CITY OF HOUSTON

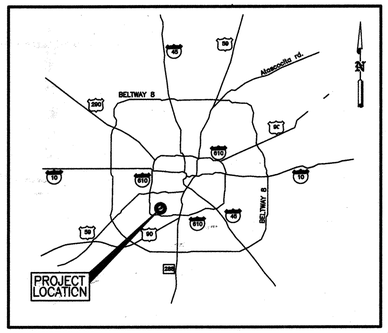
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION DIVISION

NEIGHBORHOOD STREET RECONSTRUCTION PROJECT 451 IN BRAESWOOD PLACE SUBDIVISION

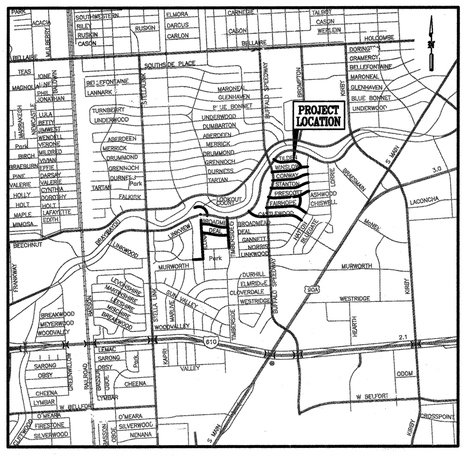
WBS NO. N-000383-0001-4

All Utilities Must Be Elevated Or Protected To The Minimum Flood Protection Elevation
50.4 ft (2001 Adj)

APPROVED
FLOODPLAIN GROUP
Date 3/27/12 TDT



LOCATION MAP
NTS



VICINITY MAP
KEY MAP NO. 532 N, P & K
GIMS MAP NO: 5254-A, 5254-B, 5254-C & 5254-D
FEMA FIRM MAP NO: 48201C0860K
NTS

CITY OF HOUSTON
TEXAS

MAYOR
ANNISE D. PARKER

CONTROLLER
RONALD C. GREEN

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CONTRACTOR TO NOTIFY CITY OF HOUSTON 48 HOURS BEFORE STARTING CONSTRUCTION.

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	ED GONZALEZ DISTRICT H	JAMES G. RODRIGUEZ DISTRICT I
MIKE LESTER 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 POS'TION 5	

P:\City of Houston\2006-35_NSR 451\DRAWINGS\01-coversheet.dwg

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596
11011 Richmond Avenue
Suite 375
Houston, Texas 77042
713-965-9996

FB NO. P-5444
TDLR EABPRJ: A8821655

WATER 3-13-2012	CONSTRUCTION Concurrence Survey 3/15/12 3/19/12
WASTEWATER 3/5/12	TRAFFIC AND TRANSPORTATION 3/22/12
STORM WATER 2-23-12	SPONSOR DEPARTMENT N/A
STREET & BRIDGE N/A	CHIEF ENGINEER 2-27-12
PARKS & RECREATION DEPARTMENT URBAN FORESTRY DIVISION 2-24-10	
CITY ENGINEER 3-22-12 DATE	
DIRECTOR OF PUBLIC WORKS AND ENGINEERING 3/26/12 DATE	

PUBLIC WORKS AND ENGINEERING
RECEIVED AND FILED
49097
CITY SECRETARY'S NUMBER
HOUSTON, TEXAS

LEGEND

PLAN VIEW – EXISTING

ROW LINE

DITCHES, LEFT AND RIGHT

BASE LINE 9+00 10+00

FENCE LINE

EDGE OF CONCRETE

EXISTING CURB LINE

EDGE OF ASPHALT

EDGE OF SHELL OR GRAVEL

DIMENSION LINE 28'

CENTERPOINT ENERGY CONDUIT CENTERPOINT ENERGY (MID) M.H.

CENTERPOINT ENERGY GAS CENTERPOINT ENERGY GAS LINE

SBC CONDUIT SBC MCD M.H.

LIGHT POLE

LOT LINES

MATCH LINES

CABLE TV

FILL EASEMENT

DRAINAGE EASEMENT

WATER LINE 24" (AND SMALLER) WATER / 30" (AND LARGER) WATER

WASTEWATER SEWER LINE 24" (AND SMALLER) WASTEWATER SEWER / 30" (AND LARGER) WASTEWATER SEWER

STORM SEWER LINE 24" (AND SMALLER) STORM SEWER / 30" (AND LARGER) STORM SEWER

IRON PIPE OR IRON ROD MONUMENTS 3/4" IP

POINT OF INTERSECTION

POWER POLE

POWER POLE w/ DOWN GUY

GAS METER G.M.

GAS VALVE G.V.

HEADER

BUILDING

TREE

WATER METER W.M.

WATER VALVE W.V.

FIRE HYDRANT F.H.W.V.

TAPPING SLEEVE & VALVE T.S.& V.

REDUCER 8" 6"

ROUND CONNECTIONS 8"

SANITARY SEWER MANHOLE AND CLEANOUT M.H.

STORM SEWER MANHOLE M.H.

STORM SEWER INLETS "B" INLET "BB" INLET "C" INLET

CULVERT & PIPE 24" CP

TOP OF CURB OR GUTTER LINE ELEV. TC= 380.54 GL=379.06

PROFILE VIEW – EXISTING

NORTH OR EAST PROPERTY LINE

SOUTH OR WEST PROPERTY LINE

NORTH OR EAST CURB LINE

SOUTH OR WEST CURB LINE

CENTERLINE OF RIGHT OF WAY

PROFILE VIEW – EXISTING

CENTERPOINT ENERGY CONDUIT — CENTERPOINT ENERGY CONDUIT

CENTERPOINT ENERGY GAS LINE — 8" ENTEX GAS

WESTERN UNION — WESTERN UNION

SBC TELEPHONE CONDUIT — SBC MCD

WATER LINE — WATER LINE 24" (AND SMALLER)

WASTEWATER SEWER LINE — SANITARY SEWER 24" (AND SMALLER)

WASTEWATER SEWER LINE — SANITARY SEWER 30" (AND LARGER)

STORM SEWER LINE — STORM SEWER 24" (AND SMALLER)

STORM SEWER LINE — STORM SEWER 30" (AND LARGER)

CENTERPOINT ENERGY MANHOLE

SBC TELEPHONE MANHOLE

SANITARY SEWER MANHOLE AND CLEANOUT

STORM SEWER MANHOLE

INFORMATION OBTAINED FROM RECORD DRAWINGS, NOT FIELD VERIFIED ®

PLAN VIEW – PROPOSED

WATER LINE — WATER LINE 24" (AND SMALLER) / WATER LINE 30" (AND LARGER)

WATER VALVE W.V.

FIRE HYDRANT F.H.W.V.

TAPPING SLEEVE & VALVE T.S.& V.

REDUCERS 12" 8"

ROUND CONNECTIONS 8"

SANITARY SEWER LINES — SANITARY LINE 24" (AND SMALLER) / SANITARY LINE 30" (AND LARGER)

SANITARY SEWER MANHOLE

STORM SEWER LINES — STORM SEWER 24" (AND SMALLER) / STORM SEWER 30" (AND LARGER)

STORM SEWER MANHOLE

STORM SEWER INLETS "B" INLET "BB" INLET "C" INLET

PROFILE VIEW – PROPOSED

SANITARY SEWER LINE — SANITARY LINE 24" (AND SMALLER)

SANITARY SEWER LINE — SANITARY LINE 30" (AND LARGER)

STORM SEWER LINE (24" AND SMALLER) — STORM SEWER 24" (AND SMALLER)

STORM SEWER LINE — STORM SEWER 30" (AND LARGER)

STORM SEWER MANHOLE

WATER LINE — WATER LINE 24" (AND SMALLER)

WATER LINE — WATER LINE 30" (AND LARGER)

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No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223–4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

INDEX SHEET AND PROJECT LEGEND

WBS N–000383–0001–4

FILE: P:\City of Houston\2006–05_NSR 451\DRAWINGS\02–INDEX.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 2 OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
LICENSE NUMBER
ENGINEER

STANDARD PAVING NOTES FOR DRAWING CALL OUTS:

THE FOLLOWING NOTES OR PHRASES ARE SPECIFIC TO PAVING IMPROVEMENTS AND MAY BE INCLUDED IN ALL SETS OF CONSTRUCTION DRAWINGS CONTAINING PAVING IMPROVEMENTS. THE PLAN AND PROFILE SHEETS MAY REFERENCE THE NOTES OR PHRASES IN THE PLAN VIEW BY NOTE NUMBER AS LISTED BELOW:

1. PROPOSED CONCRETE PIPE STUB WITH RING GRATE AS SHOWN ON STANDARD DETAIL 02084–05 STORM SEWER RING GRATE FOR OPEN END OF 18" TO 72" RCP STUBS TO DITCH, AT A MINIMUM OF 0.5 FEET BELOW THE EXISTING DITCH FLOW LINE. REALIGN DITCH AS DIRECTED BY THE CITY ENGINEER.
2. PROPOSED FLEXIBLE BASE AS SHOWN ON STANDARD DETAIL 02741–01 – HOT–MIX ASPHALTIC CONCRETE PAVEMENT DETAILS.
3. PROPOSED SAWED JOINT AND EXPOSE 15–INCHES OF REINFORCING STEEL. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. SEE NOTE 11.
4. PROPOSED ESPLANADE CURB.
5. PROPOSED STANDARD MONOLITHIC CURB AND GUTTER AS SHOWN ON STANDARD DETAIL 02771–01 – CURB, CURB AND GUTTER AND HEADER DETAILS.
6. DOWEL ON 6–INCH CURB AFTER ASPHALTIC SURFACING IS IN PLACE, OR INTO EXISTING CONCRETE PAVEMENT, AS APPLICABLE.
7. RACK OVER EXISTING MANHOLE TO MISS PROPOSED CURB, IF CONFLICT EXISTS. MAXIMUM RACK OF ONE–INCH PER COURSE OF BRICK.
8. REMOVE AND REPLACE SIDEWALK AS DIRECTED BY THE ENGINEER.
9. PROPOSED 3/4–INCH BOARD EXPANSION OR PREMOLDED NON–EXTRUDING JOINT BETWEEN WALK AND CURB.
10. REMOVE A SUFFICIENT LENGTH OF CONCRETE PIPE, AS DETERMINED BY THE ENGINEER, AND CONNECT TO PROPOSED INLET WITH REINFORCED CONCRETE PIPE OF LIKE DIAMETER.
11. HORIZONTAL DOWELS SHALL BE NO. 6 BARS, 24 INCHES LONG, DRILLED AND EMBEDDED 12 INCHES INTO THE CENTER OF THE EXISTING SLAB WITH PO ROC OR EQUAL. DOWELS SHALL BE 12 INCHES, CENTER TO CENTER, UNLESS OTHERWISE SPECIFIED.
12. THE CONTRACTOR SHALL NOTIFY THE CITY TRAFFIC SIGNAL DIVISION, 10 WORKING DAYS IN ADVANCE FOR RELOCATION OF EXISTING TRAFFIC SIGNAL POLES.
13. ADJUST EXISTING INLET TO FIT NEW GRADE AND ALIGNMENT.
14. DECREASE CURB EXPOSURE FROM 6 INCHES TO 2 INCHES IN 1 FOOT.
15. DECREASE CURB EXPOSURE FROM 6 INCHES TO 2 INCHES IN 4 FEET.
16. DECREASE CURB EXPOSURE FROM 6 INCHES TO 0 INCHES IN 2 FEET.
17. PROPOSED REINFORCED CONCRETE SIDEWALK SHALL BE COLORED BLACK FOR CONCRETE ROADWAYS AND UNCOLORED FOR ASPHALTIC CONCRETE ROADWAYS.
18. RIP–RAP SHALL BE PLACED ON SLOPES AND DITCHES AS DIRECTED BY THE ENGINEER.
19. CONVERT EXISTING INLET OR MANHOLE WITH INLET TOP TO MANHOLE.
20. REMOVE EXISTING CULVERT.
21. REMOVE AND REPLACE PIPE CULVERT AS DIRECTED BY THE ENGINEER.
22. EXISTING STRUCTURE TO BE REMOVED.
23. BREAK INTO BARREL OF MONOLITHIC REINFORCED CONCRETE STORM SEWER. COST TO BE INCLUDED IN THE UNIT PRICE BID FOR STORM SEWER OR LEAD, AS APPLICABLE.
24. PROPOSED DOWELED–ON, 12–INCH–WIDE MOUNTABLE CURB.
25. SHADED AREA DENOTES APPROXIMATE LIMITS OF PROPOSED ASPHALT OVERLAY.
26. PLUG AND ABANDON EXISTING RCP.
27. REMOVE EXISTING CONCRETE PAVEMENT, CONCRETE BASE, AND CEMENT STABILIZED SHELL BASE COURSE WITH OR WITHOUT ASPHALT SURFACING.
28. PROPOSED ASPHALT OVERLAY.
29. REMOVE INLET AND EXTEND LEAD.
30. MEET EXISTING CURB OR CURB AND GUTTER FOR GRADE AND ALIGNMENT.
31. PROPOSED WHEELCHAIR RAMP, AS SHOWN ON STANDARD DETAIL 02775–02 – WHEELCHAIR RAMP DETAILS.
32. ADJUST EXISTING MANHOLE FRAME AND COVER TO FIT NEW GRADE.
33. REMOVE CURB OR CURB AND GUTTER, AS APPLICABLE.
34. ADJUST EXISTING WATER VALVE BOXES TO NEW PAVING AND SIDEWALK GRADE. REPLACE MISSING OR DAMAGED VALVE BOXES AND COVERS.
35. REPLACE TYPE B INLET WITH TYPE BB INLET OR TYPE C–1 INLET.
36. REMOVE MOUNTABLE CURB.
37. PROPOSED PAVEMENT MARKINGS AS SHOWN ON STANDARD DETAIL 02763–01 – PAVEMENT MARKING DETAILS.
38. PROPOSED WHITE PLASTIC MARKER AS SHOWN ON TRAFFIC AND TRANSPORTATION DRAWING, STANDARD ELONGATED WORD AND ARROW SYMBOL DESIGN DETAILS FOR PAVEMENT MARKINGS.
39. PROPOSED PLASTIC MARKER, AS SHOWN ON TRAFFIC AND TRANSPORTATION DRAWING, STANDARD FOR LEFT TURN CHANNELIZATION.
40. PROPOSED STANDARD CONCRETE PAVING HEADER AS SHOWN ON STANDARD DETAIL 02771–01 CURB, CURB AND GUTTER AND HEADER DETAILS.
41. REMOVE AND DISPOSE OF EXISTING STORM SEWER INLET, INLET LEAD, AND/OR MANHOLE
42. REMOVE EXISTING STORM SEWER
43. SPRINKLER HEAD ADJUSTMENT TO BE RELOCATED AS NECESSARY.

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 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 CONTPACTOR 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 E–MAIL HIM AT rl17259@att.com, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR ATT&T TEXAS/SWBT FACILITIES.

DIRECT BURIED CABLE PROCEDURE

DIRECT BURIED CABLE RECORDS ARE NOT AVAILABLE. TO DETERMINE THE LOCATION OF BURIED CABLE PLANT DURING THE DESIGN PHASE OF YOUR PROJECT, FOLLOW THE PROCEDURE BELOW:

- CALL 1–800–344–8377 AND ADVISE YOU NEED THE EXISTING AT&T TEXAS/SWBT FACILITIES LOCATED FOR THE DESIGN PHASE OF YOUR PROJECT PLEASE ALLOW AT LEAST 72 HOURS FOR THE CABLES TO GET MARKED BEFORE SENDING YOUR FIELD CREW FOR BASE LINE SURVEY FOR LOCATES OF. BE SPECIFIC ON THE PROJECT LOCATION.
- THE LOCATOR WILL FIELD LOCATE THE EXISTING AT&T TEXAS/SWBT FACILITIES ORANGE PAINT AND/OR FLAGS.
- YOUR FIELD PARTY CAN SURVEY THE BURIED CABLE LOCATION USING THE ORANGE MARKS ON THE GROUND. IF THE CABLES ARE NOT MARKED, 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.
- PLOT THE EXACT LOCATION OF THE AT&T TEXAS/SWBT DIRECT BURIED CABLE FACILITIES ON THE PLAN AND PROFILE SHEETS.

CENTERPOINT ENERGY

1. NOTIFY CENTERPOINT ENERGY AT (713) 675–7450 AFTER UNCOVERING ANY ABANDONED GAS LINES. DO NOT DISTURB GAS LINES UNTIL CENTERPOINT ENERGY HAS VERIFIED STATUS OF LINE.

2. CAUTION: UNDERGROUND GAS FACILITIES.
LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY INTRASTATE PIPELINE INC. WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURES 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.

A. 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.

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

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

3. 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 (CENTERPOINT ENERGY)

OVERHEAD LINES MAY EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) 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 MOVED CALL CENTERPOINT ENERGY AT 713–207–2222 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.

CITY OF HOUSTON STANDARD NOTES

GENERAL CONSTRUCTION NOTES INSIDE CITY LIMITS

GENERAL NOTES – INSIDE CITY LIMITS

1. Construct wastewater collection systems, water lines, storm drainage and street paving in accordance with the latest edition of the publications Standard Construction Specifications 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. The geotechnical investigation for this project was conducted in accordance with Chapter 11 of the latest edition of the publication Infrastructure Design Manual, published by the City of Houston, Department of the Public Works and Engineering. Soils report was prepared by [Geotechnical Engineering Firm] Report No. [No. of Report], dated [Date of Report].
3. Utilities presented on these drawings are shown based on the best available information. Contractor shall verify the exact locations in the field prior to commencing construction. Contractor shall notify Texas One Call at 713-223-4567/800-245-4545 and Lone Star One Call at 800-669-8344 at least 48 hours before proceeding with any excavation.
4. Contractor shall be responsible for damages to existing water, wastewater, storm water lines and traffic control devices. Damages shall be repaired in accordance with the City of Houston, Department of Public Works and Engineering's Standard Construction Specifications for Wastewater Collection System. Water Lines, Storm Drainage, and Street Paving and Standard Construction Details for Wastewater Collection Systems, Water Lines, Storm Drainage, and Street Paving, referenced above, at no additional cost.
5. Contractor shall notify the office of the City Engineer, Department of Public Works and Engineering via fax at 832-395-4424 (fax) for inspection at least 48 hours prior to commencing construction.
6. Adequate drainage shall be maintained at all time during construction and any drainage ditch or structure disturbed during construction shall be restored to existing conditions or better.
7. Contractor shall take necessary precautions to protect root systems of shrubs, plants and trees along the area of excavation.
8. Contractor shall comply with latest edition of OSHA regulations and the State of Texas laws concerning excavation.
9. Contractor shall maintain a set of redline drawings recording as-built conditions during construction. These redline marked up drawings will be submitted to the Design Consultant who will make the changes on the original tracings, labeling each sheet in the set as "Record Drawings", and returning same to the City Engineer.

GCN (INSIDE)-1
03-21-2006

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

GENERAL NOTES

WBS N–000383–0001–4

FILE: N:\City of Houston\2006–05_NSR 451\DRAWINGS\03–NOTES.dwg

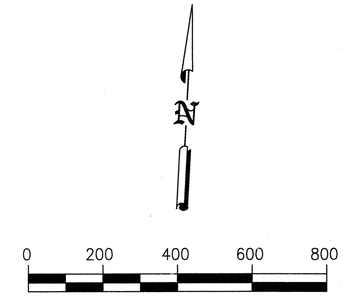
DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 3 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED AND FILED
49097
USER





NO NET FILL WAS ADDED ON THIS PROJECT.
NO CHANGE IN STORM SEWER CONVEYANCE.
NO MITIGATION IS REQUIRED DUE TO THE NATURE OF THIS PROJECT.

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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SIGNATURE VALID FOR ONE YEAR

n/a DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

PROJECT LAYOUT

WBS N-000383-0001-4

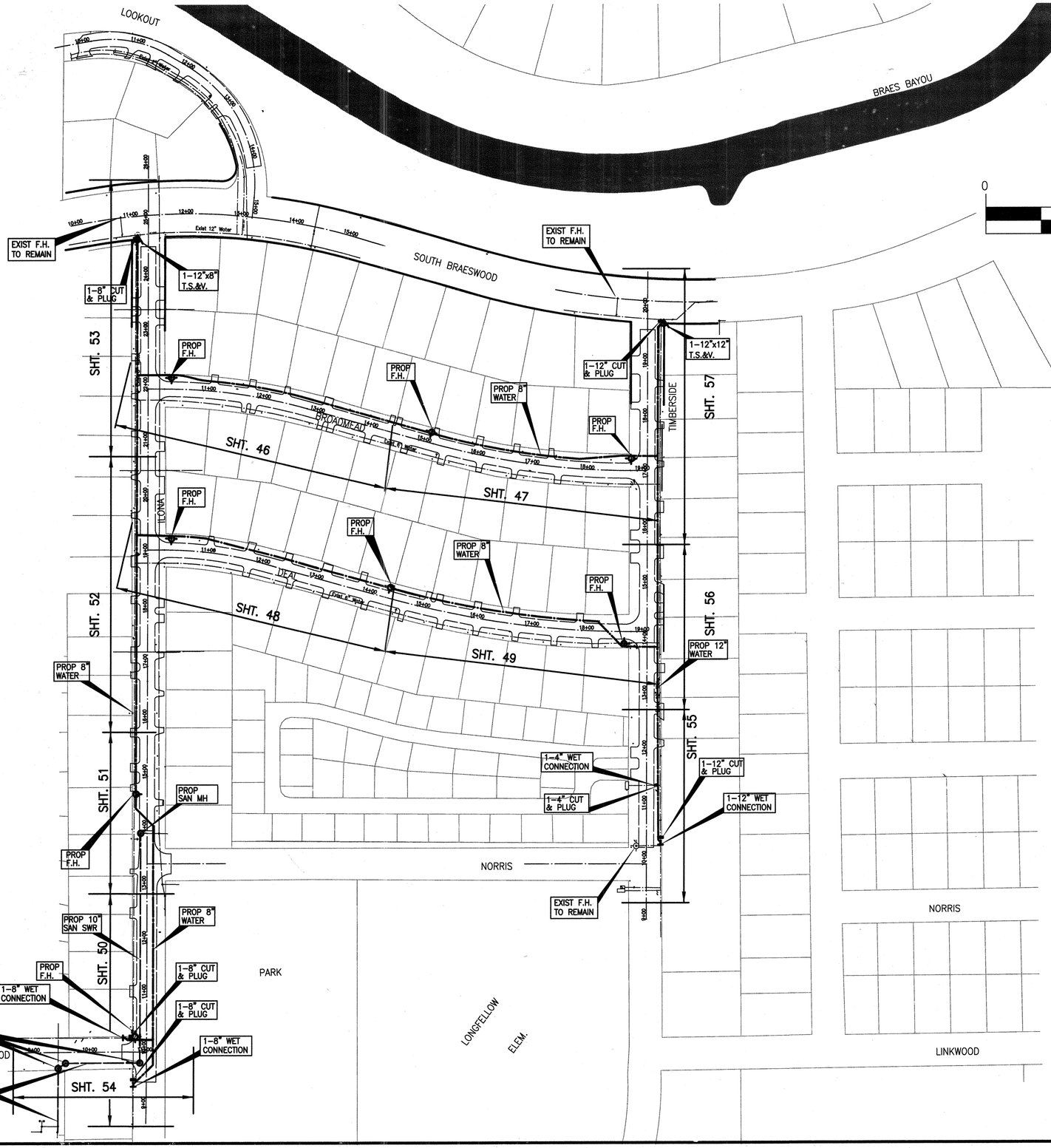
FILE:
J:\City of Houston\2006-05_NSR 451\DRAWINGS\project layout.dwg

DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 4 OF 131

PUBLIC WORKS AND ENGINEERING
49097



No.	Date	Revisions	App'd

LEGEND

- 8" — PROP WATER & SIZE
- PROP TAPPING SLEEVE & VALVE (TS & V)
- PROP FIRE HYDRANT
- PROP CUT & PLUG
- PROP WET CONNECTION
- EXIST WATER
- EXIST FIRE HYDRANT (TO REMAIN)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

WATER LINE & SANITARY SEWER LAYOUT

SHEET 1 OF 2

WBS N-000383-0001-4

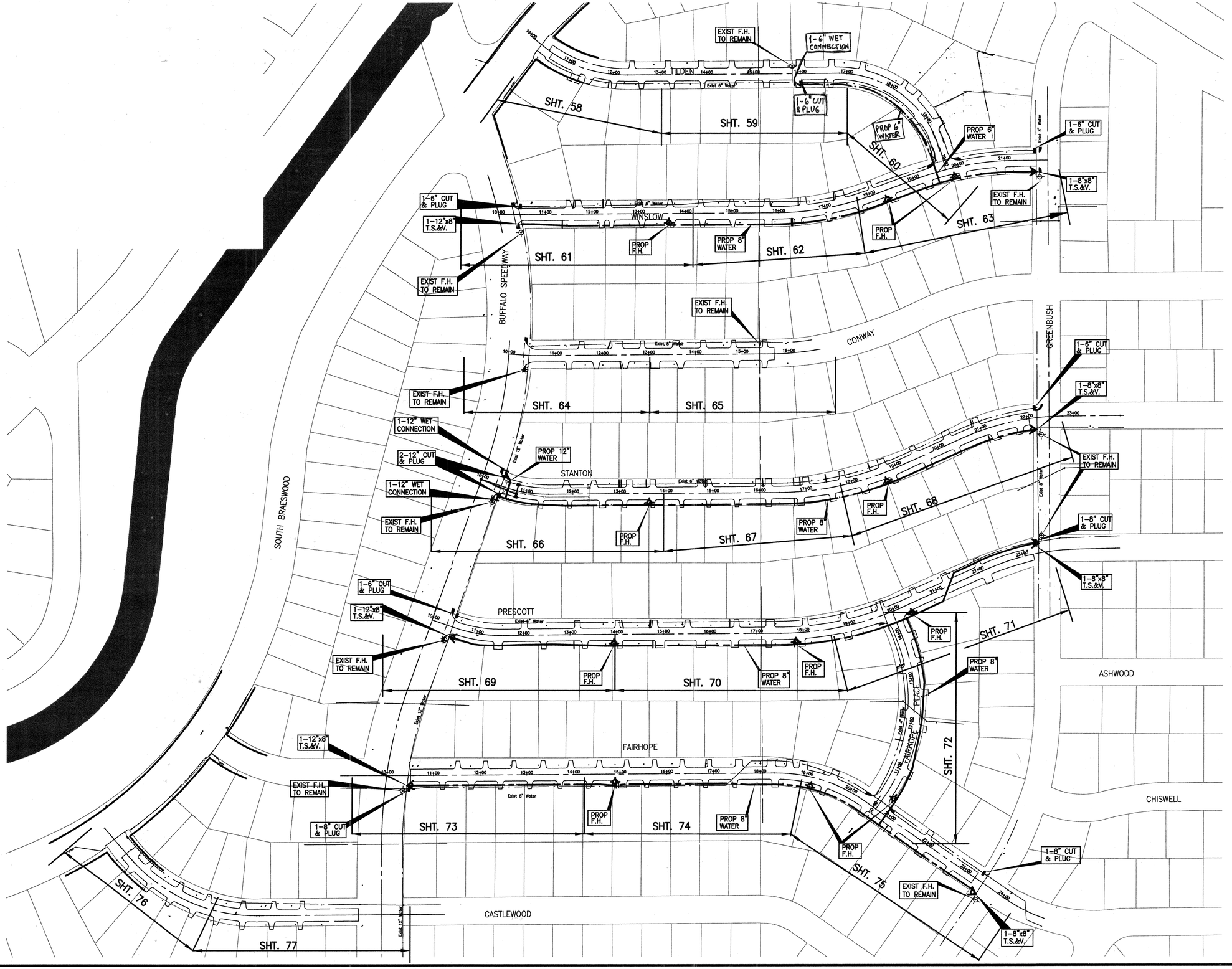
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\A Prop Water layout.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 5 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — CITY PROJECT NUMBER — HOUSTON, TEXAS



LEGEND

- PROP WATER & SIZE
- PROP TAPPING SLEEVE & VALVE (TS & V)
- PROP FIRE HYDRANT
- PROP CUT & PLUG
- PROP WET CONNECTION
- EXIST WATER
- EXIST FIRE HYDRANT (TO REMAIN)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
NB DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON, TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3745

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

WATER LINE LAYOUT

SHEET 2 OF 2

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\@ Prop Water layout.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 6 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — NUMBER — TEXAS

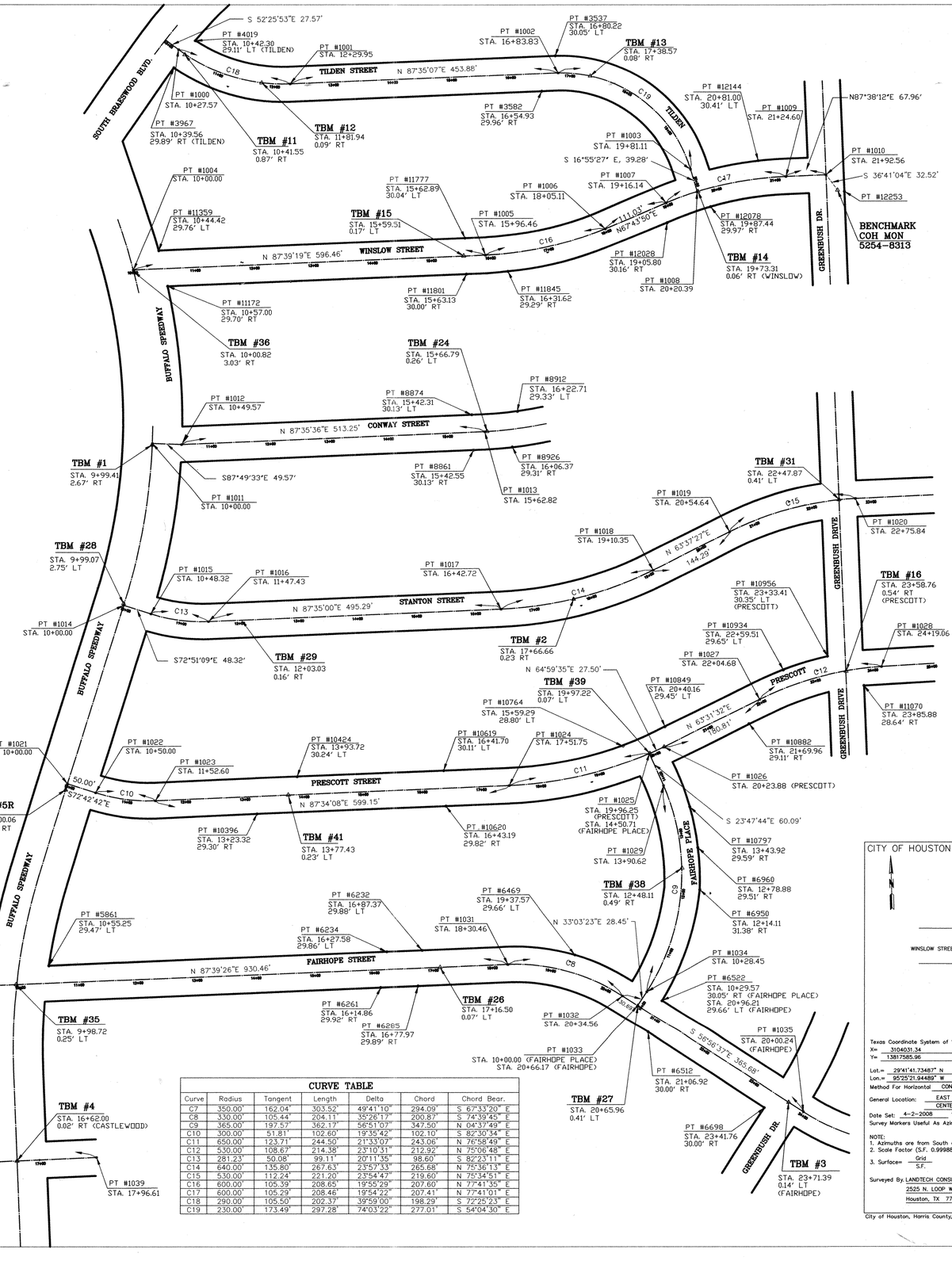
MW

BASELINE POINT TABLE

Point	Surf. Northing	Surf. Easting	Description	Grid Northing	Grid Easting
1000	13819427.66	3103275.93	CUT X IN CONC	13817824.61	3102915.95
1001	13819367.78	3103464.96	SET SQUARE HEAD NAIL	13817764.73	3103104.96
1002	13819386.90	3103918.44	SET SQUARE HEAD NAIL	13817783.85	3103558.39
1003	13819224.37	3104142.76	SET SQUARE HEAD NAIL	13817621.34	3103782.68
1004	13819057.29	3103199.94	CUT X IN CONC	13817454.28	3102839.97
1005	13819081.69	3103795.90	SET SQUARE HEAD NAIL	13817478.68	3103435.86
1006	13819125.94	3103998.73	SET SQUARE HEAD NAIL	13817522.92	3103638.67
1007	13819168.02	3104101.48	SET SQUARE HEAD NAIL	13817564.99	3103741.41
1008	13819186.79	3104154.20	SET SQUARE HEAD NAIL	13817583.76	3103794.12
1009	13819212.26	3104304.12	SET SQUARE HEAD NAIL	13817609.23	3103944.02
1010	13819215.06	3104372.02	CUT X IN CONC	13817612.03	3104011.92
1011	13818761.69	3103232.63	CUT X IN CONC	13817158.72	3102872.65
1012	13818759.81	3103282.16	SET SQUARE HEAD NAIL	13817156.84	3102922.18
1013	13818781.36	3103794.96	SET SQUARE HEAD NAIL	13817178.39	3103434.92
1014	13818489.54	3103184.33	CUT X IN CONC	13816886.60	3102824.36
1015	13818475.30	3103230.50	SET SQUARE HEAD NAIL	13816872.35	3102870.52
1016	13818462.23	3103328.23	SET SQUARE HEAD NAIL	13816859.29	3102968.25
1017	13818483.12	3103823.08	SET SQUARE HEAD NAIL	13816880.17	3103463.04
1018	13818549.17	3104080.42	SET SQUARE HEAD NAIL	13816946.22	3103720.35
1019	13818613.27	3104209.69	SET SQUARE HEAD NAIL	13817010.32	3103849.60
1020	13818667.96	3104422.37	CUT X IN CONC	13817064.99	3104062.26
1021	13818185.67	3103089.75	SET SQUARE HEAD NAIL	13816582.76	3102729.79
1022	13818170.81	3103137.49	CUT X IN CONC	13816567.90	3102777.53
1023	13818157.50	3103238.72	SET SQUARE HEAD NAIL	13816554.59	3102878.75
1024	13818182.91	3103837.34	SET SQUARE HEAD NAIL	13816580.00	3103477.29
1025	13818237.67	3104074.15	SET SQUARE HEAD NAIL	13816634.75	3103714.07
1026	13818249.35	3104099.18	SET SQUARE HEAD NAIL	13816646.43	3103739.10
1027	13818329.95	3104261.03	SET SQUARE HEAD NAIL	13816727.03	3103900.93
1028	13818384.65	3104466.80	SET SQUARE HEAD NAIL	13816781.72	3104106.68
1029	13818182.69	3104098.39	SET SQUARE HEAD NAIL	13816579.78	3103738.31
1030	13817844.32	3102905.71	CUT X IN CONC	13816241.45	3102545.77
1031	13817882.35	3103835.39	SET SQUARE HEAD NAIL	13816279.48	3103475.34
1032	13817829.22	3104029.10	SET SQUARE HEAD NAIL	13816226.36	3103669.03
1033	13817812.49	3104054.82	SET SQUARE HEAD NAIL	13816209.62	3103694.75
1034	13817836.33	3104070.34	SET SQUARE HEAD NAIL	13816233.46	3103710.27
1035	13817629.76	3104335.59	CUT X IN CONC	13816026.91	3103975.49
1036	13817714.62	3102404.36	CUT X IN CONC	13816111.77	3102044.49
1037	13817648.53	3102465.38	SET SQUARE HEAD NAIL	13816045.68	3102105.50
1038	13817536.25	3102737.20	SET SQUARE HEAD NAIL	13815933.41	3102377.28
1039	13817553.03	3103139.99	CUT X IN CONC	13815950.19	3102780.03

