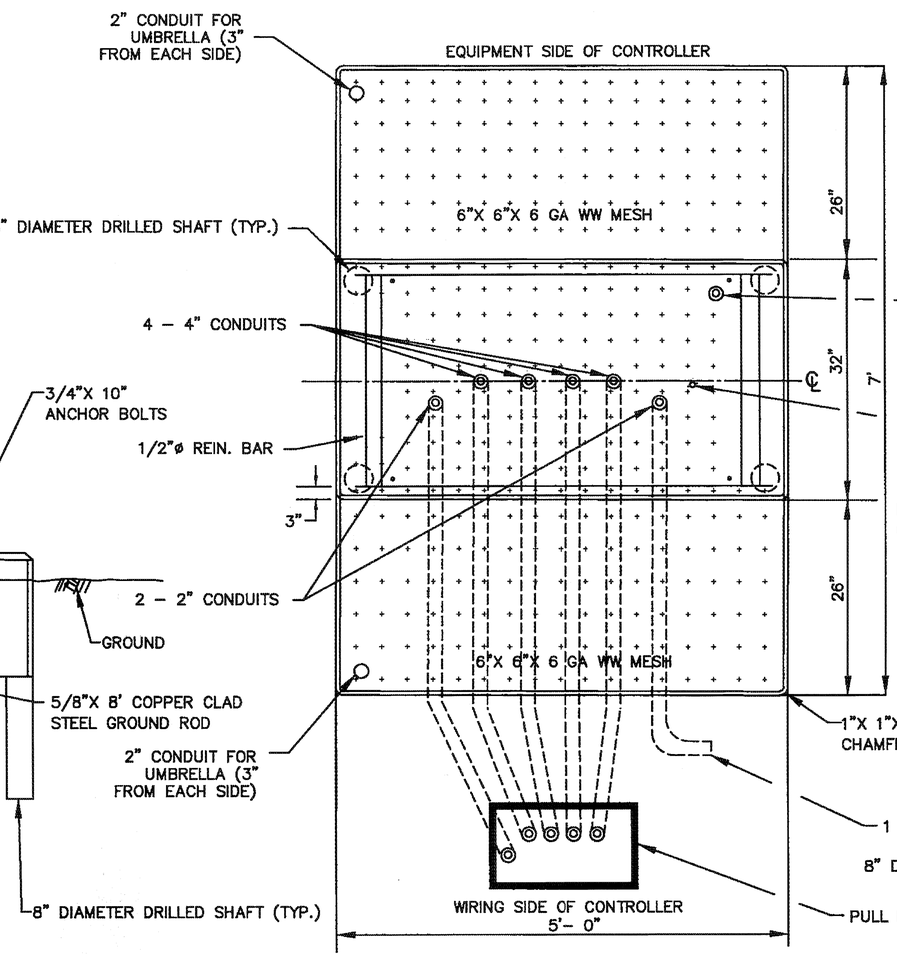
OVERHEAD STREET NAME SIGN MOUNTING DETAILS

DWG. NO. 02893-09

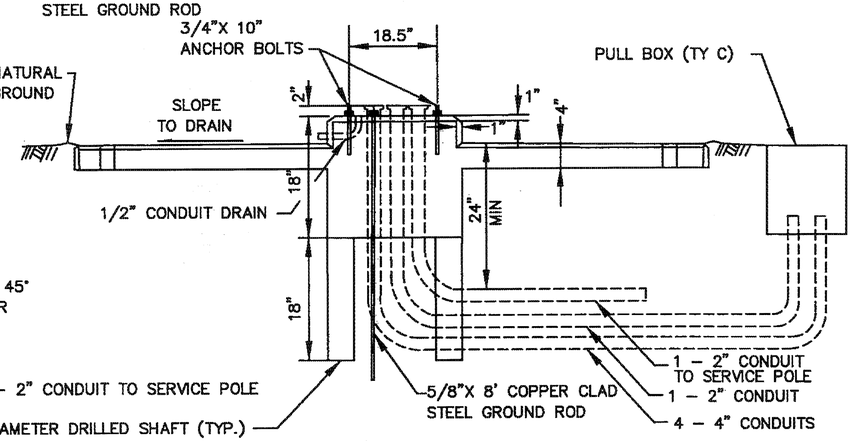
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MODEL 340 DETAIL
FRONT VIEW



MODEL 340 DETAIL
TOP VIEW



MODEL 340 DETAIL
SIDE VIEW

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED
PROFESSIONAL ENGINEER
9-9-12

CONTROLLER FOUNDATION NOTES:

1. ALL CONCRETE TO BE IN ACCORDANCE WITH CITY OF HOUSTON SPECIFICATION SECTION 03310.
2. SET THE TOP OF THE STEP OF THE CONTROLLER FOUNDATION NO LOWER THAN THE LEVEL OF THE PAVEMENT SURFACE. ANY NECESSARY ADJUSTMENT SHALL BE APPROVED BY THE ENGINEER.
3. CENTER THE CABINET ON THE FOUNDATION.
4. THE FOUNDATION SHALL BE SUPPORTED BY UNDISTURBED SOIL OR BY SOIL THAT HAS BEEN COMPACTED TO 90% PROCTOR DENSITY IN 6" LIFTS.

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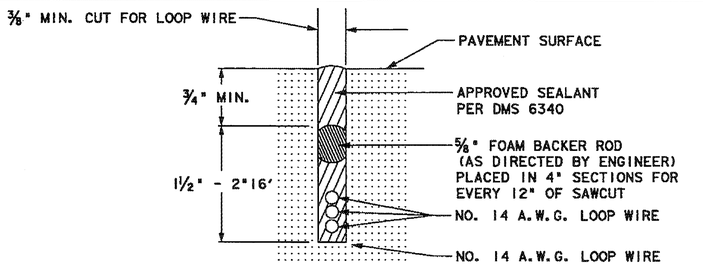
TRAFFIC SIGNAL DETAILS

CONTROLLER FOUNDATIONS

SHEET 3 OF 3

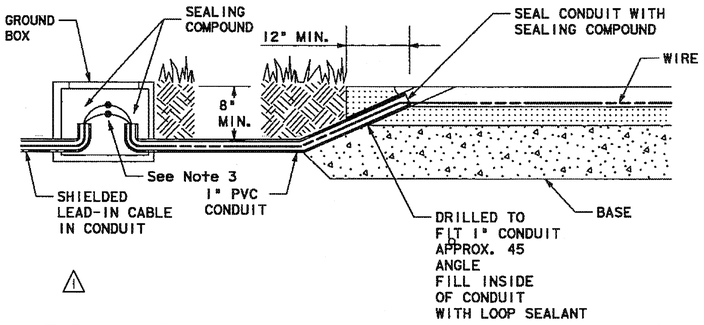
DWG. NO. 02893–10C

SHEET NO. 156 OF 191

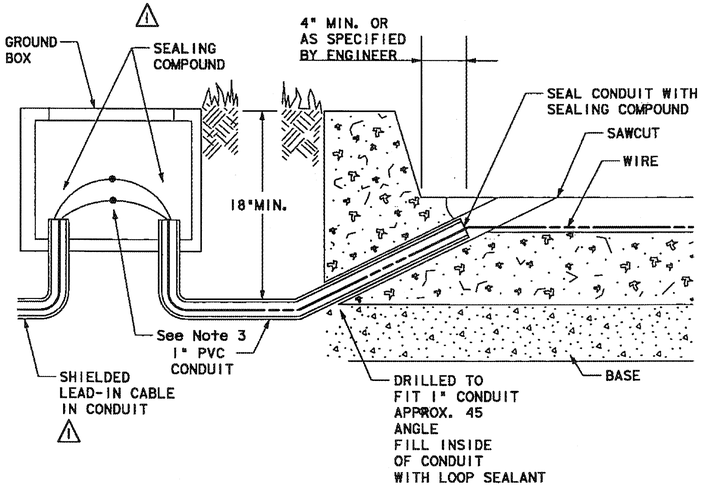


LOOP SAW CUT CROSS-SECTION

* SAWCUTS IN BRIDGE DECKS ARE TYPICALLY 1" DEPTH MAXIMUM
SAWCUTS IN BRIDGE DECKS AND ACROSS EXPANSION JOINTS
SHALL BE AS APPROVED BY ENGINEER



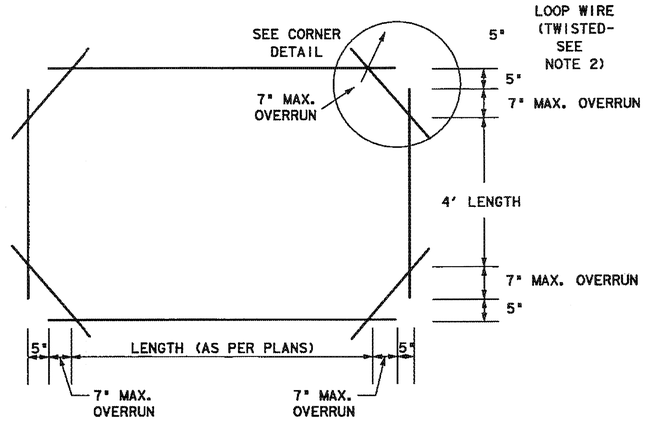
TYPICAL LEAD IN CONFIGURATION (WITHOUT CURBING)



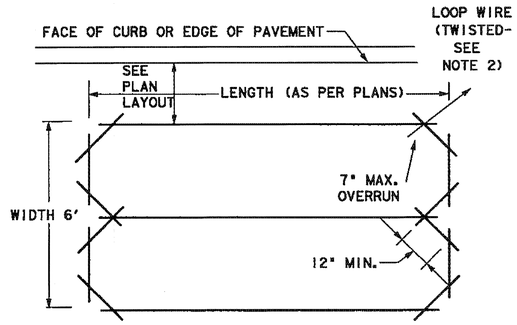
TYPICAL LEAD IN CONFIGURATION (WITH CURBING)

TYPICAL LOOP DETECTOR LAYOUT

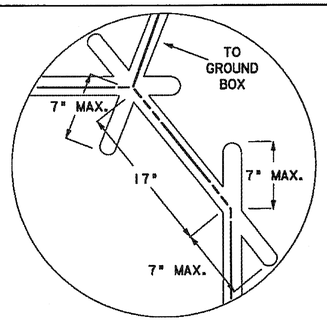
(AS SPECIFIED IN PLANS)



RECTANGULAR

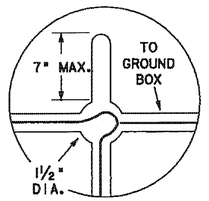


QUADRAPOLE



RECTANGULAR & HEXIGON LOOP

SAWCUT CORNER DETAIL
7" OVERRUN BASED ON
24" DIAMETER SAW BLADE



RECTANGULAR & HEXIGON LOOP (ALT.)

DRILLED CORNER DETAIL

TYPICAL CORNER DETAILS

GENERAL NOTES:

1. The pavement cut is to be made with a concrete saw to neat lines and loose material removed. The cut shall be clean and dry when the wire and sealing compound is placed.
2. Loop wire shall be 14 AWG Stranded Type XHHW. Wire from the loop to the ground box shall be twisted a minimum of 5 turns per foot. No splices shall be permitted in the loop or in the run to the ground box.
3. The home run cable from the pull box to the controller shall be IMSA 50-2 shielded cable and shall be soldered to the loop wire. The solder joints shall be sealed with Scotchcast or other method acceptable to the Engineer. The shield shall be grounded only at the controller end. Loop home run cable shall be two conductor 14 AWG shielded, Type XHHW.
4. All wire placed in the saw cut shall be sealed by fully encapsulating it in a sealant acceptable to the Engineer. Sealing compound shall be in accordance with DMS 6340.
5. The loop location, confirguration and number of turns shall be as indicated on the plans or as directed by the Engineer.

Recommended Number of Turns for Loop Detectors

LOOP PERIMETER SIZE (FT.)	NUMBER OF TURNS	APPROXIMATE LOOP SIZES INCLUDED
24' or Less	3 or 4	5' x 5', 6' x 6'
25' - 110'	2 or 3	6' x 10', 6' x 45'
110' or More	1 or 2	6' x 50' or Longer

6. A separate saw cut shall be made from each loop to the edge of pavement or as specified by the Engineer.
7. Splices between the loop lead-in cable and loop detector shall be made only in the ground box near the loop it is serving.
8. Circular loops may use prewound loops encased in continuous pvc tubing. Sawcut width may be adjusted to accommodate tubing.
9. The lead-in wire in the circular loop shall be coiled at the 3 inch drilled corner to reduce bending stress.
10. Loop duct may be used as specified by Engineer.

For additionhnal information refer to "Texas Traffic Signal Detector" manual, TTI Report 1163-1.

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED
PROFESSIONAL ENGINEER
9-9-12

PUBLIC WORKS AND ENGINEERING
49210
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NO.	DATE	REVISION	BY:	CHKD:	APPROVAL (SIGNATURE):

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TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

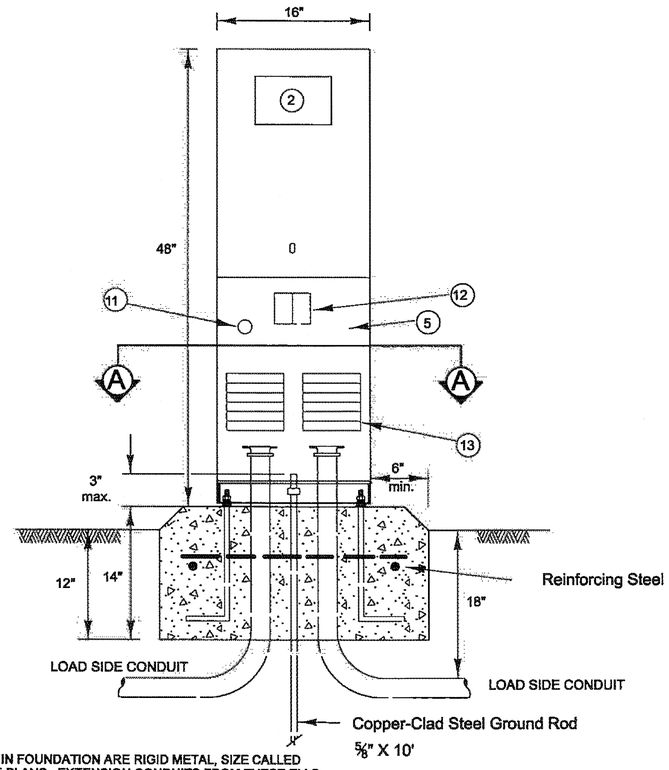
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TRAFFIC SIGNAL DETAILS

LOOP DETECTOR INSTALLATION DETAILS

DWG. NO. 02893-11

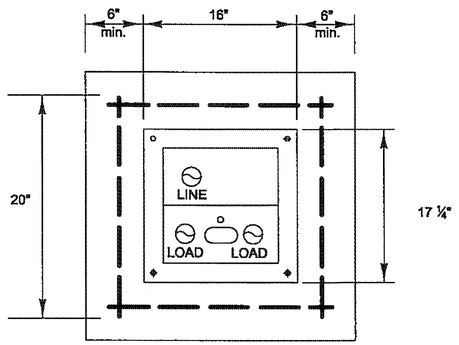
SHEET NO. 157 OF 191



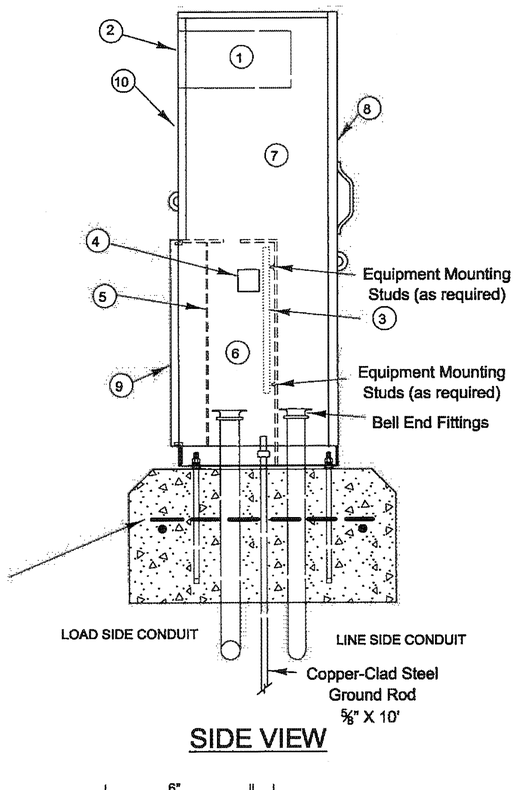
NOTE: ELLS IN FOUNDATION ARE RIGID METAL, SIZE CALLED FOR ON THE PLANS. EXTENSION CONDUITS FROM THESE ELLS MAY BE PVC, PROVIDED ENDS OF RIGID METAL CONDUITS ARE MORE THAN 2 IN. BELOW TOP OF CONCRETE FOUNDATION. WHERE EXTENSION CONDUITS ARE METAL, GROUNDING BUSHING MUST BE INSTALLED AND A BONDING JUMPER PROPERLY TERMINATED.

FRONT VIEW

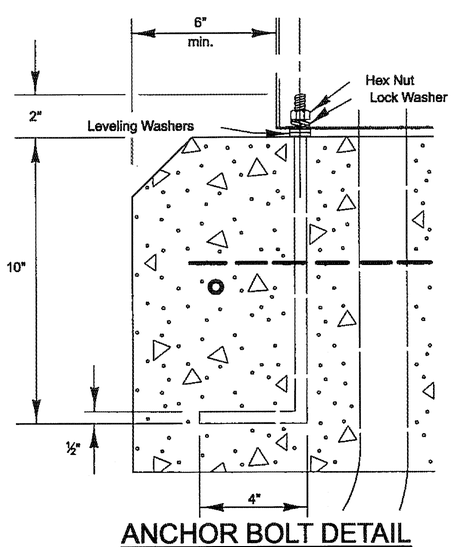
TY C SHOWN, TY A SIMILAR EXCEPT THAT TY A SHALL HAVE INDIVIDUAL CIRCUIT BREAKERS MOUNTED ON A EQUIPMENT MOUNTING PANEL. CB HANDLES SHALL PROTRUDE THROUGH HINGED DEADFRONT TRIM.



SECTION A-A



SIDE VIEW



ANCHOR BOLT DETAIL

GENERAL NOTES:

1. THE PEDESTAL SERVICE SHALL BE UL TYPE 3R, AND SHALL BE CONSTRUCTED OF A MINIMUM OF 12 GAUGE STAINLESS STEEL OR ALUMINUM AS REQUIRED. STAINLESS STEEL SHALL NOT BE PAINTED. FOR ALUMINUM, THE FINISH SHALL BE AN ELECTROSTATIC APPLIED POLY-URETHANE BAKED ON POWDER, LIGHT GREEN IN COLOR, OR COLOR AS SHOWN ELSEWHERE AND AS APPROVED BY THE ENGINEER. THE FRONT OF THE INTERIOR DEAD FRONT TRIM SHALL BE PERMANENTLY LABELED, "DANGER HIGH VOLTAGE" WITH OSHA STYLE LABEL. THE EXTERIOR OF THE PEDESTAL SERVICE DOOR SHALL BE PERMANENTLY LABELED WITH A PLACARD AS TO ITS USE (I.E. ROADWAY LIGHTING, TRAFFIC SIGNALS, ETC.). PLACARD SHALL BE NEAT AND PROFESSIONAL IN APPEARANCE. LETTERING SHALL BE 1" MINIMUM HEIGHT.
2. UTILITY ACCESS DOOR SHALL HAVE STAINLESS STEEL PIANO HINGE AND PROVISIONS FOR PADLOCKING.
3. PEDESTAL DOOR SHALL HAVE STAINLESS STEEL PIANO HINGE AND STAINLESS STEEL LATCH WITH PROVISIONS FOR PADLOCKING.
4. METER ACCESS SHALL BE HINGED AND CAPABLE OF PADLOCKING.
5. ALL MOUNTING HARDWARE AND INSTALLATION DETAILS OF SERVICES SHALL BE IN ACCORDANCE WITH UTILITY COMPANY SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE LOCAL UTILITY COMPANY AND OBTAINING THEIR APPROVAL OF PEDESTAL DETAILS PRIOR TO MAKING SUBMITTAL TO THE CITY AND PRIOR TO CONSTRUCTING THE ELECTRICAL PEDESTAL SERVICE. ANY CHANGES REQUIRED BY THE UTILITY COMPANY SHALL BE NOTED ON THE SUBMITTALS.
6. METER SOCKET SHALL BE A MINIMUM OF 100 AMP RATING AND SHALL COMPLY WITH THE LOCAL UTILITY REQUIREMENTS.
7. PHOTOELECTRIC CONTROL SHALL MEET THE REQUIREMENTS AS SHOWN ON ED(5). SHIELD TO CONTROL STRAY LIGHT IS ALLOWABLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER OPERATION OF THE PHOTO-ELECTRIC CONTROL. THE CONTRACTOR SHALL MOVE AND/OR ADJUST OR SHIELD THE PHOTOCELL FROM STRAY OR AMBIENT NIGHTTIME LIGHT OR SHALL MAKE ANY OTHER ADJUSTMENTS REQUIRED FOR PROPER OPERATION. THE PHOTOCELL SHALL FACE NORTH WHEN PRACTICABLE. UNLESS OTHERWISE SHOWN ON THE PLANS, THE PHOTOCELL SHALL TURN ON THE ILLUMINATION SYSTEM AT 1.0 +(-) 0.5 FOOTCANDLE AND TURN OFF THE ILLUMINATION SYSTEM AT TWO FOOTCANDLES HIGHER THAN TURN ON.
8. THE CONTROL STATION (H-O-A SWITCH) SHALL BE AS SHOWN ON TxDOT STANDARD ED(5) EXCEPT THAT H-O-A SWITCH OPERATING HANDLE SHALL PROTRUDE THROUGH HINGED DEADFRONT TRIM AND NEMA 1 ENCLOSURE WILL NOT BE REQUIRED.
9. CONCRETE FOR PEDESTAL SERVICE FOUNDATION SHALL BE CLASS A OR C , AND SHALL BE IN ACCORDANCE WITH TxDOT ITEM 420, "CONCRETE STRUCTURES", EXCEPT THAT CONCRETE WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL.
10. REINFORCING STEEL SHALL BE #4 REBAR IN ACCORDANCE WITH TxDOT ITEM 440, "REINFORCING STEEL".
11. ANCHOR BOLTS SHALL BE A36M55 IN ACCORDANCE WITH ITEM 449, "ANCHOR BOLTS". ANCHOR BOLTS SHALL BE ½ INCH X 12 INCHES X 4 INCHES (DIA. X LENGTH X HOOK LENGTH).
12. ALL CONDUIT AND CONDUCTORS ATTACHED TO THE PEDESTAL SERVICE AND WITHIN 12 INCHES OF THE PEDESTAL SERVICE WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO THE PEDESTAL SERVICE. ALL SERVICE CONDUIT AND CONDUCTORS FROM THE UTILITY COMPANY TRANSFORMER TO A POINT 12 INCHES FROM THE THE PEDESTAL SERVICE SHALL BE PAID FOR SEPARATELY. SERVICE CONDUIT SHALL BE THE SIZE AND TYPE AS SHOWN IN THE ELECTRICAL SERVICE DATA.
13. DIMENSIONS MAY VARY TO ACCOMODATE REQUIRED EQUIPMENT, UTILITY COMPANY REQUIREMENTS, OR MANUFACTURER'S STANDARD EQUIPMENT DIMENSIONS. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, SIX (6) COPIES OF BROCHURES AND/OR DRAWINGS OF THE PEDESTAL SERVICE TO BE SUPPLIED, INCLUDING ACTUAL DIMENSIONS, AND A PAINT COLOR SAMPLE.
14. A SEPARATE ENCLOSURE AS SHOWN ON TxDOT STANDARD ED(4) OR ED(5) FOR PHOTOCELL SHALL NOT BE USED FOR PEDESTAL SERVICES. PHOTOCELL SHALL BE INSTALLED AS SHOWN HERE.
15. THE PEDESTAL DOOR SHALL HAVE A MECHANICALLY ATTACHED DATA POCKET ON THE INSIDE. POCKET SHALL BE EITHER METAL OR THEMOPLASTIC AND SHALL MEASURE AT LEAST 12 INCHES BY 12 INCHES. THE CONTRACTOR SHALL PREPARE AND SUBMIT A SCHEMATIC DRAWING UNIQUE TO AN INDIVIDUAL SERVICE. THE APPROVED DRAWING SHALL BE LAMINATED AND PLACED IN THE DOCUMENT POCKET OF THE SERVICE AT THE TIME OF SHIPMENT TO THE JOB SITE. ALL APPLICABLE WIRING DIAGRAMS AND PLAN SHEET LAYOUTS FOR ALL EQUIPMENT AND BRANCH BREAKER CIRCUITS SUPPLIED BY THAT SERVICE SHALL ALSO BE LAMINATED AND PLACED IN THE DOCUMENT POCKET PRIOR TO SHIPPING.
16. GROUND ROD CLAMP TO BE UL LISTED FOR DIRECT BURIAL. ALL NON-CONDUCTIVE COATING TO BE REMOVED FROM GROUND ROD WIRE TO BE #6 AWG SOLID COPPER. METAL CONDUIT ELLS TO HAVE GROUNDING BUSHING AND BONDING JUMPERS CORRECTLY INSTALLED.
17. ALL CONDUITS ENTERING ENCLOSURES FROM UNDERGROUND MUST BE SEALED. SILICONE SHALL NOT BE ALLOWED.
18. ALL CONDUCTORS SHALL BE MEGGED AND PULL TESTED. TRAFFIC SIGNAL CABLE NOT TO BE MEGGED AFTER CONNECTION, AS ELECTRONICS WILL BE DAMAGED.
19. TOP OF CONCRETE FOUNDATION TO BE FINISHED IN A NEAT AND WORKMAN LIKE MANNER. IF LEVELING WASHERS ARE USED, NO MORE THAN ⅛ IN. HEIGHT SHALL BE USED AT ANY ONE CORNER. MAXIMUM DIP OR RISE IN FOUNDATION IS NOT TO EXCEED ⅛ IN PER FOOT. WHEN PROPERLY INSTALLED, TOP OF SERVICE ENCLOSURE SHALL READ LEVEL FRONT TO BACK AND SIDE TO SIDE WITHIN ¼ IN. ROCKING OR MOVEMENT OF THE SERVICE ENCLOSURE SHALL BE PREPARED BY THE CONTRACTOR AT NO COST TO THE STATE.
20. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL NOT BE ALLOWED ON PS TYPE SERVICES.

LEGEND

1. METER SOCKET, (when required)
2. METER SOCKET WINDOW, (when required)
3. EQUIPMENT MOUNTING PANEL
4. PHOTO ELECTRIC CONTROL WINDOW, (when required)
5. HINGED DEADFRONT TRIM
6. LOAD SIDE CONDUIT AREA
7. LINE SIDE CONDUIT AREA
8. UTILITY ACCESS DOOR, with handle
9. PEDESTAL DOOR
10. HINGED METER ACCESS
11. CONTROL STATION (H-O-A Switch)
12. MAIN DISCONNECT
13. BRANCH CIRCUIT BREAKERS

STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED
PROFESSIONAL ENGINEER
9-9-12

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

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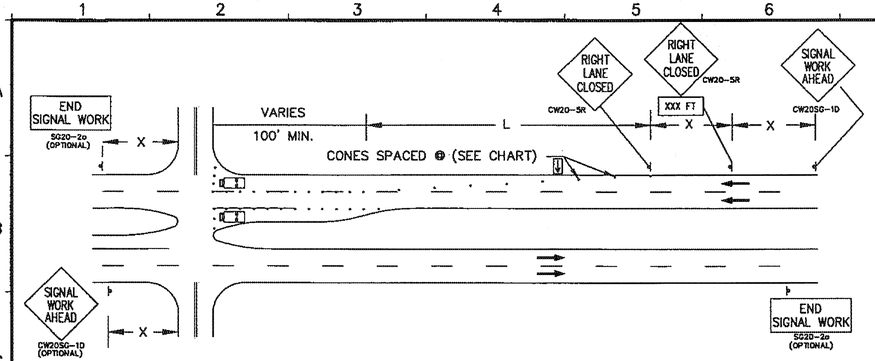
PUBLIC WORKS & ENGINEERING DEPARTMENT
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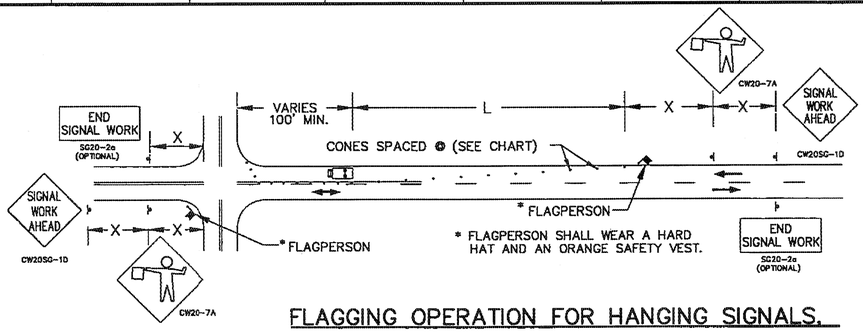
TRAFFIC SIGNAL DETAILS

ELECTRICAL SERVICE SUPPORT PEDESTAL SERVICE TYPE PS

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ONE LANE CLOSURE W/ RIGHT LANE AND/OR LEFT TURN LANE CLOSED



* FLAGPERSON SHALL WEAR A HARD HAT AND AN ORANGE SAFETY VEST.

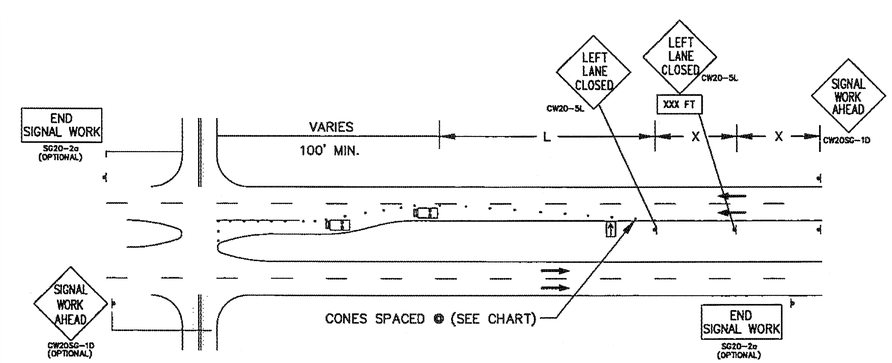
FLAGGING OPERATION FOR HANGING SIGNALS, STRAPPING CABLE, OR INSALLING LOOP DETECTORS

TYPICAL TRANSITION LENGTHS
SUGGESTED MAXIMUM SPACING OF DEVICES

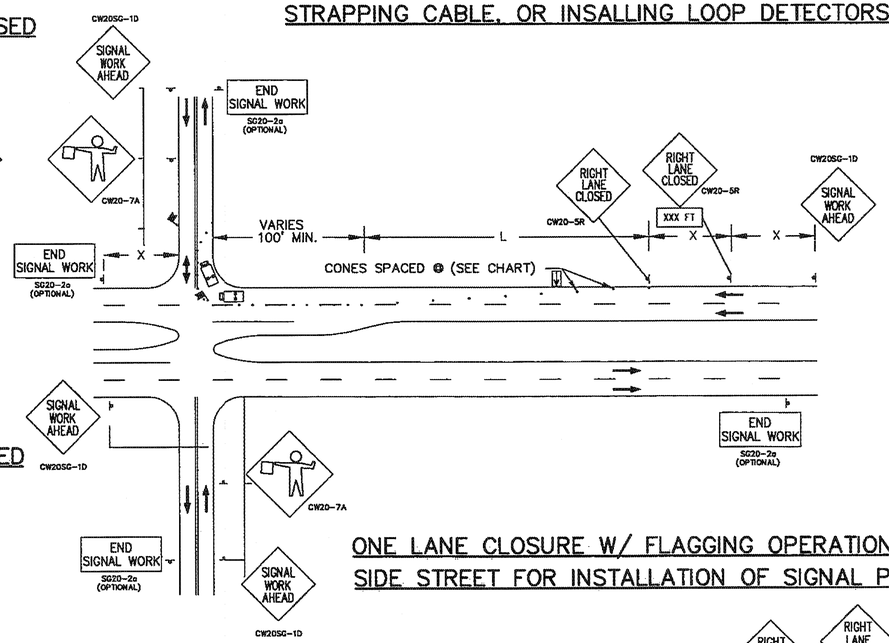
POSTED SPEED	FORMULA	MINIMUM DESIRABLE TAPER LENGTHS ** 10' OFFSET	11' OFFSET	12' OFFSET	SUGGESTED MAXIMUM SPACING OF DEVICE ON A TAPER	ON A TANGENT	MINIMUM SIGN SPACING X DISTANCE
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	600'

** TAPER LENGTHS HAVE BEEN ROUNDED OFF

L=LENGTH OF TAPER (FT.)
W=WIDTH OF OFFSET (FT.)
S=POSTED SPEED(MPH)



ONE LANE CLOSURE W/ LEFT LANE AND/OR LEFT TURN LANE CLOSED



ONE LANE CLOSURE W/ FLAGGING OPERATION ON SIDE STREET FOR INSTALLATION OF SIGNAL POLES

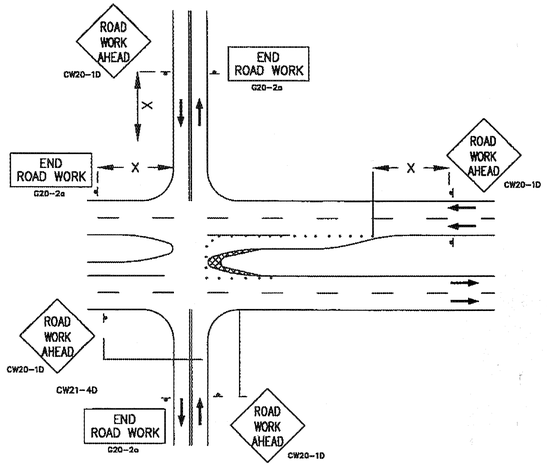
LEGEND

HEAVY WORK VEHICLE

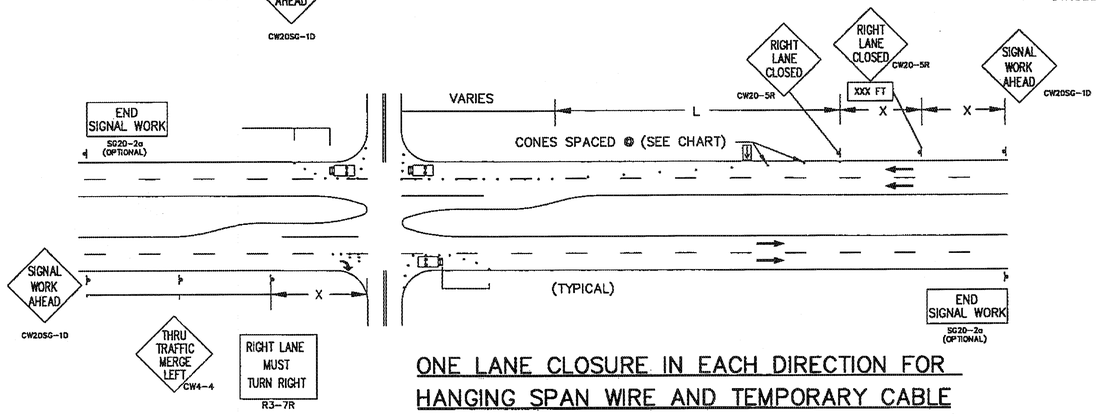
FLASHING ARROW PANEL

NOTES:

1. ALL TRAFFIC CONTROL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST REVISION.
2. THE MINIMUM LANE WIDTH ALLOWED IS 10 FEET. THE MINIMUM BUFFER ZONE BETWEEN THE WORK ZONE AN ADJACENT TRAFFIC IS 2 FEET.
3. FLORESCENT ORANGE SHALL BE THE BACK GROUND COLOR ON ALL WORK ZONE SIGNS.
4. THE CONTRACTOR SHALL REMOVE ADVANCE SIGNS WHEN NO CONSTRUCTION OPERATIONS ARE UNDERWAY.
5. OBSTRUCTIONS OR HAZARDS AT THE WORK AREA SHALL BE CLEARLY MARKED AND DELINEATED AT ALL TIMES.
6. ALL HOLES, TRENCHES OR OTHER HAZARDOUS AREAS SHALL BE ADEQUATELY PROTECTED BY LIGHTS OR OTHER PROTECTIVE DEVICES.
7. TRENCHES SHALL BE COVERED OR SURROUNDED WITH ORANGE PLASTIC CONSTRUCTION FENCE AS DIRECTED BY THE ENGINEER.
8. FLAGGER AND FCW20-7a SIGN MAY BE REQUIRED ACCORDING TO FIELD CONDITIONS.
9. VEHICLES PARKED IN ROADWAY SHALL BE EQUIPPED WITH TWO STROBES.



MEDIAN NOSE MODIFICATION



ONE LANE CLOSURE IN EACH DIRECTION FOR HANGING SPAN WIRE AND TEMPORARY CABLE

STATE OF TEXAS
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98414
LICENSED
PROFESSIONAL ENGINEER
4-9-12

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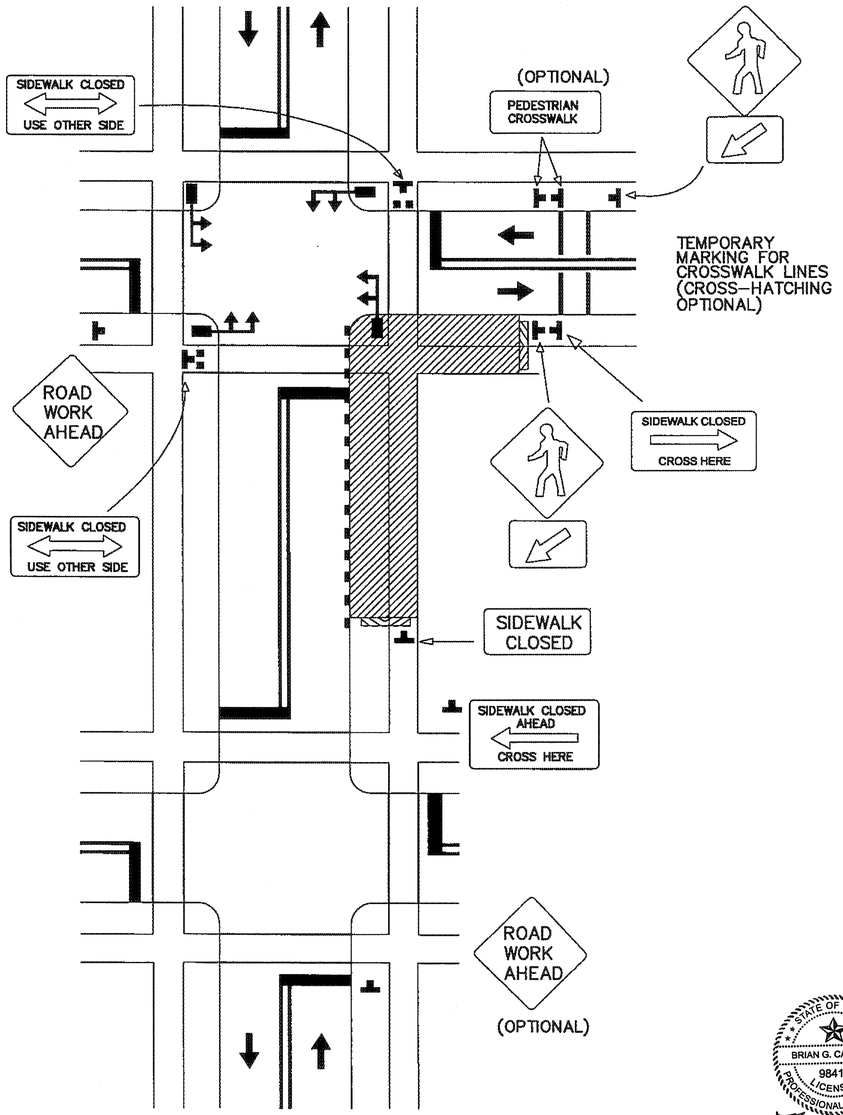
TRAFFIC SIGNAL DETAILS

TRAFFIC CONTROL PLAN FOR SIGNAL CONSTRUCTION

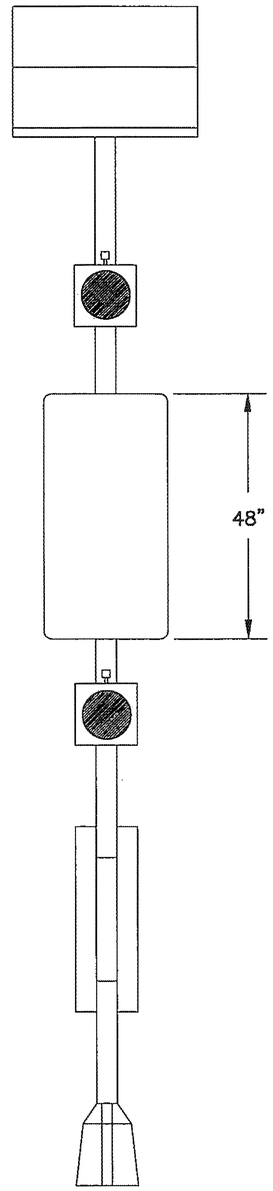
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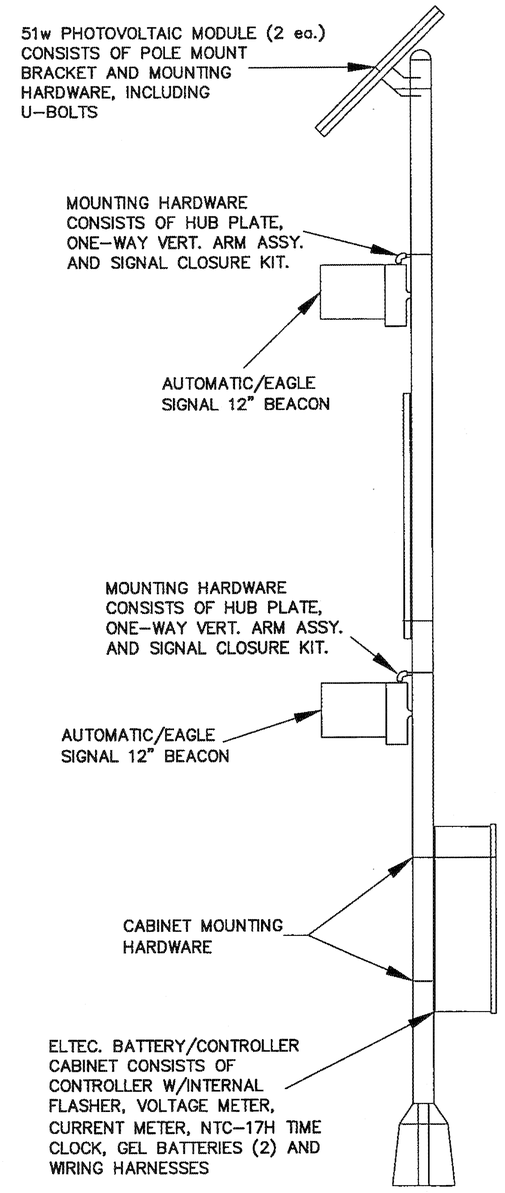
CROSSWALK CLOSURES AND PEDESTRIAN DETOURS



SOLAR SCHOOL ZONE FLASHING BEACON



FRONT VIEW



SIDE VIEW

STATE OF TEXAS — BRIAN G. CASTILLE — 98414 LICENSED PROFESSIONAL ENGINEER
9-9-12

PUBLIC WORKS AND ENGINEERING — 49210 CITY NUMBER — HOUSTON, TEXAS

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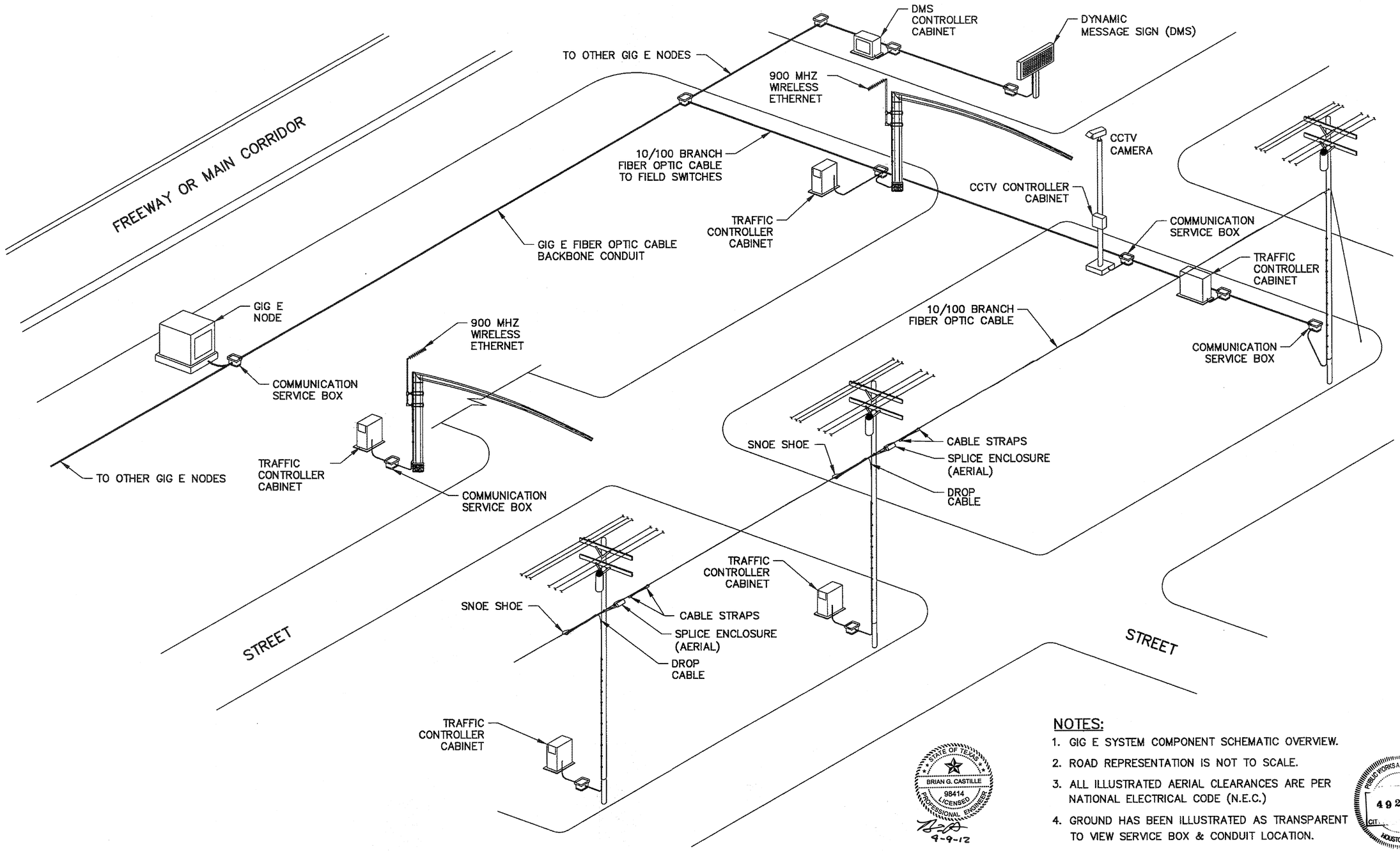
PUBLIC WORKS & ENGINEERING DEPARTMENT
TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

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TRAFFIC SIGNAL DETAILS

CROSSWALK CLOSURES AND PEDESTRIAN DETOURS, SOLAR SCHOOL ZONE FLASHING BEACON

DWG. NO. 02893-18



STATE OF TEXAS
BRIAN G. CASTILLE
98414
LICENSED
PROFESSIONAL ENGINEER
4-9-12

NOTES:

1. GIG E SYSTEM COMPONENT SCHEMATIC OVERVIEW.
2. ROAD REPRESENTATION IS NOT TO SCALE.
3. ALL ILLUSTRATED AERIAL CLEARANCES ARE PER NATIONAL ELECTRICAL CODE (N.E.C.)
4. GROUND HAS BEEN ILLUSTRATED AS TRANSPARENT TO VIEW SERVICE BOX & CONDUIT LOCATION.

PUBLIC WORKS AND ENGINEERING
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TRAFFIC SIGNAL ENGINEERING
AND OPERATIONS SECTION

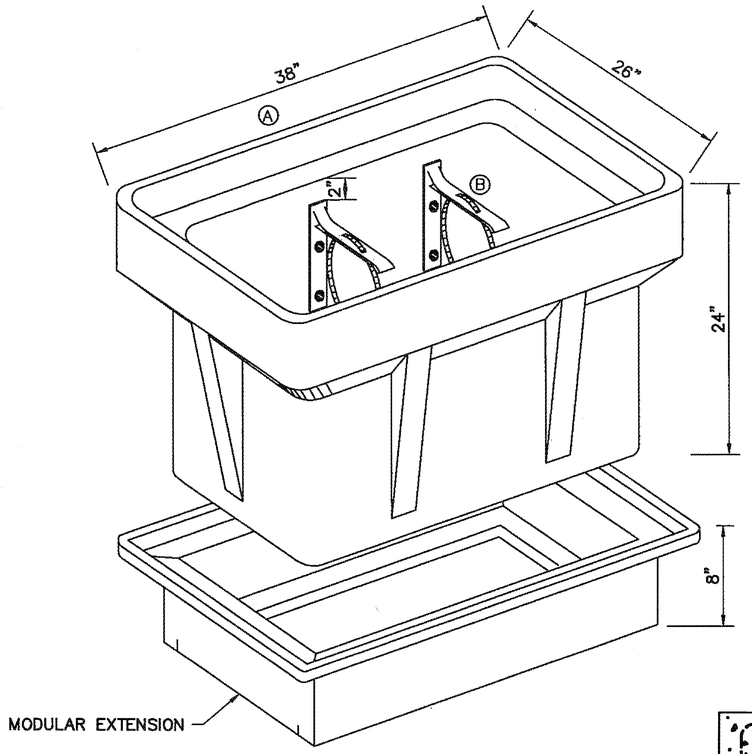
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COMMUNICATION DETAILS

COMMUNICATIONS OVERVIEW

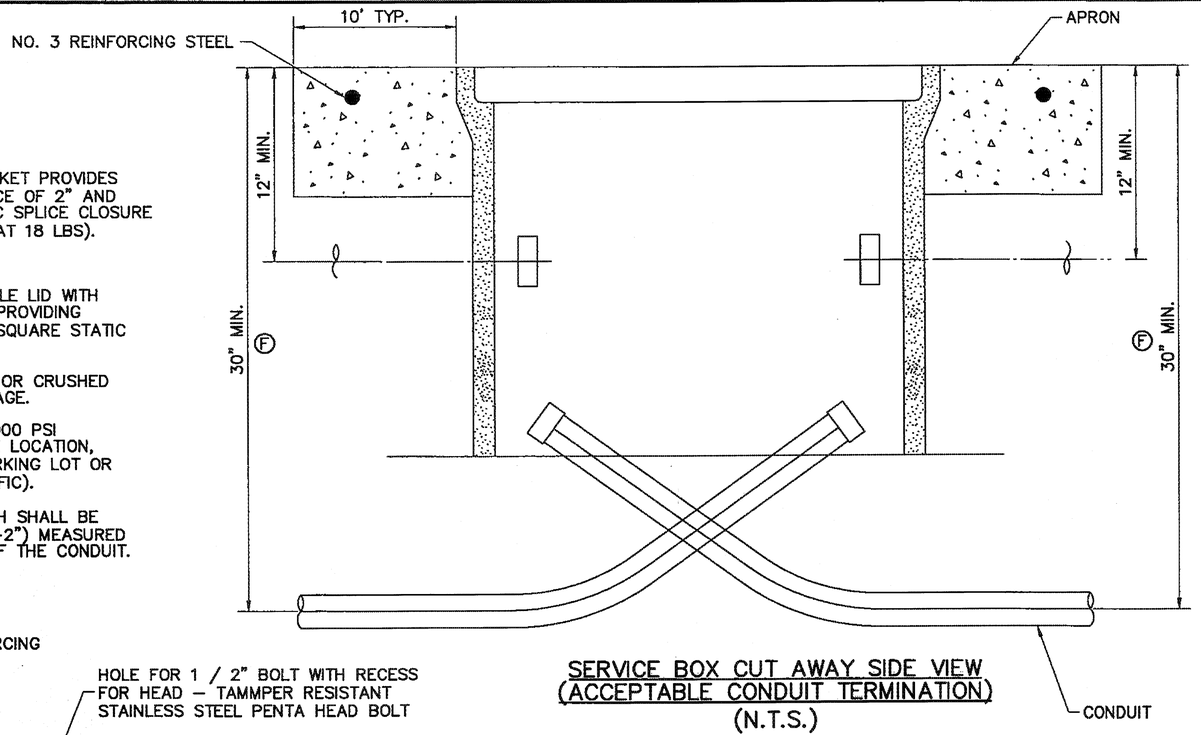
DWG. NO. 02893-19

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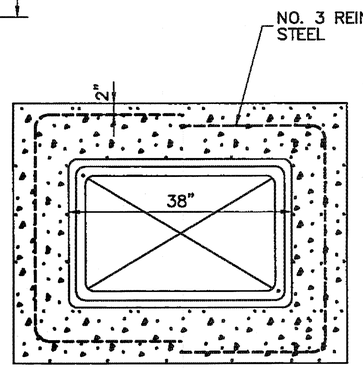


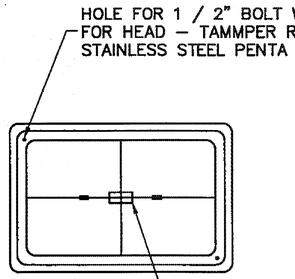
LEGEND

- Ⓐ SPLICE CLOSURE BRACKET PROVIDES MINIMUM LID CLEARANCE OF 2" AND SUPPORTS FIBER OPTIC SPLICE CLOSURE (8" DIA. X 24" LONG AT 18 LBS).
- Ⓑ NYLON TIES
- Ⓒ HEAVY DUTY REMOVABLE LID WITH LOCKING PROVISIONS, PROVIDING 15,000 LB. OVER 10" SQUARE STATIC LOAD SUPPORT.
- Ⓓ 6" TO 8" OF GROUND OR CRUSHED ROCK BED FOR DRAINAGE.
- Ⓔ CONCRETE APRON; 3,000 PSI AS REQUIRED FOR THE LOCATION, (DRIVE, SIDEWALK, PARKING LOT OR AREAS OF LIGHT TRAFFIC).
- Ⓕ CONDUIT BURIAL DEPTH SHALL BE 30" MIN. OR 12" (+/–2") MEASURED TO THE CENTERLINE OF THE CONDUIT.

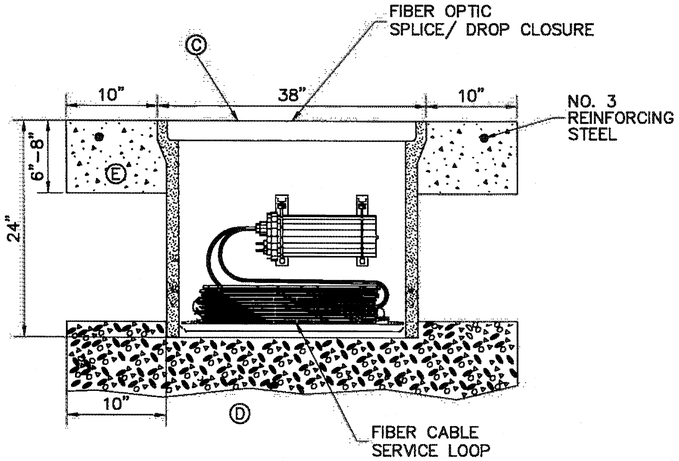


SERVICE BOX CUT AWAY SIDE VIEW
(ACCEPTABLE CONDUIT TERMINATION)
(N.T.S.)





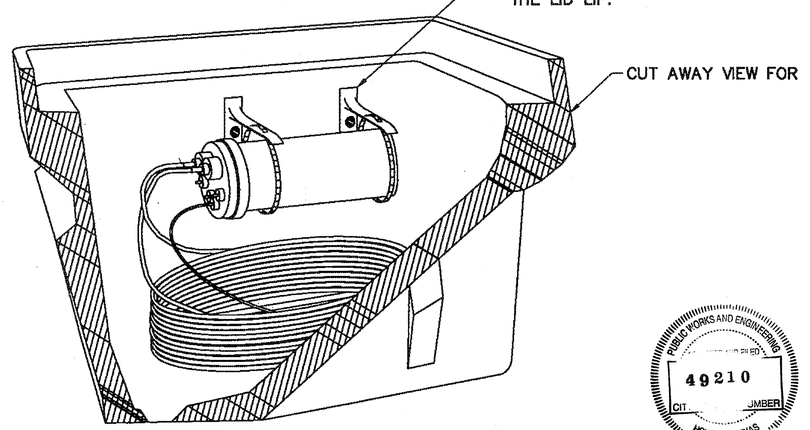
COMMUNICATION SERVICE BOX DETAIL
TOP VIEW
(N.T.S.)



INSTALLED COMMUNICATION
SERVICE BOX DETAIL
(N.T.S.)

NOTE:

CROSS SECTION VIEW OF BOX IN ORDER TO VIEW DROP CLOSURE AND CABLE CONTAINED WITHIN.



STATE OF TEXAS
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9-9-12

PUBLIC WORKS AND ENGINEERING
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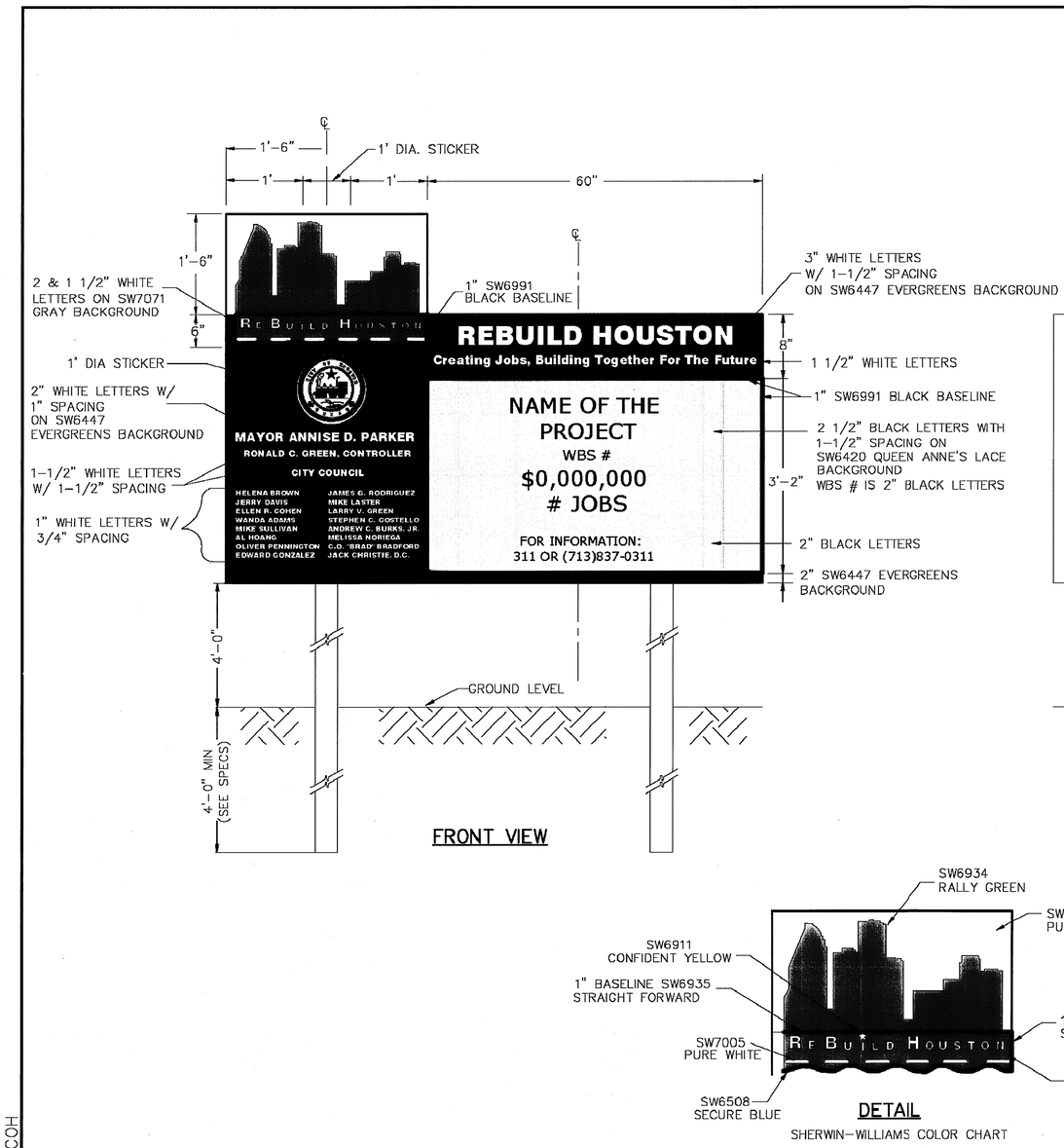
COMMUNICATION DETAILS

COMMUNICATIONS SERVICE BOX DETAILS

DWG. NO. 02893-20

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FOR REDUCED PLANS
original scale in inches



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONSTRUCTION SIGN
ReBuild Houston Project

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER

DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE JAN-25-2012

DWG NO: 01580-05

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5802

ERFANO E. SALAZAR JR.
97269
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STATE OF TEXAS
02/29/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

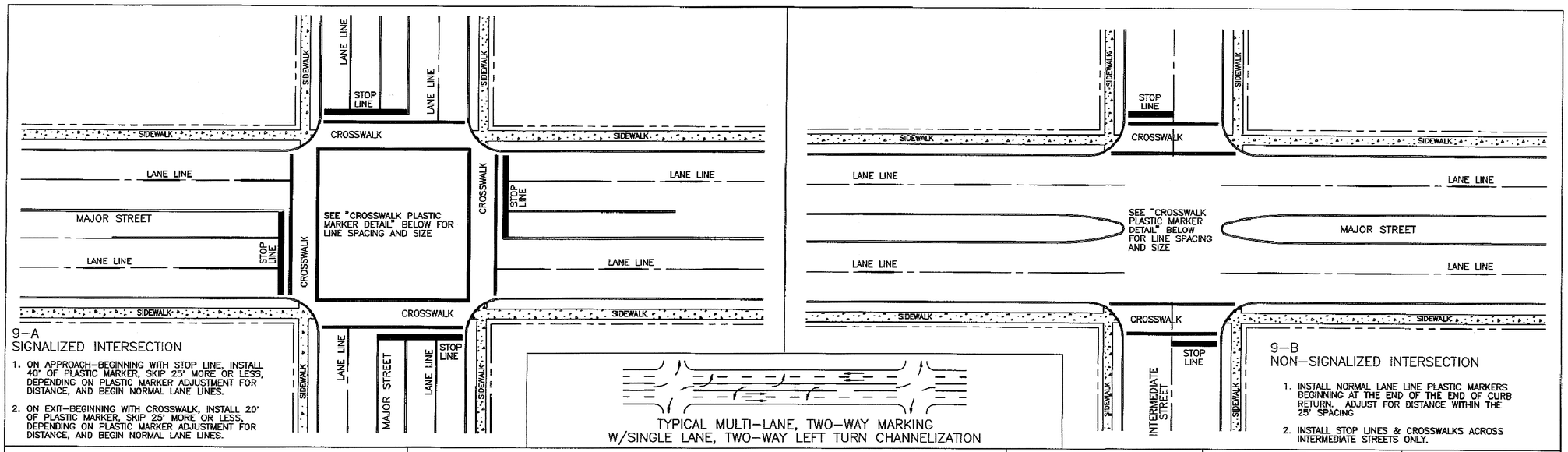
PROJECT IDENTIFICATION SIGN

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FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 163 OF 191	

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PLOTTED ON: Wednesday, April 25, 2012 1:31:40 PM
FILE NAME: F:\WHB-SG4\CAD\STD\PROJECT IDENTIFICATION SIGN.DWG

FOR REDUCED PLANS
original scale in inches



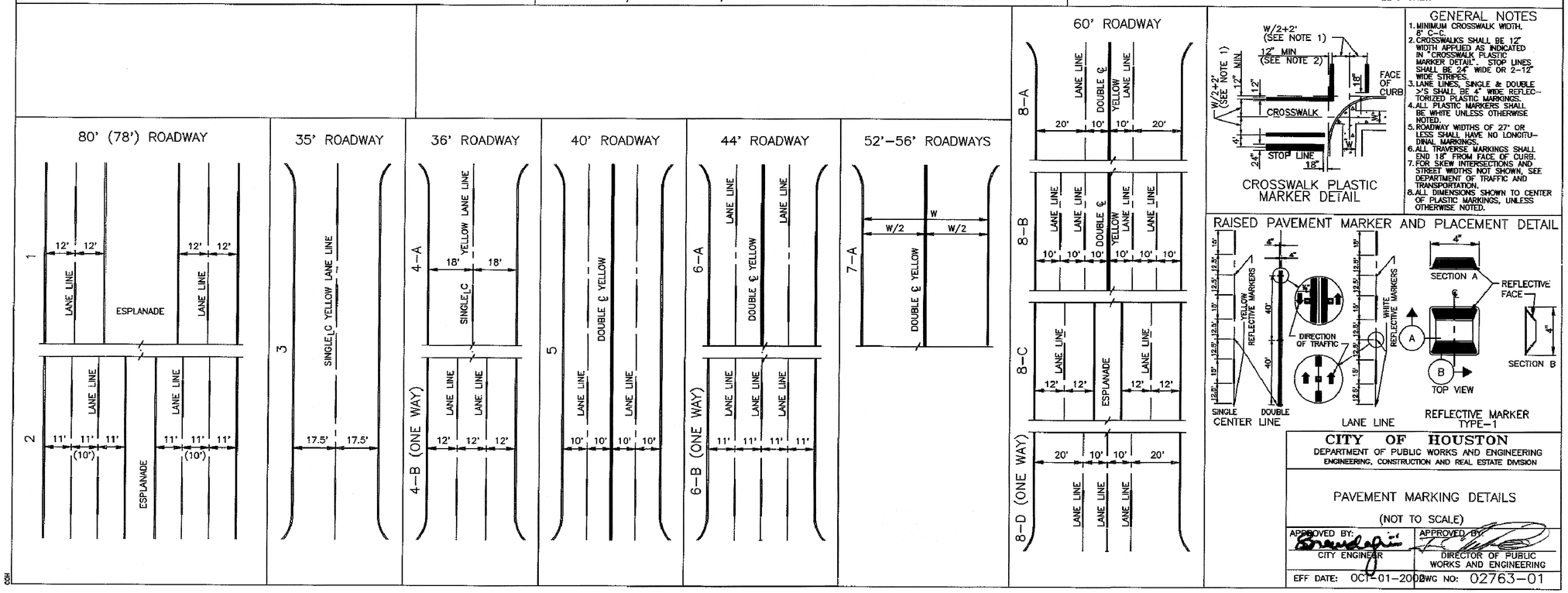
9–A
SIGNALIZED INTERSECTION

1. ON APPROACH–BEGINNING WITH STOP LINE, INSTALL 40' OF PLASTIC MARKER, SKIP 25' MORE OR LESS, DEPENDING ON PLASTIC MARKER ADJUSTMENT FOR DISTANCE, AND BEGIN NORMAL LANE LINES.
2. ON EXIT–BEGINNING WITH CROSSWALK, INSTALL 20' OF PLASTIC MARKER, SKIP 25' MORE OR LESS, DEPENDING ON PLASTIC MARKER ADJUSTMENT FOR DISTANCE, AND BEGIN NORMAL LANE LINES.

9–B
NON–SIGNALIZED INTERSECTION

1. INSTALL NORMAL LANE LINE PLASTIC MARKERS BEGINNING AT THE END OF THE END OF CURB RETURN. ADJUST FOR DISTANCE WITHIN THE 25' SPACING
2. INSTALL STOP LINES & CROSSWALKS ACROSS INTERMEDIATE STREETS ONLY.

TYPICAL MULTI–LANE, TWO–WAY MARKING
W/SINGLE LANE, TWO–WAY LEFT TURN CHANNELIZATION



GENERAL NOTES

1. MINIMUM CROSSWALK WIDTH, 8' C–C.
2. CROSSWALKS SHALL BE 12" WIDTH APPLIED AS INDICATED IN "CROSSWALK PLASTIC MARKER DETAIL". STOP LINES SHALL BE 24" WIDE OR 2–12" WIDE STRIPES.
3. LANE LINES, SINGLE & DOUBLE ≥ S SHALL BE 4" WIDE REFLECTORIZED PLASTIC MARKINGS.
4. ALL PLASTIC MARKERS SHALL BE WHITE UNLESS OTHERWISE NOTED.
5. ROADWAY WIDTHS OF 27' OR LESS SHALL HAVE NO LONGITUDINAL MARKINGS.
6. ALL TRAVERSE MARKINGS SHALL END 18" FROM FACE OF CURB.
7. FOR SKEW INTERSECTIONS AND STREET WIDTHS NOT SHOWN, SEE DEPARTMENT OF TRAFFIC AND TRANSPORTATION.
8. ALL DIMENSIONS SHOWN TO CENTER OF PLASTIC MARKINGS, UNLESS OTHERWISE NOTED.

CROSSWALK PLASTIC MARKER DETAIL

RAISED PAVEMENT MARKER AND PLACEMENT DETAIL

REFLECTIVE MARKER TYPE–1

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

PAVEMENT MARKING DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT–01–2002 DWG NO: 02763–01

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988–5504, Fax (713) 988–1441 www.seshorizon.com

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TEXAS REGISTERED ENGINEERING FIRM F–003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
87749
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P–5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

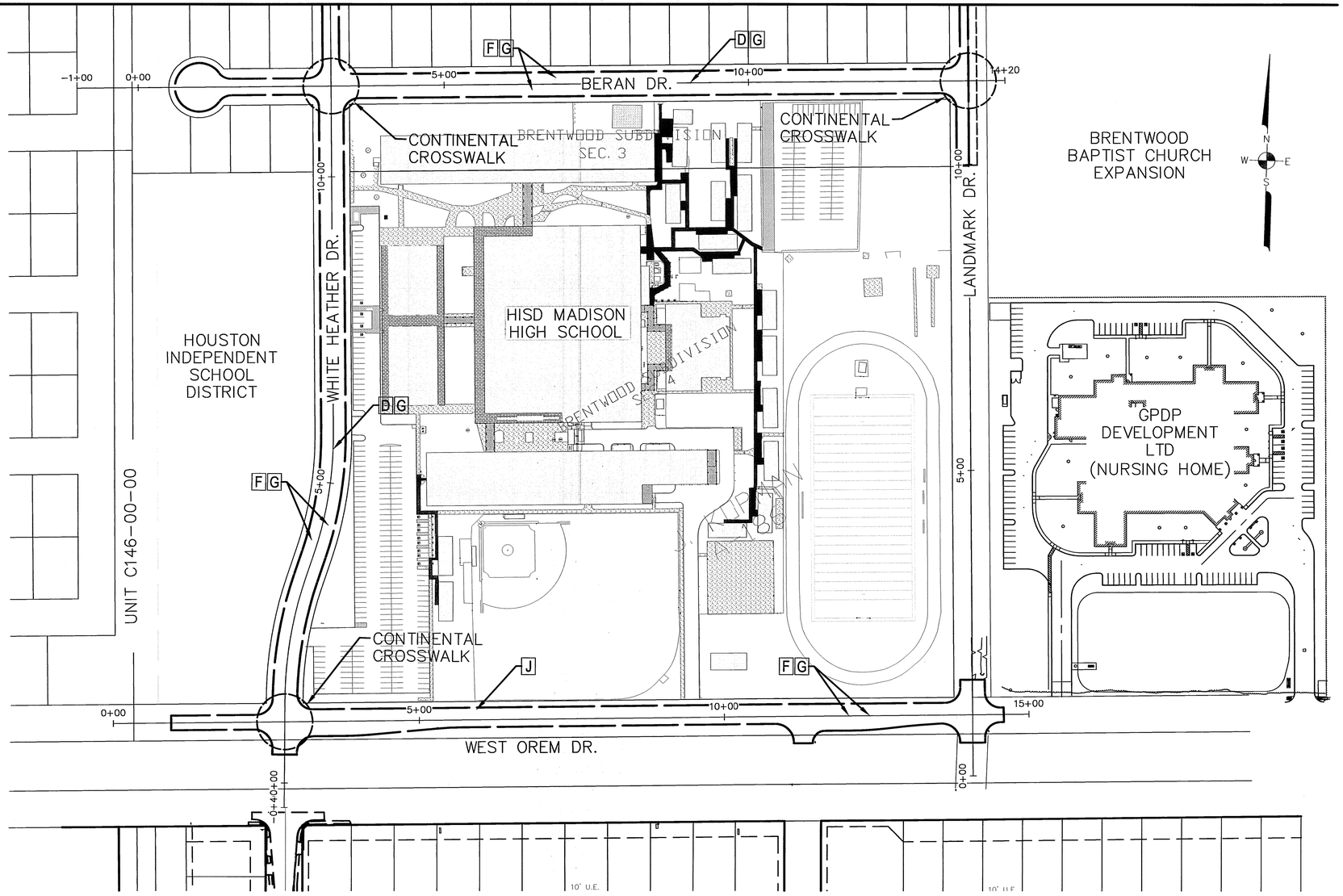
WHITE HEATHER DRAINAGE AND PAVING SUB–PROJECT IV

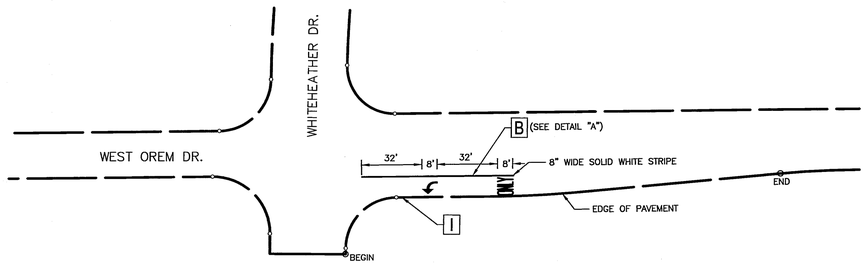
PAVEMENT MARKINGS

WBS NO.: M–000262–0004–4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	49210
ISAAC MUNIZ, E.I.T.	
SHEET NO. 164 OF 191	

PLOTTED ON: Monday, April 09, 2012 2:41:10 PM
FILE NAME: F:\WHB–SG4\CAD\STD\PAVEMENT MARKINGS.DWG

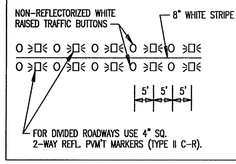
MATCH LINE SHEET NO. 166





TYPICAL LEFT TURN PAVEMENT MARKING DETAIL

DETAIL "A"



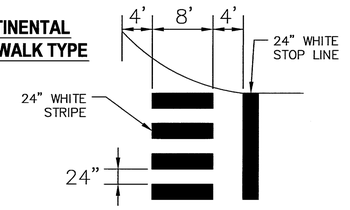
PAVEMENT MARKER LEGEND

SYMBOL	DESCRIPTION
>□<	TWO SIDED REFLECTORIZED RAISED PAVEMENT MARKER
□<	ONE SIDED REFLECTORIZED PAVEMENT MARKER
O	NON-REFLECTIVE 4" DIA. RAISED TRAFFIC BUTTON

LEGEND

A	24" SOLID WHITE STOP LINE
B	8" SOLID WHITE CHANNELIZING LINE
C	24" SOLID YELLOW LINE
D	4" DOUBLE YELLOW LINE
E	12" SOLID WHITE CROSS LINE
F	4" WHITE LANE LINE (15' LONG & 25' SPACING)
G	RAISED PAVEMENT MARKER
H	PAVEMENT MARKER SYMBOL
I	REFLECTORIZED YELLOW TRAFFIC PAINT
J	4" SOLID WHITE LINE
	PROPOSED TRAFFIC SIGN

CONTINENTAL CROSSWALK TYPE



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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

ERIFANIO E. SALAZAR JR. 67749 REGISTERED PROFESSIONAL ENGINEER 04-09-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

PAVEMENT MARKING DETAILS

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.: 49210
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 165 OF 191	

PUBLIC WORKS AND ENGINEERING REGISTERED ENGINEER CITY NUMBER HOUSTON, TEXAS

FOR REDUCED PLANS original scale in inches

PLOTTED ON: Monday, April 09, 2012 2:56:14 PM
FILE NAME: F:\WHB-SG4\CAD\STD\WHB-SG4-PAVEMENT MARKING DETAILS.DWG

FOR REDUCED PLANS
original scale in inches

3 2 1 0

UNIT C146-00-00

HISD HOBBY ELEMENTARY SCHOOL

BRENTWOOD PARK

BRENTWOOD SUBDIV. SEC. 3

BRENTWOOD SEC. 1

F G D G

CONTINENTAL CROSSWALK

CONTINENTAL CROSSWALK

CONTINENTAL CROSSWALK

BRENTWOOD BAPTIST CHURCH

ROAD HUMP 20 M.P.H.