FOUND PROPERTY CORNER TABLE

Point	Surf. Northing	Surf. Easting	Elev.	Description	Grid Northing	Grid Easting
3537	13819416.78	3103913.58	46.63	FND 3\4IN IP	13817813.72	3103553.52
3582	13819355.75	3103890.84	47.25	FND 1\2IN IR	13817752.71	3103530.79
3967	13819396.13	3103268.35	47.51	FND 1\2IN IR	13817793.08	3102908.37
4019	13819442.92	3103304.38	47.36	FND 1\2IN IR	13817839.87	3102944.39
5296	13817621.69	3102449.88	48.08	FND 1\2IN IR	13816018.84	3102090.00
5446	13817570.09	3102826.70	48.60	FND 3\4IN IP	13815967.25	3102466.77
5447	13817567.45	3102766.80	48.47	FND 3\4IN PTP	13815964.62	3102406.88
5448	13817566.24	3102702.58	48.81	FND 3\4IN PTP	13815963.41	3102342.66
5449	13817507.14	3102701.10	48.88	FND 3\4IN PTP	13815904.31	3102341.19
5450	13817514.28	3102644.90	48.02	FND 3\4IN PTP	13815911.45	3102285.00
5457	13817572.52	3102886.90	48.33	FND 3\4IN PTP	13815969.68	3102526.96
5515	13817575.36	3102954.38	48.57	FND 3\4IN IP	13815972.52	3102594.44
5538	13817515.73	3102956.85	48.10	FND 3\4IN PTP	13815912.90	3102596.90
5860	13817815.94	3102951.41	48.41	FND 3\4IN IP	13816213.08	3102591.46
5861	13817880.08	3103058.70	48.36	FND 3\4IN IP	13816277.20	3102698.74
6232	13817906.33	3103690.28	48.27	FND 1\2IN IR	13816303.45	3103330.25
6234	13817903.86	3103630.54	48.30	FND 5\8IN IR	13816300.98	3103270.52
6261	13817843.61	3103620.28	48.36	FND 3\4IN PTP	13816240.74	3103260.26
6285	13817846.22	3103683.34	47.81	FND 3\4IN PTP	13816243.35	3103323.31
6469	13817898.27	3103948.58	47.89	FND 3\4IN PTP	13816295.39	3103588.52
6512	13817765.11	3104072.61	48.27	FND 5\8IN IR	13816162.25	3103712.54
6522	13817820.96	3104096.18	47.62	FND 5\8IN IR	13816218.09	3103736.11
6698	13817637.02	3104269.44	47.69	FND 1\2IN IR	13816034.17	3103909.34
6950	13818008.38	3104159.88	47.58	FND 1\2IN IR	13816405.49	3103799.79
6960	13818078.41	3104156.58	47.48	FND 1\2IN IR	13816475.51	3103796.50
8861	13818750.41	3103775.97	47.23	FND 1\2IN IP	13817147.44	3103415.93
8874	13818810.60	3103773.20	47.02	FND 3\4IN PTP	13817207.62	3103413.16
8912	13818816.04	3103850.46	47.66	FND 3\4IN IP	13817213.06	3103490.41
8926	13818755.80	3103841.72	48.11	FND 1\2IN IR	13817152.83	3103481.67
10396	13818135.47	3103410.53	47.83	FND 3\8IN IR	13816532.57	3103050.54
10424	13818197.93	3103478.34	48.12	FND 3\4IN PTP	13816595.02	3103118.34
10619	13818208.33	3103726.11	48.12	FND 3\4IN PTP	13816605.41	3103366.08
10620	13818148.51	3103730.14	48.20	FND 1\2IN IR	13816545.61	3103370.11
10764	13818250.70	3104029.82	47.06	FND 1\2IN IR	13816647.78	3103669.75
10797	13818147.26	3104142.83	46.97	FND 5\8IN IR	13816544.35	3103782.75
10849	13818282.97	3104100.63	46.89	FND 5\8IN IR	13816680.05	3103740.56
10882	13818288.42	3104242.92	46.83	FND 1\2IN IR	13816685.50	3103882.83
10934	13818379.58	3104300.87	46.47	FND 3\4IN IP	13816776.65	3103940.77
10956	13818402.48	3104375.46	46.48	FND 1\2IN IR	13816799.54	3104015.35
11070	13818353.28	3104437.19	47.13	FND 1\2IN IR	13816750.35	3104077.07
11172	13819029.95	3103258.11	47.63	FND 3\4IN PTP	13817426.94	3102898.13
11359	13819088.84	3103243.11	47.40	FND 3\4IN PTP	13817485.83	3102883.13
11777	13819110.33	3103761.13	46.92	FND 3\4IN PTP	13817507.32	3103401.09
11801	13819050.35	3103763.83	46.72	FND 3\4IN PTP	13817447.34	3103403.80
11845	13819055.02	3103833.88	47.26	FND 1\2IN IR	13817452.01	3103473.83
12028	13819136.19	3104103.34	46.30	FND 1\2IN IR	13817533.17	3103743.26
12078	13819162.17	3104176.90	46.10	FND 1\2" IRC "HUGHES SW"	13817559.15	3103816.82
12144	13819239.09	3104257.20	44.81	FND 1\2IN IR	13817636.06	3103897.11
12191	13819183.85	3104343.29	44.67	FND 3\4IN PTP	13817580.83	3103983.18
12219	13819078.65	3104347.93	46.23	FND 1\2IN IR	13817475.64	3103987.82
12253	13819186.77	3104403.13	44.38	FND 1\2IN IR	13817583.74	3104043.02

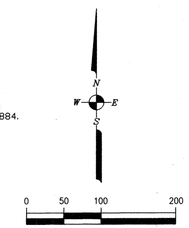


CURVE TABLE

Curve	Radius	Tangent	Length	Delta	Chord	Chord Bear.
C7	350.00'	162.04'	303.52'	49°41'10"	294.09'	S 67°33'20" E
C8	330.00'	105.44'	204.11'	35°26'17"	200.87'	S 74°39'45" E
C9	365.00'	197.57'	362.17'	56°51'07"	347.50'	N 04°37'49" E
C10	300.00'	51.81'	102.60'	19°35'42"	102.10'	S 82°30'34" E
C11	650.00'	123.71'	244.50'	21°33'07"	243.06'	N 76°58'49" E
C12	530.00'	108.67'	214.38'	23°10'31"	212.92'	N 75°06'48" E
C13	281.23'	50.08'	99.11'	20°11'35"	98.60'	S 82°23'11" E
C14	640.00'	135.80'	267.63'	23°57'33"	265.68'	N 75°36'13" E
C15	530.00'	112.24'	221.20'	23°54'47"	219.60'	N 75°34'51" E
C16	600.00'	105.39'	208.65'	19°55'29"	207.60'	N 77°41'35" E
C17	600.00'	105.29'	208.46'	19°54'22"	207.41'	N 77°41'01" E
C18	290.00'	105.50'	202.37'	39°59'00"	198.29'	S 72°25'23" E
C19	230.00'	173.49'	297.28'	74°03'22"	277.01'	S 54°04'30" E

Notes:

All bearings and coordinates are based on the Texas Coordinate System, South Central Zone, North American Datum of 1983, 1993 Adjustment. All distances shown are surface values, surface coordinates may be converted to grid coordinates by multiplying by a combined scale factor of 0.999884.



Benchmark:

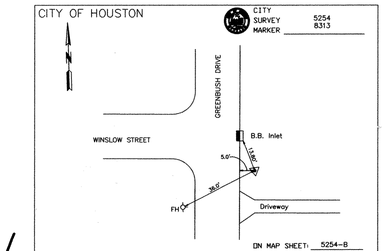
All elevations are based on FEMA Floodplain Reference Mark No. 040135: a brass disk stamped "D100 BM18" on the east sidewalk over bridge at North Braeswood and Buffalo Speedway.
Elev = 49.48 FEET NAVD88, 2001 Adjustment

COH Mon. 5254-0810: at northeast corner of S. Braeswood Boulevard and Lookout Court.
Elev= 46.92 FEET NAVD 88, 2001 Adjustment

COH Mon. 5254-8313: at the east side of Greenbush Drive. Approx. 25 Ft. south of centerline of Winslow Street.
Elev= 44.98 FEET NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARK (TBM) TABLE

TBM	Surf. Northing	Surf. Easting	Elev.	Description	Grid Northing	Grid Easting
1	13818759.05	3103231.94	47.02	SET NAIL\WASHINER	13817156.07	3102871.96
2	13818500.04	3103945.69	46.70	NAIL WASHER	13816897.09	3103585.63
3	13817646.12	3104310.71	46.49	SET NAIL\WASHINER	13816043.27	3103950.61
4	13817547.41	3103005.50	48.31	SET NAIL\WASHINER	13815944.57	3102645.55
5R	13818175.63	3103086.69	47.26	SET NAIL\WASHINER	13816572.72	3102726.73
11	13819418.69	3103286.72	46.36	SET NAIL\WASHINER	13817815.64	3102926.73
12	13819369.64	3103417.04	46.85	SET NAIL\WASHINER	13817766.59	3103057.04
13	13819381.38	3103972.76	46.12	SET NAIL\WASHINER	13817778.33	3103612.70
14	13819187.08	3104155.35	45.31	SET NAIL\WASHINER	13817584.05	3103795.27
15	13819080.35	3103758.98	47.23	SET NAIL\WASHINER	13817477.34	3103398.94
16	13818377.24	3104407.02	45.26	SET XCON	13816774.31	3104046.91
24	13818781.83	3103798.91	47.62	SET NAIL\WASHINER	13817178.85	3103438.87
26	13817877.72	3103720.61	48.09	SET NAIL\WASHINER	13816274.85	3103360.57
27	13817811.76	3104055.19	47.85	SET NAIL\WASHINER	13816208.89	3103695.12
28	13818492.45	3103184.25	46.88	SET NAIL\WASHINER	13816889.50	3102824.28
29	13818464.41	3103383.79	47.03	SET NAIL\WASHINER	13816861.47	3103023.80
31	13818666.43	3104394.44	44.39	SET NAIL\WASHINER	13817063.47	3104034.33
32	13817537.32	3102691.83	47.66	SET NAIL\WASHINER	13815934.49	3102331.92
35	13817848.57	3103003.41	48.73	SET NAIL\WASHINER	13816245.70	3102643.47
36	13819054.29	3103200.88	46.77	SET NAIL\WASHINER	13817451.28	3102840.91
38	13818044.51	3104129.80	46.93	SET NAIL\WASHINER	13816441.62	3103769.72
39	13818238.13	3104075.00	46.86	SET NAIL\WASHINER	13816635.21	3103714.93
41	13818167.27	3103463.34	47.61	SET NAIL\WASHINER	13816564.36	3103103.34



Texas Coordinate System of 1983, S.C. Zone NAD 83
X= 3104031.34
Y= 13817585.96

Lat.= 29°41'41.73487" N
Lon.= 95°25'21.94489" W
Method For Horizontal CONVENTIONAL
General Location: EAST SIDE OF GREENBUSH DRIVE, APPROX. 28 FT. SOUTH OF CENTERLINE OF WINSLOW STREET
Date Set: 4-2-2008 Type of Mark: TYPE 4B
Survey Markers Useful As Azimuth From Station

NOTE:
1. Azimuths are from South orientation.
2. Scale Factor (S.F. 0.999884).
3. Surface= Grid / S.F.

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

IN MAP SHEET: 5254-B
Elevations NAVD 88
44.98 FT. 2001 ADJUSTMENT
Method For Vert. CONVENTIONAL
Ellipsoid Height= N\A

City of Houston, Harris County, Texas

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR SBC UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR.
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS REGISTERED WILLIAM J. MARSEY 4733 PROFESSIONAL ENGINEER 2/14/2012

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

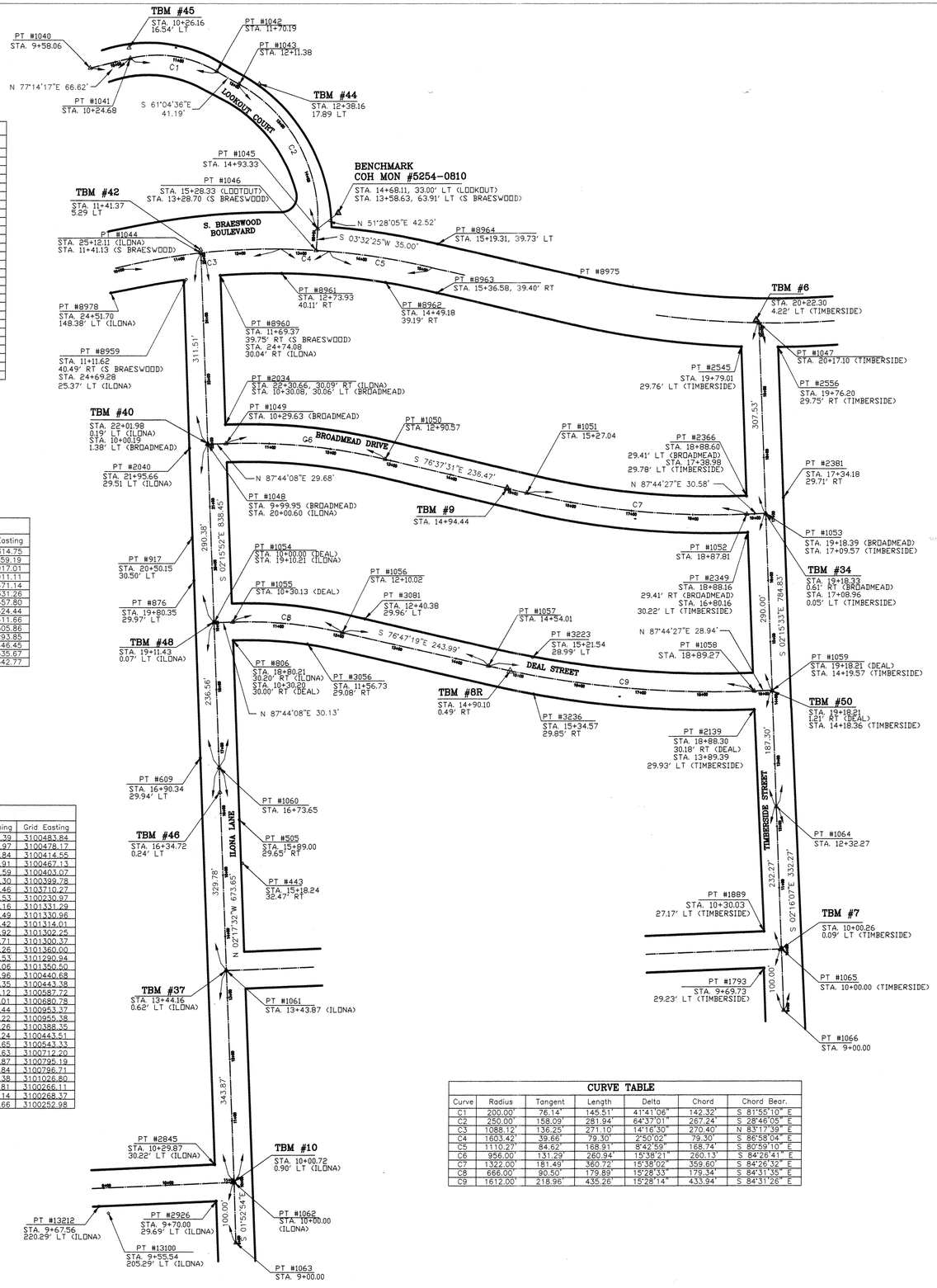
NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

SURVEY CONTROL MAP

SHEET 1 OF 2

PUBLIC WORKS AND ENGINEERING — PROFESSIONAL ENGINEER — FILED — 49097 — LICENSED — STATE OF TEXAS

WBS N-000383-0001-4
DRAWING SCALE 1" =100'
CITY OF HOUSTON PM MOH'D K. WARRAD, P.E.
SHEET NO. 7A OF 131



BASELINE POINT TABLE

Point	Surf. Northing	Surf. Easting	Description	Grid Northing	Grid Easting
1040	13817916.41	3100590.84	SET 3/8" IR	13816313.53	3100230.97
1041	13817931.12	3100655.62	CUT X IN CONC	13816328.24	3100295.94
1042	13817911.12	3100796.53	CUT X IN CONC	13816308.24	3100436.83
1043	13817891.20	3100832.58	CUT X IN CONC	13816288.32	3100472.88
1044	13817617.89	3100771.69	CUT X IN CONC	13816015.05	3100412.00
1045	13817656.94	3100961.19	CUT X IN CONC	13816054.10	3100601.48
1046	13817622.01	3100959.03	CUT X IN CONC	13816019.16	3100599.32
1047	13817501.58	3101678.96	CUT X IN CONC	13815898.75	3101319.17
1048	13817306.63	3100784.00	SET SQUARE HEAD NAIL	13815703.82	3100424.31
1049	13817307.80	3100813.65	SET CONC NAIL	13815704.99	3100453.96
1050	13817282.62	3101072.57	SET CONC NAIL	13815679.81	3100712.84
1051	13817227.92	3101302.62	SET SQUARE HEAD NAIL	13815625.12	3100942.87
1052	13817193.09	3101660.53	SET SQUARE HEAD NAIL	13815590.30	3101300.74
1053	13817194.30	3101691.09	SET SQUARE HEAD NAIL	13815591.50	3101331.29
1054	13817016.47	3100795.47	SET CONC NAIL	13815413.69	3100435.78
1055	13817017.66	3100825.58	SET CONC NAIL	13815414.89	3100465.89
1056	13817000.55	3101004.11	SET CONC NAIL	13815397.78	3100644.39
1057	13816944.79	3101241.64	SET CONC NAIL	13815342.02	3100881.89
1058	13816903.38	3101673.60	SET CONC NAIL	13815300.62	3101313.80
1059	13816904.52	3101702.52	SET CONC NAIL	13815301.76	3101342.72
1060	13816780.09	3100804.82	SET CONC NAIL	13815177.34	3100445.13
1061	13816450.58	3100818.01	SET CONC NAIL	13814847.87	3100458.31
1062	13816106.98	3100831.76	SET CONC NAIL	13814504.31	3100472.07
1063	13816007.03	3100835.05	SET CONC NAIL	13814404.38	3100475.35
1064	13816717.36	3101709.90	SET CONC NAIL	13815114.62	3101350.10
1065	13816485.28	3101719.09	SET CONC NAIL	13814882.56	3101359.29
1066	13816385.35	3101723.05	SET CONC NAIL	13814782.65	3101363.25

TEMPORARY BENCHMARK TABLE

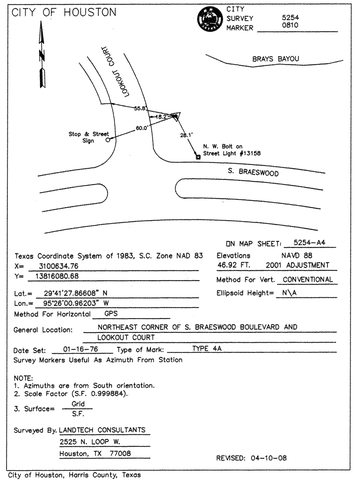
TBM	Surf. Northing	Surf. Easting	Elev.	Description	Grid Northing	Grid Easting
6	13817506.61	3101674.54	46.19	CUT X IN CONC.	13815903.78	3101314.75
7	13816485.53	3101718.99	46.85	SET NAIL\wSHINER	13814882.82	3101359.19
8R	13816936.45	3101276.76	45.65	SET NAIL	13815333.69	3100917.01
9	13817235.47	3101270.86	46.71	SET NAIL	13815632.67	3100911.11
10	13816107.67	3100830.84	47.37	SET PK NAIL	13814505.00	3100471.14
34	13817193.68	3101691.06	48.30	SET NAIL\wSHINER	13815590.89	3101331.26
37	13816450.85	3100817.50	48.74	SET NAIL\wSHINER	13814848.14	3100457.80
40	13817308.02	3100784.13	48.19	SET NAIL\wSHINER	13815705.21	3100424.44
42	13817623.17	3100771.35	47.74	CUT X IN CONC.	13816020.33	3100411.66
44	13817891.67	3100865.56	46.61	SET 3/8IRwCAP	13816288.79	3100505.86
45	13817947.60	3100653.53	46.88	SET 3/8IRwCAP	13816344.72	3100293.85
46	13816741.18	3100806.15	47.75	SET NAIL\wSHINER	13815138.44	3100446.45
48	13817017.68	3100795.36	47.81	SET NAIL	13815414.91	3100435.67
50	13816903.31	3101702.56	47.97	SET NAIL\wSHINER	13815300.55	3101342.77

FOUND PROPERTY CORNER TABLE

Point	Surf. Northing	Surf. Easting	Elev.	Description	Grid Northing	Grid Easting
443	13816626.12	3100843.54	52.17	FND 1\2IN IR	13815023.39	3100483.84
505	13816696.71	3100837.86	48.32	FND 1\2IN W\CAP	13815093.97	3100478.17
609	13816795.59	3100774.24	48.27	FND 5\8IN IR	13815192.84	3100414.55
806	13816987.69	3100826.83	48.37	FND 5\8IN IR	13815384.91	3100467.13
876	13817085.37	3100762.75	48.28	FND 5\8IN IR	13815482.59	3100403.07
917	13817155.09	3100759.47	48.21	FND 1\2IN IR	13815552.30	3100399.78
1034	13817337.85	3100812.88	48.37	FND 1\2IN IR	13816233.46	3103710.27
1040	13817300.52	3100754.71	48.45	FND 5\8IN IR	13816313.53	3100230.97
1793	13816453.87	3101691.08	47.54	FND X IN CONC	13814851.16	3101331.29
1889	13816514.21	3101690.76	48.95	FND 5\8IN W\CAP SUNLAND	13814911.49	3101330.96
2139	13816873.18	3101673.80	48.69	FND 1\2IN IR	13815270.42	3101314.01
2349	13817163.72	3101662.05	48.38	FND 3\4IN PTP	13815560.92	3101302.25
2366	13817222.51	3101660.17	48.58	FND 3\4IN PTP	13815619.71	3101300.37
2381	13817220.06	3101719.80	48.56	FND 1\2IN IR	13815617.26	3101360.00
2545	13817462.35	3101650.73	46.55	FND 3\4IN PTP	13815859.53	3101290.94
2556	13817461.89	3101710.30	46.42	FND 3\4IN PTP	13815859.06	3101350.50
2845	13816135.63	3100800.38	47.38	FND 1\2IN IP	13814532.96	3100440.68
2926	13816076.02	3100803.08	47.85	FND 1\2IN IP	13814473.35	3100443.38
3056	13816981.89	3100947.43	48.00	FND 1\2IN IR	13815379.12	3100587.72
3081	13817022.79	3101040.50	47.56	FND 1\2IN IR	13815420.01	3100680.78
3223	13816959.21	3101313.12	47.57	FND 1\2IN IR	13815356.44	3100953.37
3236	13816898.98	3101315.13	47.61	FND 1\2IN IR	13815296.22	3100955.38
8959	13817574.10	3100748.03	48.52	FND 3\8IN IR	13815971.26	3100388.35
8960	13817581.08	3100803.21	47.76	FND 1\2IN IP	13815978.24	3100443.51
8961	13817584.49	3100903.04	47.70	FND 5\8IN IR	13815981.65	3100543.33
8962	13817569.46	3101071.92	46.49	FND 3\8IN IR	13815966.63	3100712.20
8963	13817551.71	3101154.92	45.82	FND 3\8IN IR	13815948.87	3100795.19
8964	13817632.69	3101156.44	45.38	FND 3\4IN PTP	13816029.84	3100796.71
8975	13817578.22	3101386.56	43.99	FND 3\4IN PTP	13815975.38	3101026.80
8978	13817551.64	3100625.78	47.68	FND 1\2IN IR	13815948.81	3100266.11
13100	13816055.81	3100628.04	48.58	FND 60D NAIL	13814453.14	3100268.37
13212	13816067.32	3100612.65	47.87	FND 3\8IN IR	13814464.66	3100252.98

CURVE TABLE

Curve	Radius	Tangent	Length	Delta	Chord	Chord Bear.
C1	200.00'	76.14'	145.51'	41°41'06"	142.32'	S 81°55'10" E
C2	250.00'	158.09'	281.94'	64°37'01"	267.24'	S 28°46'05" E
C3	1088.12'	136.25'	271.10'	14°16'30"	270.40'	N 83°17'39" E
C4	1603.42'	39.66'	79.30'	2°50'02"	79.30'	S 86°58'04" E
C5	1110.27'	84.62'	168.91'	8°42'59"	168.74'	S 80°59'10" E
C6	956.00'	131.29'	260.94'	15°38'21"	260.13'	S 84°26'41" E
C7	1322.00'	181.49'	360.72'	15°38'02"	359.60'	S 84°26'32" E
C8	666.00'	90.50'	179.89'	15°28'33"	179.34'	S 84°31'35" E
C9	1612.00'	218.96'	435.26'	15°28'14"	433.94'	S 84°31'26" E



DN MAP SHEET: 5254-A4

Texas Coordinate System of 1983, S.C. Zone NAD 83
Xe= 3100634.76
Ye= 13816080.68

Elevations NAVD 88
45.92 FT. 2001 ADJUSTMENT
Method For Vert. CONVENTIONAL
Ellipsoid Height= N\A

Lat.= 29°41'27.86608" N
Lon.= 95°26'00.96203" W
Method For Horizontal GPS

General Location: NORTHEAST CORNER OF S. BRAESWOOD BOULEVARD AND LOOKOUT COURT

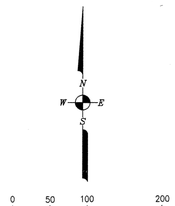
Date Set: 01-16-76 Type of Mark: TYPE 4A
Survey Markers Useful As Azimuth From Station

NOTE:
1. Azimuths are from South orientation.
2. Scale Factor (S.F.: 0.999884).
3. Surface= Grid / S.F.

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

REVISED: 04-10-08

City of Houston, Harris County, Texas



Notes:

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Benchmark:

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Elev = 49.48 FEET NAVD88, 2001 Adjustment

COH Mon. 5254-0810: at northeast corner of S. Braeswood Boulevard and Lookout Court.
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MW

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

N/A DATE:

APPROVED FOR SBC UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR.

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 4709 LICENSED SURVEYOR
2/14/2012

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

SURVEY CONTROL MAP

SHEET 2 OF 2

WBS N-000383-0001-4

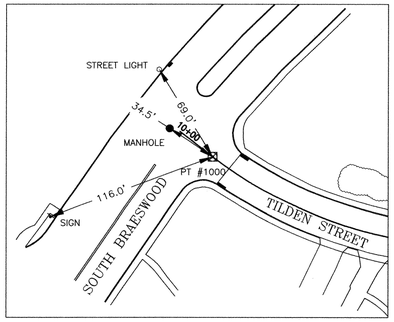
DRAWING SCALE
1" =100'

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

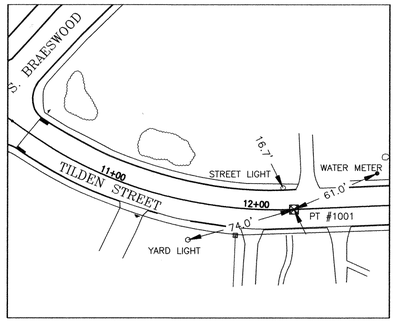
SHEET NO. 7B OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
NUMBER
TEXAS

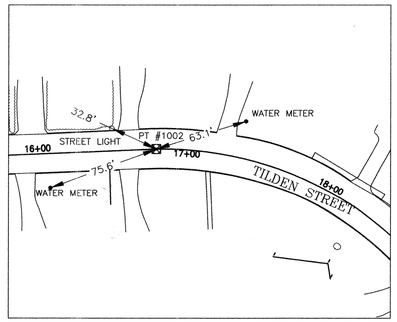
PT. #1000
TILDEN AND S. BRAESWOOD



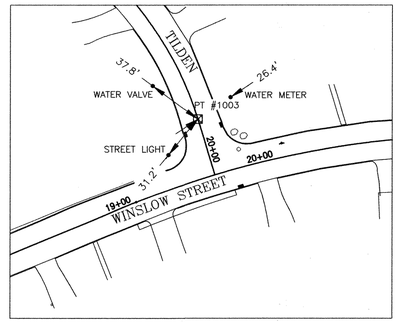
PT. #1001
TILDEN



PT. #1002
TILDEN

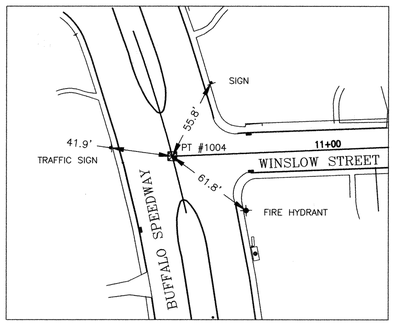


PT. #1003
TILDEN

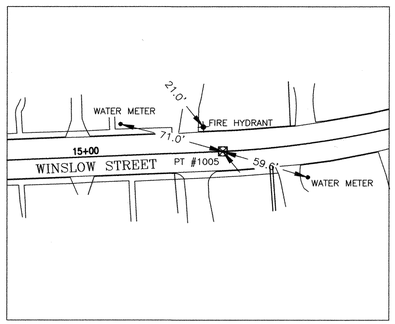


NOT TO SCALE

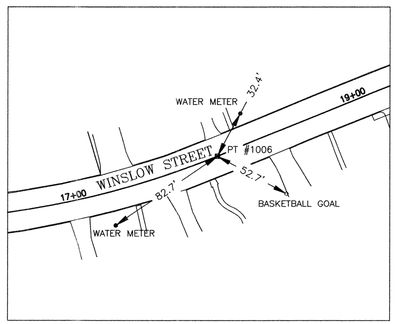
PT. #1004
BUFFALO AND WINSLOW



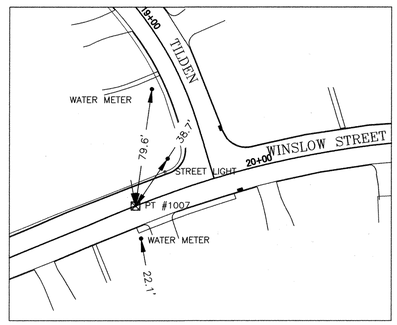
PT. #1005
WINSLOW



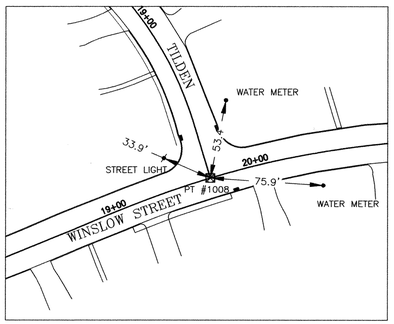
PT. #1006
WINSLOW



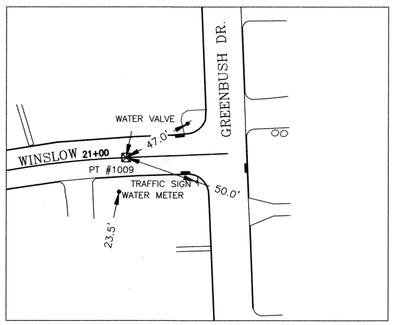
PT. #1007
WINSLOW



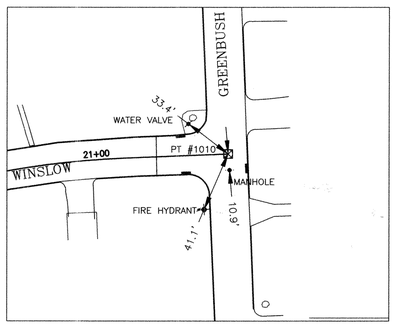
PT. #1008
TILDEN AND WINSLOW



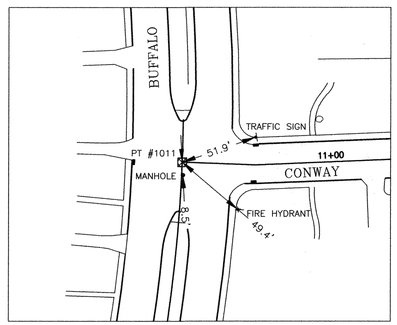
PT. #1009
WINSLOW



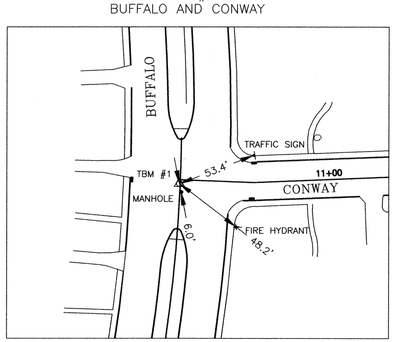
PT. #1010
WINSLOW AND GREENBUSH



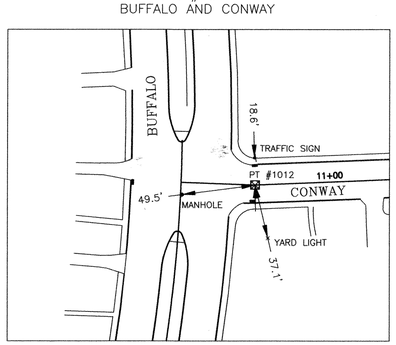
PT. #1011
BUFFALO AND CONWAY



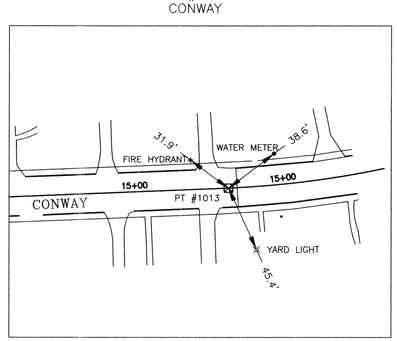
TBM #1
BUFFALO AND CONWAY



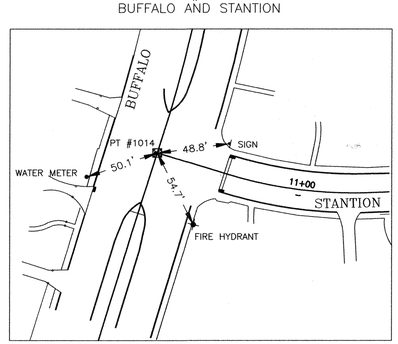
PT. #1012
BUFFALO AND CONWAY



PT. #1013
CONWAY



PT. #1014
BUFFALO AND STANTION



No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47201 PROFESSIONAL ENGINEER
2/14/2012

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

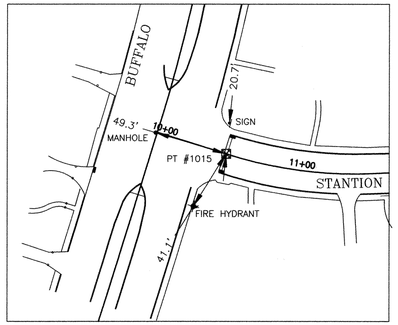
CONTROL POINT THREE WAY TIE

SHEET 1 OF 6

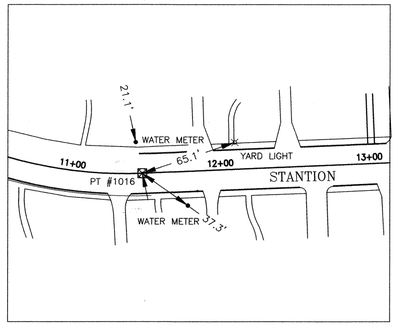
WBS N-000383-0001-4	
DRAWING SCALE	
N. T. S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 8A OF 131	

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER

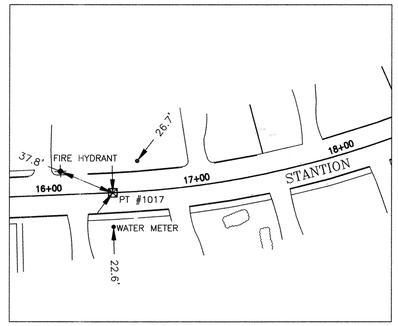
PT. #1015
BUFFALO AND STANTION



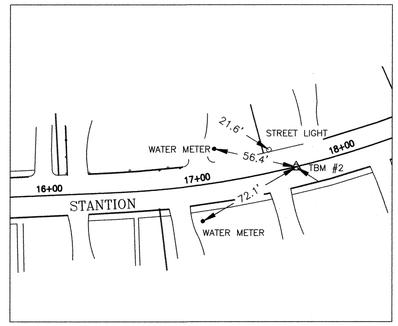
PT. #1016
STANTION



PT. #1017
STANTION

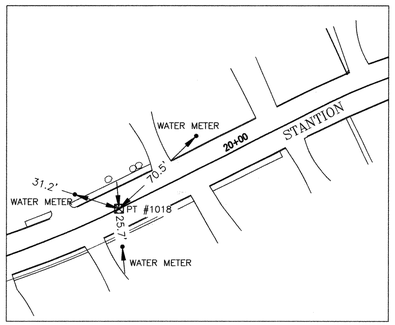


TBM #2
STANTION



NOT TO SCALE

PT. #1018
STANTION



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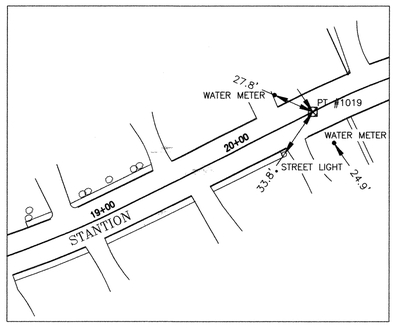
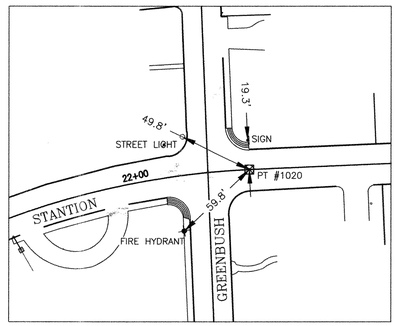
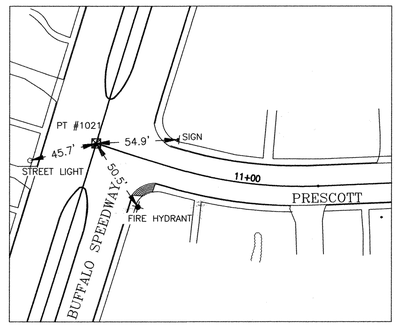
STANTION



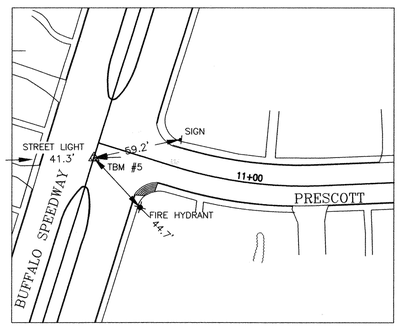
PT. #1020
STANTION AND GREENBUSH



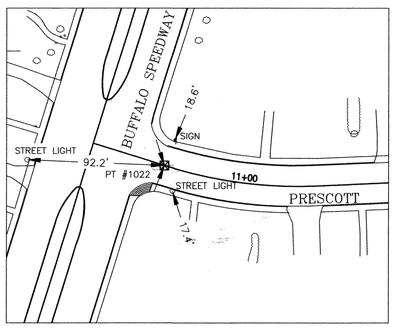
PT. #1021
BUFFALO AND PRESCOTT



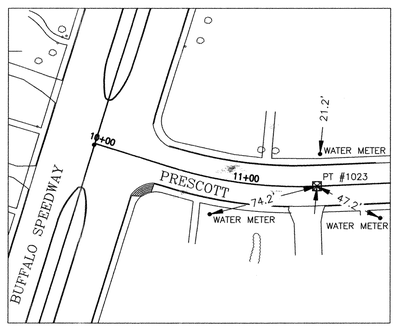
TBM #5R
BUFFALO AND PRESCOTT



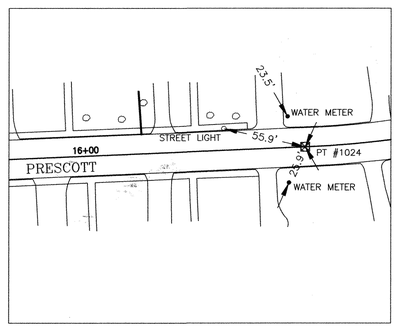
PT. #1022
BUFFALO AND PRESCOTT



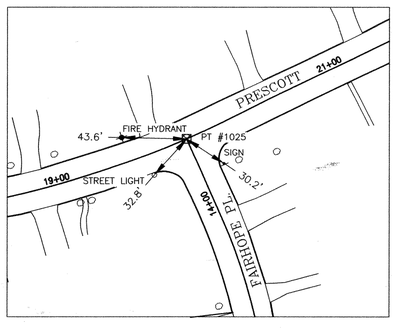
PT. #1023
PRESCOTT



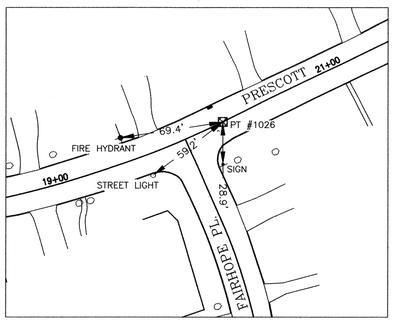
PT. #1024
PRESCOTT



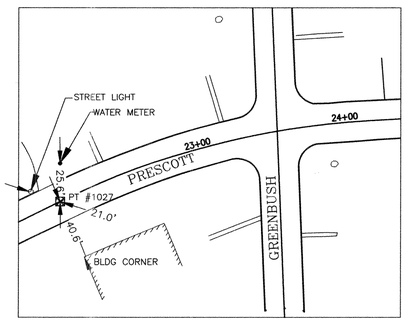
PT. #1025
PRESCOTT AND FAIRHOPE PLACE



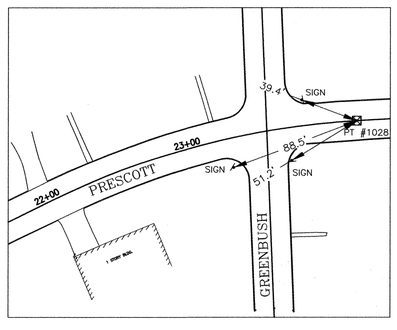
PT. #1026
PRESCOTT



PT. #1027
PRESCOTT



PT. #1028
PRESCOTT



No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47021 PROFESSIONAL ENGINEER
2/14/2012

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CONTROL POINT THREE WAY TIE

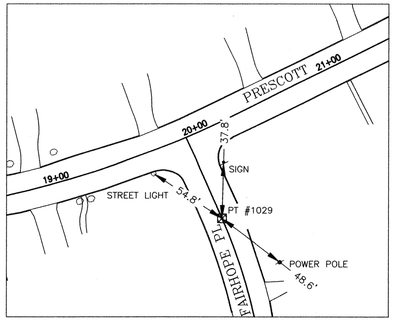
SHEET 2 OF 6

WBS N-000383-0001-4	
DRAWING SCALE	
N. T. S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 8B OF 131	

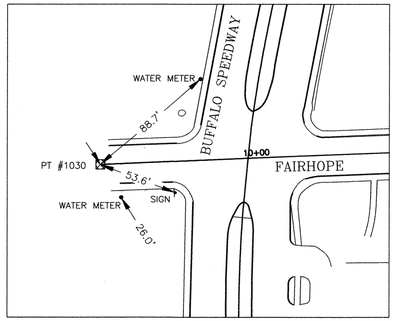
PUBLIC WORKS AND ENGINEERING
APPROVED AND FILED
49097
NUMBER
TEXAS

WMW

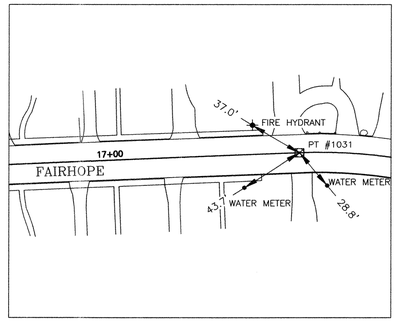
PT. #1029
FAIRHOPE PLACE



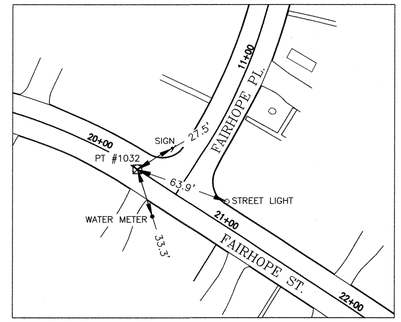
PT. #1030
FAIRHOPE



PT. #1031
FAIRHOPE

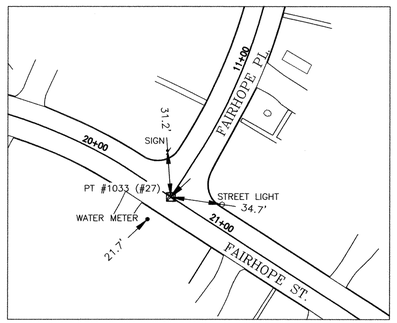


PT. #1032
FAIRHOPE

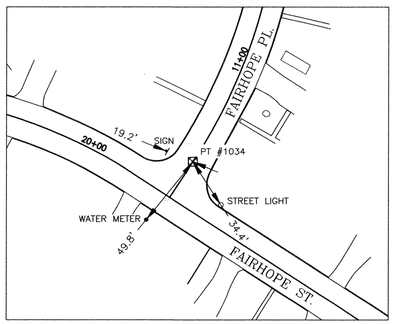


NOT TO SCALE

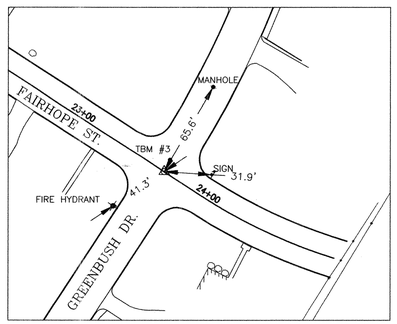
PT. #1033
FAIRHOPE AND FAIRHOPE PL.



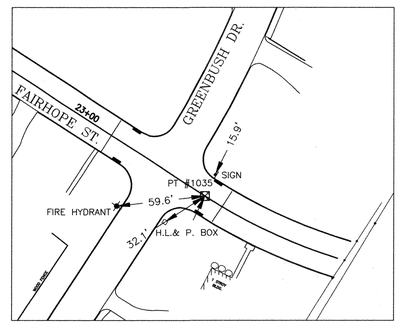
PT. #1034
FAIRHOPE PL.



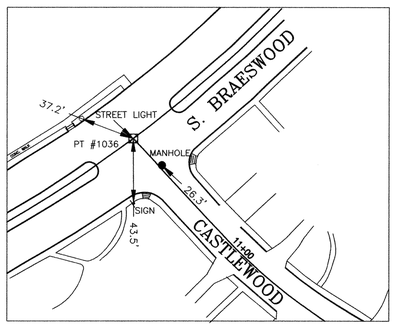
TBM #3
FAIRHOPE AND GREENBUSH



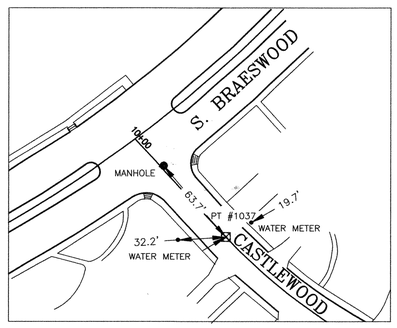
PT. #1035
FAIRHOPE



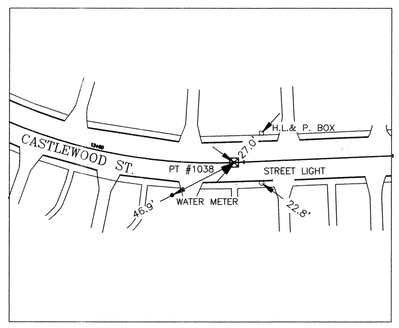
PT. #1036
S. BRAESWOOD AND CASTLEWOOD



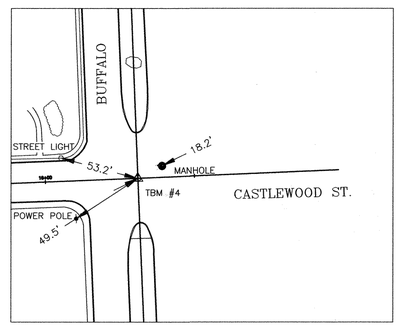
PT. #1037
CASTLEWOOD



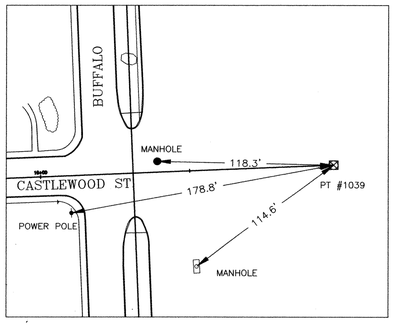
PT. #1038
CASTLEWOOD



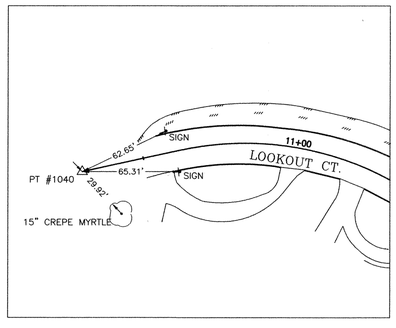
TBM #4
CASTLEWOOD AND BUFFALO



PT. #1039
CASTLEWOOD



PT. #1040
LOOKOUT CT.



PT. #1041
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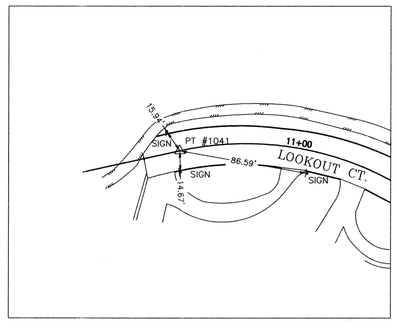
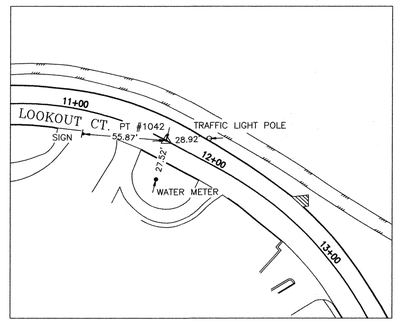


PT. #1042
LOOKOUT CT.



SPARKS - BARLOW - BARNETT, INC.
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713–965–9996

SURVEYED BY: LANDTECH
FB NO. P–5444

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 4793 PROFESSIONAL ENGINEER
2/14/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CONTROL POINT THREE WAY TIE

SHEET 3 OF 6

WBS N-000383-0001-4	
DRAWING SCALE	
N. T. S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 8C OF 131	

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
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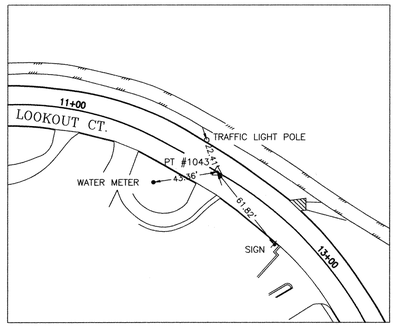
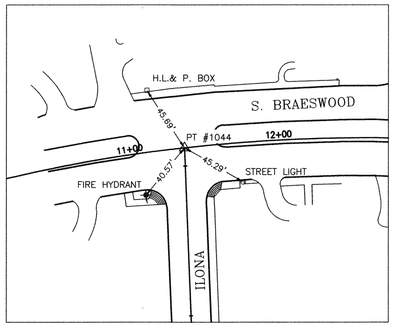
LICENSED

No.	Date	Revisions	App.

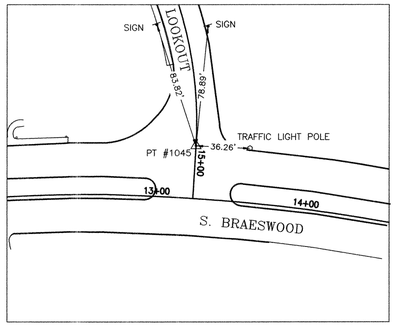
PT. #1043
LOOKOUT CT.



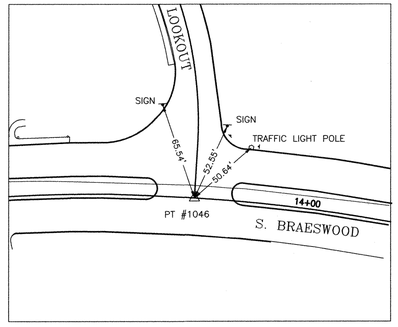
PT. #1044
S. BRAESWOOD AND ILONA

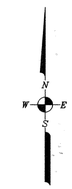


PT. #1045
LOOKOUT CT. AND S. BRAESWOOD



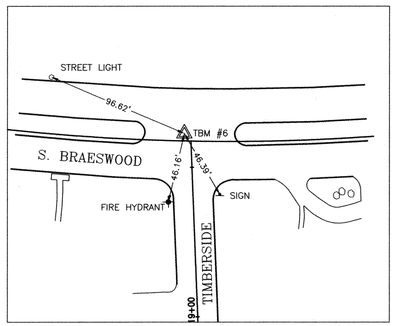
PT. #1046
LOOKOUT CT. AND S. BRAESWOOD



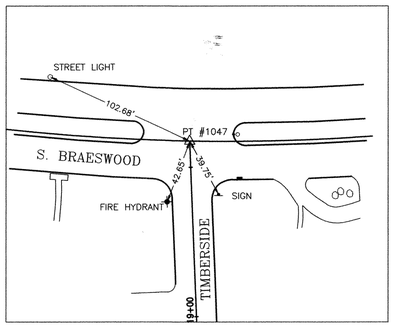


NOT TO SCALE

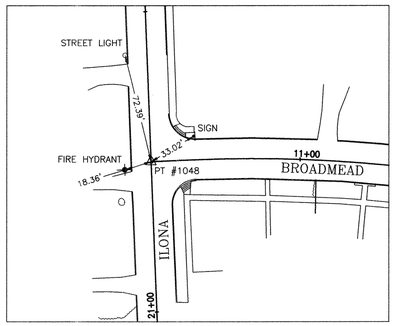
TBM #6
S. BRAESWOOD AND TIMBERSIDE



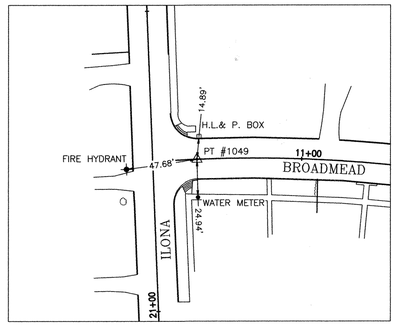
PT. #1047
S. BRAESWOOD AND TIMBERSIDE



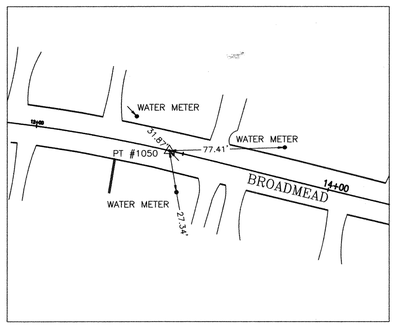
PT. #1048
ILONA AND BROADMEAD



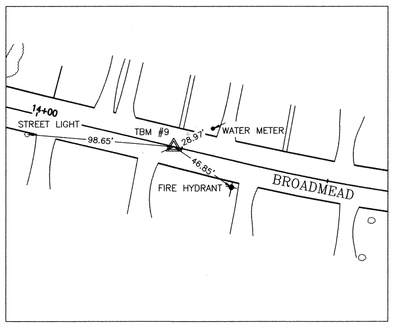
PT. #1049
ILONA AND BROADMEAD



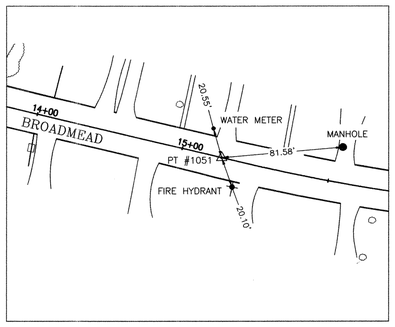
PT. #1050
BROADMEAD



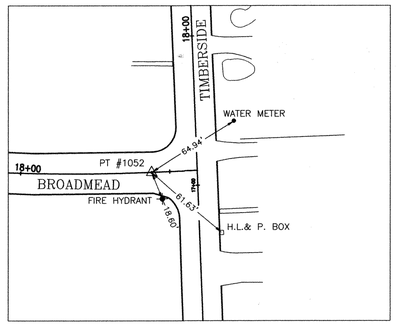
TBM #9
BROADMEAD



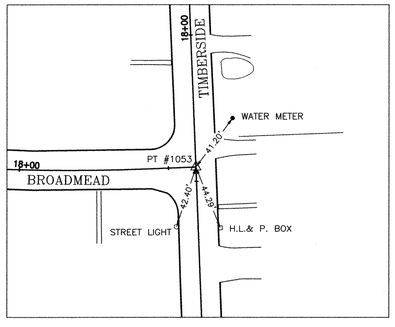
PT. #1051
BROADMEAD



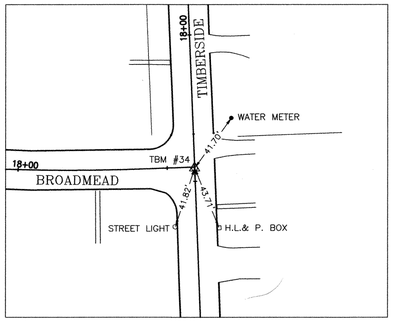
PT. #1052
BROADMEAD AND TIMBERSIDE



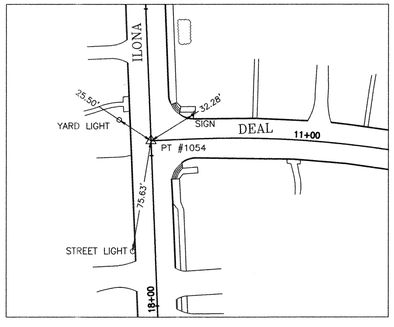
PT. #1053
BROADMEAD AND TIMERSIDE



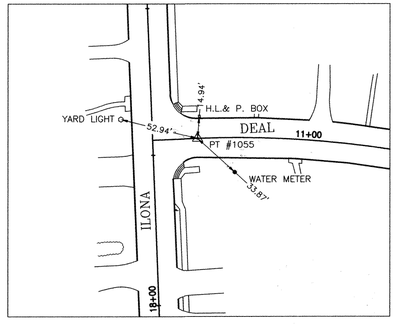
TBM #34
BROADMEAD AND TIMERSIDE



PT. #1054
ILONA AND DEAL



PT. #1055
DEAL



Rev. No.	Date	Revisions	App.

SBB SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

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SIGNATURE VALID FOR ONE YEAR.