ROAD HUMP 20 M.P.H.

WHITE HEATHER DR.

WUTHERING HEIGHTS DR.

TIDEWATER DR.

KNOTTY OAKS DR.

EBBTIDE DR.

LANDMARK DR.

PROP. SPEED CUSHION

PROP. SPEED CUSHION

200.0'

200.0'

200.0'

-0+40+00 -1+00 0+00 5+00 10+00 14+20 15+00 20+00 24+00 30+00 33+00

BRENTWOOD BAPTIST CHURCH EXPANSION

BRENTWOOD BAPTIST CHURCH EXPANSION

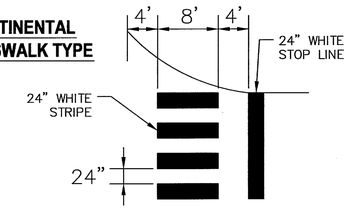
MATCH LINE SHEET NO. 165

LEGEND

A	24" SOLID WHITE STOP LINE
B	8" SOLID WHITE CHANNELIZING LINE
C	24" SOLID YELLOW LINE
D	4" DOUBLE YELLOW LINE
E	12" SOLID WHITE CROSS LINE
F	4" WHITE LANE LINE (15' LONG & 25' SPACING)
G	RAISED PAVEMENT MARKER
H	PAVEMENT MARKER SYMBOL
I	REFLECTORIZED YELLOW TRAFFIC PAINT
J	4" SOLID WHITE LINE
	PROPOSED TRAFFIC SIGN

N W E S

CONTINENTAL CROSSWALK TYPE



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STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04/09/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

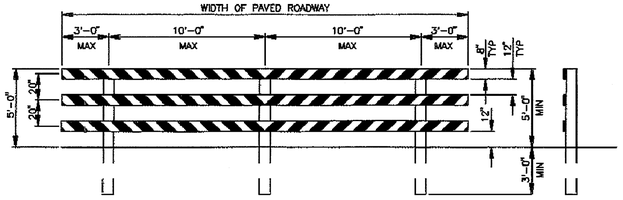
PAVEMENT MARKING DETAILS

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 166 OF 191	

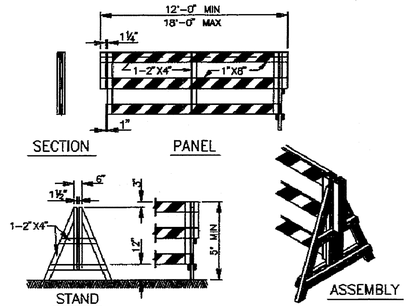
PUBLIC WORKS AND ENGINEERING
REGISTERED
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 2:56:30 PM
FILE NAME: F:\WHB-SG4\CAD\STD\WHB-SG4-PAVEMENT MARKING DETAILS.DWG



TYPE III BARRICADE
FOR END OF ROAD

FOR TYPE III BARRICADE FOR END OF ROAD, THE THREE (3) RAILS SHALL BE REFLECTIVE RED AND RELFLECTIVE WHITE SRIPES ON SIDE FACING TRAFFIC



DEMOUNTABLE TYPE III BARRICADE

BARRICADE NOTES

THE MOST RECENT EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND IT'S REVISIONS, SHALL GOVERN THE CONSTRUCTION AND USE OF ALL ITEMS HEREIN DESCRIBED.

CHANNELIZATION DEVICES OTHER THAN BARRICADES SHOULD NORMALLY BE USED FOR CHANNELIZATION PURPOSES.

BARRICADES SHOULD NORMALLY BE PLACED PERPENDICULAR TO THE TRAFFIC FLOW. OTHER CHANNELIZING DEVICES, SUCH AS DRUMS, VERTICAL PANELS OR PORTABLE BARRIERS, SHOULD BE USED WHERE NEEDED TO SEPARATE TRAFFIC FROM THE WORK AREA, IN ALL CASES, THE BARRICADES SHOULD BE SO LOCATED AS TO MOST ADVANTAGEOUSLY WARN AND DIRECT TRAFFIC.

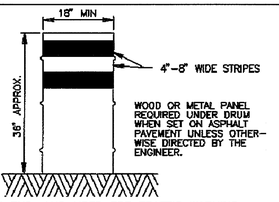
BARRICADES MAY BE DESIGNED AND CONSTRUCTED FROM WOOD OR ANY OTHER SUITABLE MATERIAL IN A MANNER APPROVED BY THE DEPARTMENT OF TRAFFIC AND TRANSPORTATION. THE CONSTRUCTION DETAILS SHOWN HEREON ARE TYPICAL AND ARE SUGGESTED DETAILS FOR WOOD SUPPORT SYSTEMS FOR BARRICADES. THE DETAILS OF RAIL WIDTH AND STRIPING, NUMBER AND SPACING OF RAILS, MINIMUM LENGTH AND HEIGHT (ABOVE PAVEMENT) OF RAILS MUST BE ADHERED TO WHEN ALTERNATE DESIGNS ARE USED.

BARRICADES ARE TO BE CONSTRUCTED OF CLEAN SOUND MATERIAL. ALL SURFACES ABOVE GROUND, WHICH ARE NOT STRIPED, SHALL BE WHITE EXCEPT THE UNPAINTED GALVANIZED METAL OR ALUMINUM COMPONENTS MAY BE USED.
COMPONENTS MADE OF LUMBER SHALL BE PAINTED WITH A MINIMUM OF TWO COATS OF AN APPROVED BRAND OF WHITE PAINT TO SECURE THOROUGH COVERAGE AND A UNIFORM WHITE COLOR.

THE REFLECTORIZED WHITE AND REFLECTORIZED ORANGE (REFLECTORIZED RED) STRIPES FOR BARRICADES, DRUMS AND VERTICAL PANELS SHALL BE CONSTRUCTED OF "HIGH INTESITY SHEETING AND SHALL BE MAINTAINED TO MEET THE APPEARANCE, COLOR AND REFLECTIVITY REQUIREMENTS SET BY DOTT.

THE CONTRACTOR SHALL MAINTAIN EACH BARRICADE IN A CLEAN AND GOOD CONDITION.

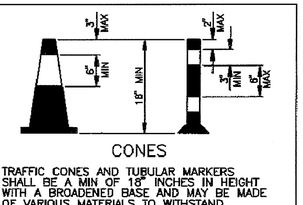
BARRICADES SHALL BE REMOVED UPON COMPLETION OF THE WORK AND/OR THE ELIMINATION OF THE HAZARD ON ANY SECTION.



DRUMS

DRUMS, SET ON END, AND USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE APPROX 36" IN HEIGHT AND A MIN OF 18" IN DIAMETER. THE CONTRACTOR, AT HIS OPTION, MAY USE DRUMS MADE FROM STEEL BARRELS OR BLACK POLYETHYLENE PLASTIC DRUM LINERS WEIGHING APPROX EIGHT POUNDS EACH. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, REFLECTORIZED ORANGE AND REFLECTORIZED WHITE STRIPES, 4 TO 8 INCHES WIDE. THE FIRST REFLECTORIZED STRIPE SHOULD START WITHIN TWO (2) INCHES OF THE TOP OF THE DRUM. THERE SHALL BE AT LEAST TWO ORANGE AND TWO WHITE STRIPES ON EACH DRUM. IF THERE ARE NON-REFLECTORIZED SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES, THEY SHALL BE NO MORE THAN 2 INCHES WIDE. METAL DRUMS SHALL BE PAINTED BLACK OR ORANGE BEFORE REFLECTORIZED STRIPES ARE ADDED. ALL DRUMS ON PROJECT WILL BE THE SAME COLOR. WHEN DRUMS ARE PLACED IN THE ROADWAY, APPROPIATE WARNING SIGNS SHOULD BE USED. DURING HOURS OF DARKNESS, A FLASHING WARNING LIGHT SHOULD BE PLACED ON DRUMS USED SINGLY AS A WARNING DEVICE. STEADY BURN ELECTRIC LIGHTS OR DELINEATORS SHOULD BE PLACED ON DRUMS USED IN SERIES FOR TRAFFIC CHANNELIZATION. DRUMS SHALL BE WEIGHTED WITH SAND TO THE EXTENT INDICATED IN THE PLANS.

CWI-8 CHEVRON SIGNS, CWI-6A ARROW SIGNS OR VP-I VERTICAL PANELS MOUNTED ABOVE DRUMS MAY BE USED AS SUPPLEMENTS TO DRUM DELINEATION.

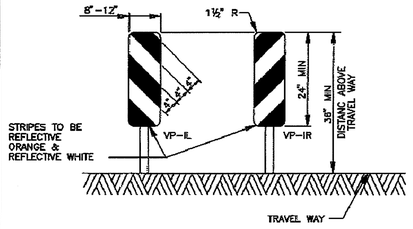


CONES

TRAFFIC CONES AND TUBULAR MARKERS SHALL BE A MIN OF 18" INCHES IN HEIGHT WITH A BROADENED BASE AND MAY BE MADE OF VARIOUS MATERIALS TO WITHSTAND IMPACT WITHOUT DAMAGE TO THEMSELVES OR TO VEHICLES. LARGER SIZES SHOULD BE USED ON FREEWAYS AND OTHER ROADWAYS WHERE SPEED ARE RELATIVELY HIGH OR WHERE EVER MORE CONSPICUOUS GUIDANCE IS NEEDED. ORANGE SHALL BE THE PREDOMINANT COLOR ON CONES AND TUBULAR MARKERS. THEY SHOULD BE KEPT CLEAN AND BRIGHT FOR MAX TARGET VALUE. FOR NIGHTTIME USE THEY SHALL BE REFLECTORIZED OR EQUIPPED WITH LIGHTING DEVICES FOR MAX VISIBILITY. REFLECTORIZED MATERIAL SHALL HAVE A SMOOTH, SEALED OUTER SURFACE WHICH WILL DISPLAY THE SAME APPROX COLOR DAY AND NIGHT.

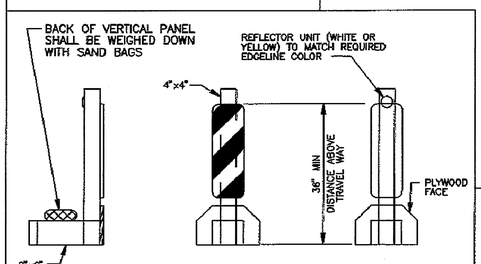
REFLECTORIZATION OF TUBULAR MARKERS SHALL BE A MIN OF TWO THREE-INCH BANDS PLACED A MAX OF 2" FROM THE TOP WITH A MAX OF 6" BETWEEN THE BANDS. REFLECTORIZATION OF CONES SHALL BE PROVIDED BY A MIN 6" BAND PLACED A MAX OF 3" FROM THE TOP.

CONES OR TUBULAR MARKERS ARE GENERALLY ONLY SUITABLE FOR TEMPORARY USAGE (UP TO 8 HOURS) WITH OTHER CHANNELIZATION DEVICES SUCH AS VERTICAL PANELS OR BARRICADES PREFERRED FOR LONGER TERM USAGE. CARE SHOULD BE TAKEN TO INSURE THAT THEY REMAIN IN THEIR PROPER LOCATION AND IN AN UPRIGHT POSITION.



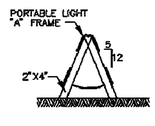
VERTICAL PANELS (VP)

VERTICAL PANELS ARE NORMALLY USED AS CHANNELIZING DEVICES TO INDICATE TANGENT OR NEARLY TANGENT ROADWAY ALIGNMENT WHERE GOOD TARGET VALUE OF A DEVICE IS NEEDED IN DAYTIME AS WELL AS THE NIGHTTIME. IN ADDITION, VERTICAL PANELS SHOULD BE USED AT THE EDGE OF SHOULDER DROP-OFFS AND OTHER SUCH AREAS AS LANE TRANSITIONS WHERE POSITIVE DAY AND NIGHT DELINEATION MAY BE REQUIRED. VERTICAL PANELS SHOULD BE MOUNTED BACK TO BACK IF USED AT THE EDGE OF CUTS ADJACENT TO TWO-WAY TWO LANE ROADWAYS. STRIPES SHOULD ALWAYS SLOPE DOWNWARD TOWARD THE TRAVELED WAY.

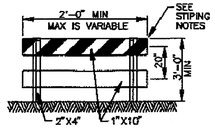


TYPICAL PORTABLE VERTICAL PANEL OR DELINEATOR

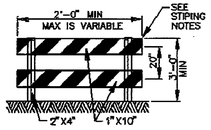
OTHER SIMILAR SUPPORTS MAY BE USED WHEN APPROVED OR DIRECTED BY THE COH DEPT OF TRAFFIC AND TRANSPORTATION



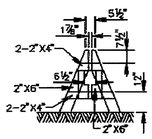
"A" FRAME



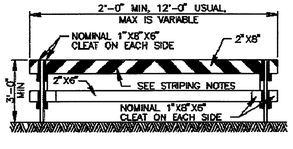
TYPE I



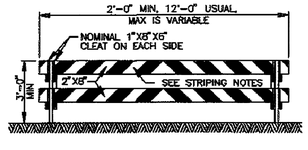
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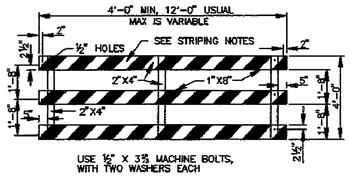
DEMOUNTABLE



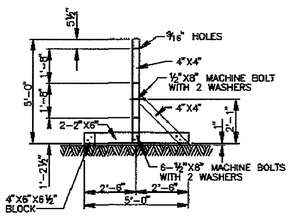
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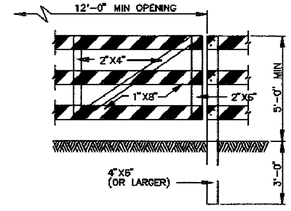
TYPE II



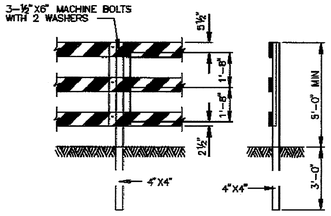
PANEL FOR
TYPE III BARRICADE



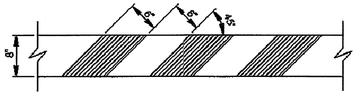
STAND FOR
TYPE III BARRICADE



GATE FOR
TYPE III BARRICADE



POST FOR
TYPE III BARRICADE



STRIPING FOR BARRICADE

FOR ALL TYPES OF BARRICADES WITH RAILS LESS THAN 3'-0" LONG, STRIPES 4" WIDE SHALL BE USED. IDENTIFICATION MARKINGS MAY BE SHOWN ONLY ON BACK SIDE OF BARRICADE RAILS.

STRIPING SHOULD COVER THE FULL WIDTH OF THE RAIL. STRIPING OF RAILS, PANELS, ETC. SHOULD SLOPE DOWNWARD AT AN ANGLE OF 45° DEGREES IN DIRECTIONS TRAFFIC IS TO PASS.

WHERE A BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, IT IS DESIRABLE THAT THE STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING. WHEN BOTH RIGHT AND LEFT TURNS ARE PROVIDED FOR, THE CHEVRON STRIPING MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE.

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

BARRICADE STANDARD

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 01580-01

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

BARRICADE STANDARDS

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 167 OF 191	

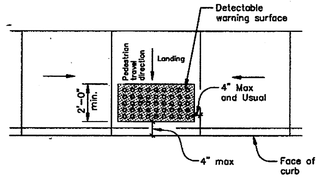
PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

FOR REDUCED PLANS
original scale in inches

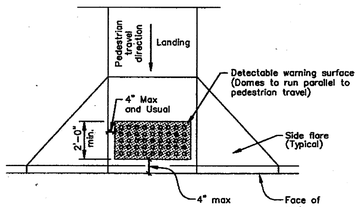
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FILE NAME: F:\WHB-SG4\CAD\STD\BARRICADE STANDARDS.DWG

COH

FOR REDUCED PLANS
original scale in inches



Typical placement of detectable warning surface on landing at street edge.



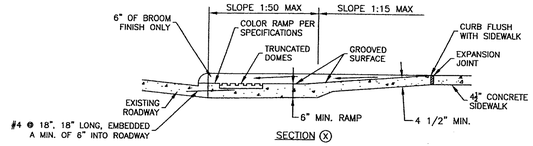
Typical placement of detectable warning surface on sloping ramp run.

GENERAL NOTES FOR DETECTABLE WARNINGS

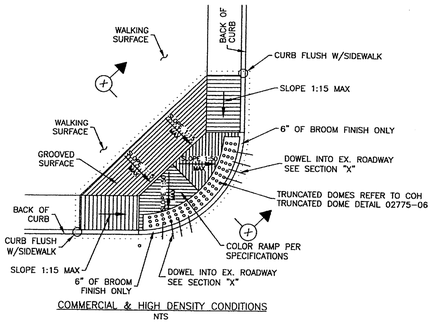
1. CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 4.29 OF THE TEXAS ACCESSIBILITY STANDARDS (TAS). THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACES, INCLUDING SIDE FLARES. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
2. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
3. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
4. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
5. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS A MAXIMUM OF 4" FROM THE EXTENSION OF THE FACE OF CURB. DETECTABLE WARNING SURFACES SHALL BE CURVED ALONG THE CORNER RADIUS.
6. REFERENCE CURB RAMP DETAILS FOR RAMP GROOVED SURFACE..

NOTE:
ALL RAMP LANDINGS SHALL HAVE A MAXIMUM 2% SLOPE IN ANY DIRECTION

DETECTABLE WARNING CURB RAMP DETAILS
(NOT TO SCALE)



SECTION (X)



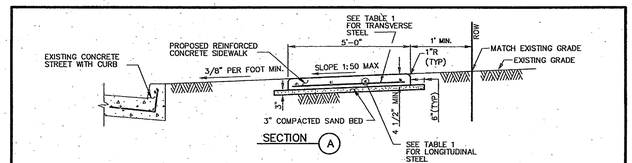
COMMERCIAL & HIGH DENSITY CONDITIONS
NTS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

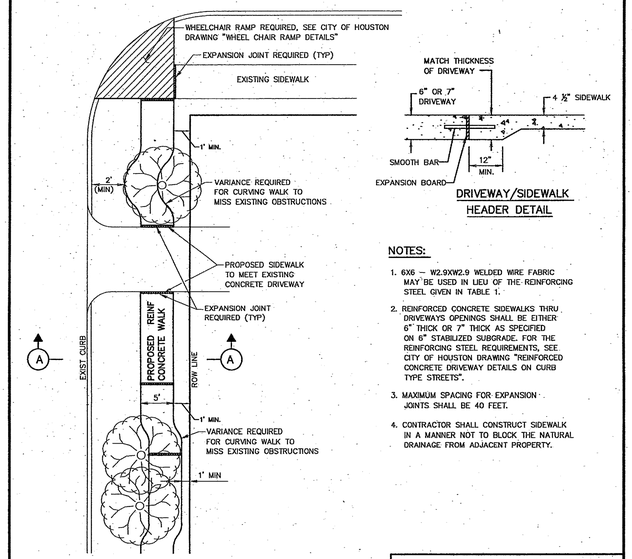
COMMERCIAL CURB RAMP DETAIL

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02775-05



SECTION (A)



DRIVEWAY/SIDEWALK HEADER DETAIL

NOTES:

1. 6X6 – W2.9XW2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL GIVEN IN TABLE 1.
2. REINFORCED CONCRETE SIDEWALKS THRU DRIVEWAYS OPENINGS SHALL BE EITHER 6" THICK OR 7" THICK AS SPECIFIED ON 6" STABILIZED SUBGRADE. FOR THE REINFORCING STEEL REQUIREMENTS, SEE CITY OF HOUSTON DRAWING "REINFORCED CONCRETE DRIVEWAY DETAILS ON CURB TYPE STREETS".
3. MAXIMUM SPACING FOR EXPANSION JOINTS SHALL BE 40 FEET.
4. CONTRACTOR SHALL CONSTRUCT SIDEWALK IN A MANNER NOT TO BLOCK THE NATURAL DRAINAGE FROM ADJACENT PROPERTY.

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
fc' = 3,000 PSI AND fy = 60,000 PSI

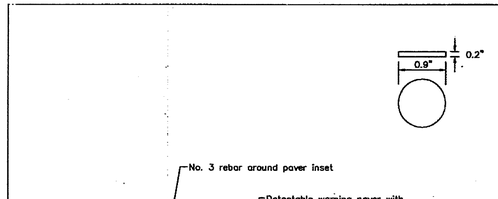
SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL # 3 BARS			TRANSVERSE STEEL # 3 BARS SPACING (IN)
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONCRETE SIDEWALK DETAILS FOR STREETS WITH CURBS

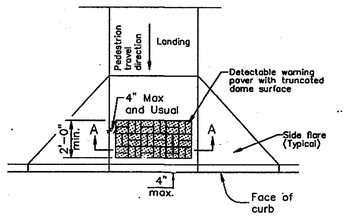
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02775-01



SECTION A–A

DETECTABLE WARNING PAVER



TRUNCATED DOME PATTERN CURB RAMP

GENERAL NOTES (PAVERS)

1. FURNISH DETECTABLE WARNING PAVER UNITS MEETING ALL REQUIREMENTS OF ASTM C-936, C-33. LAY IN A TWO BY TWO UNIT BASKET WEAVE PATTERN OR AS DIRECTED.
2. LAY FULL-SIZE UNITS FIRST FOLLOWED BY CLOSURE UNITS CONSISTING OF AT LEAST 25 PERCENT OF A FULL UNIT. CUT DETECTABLE WARNING PAVER UNITS USING A POWER SAW.
3. TRUNCATED DOME SHALL HAVE A DIAMETER OF NOMINAL 0.9", A HEIGHT OF NOMINAL 0.2", AND A CENTER-TO-CENTER SPACING OF 2.35".

NOTE:
ALL RAMP LANDINGS SHALL HAVE A MAXIMUM 2% SLOPE IN ANY DIRECTION

DETECTABLE WARNING PAVER (OPTION)
(NOT TO SCALE)

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STREET & BRIDGE DETAILS

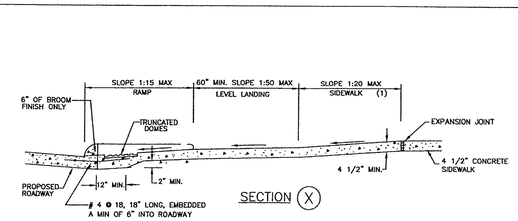
1 OF 4

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 168 OF 191	

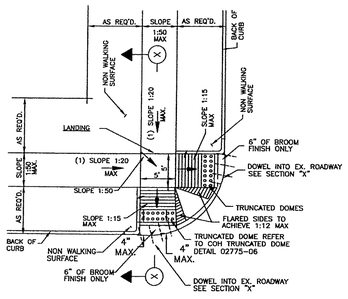
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PLOTTED ON: Monday, April 09, 2012 3:00:30 PM
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FOR REDUCED PLANS
original scale in inches



SECTION (X)



STREETS WITH NON-WALKING SURFACE BEHIND CURB

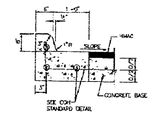
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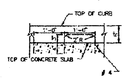
1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE
2. SLOPES GREATER THAN 1:20 BUT LESS THAN 1:15 (MAX) REQUIRE GROOVES AND COLORING

WHEEL CHAIR RAMP DETAILS

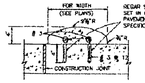
NOT TO SCALE



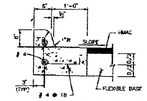
ESPLANADE CURB CONNECTED TO CONCRETE BASE



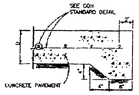
ALTERNATE CONCRETE CURB REINFORCEMENT



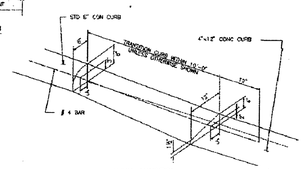
MOUNTABLE CURB



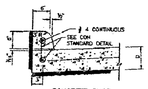
ESPLANADE CURB CONNECTED TO FLEXIBLE BASE



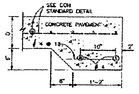
STANDARD CONCRETE PAVING HEADER



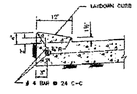
CURB TRANSITION



CONCRETE CURB

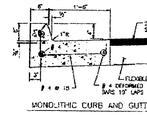


STANDARD RAILROAD HEADER

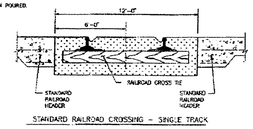


4-INCH x 12-INCH MONOLITHIC CURB

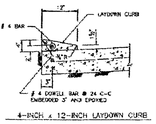
NOTE:
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE
#4 @ 18-1/2" LONG, DOWELED AND SET IN EPOXY GROUT.
SEE #4 DOWELS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



MONOLITHIC CURB AND GUTTER



STANDARD RAILROAD CROSSING - SINGLE TRACK

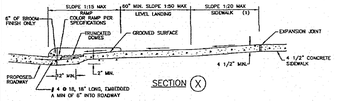


4-INCH x 12-INCH LAYDOWN CURB

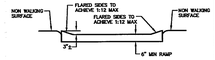
4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

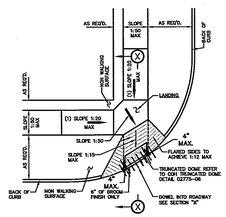
1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS NON-RESIDENTIAL STREETS, AND RESIDENTIAL STREETS.
2. TRANSITIONS FROM 6-INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FOOT TRANSITION CURB IS NOT POURED MONOLITHICALLY WITH THE PAVEMENT, RAIN REINFORCING STEEL AS SHOWN IN 6-INCH x 12-INCH TRANSITION CURB IS TO BE INSTALLED.

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
CURB, CURB AND GUTTER AND HEADER DETAILS	
(NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02771-01



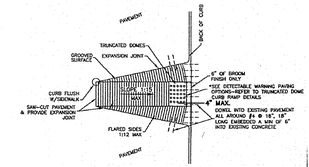
SECTION (X)





NOTES:

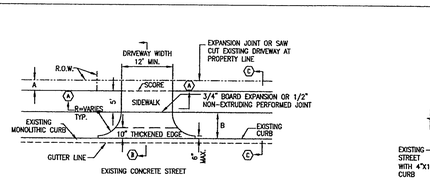
1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE



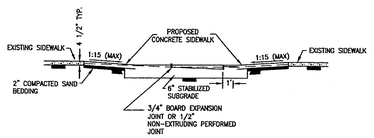
RAMP CONSTRUCTION FOR EXISTING PAVEMENT

WHEEL CHAIR RAMP ON CURB

NOT TO SCALE



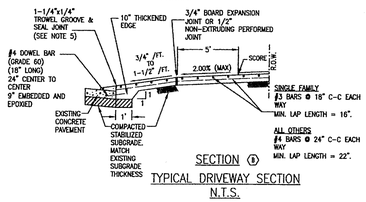
PLAN VIEW – DRIVEWAY



SECTION (A)

PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE GRADES

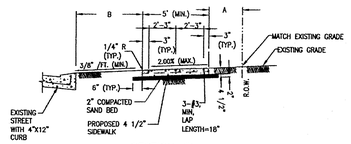
N.T.S.



SECTION (B)

TYPICAL DRIVEWAY SECTION

N.T.S.



SECTION (C)

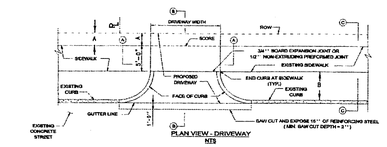
TYPICAL SIDEWALKS SECTION

N.T.S.

NOTES

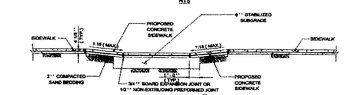
1. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FEET WIDE SIDEWALK.
2. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY
3. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5 1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. THE OUTER DOWEL BARS ARE TO BE LOCATED 12" FROM END OF PROPOSED EDGE OF DRIVEWAY RETURN. EXTEND DOWEL 3" INCHES INTO PROPOSED DRIVEWAY AND BEND REMAINING BAR TO EXTEND TO RADIUS RETURN BOTH SIDES.
5. TROWEL GROOVE SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE SEALANT.
6. EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALK SHALL BE ACCORDING TO DRAWING No. 02752-02.
7. REFER CHAPTER 10 DESIGN REQUIREMENTS FOR A AND B.

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
DRIVEWAY / LOCAL RESIDENTIAL STREETS	
(NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02754-01A



PLAN VIEW - DRIVEWAY

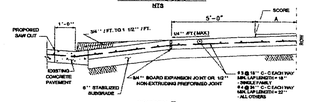
NTS



SECTION (A)

PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE WITH EXISTING SIDEWALK

NTS



SECTION (B)

TYPICAL DRIVEWAY SECTION

NTS



SECTION (C)

TYPICAL SIDEWALK SECTION

NTS

NOTES

1. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FEET WIDE SIDEWALK.
2. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" THICK FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)
3. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5-1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. 6X6-W2.9 X W2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL.
5. EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALKS SHALL BE ACCORDING TO DRAWING NO. 02752-02.
6. REFER CHAPTER 10 DESIGN REQUIREMENTS FOR A AND B.

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
DRIVEWAY DETAIL WITH 6" CURBED STREETS	
(NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02754-01B

SES HORIZON
CONSULTING ENGINEERS, INC.
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
LICENSED
PROFESSIONAL ENGINEER
04-09-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STREET & BRIDGE DETAILS

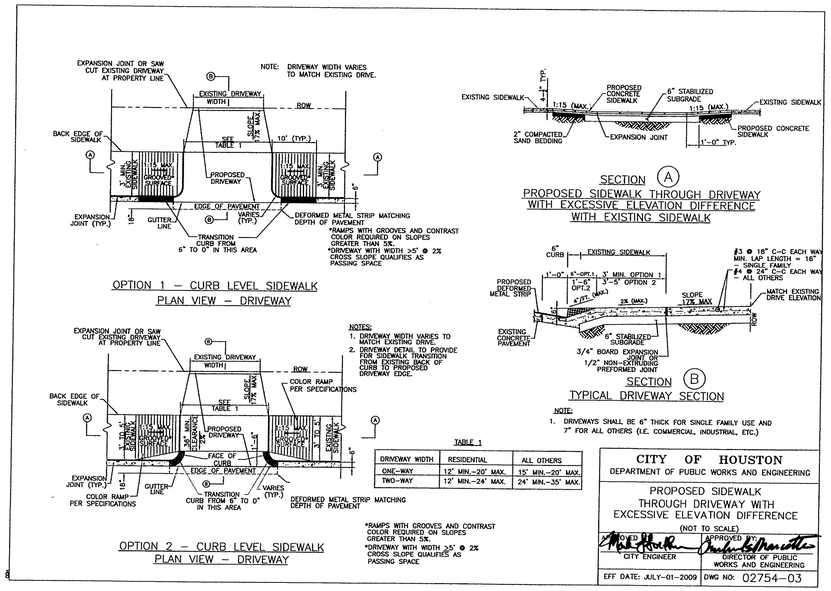
2 OF 4

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 169 OF 191	

PUBLIC WORKS & ENGINEERING
49210
CITY OF HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 3:01:32 PM
FILE NAME: F:\WHB-SG4\CAD\STD\STREET & BRIDGE DETAILS.DWG

FOR REDUCED PLANS
original scale in inches



OPTION 1 – CURB LEVEL SIDEWALK
PLAN VIEW – DRIVEWAY

OPTION 2 – CURB LEVEL SIDEWALK
PLAN VIEW – DRIVEWAY

NOTES:
1. DRIVEWAY WIDTH VARIES TO MATCH EXISTING DRIVE.
2. DRIVEWAY DETAIL TO PROVIDE FOR SIDEWALK TRANSITION FROM EXISTING BACK OF CURB TO PROPOSED DRIVEWAY EDGE.

*RAMPS WITH GROOVES AND CONTRAST COLOR REQUIRED ON SLOPES GREATER THAN 5%.
*DRIVEWAY WITH WIDTH >5' @ 2% CROSS SLOPE QUALIFIES AS PASSING SPACE

TABLE 1

DRIVEWAY WIDTH	RESIDENTIAL	ALL OTHERS
ONE–WAY	12' MIN.–20' MAX.	15' MIN.–20' MAX.
TWO–WAY	12' MIN.–24' MAX.	24' MIN.–35' MAX.