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 47041 PROFESSIONAL ENGINEER

SURVEYED BY: LANDTECH
FB NO. P-5444

7/16/2012

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CONTROL POINT THREE WAY TIE

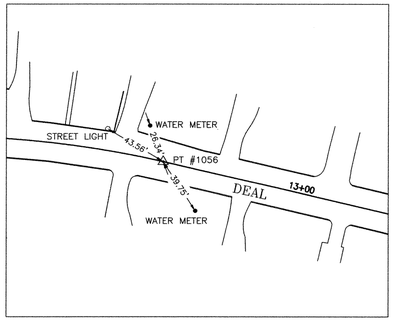
SHEET 4 OF 6

WBS N-000383-0001-4	
DRAWING SCALE	
N. T. S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 8D OF 131	

PUBLIC WORKS AND ENGINEERING REVIEWED AND FILED 49097 JMBER CLASS

MW

PT. #1056
DEAL



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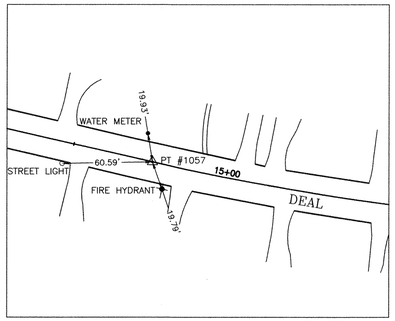
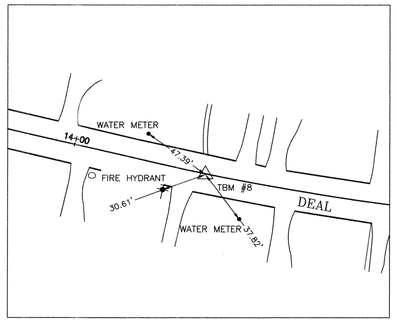
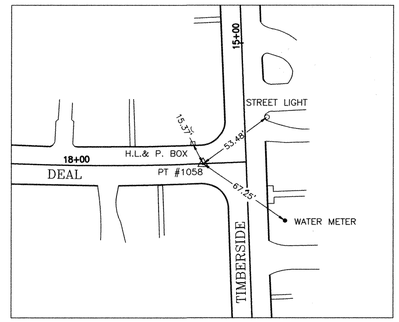


TBM #8R
DEAL



PT. #1058
DEAL AND TIMBERSIDE



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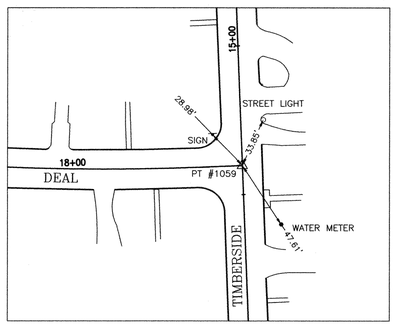
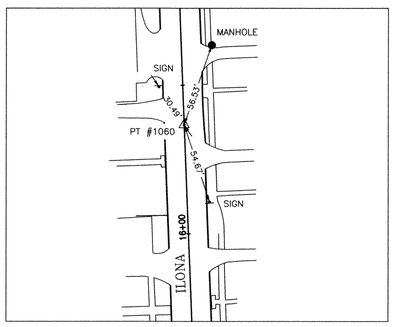
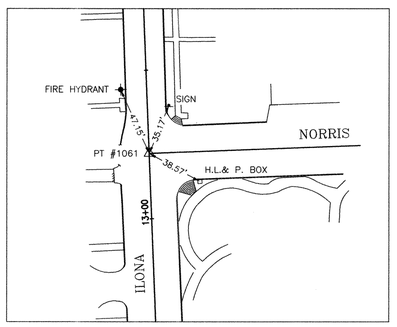


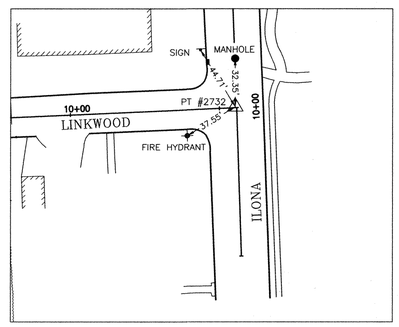
PT. #1060
ILONA



PT. #1061
ILONA AND NORRIS



TBM #10
LINKWOOD AND ILONA



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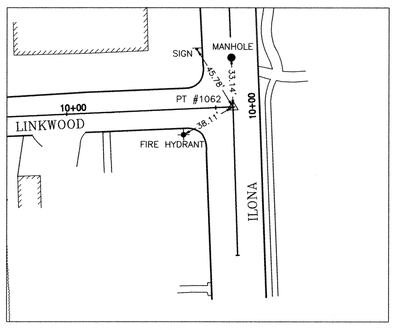
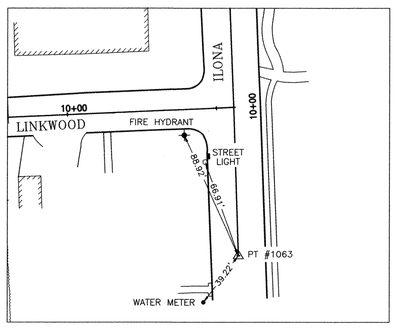
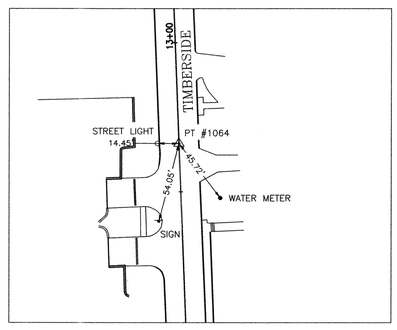
LINKWOOD AND ILONA



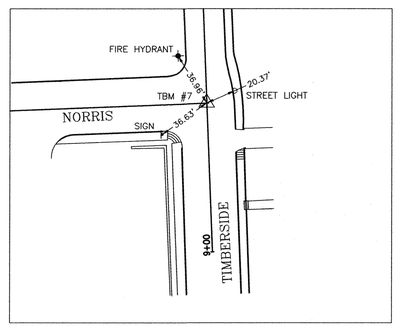
PT. #1063
LINKWOOD AND ILONA



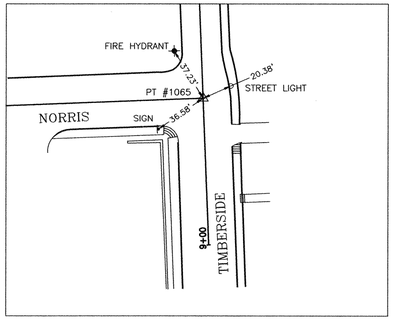
PT. #1064
TIMBERSIDE



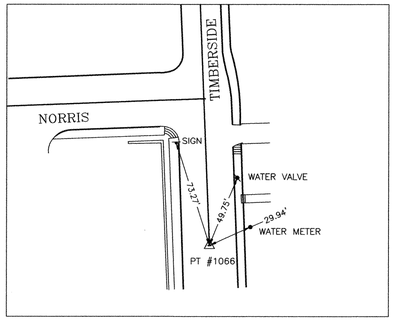
TBM #7
NORRIS AND TIMBERSIDE



PT. #1065
NORRIS AND TIMBERSIDE



PT. #1066
TIMBERSIDE



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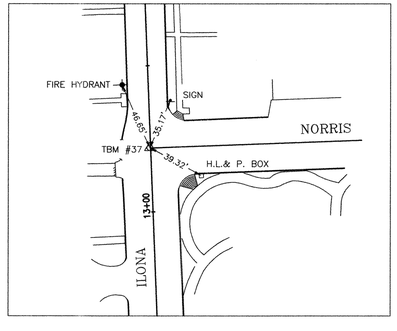
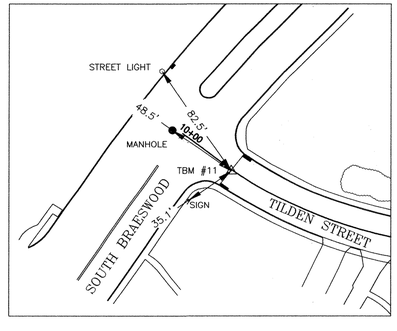
ILONA AND NORRIS



TBM #11
TILDEN



N
W E
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NOT TO SCALE

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 4795 PROFESSIONAL ENGINEER
2/14/2012

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

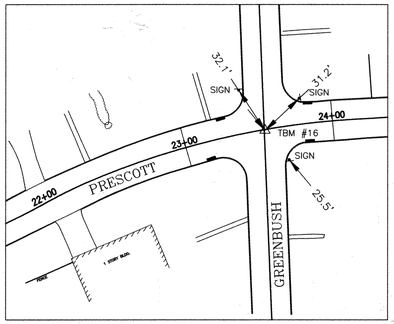
CONTROL POINT THREE WAY TIE

SHEET 5 OF 6

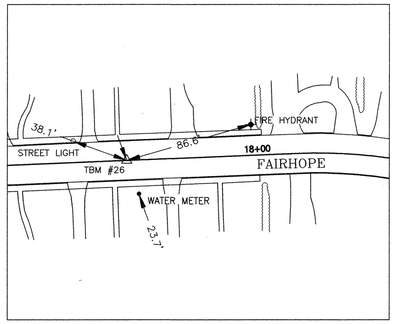
WBS N-000383-0001-4	
DRAWING SCALE	
N. T. S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 8E OF 131	

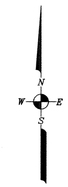
PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER

TBM #16
PRESCOTT AND GREENBUSH



TBM #26
FAIRHOPE





NOT TO SCALE

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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N/A DATE:

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(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11000 RICHMOND
SUITE 300
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS REGISTERED WILLIAM J. MASSEY 103906 PROFESSIONAL ENGINEER
2/11/20

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CONTROL POINT THREE WAY TIE

SHEET 6 OF 6

WBS N-000383-0001-4

DRAWING SCALE
N. T. S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 8F OF 131

PUBLIC WORKS AND ENGINEERING DOCUMENT FILED
49097
CONTROL NUMBER

MW



OVERALL DRAINAGE AREAS

AREA A =	560.08	ACRES
AREA B =	110.31	ACRES
AREA C =	22.10	ACRES
AREA D =	57.87	ACRES
TOTAL AREA =	750.20	ACRES

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

OVERALL DRAINAGE AREA MAP

WBS N-000383-0001-4

FILE: N:\City of Houston\2006-05_NSR 451\DRAWINGS\Obdrainmap-overall.dwg

DRAWING SCALE
1" = 1000' HALF
1" = 500' FULL

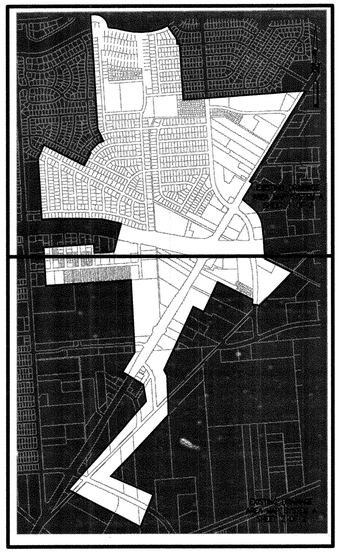
CITY OF HOUSTON PM

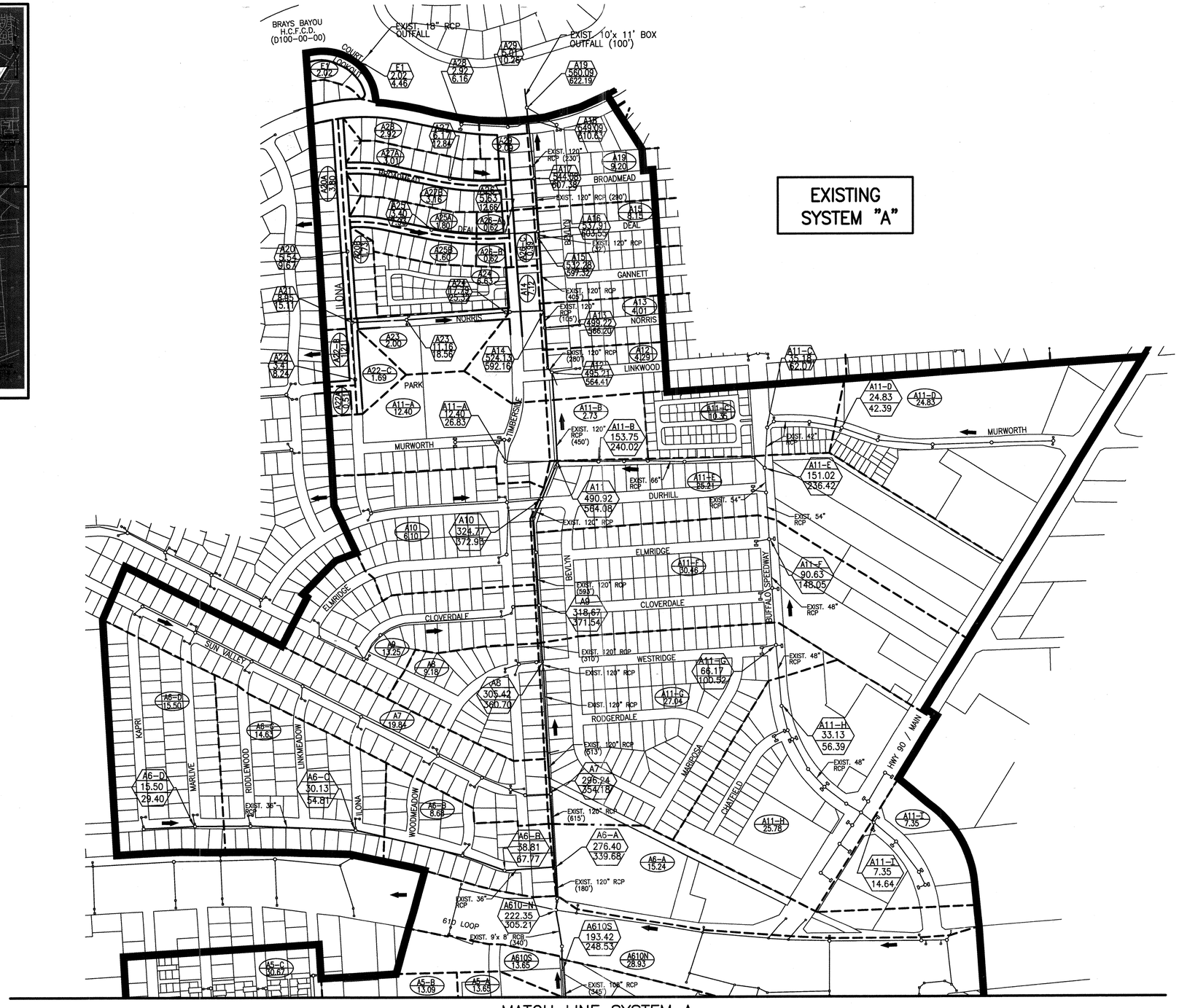
MOH'D K. WARRAD, P.E.

SHEET NO. 9 OF 131

PUBLIC WORKS AND ENGINEERING
49097
REGISTERED
TEXAS

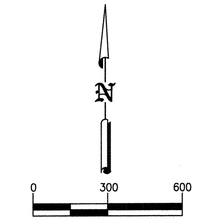
No.	Date	Revisions	Apr.





MATCH LINE SYSTEM A

EXISTING SYSTEM "A"



LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx — JUNCTION #
- ACRES — TOTAL ACCUMULATIVE AREA
- FLOW — TOTAL ACCUMULATIVE FLOW (2 YR)
- FLOW DIRECTION
- A17B 3.27 — DRAINAGE AREA ID (ACRES)

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

EXISTING DRAINAGE AREA MAP SYSTEM A

SHEET 1 OF 2

WBS N-000383-0001-4

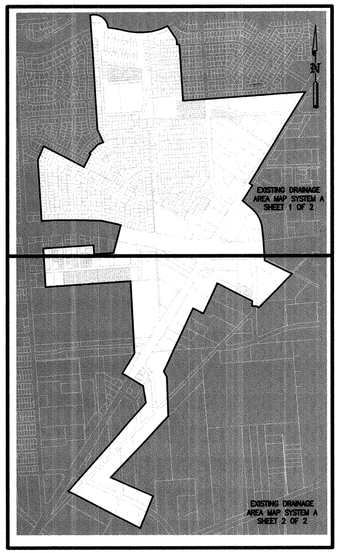
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM A EX.dwg

DRAWING SCALE
1" = 600' HALF
1" = 300' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

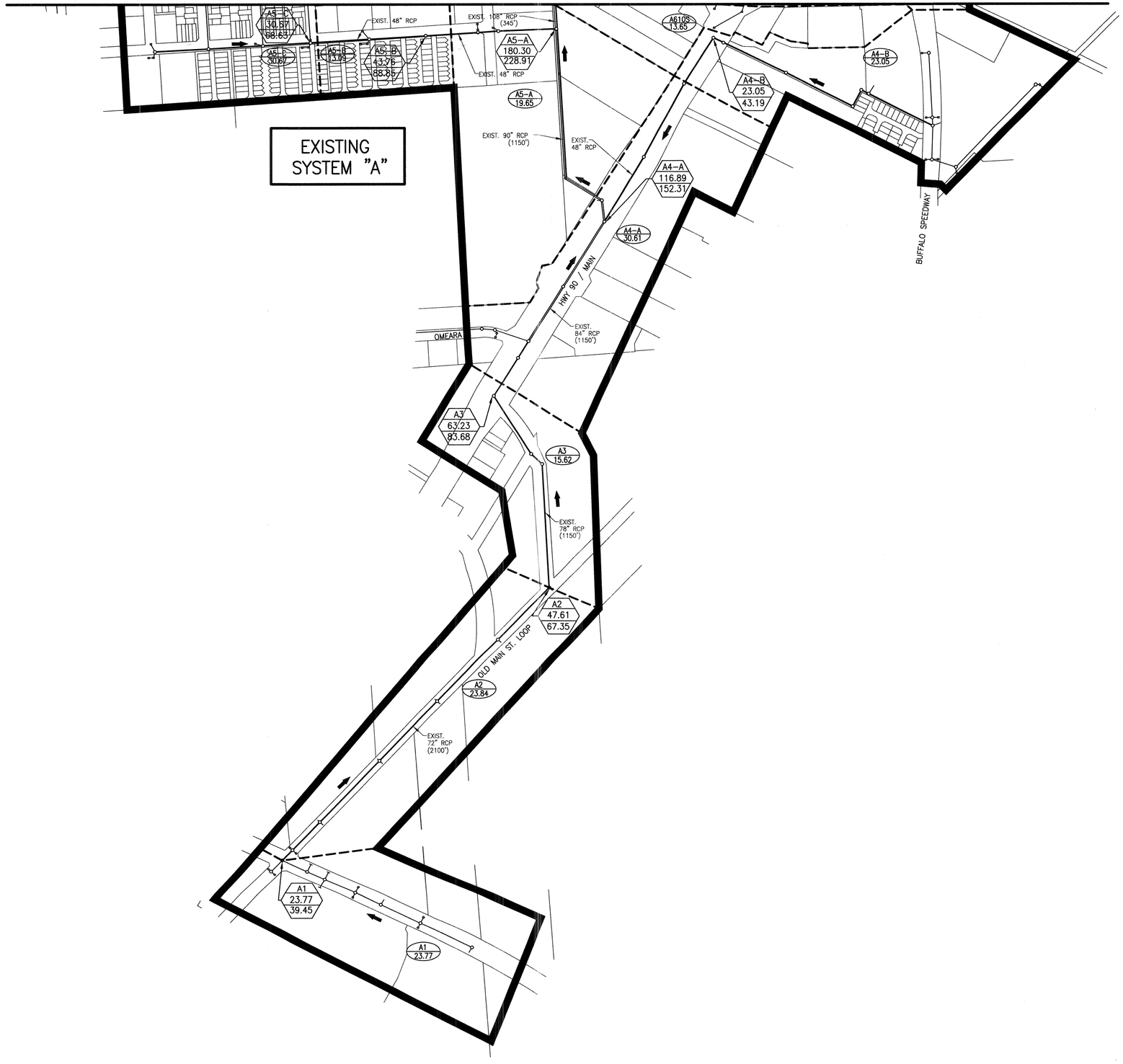
SHEET NO. 10 OF 131

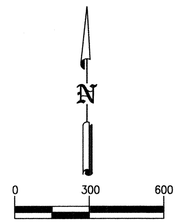
PUBLIC WORKS AND ENGINEERING
APP. FILED
49097
LICENSE NUMBER
TEXAS



MATCH LINE SYSTEM A

EXISTING SYSTEM "A"





LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx / ACRES / FLOW — JUNCTION # / TOTAL ACCUMULATIVE AREA / TOTAL ACCUMULATIVE FLOW (2 YR)
- FLOW DIRECTION
- A17B / 3.27 — DRAINAGE AREA ID (ACRES)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

EXISTING DRAINAGE AREA MAP SYSTEM A

SHEET 2 OF 2

WBS N-000383-0001-4

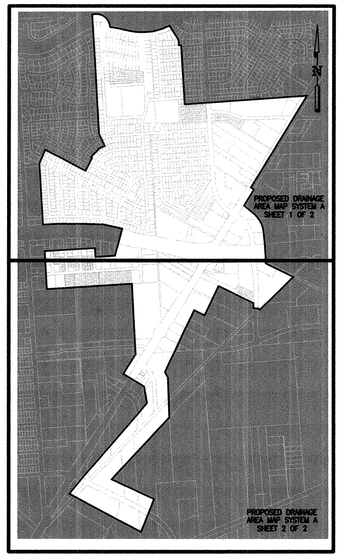
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM A EX.dwg

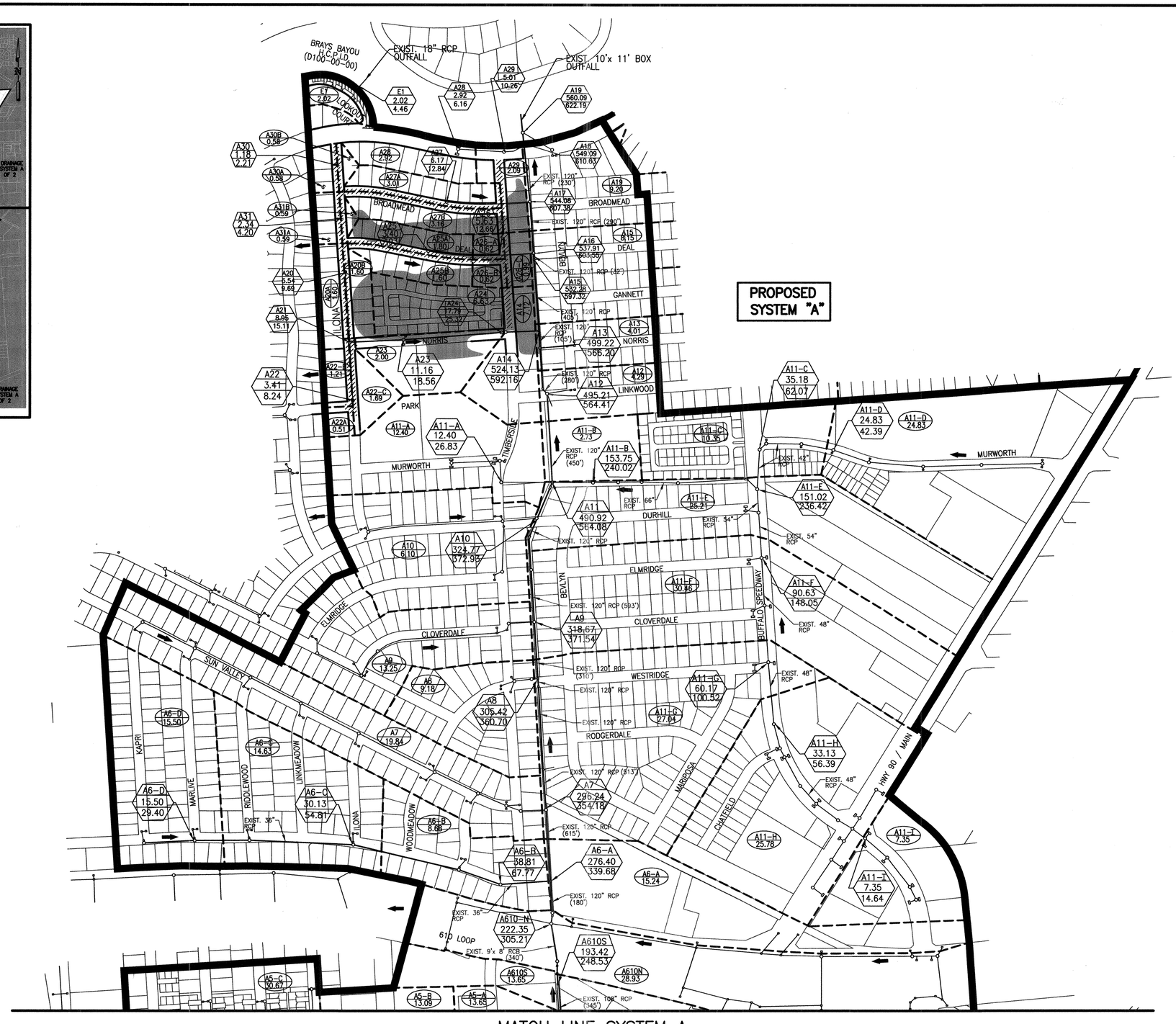
DRAWING SCALE
1" = 600' HALF
1" = 300' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

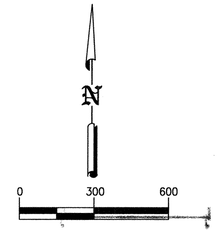
SHEET NO. 11 OF 131

PUBLIC WORKS AND ENGINEERING — 49097 — LICENSE NUMBER — TEXAS





MATCH LINE SYSTEM A



LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx / ACRES / FLOW — JUNCTION #, TOTAL ACCUMULATIVE AREA, TOTAL ACCUMULATIVE FLOW (2 YR.)
- FLOW DIRECTION
- A17B / 3.27 — DRAINAGE AREA ID (ACRES)
- PROP. PROJECT LIMITS (PAVEMENT REPLACEMENT)
- SHADED REGIONS DENOTE AREAS LOCATED OUTSIDE THE 100 YR. FLOOD PLAIN.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PROPOSED DRAINAGE AREA MAP SYSTEM A

SHEET 1 OF 2

WBS N-000383-0001-4

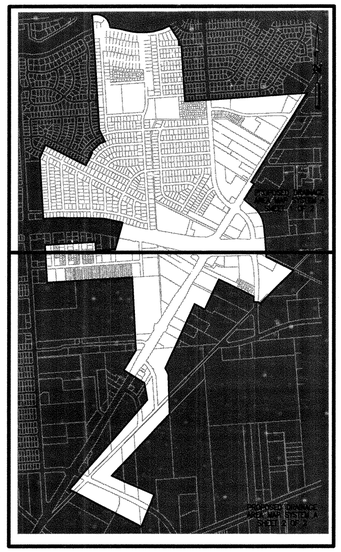
FILE: P:\City of Houston\2006-05_NSR 451\DRAINAGE\SYSTEM A PROP.dwg

DRAWING SCALE
1" = 600' HALF
1" = 300' FULL

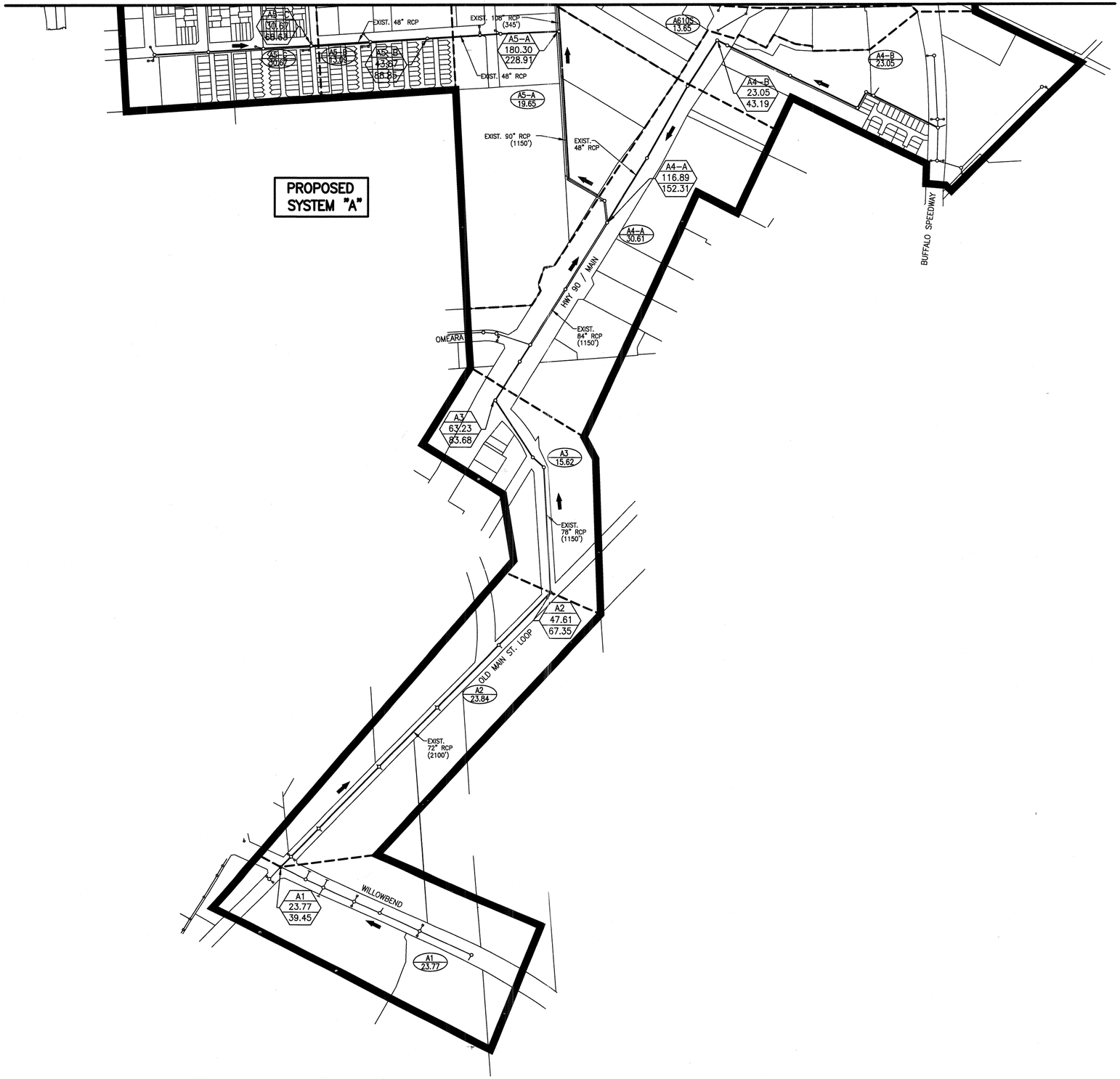
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 12 OF 131

PUBLIC WORKS AND ENGINEERING — APPROVED FILED — 49097 — NUMBER



MATCH LINE SYSTEM A



N

0 300 600

LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx / ACRES / FLOW — JUNCTION # / TOTAL ACCUMULATIVE AREA / TOTAL ACCUMULATIVE FLOW (2 YR.)
- FLOW DIRECTION
- A17B 3.27 — DRAINAGE AREA ID (ACRES)
- PROP. PROJECT LIMITS (PAVEMENT REPLACEMENT)

No. Date Revision App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PROPOSED DRAINAGE AREA MAP SYSTEM A

SHEET 2 OF 2

WBS N-000383-0001-4

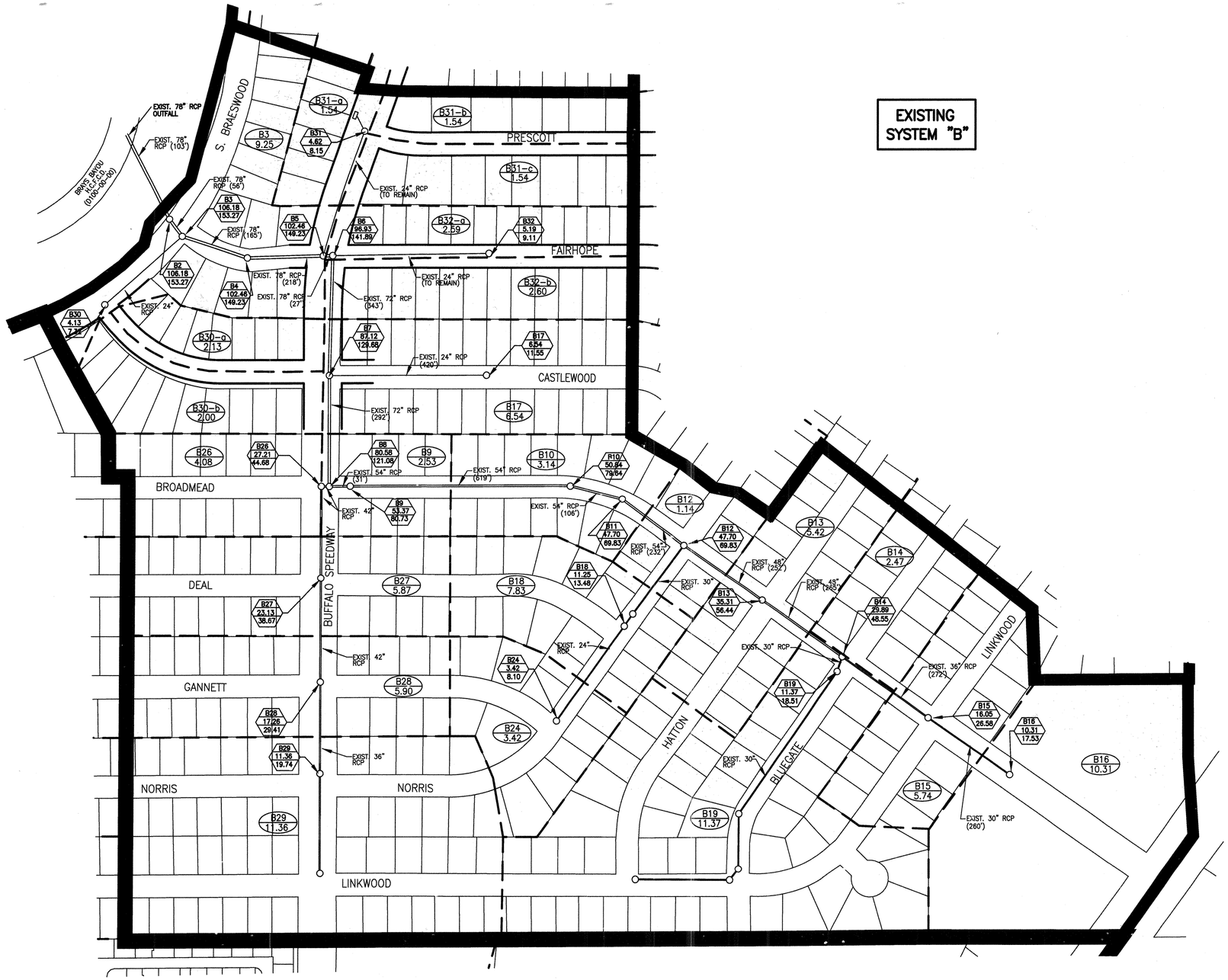
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM A PROP.dwg

DRAWING SCALE
1" = 600' HALF
1" = 300' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 13 OF 131

PUBLIC WORKS AND ENGINEERING — APP. FILED — 49097 — P.E.



SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

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SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
EXISTING
DRAINAGE AREA MAP
SYSTEM B

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM B EX.dwg

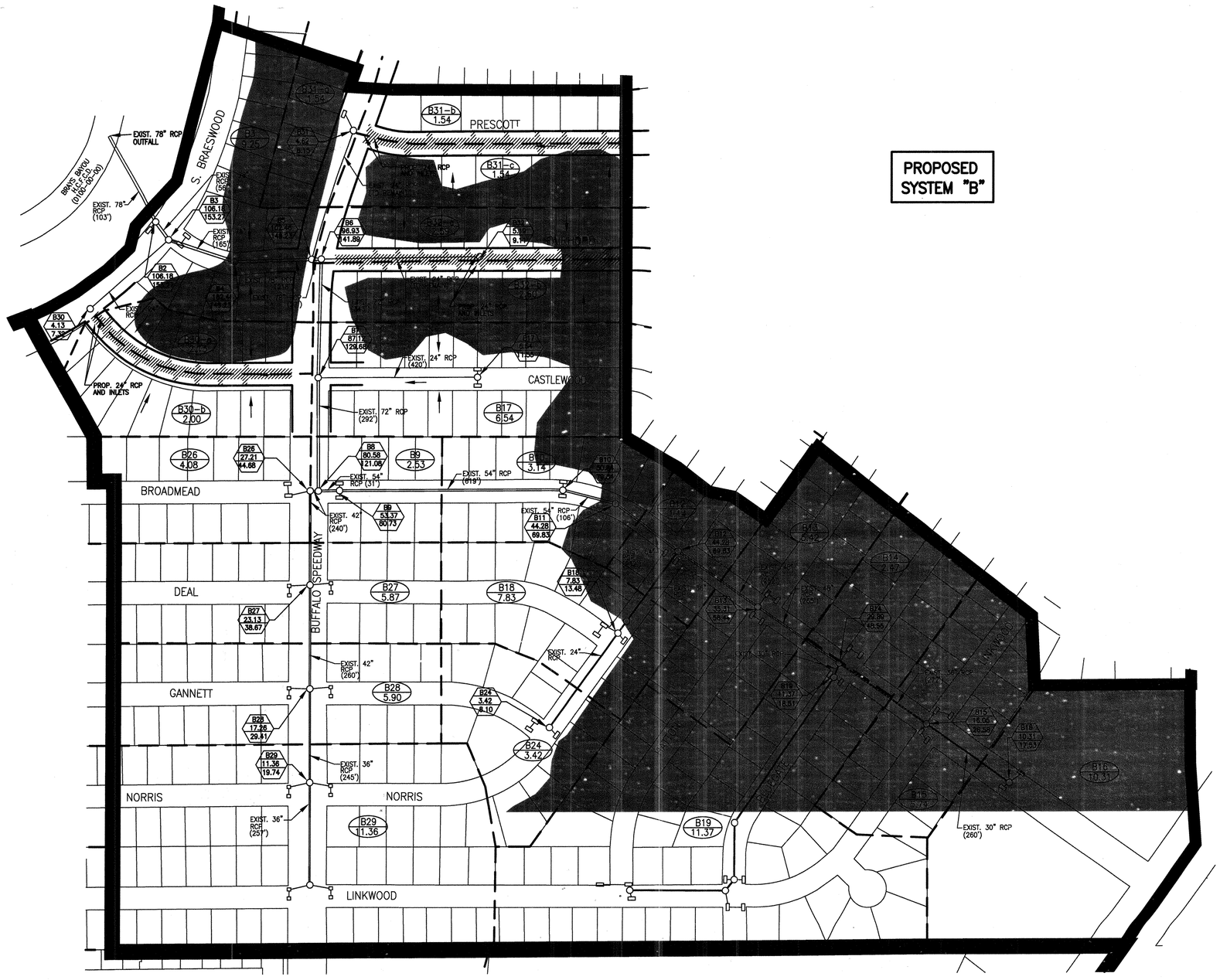
DRAWING SCALE
1" = 240' HALF
1" = 120' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 14 OF 131

PUBLIC WORKS AND ENGINEERING
SAVE FILED
49097
ENGINEER NUMBER
TEXAS

No.	Date	Revisions	App.



No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

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N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

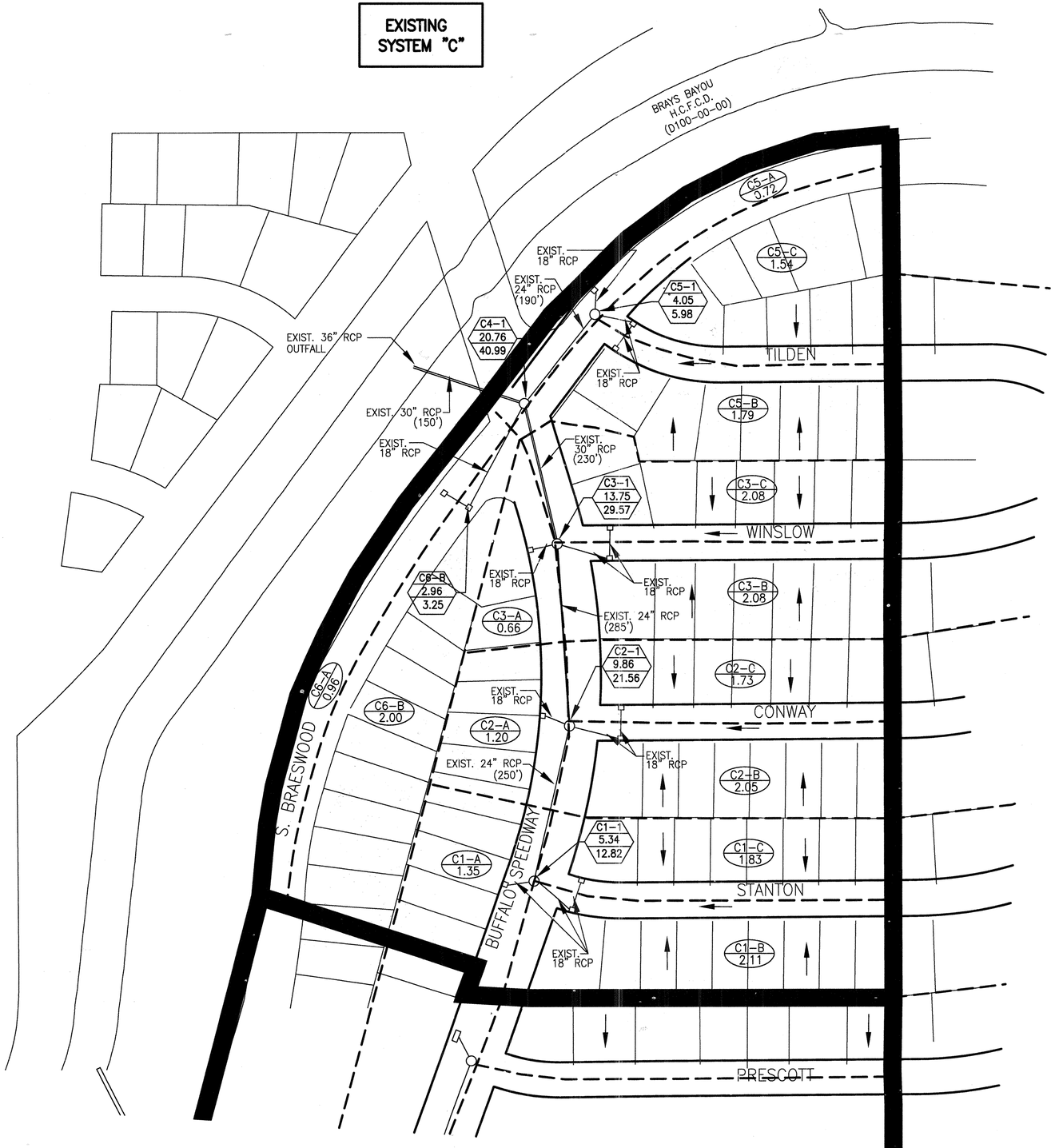
PROPOSED DRAINAGE AREA MAP SYSTEM B

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM B PROP.dwg
DRAWING SCALE
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 15 OF 131

PUBLIC WORKS AND ENGINEERING
ACCEPTED AND FILED
49097
CONTRACT NUMBER
HOUSTON, TEXAS

MW

EXISTING SYSTEM "C"



N

0 50 100 200

LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Cxx / ACRES / FLOW — JUNCTION # / TOTAL ACCUMULATIVE AREA / TOTAL ACCUMULATIVE FLOW (2 YR)
- FLOW DIRECTION
- C17B / 3.27 — DRAINAGE AREA ID (ACRES)

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

EXISTING DRAINAGE AREA MAP SYSTEM C

WBS N-000383-0001-4

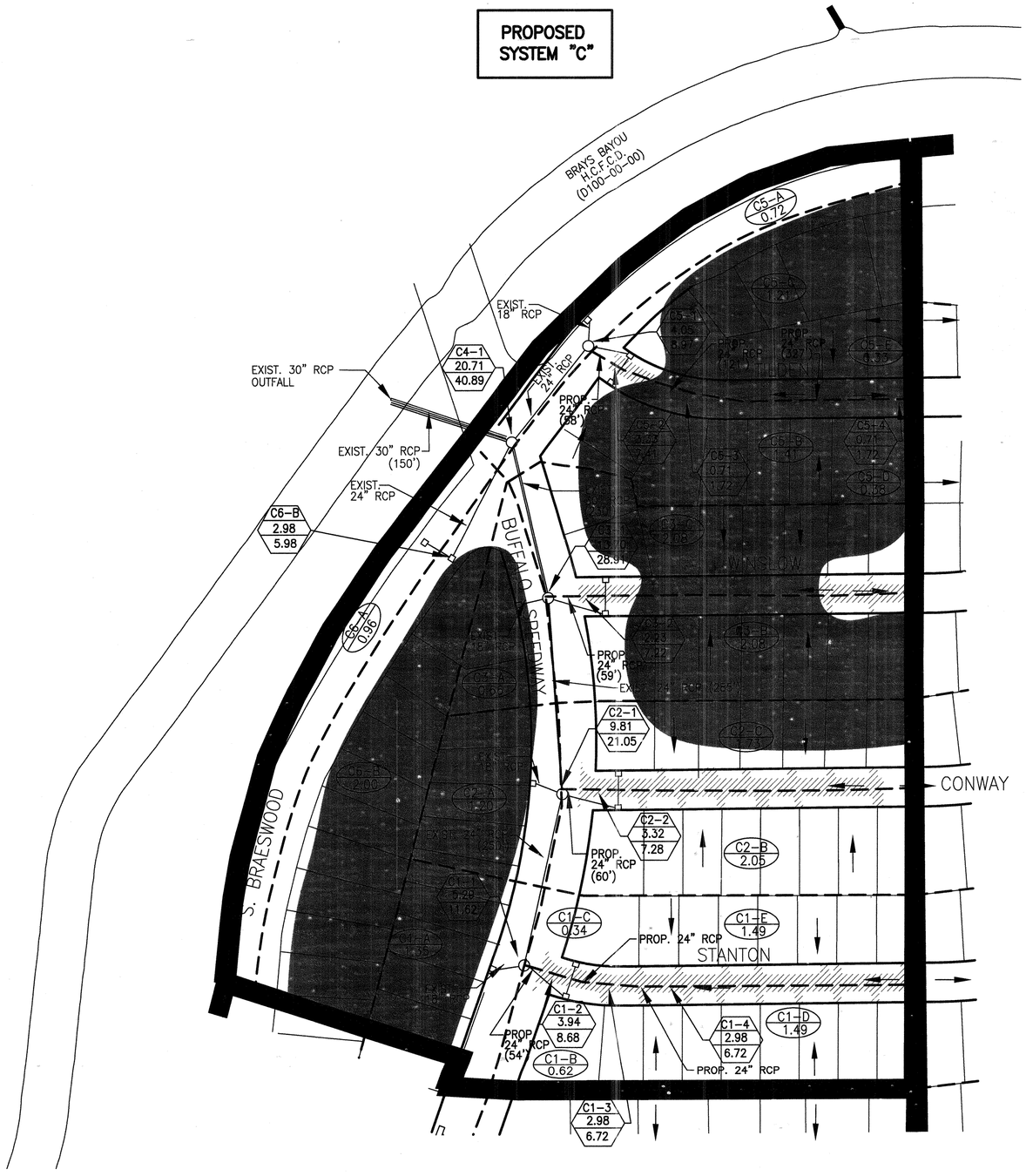
FILE: n:\City of Houston\2006-06_NSR 451\DRAWINGS\SYSTEM C EX.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 16 OF 131

PUBLIC WORKS AND ENGINEERING
APPROVED AND FILED
49097
LICENSE NUMBER
TEXAS



0 50 100 200

LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx / ACRES / FLOW — JUNCTION # / TOTAL ACCUMULATIVE AREA / TOTAL ACCUMULATIVE FLOW (2 YR.)
- FLOW DIRECTION
- A17B / 3.27 — DRAINAGE AREA ID (ACRES)
- PROP. PROJECT LIMITS (PAVEMENT REPLACEMENT)
- SHADED REGIONS DENOTE AREAS LOCATED OUTSIDE THE 100 YR. FLOOD PLAIN.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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N/A DATE:

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N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PROPOSED
DRAINAGE AREA MAP
SYSTEM C

WBS N-000383-0001-4

FILE: K:\City of Houston\2008-05_NSR 451\DRAWINGS\SYSTEM C PROP.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 17 OF 131

PUBLIC WORKS AND ENGINEERING
ACCEPTED AND FILED
49097
LICENSE NUMBER
EXAS

MW

EXISTING SYSTEM "D"

N

0 50 100 200

BRAYS BAYOU H.C.F.C.D. (D100-00-00)

EXIST. 66" RCP OUTFALL

S. BRAESWOOD

TILDEN

WINSLOW

CONWAY

STANTON

PRESCOTT

FAIRHOPE PLACE

FAIRHOPE

CASTLEWOOD

LINKWOOD

BLUEGATE

BUFFALO SPEEDWAY

D7 43.54 82.24

D8 52.75 98.24

D8 4.06

D9 57.87 106.40

D9 5.12

D14 5.15 11.40

D14 5.15

D5 31.47 61.02

D6 37.60 71.75

D7 5.94

D6 6.13

D4 2.76

D3 2.45

D3 22.22 44.35

D4 24.98 49.12

D5 6.49

D11 9.23 19.67

D11 3.07

D12 9.23 19.67

D10 6.16 13.52

D10 6.16

D13 12.61 25.48

D13 3.38

D2 19.77 39.78

D2 4.13

D1 3.03 6.94

D1 3.03

EXIST. 66" RCP (270')

EXIST. 54" RCP (285')

EXIST. 66" RCP (265')

EXIST. 24" RCP

EXIST. 54" RCP (270')

EXIST. 54" RCP (300')

EXIST. 54" RCP (260')

EXIST. 48" RCP (275')

EXIST. 48" RCP (160')

EXIST. 24" RCP

EXIST. 30" RCP

EXIST. 30" RCP

EXIST. 36" RCP

EXIST. 42" RCP (300')

EXIST. 24" RCP

LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx — JUNCTION #
- ACRES — TOTAL ACCUMULATIVE AREA
- FLOW — TOTAL ACCUMULATIVE FLOW
- FLOW DIRECTION
- B175 3.27 — DRAINAGE AREA ID (ACRES)

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

EXISTING DRAINAGE AREA MAP SYSTEM D

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM D EX.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 18 OF 131

PUBLIC WORKS AND ENGINEERING
EXAMINED AND FILED
49099
COUNTY CLERK
HARRIS COUNTY, TEXAS

0 50 100 200

PROPOSED SYSTEM "D"

BRAYS BAYOU H.C.F.C.D. (D100-00-00)

EXIST. 66" RCP OUTFALL

D7 45.20 85.50

D5-1 2.24

D5-1 33.13 64.31

D3 2.45

D11 9.23 12.57

EXIST. 24" RCP

D10 6.16 13.52

D11 3.07

EXIST. 30" RCP

D10 6.16

BLUEGATE

D12 9.23 18.67

LINKWOOD

EXIST. 66" RCP (270')

D8-1 54.41 101.49

D8-1 2.48

EXIST. 54" RCP (285')

CONWAY

EXIST. 54" RCP (270')

STANTON

PRESCOTT

EXIST. 54" RCP (260')

ASHWOOD

CRISWELL

D4 2.76

D3 22.22 44.40

D13 12.61 25.53

EXIST. 18" RCP

HATTON

D13 3.38

GREENBUSH

D9 59.43 109.63

PROP. 24" RCP (175')

EXIST. 66" RCP (265')

EXIST. 24" RCP (45')

D8-2 6.73 14.37

D8-2 1.58

D6 39.26 75.02

EXIST. 54" RCP (300')

D5-D 1.72

D5-D 5.91 13.34

PROP. 24" RCP (90')

D5-2 4.19 9.56

PROP. 24" RCP (220')

D5-B 1.38

D4 24.98 49.18

EXIST. 48" RCP (270')

D2 19.77 39.85

EXIST. 42" RCP (300')

EXIST. 42" RCP

D1 3.03 6.94

D1 3.03

CASTLEWOOD

BRAESWOOD

D9 5.12

D14-2 3.42 7.49

D14-A 1.71

TILDEN

PROP. 24" RCP (48')

D14-1 5.15 11.22

D7 5.94

D6 6.13

FAIRHOPE PLACE

D6-3 4.19 9.56

D14-B 1.71

D14-C 1.73

WINSLOW

D5-C 1.02

D5-A 1.79

D2 19.77

LEGEND

- SYSTEM BOUNDARY
- SUBAREA DIVIDE
- Axx / ACRES / FLOW — JUNCTION #, TOTAL ACCUMULATIVE AREA, TOTAL ACCUMULATIVE FLOW (2 YEAR)
- FLOW DIRECTION
- R17B / 3.27 — DRAINAGE AREA ID (ACRES)
- PROP. PROJECT LIMITS (PAVEMENT REPLACEMENT)
- SHADED REGIONS DENOTE AREAS LOCATED OUTSIDE THE 100 YR. FLOOD PLAIN.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

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(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PROPOSED DRAINAGE AREA MAP SYSTEM D

WBS N-000383-0001-4

FILE: K:\City of Houston\2006-05_NSR 451\DRAWINGS\SYSTEM D PROP.dwg

DRAWING SCALE
1" = 200' HALF
1" = 100' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 19 OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
JUMBER
EXAM

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/30/2009 7:56:24 AM

PROJECT NAME : NSR 451
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM A - EXISTING
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
A8	0.55	9.18	11.67	11.67	4.72	0.000	23.806
A9	0.45	13.25	20.83	20.83	3.72	0.000	22.197
A10	0.45	6.10	17.92	17.92	3.98	0.000	10.939
A12	0.55	4.29	17.02	17.02	4.07	0.000	9.614
A13	0.55	4.01	17.02	17.02	4.07	0.000	8.986
A14	0.55	7.12	15.95	15.95	4.19	0.000	16.396
A4-a	0.45	30.61	18.75	18.75	3.91	0.000	53.805
A1	0.45	23.77	21.25	21.25	3.69	0.000	39.449
A2	0.45	23.84	27.50	27.50	3.24	0.000	34.800
A3	0.45	15.62	19.17	19.17	3.87	0.000	27.185
A7	0.45	19.84	30.83	30.83	3.05	0.000	27.245
A5-a	0.45	19.65	30.00	30.00	3.10	0.000	27.387
A5-b	0.45	13.09	12.50	12.50	4.60	0.000	27.105
A610S	0.65	13.12	33.81	33.81	2.90	0.000	24.729
A15	0.55	8.15	23.81	23.81	3.49	0.000	15.647
A19	0.55	11.00	17.62	17.62	4.01	0.000	24.287
A23	0.55	2.21	18.93	18.93	3.89	0.000	4.728
A24	0.38	6.63	18.99	18.99	3.88	0.000	9.785
A28	0.55	2.92	19.52	19.52	3.84	0.000	6.161
A22-a	0.55	0.51	11.19	11.19	4.78	0.000	1.342
A22-b	0.55	1.21	13.57	13.57	4.46	0.000	2.970
A25-a	0.55	1.80	15.36	15.36	4.25	0.000	4.209
A26-a	0.55	0.62	13.45	13.45	4.48	0.000	1.527
A26-b	0.55	0.62	13.45	13.45	4.48	0.000	1.527
A27-a	0.55	3.01	20.00	20.00	3.79	0.000	6.280
A29	0.55	2.09	11.79	11.79	4.70	0.000	5.401
A11-a	0.55	12.40	18.45	18.45	3.93	0.000	26.831
A11-b	0.45	2.73	16.67	16.67	4.11	0.000	5.050
A11-c	0.55	10.35	17.14	17.14	4.06	0.000	23.125
A11-d	0.45	24.83	20.00	20.00	3.79	0.000	42.388
A11-e	0.55	25.21	24.29	24.29	3.46	0.000	47.923
A11-f	0.55	30.46	26.37	26.37	3.32	0.000	55.541
A11-g	0.55	27.04	26.67	26.67	3.30	0.000	49.018
A11-h	0.55	25.78	20.00	20.00	3.79	0.000	53.790
A4-b	0.55	23.05	25.00	25.00	3.41	0.000	43.188
A5-c	0.55	30.67	17.08	17.08	4.07	0.000	68.628
A610N	0.8	28.93	30.00	30.00	3.10	0.000	71.682
A6-a	0.55	15.24	50.00	50.00	2.30	0.000	19.250
A6-b	0.55	8.68	21.07	21.07	3.70	0.000	17.677
A6-c	0.55	14.63	23.33	23.33	3.53	0.000	28.371
A6-d	0.55	15.50	24.40	24.40	3.45	0.000	29.398
A20-a	0.55	3.80	25.00	25.00	3.41	0.000	7.120
A20-b	0.55	1.73	25.00	25.00	3.41	0.000	3.241
A22-c	0.55	1.69	13.57	13.57	4.46	0.000	4.149
A25-b	0.55	1.60	15.36	15.36	4.25	0.000	3.742
A26-c	0.55	0.99	13.45	13.45	4.48	0.000	2.439
A27-b	0.55	3.16	20.00	20.00	3.79	0.000	6.593
A11-i	0.55	7.35	22.08	22.08	3.62	0.000	14.640

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)
A20-a	Curb	5.00	0.00	0.35	2.00	0.30	2.00	0.014	1.50	0.57
A20-b	Curb	5.00	0.00	0.30	2.00	0.35	2.00	0.014	1.50	0.57
A22-a	Curb	5.00	0.00	1.00	2.00	0.40	2.00	0.014	1.50	0.57
A22-b	Curb	5.00	0.00	0.40	2.00	1.00	2.00	0.014	1.50	0.57
A22-c	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A25-a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A25-b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A26-a	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-b	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-c	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A27-a	Curb	5.00	0.00	0.30	2.00	0.51	2.00	0.014	1.50	0.57
A27-b	Curb	5.00	0.00	0.51	2.00	0.30	2.00	0.014	1.50	0.57

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)
A20-a	Curb	5.00	n/a	n/a	7.120	7.601	0.531	13.45	13.85
A20-b	Curb	5.00	n/a	n/a	3.241	7.601	0.308	10.30	10.00
A22-a	Curb	5.00	n/a	n/a	1.342	7.601	0.260	5.90	7.00
A22-b	Curb	5.00	n/a	n/a	2.970	7.601	0.299	9.45	7.95
A22-c	Curb	5.00	n/a	n/a	4.149	7.601	0.345	11.30	9.00
A25-a	Curb	5.00	n/a	n/a	4.209	7.601	0.348	11.35	11.35
A25-b	Curb	5.00	n/a	n/a	3.742	7.601	0.328	10.85	10.85
A26-a	Curb	5.00	n/a	n/a	1.527	7.601	0.263	7.75	6.20
A26-b	Curb	5.00	n/a	n/a	1.527	7.601	0.263	7.75	6.20
A26-c	Curb	5.00	n/a	n/a	2.439	7.601	0.283	9.25	9.25
A27-a	Curb	5.00	n/a	n/a	6.280	7.601	0.468	12.15	12.80
A27-b	Curb	5.00	n/a	n/a	6.593	7.601	0.491	13.05	12.35

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)
A610N	CrcMh	0.531	222.35	41.28	2.58		0.00	305.211
A1	CrcMh	0.450	23.77	21.25	3.69		0.00	39.449
A2	CrcMh	0.450	47.61	29.18	3.14		0.00	67.349
A3	CrcMh	0.450	63.23	32.97	2.94		0.00	83.680
A4-a	CrcMh	0.470	116.89	36.55	2.77		0.00	152.313
A5-a	CrcMh	0.480	180.30	39.63	2.65		0.00	228.905
A6-a	CrcMh	0.535	276.40	50.00	2.30		0.00	339.675
A7	CrcMh	0.529	296.24	51.35	2.26		0.00	354.184
A8	CrcMh	0.530	305.42	52.45	2.23		0.00	360.695
A9	CrcMh	0.527	318.67	53.00	2.21		0.00	371.539
A10	CrcMh	0.525	324.77	54.04	2.19		0.00	372.928
A20	CrcMh	0.550	5.53	25.07	3.40		0.00	10.348
A22	CrcMh	0.550	3.41	14.13	4.40		0.00	8.243
A21	CrcMh	0.550	8.94	27.03	3.27		0.00	16.093
A23	CrcMh	0.550	11.15	27.88	3.22		0.00	19.750
A24	CrcMh	0.487	17.78	29.82	3.11		0.00	26.885
A25	CrcMh	0.550	3.40	15.48	4.24		0.00	7.926
A26	CrcMh	0.550	5.63	16.87	4.09		0.00	12.664
A27	CrcMh	0.550	6.17	20.11	3.78		0.00	12.843
A28	CrcMh	0.550	2.92	19.52	3.84		0.00	6.161
A29	CrcMh	0.550	5.01	20.84	3.72		0.00	10.255
A4-b	CrcMh	0.550	23.05	25.00	3.41		0.00	43.188
A5-b	CrcMh	0.520	43.76	18.77	3.90		0.00	88.852
A5-c	CrcMh	0.550	30.67	17.08	4.07		0.00	68.628
A6-b	CrcMh	0.550	38.81	28.64	3.17		0.00	67.770
A6-c	CrcMh	0.550	30.13	26.49	3.31		0.00	54.806
A6-d	CrcMh	0.550	15.50	24.40	3.45		0.00	29.398
A11-a	CrcMh	0.550	12.40	18.45	3.93		0.00	26.831
A11-b	CrcMh	0.532	153.75	33.11	2.93		0.00	240.023
A11-c	CrcMh	0.479	35.18	21.34	3.68		0.00	62.072
A11-d	CrcMh	0.450	24.83	20.00	3.79		0.00	42.388
A11-e	CrcMh	0.534	151.02	33.11	2.93		0.00	236.419
A11-f	CrcMh	0.550	90.63	32.39	2.97		0.00	148.053
A11-g	CrcMh	0.550	60.17	31.09	3.04		0.00	100.523
A11-h	CrcMh	0.550	33.13	30.04	3.09		0.00	56.393
A11-i	CrcMh	0.550	7.35	22.08	3.62		0.00	14.640
A20-a	Curb	0.550	3.80	25.00	3.41		0.00	7.120
A20-b	Curb	0.550	1.73	25.00	3.41		0.00	3.241
A22-a	Curb	0.550	2.20	14.08	4.40		0.00	5.325
A22-b	Curb	0.550	1.21	13.57	4.46		0.00	2.970
A22-c	Curb	0.550	1.69	13.57	4.46		0.00	4.149
A25-a	Curb	0.550	3.40	15.48	4.24		0.00	7.926
A25-b	Curb	0.550	1.60	15.36	4.25		0.00	3.742
A26-a	Curb	0.550	2.23	13.94	4.42		0.00	5.418
A26-b	Curb	0.550	1.61	13.80	4.44		0.00	3.927
A26-c	Curb	0.550	0.99	13.45	4.48		0.00	2.439
A27-a	Curb	0.550	6.17	20.11	3.78		0.00	12.843
A27-b	Curb	0.550	3.16	20.00	3.79		0.00	6.593
A11	CrcMh	0.528	490.92	54.43	2.18		0.00	564.084
A12	CrcMh	0.528	495.21	55.15	2.16		0.00	564.412
A13	CrcMh	0.528	499.22	55.61	2.15		0.00	566.202
A14	CrcMh	0.527	524.12	55.76	2.14		0.00	592.147
A15	CrcMh	0.528	532.27	56.40	2.13		0.00	597.312
A16	CrcMh	0.528	537.90	56.45	2.13		0.00	603.536
A17	CrcMh	0.528	544.07	56.94	2.11		0.00	607.368
A18	CrcMh	0.528	549.08	57.31	2.11		0.00	610.616
A19	CrcMh	0.529	560.08	57.50	2.10		0.00	622.043
A610S	CrcMh	0.491	193.42	40.42	2.62		0.00	248.532
OUT	Outlt	0.529	560.08	57.50	2.10		0.00	622.043

Conveyance Configuration Data

Run #	Node US	Node DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A1	A2	40.68	38.16	Cir 1	0.00	6.00	2100.0	0.120	0.013
2	A2	A3	38.16	36.78	Cir 1	0.00	6.50	1150.0	0.120	0.013
3	A3	A4-a	36.78	35.40	Cir 1	0.00	7.00	1150.0	0.120	0.013
4	A4-a	A5-a	35.40	34.02	Cir 1	0.00	7.50	1150.0	0.120	0.013
5	A5-a	A610S	34.02	33.55	Cir 1	0.00	9.00	345.0	0.136	0.013
6	A610S	A610N	33.55	33.15	Box 1	9.00	8.00	340.0	0.118	0.013
7	A610N	A6-a	33.15	32.97	Cir 1	0.00	10.0	180.0	0.100	0.013
8	A6-a	A7	32.97	32.24	Cir 1	0.00	10.0	615.0	0.119	0.013
9	A7	A8	32.24	31.61	Cir 1	0.00	10.0	513.0	0.123	0.013
10	A8	A9	31.61	30.96	Cir 1	0.00	10.0	310.0	0.210	0.013
11	A9	A10	30.96	29.77	Cir 1	0.00	10.0	593.0	0.201	0.013
12	A10	A11	29.77	29.33	Cir 1	0.00	10.0	220.0	0.200	0.013
13	A11	A12	29.33	28.43	Cir 1	0.00	10.0	450.0	0.200	0.013
14	A12	A13	28.43	27.87	Cir 1	0.00	10.0	280.0	0.200	0.013
15	A13	A14	27.87	27.59	Cir 1	0.00	10.0	105.0	0.267	0.013
16	A14	A15	27.59	26.78	Cir 1	0.00	10.0	405.0	0.200	0.013
17	A15	A16	26.78	26.72	Cir 1	0.00	10.0	32.0	0.188	0.013
18	A16	A17	26.72	26.21	Cir 1	0.00	10.0	290.0	0.176	0.013
19	A17	A18	26.21	25.77	Cir 1	0.00	10.0	230.0	0.191	0.013
20	A18	A19	24.77	24.57	Box 1	10.0	11.0	100.0	0.200	0.015
21	A19	OUT	24.57	24.37	Box 1	10.0	11.0	100.0	0.200	0.015
22	A24	A14	38.49	37.35	Cir 1	0.00	2.50	210.0	0.543	0.013
23	A23	A24	39.85	38.49	Cir 1	0.00	2.50	550.0	0.247	0.013
24	A21	A23	41.90	40.35	Cir 1	0.00	2.00	300.0	0.517	0.013
25	A22	A21	42.45	41.90	Cir 1	0.00	2.00	307.0	0.179	0.013
26	A20	A21	42.65	41.90	Cir 1	0.00	2.00	408.0	0.184	0.013
27	A25	A26	41.72	40.01	Cir 1	0.00	2.00	400.0	0.428	0.013
28	A26	A16	40.01	39.00	Cir 1	0.00	2.00	188.0	0.537	0.013
29	A27	A17	42.38	40.10	Cir 1	0.00	2.00	467.0	0.488	0.013
30	A29	A18	41.30	41.00	Cir 1	0.00	2.00	117.0	0.256	0.013
31	A28	A29	41.67	41.21	Cir 1	0.00	2.00	257.0	0.179	0.013
100	A4-b	A4-a	36.78	35.40	Cir 1	0.00	4.00	1150.0	0.120	0.013
101	A5-c	A5-b	45.50	44.00	Cir 1	0.00	4.00	640.0	0.234	0.013
102	A5-b	A5-a	44.00	42.46	Cir 1	0.00	4.50	730.0	0.211	0.013
103	A6-d	A6-c	42.00	36.90	Cir 1	0.00	2.50	900.0	0.567	0.013
104	A6-c	A6-b	36.90	34.30	Cir 1	0.00	3.50	850.0	0.306	0.013
105	A6-b	A6-a	34.30	32.97	Cir 1	0.00	3.50	280.0	0.475	0.013
106	A11-a	A11	30.70	30.00	Cir 1	0.00	3.00	300.0	0.233	0.013
107	A11-i	A11-h	45.75	45.61	Cir 1	0.00	4.00	800.0	0.018	0.013
108	A11-h	A11-g	45.61	44.97	Cir 1	0.00	4.00	350.0	0.183	0.013
109	A11-g	A11-f	44.47	42.65	Cir 1	0.00	4.50	600.0	0.303	0.013
110	A11-f	A11-e	42.15	40.64	Cir 1	0.00	5.00	400.0	0.378	0.013
111	A11-d	A11-c	43.80	43.00	Cir 1	0.00	3.50	420.0	0.190	0.013
112	A11-c	A11-e	43.00	42.14	Cir 1	0.00	3.50	220.0	0.391	0.013
113	A11-e	A11-b	40.15	35.50	Cir 1	0.00	5.50	920.0	0.505	0.013
114	A11-b	A11	35.50	34.10	Cir 1	0.00	5.50	270.0	0.519	0.013
115	A27-b	A27-a	42.61	42.50	Cir 1	0.00	2.00	28.0	0.393	0.013
116	A27-a	A27	42.50	42.38	Cir 1	0.00	2.00	9.0	1.333	0.013
117	A25-b	A25-a	42.12	42.00	Cir 1	0.00	2.00	28.0	0.429	0.013
118	A25-a	A25	42.00	41.72	Cir 1	0.00	2.00	22.0	1.273	0.013
119	A26-c	A26-b	41.82	41.72	Cir 1	0.00	2.00	54.0	0.185	0.013
120	A26-b	A26-a	41.72	41.68	Cir 1	0.00	2.00	24.0	0.167	0.013
121	A26-a	A26	41.68	41.24	Cir 1	0.00	2.00	8.0	5.508	0.013
122	A22-c	A22-a	42.66	42.50	Cir 1	0.00	2.00	90.0	0.178	0.013
123	A22-a	A22	42.50	42.45	Cir 1	0.00	2.00	12.0	0.417	0.013
124	A22-b	A22	42.50	42.45	Cir 1	0.00	2.00	24.0	0.208	0.013
125	A20-a	A20	42.82	42.62	Cir 1	0.00	2.00	8.0	2.501	0.013
126	A20-b	A20	42.82	42.62	Cir 1	0.00	2.00	20.0	1.000	0.013