SECTION (A)
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE WITH EXISTING SIDEWALK

SECTION (B)
TYPICAL DRIVEWAY SECTION

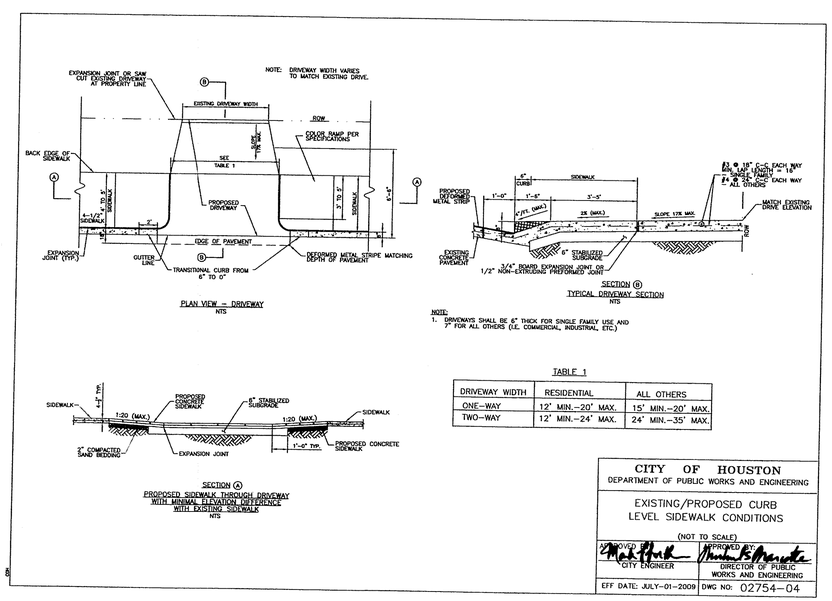
NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY–01–2009	DWG NO: 02754–03



PLAN VIEW – DRIVEWAY
NTS

SECTION (B)
TYPICAL DRIVEWAY SECTION
NTS

NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

TABLE 1

DRIVEWAY WIDTH	RESIDENTIAL	ALL OTHERS
ONE–WAY	12' MIN.–20' MAX.	15' MIN.–20' MAX.
TWO–WAY	12' MIN.–24' MAX.	24' MIN.–35' MAX.

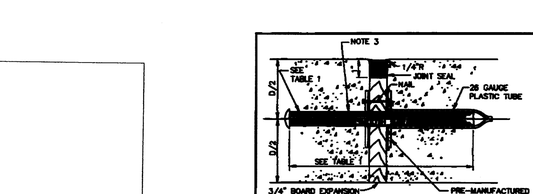
SECTION (A)
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH MINIMAL ELEVATION DIFFERENCE WITH EXISTING SIDEWALK
NTS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

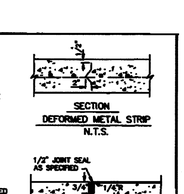
EXISTING/PROPOSED CURB LEVEL SIDEWALK CONDITIONS

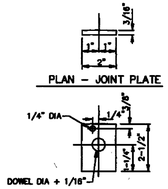
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY–01–2009	DWG NO: 02754–04



SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S





NOTES:
1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS. UNITS TO BE SPACED ON 12" CENTERS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE BASE. EXTEND THICKENED CONCRETE AS NEEDED TO MAINTAIN 3" MIN. COVER.
5. CITY OF HOUSTON APPROVED PRODUCTS MAY BE USED AS JOINT PLATE ALTERNATIVE

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
6	3/4	18	12
7	1	18	12
8	1	18	12
9	1 1/4	18	12
10	1 1/4	18	12
11	1 1/4	18	12
12	1 1/4	18	12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

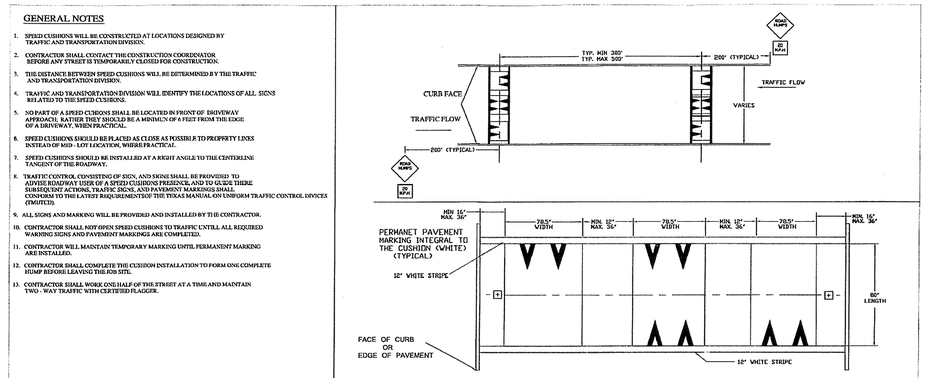
PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: June–01–2003 DWG NO: 02752–01

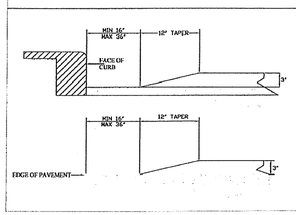
GENERAL NOTES

1. SPEED CUSHIONS WILL BE CONSTRUCTED AT LOCATIONS DESIGNED BY TRAFFIC AND TRANSPORTATION DIVISION.
2. CONTRACTOR SHALL CONTACT THE CONSTRUCTION COORDINATOR BEFORE ANY STREET IS TEMPORARILY CLOSED FOR CONSTRUCTION.
3. THE DISTANCE BETWEEN SPEED CUSHIONS WILL BE DETERMINED BY THE TRAFFIC AND TRANSPORTATION DIVISION.
4. TRAFFIC AND TRANSPORTATION DIVISION WILL IDENTIFY THE LOCATIONS OF ALL SIGNS RELATED TO THE SPED CUSHIONS.
5. NO PART OF A SPEED CUSHIONS SHALL BE LOCATED IN FRONT OF DRIVEWAY APPROACH; RATHER THEY SHOULD BE A MINIMUM OF 6 FEET FROM THE EDGE OF A DRIVEWAY, WHEN PRACTICAL.
6. SPEED CUSHIONS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO PROPERTY LINES INSTEAD OF MID - LOT LOCATION, WHERE PRACTICAL.
7. SPEED CUSHIONS SHOULD BE INSTALLED AT A RIGHT ANGLE TO THE CENTERLINE TANGENT OF THE ROADWAY.
8. TRAFFIC CONTROL, CONSISTING OF SIGN, AND SWING SHALL BE PROVIDED TO ADVISE ROADWAY USER OF A SPEED CUSHIONS PRESENCE, AND TO GUIDE THERE SUBSEQUENT ACTIONS. TRAFFIC SIGNS, AND PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
9. ALL SIGNS AND MARKING WILL BE PROVIDED AND INSTALLED BY THE CONTRACTOR.
10. CONTRACTOR SHALL NOT OPEN SPEED CUSHIONS TO TRAFFIC UNTILL ALL REQUIRED WARNING SIGNS AND PAVEMENT MARKINGS ARE COMPLETED.
11. CONTRACTOR WILL MAINTAIN TEMPORARY MARKING UNTIL PERMANENT MARKING ARE INSTALLED.
12. CONTRACTOR SHALL COMPLETE THE CUSHION INSTALLATION TO FORM ONE COMPLETE HUMP BEFORE LEAVING THE JOB SITE.
13. CONTRACTOR SHALL WORK ONE HALF OF THE STREET AT A TIME AND MAINTAIN TWO - WAY TRAFFIC WITH CERTIFIED FLAGGER.



TYPICAL SPEED CUSHIONS ARRANGEMENT FOR A GIVEN PAVEMENT WIDTH

PAVEMENT WITH (FT)	No OF CUSHIONS	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)
26	3	18.5	78.5	19.5	78.5	19.5	78.5	18.5				
28	3	24.5	78.5	25.5	78.5	25.5	78.5	24.5				
30	3	30.5	78.5	31.5	78.5	31.5	78.5	30.5				
32	4	16	78.5	12.5	78.5	12.5	78.5	12.5	78.5	16		
34	4	18.5	78.5	19	78.5	19	78.5	19	78.5	18.5		
36	4	23.5	78.5	23.5	78.5	23.5	78.5	23.5	78.5	23.5		
38	4	28.5	78.5	28.5	78.5	28	78.5	28.5	78.5	28.5		
40	4	33	78.5	33	78.5	33.5	78.5	33	78.5	33		
42	5	18.5	78.5	18.5	78.5	18.5	78.5	18.5	78.5	18.5	78.5	18.5
44	5	22.5	78.5	22.5	78.5	22.5	78.5	22.5	78.5	22.5	78.5	22.5

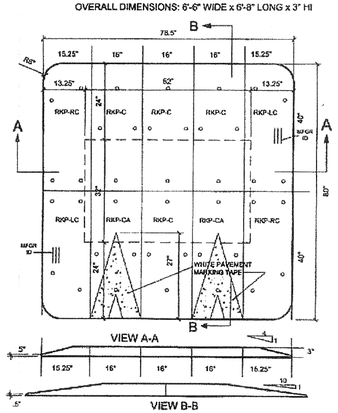


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SPEED CUSHIONS

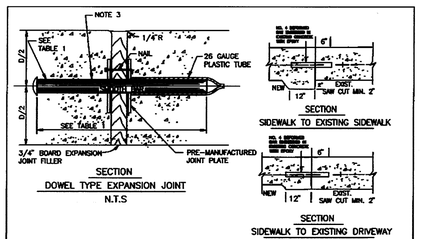
APPROVED BY: M.Y.E.	DWG No: 1 of 1
DESIGNED BY: J.B.	

ROAD KOP SPEED CUSHION
OVERALL DIMENSIONS: 6'-6" WIDE x 6'-9" LONG x 3" HI

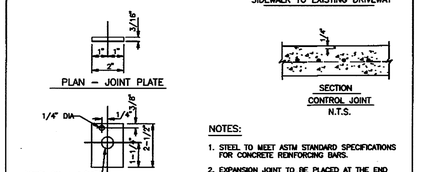


Material: 100% recycled rubber and polyurethane binder
Specifications: Tensile Strength: 500 psi (minimum)
Hardness: 65 Shore A (minimum)
Specific Gravity: 1.13
Skid Resistance: 89
Chemical Resistance: Impervious to engine oil, Transmission fluid, Road salts, Anti-freeze, Gasoline/diesel fuel

SPEED HUMP CUSHION
ROADKOP PREFORM SPEED CUSHION
WWW.ROADKARE.COM



SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S



NOTES:
1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 36' FEET. MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5' FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN 2" MIN. COVER.

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)
APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 DWG NO: 02752–02

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988–5504, Fax (713) 988–1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

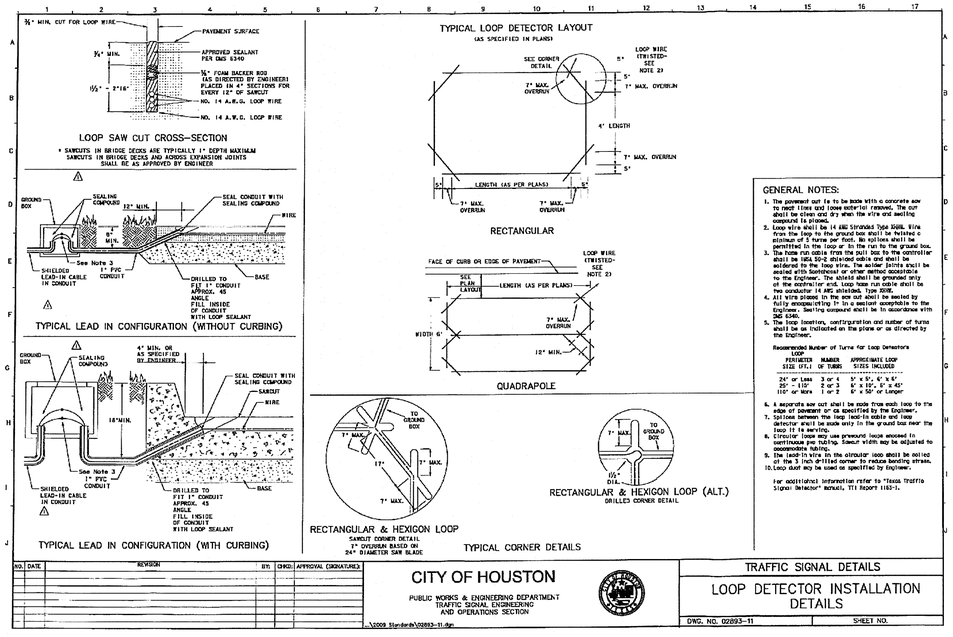
STREET & BRIDGE DETAILS

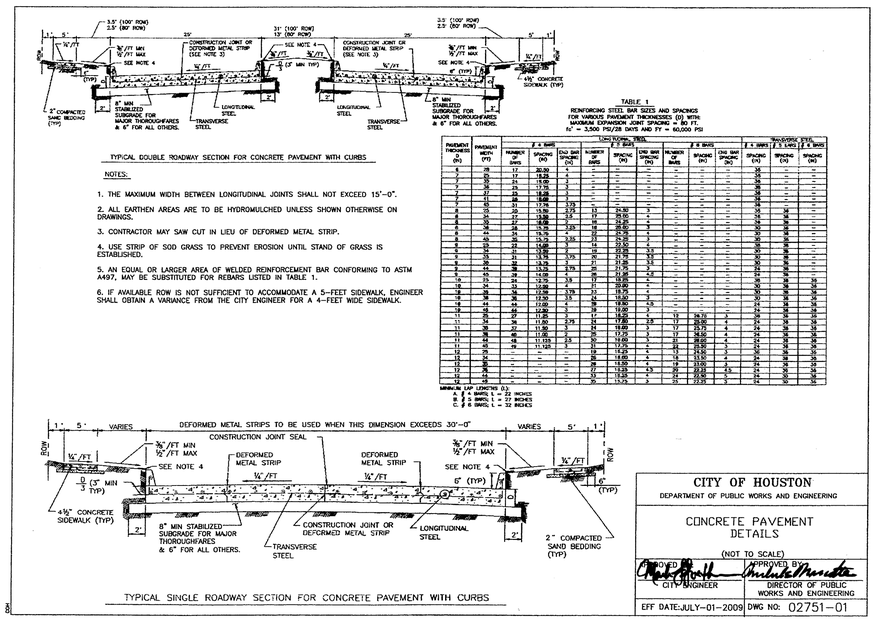
3 OF 4

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 170 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 3:02:12 PM
FILE NAME: F:\WHB–SG4\CAD\STD\STREET & BRIDGE DETAILS.DWG

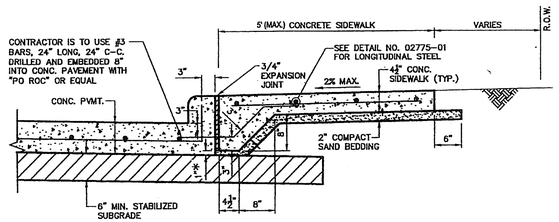




PAVEMENT THICKNESS T (in)	PAVEMENT WIDTH (ft)	Lane Rows: T ≤ 8.5in: NUMBER OF BARS	Lane Rows: T ≤ 8.5in: SPACING (in)	Lane Rows: 8.5in < T ≤ 10in: NUMBER OF BARS	Lane Rows: 8.5in < T ≤ 10in: SPACING (in)	Lane Rows: T > 10in: NUMBER OF BARS	Lane Rows: T > 10in: SPACING (in)	Transverse Steel: T ≤ 8.5in: END BAR SPACING (in)	Transverse Steel: T ≤ 8.5in: SPACING (in)	Transverse Steel: 8.5in < T ≤ 10in: END BAR SPACING (in)	Transverse Steel: 8.5in < T ≤ 10in: SPACING (in)	Transverse Steel: T > 10in: END BAR SPACING (in)	Transverse Steel: T > 10in: SPACING (in)
7	28	12	30.00	4	–	–	–	–	–	35	–	–	–
7	25	12	18.75	4	–	–	–	–	–	35	–	–	–
7	21	21	11.00	5	–	–	–	–	–	35	–	–	–
7	17	25	8.00	5	–	–	–	–	–	35	–	–	–
7	13	25	6.25	5	–	–	–	–	–	35	–	–	–
7	11	25	5.00	5	–	–	–	–	–	35	–	–	–
7	45	31	17.76	5.75	–	–	–	–	–	35	–	–	–
8	55	30	15.86	5.72	33	24.92	4	–	–	24	36	–	–
8	54	27	13.26	5.5	27	25.00	4	–	–	24	36	–	–
8	50	27	13.26	5	27	25.00	4	–	–	24	36	–	–
8	46	24	11.78	5.23	24	25.00	4	–	–	24	36	–	–
8	44	24	10.76	5	22	24.28	4	–	–	30	36	–	–
8	40	24	10.76	4.54	24	24.00	4	–	–	30	36	–	–
8	39	22	13.60	5	18	23.50	4	–	–	30	36	–	–
8	36	22	13.60	4.5	18	23.50	4.5	–	–	30	36	–	–
9	55	32	13.76	5.75	31	21.75	3.5	–	–	30	36	–	–
9	50	32	13.76	5.1	31	21.75	3	–	–	30	36	–	–
9	46	28	11.75	5.75	25	21.75	3	–	–	30	36	–	–
9	45	28	14.08	5	25	21.96	4.5	–	–	24	36	–	–
9	41	24	12.75	5.8	21	19.25	4	–	–	30	36	24	36
10	54	33	12.88	6	31	19.80	4	–	–	30	36	24	36
10	50	33	12.88	5.75	31	19.80	4	–	–	30	36	24	36
10	46	28	14.50	5.5	26	19.80	4	–	–	30	36	24	36
10	44	24	12.60	4	26	19.80	4.5	–	–	24	36	24	36
10	42	24	12.60	5	26	19.80	4	–	–	24	36	24	36
11	55	37	11.25	5	37	19.80	4	13	36	24	36	24	36
11	54	36	11.50	5.75	35	17.80	4.5	17	36.00	3	36	24	36
11	50	32	11.50	5	34	19.80	5	17	23.75	4	24	36	36
11	48	32	11.50	5.5	34	19.80	4	17	23.75	4	24	36	36
11	46	28	11.03	5.5	30	19.80	4	17	36.00	3	24	36	36
11	40	28	11.125	5	30	17.25	4	22	23.00	3	24	36	36
12	55	–	–	–	38	17.25	4	13	24.00	3	24	36	36
12	54	–	–	–	38	18.00	4	18	23.50	4	24	36	36
12	50	–	–	–	38	18.50	4	19	23.00	4	24	36	36
12	46	–	–	–	32	19.33	4.5	29	22.83	4.5	24	30	36
12	44	–	–	–	32	19.25	4	29	22.00	4	24	30	36
12	42	–	–	–	32	19.25	4	23	22.00	3	24	30	36

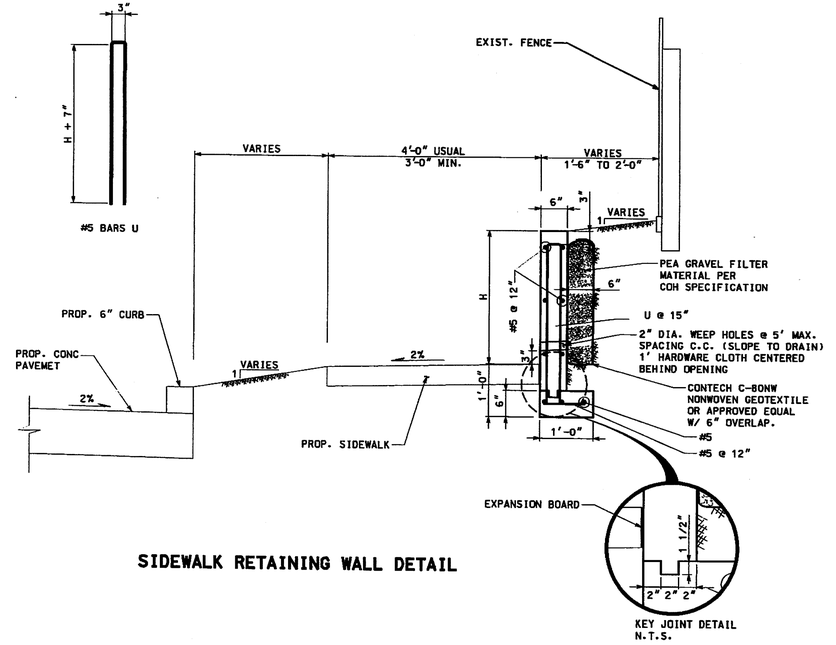
MINIMUM LAP LENGTHS (L):
A. If # 5 BARS, L = 22 INCHES
B. If # 6 BARS, L = 27 INCHES
C. If # 8 BARS, L = 32 INCHES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
CONCRETE PAVEMENT DETAILS
(NOT TO SCALE)
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE:JULY-01-2009 | DWG NO: 02751-01



SIDEWALK ON BACK OF CURB DETAIL
N.T.S.

* NOTE: FOR 6" PAVING, SIDEWALK FOOTER WILL SET DIRECTLY ON TOP OF SUBGRADE.



SIDEWALK RETAINING WALL DETAIL

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — EPIFANIO E. SALAZAR JR. — 67749 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STREET & BRIDGE DETAILS

4 OF 4

WBS NO.:M-000262-0004-4	CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	49210
CITY OF HOUSTON PM	CITY ENGINEER
ISAAC MUNIZ, E.I.T.	HOUSTON, TEXAS
SHEET NO. 171 OF 191	

FOR REDUCED PLANS original scale in inches

PLOTTED ON:Monday, April 09, 2012 3:02:41 PM
FILE NAME: F:\WHB-SG4\CAD\STD\STREET & BRIDGE DETAILS.DWG

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Monday, April 09, 2012 3:51:56 PM
FILE NAME: F:\WHB-SG4\CAD\STD\DRIVEWAY SCHEDULE.DWG

WHITEHEATHER SEGMENT IV
SCHEDULE OF DRIVEWAYS

BERAN DRIVE

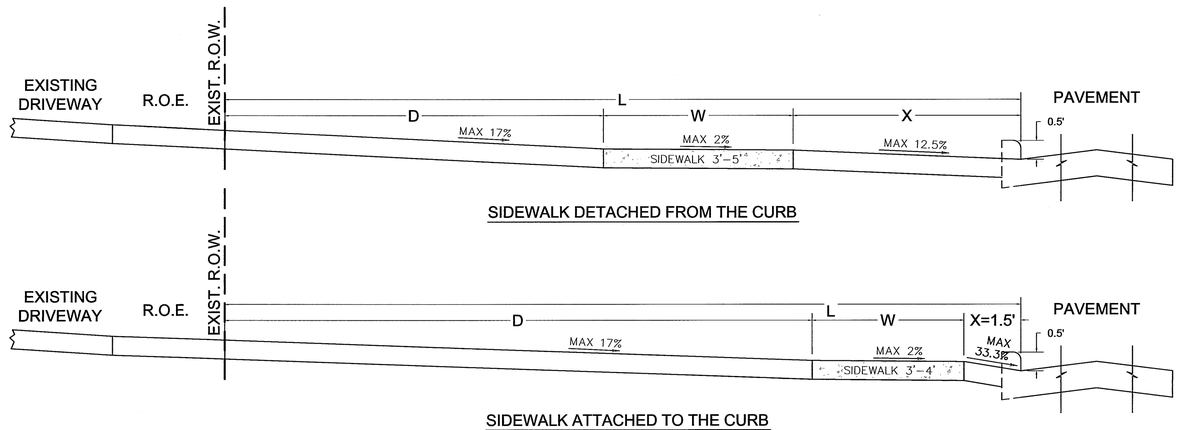
CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
+89.67		53.48	52.70	10.00	4.50	11.6%	4.00	2.0%	1.50	11.6%	-
	1+04.65	53.48	52.59	10.00	4.50	12.5%	4.00	2.0%	1.50	17.0%	-
1+65.92		53.38	52.17	16.50	11.00	9.7%	5.00	2.0%	0.50	9.7%	-
	1+69.32	53.46	52.16	16.50	11.00	10.5%	5.00	2.0%	0.50	10.5%	-
	2+34.30	53.09	51.94	16.50	11.00	9.1%	5.00	2.0%	0.50	9.1%	-
4+31.80		52.51	51.55	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	-
5+25.99		52.18	51.21	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	-
5+62.88		52.30	51.07	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.08
6+26.41		52.26	50.83	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.22
6+94.64		52.06	50.58	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.53
7+46.98		52.05	50.39	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	3.61
8+30.47		51.28	50.28	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	-
9+16.62		51.35	50.53	10.00	4.50	12.3%	4.00	2.0%	1.50	12.3%	-
9+53.87		51.50	50.65	10.00	4.50	12.5%	4.00	2.0%	1.50	17.0%	-
10+19.90		52.25	50.84	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.11
	10+53.23	52.43	50.94	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.58
10+82.64		52.44	51.03	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.12
11+49.37		52.50	51.23	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.30
12+12.73		52.65	51.42	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.06

EBBTIDE DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
1+97.54		52.97	52.04	16.50	5.00	7.2%	5.00	2.0%	6.50	7.2%	-
	1+99.31	53.14	52.04	16.50	5.00	8.7%	5.00	2.0%	6.50	8.7%	-
2+53.56		52.94	51.86	16.50	11.00	8.5%	5.00	2.0%	0.50	8.5%	-
	2+54.75	52.81	51.86	16.50	11.00	7.4%	5.00	2.0%	0.50	7.4%	-
	2+75.45	52.58	51.80	16.50	11.00	5.9%	5.00	2.0%	0.50	5.9%	-
3+33.97		52.53	51.61	16.50	11.00	7.2%	5.00	2.0%	0.50	7.2%	-
4+70.95		52.79	51.42	16.50	3.00	11.0%	5.00	2.0%	8.50	11.0%	-
	5+36.90	52.74	51.20	16.50	3.00	12.5%	5.00	2.0%	8.50	12.5%	-
5+39.18		52.53	51.20	16.50	3.00	10.7%	5.00	2.0%	8.50	10.7%	-
	6+02.83	52.59	50.99	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
6+02.99		52.67	50.98	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	6+67.64	52.49	50.77	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
6+67.92		52.38	50.77	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	7+32.72	52.44	50.56	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
7+32.87		52.38	50.56	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
7+97.49		52.18	50.46	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	7+97.91	51.92	50.46	16.50	3.00	11.8%	5.00	2.0%	8.50	11.8%	-
8+59.86		52.34	50.65	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	8+60.78	52.38	50.65	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	9+27.56	52.76	50.85	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
9+29.83		52.22	50.86	16.50	3.00	11.0%	5.00	2.0%	8.50	11.0%	-
9+91.41		52.39	51.04	16.50	3.00	10.9%	5.00	2.0%	8.50	10.9%	-
	9+92.69	52.76	51.04	16.50	3.00	12.5%	5.00	2.0%	8.50	17.0%	-
	10+54.52	52.72	51.23	16.50	3.00	12.1%	5.00	2.0%	8.50	12.1%	-
10+57.35		52.49	51.24	16.50	3.00	10.0%	5.00	2.0%	8.50	10.0%	-
	11+22.70	52.90	51.43	16.50	3.00	11.9%	5.00	2.0%	8.50	11.9%	-
11+62.76		52.76	51.55	16.50	3.00	9.6%	5.00	2.0%	8.50	9.6%	-
	11+86.89	53.04	51.63	16.50	3.00	11.4%	5.00	2.0%	8.50	11.4%	-
11+87.86		52.69	51.63	16.50	3.00	8.4%	5.00	2.0%	8.50	8.4%	-
	12+52.59	53.05	51.82	16.50	3.00	9.8%	5.00	2.0%	8.50	9.8%	-
12+56.04		53.11	51.83	16.50	3.00	10.2%	5.00	2.0%	8.50	10.2%	-
	13+17.77	53.25	52.02	16.50	3.00	9.8%	5.00	2.0%	8.50	9.8%	-
13+19.52		53.23	52.02	16.50	3.00	9.6%	5.00	2.0%	8.50	9.6%	-

KNOTTY OAKS TRAIL

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
+99.72		52.5	51.79	10.50	4.50	11.0%	5.00	2.0%	1.00	11.0%	-
	1+48.00	52.29	51.16	16.50	6.00	9.0%	5.00	2.0%	5.50	9.0%	-
	1+69.98	52.46	51.09	16.50	6.00	11.0%	5.00	2.0%	5.50	11.0%	-
1+92.01		52.63	51.02	16.50	6.00	12.5%	5.00	2.0%	5.50	17.0%	-
	2+50.23	52.14	50.85	16.50	6.00	10.4%	5.00	2.0%	5.50	10.4%	-
4+83.24		52.61	51.16	16.50	11.00	11.8%	5.00	2.0%	0.50	11.8%	-
	4+88.22	51.93	51.14	16.50	11.00	6.0%	5.00	2.0%	0.50	6.0%	-
5+64.83		52.63	50.89	16.50	11.00	12.5%	3.00	2.0%	2.50	12.5%	-
	5+66.18	52.14	50.88	16.50	11.00	10.1%	5.00	2.0%	0.50	10.1%	-
6+23.76		52.58	50.69	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	0.17
	6+32.87	52.08	50.66	16.50	11.00	11.5%	5.00	2.0%	0.50	11.5%	-
	6+96.55	52.05	50.45	16.50	11.00	12.1%	4.00	2.0%	1.50	12.1%	-
7+29.48		52.23	50.34	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	0.16
	7+61.29	51.99	50.24	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	-
7+92.35		52.05	50.14	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	0.32
8+30.98		51.98	50.13	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	-
	8+31.30	52.05	50.13	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	0.37
	8+93.03	52.07	50.31	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	-
9+24.11		52.10	50.41	16.50	11.00	12.5%	4.00	2.0%	1.50	17.0%	-
	9+57.45	52.08	50.51	16.50	11.00	11.9%	4.00	2.0%	1.50	11.9%	-
9+57.76		52.12	50.51	16.50	11.00	12.3%	4.00	2.0%	1.50	12.3%	-
10+21.18		52.24	50.70	16.50	11.00	12.5%	5.00	2.0%	0.50	17.0%	-
	10+21.49	52.33	50.70	16.50	11.00	12.4%	4.00	2.0%	1.50	12.4%	-
	10+86.04	52.57	50.89	16.50	11.00	12.5%	4.00	2.0%	1.50	17.0%	-
10+88.57		52.40	50.90	16.50	11.00	12.2%	5.00	2.0%	0.50	12.2%	-
	11+52.41	52.54	51.09	16.50	11.00	11.7%	5.00	2.0%	0.50	11.7%	-
11+53.28		52.70	51.09	16.50	11.00	12.2%	4.00	2.0%	1.50	12.2%	-
12+16.48		52.86	51.28	16.50	11.00	12.0%	4.00	2.0%	1.50	12.0%	-
	12+17.80	52.83	51.29	16.50	11.00	12.5%	5.00	2.0%	0.50	17.0%	-
	12+81.74	52.91	51.48	16.50	11.00	11.6%	5.00	2.0%	0.50	11.6%	-
12+83.51		52.85	51.48	16.50	11.00	11.0%	5.00	2.0%	0.50	11.0%	-



TIDEWATER DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
+99.69		53.44	51.73	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	3.88
	1+02.78	53.07	52.28	10.00	4.50	11.8%	4.00	2.0%	1.50	11.8%	-
1+67.55		52.94	51.33	16.50	11.00	12.3%	4.00	2.0%	1.50	12.3%	-
	2+01.40	52.92	51.17	16.50	11.00	12.5%	3.00	2.0%	2.50	12.5%	-
2+26.21		52.87	51.06	16.50	1.50	33.3%	4.00	2.0%	11.00	11.2%	-
	2+72.62	52.75	51.17	16.50	11.00	12.0%	4.00	2.0%	1.50	12.0%	-
2+84.24		53.04	51.23	16.50	1.50	33.3%	4.00	2.0%	11.00	11.2%	-
	5+57.59	53.12	51.84	16.50	11.00	10.3%	5.00	2.0%	0.50	10.3%	-
5+63.10		52.95	51.82	16.50	11.00	8.9%	5.00	2.0%	0.50	8.9%	-
	6+27.84	53.01	51.63	16.50	11.00	11.2%	5.00	2.0%	0.50	11.2%	-
6+36.05		54.10	51.60	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	3.75
	7+02.24	52.93	51.40	16.50	11.00	12.4%	5.00	2.0%	0.50	12.4%	-
7+03.13		53.00	51.40	16.50	11.00	12.2%	4.00	2.0%	1.50	12.2%	-
	7+65.84	52.90	51.21	16.50	11.00	12.5%	4.00	2.0%	1.50	17.0%	-
7+68.35		52.72	51.21	16.50	1.50	33.3%	4.00	2.0%	11.00	8.5%	-
	8+27.87	52.58	51.03	16.50	11.00	12.5%	5.00	2.0%	0.50	17.0%	-
8+33.84		53	51.01	16.50	1.50	33.3%	4.00	2.0%	11.00	12.8%	-
8+97.92		52.67	50.82	16.50	1.50	33.3%	4.00	2.0%	11.00	11.6%	-
	9+36.47	52.46	50.80	16.50	11.00	12.5%	4.00	2.0%	1.50	17.0%	-
9+63.43		52.59	50.88	16.50	1.50	33.3%	4.00	2.0%	11.00	10.2%	-
	9+64.25	52.52	50.89	16.50	11.00	12.4%	4.00	2.0%	1.50	12.4%	-
	10+26.47	52.85	51.08	16.50	11.00	12.5%	3.00	2.0%	2.50	17.0%	-
10+26.89		52.90	51.08	16.50	1.50	33.3%	4.00	2.0%	11.00	11.3%	-
	10+87.96	52.81	51.27	16.50	11.00	12.5%	5.00	2.0%	0.50	17.0%	-
10+89.77		53.03	51.28	16.50	1.50	33.3%	4.00	2.0%	11.00	10.7%	-
	11+55.88	53.12	51.48	16.50	11.00	12.5%	4.00	2.0%	1.50	12.5%	-
11+56.43		52.94	51.48	16.50	11.00	11.8%	5.00	2.0%	0.50	11.8%	-
12+21.71		53.12	51.69	16.50	11.00	11.6%	5.00	2.0%	0.50	11.6%	-
	12+31.41	53.00	51.72	16.50	11.00	10.3%	5.00	2.0%	0.50	10.3%	-

WUTHERING HEIGHTS DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
1+54.65		53.64	52.67	16.50	6.00	7.6%	5.00	2.0%	5.50	7.6%	-
	2+02.04	53.88	52.37	16.50	11.00	12.2%	5.00	2.0%	0.50	12.2%	-
	2+58.93	53.47	52.02	14.50	9.00	12.5%	4.00	2.0%	1.50	17.0%	-
	3+35.21	53.28	52.00	12.00	6.50	12.5%	3.00	2.0%	2.50	17.0%	-
	4+53.79	53.42	52.42	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	-
	6+87.06	53.34	52.43	10.00	4.50	12.2%	3.00	2.0%	2.50	12.2%	-
	7+60.03	53.39	52.16	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.10
	8+26.34	53.35	51.91	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.31
	8+90.36	52.93	51.67	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.23
	9+85.64	52.80	51.32	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.54
	10+25.61	53.04	51.26	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	4.28
	10+85.06	53.12	51.46	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	3.60
	11+49.71	52.99	51.67	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.58
	12+46.84	53.22	51.99	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	1.04
	12+86.07	53.30	52.12	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	0.75

LANDMARK DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
12+46.80		53.26	52.34	16.50	1.50	33.3%	4.00	2.0%	11.00	3.1%	-
13+51.23		53.97	52.66	16.50	1.50	33.3%	4.00	2.0%	11.00	6.7%	-
15+36.60		53.1	52.45	16.50	1.50	33.3%	4.00	2.0%	11.00	0.7%	-
19+09.03		53.48	52.89	16.50	1.50	33.3%	4.00	2.0%	11.00	0.1%	-
20+94.73		53.94	52.65	16.50	1.50	33.3%	4.00	2.0%	11.00	6.5%	-
21+56.90		53.80	52.83	16.50	1.50	33.3%	4.00	2.0%	11.00	3.5%	-

WEST OREM DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
9+47.07		51.8	51.53	10.00	2.50	3.4%	5.00	2.0%	2.50	3.4%	-

WHITEHEATHER DRIVE

CL.STATION LT	CL.STATION RT	ROW ELEV.	GUTTER ELEV.	LENGTH - L LF	X LF	OPTIMIZED SLOPE X	W - SIDEWALK LF	SLOPE W %	D - DRIVEWAY LF	OPTIMIZED SLOPE D	ROE LF
	2+43.53	51.19	50.64	16.50	4.50	3.9%	5.00	2.0%	7.00	3.9%	-
2+49.52		51.55	50.66	16.50	3.00	6.9%	5.00	2.0%	8.50	6.9%	-
2+87.50		51.64	50.77	16.50	3.00	6.7%	5.00	2.0%	8.50	6.7%	-
3+32.60		51.62	50.91	16.50	3.00	5.3%	5.00	2.0%	8.50	5.3%	-
	5+92.73	52.20	51.69	16.50	4.50	3.6%	5.00	2.0%	7.00	3.6%	-
	9+35.12	53.34	51.91	16.50	1.50	33.3%	4.00	2.0%	11.00	7.7%	-
	12+62.49	53.20	51.84	16.50	6.00	11.0%	5.00	2.0%	5.50	11.0%	-
12+70.37		53.09	51.86	16.50	6.00	9.8%	5.00	2.0%	5.50	9.8%	-
13+33.58		53.25	52.02	16.50	6.00	9.8%	5.00	2.0%	5.50	9.8%	-
	15+54.39	52.67	51.57	16.50	6.00	8.7%	5.00	2.0%	5.50	8.7%	-
	16+85.99	52.68	51.14	16.50	6.00	12.5%	5.00	2.0%	5.50	17.0%	-
18+63.09		52.72	51.26	16.50	6.00	11.8%	5.00	2.0%	5.50	11.8%	-
	18+81.48	52.66	51.32	16.50	0.50	7.4%	4.00	2.0%	12.00	7.4%	-
19+44.82		52.8	51.51	16.50	6.00	10.4%	5.00	2.0%	5.50	10.4%	-
	19+75.49	53.11	51.60	16.50	6.00	12.3%	5.00	2.0%	5.50	12.3%	-
	21+23.06	53.84	52.62	16.50	6.00	9.7%	5.00	2.0%	5.50	9.7%	-
21+43.13		52.68	52.41	16.50	6.00	1.5%	5.00	2.0%	5.50	1.5%	-
	22+14.00	54.02	52.90	16.50	6.00	8.9%	5.00	2.0%	5.50	8.9%	-
22+28.63		53.52	52.94	16.50	6.00	4.2%	5.00	2.0%	5.50	4.2%	-
32+06.31		54.1	52.67	10.00	4.50	12.5%	3.00	2.0%	2.50	17.0%	2.24

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

DRIVEWAY SCHEDULE & DETAILS

1 OF 1

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	PUBLIC WORKS AND ENGINEERING
DRAWING SCALE	
N.T.S.	49210
CITY OF HOUSTON PM	CITY NUMBER
ISAAC MUNIZ, E.I.T.	HOUSTON, TEXAS
SHEET NO. 172 OF 191	

FOR REDUCED PLANS
original scale in inches

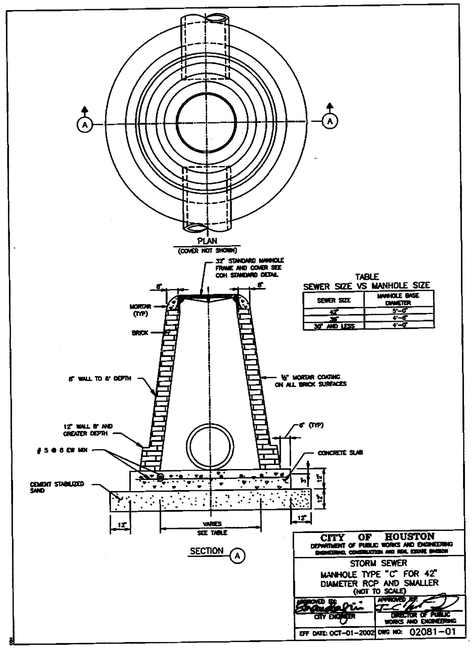


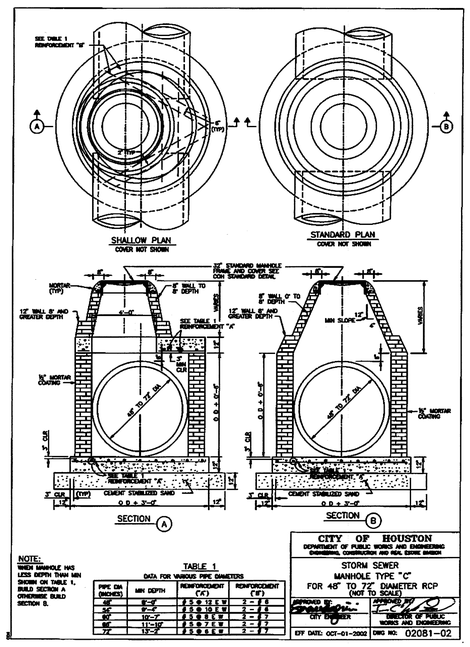
TABLE
SEWER SIZE VS MANHOLE SIZE

SEWER SIZE	MANHOLE BARE DIAMETER
42"	5'-0"
36"	4'-6"
30" AND LESS	4'-0"

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

STORM SEWER
MANHOLE TYPE "C" FOR 42"
DIAMETER RCP AND SMALLER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02081-01



NOTE:
WHEN MANHOLE HAS LESS DEPTH THAN MIN SHOWN ON TABLE 1, BUILD SECTION A OTHERWISE BUILD SECTION B.

TABLE 1
DATA FOR VARIOUS PIPE DIAMETERS

PIPE DIA (INCHES)	MIN DEPTH	REINFORCEMENT ("A")	REINFORCEMENT ("B")
48"	6'-0"	# 5 @ 12 C to C	2 - # 6
54"	6'-0"	# 5 @ 10 C to C	2 - # 6
60"	100'-0"	# 5 @ 8 C to C	2 - # 7
66"	111'-10"	# 5 @ 7 C to C	2 - # 7
72"	119'-0"	# 5 @ 6 C to C	2 - # 7

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

STORM SEWER
MANHOLE TYPE "C"
FOR 48" TO 72" DIAMETER RCP
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02081-02

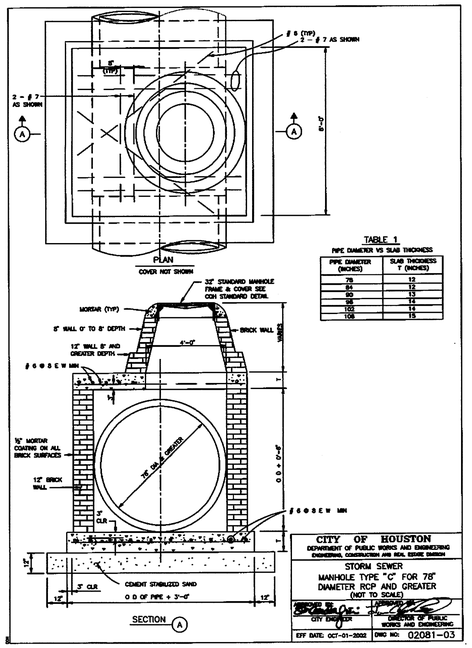


TABLE 1
PIPE DIAMETER VS SLAB THICKNESS

PIPE DIAMETER (INCHES)	SLAB THICKNESS T (INCHES)
78	12
84	12
90	13
96	14
102	14
108	15

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

STORM SEWER
MANHOLE TYPE "C" FOR 78"
DIAMETER RCP AND GREATER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02081-03

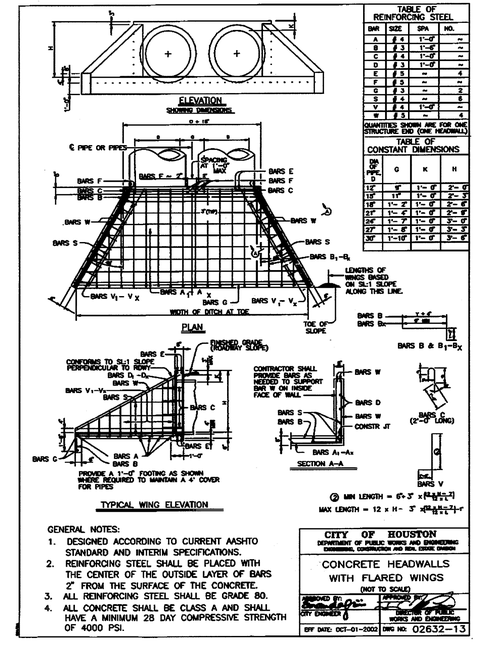


TABLE OF REINFORCING STEEL

BAR	SIZE	SPA	NO.
A	# 5	1'-0"	--
B	# 5	1'-0"	--
C	# 4	1'-0"	--
D	# 4	1'-0"	--
E	# 5	--	4
F	# 5	--	2
G	# 5	--	2
S	# 4	--	8
V	# 4	1'-0"	--
W	# 5	--	4

QUANTITIES SHOWN ARE FOR ONE STRUCTURE END (ONE HEADWALL)

TABLE OF CONSTANT DIMENSIONS

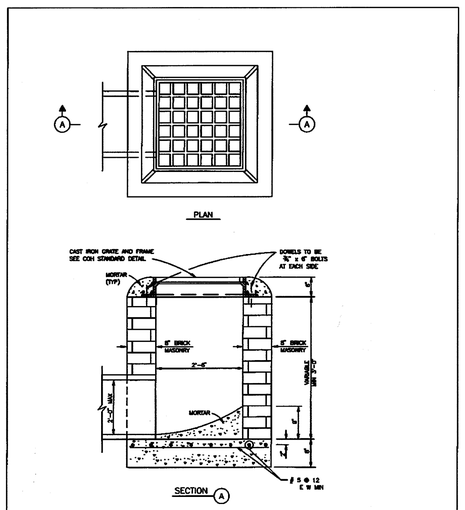
DIA OF PIPE D	G	K	H
12"	8"	1'-0"	2'-0"
15"	11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-5"	1'-0"	2'-9"
24"	1'-8"	1'-0"	3'-0"
27"	1'-11"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"

GENERAL NOTES:
1. DESIGNED ACCORDING TO CURRENT AASHTO STANDARD AND INTERIM SPECIFICATIONS.
2. REINFORCING STEEL SHALL BE PLACED WITH THE CENTER OF THE OUTSIDE LAYER OF BARS 2" FROM THE SURFACE OF THE CONCRETE.
3. ALL REINFORCING STEEL SHALL BE GRADE 80.
4. ALL CONCRETE SHALL BE CLASS A AND SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.

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

CONCRETE HEADWALLS
WITH FLARED WINGS
(NOT TO SCALE)

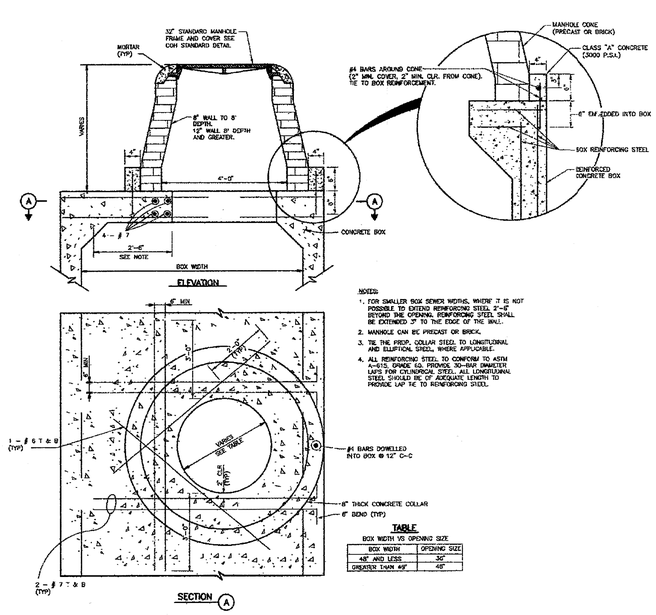
APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02632-13



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

STORM SEWER
TYPE "A" GRATE INLET
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02632-01

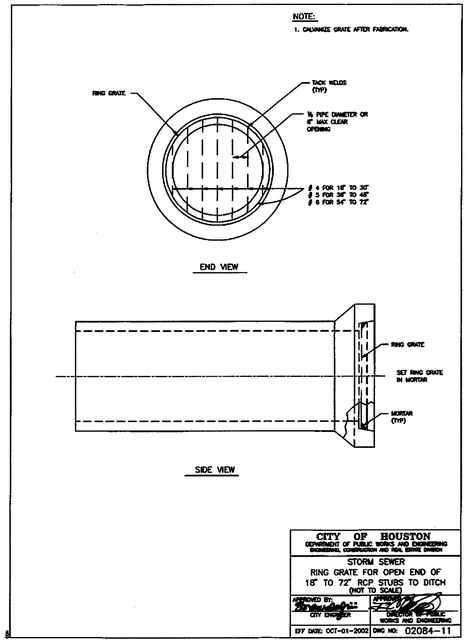


NOTES:
1. FOR SMALLER BOX SEWER WIDTHS, WHERE IT IS NOT POSSIBLE TO EXTEND REINFORCING STEEL 2'-6" BEYOND THE OPENING, REINFORCING STEEL SHALL BE EXTENDED 3" TO THE EDGE OF THE WALL.
2. MANHOLE CAN BE PRECAST OR BRICK.
3. TIE THE PROP. COLLAR STEEL TO LONGITUDINAL AND ELLIPTICAL STEEL, WHERE APPLICABLE.
4. ALL REINFORCING STEEL TO CONFORM TO ASTM A-615, GRADE 60. PROVIDE 30-BAR DIAMETER LAPS FOR CYLINDRICAL STEEL. ALL LONGITUDINAL STEEL SHOULD BE OF ADEQUATE LENGTH TO PROVIDE LAP TIE TO REINFORCING STEEL.

TABLE
BOX WIDTH VS OPENING SIZE

BOX WIDTH	OPENING SIZE
48" AND LESS	30"
GREATER THAN 48"	48"

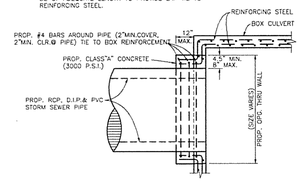
STORM SEWER MANHOLE FOR PROPOSED CONCRETE BOX SEWER
(REVISED CITY OF HOUSTON DETAIL NO. 02081-04)
(NOT TO SCALE)



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

STORM SEWER
RING GRATE FOR OPEN END OF
18" TO 72" RCP STUBS TO DITCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02084-11



NOTES:
1. HOLE CUT IN WALL OF BOX TO BE NEAT AND DONE IN A WORKMANLIKE MANNER.
2. TIE THE PROP. COLLAR STEEL TO LONGITUDINAL AND ELLIPTICAL STEEL, WHERE APPLICABLE.
3. ALL REINFORCING STEEL TO CONFORM TO ASTM A-615, GRADE 60. PROVIDE 30-BAR DIAMETER LAPS FOR CYLINDRICAL STEEL. ALL LONGITUDINAL STEEL SHOULD BE OF ADEQUATE LENGTH TO PROVIDE LAP TIE TO REINFORCING STEEL.

STORM SEWER/BOX CULVERT TIE-IN DETAIL
(NOT TO SCALE)

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
LICENSED PROFESSIONAL ENGINEER
04-08-2013

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

STORM SEWER DETAILS

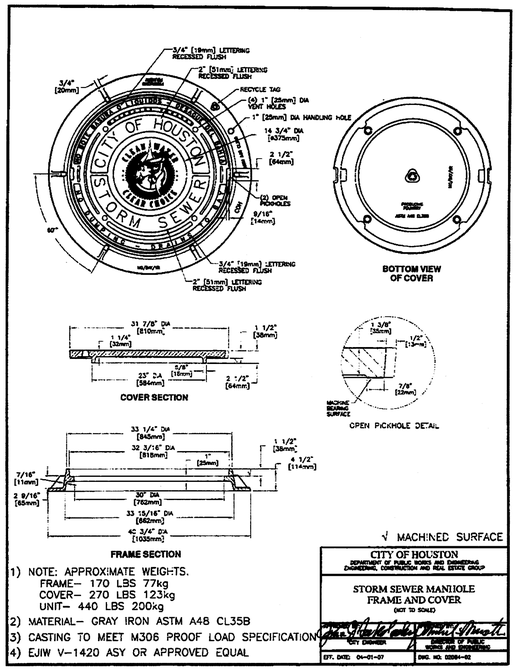
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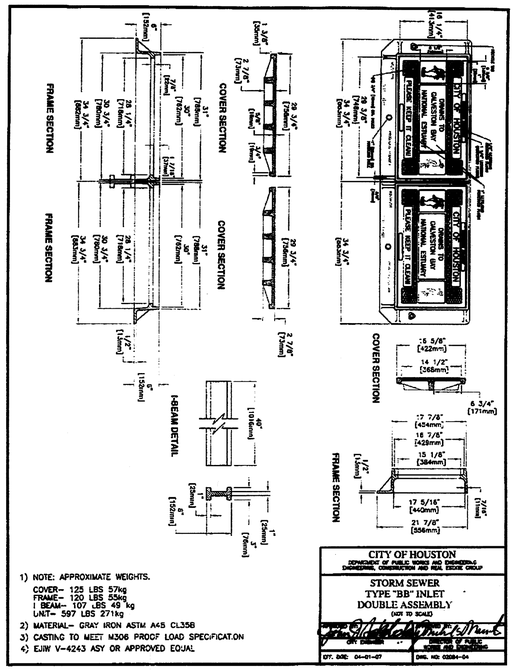
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 173 OF 191	

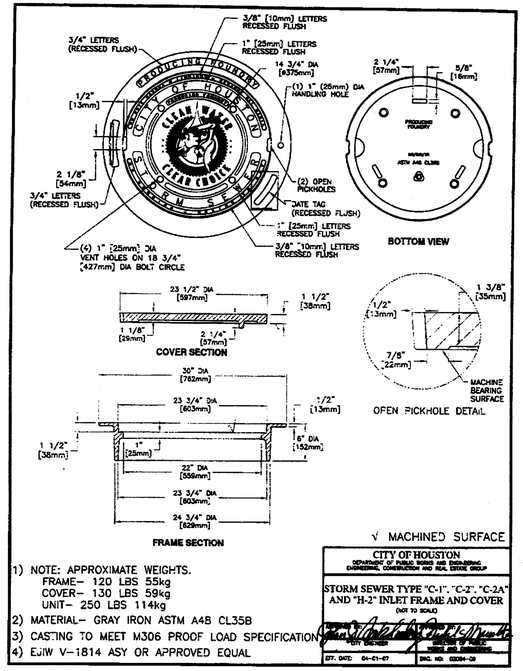
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49210
CITY NUMBER
HOUSTON, TEXAS

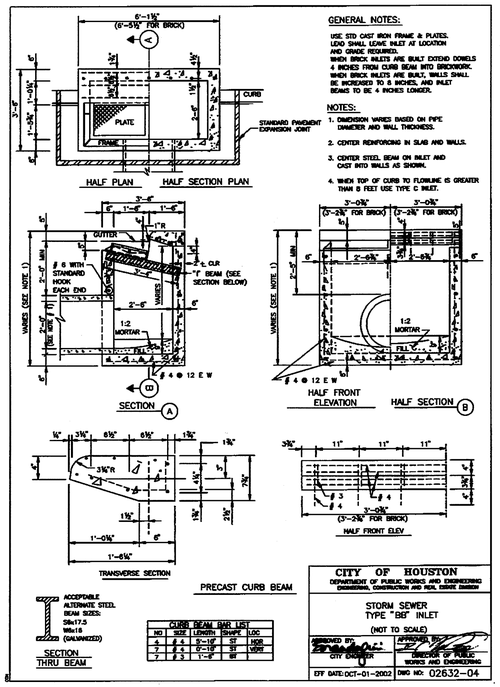
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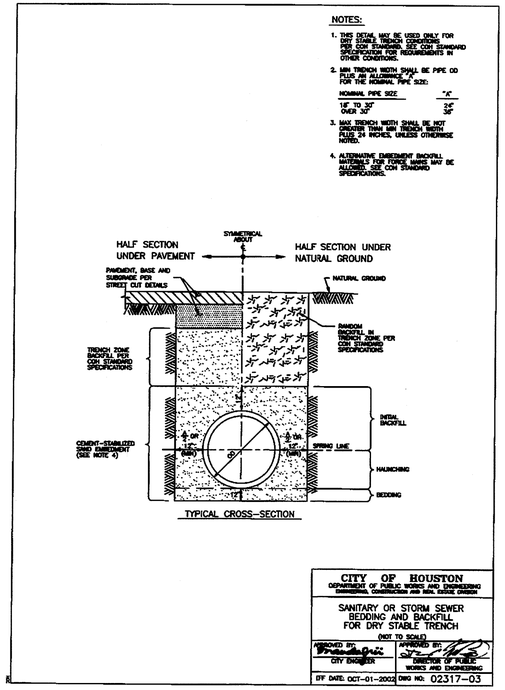
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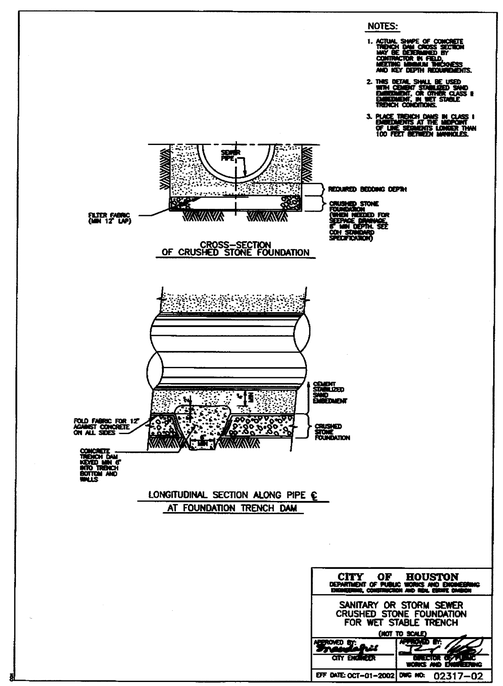












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TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STORM SEWER DETAILS

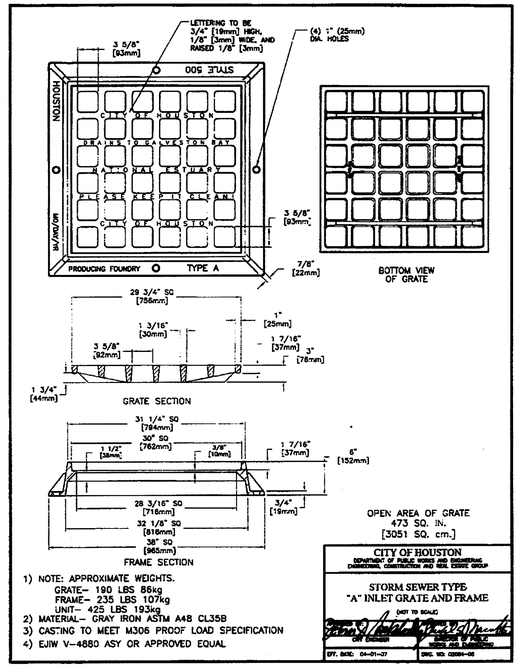
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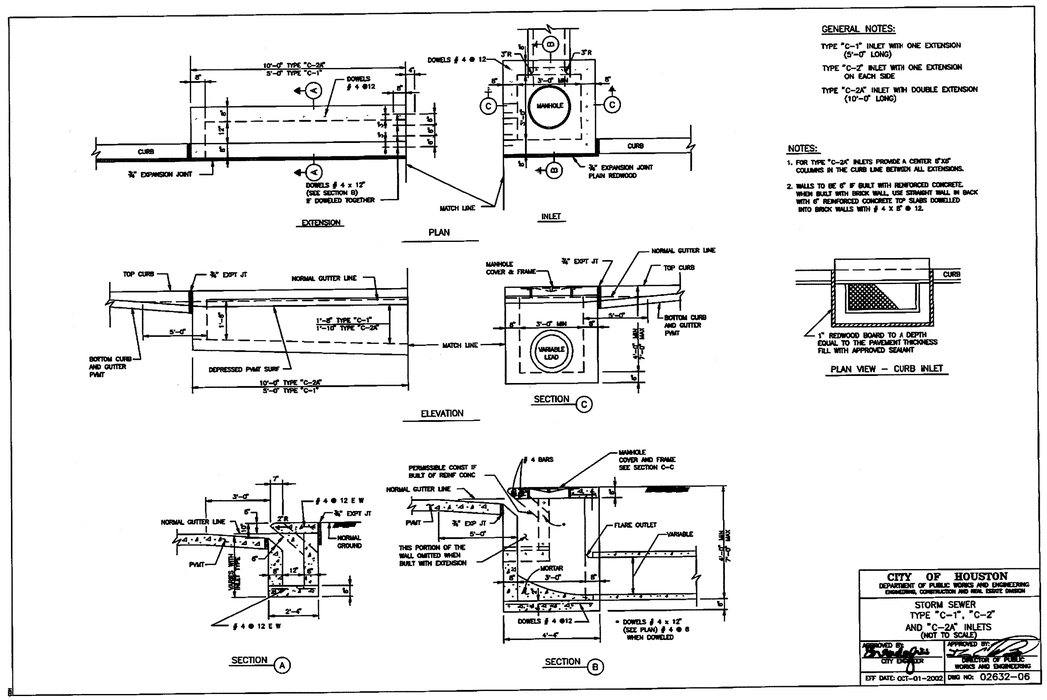
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ISAAC MUNIZ, E.I.T.	
SHEET NO. 174 OF 191	

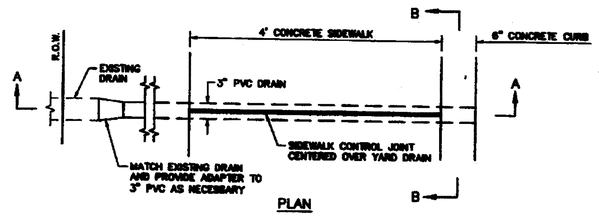
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HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches
0 1 2 3







PVC YARD DRAIN DETAIL

N.T.S.

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TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
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REGISTERED PROFESSIONAL ENGINEER
04-01-2012

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FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

STORM SEWER DETAILS

3 OF 3

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 175 OF 191	

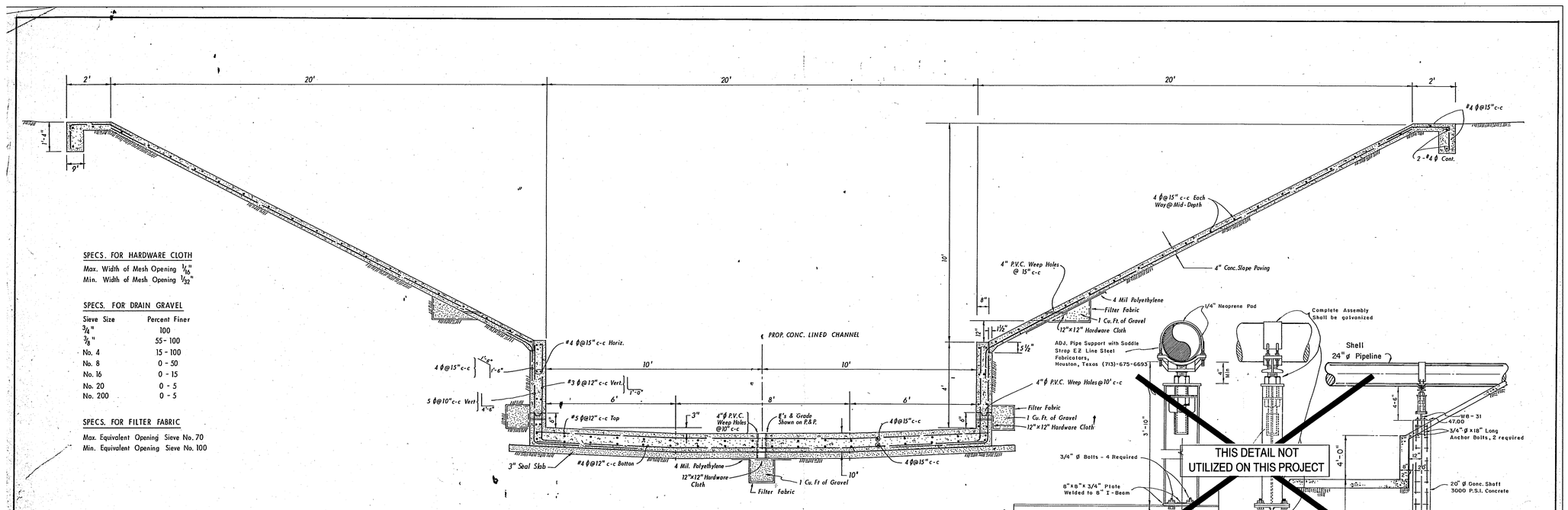
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REGISTERED
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HOUSTON, TEXAS

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FOR REDUCED PLANS
original scale in inches

HCFCD C146-00-00 CONCRETE SLOPE PAVING AND CONCRETE LOW FLOW CHANNEL CONSTRUCTION @ PROPOSED STORM SEWER OUTFALLS:

THE CONTRACTOR IS REQUIRED TO EXPOSE 24" OF ALL EXISTING REINFORCING STEEL OR USE 36" LENGTH HORIZONTAL DOWELS AT ALL SAWCUTS. THE CONTRACTOR IS REQUIRED TO UTILIZE THE SAME REBAR SIZES AND SPACINGS INDICATED ON PLAN SHEETS TITLED "LOW FLOW CHANNEL & SLOPE PAVING OUTFAL DETAILS". THE 36" DOWELS SHALL BE EMBEDDED 12" INTO THE CENTER OF THE EXISTING CONCRETE SLABS AND STRUCTURES WITH "PO ROC" OR AN APPROVED EQUAL. THE COSTS OF THE DOWELS ARE INCIDENTAL TO ALL OTHER PAY ITEMS.
THE CONCRETE DETAILS, WEEP HOLES, TOE WALLS, AND ALL JOINTS ARE INDICATED ON THE ABOVE REFERENCED PLAN SHEETS.



TYPICAL SECTION OF CONCRETE CHANNEL LINING
N.T.S.

SPECS. FOR HARDWARE CLOTH

Max. Width of Mesh Opening 1/16"
Min. Width of Mesh Opening 1/32"

SPECS. FOR DRAIN GRAVEL

Sieve Size	Percent Finer
3/4"	100
3/8"	55 - 100
No. 4	15 - 100
No. 8	0 - 50
No. 16	0 - 15
No. 20	0 - 5
No. 200	0 - 5

SPECS. FOR FILTER FABRIC

Max. Equivalent Opening Sieve No. 70
Min. Equivalent Opening Sieve No. 100

WHITEHEATHER
GENERAL CONSTRUCTION NOTES

EXCAVATION, FILL AND BACKFILL

1. Refer to foundation investigation "Geotechnical Investigation Whiteheather Ditch, Houston,Texas", Report No. 81-195, dated November 13, 1981 and it's supplements prepared by McBride-Ratcliff and Associates, Inc.
2. Dewatering may be required - See Specifications.
3. Design and construction of any temporary earth retainage system such as sheeting&oring, sheet piling, soldier piles, tie-backs, etc., are the responsibility of the Contractor.
4. Excavations for footings of retaining walls, bottom slabs of box culverts and bottom slabs of channel sections shall be scheduled to permit placement of concrete as rapidly as possible following excavation. Protect excavation to maintain an undisturbed bearing surface.

NOTE 5 REVISED

5. Backfill against retaining walls and box culverts shall be a select material having a plasticity index from 10 to 20. Backfill shall be placed in 8 inch lifts. Compaction of backfill to 12" above the top of culverts and retaining walls shall be compacted to a minimum of 90 percent and a maximum of 95 percent of Standard Proctor Maximum Dry Density (ASTM D698). Backfill above the level shall be compacted to 95 percent of ASTM D698. All backfill shall be compacted to the above densities at optimum moisture content. Existing soil backfill shall be compacted at 2 to 4 percent above optimum.
6. For all construction below grade, the Contractor shall take all necessary precautions as the situation may require to prevent differential earth or hydrostatic pressures on the structures or any of their components during construction. The pumping of water after flooding from various sections of the structures or the excavations shall be done with caution to prevent an un-pumped section causing hydrostatic pressures on a pumped section.
7. Backfilling against walls of box culverts shall proceed simultaneously on both sides of the culvert and care taken to limit the differential height of fill on each side of the culverts to 3' - 0" maximum. Backfilling to full height on one side of the culvert only will produce an unbalanced horizontal force that is not included in the culvert design.

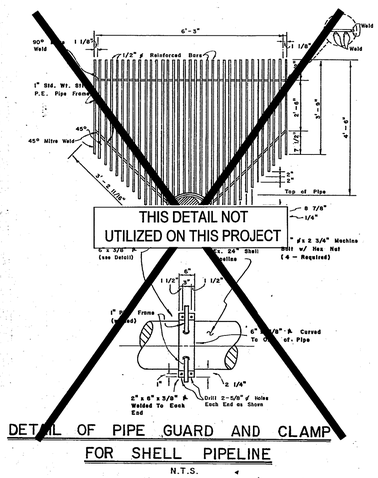
CAST-IN-PLACE CONCRETE

1. All concrete work shall be in accordance with building code requirements for reinforced concrete, ACI-318-77.
2. All concrete shall be Class A sand and gravel aggregate with a minimum 28 day compressive strength of 3000 PSI. Concrete for seal slabs shall have a minimum 28 day compressive strength of 2000 PSI.
3. Chamfer all exposed corners 3/4 inch.
4. Location of construction joints, expansion joints and control joints shall be submitted to the Engineer for review. No horizontal joints will be permitted unless indicated on the drawings.
5. Design and construction of formwork and shoring is the responsibility of the Contractor. Shoring and reshoring shall not be removed until the concrete is of such strength to support itself and all superimposed construction loading.
6. Filter cloth at weep holes shall be Mirafi 500 X or equal. Substitutions shall be submitted to the Engineer for approval.

REINFORCING STEEL

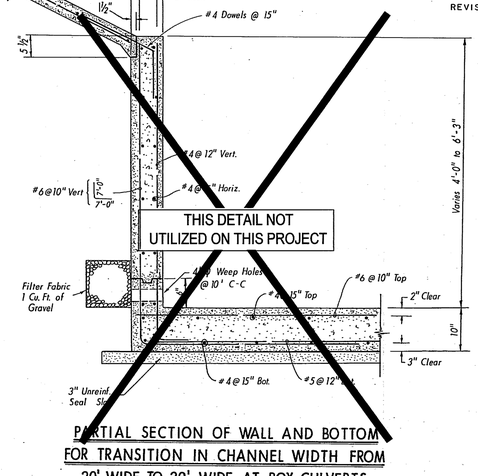
1. All reinforcing steel shall conform to ASTM A615, Grade 60, except # 3 and # 4 bars which are bent (such as stirrups, ties, and dowels) may be Grade 40. Welded wire fabric shall conform to ASTM A185.
2. Detailing of reinforcing steel shall be in accordance with the Manual of Standard Practice, ACI 315-74. Unless shown otherwise, lap continuous bars 24 diameters at splices. When splices are required in continuous beam reinforcing, top bars shall be spliced 24 bar diameters at midspan only and bottom bars shall be spliced 12 inches over supports only. Lap welded wire fabric one mesh at splices.
3. Horizontal wall steel shall be continuous at corners with 24 bar diameter returns or use corner bars to match horizontal steel x 48 bar diameters long. Provide 1-#4 x 4' - 0" diagonal bar in top of slab at all reentrant corners.
4. At slabs cast on grade, provide bar chairs with 3" x 6" x 20 gage plate feet at 4' - 0" on center maximum each way for support of reinforcing. Depth of chairs shall provide the reinforcing location shown on the drawings.
5. Unless shown otherwise, concrete cover for reinforcing steel shall be as follows:

Footings	3"
Formed slabs	2" top 2" bottom
Slabs poured against earth	2" top 3" bottom
Walls	2"



DETAIL OF PIPE GUARD AND CLAMP FOR SHELL PIPELINE
N.T.S.

DETAIL OF PIPE SUPPORTS FOR SHELL PIPELINE
N.T.S.
REVISED: JANUARY 12, 1983



PARTIAL SECTION OF WALL AND BOTTOM FOR TRANSITION IN CHANNEL WIDTH FROM 20' WIDE TO 29' WIDE AT BOX CULVERTS
N.T.S.

7/6/83

DAVID C. RISNIETS JR. 67749 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS
David C. Risniets

WHITEHEATHER DITCH FROM SIMS BAYOU TO WUTHERING HEIGHTS

CALVIN J. MORGAN & ASSOC., INC.
CIVIL ENGINEERS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS

APPROVALS
WATER SERVICE — WATER DIST. — 11/19/82
WATER QUALITY — STORM SEWERS — 11-22-82 — 11/19/82
ASSISTANT DIRECTOR - WATER DIV. — SANITARY SEWER
CHIEF ENG. - SEWER DIV.
OTHER DEPT'S.
TRAFFIC & TRANSPORTATION DEPT. — SITE PLANNING DEPT.
ASST. DIRECTOR OF PUBLIC WORKS — DIRECTOR OF PUBLIC WORKS

SUBMITTED: C.J.M. — DESIGNED BY: W.B.S.
SCALE: As Shown — DRAWN BY: F.A.O.
DATE: — CHECKED BY: W.B.S.
SURV. BY: — FILE: F-B-E-2-S-2-A2
W.B. DWG. NO. — P.W. DWG. NO. 27013

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

STATE OF TEXAS EPIFANIO E. SALAZAR JR. 92749 REGISTERED PROFESSIONAL ENGINEER 6-29-2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

LOW FLOW CHANNEL & SLOPE PAVING OUTFALL DETAILS

1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG. NO.:
FILE NO.: SM5056	
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N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 176 OF 191	

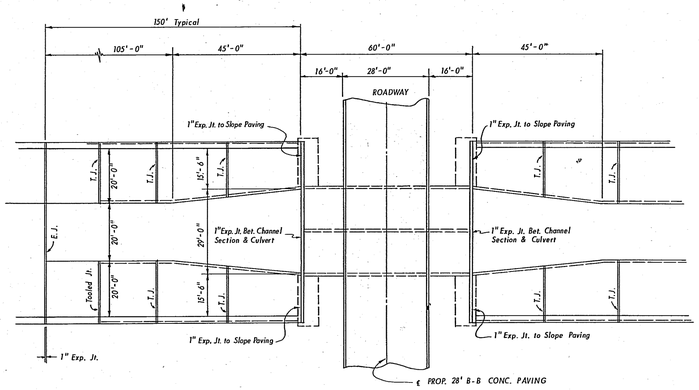
CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

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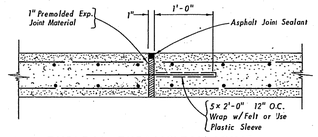
FOR REDUCED PLANS
original scale in inches

HCFCD C146-00-00 CONCRETE SLOPE PAVING AND CONCRETE LOW FLOW CHANNEL CONSTRUCTION @ PROPOSED STORM SEWER OUTFALLS:

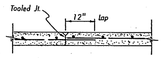
THE CONTRACTOR IS REQUIRED TO EXPOSE 24" OF ALL EXISTING REINFORCING STEEL OR USE 36" LENGTH HORIZONTAL DOWELS AT ALL SAWCUTS. THE CONTRACTOR IS REQUIRED TO UTILIZE THE SAME REBAR SIZES AND SPACINGS INDICATED ON PLAN SHEETS TITLED "LOW FLOW CHANNEL & SLOPE PAVING OUTFAL DETAILS". THE 36" DOWELS SHALL BE EMBEDDED 12" INTO THE CENTER OF THE EXISTING CONCRETE SLABS AND STRUCTURES WITH "PO ROC" OR AN APPROVED EQUAL. THE COSTS OF THE DOWELS ARE INCIDENTAL TO ALL OTHER PAY ITEMS.
THE CONCRETE DETAILS, WEEP HOLES, TOE WALLS, AND ALL JOINTS ARE INDICATED ON THE ABOVE REFERENCED PLAN SHEETS.