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAIN\SYS-A-2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 20 OF 131

PUBLIC WORKS AND ENGINEERING
ACCEPTED AND FILED
49097
KEY NUMBER
MAP

Conveyance Hydraulic Computations. Tailwater = 35.370 (ft)

Run #	Hyd. Gr.line US (ft)	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	42.80	40.90	53.00	0.009	2.12	2.74	4.41	3.13	39.4	147.3	0.000
2	40.90	40.04	60.00	0.016	2.74	3.26	5.06	4.04	67.3	182.4	0.000
3	40.04	39.47	58.00	0.017	2.98	4.07	5.36	3.60	83.7	222.2	0.000
4	39.47	38.80	56.00	0.039	4.07	4.78	6.22	5.13	152.3	267.1	0.000
5	38.80	38.79	54.00	0.033	4.48	5.24	7.23	5.95	228.9	462.8	0.000
6	38.79	38.64	53.00	0.034	4.19	5.49	6.59	5.03	248.5	465.5	0.000
7	38.64	38.52	53.00	0.034	5.49	5.55	6.91	6.82	305.2	525.2	0.000
8	38.52	37.88	52.00	0.042	5.55	5.64	7.59	7.43	339.7	572.2	0.000
9	37.88	37.31	51.50	0.045	5.64	5.70	7.75	7.65	354.2	582.0	0.000
10	37.31	37.17	50.00	0.047	4.86	6.21	9.52	7.04	360.7	760.5	0.000
11	37.17	36.66	49.50	0.050	5.01	6.89	9.44	6.44	371.5	744.0	0.000
12	36.66	36.42	48.50	0.050	5.02	7.09	9.45	6.26	372.9	742.7	0.000
13	36.42	36.45	48.50	0.115	6.54	8.02	10.36	8.36	564.1	742.7	0.000
14	36.45	36.31	47.50	0.115	6.54	8.44	10.37	7.98	564.4	742.7	0.000
15	36.31	36.17	46.50	0.116	5.95	8.58	11.63	7.89	566.2	857.6	0.000
16	36.17	35.92	46.50	0.127	6.76	9.14	10.48	7.87	592.1	742.7	0.000
17	35.92	35.90	46.50	0.129	6.99	9.18	10.18	7.91	597.3	719.1	0.000
18	35.90	35.78	46.50	0.132	7.23	9.57	9.93	7.80	603.5	696.5	0.000
19	35.78	35.63	46.50	0.134	7.01	9.86	10.32	7.75	607.4	726.4	0.000
20	35.63	35.50	46.50	0.087	6.81	10.93	8.97	5.59	610.6	926.0	0.000
21	35.50	35.37	46.50	0.090	6.90	11.00	9.02	5.65	622.0	926.0	0.000
22	40.33	39.85	46.52	0.426	1.84	2.50	6.96	5.48	26.9	30.4	0.000
23	41.83	40.33	46.52	0.230	1.98	1.98	4.73	4.73	19.8	20.5	0.000
24	43.52	41.83	48.36	0.502	1.62	1.62	5.90	5.90	16.1	16.3	0.000
25	43.88	43.52	47.35	0.132	1.43	1.62	3.43	3.02	8.2	9.6	0.000
26	44.46	43.52	46.97	0.207	1.81	1.81	3.46	3.46	10.3	9.7	0.000
27	42.76	41.32	46.72	0.122	1.04	1.31	4.79	3.64	7.9	14.9	0.000
28	41.32	41.00	47.91	0.311	1.31	2.00	5.81	4.03	12.7	16.7	0.000
29	43.75	42.10	47.48	0.320	1.37	2.00	5.60	4.09	12.8	15.9	0.000
30	43.06	43.00	46.50	0.204	1.48	2.00	4.12	3.26	10.3	11.5	0.000
31	43.34	43.06	46.50	0.074	1.17	1.85	3.23	2.03	6.2	9.6	0.000
100	39.76	39.47	54.00	0.090	2.88	4.00	4.47	3.44	43.2	50.0	0.000
101	48.73	47.62	54.00	0.226	3.23	3.62	6.30	5.74	68.6	69.8	0.000
102	47.62	46.96	54.00	0.202	3.62	4.50	6.48	5.59	88.9	90.7	0.000
103	43.95	39.72	52.00	0.509	1.95	2.50	7.16	5.99	29.4	31.0	0.000
104	39.72	38.59	52.00	0.294	2.82	3.50	6.59	5.70	54.8	55.9	0.000
105	38.59	38.52	52.00	0.450	2.80	3.50	8.22	7.04	67.8	69.6	0.000
106	36.64	36.42	48.50	0.160	2.09	3.00	5.10	3.80	26.8	32.4	0.000
107	48.66	48.63	52.00	0.010	2.63	3.02	1.67	1.44	14.6	19.1	0.000
108	48.63	47.90	51.00	0.153	3.02	3.02	5.55	5.55	56.4	61.7	0.000
109	47.90	45.95	50.00	0.259	3.43	3.43	7.73	7.73	100.5	108.8	0.000
110	45.95	44.61	48.50	0.320	3.80	3.97	9.25	8.86	148.1	160.7	0.000
111	46.56	45.83	48.50	0.176	2.76	2.83	5.21	5.09	42.4	44.1	0.000
112	45.83	44.61	48.00	0.377	2.83	2.83	7.45	7.45	62.1	63.2	0.000
113	44.61	39.97	48.50	0.491	4.46	4.47	11.46	11.44	236.4	239.8	0.000
114	39.97	36.42	48.50	0.507	4.47	4.47	11.61	11.61	240.0	242.8	0.000
115	43.84	43.79	46.43	0.084	0.96	1.29	4.43	3.07	6.6	14.2	0.000
116*	43.79	43.75	46.43	0.320	0.99	1.37	8.28	5.60	12.8	26.2	0.000
117	43.08	43.00	45.84	0.027	0.69	1.00	3.93	2.38	3.7	14.9	0.000
118*	43.00	42.76	45.84	0.122	0.77	1.04	7.17	4.79	7.9	25.6	0.000
119	42.64	42.59	47.50	0.012	0.68	0.87	2.58	1.86	2.4	9.8	0.000
120	42.59	42.11	47.50	0.030	0.91	0.91	2.82	2.82	3.9	9.3	0.000
121*	42.11	41.32	47.50	0.057	0.43	0.43	10.87	10.87	5.4	53.3	0.000
122	44.03	43.92	47.25	0.033	0.92	1.42	2.93	1.74	4.1	9.6	0.000
123	43.92	43.88	47.00	0.055	0.84	1.43	4.28	2.22	5.3	14.7	0.000
124	43.92	43.88	47.00	0.017	0.73	1.43	2.84	1.24	3.0	10.4	0.000
125*	44.47	44.46	46.98	0.098	0.60	1.84	8.88	4.86	7.1	35.9	0.000
126*	44.47	44.46	46.98	0.020	0.51	1.84	5.11	3.82	3.2	22.7	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	6.0	0.0	1	2100.0
Circular	Concrete	6.5	0.0	1	1150.0
Circular	Concrete	7.0	0.0	1	1150.0
Circular	Concrete	7.5	0.0	1	1150.0
Circular	Concrete	9.0	0.0	1	345.0
Box	Concrete	8.0	9.0	1	340.0
Circular	Concrete	10.0	0.0	13	4223.0
Box	Concrete	11.0	10.0	2	200.0
Circular	Concrete	2.5	0.0	3	1660.0
Circular	Concrete	2.0	0.0	20	2771.0
Circular	Concrete	4.0	0.0	4	2940.0
Circular	Concrete	4.5	0.0	2	1330.0
Circular	Concrete	3.5	0.0	4	1770.0
Circular	Concrete	3.0	0.0	1	300.0
Circular	Concrete	5.0	0.0	1	400.0
Circular	Concrete	5.5	0.0	2	1190.0

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	46
Curb In Sag		5.0	0.0	0.0	0.0	0.0	12
Outlet		0.0	0.0	0.0	0.0	0.0	1

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A8	0.55	9.18	11.67	11.67	9.01	0.000	45.500
A9	0.45	13.25	20.83	20.83	7.52	0.000	44.817
A10	0.45	6.10	17.92	17.92	7.93	0.000	21.756
A12	0.55	4.29	17.02	17.02	8.06	0.000	19.025
A13	0.55	4.01	17.02	17.02	8.06	0.000	17.783
A14	0.55	7.12	15.95	15.95	8.23	0.000	32.244
A4-a	0.45	30.61	18.75	18.75	7.80	0.000	107.493
A1	0.45	23.77	21.25	21.25	7.46	0.000	79.810
A2	0.45	23.84	27.50	27.50	6.74	0.000	72.307
A3	0.45	15.62	19.17	19.17	7.74	0.000	54.430
A7	0.45	19.84	30.83	30.83	6.42	0.000	57.296
A5-a	0.45	19.65	30.00	30.00	6.49	0.000	57.428
A5-b	0.45	13.09	12.50	12.50	8.85	0.000	52.117
A610S	0.65	13.12	33.81	33.81	6.16	0.000	52.515
A15	0.55	8.15	23.81	23.81	7.15	0.000	32.027
A19	0.55	11.00	17.62	17.62	7.97	0.000	48.224
A23	0.55	2.21	18.93	18.93	7.78	0.000	9.454
A24	0.38	6.63	18.99	18.99	7.77	0.000	19.574
A28	0.55	2.92	19.52	19.52	7.69	0.000	12.357
A22-a	0.55	0.51	11.19	11.19	9.11	0.000	2.555
A22-b	0.55	1.21	13.57	13.57	8.65	0.000	5.754
A25-a	0.55	1.80	15.36	15.36	8.33	0.000	8.249
A26-a	0.55	0.62	13.45	13.45	8.67	0.000	2.956
A26-b	0.55	0.62	13.45	13.45	8.67	0.000	2.956
A27-a	0.55	3.01	20.00	20.00	7.63	0.000	12.628
A29	0.55	2.09	11.79	11.79	8.99	0.000	10.331
A11-a	0.55	12.40	18.45	18.45	7.85	0.000	53.519
A11-b	0.45	2.73	16.67	16.67	8.12	0.000	9.973
A11-c	0.55	10.35	17.14	17.14	8.04	0.000	45.793
A11-d	0.45	24.83	20.00	20.00	7.63	0.000	85.232
A11-e	0.55	25.21	24.29	24.29	7.09	0.000	98.294
A11-f	0.55	30.46	26.37	26.37	6.86	0.000	114.897
A11-g	0.55	27.04	26.67	26.67	6.83	0.000	101.522
A11-h	0.55	25.78	20.00	20.00	7.63	0.000	108.159
A4-b	0.55	23.05	25.00	25.00	7.01	0.000	88.848
A5-c	0.55	30.67	17.08	17.08	8.05	0.000	135.856
A610N	0.8	28.93	30.00	30.00	6.49	0.000	150.310
A6-a	0.55	15.24	50.00	50.00	5.08	0.000	42.614
A6-b	0.55	8.68	21.07	21.07	7.48	0.000	35.733
A6-c	0.55	14.63	23.33	23.33	7.20	0.000	57.950
A6-d	0.55	15.50	24.40	24.40	7.08	0.000	60.327
A20-a	0.55	3.80	25.00	25.00	7.01	0.000	14.647
A20-b	0.55	1.73	25.00	25.00	7.01	0.000	6.668
A22-c	0.55	1.69	13.57	13.57	8.65	0.000	8.037
A25-b	0.55	1.60	15.36	15.36	8.33	0.000	7.332
A26-c	0.55	0.99	13.45	13.45	8.67	0.000	4.720
A27-b	0.55	3.16	20.00	20.00	7.63	0.000	13.258
A11-i	0.55	7.35	22.08	22.08	7.36	0.000	29.734

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)
A20-a	Curb	5.00	0.00	0.35	2.00	0.30	2.00	0.014	1.50	0.57
A20-b	Curb	5.00	0.00	0.30	2.00	0.35	2.00	0.014	1.50	0.57
A22-a	Curb	5.00	0.00	1.00	2.00	0.40	2.00	0.014	1.50	0.57
A22-b	Curb	5.00	0.00	0.40	2.00	1.00	2.00	0.014	1.50	0.57
A22-c	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A25-a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A25-b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A26-a	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-b	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-c	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A27-a	Curb	5.00	0.00	0.30	2.00	0.51	2.00	0.014	1.50	0.57
A27-b	Curb	5.00	0.00	0.51	2.00	0.30	2.00	0.014	1.50	0.57

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)
A20-a	Curb	5.00	n/a	n/a	14.647	7.601	1.438	17.60	18.15
A20-b	Curb	5.00	n/a	n/a	6.668	7.601	0.496	13.50	13.10
A22-a	Curb	5.00	n/a	n/a	2.555	7.601	0.286	7.50	8.90
A22-b	Curb	5.00	n/a	n/a	5.754	7.601	0.433	12.10	10.20
A22-c	Curb	5.00	n/a	n/a	8.037	7.601	0.608	14.45	11.55
A25-a	Curb	5.00	n/a	n/a	8.249	7.601	0.627	14.60	14.60
A25-b	Curb	5.00	n/a	n/a	7.332	7.601	0.548	14.00	14.00
A26-a	Curb	5.00	n/a	n/a	2.956	7.601	0.298	9.95	7.95
A26-b	Curb	5.00	n/a	n/a	2.956	7.601	0.298	9.95	7.95
A26-c	Curb	5.00	n/a	n/a	4.720	7.601	0.373	11.85	11.85
A27-a	Curb	5.00	n/a	n/a	12.628	7.601	1.133	15.75	16.60
A27-b	Curb	5.00	n/a	n/a	13.258	7.601	1.224	16.95	16.05

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)
A610N	CrcMh	0.531	222.35	37.94	5.84		0.00	689.654
A1	CrcMh	0.450	23.77	21.25	7.46		0.00	79.810
A2	CrcMh	0.450	47.61	27.85	6.70		0.00	143.637
A3	CrcMh	0.450	63.23	31.01	6.40		0.00	182.126
A4-a	CrcMh	0.470	116.89	34.00	6.14		0.00	337.233
A5-a	CrcMh	0.480	180.30	36.51	5.94		0.00	514.079
A6-a	CrcMh	0.535	276.40	50.00	5.08		0.00	751.954
A7	CrcMh	0.529	296.24	51.07	5.03		0.00	788.542
A8	CrcMh	0.530	305.42	51.92	4.98		0.00	806.866
A9	CrcMh	0.527	318.67	52.40	4.96		0.00	832.555
A10	CrcMh	0.525	324.77	53.33	4.91		0.00	838.283
A20	CrcMh	0.550	5.53	25.05	7.00		0.00	21.298
A22	CrcMh	0.550	3.41	14.05	8.56		0.00	16.053
A21	CrcMh	0.550	8.94	26.06	6.89		0.00	33.888
A23	CrcMh	0.550	11.15	26.52	6.84		0.00	41.961
A24	CrcMh	0.487	17.78	27.59	6.73		0.00	58.233
A25	CrcMh	0.550	3.40	15.46	8.32		0.00	15.549
A26	CrcMh	0.550	5.63	16.71	8.11		0.00	25.119
A27	CrcMh	0.550	6.17	20.09	7.62		0.00	25.844
A28	CrcMh	0.550	2.92	19.52	7.69		0.00	12.357
A29	CrcMh	0.550	5.01	20.61	7.55		0.00	20.792
A4-b	CrcMh	0.550	23.05	25.00	7.01		0.00	88.848
A5-b	CrcMh	0.520	43.76	18.07	7.90		0.00	179.884
A5-c	CrcMh	0.550	30.67	17.08	8.05		0.00	135.856
A6-b	CrcMh	0.550	38.81	26.81	6.81		0.00	145.408
A6-c	CrcMh	0.550	30.13	25.62	6.94		0.00	114.996
A6-d	CrcMh	0.550	15.50	24.40	7.08		0.00	60.327
A11-a	CrcMh	0.550	12.40	18.45	7.85		0.00	53.519
A11-b	CrcMh	0.532	153.75	30.12	6.48		0.00	530.339
A11-c	CrcMh	0.479	35.18	20.79	7.52		0.00	126.861
A11-d	CrcMh	0.450	24.83	20.00	7.63		0.00	85.232
A11-e	CrcMh	0.534	151.02	29.43	6.55		0.00	527.646
A11-f	CrcMh	0.550	90.63	29.04	6.59		0.00	328.326
A11-g	CrcMh	0.550	60.17	28.31	6.66		0.00	220.329
A11-h	CrcMh	0.550	33.13	27.72	6.72		0.00	122.413
A11-i	CrcMh	0.550	7.35	22.08	7.36		0.00	29.734
A20-a	Curb	0.550	3.80	25.00	7.01		0.00	14.647
A20-b	Curb	0.550	1.73	25.00	7.01		0.00	6.668
A22-a	Curb	0.550	2.20	14.01	8.57		0.00	10.365
A22-b	Curb	0.550	1.21	13.57	8.65		0.00	5.754
A22-c	Curb	0.550	1.69	13.57	8.65		0.00	8.037
A25-a	Curb	0.550	3.40	15.46	8.32		0.00	15.549
A25-b	Curb	0.550	1.60	15.36	8.33		0.00	7.332
A26-a	Curb	0.550	2.23	13.86	8.59		0.00	10.539
A26-b	Curb	0.550	1.61	13.74	8.61		0.00	7.628
A26-c	Curb	0.550	0.99	13.45	8.67		0.00	4.720
A27-a	Curb	0.550	6.17	20.09	7.62		0.00	25.844
A27-b	Curb	0.550	3.16	20.00	7.63		0.00	13.258
A11	CrcMh	0.528	490.92	53.67	4.90		0.00	1269.442
A12	CrcMh	0.528	495.21	54.14	4.87		0.00	1275.122
A13	CrcMh	0.528	499.22	54.43	4.86		0.00	1282.235
A14	CrcMh	0.527	524.12	54.53	4.86		0.00	1341.912
A15	CrcMh	0.528	532.27	54.93	4.84		0.00	1358.409
A16	CrcMh	0.528	537.90	54.96	4.84		0.00	1372.973
A17	CrcMh	0.528	544.07	55.24	4.82		0.00	1385.641
A18	CrcMh	0.528	549.08	55.45	4.81		0.00	1395.978
A19	CrcMh	0.529	560.08	55.58	4.81		0.00	1423.278
A610S	CrcMh	0.491	193.42	37.22	5.89		0.00	559.643
OUT	Outlt	0.529	560.08	55.58	4.81		0.00	1423.278

Revisions

No.	Date	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE: P:\City of Houston\3306-05_NSR 451\DRAWINGS\A-D STORM SYS A 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 21 OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
NUMBER
TEXAS

Conveyance Configuration Data

Run #	Node US	Node DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A1	A2	40.68	38.16	Cir 1	0.00	6.00	2100.0	0.120	0.013
2	A2	A3	38.16	36.78	Cir 1	0.00	6.50	1150.0	0.120	0.013
3	A3	A4-a	36.78	35.40	Cir 1	0.00	7.00	1150.0	0.120	0.013
4	A4-a	A5-a	35.40	34.02	Cir 1	0.00	7.50	1150.0	0.120	0.013
5	A5-a	A610S	34.02	33.55	Cir 1	0.00	9.00	345.0	0.136	0.013
6	A610S	A610N	33.55	33.15	Box 1	9.00	8.00	340.0	0.118	0.013
7	A610N	A6-a	33.15	32.97	Cir 1	0.00	10.0	180.0	0.100	0.013
8	A6-a	A7	32.97	32.24	Cir 1	0.00	10.0	615.0	0.119	0.013
9	A7	A8	32.24	31.61	Cir 1	0.00	10.0	513.0	0.123	0.013
10	A8	A9	31.61	30.96	Cir 1	0.00	10.0	310.0	0.210	0.013
11	A9	A10	30.96	29.77	Cir 1	0.00	10.0	593.0	0.201	0.013
12	A10	A11	29.77	29.33	Cir 1	0.00	10.0	220.0	0.200	0.013
13	A11	A12	29.33	28.43	Cir 1	0.00	10.0	450.0	0.200	0.013
14	A12	A13	28.43	27.87	Cir 1	0.00	10.0	280.0	0.200	0.013
15	A13	A14	27.87	27.59	Cir 1	0.00	10.0	105.0	0.267	0.013
16	A14	A15	27.59	26.78	Cir 1	0.00	10.0	405.0	0.200	0.013
17	A15	A16	26.78	26.72	Cir 1	0.00	10.0	32.0	0.188	0.013
18	A16	A17	26.72	26.21	Cir 1	0.00	10.0	290.0	0.176	0.013
19	A17	A18	26.21	25.77	Cir 1	0.00	10.0	230.0	0.191	0.013
20	A18	A19	24.77	24.57	Box 1	10.0	11.0	100.0	0.200	0.015
21	A19	OUT	24.57	24.37	Box 1	10.0	11.0	100.0	0.200	0.015
22	A24	A14	38.49	37.35	Cir 1	0.00	2.50	210.0	0.543	0.013
23	A23	A24	39.85	38.49	Cir 1	0.00	2.50	550.0	0.247	0.013
24	A21	A23	41.90	40.35	Cir 1	0.00	2.00	300.0	0.517	0.013
25	A22	A21	42.45	41.90	Cir 1	0.00	2.00	307.0	0.179	0.013
26	A20	A21	42.65	41.90	Cir 1	0.00	2.00	408.0	0.184	0.013
27	A25	A26	41.72	40.01	Cir 1	0.00	2.00	400.0	0.428	0.013
28	A26	A16	40.01	39.00	Cir 1	0.00	2.00	188.0	0.537	0.013
29	A27	A17	42.38	40.10	Cir 1	0.00	2.00	467.0	0.488	0.013
30	A29	A18	41.30	41.00	Cir 1	0.00	2.00	117.0	0.256	0.013
31	A28	A29	41.67	41.21	Cir 1	0.00	2.00	257.0	0.179	0.013
100	A4-b	A4-a	36.78	35.40	Cir 1	0.00	4.00	1150.0	0.120	0.013
101	A5-c	A5-b	45.50	44.00	Cir 1	0.00	4.00	640.0	0.234	0.013
102	A5-b	A5-a	44.00	42.46	Cir 1	0.00	4.50	730.0	0.211	0.013
103	A6-d	A6-c	42.00	36.90	Cir 1	0.00	2.50	900.0	0.567	0.013
104	A6-c	A6-b	36.90	34.30	Cir 1	0.00	3.50	850.0	0.306	0.013
105	A6-b	A6-a	34.30	32.97	Cir 1	0.00	3.50	280.0	0.475	0.013
106	A11-a	A11	30.70	30.00	Cir 1	0.00	3.00	300.0	0.233	0.013
107	A11-i	A11-h	45.75	45.61	Cir 1	0.00	4.00	800.0	0.018	0.013
108	A11-h	A11-g	45.61	44.97	Cir 1	0.00	4.00	350.0	0.183	0.013
109	A11-g	A11-f	44.47	42.65	Cir 1	0.00	4.50	600.0	0.303	0.013
110	A11-f	A11-e	42.15	40.64	Cir 1	0.00	5.00	400.0	0.378	0.013
111	A11-d	A11-c	43.80	43.00	Cir 1	0.00	3.50	420.0	0.190	0.013
112	A11-c	A11-e	43.00	42.14	Cir 1	0.00	3.50	220.0	0.391	0.013
113	A11-e	A11-b	40.15	35.50	Cir 1	0.00	5.50	920.0	0.505	0.013
114	A11-b	A11	35.50	34.10	Cir 1	0.00	5.50	270.0	0.519	0.013
115	A27-b	A27-a	42.61	42.50	Cir 1	0.00	2.00	28.0	0.393	0.013
116	A27-a	A27	42.50	42.38	Cir 1	0.00	2.00	9.0	1.333	0.013
117	A25-b	A25-a	42.12	42.00	Cir 1	0.00	2.00	28.0	0.429	0.013
118	A25-a	A25	42.00	41.72	Cir 1	0.00	2.00	22.0	1.273	0.013
119	A26-c	A26-b	41.82	41.72	Cir 1	0.00	2.00	54.0	0.185	0.013
120	A26-b	A26-a	41.72	41.68	Cir 1	0.00	2.00	24.0	0.167	0.013
121	A26-a	A26	41.68	41.24	Cir 1	0.00	2.00	8.0	5.508	0.013
122	A22-c	A22-a	42.66	42.50	Cir 1	0.00	2.00	90.0	0.178	0.013
123	A22-a	A22	42.50	42.45	Cir 1	0.00	2.00	12.0	0.417	0.013
124	A22-b	A22	42.50	42.45	Cir 1	0.00	2.00	24.0	0.208	0.013
125	A20-a	A20	42.82	42.62	Cir 1	0.00	2.00	8.0	2.501	0.013
126	A20-b	A20	42.82	42.62	Cir 1	0.00	2.00	20.0	1.000	0.013

Conveyance Hydraulic Computations. Tailwater = 45.000 (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	68.90	67.12	64.00	0.035	3.15	6.00	5.30	2.82	79.8	147.3	0.000
2	67.12	66.60	61.00	0.074	4.37	6.50	6.06	4.33	143.6	182.4	0.000
3	66.60	66.14	59.00	0.081	4.84	7.00	6.42	4.73	182.1	222.2	0.000
4	66.14	63.94	57.00	0.191	7.50	7.50	7.63	7.63	337.2	267.1	0.000
5	63.94	63.36	55.00	0.168	9.00	9.00	8.08	8.08	514.1	462.8	0.000
6	63.36	62.78	54.00	0.170	7.88	8.00	7.90	7.77	559.6	465.5	0.000
7	62.78	62.47	54.00	0.172	10.00	10.00	8.78	8.78	689.7	525.2	0.000
8	62.47	61.21	53.00	0.205	10.00	10.00	9.57	9.57	752.0	572.2	0.000
9	61.21	60.06	52.50	0.225	10.00	10.00	10.04	10.04	788.5	582.0	0.000
10	60.06	59.32	51.00	0.236	8.98	10.00	10.85	10.27	806.9	760.5	0.000
11	59.32	57.83	51.50	0.251	10.00	10.00	10.60	10.60	832.6	744.0	0.000
12	57.83	57.27	49.50	0.255	10.00	10.00	10.67	10.67	838.3	742.7	0.000
13	57.27	54.64	50.00	0.584	10.00	10.00	16.16	16.16	1269.4	742.7	0.000
14	54.64	52.99	49.00	0.590	10.00	10.00	16.24	16.24	1275.1	742.7	0.000
15	52.99	52.37	48.00	0.596	10.00	10.00	16.33	16.33	1282.2	857.6	0.000
16	52.37	49.72	48.00	0.653	10.00	10.00	17.09	17.09	1341.9	742.7	0.000
17	49.72	49.51	47.50	0.669	10.00	10.00	17.30	17.30	1358.4	719.1	0.000
18	49.51	47.53	47.50	0.683	10.00	10.00	17.48	17.48	1373.0	696.5	0.000
19	47.53	45.93	47.50	0.696	10.00	10.00	17.64	17.64	1385.6	726.4	0.000
20	45.93	45.47	48.00	0.455	11.00	11.00	12.69	12.69	1396.0	926.0	0.000
21	45.47	45.00	48.00	0.473	11.00	11.00	12.94	12.94	1423.3	926.0	0.000
22	56.57	52.37	47.52	1.999	2.50	2.50	11.86	11.86	58.2	30.4	0.000
23	62.27	56.57	47.52	1.038	2.50	2.50	8.55	8.55	42.0	20.5	0.000
24	68.95	62.27	49.67	2.225	2.00	2.00	10.79	10.79	33.9	16.3	0.000
25	70.48	68.95	48.50	0.499	2.00	2.00	5.11	5.11	16.1	9.6	0.000
26	72.53	68.95	47.98	0.879	2.00	2.00	6.78	6.78	21.3	9.7	0.000
27	53.68	51.81	47.72	0.468	1.75	2.00	5.33	4.95	15.5	14.9	0.000
28	51.81	49.51	48.91	1.222	2.00	2.00	8.00	8.00	25.1	16.7	0.000
29	53.57	47.53	48.48	1.294	2.00	2.00	8.23	8.23	25.8	15.9	0.000
30	46.91	45.93	47.50	0.838	2.00	2.00	6.62	6.62	20.8	11.5	0.000
31	47.67	46.91	48.00	0.296	2.00	2.00	3.93	3.93	12.4	9.6	0.000
100	70.50	66.14	55.00	0.379	4.00	4.00	7.07	7.07	88.8	50.0	0.000
101	75.68	70.00	53.00	0.887	4.00	4.00	10.81	10.81	135.9	69.8	0.000
102	70.00	63.94	55.00	0.830	4.50	4.50	11.31	11.31	179.9	90.7	0.000
103	98.59	79.28	53.00	2.145	2.50	2.50	12.29	12.29	60.3	31.0	0.000
104	79.28	68.27	53.00	1.295	3.50	3.50	11.95	11.95	115.0	55.9	0.000
105	68.27	62.47	53.00	2.071	3.50	3.50	15.11	15.11	145.4	69.6	0.000
106	59.19	57.27	50.00	0.638	3.00	3.00	7.57	7.57	53.5	32.4	0.000
107	103.10	102.76	53.00	0.042	4.00	4.00	2.37	2.37	29.7	19.1	0.000
108	102.76	100.24	52.00	0.720	4.00	4.00	9.74	9.74	122.4	61.7	0.000
109	100.24	92.78	51.00	1.245	4.50	4.50	13.85	13.85	220.3	108.8	0.000
110	92.78	86.47	50.00	1.576	5.00	5.00	16.72	16.72	328.3	160.7	0.000
111	92.93	89.94	50.00	0.712	3.50	3.50	8.86	8.86	85.2	44.1	0.000
112	89.94	86.47	49.00	1.576	3.50	3.50	13.19	13.19	126.9	63.2	0.000
113	86.47	63.95	50.00	2.448	5.50	5.50	22.21	22.21	527.6	239.8	0.000
114	63.95	57.27	50.00	2.473	5.50	5.50	22.32	22.32	530.3	242.8	0.000
115	53.70	53.69	47.43	0.341	1.54	2.00	5.12	4.22	13.3	14.2	0.000
116*	53.69	53.57	47.43	1.294	1.62	2.00	9.48	8.74	25.8	26.2	0.000
117	53.88	53.79	46.84	0.104	0.99	2.00	4.70	2.33	7.3	14.9	0.000
118*	53.79	53.68	46.84	0.468	1.13	2.00	8.52	6.51	15.5	25.6	0.000
119	51.92	51.84	48.50	0.043	0.98	2.00	3.07	1.50	4.7	9.8	0.000
120	51.84	51.83	48.50	0.113	1.38	2.00	3.29	2.43	7.6	9.3	0.000
121*	51.83	51.81	48.50	0.215	0.60	2.00	13.17	5.56	10.5	53.3	0.000
122	70.55	70.51	48.25	0.125	1.41	2.00	3.40	2.56	8.0	9.6	0.000
123	70.51	70.48	48.00	0.208	1.24	2.00	5.05	3.30	10.4	14.7	0.000
124	70.51	70.48	48.00	0.064	1.07	2.00	3.38	1.83	5.8	10.4	0.000
125*	72.57	72.53	47.98	0.416	0.89	2.00	10.82	6.34	14.6	35.9	0.000
126*	72.55	72.53	47.98	0.086	0.74	2.00	6.26	4.76	6.7	22.7	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	6.0	0.0	1	2100.0
Circular	Concrete	6.5	0.0	1	1150.0
Circular	Concrete	7.0	0.0	1	1150.0
Circular	Concrete	7.5	0.0	1	1150.0
Circular	Concrete	9.0	0.0	1	345.0
Box	Concrete	8.0	9.0	1	340.0
Circular	Concrete	10.0	0.0	13	4223.0
Box	Concrete	11.0	10.0	2	200.0
Circular	Concrete	2.5	0.0	3	1660.0
Circular	Concrete	2.0	0.0	20	2771.0
Circular	Concrete	4.0	0.0	4	2940.0
Circular	Concrete	4.5	0.0	2	1330.0
Circular	Concrete	3.5	0.0	4	1770.0
Circular	Concrete	3.0	0.0	1	300.0
Circular	Concrete	5.0	0.0	1	400.0
Circular	Concrete	5.5	0.0	2	1190.0

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	46
Curb In Sag		5.0	0.0	0.0	0.0	0.0	12
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= A11-b Previous intensity used.
Decreasing conduit size @ downstream Run# 6
Discharge decreased downstream node Id= A25 Previous intensity used.
Discharge decreased downstream node Id= A27 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= A20-a
Computed left ponded width exceeds allowable width at inlet Id= A20-a
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# 29
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# 22
Run# 26 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 102

Runoff Frequency of: 100 Years
Decreasing conduit size @ downstream Run# 6
Discharge decreased downstream node Id= A25 Previous intensity used.
Discharge decreased downstream node Id= A27 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= A20-a
Computed left ponded width exceeds allowable width at inlet Id= A20-a
Capacity of sag inlet exceeded at inlet Id= A20-a
Computed right ponded width exceeds allowable width at inlet Id= A20-b
Computed left ponded width exceeds allowable width at inlet Id= A20-b
Computed left ponded width exceeds allowable width at inlet Id= A22-b
Computed left ponded width exceeds allowable width at inlet Id= A22-c
Capacity of sag inlet exceeded at inlet Id= A22-c
Computed right ponded width exceeds allowable width at inlet Id= A25-a
Computed left ponded width exceeds allowable width at inlet Id= A25-a
Capacity of sag inlet exceeded at inlet Id= A25-a
Computed right ponded width exceeds allowable width at inlet Id= A25-b
Computed left ponded width exceeds allowable width at inlet Id= A25-b
Computed right ponded width exceeds allowable width at inlet Id= A27-a
Computed left ponded width exceeds allowable width at inlet Id= A27-a
Capacity of sag inlet exceeded at inlet Id= A27-a
Computed right ponded width exceeds allowable width at inlet Id= A27-b
Computed left ponded width exceeds allowable width at inlet Id= A27-b
Capacity of sag inlet exceeded at inlet Id= A27-b
Run# 21 Insufficient capacity.
Run# 20 Insufficient capacity.
Run# 30 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A29 Run # 30
Run# 31 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A28 Run # 31
Run# 19 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A17 Run # 19
Upstream HGL exceeds critical elevation (Analysis)at node Id= A17 Run # 19
Run# 29 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A27 Run # 29
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27 Run # 29
Upstream HGL exceeds critical elevation (Design) at node Id= A27-a Run # 116
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27-a Run # 116
Run# 18 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A16 Run # 18
Upstream HGL exceeds critical elevation (Analysis)at node Id= A16 Run # 18
Run# 28 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A26 Run # 28
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26 Run # 28
Upstream HGL exceeds critical elevation (Design) at node Id= A27-b Run # 115
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27-b Run # 115
Upstream HGL exceeds critical elevation (Design) at node Id= A26-a Run # 121
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-a Run # 121
Run# 17 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A15 Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= A15 Run # 17
Run# 27 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A25 Run # 27
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25 Run # 27
Upstream HGL exceeds critical elevation (Design) at node Id= A25-a Run # 118
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25-a Run # 118
Upstream HGL exceeds critical elevation (Design) at node Id= A26-b Run # 120
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-b Run # 120
Run# 16 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A14 Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= A14 Run # 16
Run# 22 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A24 Run # 22
Upstream HGL exceeds critical elevation (Analysis)at node Id= A24 Run # 22
Run# 23 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A23 Run # 23
Upstream HGL exceeds critical elevation (Analysis)at node Id= A23 Run # 23
Run# 24 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A21 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= A21 Run # 24
Run# 25 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A22 Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22 Run # 25

Revisions | No. | Date | App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS · JESUS M. OLIVAS · 93817 · LICENSED PROFESSIONAL ENGINEER · 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\A-D STORM SYS A 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 22 OF 131

PUBLIC WORKS AND ENGINEERING · REVIEWED AND FILED · 49097 · CITY NUMBER · TEXAS

Run# 26 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A20 Run # 26
Upstream HGL exceeds critical elevation (Analysis)at node Id= A20 Run # 26
Upstream HGL exceeds critical elevation (Design) at node Id= A25-b Run # 117
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25-b Run # 117
Upstream HGL exceeds critical elevation (Design) at node Id= A26-c Run # 119
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-c Run # 119
Upstream HGL exceeds critical elevation (Design) at node Id= A22-a Run # 123
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-a Run # 123
Upstream HGL exceeds critical elevation (Design) at node Id= A22-b Run # 124
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-b Run # 124
Upstream HGL exceeds critical elevation (Design) at node Id= A20-a Run # 125
Upstream HGL exceeds critical elevation (Analysis)at node Id= A20-a Run # 125
Upstream HGL exceeds critical elevation (Design) at node Id= A20-b Run # 126
Upstream HGL exceeds critical elevation (Analysis)at node Id= A20-b Run # 126
Run# 15 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A13 Run # 15
Upstream HGL exceeds critical elevation (Analysis)at node Id= A13 Run # 15
Upstream HGL exceeds critical elevation (Design) at node Id= A22-c Run # 122
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-c Run # 122
Run# 14 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A12 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= A12 Run # 14
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11 Run # 13
Run# 106 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-a Run # 106
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-a Run # 106
Run# 114 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-b Run # 114
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-b Run # 114
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A10 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= A10 Run # 12
Run# 113 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-e Run # 113
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-e Run # 113
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A9 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= A9 Run # 11
Run# 110 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-f Run # 110
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-f Run # 110
Run# 112 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-c Run # 112
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-c Run # 112
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A8 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= A8 Run # 10
Run# 109 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-g Run # 109
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-g Run # 109
Run# 111 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-d Run # 111
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-d Run # 111
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A7 Run # 9
Upstream HGL exceeds critical elevation (Analysis)at node Id= A7 Run # 9
Run# 108 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-h Run # 108
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-h Run # 108
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-a Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-a Run # 8
Run# 105 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-b Run # 105
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-b Run # 105
Run# 107 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-i Run # 107
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-i Run # 107
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A610N Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= A610N Run # 7
Run# 104 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-c Run # 104
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-c Run # 104
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A610S Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= A610S Run # 6
Run# 103 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-d Run # 103
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-d Run # 103
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-a Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-a Run # 5
Run# 102 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-b Run # 102
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-b Run # 102
Run# 4 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A4-a Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= A4-a Run # 4
Run# 100 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A4-b Run # 100
Upstream HGL exceeds critical elevation (Analysis)at node Id= A4-b Run # 100

Run# 101 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-c Run # 101
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-c Run # 101
Upstream HGL exceeds critical elevation (Design) at node Id= A3 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= A3 Run # 3
Upstream HGL exceeds critical elevation (Design) at node Id= A2 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= A2 Run # 2
Upstream HGL exceeds critical elevation (Design) at node Id= A1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= A1 Run # 1

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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SURVEYED BY: LANDTECH
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JESUS M. OLIVAS
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
EXISTING 2-YEAR
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WBS N-000383-0001-4

FILE:
P:\City of Houston\2006-05_NSR 4n1\DRAWINGS\A-D STORM SYS A 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 23 OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
NUMBER

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/29/2009 4:36:50 PM

PROJECT NAME : NSR 451
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM A - PROPOSED
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
A1	0.45	23.77	21.25	21.25	3.69	0.000	39.449
A2	0.45	23.84	27.50	27.50	3.24	0.000	34.800
A3	0.45	15.62	19.17	19.17	3.87	0.000	27.185
A7	0.45	19.84	30.83	30.83	3.05	0.000	27.245
A5-a	0.45	19.65	30.00	30.00	3.10	0.000	27.387
A5-b	0.45	13.09	12.50	12.50	4.60	0.000	27.105
A610S	0.65	13.12	33.81	33.81	2.90	0.000	24.729
A15	0.55	8.15	23.81	23.81	3.49	0.000	15.647
A19	0.55	11.00	17.62	17.62	4.01	0.000	24.287
A23	0.55	2.21	18.93	18.93	3.89	0.000	4.728
A24	0.38	6.63	18.99	18.99	3.88	0.000	9.785
A28	0.55	2.92	19.52	19.52	3.84	0.000	6.161
A22-a	0.55	0.51	11.19	11.19	4.78	0.000	1.342
A22-b	0.55	1.21	13.57	13.57	4.46	0.000	2.970
A25-a	0.55	1.80	15.36	15.36	4.25	0.000	4.209
A26-a	0.55	0.62	13.45	13.45	4.48	0.000	1.527
A26-b	0.55	0.62	13.45	13.45	4.48	0.000	1.527
A27-a	0.55	3.00	20.00	20.00	3.79	0.000	6.259
A29	0.55	2.09	11.79	11.79	4.70	0.000	5.401
A11-a	0.55	12.40	18.45	18.45	3.93	0.000	26.831
A11-b	0.45	2.73	16.67	16.67	4.11	0.000	5.050
A11-c	0.55	10.35	17.14	17.14	4.06	0.000	23.125
A11-d	0.45	24.83	20.00	20.00	3.79	0.000	42.388
A11-e	0.55	25.21	24.29	24.29	3.46	0.000	47.923
A11-f	0.55	30.46	26.37	26.37	3.32	0.000	55.541
A11-g	0.55	27.04	26.67	26.67	3.30	0.000	49.018
A11-h	0.55	25.78	20.00	20.00	3.79	0.000	53.790
A4-b	0.55	23.05	25.00	25.00	3.41	0.000	43.188
A5-c	0.55	30.67	17.08	17.08	4.07	0.000	68.628
A610N	0.8	28.93	30.00	30.00	3.10	0.000	71.682
A6-a	0.55	15.24	50.00	50.00	2.30	0.000	19.250
A6-b	0.55	8.68	21.07	21.07	3.70	0.000	17.677
A6-c	0.55	14.63	23.33	23.33	3.53	0.000	28.371
A6-d	0.55	15.50	24.40	24.40	3.45	0.000	29.398
A20-a	0.55	1.60	25.00	25.00	3.41	0.000	2.998
A20-b	0.55	1.60	25.00	25.00	3.41	0.000	2.998
A22-c	0.55	1.69	13.57	13.57	4.46	0.000	4.149
A25-b	0.55	1.60	15.36	15.36	4.25	0.000	3.742
A26-c	0.55	0.99	13.45	13.45	4.48	0.000	2.439
A27-b	0.55	3.00	20.00	20.00	3.79	0.000	6.259
A11-i	0.55	7.35	22.08	22.08	3.62	0.000	14.640
A30-a	0.55	0.59	25.00	25.00	3.41	0.000	1.105
A30-b	0.55	0.59	25.00	25.00	3.41	0.000	1.105
A31-a	0.55	0.58	25.00	25.00	3.41	0.000	1.087
A31-b	0.55	0.58	25.00	25.00	3.41	0.000	1.087
A8	0.55	9.18	11.67	11.67	4.72	0.000	23.806
A9	0.45	13.25	20.83	20.83	3.72	0.000	22.197
A10	0.45	6.10	17.92	17.92	3.98	0.000	10.939
A12	0.55	4.23	17.02	17.02	4.07	0.000	9.614
A13	0.55	4.01	17.02	17.02	4.07	0.000	8.986
A14	0.55	7.12	15.95	15.95	4.19	0.000	16.396
A4-a	0.45	30.61	18.75	18.75	3.91	0.000	53.805

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)
A20-a	Curb	5.00	0.00	0.35	2.00	0.30	2.00	0.014	1.50	0.57
A20-b	Curb	5.00	0.00	0.30	2.00	0.35	2.00	0.014	1.50	1.50
A31-a	Curb	5.00	0.00	0.65	2.00	0.30	2.00	0.014	1.50	0.57
A31-b	Curb	5.00	0.00	0.30	2.00	0.65	2.00	0.014	1.50	0.57
A22-a	Curb	5.00	0.00	1.00	2.00	0.40	2.00	0.014	1.50	0.57
A22-b	Curb	5.00	0.00	0.40	2.00	1.00	2.00	0.014	1.50	0.57
A22-c	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A25-a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A25-b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A26-a	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-b	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-c	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A27-a	Curb	5.00	0.00	0.40	2.00	0.60	2.00	0.014	1.50	0.57
A27-b	Curb	5.00	0.00	0.60	2.00	0.40	2.00	0.014	1.50	0.57
A30-a	Curb	5.00	0.00	0.65	2.00	0.30	2.00	0.014	1.50	0.57
A30-b	Curb	5.00	0.00	0.30	2.00	0.65	2.00	0.014	1.50	0.57

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)
A20-a	Curb	5.00	n/a	n/a	2.998	7.601	0.300	9.70	10.00
A20-b	Curb	5.00	n/a	n/a	2.998	15.022	0.300	10.00	9.70
A31-a	Curb	5.00	n/a	n/a	1.087	7.601	0.257	5.90	6.85
A31-b	Curb	5.00	n/a	n/a	1.087	7.601	0.257	6.85	5.90
A22-a	Curb	5.00	n/a	n/a	1.342	7.601	0.260	5.90	7.00
A22-b	Curb	5.00	n/a	n/a	2.970	7.601	0.299	9.45	7.95
A22-c	Curb	5.00	n/a	n/a	4.149	7.601	0.345	11.30	9.00
A25-a	Curb	5.00	n/a	n/a	4.209	7.601	0.348	11.35	11.35
A25-b	Curb	5.00	n/a	n/a	3.742	7.601	0.328	10.85	10.85
A26-a	Curb	5.00	n/a	n/a	1.527	7.601	0.263	7.75	6.20
A26-b	Curb	5.00	n/a	n/a	1.527	7.601	0.263	7.75	6.20
A26-c	Curb	5.00	n/a	n/a	2.439	7.601	0.283	9.25	9.25
A27-a	Curb	5.00	n/a	n/a	6.259	7.601	0.467	12.50	11.55
A27-b	Curb	5.00	n/a	n/a	6.259	7.601	0.467	11.55	12.50
A30-a	Curb	5.00	n/a	n/a	1.105	7.601	0.257	5.95	6.90
A30-b	Curb	5.00	n/a	n/a	1.105	7.601	0.257	6.90	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)
A11	CrcMh	0.528	490.92	54.43	2.18		0.00	564.084
A12	CrcMh	0.528	495.21	55.15	2.16		0.00	564.412
A13	CrcMh	0.528	499.22	55.61	2.15		0.00	566.202
A14	CrcMh	0.527	524.13	55.76	2.14		0.00	592.159
A15	CrcMh	0.528	532.28	56.40	2.13		0.00	597.323
A16	CrcMh	0.528	537.91	56.45	2.13		0.00	603.547
A17	CrcMh	0.528	543.91	56.94	2.11		0.00	607.182
A18	CrcMh	0.528	548.92	57.31	2.11		0.00	610.430
A19	CrcMh	0.529	559.92	57.50	2.10		0.00	621.858
A610S	CrcMh	0.491	193.42	40.42	2.62		0.00	248.532
A610N	CrcMh	0.531	222.35	41.39	2.58		0.00	304.759
A1	CrcMh	0.450	23.77	21.25	3.69		0.00	39.449
A2	CrcMh	0.450	47.61	29.18	3.14		0.00	67.349
A3	CrcMh	0.450	63.23	32.97	2.94		0.00	83.680
A4-a	CrcMh	0.470	116.89	36.55	2.77		0.00	152.313
A5-a	CrcMh	0.480	180.30	39.63	2.65		0.00	228.905
A6-a	CrcMh	0.535	276.40	50.00	2.30		0.00	339.675
A7	CrcMh	0.529	296.24	51.35	2.26		0.00	354.184
A8	CrcMh	0.530	305.42	52.45	2.23		0.00	360.695
A9	CrcMh	0.527	318.67	53.00	2.21		0.00	371.539
A10	CrcMh	0.525	324.77	54.04	2.19		0.00	372.928
A20	CrcMh	0.550	5.54	28.57	3.18		0.00	9.687
A22	CrcMh	0.550	3.41	14.13	4.40		0.00	8.243
A21	CrcMh	0.550	8.95	30.51	3.07		0.00	15.109
A23	CrcMh	0.550	11.16	31.36	3.02		0.00	18.559
A24	CrcMh	0.487	17.79	33.30	2.92		0.00	25.318
A25	CrcMh	0.550	3.40	15.48	4.24		0.00	7.926
A26	CrcMh	0.550	5.63	16.87	4.09		0.00	12.664
A27	CrcMh	0.550	6.00	20.11	3.78		0.00	12.488
A28	CrcMh	0.550	2.92	19.52	3.84		0.00	6.161
A29	CrcMh	0.550	5.01	20.84	3.72		0.00	10.255
A30	CrcMh	0.550	1.18	25.11	3.40		0.00	2.206
A31	CrcMh	0.550	2.34	27.18	3.26		0.00	4.201
A4-b	CrcMh	0.550	23.05	25.00	3.41		0.00	43.188
A5-b	CrcMh	0.520	43.76	18.77	3.90		0.00	88.852
A5-c	CrcMh	0.550	30.67	17.08	4.07		0.00	68.628
A6-b	CrcMh	0.550	38.81	28.64	3.17		0.00	67.770
A6-c	CrcMh	0.550	30.13	26.49	3.31		0.00	54.806
A6-d	CrcMh	0.550	15.50	24.40	3.45		0.00	29.398
A11-a	CrcMh	0.550	12.40	18.45	3.93		0.00	26.831
A11-b	CrcMh	0.532	153.75	33.11	2.93		0.00	240.023
A11-c	CrcMh	0.479	35.18	21.34	3.68		0.00	62.072
A11-d	CrcMh	0.450	24.83	20.00	3.79		0.00	42.388
A11-e	CrcMh	0.534	151.02	33.11	2.93		0.00	236.419
A11-f	CrcMh	0.550	90.63	32.39	2.97		0.00	148.053
A11-g	CrcMh	0.550	60.17	31.09	3.04		0.00	100.523
A11-h	CrcMh	0.550	33.13	30.04	3.09		0.00	56.393
A11-i	CrcMh	0.550	7.35	22.08	3.62		0.00	14.640
A20-a	Curb	0.550	1.60	25.00	3.41		0.00	2.998
A20-b	Curb	0.550	1.60	25.00	3.41		0.00	2.998
A31-a	Curb	0.550	0.58	25.00	3.41		0.00	1.087
A31-b	Curb	0.550	0.58	25.00	3.41		0.00	1.087
A22-a	Curb	0.550	2.20	14.08	4.40		0.00	5.325
A22-b	Curb	0.550	1.21	13.57	4.46		0.00	2.970
A22-c	Curb	0.550	1.69	13.57	4.46		0.00	4.149
A25-a	Curb	0.550	3.40	15.48	4.24		0.00	7.926
A25-b	Curb	0.550	1.60	15.36	4.25		0.00	3.742
A26-a	Curb	0.550	2.23	13.94	4.42		0.00	5.418
A26-b	Curb	0.550	1.61	13.80	4.44		0.00	3.927
A26-c	Curb	0.550	0.99	13.45	4.48		0.00	2.439
A27-a	Curb	0.550	6.00	20.11	3.78		0.00	12.488
A27-b	Curb	0.550	3.00	20.00	3.79		0.00	6.259
A30-a	Curb	0.550	0.59	25.00	3.41		0.00	1.105
A30-b	Curb	0.550	0.59	25.00	3.41		0.00	1.105
OUT	Outlt	0.529	559.92	57.50	2.10		0.00	621.858

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	A1	A2	40.68	38.16	Cir 1	0.00	6.00	2100.0	0.120	0.013
2	A2	A3	38.16	36.78	Cir 1	0.00	6.50	1150.0	0.120	0.013
3	A3	A4-a	36.78	35.40	Cir 1	0.00	7.00	1150.0	0.120	0.013
4	A4-a	A5-a	35.40	34.02	Cir 1	0.00	7.50	1150.0	0.120	0.013
5	A5-a	A610S	34.02	33.55	Cir 1	0.00	9.00	345.0	0.136	0.013
6	A610S	A610N	33.55	33.15	Box 1	9.00	8.00	340.0	0.118	0.015
7	A610N	A6-a	33.15	32.97	Cir 1	0.00	10.0	180.0	0.100	0.013
8	A6-a	A7	32.97	32.24	Cir 1	0.00	10.0	615.0	0.119	0.013
9	A7	A8	32.24	31.61	Cir 1	0.00	10.0	513.0	0.123	0.013
10	A8	A9	31.61	30.96	Cir 1	0.00	10.0	310.0	0.210	0.013
11	A9	A10	30.96	29.77	Cir 1	0.00	10.0	593.0	0.201	0.013
12	A10	A11	29.77	29.33	Cir 1	0.00	10.0	220.0	0.200	0.013
13	A11	A12	29.33	28.43	Cir 1	0.00	10.0	450.0	0.200	0.013
14	A12	A13	28.43	27.87	Cir 1	0.00	10.0	280.0	0.200	0.013
15	A13	A14	27.87	27.59	Cir 1	0.00	10.0	105.0	0.267	0.013
16	A14	A15	27.59	26.78	Cir 1	0.00	10.0	405.0	0.200	0.013
17	A15	A16	26.78	26.72	Cir 1	0.00	10.0	32.0	0.188	0.013
18	A16	A17	26.72	26.21	Cir 1	0.00	10.0	290.0	0.176	0.013
19	A17	A18	26.21	25.77	Cir 1	0.00	10.0	230.0	0.191	0.013
20	A18	A19	24.77	24.57	Box 1	10.0	11.0	100.0	0.200	0.015
21	A19	OUT	24.57	24.37	Box 1	10.0	11.0	100.0	0.200	0.015
22	A24	A14	38.49	37.35	Cir 1	0.00	2.50	210.0	0.543	0.013
23	A23	A24	39.85	38.49	Cir 1	0.00	2.50	550.0	0.247	0.013
24	A21	A23	41.90	40.35	Cir 1	0.00	2.00	300.0	0.517	0.013
25	A22	A21	42.45	41.90	Cir 1	0.00	2.00	307.0	0.179	0.013
26	A20	A21	42.65	41.90	Cir 1	0.00	2.00	408.0	0.184	0.013
27	A25	A26	41.72	40.01	Cir 1	0.00	2.00	400.0	0.428	0.013
28	A26	A16	40.01	39.00	Cir 1	0.00	2.00	188.0	0.537	0.013
29	A27	A17	42.38	40.10	Cir 1	0.00	2.00	467.0	0.488	0.013
30	A29	A18	41.30	41.00	Cir 1	0.00	2.00	117.0	0.256	0.013
31	A28	A29	41.67	41.21	Cir 1	0.00	2.00	257.0	0.179	0.013
32	A31	A20	43.05	42.65	Cir 1	0.00	2.00	240.0	0.167	0.013
33	A30	A31	43.60	43.05	Cir 1	0.00	2.00	307.0	0.179	0.013
100	A4-b	A4-a	36.78	35.40	Cir 1	0.00	4.00	1150.0	0.120	0.013
101	A5-c	A5-b	45.50	44.00	Cir 1	0.00	4.00	640.0	0.234	0.013
102	A5-b	A5-a	44.00	42.46	Cir 1	0.00	4.50	730.0	0.211	0.013
103	A6-d	A6-c	42.00	36.90	Cir 1	0.00	2.50	900.0	0.567	0.013
104	A6-c	A6-b	36.90	34.30	Cir 1	0.00	3.50	850.0	0.306	0.013
105	A6-b	A6-a	34.30	32.97	Cir 1	0.00	3.50	280.0	0.475	0.013
106	A11-a	A11	30.70	30.00	Cir 1	0.00	3.00	300.0	0.233	0.013
107	A11-i	A11-h	45.75	45.61	Cir 1	0.00	4.00	800.0	0.018	0.013
108	A11-h	A11-g	45.61	44.97	Cir 1	0.00	4.00	350.0	0.183	0.013
109	A11-g	A11-f	44.47	42.65	Cir 1	0.00	4.50	600.0	0.303	0.013
110	A11-f	A11-e	42.15	40.64	Cir 1	0.00	5.00	400.0	0.378	0.013
111	A11-d	A11-c	43.80	43.00	Cir 1	0.00	3.50	420.0	0.190	0.013
112	A11-c	A11-e	43.00	42.14	Cir 1	0.00	3.50	220.0	0.391	0.013
113	A11-e	A11-b	40.15	35.50	Cir 1	0.00	5.50	920.0	0.505	0.013
114	A11-b	A11	35.50	34.10	Cir 1	0.00	5.50	270.0	0.519	0.013
115	A27-b	A27-a	42.61	42.50	Cir 1	0.00	2.00	28.0	0.393	0.013
116	A27-a	A27	42.50	42.38	Cir 1	0.00	2.00	9.0	1.333	0.013
117	A25-b	A25-a	42.12	42.00	Cir 1	0.00	2.00	28.0	0.429	0.013
118	A25-a	A25	42.00	41.72	Cir 1	0.00	2.00	22.0	1.273	0.013
119	A26-c	A26-b	41.92	41.72	Cir 1	0.00	2.00	54.0	0.185	0.013
120	A26-b	A26-a	41.72	41.68	Cir 1	0.00	2.00	24.0	0.167	0.013
121	A26-a	A26	41.68	41.24	Cir 1	0.00	2.00	8.0	5.508	0.013
122	A22-c	A22-a	42.66	42.50	Cir 1	0.00	2.00	90.0	0.178	0.013
123	A22-a	A22	42.50	42.45	Cir 1	0.00	2.00	12.0	0.417	0.013
124	A22-b	A22	42.50	42.45	Cir 1	0.00	2.00	24.0	0.208	0.013
125	A20-a	A20	42.82	42.62	Cir 1	0.00	2.00	8.0	2.501	0.013
126	A20-b	A20	42.82	42.62	Cir 1	0.00	2.00	20.0	1.000	0.013
127	A31-a	A31	43.09	43.05	Cir 1	0.00	2.00	8.0	0.500	0.013
128	A31-b	A31	43.09	43.05	Cir 1	0.00	2.00	20.0	0.200	0.013
129	A30-a	A30	43.70	43.60	Cir 1	0.00	2.00	8.0	1.250	0.013
130	A30-b	A30	43.70	43.60	Cir 1	0.00	2.00	20.0	0.500	0.013

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAIN\SYS_A-H STM SYS A PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 24 OF 131

PUBLIC WORKS AND ENGINEERING
APPROVED
49097
NUMBER
DATE FILED

No.	Date	Revisions	App.

Conveyance Hydraulic Computations. Tailwater = 35.370 (ft)

Run #	Hyd. Gr.line 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	42.80	40.90	63.00	0.009	2.12	2.74	4.41	3.13	39.4	147.3	0.000
2	40.90	40.04	60.00	0.016	2.74	3.26	5.06	4.04	67.3	182.4	0.000
3	40.04	39.47	58.00	0.017	2.98	4.07	5.36	3.60	83.7	222.2	0.000
4	39.47	38.61	56.00	0.039	4.07	4.59	6.22	5.38	152.3	267.1	0.000
5	38.61	38.68	54.00	0.033	4.48	5.13	7.23	6.11	228.9	462.8	0.000
6	38.68	38.62	53.00	0.045	4.69	5.47	5.89	5.05	248.5	403.4	0.000
7	38.62	38.52	53.00	0.034	5.47	5.55	6.93	6.81	304.8	525.2	0.000
8	38.52	37.88	52.00	0.042	5.55	5.64	7.59	7.43	339.7	572.2	0.000
9	37.88	37.33	52.00	0.045	5.64	5.72	7.75	7.63	354.2	582.0	0.000
10	37.33	37.18	50.00	0.047	4.86	6.22	9.52	7.03	360.7	760.5	0.000
11	37.18	36.67	50.00	0.050	5.01	6.90	9.44	6.43	371.5	744.0	0.000
12	36.67	36.43	48.50	0.050	5.02	7.10	9.45	6.26	372.9	742.7	0.000
13	36.43	36.45	48.50	0.115	6.54	8.02	10.36	8.36	564.1	742.7	0.000
14	36.45	36.31	47.50	0.115	6.54	8.44	10.37	7.98	564.4	742.7	0.000
15	36.31	36.17	46.50	0.116	5.95	8.58	11.63	7.89	566.2	857.6	0.000
16	36.17	35.92	46.50	0.127	6.76	9.14	10.48	7.87	592.2	742.7	0.000
17	35.92	35.91	46.50	0.129	6.99	9.19	10.18	7.91	597.3	719.1	0.000
18	35.91	35.78	46.50	0.132	7.23	9.57	9.93	7.80	603.5	696.5	0.000
19	35.78	35.63	46.50	0.134	7.01	9.86	10.32	7.75	607.2	726.4	0.000
20	35.63	35.50	46.50	0.087	6.81	10.93	8.96	5.58	610.4	926.0	0.000
21	35.50	35.37	46.50	0.090	6.90	11.00	9.02	5.65	621.9	926.0	0.000
22	40.24	39.85	46.52	0.378	1.75	2.50	6.90	5.16	25.3	30.4	0.000
23	41.72	40.24	46.52	0.203	1.87	1.87	4.71	4.71	18.6	20.5	0.000
24	43.43	41.72	47.87	0.442	1.53	1.53	5.88	5.88	15.1	16.3	0.000
25	43.88	43.43	46.75	0.132	1.43	1.53	3.43	3.21	8.2	9.6	0.000
26	44.29	43.43	46.82	0.182	1.64	1.64	3.51	3.51	9.7	9.7	0.000
27	42.76	41.32	46.72	0.122	1.04	1.31	4.79	3.64	7.9	14.9	0.000
28	41.32	41.00	47.91	0.311	1.31	2.00	5.81	4.03	12.7	16.7	0.000
29	43.72	42.10	47.48	0.302	1.34	2.00	5.57	3.98	12.5	15.9	0.000
30	43.06	43.00	46.00	0.204	1.48	2.00	4.12	3.26	10.3	11.5	0.000
31	43.34	43.06	47.00	0.074	1.17	1.85	3.23	2.03	6.2	9.6	0.000
32	44.60	44.29	46.69	0.034	0.95	1.64	2.87	1.52	4.2	9.3	0.000
33	45.12	44.60	46.59	0.009	0.65	1.55	2.48	0.84	2.2	9.6	0.000
100	39.76	39.47	54.00	0.090	2.88	4.00	4.47	3.44	43.2	50.0	0.000
101	48.73	47.62	54.00	0.226	3.23	3.62	6.30	5.74	68.6	69.8	0.000
102	47.62	46.96	54.00	0.202	3.62	4.50	6.48	5.59	88.9	90.7	0.000
103	43.95	39.72	51.50	0.509	1.95	2.50	7.16	5.99	29.4	31.0	0.000
104	39.72	38.59	52.00	0.294	2.82	3.50	6.59	5.70	54.8	55.9	0.000
105	38.59	38.52	52.00	0.450	2.80	3.50	8.22	7.04	67.8	69.6	0.000
106	36.64	36.43	51.00	0.160	2.09	3.00	5.10	3.80	26.8	32.4	0.000
107	48.66	48.63	52.00	0.010	2.63	3.02	1.67	1.44	14.6	19.1	0.000
108	48.63	47.90	51.00	0.153	3.02	3.02	5.55	5.55	56.4	61.7	0.000
109	47.90	45.95	51.00	0.259	3.43	3.43	7.73	7.73	100.5	108.8	0.000
110	45.95	44.61	51.00	0.320	3.80	3.97	9.25	8.86	148.1	160.7	0.000
111	46.56	45.83	51.00	0.176	2.76	2.83	5.21	5.09	42.4	44.1	0.000
112	45.83	44.61	51.00	0.377	2.83	2.83	7.45	7.45	62.1	63.2	0.000
113	44.61	39.97	51.00	0.491	4.46	4.47	11.46	11.44	236.4	239.8	0.000
114	39.97	36.43	51.00	0.507	4.47	4.47	11.61	11.61	240.0	242.8	0.000
115	43.82	43.77	45.93	0.076	0.93	1.27	4.38	2.97	6.3	14.2	0.000
116*	43.77	43.72	45.93	0.302	0.97	1.34	8.22	5.57	12.5	26.2	0.000
117	43.08	43.00	45.34	0.027	0.69	1.00	3.93	2.38	3.7	14.9	0.000
118*	43.00	42.76	45.34	0.122	0.77	1.04	7.17	4.79	7.9	25.6	0.000
119	42.64	42.59	47.31	0.012	0.68	0.87	2.58	1.86	2.4	9.8	0.000
120	42.59	42.11	47.00	0.030	0.91	0.91	2.82	2.82	3.9	9.3	0.000
121*	42.11	41.32	47.00	0.057	0.43	0.43	10.87	10.87	5.4	53.3	0.000
122	44.03	43.92	46.50	0.033	0.92	1.42	2.93	1.74	4.1	9.6	0.000
123	43.92	43.88	46.75	0.055	0.84	1.43	4.28	2.22	5.3	14.7	0.000
124	43.92	43.88	46.50	0.017	0.73	1.43	2.84	1.24	3.0	10.4	0.000
125*	44.29	44.29	46.81	0.017	0.39	1.67	6.91	3.75	3.0	35.9	0.000
126*	44.29	44.29	46.81	0.017	0.49	1.67	5.00	3.75	3.0	22.7	0.000
127	44.64	44.60	46.67	0.002	0.35	1.55	2.91	0.42	1.1	16.1	0.000
128	44.64	44.60	46.67	0.002	0.44	1.55	2.10	0.42	1.1	10.2	0.000
129*	45.12	45.12	46.57	0.002	0.28	1.52	4.03	2.86	1.1	25.4	0.000
130*	45.12	45.12	46.57	0.002	0.36	1.52	2.92	2.86	1.1	16.1	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	6.0	0.0	1	2100.0
Circular	Concrete	6.5	0.0	1	1150.0
Circular	Concrete	7.0	0.0	1	1150.0
Circular	Concrete	7.5	0.0	1	1150.0
Circular	Concrete	9.0	0.0	1	345.0
Box	Concrete	8.0	9.0	1	340.0
Circular	Concrete	10.0	0.0	13	4223.0
Box	Concrete	11.0	10.0	2	200.0
Circular	Concrete	2.5	0.0	3	1660.0
Circular	Concrete	2.0	0.0	26	3374.0
Circular	Concrete	4.0	0.0	4	2940.0
Circular	Concrete	4.5	0.0	2	1330.0
Circular	Concrete	3.5	0.0	4	1770.0
Circular	Concrete	3.0	0.0	1	300.0
Circular	Concrete	5.0	0.0	1	400.0
Circular	Concrete	5.5	0.0	2	1190.0