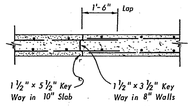
TYPICAL PLAN VIEW OF BOX CULVERT & JOINTS
N.T.S.



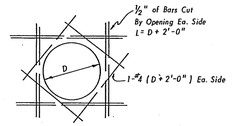
TYPICAL EXPANSION JOINT CHANNEL SECTION MAXIMUM SPACING 150'
N.T.S.



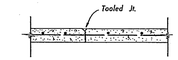
SLOPE PAVING CONSTRUCTION JOINT - SPACE AT 100'
N.T.S.



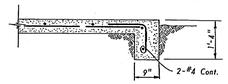
TYPICAL CONSTRUCTION JOINT WALL AND SLAB MAXIMUM SPACING 25'-0"
N.T.S.



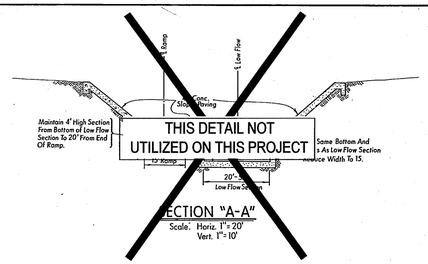
TYPICAL OPENING DETAIL
N.T.S.



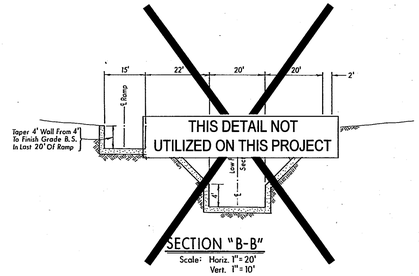
SLOPE PAVING CONTROL JOINT MAX. SPACING 25'
N.T.S.



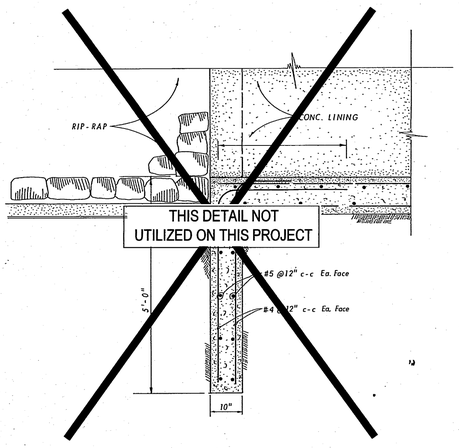
SLOPE PAVING END BEAM
N.T.S.



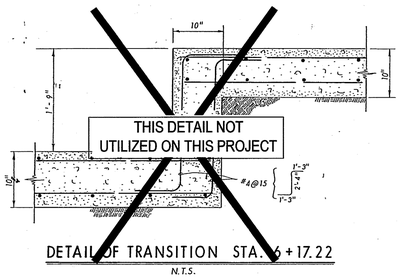
SECTION "A-A"
Scale: Horiz. 1"=20'
Vert. 1"=10'



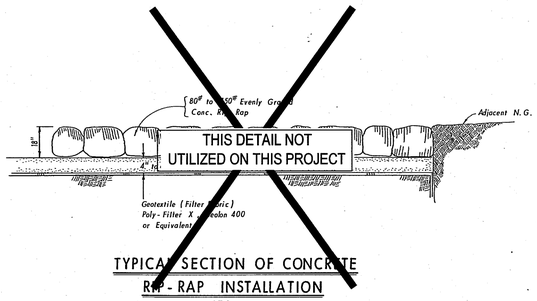
SECTION "B-B"
Scale: Horiz. 1"=20'
Vert. 1"=10'



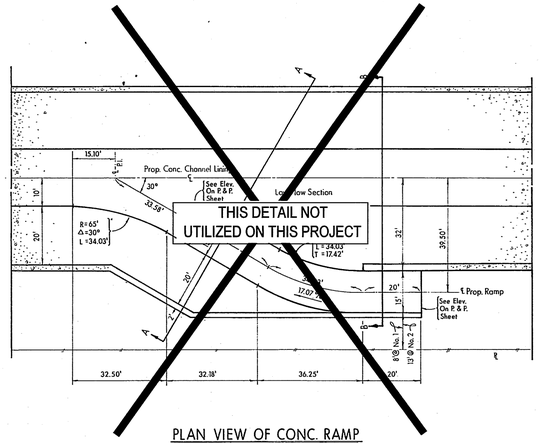
TYPICAL SECTION OF TOE WALL AT STATION 1+50
N.T.S.



DETAIL OF TRANSITION STA. 16+17.22
N.T.S.



TYPICAL SECTION OF CONCRETE RIP-RAP INSTALLATION
N.T.S.



PLAN VIEW OF CONC. RAMP TO CONC. LOW FLOW SECTION
Scale: 1"=20'

DAVID C. RIENETS JR. 61342 REGISTERED PROFESSIONAL ENGINEER

David C. Rienets Jr.

WHITEHEATHER DITCH FROM SIMS BAYOU TO WUTHERING HEIGHTS

CALVIN J. MORGAN & ASSOC., INC.
CIVIL ENGINEERS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS

APPROVALS
D. A. Jobe 11-21-12 — WATER SEWER
Matt Fu 11/9/12 — STORM SEWER
Stephen Morgan 11/6/12 — WATER QUALITY
Vishwa Bala — ASSISTANT DIRECTOR-WASTEWATER
CHIEF ENG.-SEWER DIV.
Phil Wilson — CHIEF ENG.-WATER DIV.
OTHER DEPT'S.
B. Bendik Weston — TRAFFIC & TRANSPORTATION DEPT.
CITY PLANNING DEPT.
ASST. DIRECTOR OF PUBLIC WORKS
DIRECTOR OF PUBLIC WORKS

SUBMITTED: C.J.M.
DESIGNED BY:
SCALE: As Shown
DRAWN BY: F.A.G.
DATE:
SHEET 10 OF 20 SHEETS
SURV. BY:
F.B. & P.G.
W.D. DWG. NO.
P.W. DWG. NO. 2705

11/25/13

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS EPIFANIO E. SALAZAR JR. 67749 REGISTERED PROFESSIONAL ENGINEER 04-30-2013

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

LOW FLOW CHANNEL & SLOPE PAVING OUTFALL DETAILS

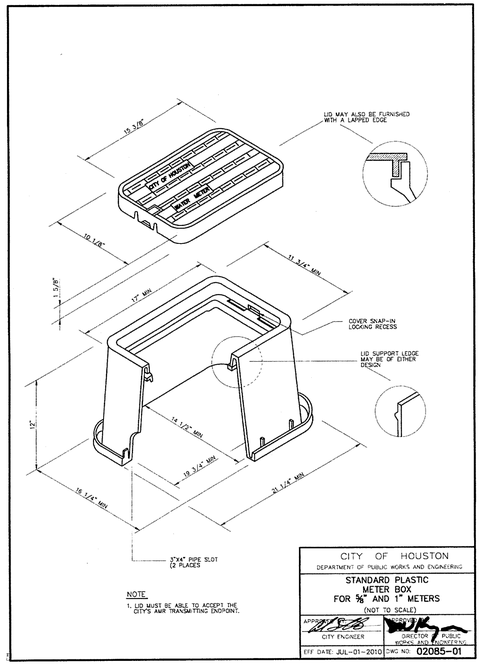
2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 177 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING REVIEWED 49210 CII NUMBER HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 1:29:09 PM
FILE NAME: F:\WHB-SG4\CAD\STD\LOW FLOW CHANNEL OUTFALL DETAILS.DWG

FOR REDUCED PLANS
original scale in inches

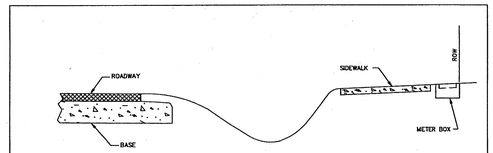


NOTE
1. LID MUST BE ABLE TO ACCEPT THE CITY'S AMR TRANSMITTING ENDPOINT.

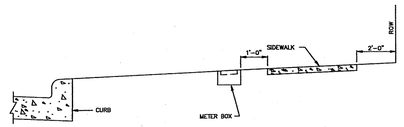
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PLASTIC METER BOX FOR 5/8" AND 1" METERS
(NOT TO SCALE)

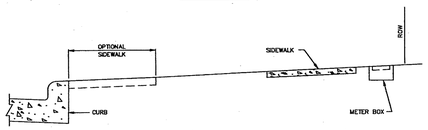
APPROVED: CITY ENGINEER | APPROVED: DIRECTOR PUBLIC WORKS AND ENGINEERING
EFF. DATE: JUL-01-2010 | DWG NO: 02085-01



OPEN DITCH STREET



CURB STREET

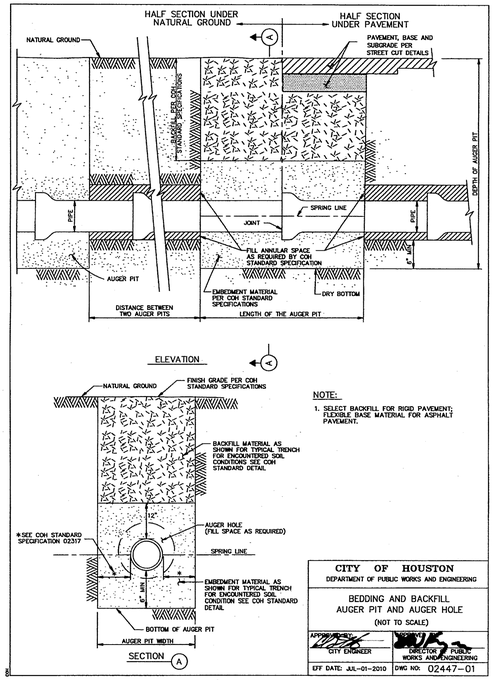


CURB STREET

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LOCATION OF WATER METER BOX FOR 2" DIAMETER AND LESS

APPROVED: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 | DWG NO: 02085-02

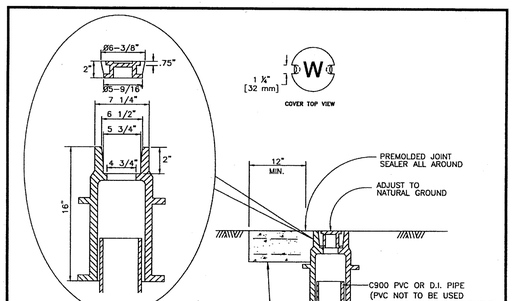


NOTE:
1. SELECT BACKFILL FOR RIGID PAVEMENT; FLEXIBLE BASE MATERIAL FOR ASPHALT PAVEMENT.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

BEDDING AND BACKFILL AUGER PIT AND AUGER HOLE
(NOT TO SCALE)

APPROVED: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 | DWG NO: 02447-01

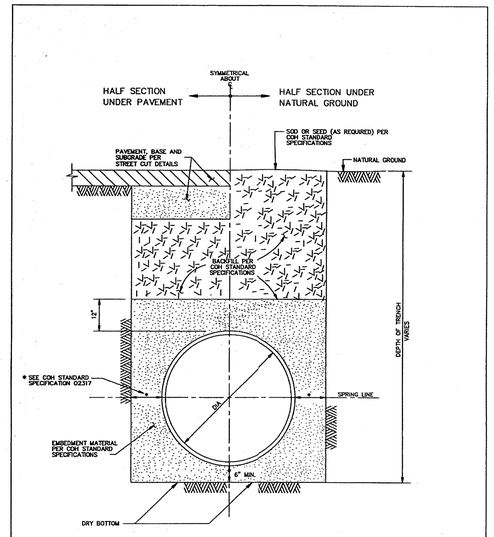


NOTE:
1) APPROXIMATE WEIGHTS
FRAME – 46 LBS
COVER – 10 LBS
2) MATERIAL – GRAY IRON ASTM A48 CL35B

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

VALVE BOX DETAIL
(NOT TO SCALE)

APPROVED: CITY ENGINEER | APPROVED: DIRECTOR PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY 01, 2010 | DWG. NO. 02085-03

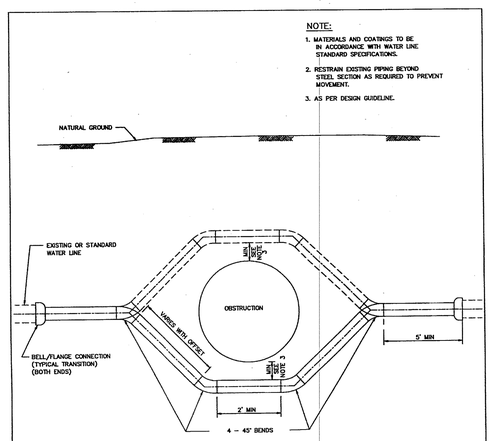


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER DISTRIBUTION MAIN BEDDING AND BACKFILL FOR OPEN CUT TRENCHES
(NOT TO SCALE)

APPROVED: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 | DWG NO: 02317-04

NOTE:
1. MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH WATER LINE STANDARD SPECIFICATIONS.
2. RESTRAIN EXISTING PIPING BEYOND STEEL SECTION AS REQUIRED TO PREVENT MOVEMENT.
3. AS PER DESIGN GUIDELINE.



PIPE OFFSET ALTERNATES

1. DUCTILE IRON PIPE PRESSURE 250 PSI WITH APPROVED RESTRAINED JOINTS.
2. PVC PIPE WITH INTEGRAL RESTRAINED JOINT SYSTEM, OR DUCTILE – IRON RESTRINED JOINT FITTINGS, EPOXY LINED AND COATED. USE 250 PSI AWWA C900 OR 14 FOR PVC RESTRAINED JOINTS.
3. PVC NOT ALLOWED FOR GREATER THAN 20 FT. OF COVER OR FOR DIAMETER LARGER THAN 20 IN.
4. USE ONLY DUCTILE IRON AND PVC PRODUCTS LISTED ON OCE DIVISION APPROVED PRODUCTS LIST AND IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES
(NOT TO SCALE)

APPROVED: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 | DWG NO: 02511-01

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
04-30-12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WATER DETAILS

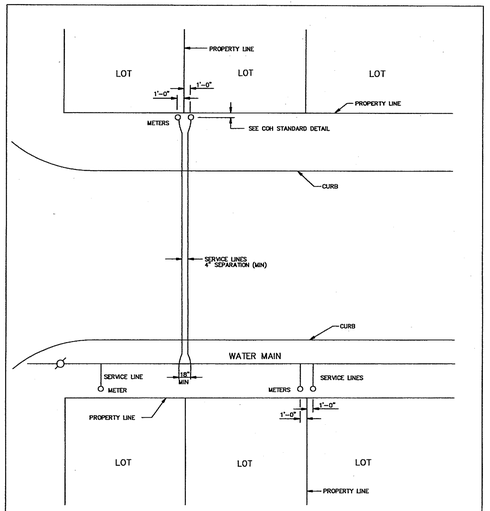
1 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 178 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Monday, April 09, 2012 1:10:47 PM
FILE NAME: F:\WHB-SG4\CAD\STD\WATER DETAILS.DWG

FOR REDUCED PLANS
original scale in inches



GENERAL NOTES:

1. TWO SERVICE LINES MAY BE INSTALLED IN SAME TRENCH PROVIDING 4" CLEARANCE IS MAINTAINED.
2. ONE METER PER SERVICE LINE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL 3/4" THROUGH 2"
SERVICE ARRANGEMENTS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02512-01

PIPE TAPPING SCHEDULE				
WATER MAIN TYPE AND DIAMETER	SERVICE SIZE			
	3/4"	1"	1 1/2"	2"
4" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
4" ASBESTOS (EXISTING) CEMENT	WBSS	WBSS	DSS, WBSS	DSS, WBSS
4" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" ASBESTOS (EXISTING) CEMENT	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" ASBESTOS (EXISTING) CEMENT	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
16" AND UP CAST IRON OR DUCTILE IRON	DWBSS	DWBSS	DWBSS	DWBSS
16" AND UP ASBESTOS (EXISTING) CEMENT	DWBSS	DWBSS	DWBSS	DWBSS
16" AND UP PVC (AWWA C900)	DWBSS	DWBSS	DWBSS	DWBSS

DSS - DUAL STRAP SADDLES
WBSS - WIDE BAND STRAP SADDLES
DWBSS - DUAL WIDE BAND STRAP SADDLES

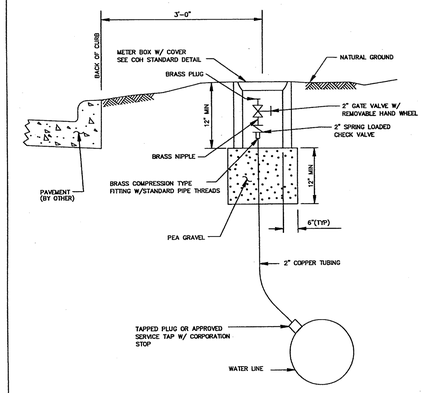




CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SERVICE TAPS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 DWG NO: 02512-02



GENERAL NOTES:

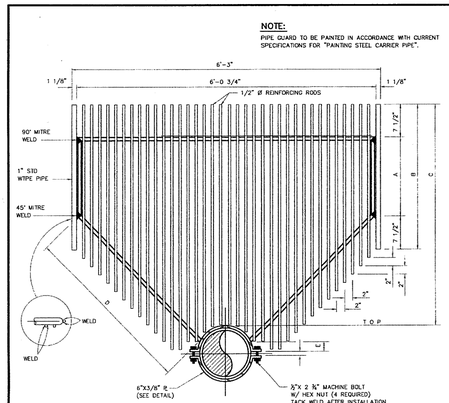
1. PLACE GATE VALVE VERTICAL TO GROUND WITH END OF BRASS PLUG 3 INCHES FROM SURFACE
2. PLACE METER BOX CENTER AROUND GATE VALVE BOX WITH LONG SIDE PARALLEL TO VALVE.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

PERMANENT
BLOW-OFF-DETAIL
(NOT TO SCALE)

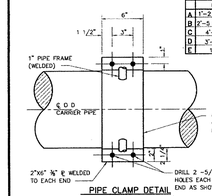
APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02524-01

NOTE:
PIPE GUARD TO BE PAINTED IN ACCORDANCE WITH CURRENT SPECIFICATIONS FOR "PAINTING STEEL CARRIER PIPE".



PIPE GUARD DETAIL

TABLE OF DIMENSIONS FOR VARIOUS PIPE SIZES								
	6"	8"	12"	16"	20"	24"	30"	36"
A	1'-2 5/8"	1'-3 5/8"	1'-7 3/4"	1'-11 1/4"	2'-3 1/4"	2'-7 1/4"	3'-1 3/8"	3'-7 1/8"
B	2'-5 5/8"	2'-6 5/8"	2'-10 3/4"	3'-2 1/4"	3'-6 1/8"	3'-10 1/4"	4'-4 3/8"	4'-10 1/8"
C	4'-6"	4'-6"	4'-6 1/8"	4'-6 1/8"	4'-6 1/8"	4'-6 1/8"	4'-6 1/4"	4'-6 1/4"
D	2'-11"	3'-10 1/8"	5'-6 7/8"	7'-5 1/4"	9'-2 3/8"	11'-1 1/2"	12'-7 1/4"	14'-2 3/8"
E	1"	2"	2"	2"	2"	2"	2"	2"

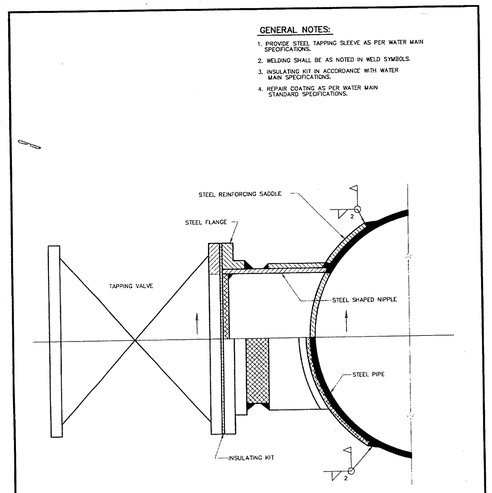


PIPE CLAMP DETAIL
TOP VIEW

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PIPE GUARD
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 DWG NO: 02502-01



GENERAL NOTES:

1. PROVIDE STEEL TAPPING SLEEVE AS PER WATER MAIN SPECIFICATIONS.
2. WELDING SHALL BE AS NOTED IN WELD SYMBOLS.
3. INSULATING KIT IN ACCORDANCE WITH WATER MAIN SPECIFICATIONS.
4. REPAIR COATING AS PER WATER MAIN STANDARD SPECIFICATIONS.

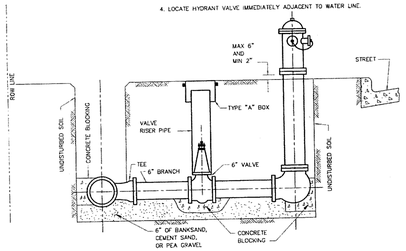
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD TAP
TO EXISTING
STEEL MAIN
(NOT TO SCALE)

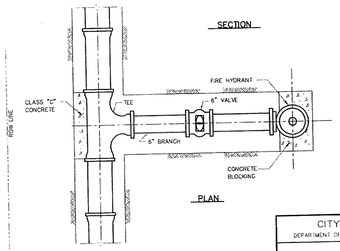
APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02512-04

NOTES:

1. LOCATE FIRE HYDRANTS AT PCs OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITH IN 5 FEET OF RIGHTS-OF-WAY LINES.
3. FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET.
4. LOCATE HYDRANT VALVE IMMEDIATELY ADJACENT TO WATER LINE.



SECTION



PLAN

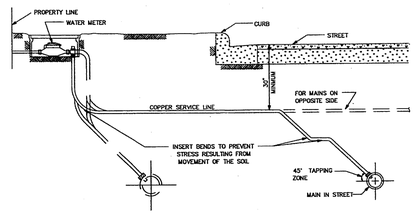
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD
FIRE HYDRANT DETAIL
(NOT TO SCALE)

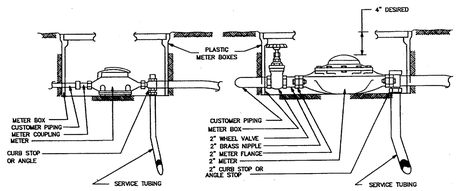
APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02520-01

NOTES:

1 1/2" METER SET IS SAME AS 2" EXCEPT WHEEL VALVE IS NOT REQUIRED.



TYPICAL SECTION SERVICE LINE



5/8", 3/4" AND 1" METER SET — 2" METER SET

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL METER
SETTINGS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02526-01

SES HORIZON
CONSULTING ENGINEERS, INC.
10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR. 67749 LICENSED PROFESSIONAL ENGINEER 04-24-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

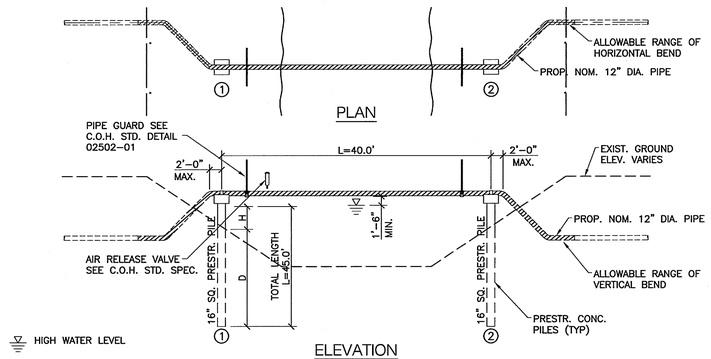
WATER DETAILS

2 OF 2

WBS NO.: M-000262-0004-4	CITY DWG NO.
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 179 OF 191	

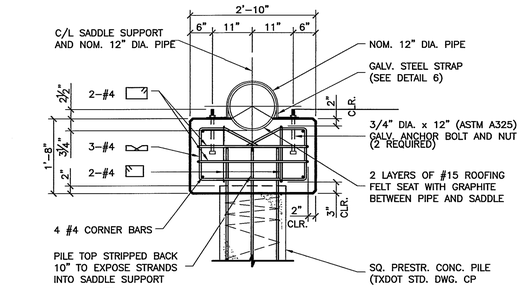
CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING 49210 CITY NUMBER HOUSTON, TEXAS

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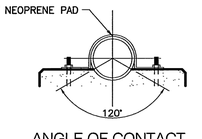
1. SINGLE SPAN CROSSING

SCALE: N.T.S.



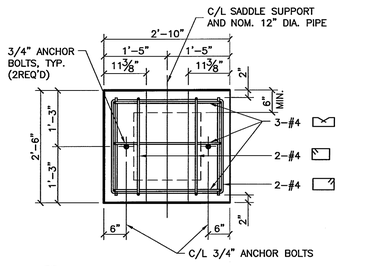
4. SADDLE SUPPORT SECTION

SCALE: 3/4"=1'-0"



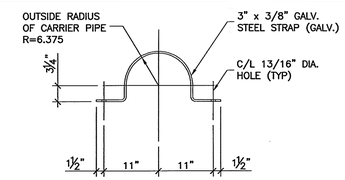
ANGLE OF CONTACT AT SADDLE SUPPORT

NOTE: PLACE 3/8" NEOPRENE PAD BETWEEN PIPE AND STRAP



5. SADDLE SUPPORT PLAN

SCALE: 3/4"=1'-0"



6. STRAP DETAIL

SCALE: 1"=1'-0"

1. GENERAL NOTES:

1.1. THE DESIGN OF THIS WATER LINE AERIAL CROSSING AS PRESENTED HEREON THIS STANDARD DRAWING CONFORMS TO AWWA M11, "STEEL PIPE–A GUIDE FOR DESIGN AND INSTALLATION". THE DESIGN OF THE BENT SUPPORTS CONFORMS TO AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES".

1.2. WHERE THE PROPOSED WATER LINE AERIAL CROSSING WILL BE CONSTRUCTED ADJACENT TO A BRIDGE STRUCTURE, CENTERLINE LOCATIONS OF WATER LINE BENT SUPPORTS SHALL MATCH STATIONING OF BRIDGE BENTS WHERE PRACTICAL.

1.3. PRIOR TO BEGINNING ANY EXCAVATION WORK IN THE AREAS OF EXISTING UTILITIES, CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES OR THE UTILITY COORDINATING COMMITTEE FOR EXACT LOCATIONS TO PREVENT ANY UTILITY DAMAGE OR INTERFERENCE WITH PRESENT FACILITIES. THE UTILITY COORDINATING COMMITTEE AND THE TEXAS ONE-CALL SYSTEM SHALL BE NOTIFIED AT THE FOLLOWING NUMBERS: HOUSTON METROPOLITAN AREA (HMA) AT 713-223-4567; AREAS OUTSIDE HMA, AT 1-800-669-8344.

1.4. THE USE OF PIPE GUARDS AND AN AIR VENT, IF APPLICABLE, ARE SPECIFIED IN THIS STANDARD DRAWING BY REFERENCE ONLY. REFER TO OTHER CITY OF HOUSTON STANDARD DRAWINGS AND SPECIFICATIONS FOR DETAILS.

2. STRUCTURAL NOTES:

2.1. THE FOLLOWING CITY OF HOUSTON GUIDE SPECIFICATIONS SHALL APPLY TO THE CONSTRUCTION OF THE WATER LINE BENT SUPPORTS: SECTION 02461, "PRESTRESSED CONCRETE PILING"; SECTION 02462, "DRIVING CONCRETE PILES"; SECTION 03100, "CONCRETE FORMWORK"; SECTION 03211, "REINFORCING STEEL"; SECTION 03310, "STRUCTURAL CONCRETE"; AND SECTION 03350, "CONCRETE FINISHING"

2.2. ALL CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 3,000 PSI AT 28 DAYS. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4". ALL PRESTRESSED CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 5,000 PSI AT 28 DAYS.

2.3. PRESTRESSED CONCRETE PILES SHALL BE IN ACCORDANCE WITH TXDOT STANDARD DRAWING CP, OR AS DESIGNATED BY ENGINEER.

2.4. ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 STEEL. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BAR.

2.5. ANCHOR BOLTS SHALL BE ASTM DESIGNATION A307. ANCHOR BOLTS SHALL BE PROVIDED WITH HEX NUTS.

2. STRUCTURAL NOTES CONT'D:

2.6. STEEL PIPE SHALL BE IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02502, "STEEL PIPE AND FITTINGS". STANDARD FIELD JOINT FOR STEEL PIPE SHALL BE SINGLE-WELDED, LAP JOINT OR DOUBLE-WELDED, BUTT JOINT IN ACCORDANCE WITH AWWA C206, LATEST EDITION. PIPE COATINGS SHALL BE SHOP APPLIED AFTER FABRICATION AND CONFORM TO STANDARD SPECIFICATION SECTION 02502.

2.7. STEEL FOR PIPE SHALL BE A MINIMUM OF ASTM A36; ASTM A570, GRADE 36; ASTM A53, GRADE G; ASTM A135, GRADE B; OR ASTM A139, GRADE B.

2.8. STRUCTURAL STEEL AND BOLTING SHALL BE IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATION SECTION 05501, "METAL FABRICATION".

12-INCH WATER LINE CROSSING DESIGN TABLE

SPAN CONFIGURATION	SPAN LENGTH "L" (FT)	REQ'D PIPE THICKNESS (IN)	REQ'D SQUARE PRESTRESSED PILE SIZE BASED ON UNSUPPORTED HEIGHT "H" (SIDE DIMENSION IN INCHES)
			5.0'
SINGLE SPAN CROSSING	45.0'	0.313	16
MIN. EMBED. DEPTH "D" (FT)			40

CSF
CIVIL, STRUCTURAL & FORENSIC ENGINEERING SOLUTIONS
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CSF CONSULTING, L.P.
TEXAS REGISTERED ENGINEERING FIRM F-4395

STATE OF TEXAS
CARLOS A. GUTIERREZ
68320
LICENSED
PROFESSIONAL ENGINEER
12/31/2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

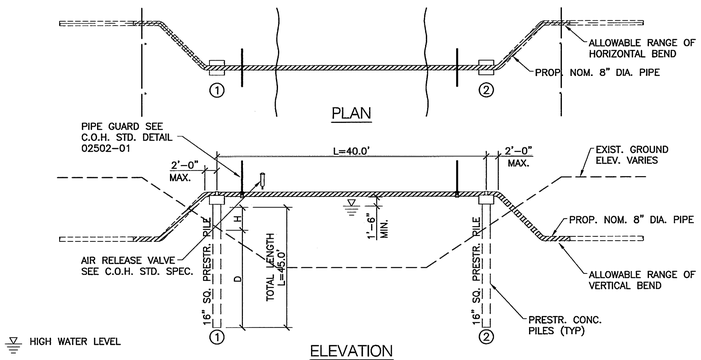
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

12 IN. DIAMETER WATER LINE AERIAL CROSSING DETAIL

WBS NO.:M-000262-0004-4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 180 OF 191	

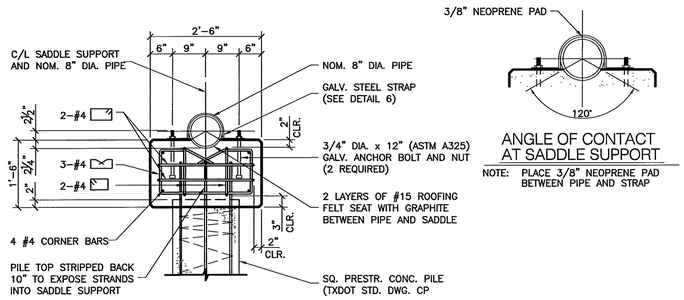
PUBLIC WORKS AND ENGINEERING
FILED
49210
CITY PROJECT NUMBER
HOUSTON, TEXAS

FILE NAME: P:\1900\1985 PIPE BRIDGE CITY OF HOUSTON(SES)\CAD\WHB-SG4 - FINAL 2010\STD\1985 WATER CROSSING SIGNED AND SEALED.DWG
original scale in inches



1. SINGLE SPAN CROSSING

SCALE: N.T.S.

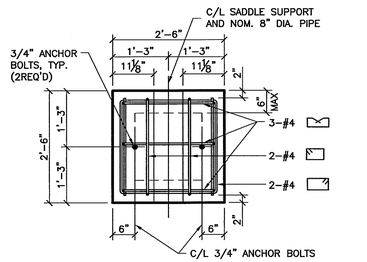


4. SADDLE SUPPORT SECTION

SCALE: 3/4"=1'-0"

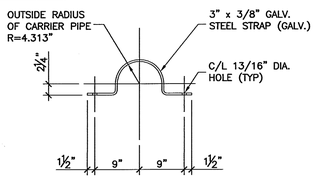
ANGLE OF CONTACT AT SADDLE SUPPORT

NOTE: PLACE 3/8" NEOPRENE PAD BETWEEN PIPE AND STRAP



5. SADDLE SUPPORT PLAN

SCALE: 3/4"=1'-0"



6. STRAP DETAIL

SCALE: 1"=1'-0"

1. GENERAL NOTES:

1.1. THE DESIGN OF THIS WATER LINE AERIAL CROSSING AS PRESENTED HEREON THIS STANDARD DRAWING CONFORMS TO AWWA M11, "STEEL PIPE-A GUIDE FOR DESIGN AND INSTALLATION". THE DESIGN OF THE BENT SUPPORTS CONFORMS TO AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES".

1.2. WHERE THE PROPOSED WATER LINE AERIAL CROSSING WILL BE CONSTRUCTED ADJACENT TO A BRIDGE STRUCTURE, CENTERLINE LOCATIONS OF WATER LINE BENT SUPPORTS SHALL MATCH STATIONING OF BRIDGE BENTS WHERE PRACTICAL.

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1.4. THE USE OF PIPE GUARDS AND AN AIR VENT, IF APPLICABLE, ARE SPECIFIED IN THIS STANDARD DRAWING BY REFERENCE ONLY. REFER TO OTHER CITY OF HOUSTON STANDARD DRAWINGS AND SPECIFICATIONS FOR DETAILS.

2. STRUCTURAL NOTES:

2.1. THE FOLLOWING CITY OF HOUSTON GUIDE SPECIFICATIONS SHALL APPLY TO THE CONSTRUCTION OF THE WATER LINE BENT SUPPORTS: SECTION 02461, "PRESTRESSED CONCRETE PILING"; SECTION 02462, "DRIVING CONCRETE PILES"; SECTION 03100, "CONCRETE FORMWORK"; SECTION 03211, "REINFORCING STEEL"; SECTION 03310, "STRUCTURAL CONCRETE"; AND SECTION 03350, "CONCRETE FINISHING"

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2.3. PRESTRESSED CONCRETE PILES SHALL BE IN ACCORDANCE WITH TXDOT STANDARD DRAWING CP, OR AS DESIGNATED BY ENGINEER.

2.4. ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 STEEL. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BAR.

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2. STRUCTURAL NOTES CONT'D:

2.6. STEEL PIPE SHALL BE IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02502, "STEEL PIPE AND FITTINGS". STANDARD FIELD JOINT FOR STEEL PIPE SHALL BE SINGLE-WELDED, LAP JOINT OR DOUBLE-WELDED, BUTT JOINT IN ACCORDANCE WITH AWWA C206, LATEST EDITION. PIPE COATINGS SHALL BE SHOP APPLIED AFTER FABRICATION AND CONFORM TO STANDARD SPECIFICATION SECTION 02502.

2.7. STEEL FOR PIPE SHALL BE A MINIMUM OF ASTM A36; ASTM A570, GRADE 36; ASTM A53, GRADE G; ASTM A135, GRADE B; OR ASTM A139, GRADE B.

2.8. STRUCTURAL STEEL AND BOLTING SHALL BE IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATION SECTION 05501, "METAL FABRICATION".

8-INCH WATER LINE CROSSING DESIGN TABLE

SPAN CONFIGURATION	SPAN LENGTH "L" (FT)	REQ'D PIPE THICKNESS (IN)	REQ'D SQUARE PRESTRESSED PILE SIZE BASED ON UNSUPPORTED HEIGHT "H" (SIDE DIMENSION IN INCHES)
			5.0'
SINGLE SPAN CROSSING	45.0'	0.313	16
MIN. EMBED. DEPTH "D" (FT)			40

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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
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CSF CONSULT
TEXAS REGIS
ENGINEERING FI

STATE OF TEXAS
CARLOS A. GUTIERREZ
68320
LICENSED
PROFESSIONAL ENGINEER
8/27/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

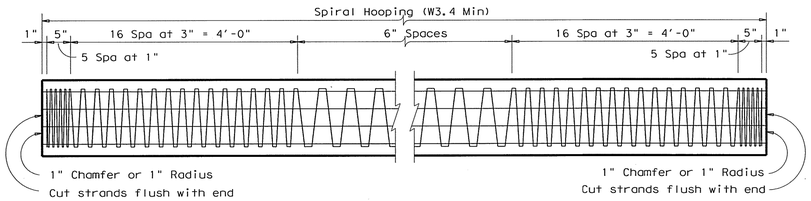
WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

8 IN. DIAMETER WATER LINE AERIAL CROSSING DETAIL

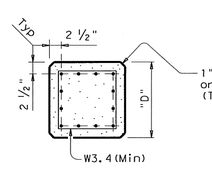
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FILE NO.: SM5056	
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N.T.S.	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 181 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
HOUSTON, TEXAS

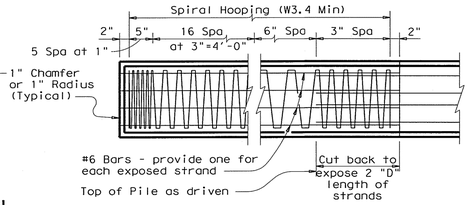
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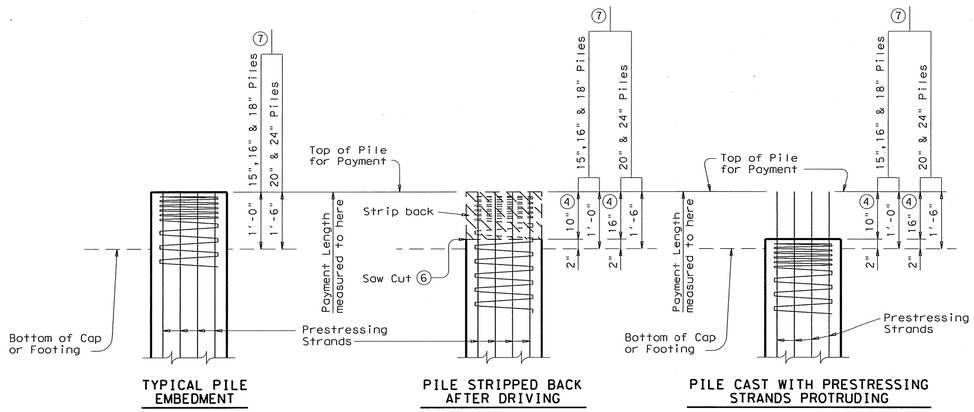
PILE DETAILS



TYPICAL SECTION THRU PILE ①



PILE BUILD-UP DETAIL ②



TYPICAL PILE EMBEDMENT

PILE STRIPPED BACK AFTER DRIVING

PILE CAST WITH PRESTRESSING STRANDS PROTRUDING

PILE EMBEDMENT DETAILS ③

TABLE OF PROPERTIES FOR PRESTRESSED CONCRETE PILES

Pile Size "D"	Area of Pile Section	I	Weight	Prestressing ⑤		
				No.	Initial Prestress Force	Concrete Final Prestress (15% Loss)
	Sq In	In⁴	Lb/Ft		Kips	psi
16"	254	5,340	265	8	231	774
18"	322	8,600	336	10	289	763
20"	398	13,150	415	14	405	864
24"	574	27,380	598	18	520	770

① Locate strands symmetrically about the axis of the pile, with no more than one strand difference between any two adjacent sides.

② Provide Class S Concrete for pile build-ups.

③ Payment for piles will be in accordance with the details shown. Strip back piling and extend prestressing strands into substructure when piling conflicts with substructure reinforcing or when the side cover from pile edge to substructure edge is less than 4" after driving.

④ Provide more strip back if indicated. When stripped back piles are required, strip back piling after driving or cast short with strands protruding from top of piling as shown.

⑤ Provide ½" 270 ksi low relaxation strands tensioned to 28.9 kips each. If an optional design is used, provide a minimum Concrete Final Prestress of 750 psi. Submit optional designs for approval.

⑥ Saw cut ½" deep around perimeter of pile at the breakback line.

⑦ Unless shown otherwise.

FABRICATION NOTES:

Provide Class H or Class H (HPC) Concrete, as indicated. Provide sulfate resistant concrete when required.

Minimum release strength, f'ci = 4000 psi.
Minimum 28-day strength, f'c = 5000 psi.

All dimensions relating to prestressing steel are to centers of strands or bars.

See Layout for size, number, and length of piling.

Shop drawing submittal and approval is not required if fabrication is in accordance with the details shown on this standard.

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

LEVELS DISPLAYED | PATH:

Texas Department of Transportation
Bridge Division

PRESTRESSED CONCRETE PILING

CP

FILE: cpstde01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2006	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS 08-2007: Added Saw Cut Note 7. 01-2012: Notes; Embedment; Remove 15" Piles	COUNTY	CONTROL	SECT	JOB	HIGHWAY

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

EPIFANIO E. SALAZAR JR.
67749
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
04-30-2012

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

TXDOT PRESTRESSED CONCRETE PILING DETAIL

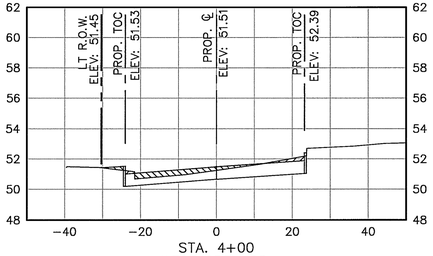
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FILE NO.: SM5056	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	49210
ISAAC MUNIZ, E.I.T.	
SHEET NO. 182 OF 191	

CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING
CITY NUMBER
HOUSTON, TEXAS

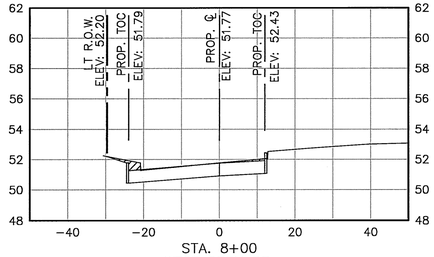
FOR REDUCED PLANS
original scale in inches

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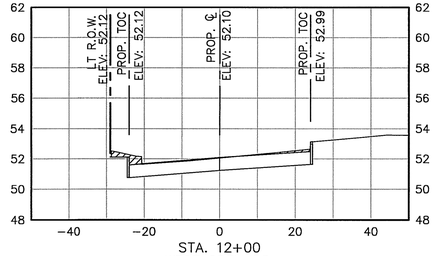
FOR REDUCED PLANS
original scale in inches



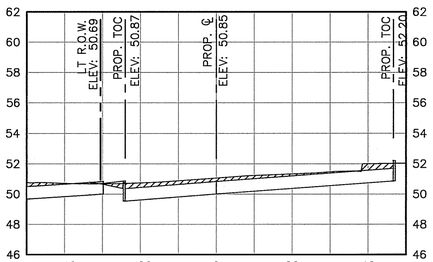
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WEST OREM DR.



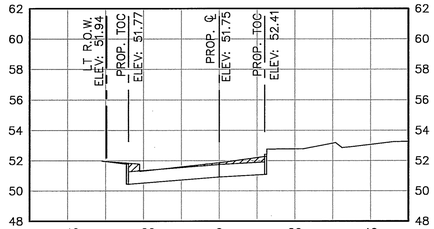
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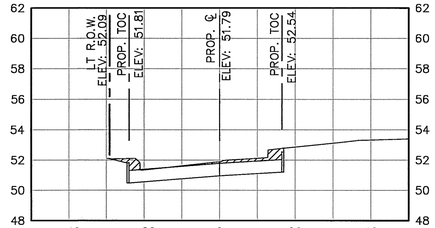
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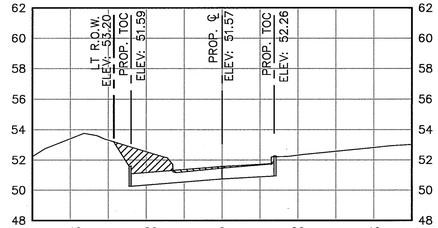
STA. 3+00
WEST OREM DR.



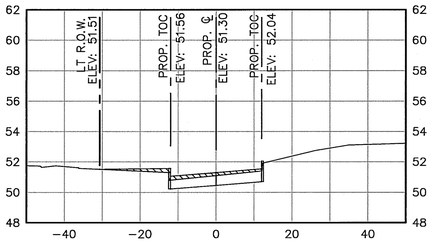
STA. 7+00
WEST OREM DR.



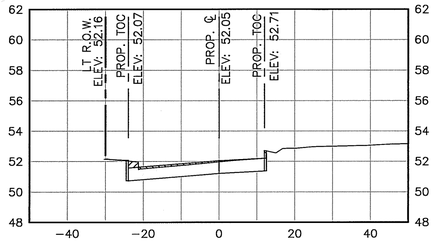
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WEST OREM DR.



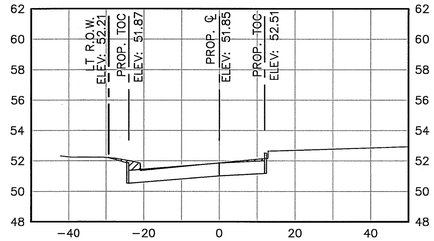
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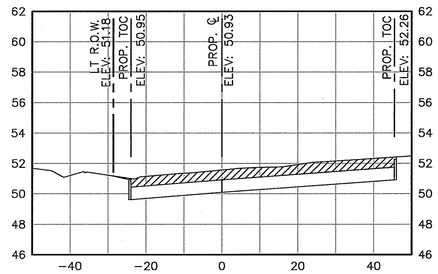
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WEST OREM DR.



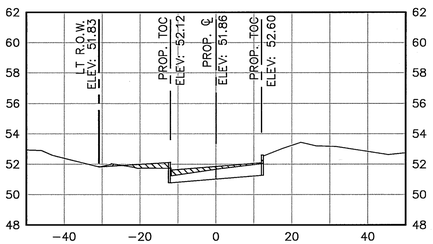
STA. 6+00
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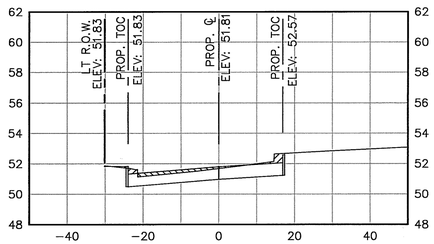
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WEST OREM DR.



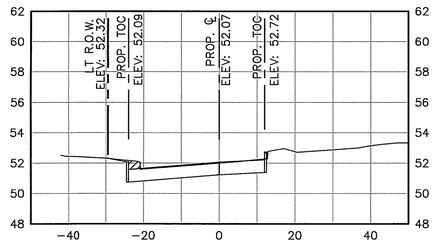
STA. 14+00
WEST OREM DR.



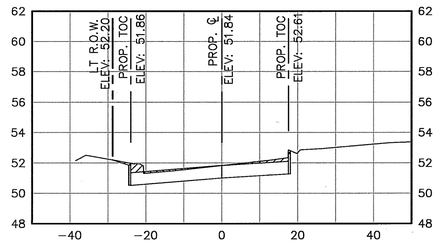
STA. 1+00
WEST OREM DR.



STA. 5+00
WEST OREM DR.



STA. 9+00
WEST OREM DR.



STA. 13+00
WEST OREM DR.

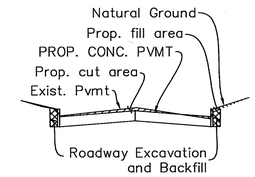
TOTAL VOLUME TABLE
WEST OREM DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+00.00	8.23	0.43	0.00	0.00	0.00	0.00	0.00
2+00.00	7.43	0.00	29.00	0.79	29.00	0.79	−28.21
3+00.00	0.57	17.24	14.81	31.93	43.81	32.72	−11.09
4+00.00	9.83	1.94	19.26	35.52	63.07	68.25	5.18
5+00.00	4.86	2.67	27.21	8.54	90.28	76.79	−13.49
6+00.00	2.94	1.10	14.45	6.98	104.72	83.77	−20.95
7+00.00	0.18	5.44	5.77	12.11	110.49	95.88	−14.61
8+00.00	0.53	3.15	1.31	15.91	111.80	111.79	−0.01
9+00.00	1.63	2.07	4.00	9.66	115.79	121.45	5.66
10+00.00	0.77	3.18	4.44	9.72	120.23	131.17	10.94
11+00.00	0.19	8.66	1.78	21.93	122.01	153.10	31.09
12+00.00	0.89	4.72	2.00	24.77	124.01	177.87	53.86
13+00.00	1.47	4.20	4.37	16.52	128.38	194.39	66.01
14+00.00	0.00	44.84	2.73	90.82	131.11	285.21	154.10
14+50.00	2.61	17.05	2.42	57.31	133.53	342.52	208.99

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100−YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WEST OREM

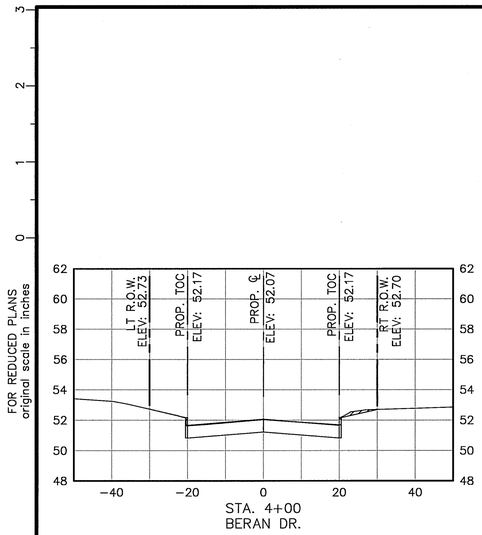
CROSS SECTION
1 OF 9

WBS NO.: M−000262−0004−4	CITY DWG. NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 183 OF 191	

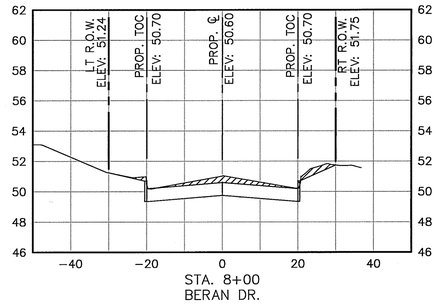
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

PLOTTED ON: Wednesday, April 18, 2012 5:09:27 PM
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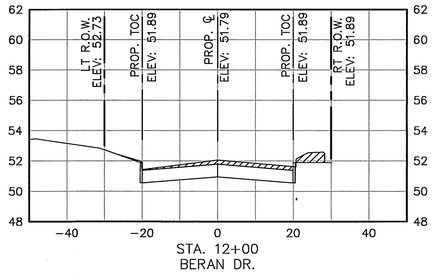
FOR REDUCED PLANS
original scale in inches



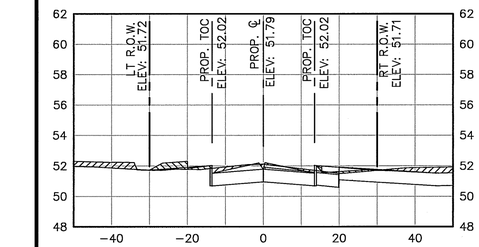
STA. 4+00
BERAN DR.



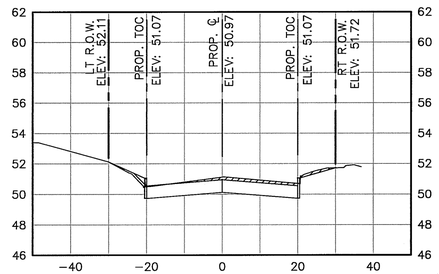
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BERAN DR.



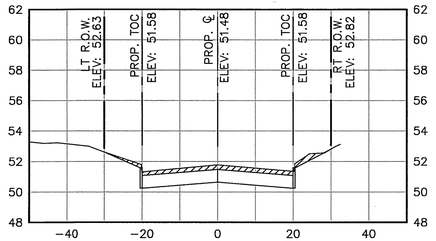
STA. 12+00
BERAN DR.



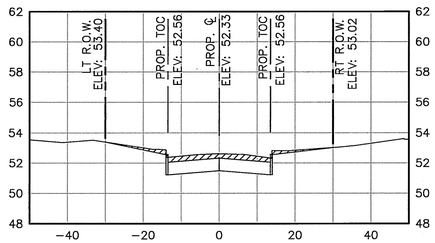
STA. 3+00
BERAN DR.



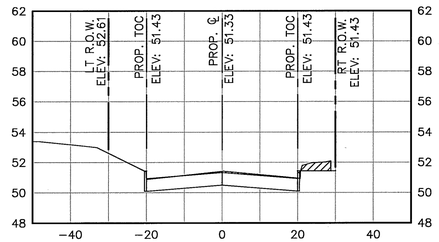
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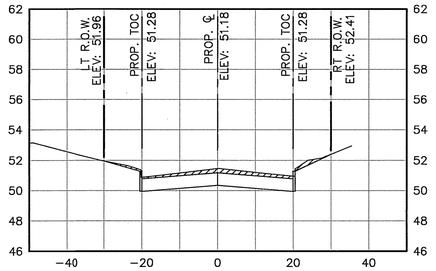
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BERAN DR.



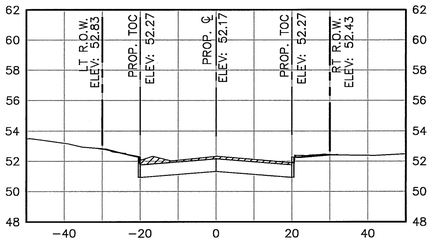
STA. 2+00
BERAN DR.



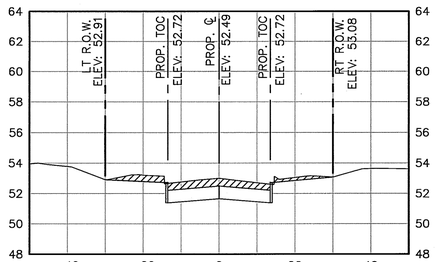
STA. 6+00
BERAN DR.



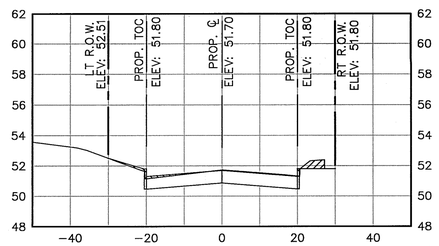
STA. 10+00
BERAN DR.



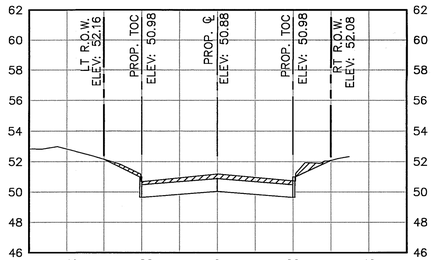
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BERAN DR.



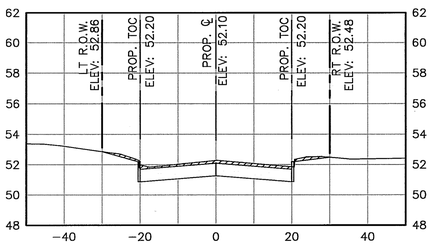
STA. 1+50
BERAN DR.



STA. 5+00
BERAN DR.



STA. 9+00
BERAN DR.



STA. 13+00
BERAN DR.

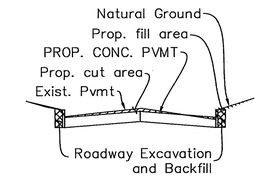
TOTAL VOLUME TABLE
BERAN DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (–) Cut (+)
1+50.00	0.19	20.03	0.00	0.00	0.00	0.00	0.00
2+00.00	0.17	12.38	0.34	30.00	0.34	30.00	29.67
3+00.00	7.11	14.12	13.48	49.07	13.82	79.08	65.26
4+00.00	1.30	1.43	15.58	28.81	29.40	107.89	78.49
5+00.00	2.65	3.55	7.33	9.23	36.72	117.12	80.40
6+00.00	0.69	5.79	6.20	17.30	42.92	134.42	91.50
7+00.00	2.26	5.82	5.46	21.50	48.38	155.91	107.53
8+00.00	0.31	12.02	4.75	33.04	53.14	188.96	135.82
9+00.00	0.23	15.04	1.01	50.11	54.14	239.07	184.93
10+00.00	0.25	10.66	0.89	47.58	55.04	286.65	231.61
11+00.00	0.15	14.54	0.73	46.66	55.77	333.31	277.54
12+00.00	0.24	13.07	0.72	51.13	56.49	384.44	327.95
13+00.00	0.30	8.91	1.01	40.71	57.50	425.15	367.65
13+15.25	0.48	8.42	0.22	4.89	57.72	430.05	372.33

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100–YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR J. CORREDOR
47746
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

BERAN DR.

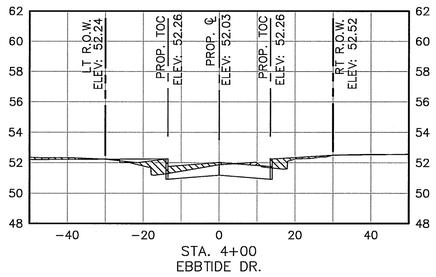
CROSS SECTION
2 OF 9

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20'	VERT: 1"=5'
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 184 OF 191	

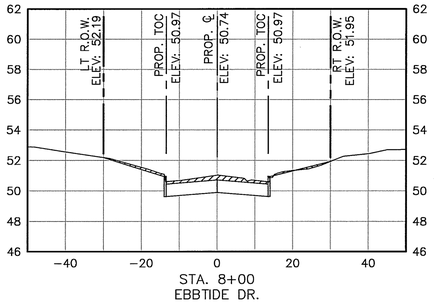
PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

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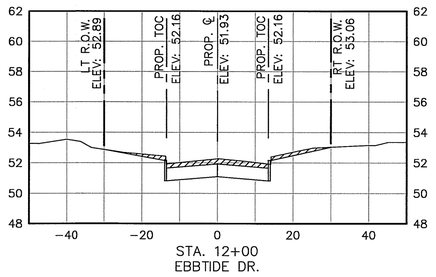
FOR REDUCED PLANS
original scale in inches



STA. 4+00
EBBTIDE DR.



STA. 8+00
EBBTIDE DR.



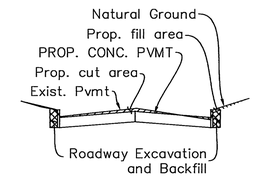
STA. 12+00
EBBTIDE DR.

TOTAL VOLUME TABLE EBBTIDE DR.							
Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+40.00	4.55	12.01	0.00	0.00	0.00	0.00	0.00
2+00.00	12.06	0.24	18.77	13.12	18.77	13.12	−5.65
3+00.00	2.88	0.42	27.44	1.25	46.21	14.36	−31.84
4+00.00	16.43	1.04	35.30	2.75	81.50	17.12	−64.38
5+00.00	3.32	2.82	36.58	7.15	118.09	24.27	−93.82
6+00.00	0.20	8.54	6.53	21.05	124.62	45.32	−79.30
7+00.00	0.18	15.82	0.71	45.12	125.34	90.44	−34.90
8+00.00	0.99	8.21	2.16	44.50	127.50	134.94	7.45
9+00.00	0.20	13.54	2.20	40.28	129.69	175.22	45.52
10+00.00	0.33	11.80	0.99	46.92	130.69	222.14	91.46
11+00.00	0.11	15.98	0.82	51.45	131.51	273.59	142.08
12+00.00	0.20	13.49	0.57	54.57	132.08	328.16	196.09
13+00.00	0.79	6.58	1.84	37.15	133.91	365.31	231.40
14+00.00	0.81	6.09	2.98	23.46	136.89	388.77	251.87
14+26.00	0.41	3.49	0.59	4.61	137.48	393.38	255.89

LEGEND

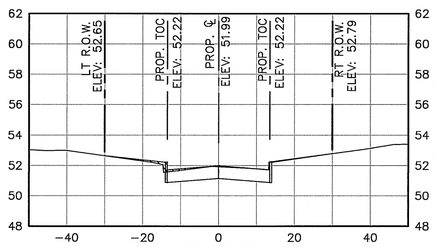
CUT AREA

FILL AREA

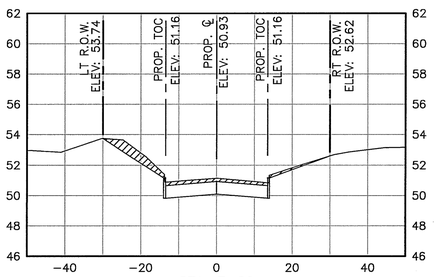


NOTES:

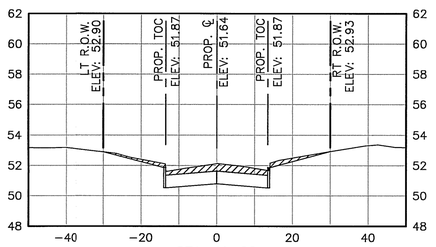
1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100−YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.



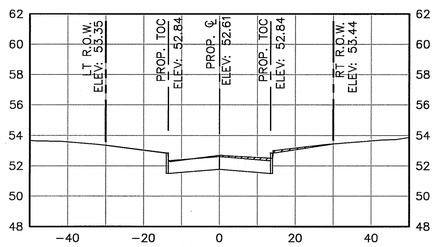
STA. 3+00
EBBTIDE DR.



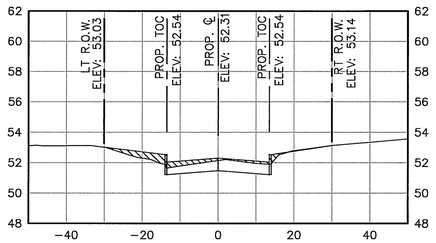
STA. 7+00
EBBTIDE DR.



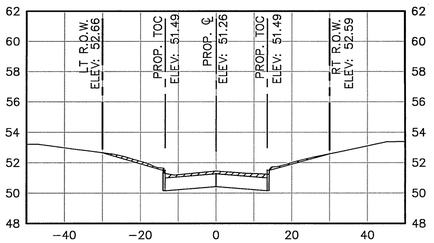
STA. 11+00
EBBTIDE DR.



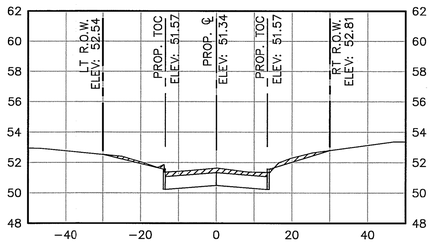
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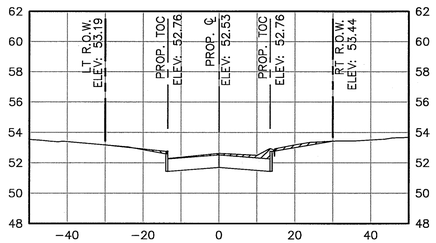
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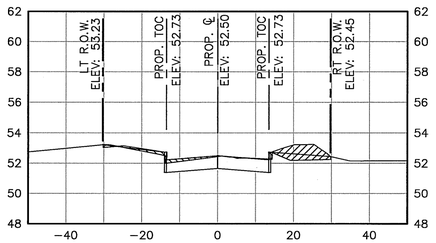
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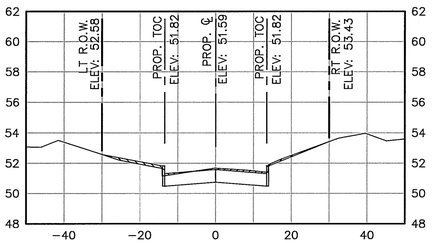
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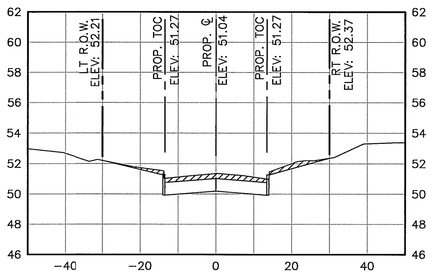
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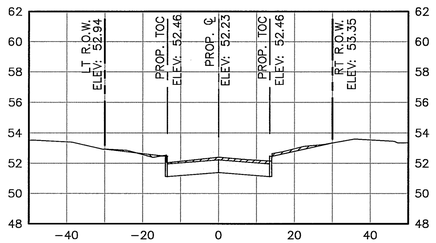
STA. 1+40
EBBTIDE DR.



STA. 5+00
EBBTIDE DR.



STA. 9+00
EBBTIDE DR.



STA. 13+00
EBBTIDE DR.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

EBBTIDE DR.

CROSS SECTION 3 OF 9

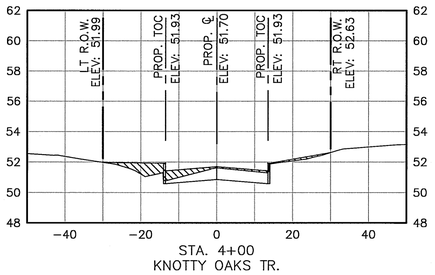
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HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 185 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY NUMBER
HOUSTON, TEXAS

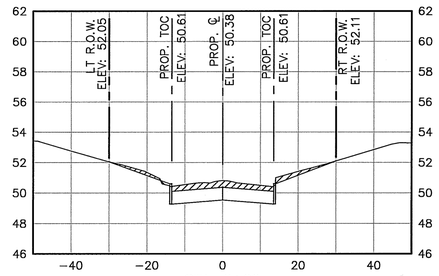
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FOR REDUCED PLANS
original scale in inches

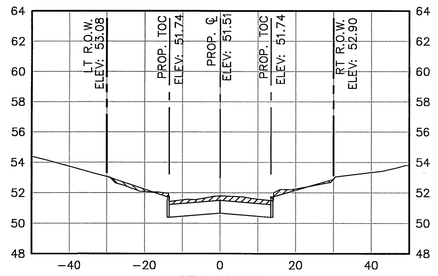
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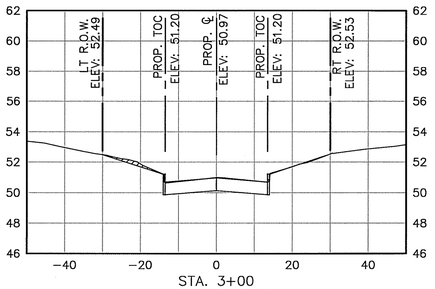
STA. 4+00
KNOTTY OAKS TR.



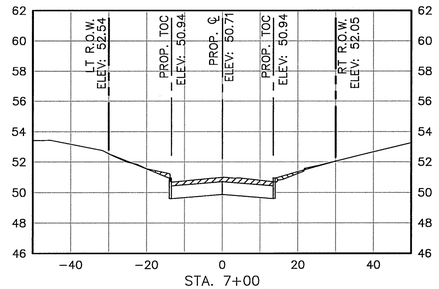
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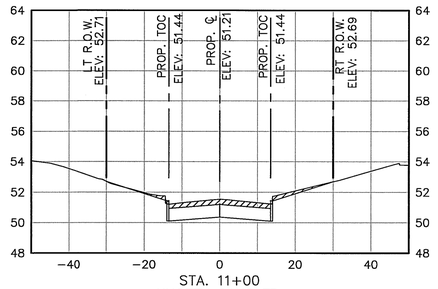
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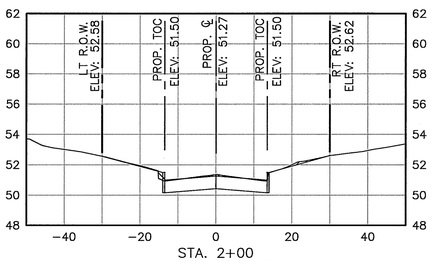
STA. 3+00
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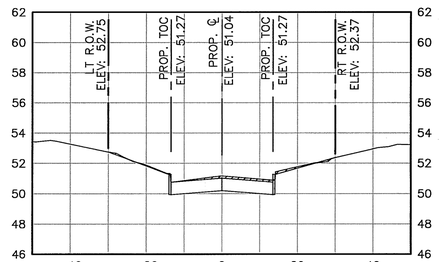
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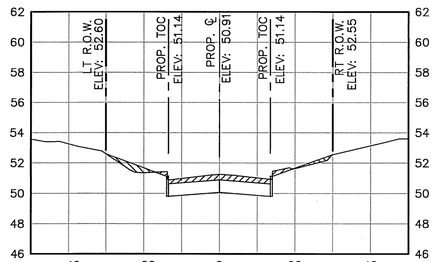
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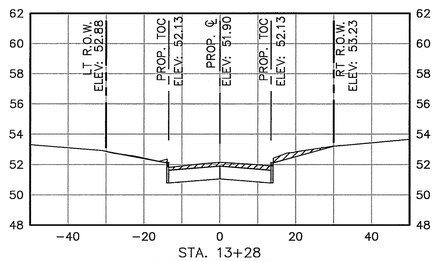
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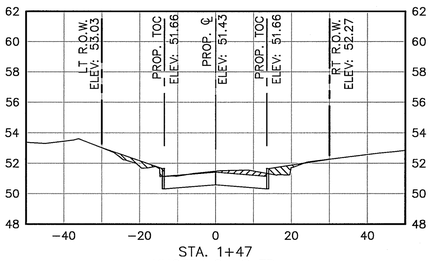
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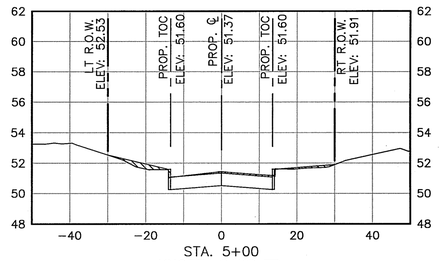
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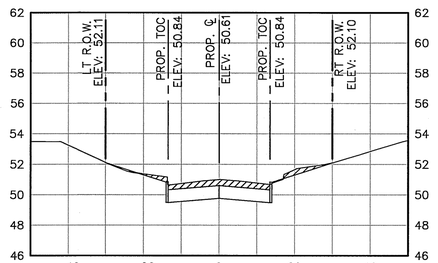
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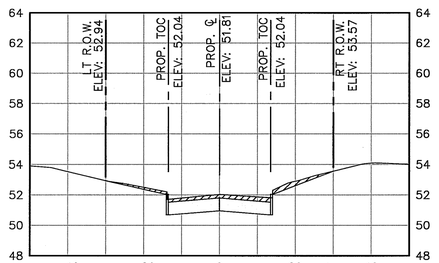
STA. 1+47
KNOTTY OAKS TR.



STA. 5+00
KNOTTY OAKS TR.



STA. 9+00
KNOTTY OAKS TR.



STA. 13+00
KNOTTY OAKS TR.

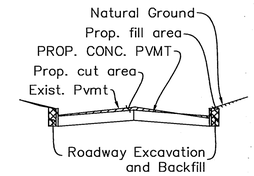
TOTAL VOLUME TABLE
KNOTTY OAKS TR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+46.50	6.98	3.33	0.00	0.00	0.00	0.00	0.00
2+00.00	1.37	1.97	8.32	5.17	8.32	5.17	−3.15
3+00.00	1.04	2.23	4.47	7.85	12.80	13.02	0.23
4+00.00	15.72	0.00	31.04	4.12	43.84	17.14	−26.70
5+00.00	4.71	1.62	37.41	3.02	81.25	20.16	−61.09
6+00.00	0.56	4.43	9.70	11.24	90.95	31.40	−59.55
7+00.00	1.68	8.93	4.17	24.73	95.12	56.13	−38.99
8+00.00	0.50	15.06	4.04	44.43	99.17	100.56	1.39
9+00.00	0.74	14.46	2.29	54.68	101.45	155.23	53.78
10+00.00	5.05	10.71	10.72	46.61	112.17	201.84	89.67
11+00.00	0.40	11.98	10.09	42.02	122.26	243.87	121.60
12+00.00	2.71	9.27	5.76	39.36	128.03	283.22	155.20
13+00.00	0.22	11.45	5.43	38.37	133.45	321.60	188.14
13+28.46	0.25	11.02	0.25	11.84	133.70	333.44	199.74

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100−YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

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SES HORIZON CONSULTING ENGINEERS, INC. TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS — OMAR J. CORREDOR — 47746 — REGISTERED PROFESSIONAL ENGINEER — 7/24/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

KNOTTY OAKS TR.

CROSS SECTION
4 OF 9

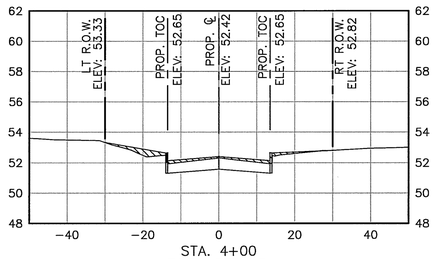
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HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 186 OF 191	

PUBLIC WORKS AND ENGINEERING — 49210 — CITY NUMBER — HOUSTON, TEXAS

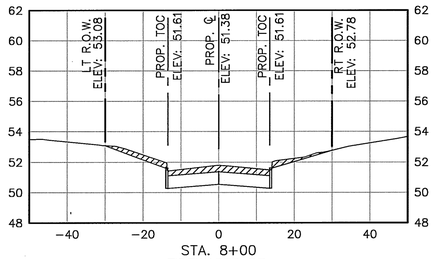
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FOR REDUCED PLANS
original scale in inches

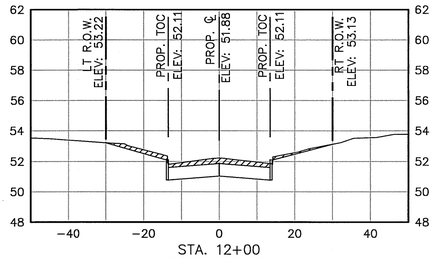
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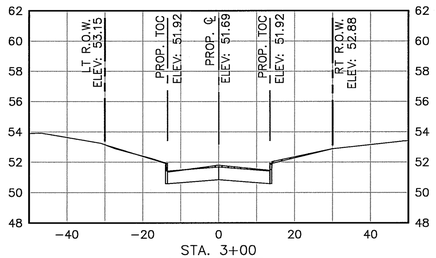
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TIDEWATER DR.



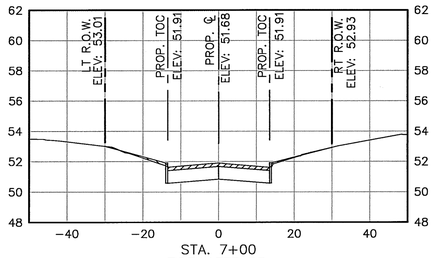
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TIDEWATER DR.



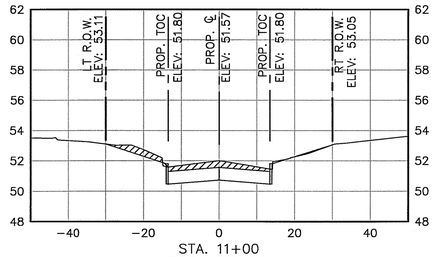
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TIDEWATER DR.



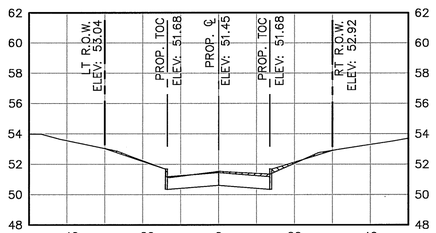
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TIDEWATER DR.



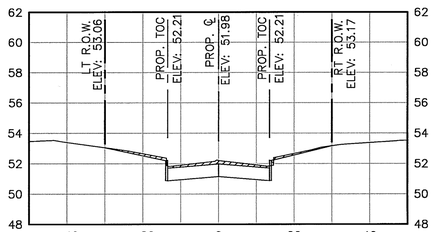
STA. 7+00
TIDEWATER DR.



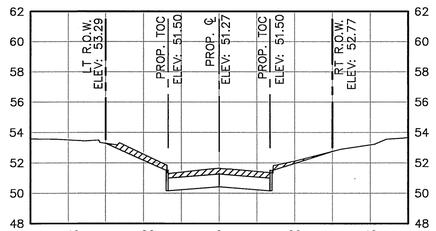
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TIDEWATER DR.



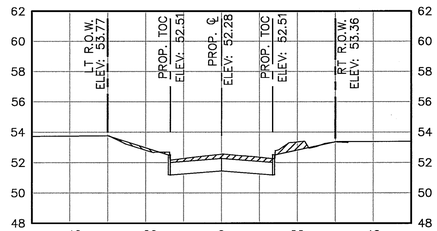
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TIDEWATER DR.



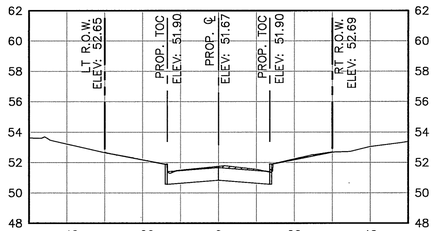
STA. 6+00
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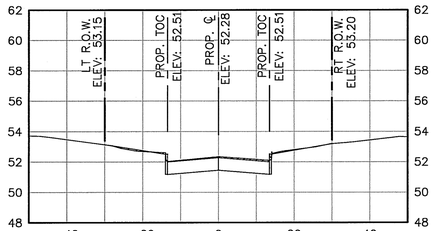
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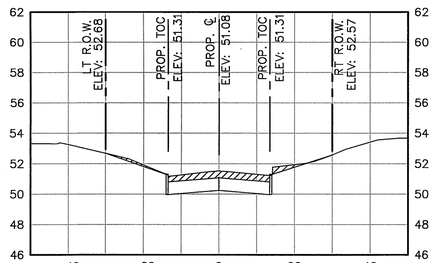
STA. 13+30
TIDEWATER DR.



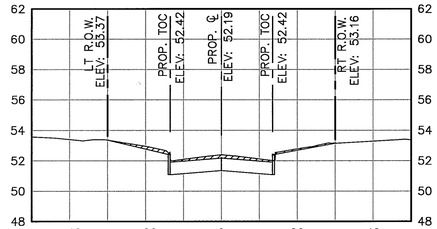
STA. 1+51
TIDEWATER DR.



STA. 5+00
TIDEWATER DR.



STA. 9+00
TIDEWATER DR.

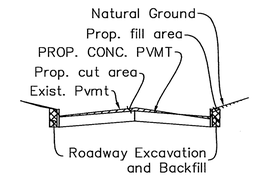


STA. 13+00
TIDEWATER DR.

LEGEND

CUT AREA

FILL AREA



TOTAL VOLUME TABLE
TIDEWATER DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+51.34	0.71	2.72	0.00	0.00	0.00	0.00	0.00
2+00.00	1.78	3.23	2.20	5.29	2.20	5.29	3.10
3+00.00	0.74	2.72	4.63	10.96	6.83	16.25	9.42
4+00.00	9.40	0.01	18.78	5.04	25.61	21.29	−4.32
5+00.00	1.03	2.33	19.27	4.34	44.87	25.63	−19.24
6+00.00	0.46	7.41	2.75	18.06	47.62	43.69	−3.93
7+00.00	1.92	6.20	4.40	25.20	52.02	68.89	16.87
8+00.00	0.09	18.17	3.72	45.13	55.74	114.02	58.27
9+00.00	0.20	15.03	0.54	61.48	56.28	175.50	119.22
10+00.00	0.16	17.40	0.66	60.06	56.94	235.56	178.61
11+00.00	0.89	13.94	1.94	58.02	58.89	293.58	234.69
12+00.00	0.22	13.36	2.05	50.55	60.94	344.13	283.19
13+00.00	0.28	7.88	0.92	39.33	61.86	383.45	321.60
13+30.08	1.89	11.21	1.21	10.64	63.06	394.09	331.03

NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100–YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
LICENSED PROFESSIONAL ENGINEER
12/31/12

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

TIDEWATER DR.

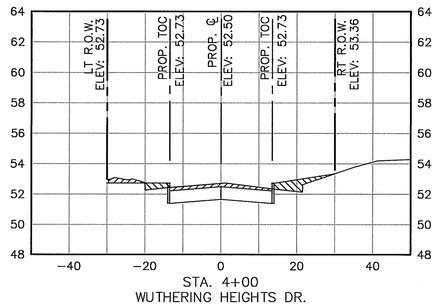
CROSS SECTION
5 OF 9

WBS NO.: M–000262–0004–4	CITY DWG NO.:
FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 187 OF 191	

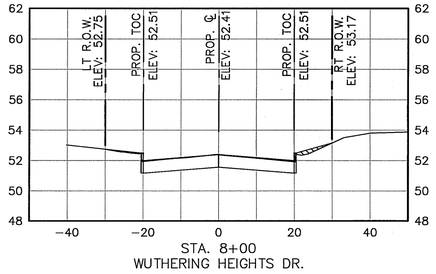
PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

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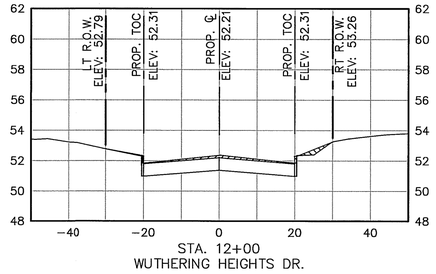
FOR REDUCED PLANS
original scale in inches



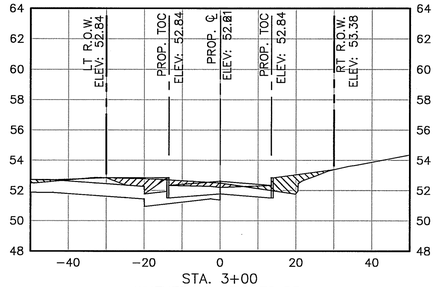
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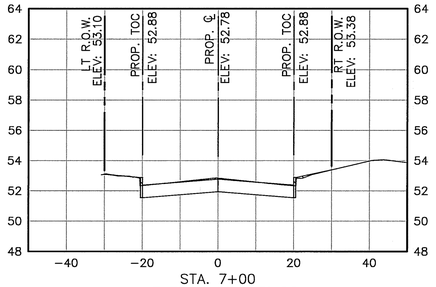
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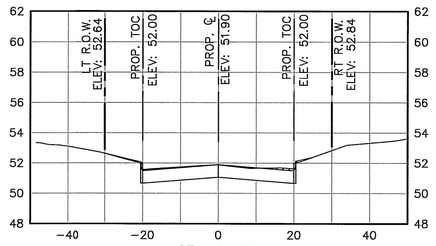
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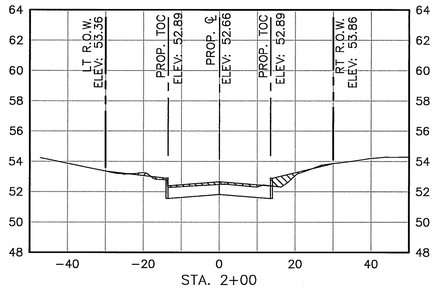
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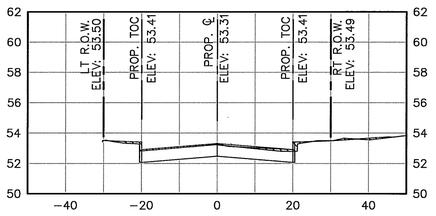
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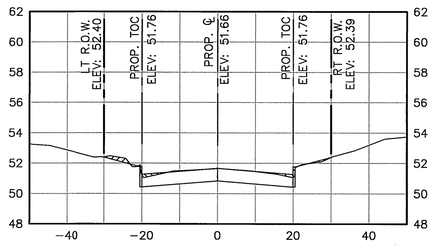
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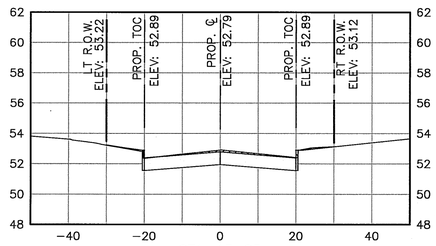
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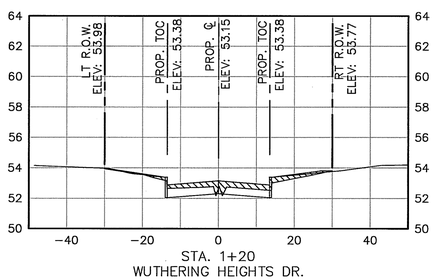
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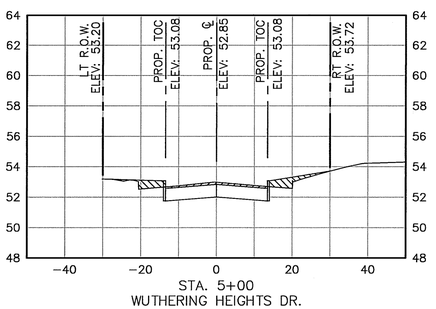
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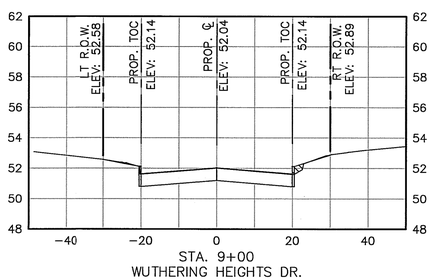
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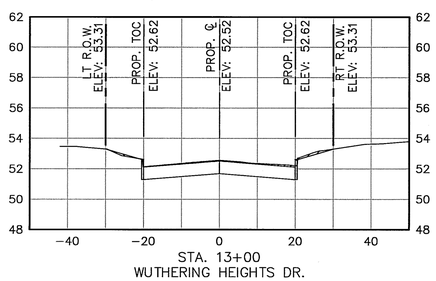
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WUTHERING HEIGHTS DR.



STA. 5+00
WUTHERING HEIGHTS DR.



STA. 9+00
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WUTHERING HEIGHTS DR.

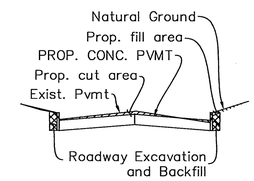
TOTAL VOLUME TABLE
WUTHERING HEIGHTS DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+20.00	14.92	0.22	0.00	0.00	0.00	0.00	0.00
2+00.00	7.81	0.89	33.48	1.67	33.48	1.67	−31.81
3+00.00	12.58	11.29	37.34	22.95	70.81	24.62	−46.19
4+00.00	8.98	7.93	39.40	36.11	110.21	60.73	−49.49
5+00.00	8.88	3.51	32.98	21.23	143.19	81.95	−61.24
6+00.00	5.59	0.48	26.93	7.42	170.12	89.38	−80.75
7+00.00	1.46	1.09	13.14	2.93	183.26	92.30	−90.95
8+00.00	3.77	0.02	9.76	2.04	193.02	94.35	−98.67
9+00.00	2.54	0.36	11.69	0.69	204.70	95.04	−109.66
10+00.00	2.62	1.75	9.57	3.89	214.27	98.93	−115.33
11+00.00	0.71	2.30	6.18	7.50	220.44	106.43	−114.01
12+00.00	1.84	4.50	4.72	12.59	225.16	119.02	−106.14
13+00.00	0.81	3.14	4.91	14.13	230.07	133.16	−96.92
13+85.41	1.28	2.56	3.32	9.01	233.39	142.17	−91.22

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100−YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

SES HORIZON
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10101 Southwest Freeway, Suite 400 Houston, Texas 77074
(713) 988-5504, Fax (713) 988-1441 www.seshorizon.com

SES HORIZON CONSULTING ENGINEERS, INC. TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE AND PAVING SUB-PROJECT IV

WUTHERING HEIGHTS DR.

CROSS SECTION 6 OF 9

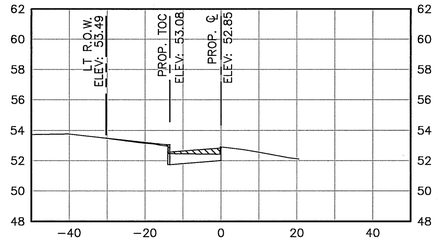
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DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 188 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER NUMBER
HOUSTON, TEXAS

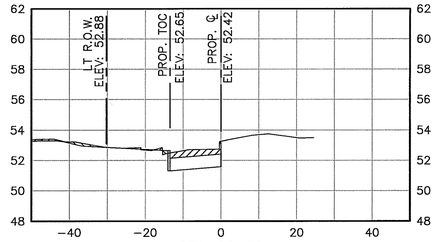
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FOR REDUCED PLANS
original scale in inches

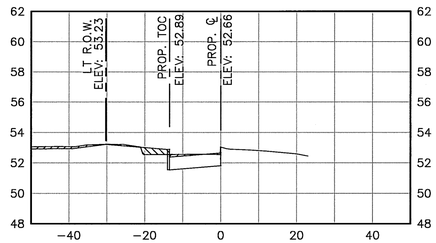
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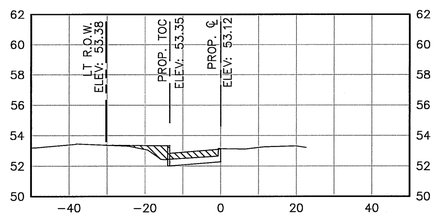
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LANDMARK DR.



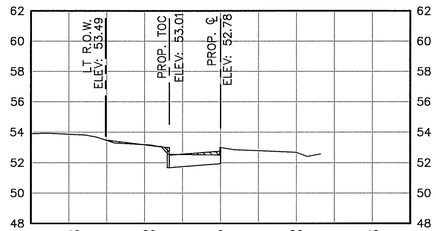
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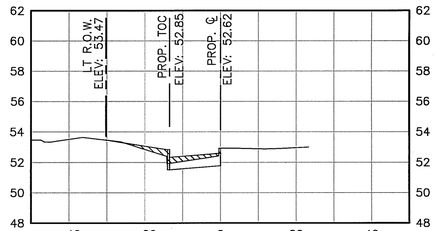
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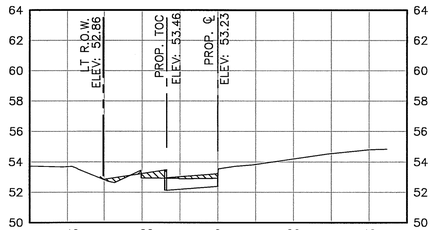
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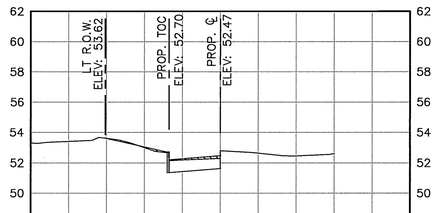
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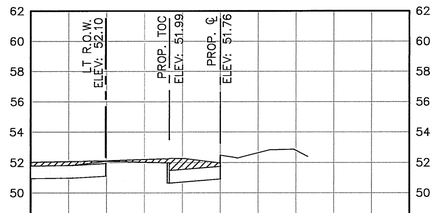
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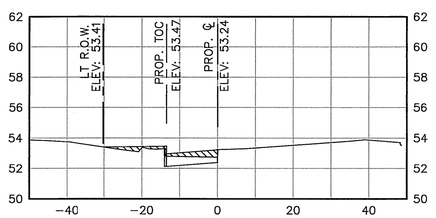
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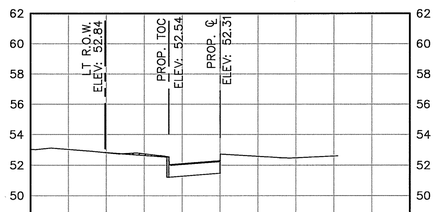
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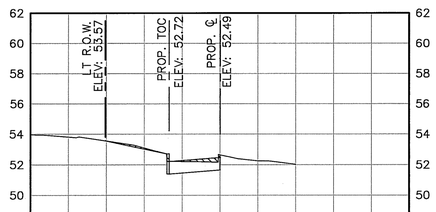
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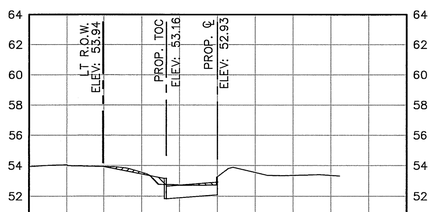
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STA. 11+75
LANDMARK DR.



STA. 16+00
LANDMARK DR.



STA. 21+00
LANDMARK DR.

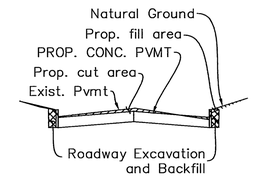
TOTAL VOLUME TABLE
LANDMARK DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
11+75.00	0.71	1.03	0.00	0.00	0.00	0.00	0.00
12+00.00	2.02	0.42	1.27	0.67	1.27	0.67	−0.60
13+00.00	2.41	0.19	8.20	1.13	9.47	1.80	−7.67
14+00.00	3.14	3.55	10.27	6.94	19.74	8.74	−11.00
15+00.00	4.25	0.02	13.69	6.61	33.43	15.35	−18.08
16+00.00	2.10	0.94	11.77	1.78	45.20	17.13	−28.08
17+00.00	0.00	13.79	3.90	27.29	49.10	44.41	−4.69
18+00.00	6.87	0.24	12.72	25.98	61.82	70.39	8.57
19+00.00	10.55	0.03	32.26	0.49	94.09	70.88	−23.20
20+00.00	1.74	6.77	22.76	12.59	116.84	83.48	−33.36
21+00.00	2.33	1.79	7.52	15.85	124.37	99.32	−25.04
22+00.00	7.30	0.00	17.82	3.31	142.19	102.63	−39.56
23+00.00	6.39	0.32	25.35	0.59	167.54	103.22	−64.31

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100–YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

STATE OF TEXAS
OMAR J. CORREDOR
47746
REGISTERED
PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

LANDMARK DR.

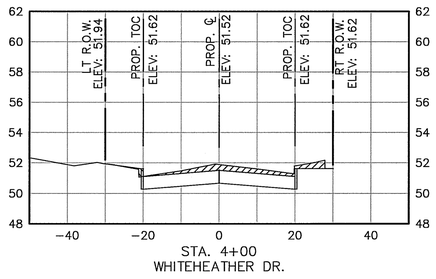
CROSS SECTION
7 OF 9

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FILE NO.: SM5056	
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CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 189 OF 191	

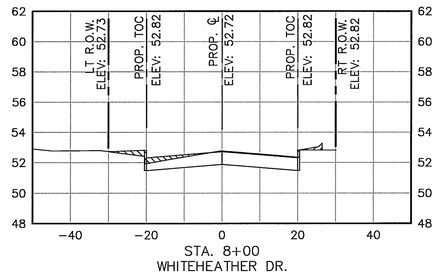
PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

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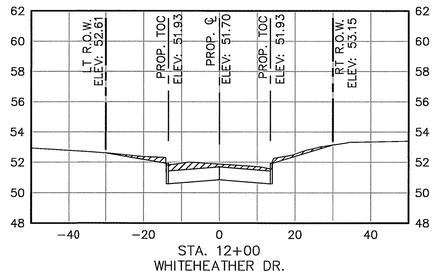
FOR REDUCED PLANS
original scale in inches



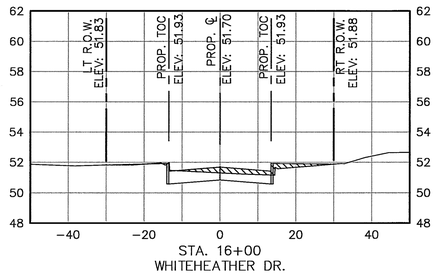
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WHITEHEATHER DR.



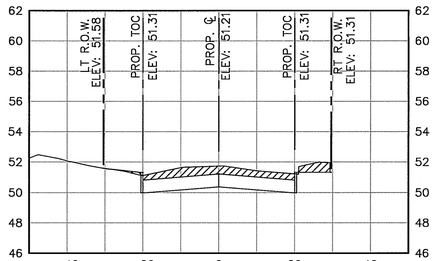
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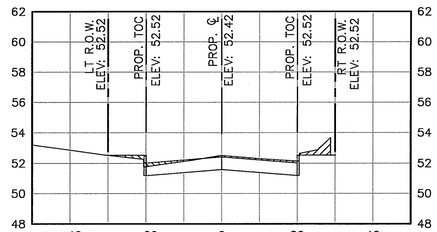
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WHITEHEATHER DR.



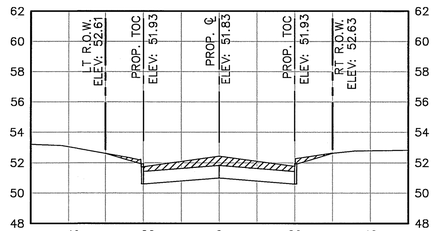
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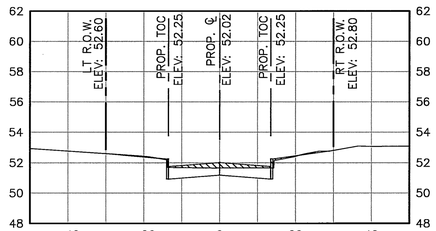
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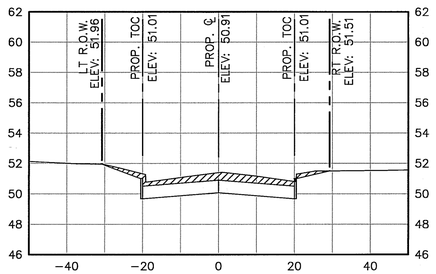
STA. 7+00
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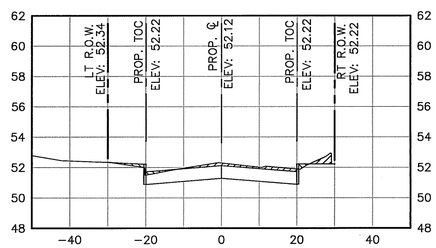
STA. 11+00
WHITEHEATHER DR.



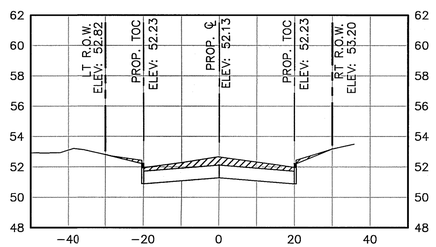
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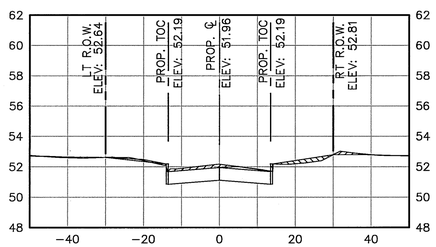
STA. 2+00
WHITEHEATHER DR.



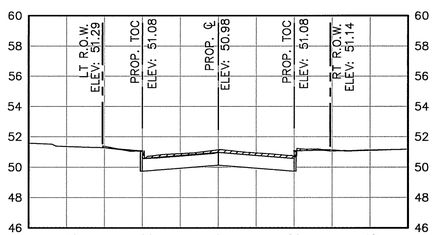
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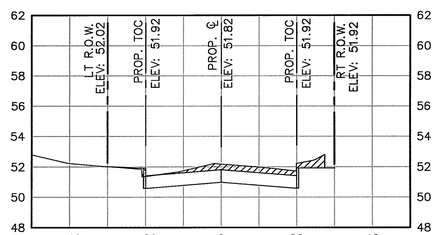
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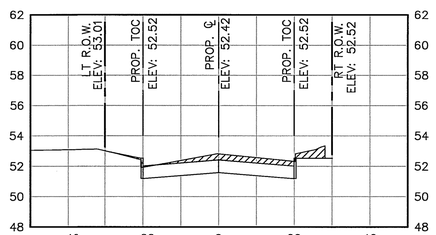
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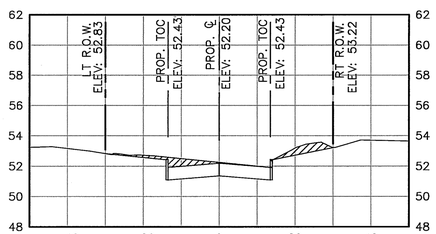
STA. 1+45
WHITEHEATHER DR.



STA. 5+00
WHITEHEATHER DR.



STA. 9+00
WHITEHEATHER DR.

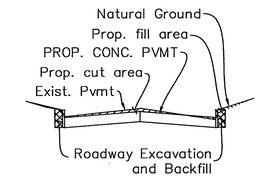


STA. 13+00
WHITEHEATHER DR.

LEGEND

CUT AREA

FILL AREA



NOTES:

1. FILL TOTAL ADJUST TO ADD AREA OF FILL FROM 2' BACK OF CURB ABOVE SUBGRADE.
2. ALL VOLUME QUANTITIES ARE STATED IN CUBIC YARDS ON CROSS SECTION SHEETS.
3. TOTAL NET CUT VOLUME OF 00.00 CUBIC YARDS INDICATES NO INCREASE OF FILL IN FLOODPLAIN FOR THIS PROJECT. THIS PROJECT IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.
4. FOR BID PURPOSES, CUT VOLUME IS DIVIDED BETWEEN THE PAY ITEMS FOR ROADWAY EXCAVATION AND STORM SEWER.

SES HORIZON
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SES HORIZON CONSULTING ENGINEERS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-003922

OMAR J. CORREDOR
47746
REGISTERED PROFESSIONAL ENGINEER

SURVEYED BY:
LANDTECH CONSULTANTS, INC.
FB. NO. P-5602

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

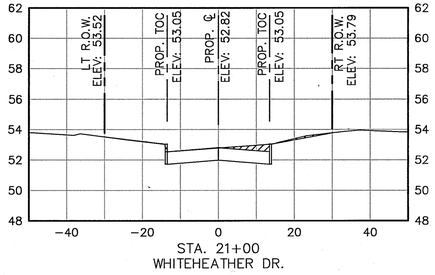
WHITEHEATHER DR.

CROSS SECTION
8 OF 9

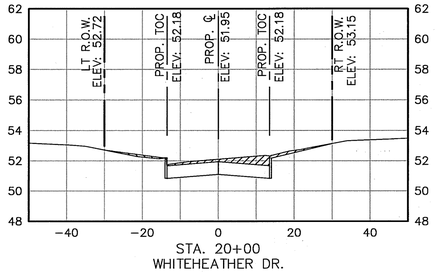
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FILE NO.: SM5056	
DRAWING SCALE	
HORIZ: 1"= 20' VERT: 1"=5'	
CITY OF HOUSTON PM	
ISAAC MUNIZ, E.I.T.	
SHEET NO. 190 OF 191	

PUBLIC WORKS AND ENGINEERING
49210
CITY ENGINEER
HOUSTON, TEXAS

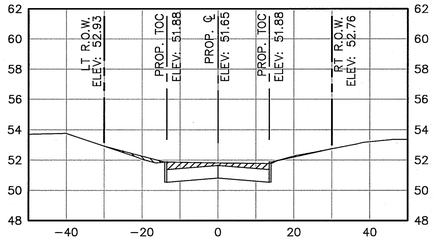
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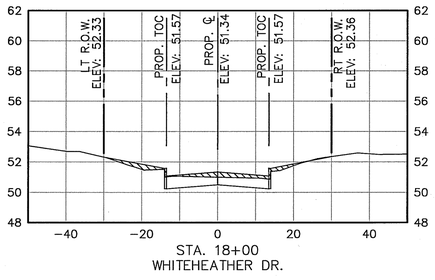
STA. 21+00
WHITEHEATHER DR.



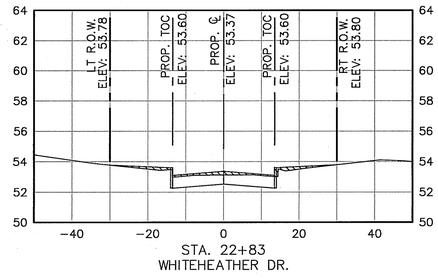
STA. 20+00
WHITEHEATHER DR.



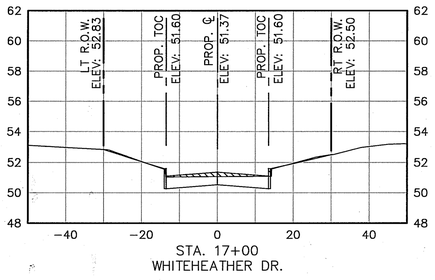
STA. 19+00
WHITEHEATHER DR.



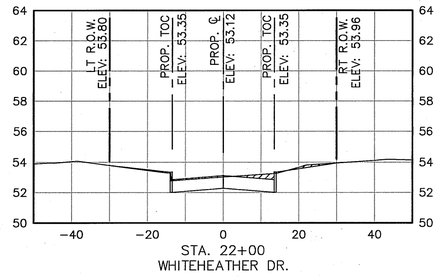
STA. 18+00
WHITEHEATHER DR.



STA. 22+83
WHITEHEATHER DR.



STA. 17+00
WHITEHEATHER DR.



STA. 22+00
WHITEHEATHER DR.

FOR REDUCED PLANS
original scale in inches

PLOTTED ON: Thursday, April 19, 2012 10:56:00 AM
FILE NAME: F:\WHB-SG4\C3D\WHB-SG4_TOC.DWG

TOTAL VOLUME TABLE
WHITEHEATHER DR.

Station	Fill Area (SF)	Cut Area (SF)	Fill Vol (CY)	Cut Vol (CY)	Cumu. Fill Vol (CY)	Cumu. Cut Vol (CY)	Net Cumm Vol (CY) Fill (−) Cut (+)
1+45.32	0.79	7.44	0.00	0.00	0.00	0.00	0.00
2+00.00	0.09	20.59	0.88	28.36	0.88	28.36	27.48
3+00.00	0.78	23.94	1.65	82.17	2.53	110.53	108.00
4+00.00	0.75	12.64	2.84	67.64	5.37	178.17	172.79
5+00.00	0.90	14.46	2.93	50.93	8.31	229.10	220.79
6+00.00	2.64	6.59	6.44	39.56	14.75	268.66	253.91
7+00.00	3.67	5.88	11.70	23.10	26.44	291.75	265.31
8+00.00	5.68	1.90	17.32	14.41	43.76	306.16	262.40
9+00.00	0.84	14.58	12.09	30.52	55.85	336.68	280.83
10+00.00	0.23	17.54	1.99	59.49	57.84	396.17	338.33
11+00.00	0.14	22.02	0.68	73.26	58.51	469.43	410.91
12+00.00	0.23	12.79	0.68	64.46	59.20	533.89	474.69
13+00.00	0.32	12.71	1.01	47.22	60.21	581.11	520.90
14+00.00	4.85	4.49	9.57	31.86	69.78	612.96	543.18
15+00.00	7.19	0.79	22.30	9.79	92.08	622.75	530.67
16+00.00	10.29	0.26	32.17	1.96	124.24	624.71	500.46
17+00.00	5.21	0.98	28.52	2.30	152.77	627.01	474.24
18+00.00	10.76	0.14	29.58	2.07	182.34	629.08	446.74
19+00.00	2.11	8.87	23.82	16.69	206.17	645.77	439.61
20+00.00	1.42	9.43	6.53	33.89	212.70	679.67	466.97
21+00.00	0.58	4.15	3.71	25.16	216.41	704.82	488.42
22+00.00	2.21	3.33	5.18	13.85	221.58	718.68	497.09
22+83.04	7.95	0.00	15.63	5.12	237.21	723.79	486.58

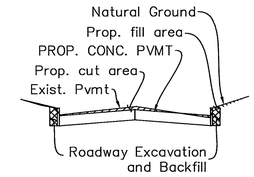
SUMMARY OF VOLUME

	FILL	CUT	BC TRENCH CUT	BC TRENCH BACK-FILL	TOTAL FILL	TOTAL CUT	NET VOL CUT(+)/FILL(-)
WEST OREM	133.53	342.52	380.00	380.00	513.53	722.52	208.99
BERAN DR.	57.72	430.05	327.93	327.93	385.65	757.98	372.33
EBBITE DR.	137.48	393.38	361.99	361.99	499.47	755.37	255.90
KNOTTY OAKS TR.	133.70	333.44	332.43	332.43	466.13	665.87	199.74
TIDEWATER DR.	63.06	394.09	331.87	331.87	394.93	725.96	331.03
WITHERING HEIGHTS	233.39	142.17	356.07	356.07	589.46	498.24	-91.22
LANDMARK DR.	167.54	103.22	294.52	294.52	462.06	397.74	-64.32
WHITEHEATHER DR.	237.21	723.79	614.74	614.74	851.95	1,338.53	486.58
SUB-TOTAL	1,163.63	2,862.66	2,999.55	2,999.55	4,163.18	5,862.21	1,699.03
ADJUSTMENT FOR STORM SEWER TRENCH EXCAVATION						-525.00	
TOTAL						5,337.21	

LEGEND

CUT AREA

FILL AREA



NOTES:

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STATE OF TEXAS 47746 OMAR J. CORREDOR REGISTERED PROFESSIONAL ENGINEER

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHITE HEATHER DRAINAGE
AND PAVING SUB-PROJECT IV

WHITEHEATHER DR.

CROSS SECTION
9 OF 9

WBS NO.: M−000262−0004−4
CITY DWG NO.:
FILE NO.: SM5056
DRAWING SCALE
HORIZ: 1"= 20' VERT: 1"=5'
CITY OF HOUSTON PM
ISAAC MUNIZ, E.I.T.
SHEET NO. 191 OF 191

PUBLIC WORKS & ENGINEERING 49210 CIVIL ENGINEER HOUSTON, TEXAS