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	48
Curb In Sag		5.0	0.0	0.0	0.0	0.0	16
Outlet		0.0	0.0	0.0	0.0	0.0	1

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A1	0.45	23.77	21.25	21.25	7.46	0.000	79.810
A2	0.45	23.84	27.50	27.50	6.74	0.000	72.307
A3	0.45	15.62	19.17	19.17	7.74	0.000	54.430
A7	0.45	19.84	30.83	30.83	6.42	0.000	57.296
A5-a	0.45	19.65	30.00	30.00	6.49	0.000	57.428
A5-b	0.45	13.09	12.50	12.50	8.85	0.000	52.117
A610S	0.65	13.12	33.81	33.81	6.16	0.000	52.515
A15	0.55	8.15	23.81	23.81	7.15	0.000	32.027
A19	0.55	11.00	17.62	17.62	7.97	0.000	48.224
A23	0.55	2.21	18.93	18.93	7.78	0.000	9.454
A24	0.38	6.63	18.99	18.99	7.77	0.000	19.574
A28	0.55	2.92	19.52	19.52	7.69	0.000	12.357
A22-a	0.55	0.51	11.19	11.19	9.11	0.000	2.555
A22-b	0.55	1.21	13.57	13.57	8.65	0.000	5.754
A25-a	0.55	1.80	15.36	15.36	8.33	0.000	8.249
A26-a	0.55	0.62	13.45	13.45	8.67	0.000	2.956
A26-b	0.55	0.62	13.45	13.45	8.67	0.000	2.956
A27-a	0.55	3.00	20.00	20.00	7.63	0.000	12.586
A29	0.55	2.09	11.79	11.79	8.99	0.000	10.331
A11-a	0.55	12.40	18.45	18.45	7.85	0.000	53.519
A11-b	0.45	2.73	16.67	16.67	8.12	0.000	9.973
A11-c	0.55	10.35	17.14	17.14	8.04	0.000	45.793
A11-d	0.45	24.83	20.00	20.00	7.63	0.000	85.232
A11-e	0.55	25.21	24.29	24.29	7.09	0.000	98.294
A11-f	0.55	30.46	26.37	26.37	6.86	0.000	114.897
A11-g	0.55	27.04	26.67	26.67	6.83	0.000	101.522
A11-h	0.55	25.78	20.00	20.00	7.63	0.000	108.159
A4-b	0.55	23.05	25.00	25.00	7.01	0.000	88.848
A5-c	0.55	30.67	17.08	17.08	8.05	0.000	135.856
A610N	0.8	28.93	30.00	30.00	6.49	0.000	150.310
A6-a	0.55	15.24	50.00	50.00	5.08	0.000	42.614
A6-b	0.55	8.68	21.07	21.07	7.48	0.000	35.733
A6-c	0.55	14.63	23.33	23.33	7.20	0.000	57.950
A6-d	0.55	15.50	24.40	24.40	7.08	0.000	60.327
A20-a	0.55	1.60	25.00	25.00	7.01	0.000	6.167
A20-b	0.55	1.60	25.00	25.00	7.01	0.000	6.167
A22-c	0.55	1.69	13.57	13.57	8.65	0.000	8.037
A25-b	0.55	1.60	15.36	15.36	8.33	0.000	7.332
A26-c	0.55	0.99	13.45	13.45	8.67	0.000	4.720
A27-b	0.55	3.00	20.00	20.00	7.63	0.000	12.586
A11-i	0.55	7.35	22.08	22.08	7.36	0.000	29.734
A30-a	0.55	0.59	25.00	25.00	7.01	0.000	2.274
A30-b	0.55	0.59	25.00	25.00	7.01	0.000	2.274
A31-a	0.55	0.58	25.00	25.00	7.01	0.000	2.236
A31-b	0.55	0.58	25.00	25.00	7.01	0.000	2.236
A8	0.55	9.18	11.67	11.67	9.01	0.000	45.500
A9	0.45	13.25	20.83	20.83	7.52	0.000	44.817
A10	0.45	6.10	17.92	17.92	7.93	0.000	21.756
A12	0.55	4.29	17.02	17.02	8.06	0.000	19.025
A13	0.55	4.01	17.02	17.02	8.06	0.000	17.783
A14	0.55	7.12	15.95	15.95	8.23	0.000	32.244
A4-a	0.45	30.61	18.75	18.75	7.80	0.000	107.493

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)
A20-a	Curb	5.00	0.00	0.35	2.00	0.30	2.00	0.014	1.50	0.57
A20-b	Curb	5.00	0.00	0.30	2.00	0.35	2.00	0.014	1.50	1.50
A31-a	Curb	5.00	0.00	0.65	2.00	0.30	2.00	0.014	1.50	0.57
A31-b	Curb	5.00	0.00	0.30	2.00	0.65	2.00	0.014	1.50	0.57
A22-a	Curb	5.00	0.00	1.00	2.00	0.40	2.00	0.014	1.50	0.57
A22-b	Curb	5.00	0.00	0.40	2.00	1.00	2.00	0.014	1.50	0.57
A22-c	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A25-a	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A25-b	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A26-a	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-b	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.57
A26-c	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
A27-a	Curb	5.00	0.00	0.40	2.00	0.60	2.00	0.014	1.50	0.57
A27-b	Curb	5.00	0.00	0.60	2.00	0.40	2.00	0.014	1.50	0.57
A30-a	Curb	5.00	0.00	0.65	2.00	0.30	2.00	0.014	1.50	0.57
A30-b	Curb	5.00	0.00	0.30	2.00	0.65	2.00	0.014	1.50	0.57

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)
A20-a	Curb	5.00	n/a	n/a	6.167	7.601	0.461	12.75	13.10
A20-b	Curb	5.00	n/a	n/a	6.167	15.022	0.461	13.10	12.75
A31-a	Curb	5.00	n/a	n/a	2.236	7.601	0.278	7.75	8.95
A31-b	Curb	5.00	n/a	n/a	2.236	7.601	0.278	8.95	7.75
A22-a	Curb	5.00	n/a	n/a	2.555	7.601	0.286	7.50	8.90
A22-b	Curb	5.00	n/a	n/a	5.754	7.601	0.433	12.10	10.20
A22-c	Curb	5.00	n/a	n/a	8.037	7.601	0.608	14.45	11.55
A25-a	Curb	5.00	n/a	n/a	8.249	7.601	0.627	14.60	14.60
A25-b	Curb	5.00	n/a	n/a	7.332	7.601	0.548	14.00	14.00
A26-a	Curb	5.00	n/a	n/a	2.956	7.601	0.298	9.95	7.95
A26-b	Curb	5.00	n/a	n/a	2.956	7.601	0.298	9.95	7.95
A26-c	Curb	5.00	n/a	n/a	4.720	7.601	0.373	11.85	11.85
A27-a	Curb	5.00	n/a	n/a	12.586	7.601	1.127	16.25	15.05
A27-b	Curb	5.00	n/a	n/a	12.586	7.601	1.127	15.05	16.25
A30-a	Curb	5.00	n/a	n/a	2.274	7.601	0.279	7.80	9.00
A30-b	Curb	5.00	n/a	n/a	2.274	7.601	0.279	9.00	7.80

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

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(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

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FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\E-H STM SYS A PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 25 OF 131

PUBLIC WORKS AND ENGINEERING
APPROVED AND FILED
49097
LICENSE NUMBER
TEXAS

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)
A11	CrcMh	0.528	490.92	53.67	4.90		0.00	1269.442
A12	CrcMh	0.528	495.21	54.14	4.87		0.00	1275.122
A13	CrcMh	0.528	499.22	54.43	4.86		0.00	1282.235
A14	CrcMh	0.527	524.13	54.53	4.86		0.00	1341.939
A15	CrcMh	0.528	532.28	54.93	4.84		0.00	1358.435
A16	CrcMh	0.528	537.91	54.96	4.84		0.00	1373.000
A17	CrcMh	0.528	543.91	55.24	4.82		0.00	1385.217
A18	CrcMh	0.528	548.92	55.45	4.81		0.00	1395.553
A19	CrcMh	0.529	559.92	55.58	4.81		0.00	1422.854
A610S	CrcMh	0.491	193.42	37.22	5.89		0.00	559.643
A610N	CrcMh	0.531	222.35	37.95	5.83		0.00	689.556
A1	CrcMh	0.450	23.77	21.25	7.46		0.00	79.810
A2	CrcMh	0.450	47.61	27.85	6.70		0.00	143.637
A3	CrcMh	0.450	63.23	31.01	6.40		0.00	182.126
A4-a	CrcMh	0.470	116.89	34.00	6.14		0.00	337.233
A5-a	CrcMh	0.480	180.30	36.51	5.94		0.00	514.079
A6-a	CrcMh	0.535	276.40	50.00	5.08		0.00	751.954
A7	CrcMh	0.529	296.24	51.07	5.03		0.00	788.542
A8	CrcMh	0.530	305.42	51.92	4.98		0.00	806.866
A9	CrcMh	0.527	318.67	52.40	4.96		0.00	832.555
A10	CrcMh	0.525	324.77	53.33	4.91		0.00	838.283
A20	CrcMh	0.550	5.54	27.99	6.69		0.00	20.386
A22	CrcMh	0.550	3.41	14.05	8.56		0.00	16.053
A21	CrcMh	0.550	8.95	29.03	6.59		0.00	32.424
A23	CrcMh	0.550	11.16	29.52	6.54		0.00	40.143
A24	CrcMh	0.487	17.79	30.64	6.44		0.00	55.710
A25	CrcMh	0.550	3.40	15.46	8.32		0.00	15.549
A26	CrcMh	0.550	5.63	16.71	8.11		0.00	25.119
A27	CrcMh	0.550	6.00	20.09	7.62		0.00	25.131
A28	CrcMh	0.550	2.92	19.52	7.69		0.00	12.357
A29	CrcMh	0.550	5.01	20.61	7.55		0.00	20.792
A30	CrcMh	0.550	1.18	25.09	7.00		0.00	4.542
A31	CrcMh	0.550	2.34	26.79	6.81		0.00	8.769
A4-b	CrcMh	0.550	23.05	25.00	7.01		0.00	88.848
A5-b	CrcMh	0.520	43.76	18.07	7.90		0.00	179.884
A5-c	CrcMh	0.550	30.67	17.08	8.05		0.00	135.856
A6-b	CrcMh	0.550	38.81	26.81	6.81		0.00	145.408
A6-c	CrcMh	0.550	30.13	25.62	6.94		0.00	114.996
A6-d	CrcMh	0.550	15.50	24.40	7.08		0.00	60.327
A11-a	CrcMh	0.550	12.40	18.45	7.85		0.00	53.519
A11-b	CrcMh	0.532	153.75	30.12	6.48		0.00	530.339
A11-c	CrcMh	0.479	35.18	20.79	7.52		0.00	126.861
A11-d	CrcMh	0.450	24.83	20.00	7.63		0.00	85.232
A11-e	CrcMh	0.534	151.02	29.43	6.55		0.00	527.646
A11-f	CrcMh	0.550	90.63	29.04	6.59		0.00	328.326
A11-g	CrcMh	0.550	60.17	28.31	6.66		0.00	220.329
A11-h	CrcMh	0.550	33.13	27.72	6.72		0.00	122.413
A11-i	CrcMh	0.550	7.35	22.08	7.36		0.00	29.734
A20-a	Curb	0.550	1.60	25.00	7.01		0.00	6.167
A20-b	Curb	0.550	1.60	25.00	7.01		0.00	6.167
A31-a	Curb	0.550	0.58	25.00	7.01		0.00	2.236
A31-b	Curb	0.550	0.58	25.00	7.01		0.00	2.236
A22-a	Curb	0.550	2.20	14.01	8.57		0.00	10.365
A22-b	Curb	0.550	1.21	13.57	8.65		0.00	5.754
A22-c	Curb	0.550	1.69	13.57	8.65		0.00	8.037
A25-a	Curb	0.550	3.40	15.46	8.32		0.00	15.549
A25-b	Curb	0.550	1.60	15.36	8.33		0.00	7.332
A26-a	Curb	0.550	2.23	13.86	8.59		0.00	10.539
A26-b	Curb	0.550	1.61	13.74	8.61		0.00	7.628
A26-c	Curb	0.550	0.99	13.45	8.67		0.00	4.720
A27-a	Curb	0.550	6.00	20.09	7.62		0.00	25.131
A27-b	Curb	0.550	3.00	20.00	7.63		0.00	12.586
A30-a	Curb	0.550	0.59	25.00	7.01		0.00	2.274
A30-b	Curb	0.550	0.59	25.00	7.01		0.00	2.274
OUT	Outlt	0.529	559.92	55.58	4.81		0.00	1422.854

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A1	A2	40.68	38.16	Cir 1	0.00	6.00	2100.0	0.120	0.013
2	A2	A3	38.16	36.78	Cir 1	0.00	6.50	1150.0	0.120	0.013
3	A3	A4-a	36.78	35.40	Cir 1	0.00	7.00	1150.0	0.120	0.013
4	A4-a	A5-a	35.40	34.02	Cir 1	0.00	7.50	1150.0	0.120	0.013
5	A5-a	A610S	34.02	33.55	Cir 1	0.00	9.00	345.0	0.136	0.013
6	A610S	A610N	33.55	33.15	Box 1	9.00	8.00	340.0	0.118	0.015
7	A610N	A6-a	33.15	32.97	Cir 1	0.00	10.0	180.0	0.100	0.013
8	A6-a	A7	32.97	32.24	Cir 1	0.00	10.0	615.0	0.119	0.013
9	A7	A8	32.24	31.61	Cir 1	0.00	10.0	513.0	0.123	0.013
10	A8	A9	31.61	30.96	Cir 1	0.00	10.0	310.0	0.210	0.013
11	A9	A10	30.96	29.77	Cir 1	0.00	10.0	593.0	0.201	0.013
12	A10	A11	29.77	29.33	Cir 1	0.00	10.0	220.0	0.200	0.013
13	A11	A12	29.33	28.43	Cir 1	0.00	10.0	450.0	0.200	0.013
14	A12	A13	28.43	27.87	Cir 1	0.00	10.0	280.0	0.200	0.013
15	A13	A14	27.87	27.59	Cir 1	0.00	10.0	105.0	0.267	0.013
16	A14	A15	27.59	26.78	Cir 1	0.00	10.0	405.0	0.200	0.013
17	A15	A16	26.78	26.72	Cir 1	0.00	10.0	32.0	0.188	0.013
18	A16	A17	26.72	26.21	Cir 1	0.00	10.0	290.0	0.176	0.013
19	A17	A18	26.21	25.77	Cir 1	0.00	10.0	230.0	0.191	0.013
20	A18	A19	24.77	24.57	Box 1	10.0	11.0	100.0	0.200	0.015
21	A19	OUT	24.57	24.37	Box 1	10.0	11.0	100.0	0.200	0.015
22	A24	A14	38.49	37.35	Cir 1	0.00	2.50	210.0	0.543	0.013
23	A23	A24	39.85	38.49	Cir 1	0.00	2.50	550.0	0.247	0.013
24	A21	A23	41.90	40.35	Cir 1	0.00	2.00	300.0	0.517	0.013
25	A22	A21	42.45	41.90	Cir 1	0.00	2.00	307.0	0.179	0.013
26	A20	A21	42.65	41.90	Cir 1	0.00	2.00	408.0	0.184	0.013
27	A25	A26	41.72	40.01	Cir 1	0.00	2.00	400.0	0.428	0.013
28	A26	A16	40.01	39.00	Cir 1	0.00	2.00	188.0	0.537	0.013
29	A27	A17	42.38	40.10	Cir 1	0.00	2.00	467.0	0.488	0.013
30	A29	A18	41.30	41.00	Cir 1	0.00	2.00	117.0	0.256	0.013
31	A28	A29	41.67	41.21	Cir 1	0.00	2.00	257.0	0.179	0.013
32	A31	A20	43.05	42.65	Cir 1	0.00	2.00	240.0	0.167	0.013
33	A30	A31	43.60	43.05	Cir 1	0.00	2.00	307.0	0.179	0.013
100	A4-b	A4-a	36.78	35.40	Cir 1	0.00	4.00	1150.0	0.120	0.013
101	A5-c	A5-b	45.50	44.00	Cir 1	0.00	4.00	640.0	0.234	0.013
102	A5-b	A5-a	44.00	42.46	Cir 1	0.00	4.50	730.0	0.211	0.013
103	A6-d	A6-c	42.00	36.90	Cir 1	0.00	2.50	900.0	0.567	0.013
104	A6-c	A6-b	36.90	34.30	Cir 1	0.00	3.50	850.0	0.306	0.013
105	A6-b	A6-a	34.30	32.97	Cir 1	0.00	3.50	280.0	0.475	0.013
106	A11-a	A11	30.70	30.00	Cir 1	0.00	3.00	300.0	0.233	0.013
107	A11-i	A11-h	45.75	45.61	Cir 1	0.00	4.00	800.0	0.018	0.013
108	A11-h	A11-g	45.61	44.97	Cir 1	0.00	4.00	350.0	0.183	0.013
109	A11-g	A11-f	44.47	42.65	Cir 1	0.00	4.50	600.0	0.303	0.013
110	A11-f	A11-e	42.15	40.64	Cir 1	0.00	5.00	400.0	0.378	0.013
111	A11-d	A11-c	43.80	43.00	Cir 1	0.00	3.50	420.0	0.190	0.013
112	A11-c	A11-e	43.00	42.14	Cir 1	0.00	3.50	220.0	0.391	0.013
113	A11-e	A11-b	40.15	35.50	Cir 1	0.00	5.50	920.0	0.505	0.013
114	A11-b	A11	35.50	34.10	Cir 1	0.00	5.50	270.0	0.519	0.013
115	A27-b	A27-a	42.61	42.50	Cir 1	0.00	2.00	28.0	0.393	0.013
116	A27-a	A27	42.50	42.38	Cir 1	0.00	2.00	9.0	1.333	0.013
117	A25-b	A25-a	42.12	42.00	Cir 1	0.00	2.00	28.0	0.429	0.013
118	A25-a	A25	42.00	41.72	Cir 1	0.00	2.00	22.0	1.273	0.013
119	A26-c	A26-b	41.82	41.72	Cir 1	0.00	2.00	54.0	0.185	0.013
120	A26-b	A26-a	41.72	41.68	Cir 1	0.00	2.00	24.0	0.167	0.013
121	A26-a	A26	41.68	41.24	Cir 1	0.00	2.00	8.0	5.508	0.013
122	A22-c	A22-a	42.66	42.50	Cir 1	0.00	2.00	90.0	0.178	0.013
123	A22-a	A22	42.50	42.45	Cir 1	0.00	2.00	12.0	0.417	0.013
124	A22-b	A22	42.50	42.45	Cir 1	0.00	2.00	24.0	0.208	0.013
125	A20-a	A20	42.82	42.62	Cir 1	0.00	2.00	8.0	2.501	0.013
126	A20-b	A20	42.82	42.62	Cir 1	0.00	2.00	20.0	1.000	0.013
127	A31-a	A31	43.09	43.05	Cir 1	0.00	2.00	8.0	0.500	0.013
128	A31-b	A31	43.09	43.05	Cir 1	0.00	2.00	20.0	0.200	0.013
129	A30-a	A30	43.70	43.60	Cir 1	0.00	2.00	8.0	1.250	0.013
130	A30-b	A30	43.70	43.60	Cir 1	0.00	2.00	20.0	0.500	0.013

Conveyance Hydraulic Computations. Tailwater = 45.000 (ft)

Run #	Hyd. Gr.line US (ft)	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	69.09	67.31	64.00	0.035	3.15	6.00	5.30	2.82	79.8	147.3	0.000
2	67.31	66.79	61.00	0.074	4.37	6.50	6.06	4.33	143.6	182.4	0.000
3	66.79	66.33	59.00	0.081	4.84	7.00	6.42	4.73	182.1	222.2	0.000
4	66.33	64.13	57.00	0.191	7.50	7.50	7.63	7.63	337.2	267.1	0.000
5	64.13	63.55	55.00	0.168	9.00	9.00	8.08	8.08	514.1	462.8	0.000
6	63.55	62.78	54.00	0.226	8.00	8.00	7.77	7.77	559.6	403.4	0.000
7	62.78	62.47	54.00	0.172	10.00	10.00	8.78	8.78	689.6	525.2	0.000
8	62.47	61.21	53.00	0.205	10.00	10.00	9.57	9.57	752.0	572.2	0.000
9	61.21	60.06	53.00	0.225	10.00	10.00	10.04	10.04	788.5	582.0	0.000
10	60.06	59.32	51.00	0.236	8.98	10.00	10.85	10.27	806.9	760.5	0.000
11	59.32	57.83	51.00	0.251	10.00	10.00	10.60	10.60	832.6	744.0	0.000
12	57.83	57.27	49.50	0.255	10.00	10.00	10.67	10.67	838.3	742.7	0.000
13	57.27	54.64	49.50	0.584	10.00	10.00	16.16	16.16	1269.4	742.7	0.000
14	54.64	52.99	48.50	0.590	10.00	10.00	16.24	16.24	1275.1	742.7	0.000
15	52.99	52.37	47.50	0.596	10.00	10.00	16.33	16.33	1282.2	857.6	0.000
16	52.37	49.72	47.50	0.653	10.00	10.00	17.09	17.09	1341.9	742.7	0.000
17	49.72	49.51	47.50	0.669	10.00	10.00	17.30	17.30	1358.4	719.1	0.000
18	49.51	47.53	47.50	0.683	10.00	10.00	17.48	17.48	1373.0	696.5	0.000
19	47.53	45.93	47.50	0.696	10.00	10.00	17.64	17.64	1385.2	726.4	0.000
20	45.93	45.47	47.50	0.454	11.00	11.00	12.69	12.69	1395.6	926.0	0.000
21	45.47	45.00	47.50	0.472	11.00	11.00	12.94	12.94	1422.9	926.0	0.000
22	56.21	52.37	47.52	1.829	2.50	2.50	11.35	11.35	55.7	30.4	0.000
23	61.43	56.21	47.52	0.950	2.50	2.50	8.18	8.18	40.1	20.5	0.000
24	67.54	61.43	48.29	2.037	2.00	2.00	10.32	10.32	32.4	16.3	0.000
25	69.07	67.54	48.23	0.499	2.00	2.00	5.11	5.11	16.1	9.6	0.000
26	70.83	67.54	48.50	0.805	2.00	2.00	6.49	6.49	20.4	9.7	0.000
27	53.68	51.81	47.72	0.468	1.75	2.00	5.33	4.95	15.5	14.9	0.000
28	51.81	49.51	48.91	1.222	2.00	2.00	8.00	8.00	25.1	16.7	0.000
29	53.24	47.53	48.48	1.224	2.00	2.00	8.00	8.00	25.1	15.9	0.000
30	46.91	45.93	48.00	0.838	2.00	2.00	6.62	6.62	20.8	11.5	0.000
31	47.67	46.91	48.00	0.296	2.00	2.00	3.93	3.93	12.4	9.6	0.000
32	70.87	70.83	48.45	0.149	1.55	2.00	3.35	2.79	8.8	9.3	0.000
33	71.30	70.87	48.18	0.040	0.97	2.00	3.01	1.45	4.5	9.6	0.000
100	70.69	66.33	55.00	0.379	4.00	4.00	7.07	7.07	88.8	50.0	0.000
101	75.87	70.19	55.00	0.887	4.00	4.00	10.81	10.81	135.9	69.8	0.000
102	70.19	64.13	55.00	0.830	4.50	4.50	11.31	11.31	179.9	90.7	0.000
103	98.59	79.28	52.50	2.145	2.50	2.50	12.29	12.29	60.3	31.0	0.000
104	79.28	68.27	53.00	1.295	3.50	3.50	11.95	11.95	115.0	55.9	0.000
105	68.27	62.47	53.00	2.071	3.50	3.50	15.11	15.11	145.4	69.6	0.000
106	59.19	57.27	52.00	0.638	3.00	3.00	7.57	7.57	53.5	32.4	0.000
107	103.10	102.76	55.00	0.042	4.00	4.00	2.37	2.37	29.7	19.1	0.000
108	102.76	100.24	52.00	0.720	4.00	4.00	9.74	9.74	122.4	61.7	0.000
109	100.24	92.77	52.00	1.245	4.50	4.50	13.85	13.85	220.3	108.8	0.000
110	92.77	86.47	52.00	1.576	5.00	5.00	16.72	16.72	328.3	160.7	0.000
111	92.93	89.94	52.00	0.712	3.50	3.50	8.86	8.86	85.2	44.1	0.000
112	89.94	86.47	52.00	1.576	3.50	3.50	13.19	13.19	126.9	63.2	0.000
113	86.47	63.95	52.00	2.448	5.50	5.50	22.21	22.21	527.6	239.8	0.000
114	63.95	57.27	52.00	2.473	5.50	5.50	22.32	22.32	530.3	242.8	0.000
115	53.38	53.35	48.50	0.307	1.47	2.00	5.10	4.01	12.6	14.2	0.000
116*	53.35	53.24	48.50	1.224	1.58	2.00	9.47	8.56	25.1	26.2	0.000
117	53.87	53.78	47.75	0.104	0.99	2.00	4.70	2.33	7.3	14.9	0.000
118*	53.78	53.68	47.75	0.468	1.13	2.00	8.52	6.51	15.5	25.6	0.000
119	51.91	51.84	48.00	0.043	0.98	2.00	3.07	1.50	4.7	9.8	0.000
120	51.84	51.82	48.00	0.113	1.38	2.00	3.29	2.43	7.6	9.3	0.000
121*	51.82	51.81	48.00	0.215	0.60	2.00	13.17	5.56	10.5	53.3	0.000
122	69.15	69.10	48.23	0.125	1.41	2.00	3.40	2.56	8.0	9.6	0.000
123	69.10	69.07	48.23	0.208	1.24	2.00	5.05	3.30	10.4	14.7	0.000
124	69.11	69.07	48.23	0.064	1.07	2.00	3.38	1.83	5.8	10.4	0.000
125*	70.83	70.83	48.50	0.074	0.56	2.00	8.52	4.64	6.2	35.9	0.000
126*	70.84	70.83	48.50	0.074	0.71	2.00	6.13	4.64	6.2	22.7	0.000
127*	70.87	70.87	48.45	0.010	0.50	2.00	3.59	3.45	2.2	16.1	0.000
128	70.91	70.87	48.45	0.010	0.64	2.00	2.59	0.71	2.2	10.2	0.000
129*	71.30	71.30	48.18	0.010	0.41	2.00	4.99	3.44	2.3	25.4	0.000
130*	71.30	71.30	48.18	0.010	0.51	2.00	3.61	3.44	2.3	16.1	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	6.0	0.0	1	2100.0
Circular	Concrete	6.5	0.0	1	1150.0
Circular	Concrete	7.0	0.0	1	1150.0
Circular	Concrete	7.5	0.0	1	1150.0
Circular	Concrete	9.0	0.0	1	345.0
Box	Concrete	8.0	9.0	1	340.0
Circular	Concrete	10.0	0.0	13	4223.0
Box	Concrete	11.0	10.0	2	200.0
Circular	Concrete	2.5	0.0	3	1660.0
Circular	Concrete	2.0	0.0	26	3374.0
Circular	Concrete	4.0	0.0	4	2940.0
Circular	Concrete	4.5	0.0	2	1330.0
Circular	Concrete	3.5	0.0	4	1770.0
Circular	Concrete	3.0	0.0	1	300.0
Circular	Concrete	5.0	0.0	1	400.0
Circular	Concrete	5.5	0.0	2	1190.0

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAINAGE\C-H STM SYS A PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 26 OF 131

PUBLIC WORKS AND ENGINEERING
APP. FILE#
49097
JMBER
EXAS

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	48
Curb In Sag		5.0	0.0	0.0	0.0	0.0	16
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= A11-b Previous intensity used.
Decreasing conduit size @ downstream Run# 6
Discharge decreased downstream node Id= A25 Previous intensity used.
Discharge decreased downstream node Id= A27 Previous intensity used.
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# 29
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# 22
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 102

Runoff Frequency of: 100 Years
Decreasing conduit size @ downstream Run# 6
Discharge decreased downstream node Id= A25 Previous intensity used.
Discharge decreased downstream node Id= A27 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= A20-a
Computed left ponded width exceeds allowable width at inlet Id= A20-a
Computed right ponded width exceeds allowable width at inlet Id= A20-b
Computed left ponded width exceeds allowable width at inlet Id= A20-b
Computed left ponded width exceeds allowable width at inlet Id= A22-b
Computed left ponded width exceeds allowable width at inlet Id= A22-c
Capacity of sag inlet exceeded at inlet Id= A22-c
Computed right ponded width exceeds allowable width at inlet Id= A25-a
Computed left ponded width exceeds allowable width at inlet Id= A25-a
Capacity of sag inlet exceeded at inlet Id= A25-a
Computed right ponded width exceeds allowable width at inlet Id= A25-b
Computed left ponded width exceeds allowable width at inlet Id= A25-b
Computed right ponded width exceeds allowable width at inlet Id= A27-a
Computed left ponded width exceeds allowable width at inlet Id= A27-a
Capacity of sag inlet exceeded at inlet Id= A27-a
Computed right ponded width exceeds allowable width at inlet Id= A27-b
Computed left ponded width exceeds allowable width at inlet Id= A27-b
Capacity of sag inlet exceeded at inlet Id= A27-b
Run# 21 Insufficient capacity.
Run# 20 Insufficient capacity.
Run# 30 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A29 Run # 30
Run# 31 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A28 Run # 31
Run# 19 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A17 Run # 19
Upstream HGL exceeds critical elevation (Analysis)at node Id= A17 Run # 19
Run# 29 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A27 Run # 29
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27 Run # 29
Upstream HGL exceeds critical elevation (Design) at node Id= A27-a Run # 116
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27-a Run # 116
Run# 18 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A16 Run # 18
Upstream HGL exceeds critical elevation (Analysis)at node Id= A16 Run # 18
Run# 28 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A26 Run # 28
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26 Run # 28
Upstream HGL exceeds critical elevation (Design) at node Id= A27-b Run # 115
Upstream HGL exceeds critical elevation (Analysis)at node Id= A27-b Run # 115
Upstream HGL exceeds critical elevation (Design) at node Id= A26-a Run # 121
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-a Run # 121
Run# 17 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A15 Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= A15 Run # 17
Run# 27 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A25 Run # 27
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25 Run # 27
Upstream HGL exceeds critical elevation (Design) at node Id= A25-a Run # 118
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25-a Run # 118
Upstream HGL exceeds critical elevation (Design) at node Id= A26-b Run # 120
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-b Run # 120
Run# 16 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A14 Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= A14 Run # 16
Run# 22 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A24 Run # 22
Upstream HGL exceeds critical elevation (Analysis)at node Id= A24 Run # 22
Run# 23 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A23 Run # 23
Upstream HGL exceeds critical elevation (Analysis)at node Id= A23 Run # 23
Run# 24 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A21 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= A21 Run # 24
Run# 25 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A22 Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22 Run # 25

Upstream HGL exceeds critical elevation (Design) at node Id= A20 Run # 26
Run# 26 Insufficient capacity.

Upstream HGL exceeds critical elevation (Analysis)at node Id= A20 Run # 26
Upstream HGL exceeds critical elevation (Design) at node Id= A31 Run # 32
Upstream HGL exceeds critical elevation (Analysis)at node Id= A31 Run # 32
Upstream HGL exceeds critical elevation (Design) at node Id= A30 Run # 33
Upstream HGL exceeds critical elevation (Analysis)at node Id= A30 Run # 33
Upstream HGL exceeds critical elevation (Design) at node Id= A25-b Run # 117
Upstream HGL exceeds critical elevation (Analysis)at node Id= A25-b Run # 117
Upstream HGL exceeds critical elevation (Design) at node Id= A26-c Run # 119
Upstream HGL exceeds critical elevation (Analysis)at node Id= A26-c Run # 119
Upstream HGL exceeds critical elevation (Design) at node Id= A22-a Run # 123
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-a Run # 123
Upstream HGL exceeds critical elevation (Design) at node Id= A22-b Run # 124
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-b Run # 124
Upstream HGL exceeds critical elevation (Design) at node Id= A20-a Run # 125
Upstream HGL exceeds critical elevation (Analysis)at node Id= A20-a Run # 125
Upstream HGL exceeds critical elevation (Design) at node Id= A20-b Run # 126
Upstream HGL exceeds critical elevation (Analysis)at node Id= A20-b Run # 126
Upstream HGL exceeds critical elevation (Design) at node Id= A31-a Run # 127
Upstream HGL exceeds critical elevation (Analysis)at node Id= A31-a Run # 127
Upstream HGL exceeds critical elevation (Design) at node Id= A31-b Run # 128
Upstream HGL exceeds critical elevation (Analysis)at node Id= A31-b Run # 128
Upstream HGL exceeds critical elevation (Design) at node Id= A30-a Run # 129
Upstream HGL exceeds critical elevation (Analysis)at node Id= A30-a Run # 129
Upstream HGL exceeds critical elevation (Design) at node Id= A30-b Run # 130
Upstream HGL exceeds critical elevation (Analysis)at node Id= A30-b Run # 130
Run# 15 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A13 Run # 15
Upstream HGL exceeds critical elevation (Analysis)at node Id= A13 Run # 15
Upstream HGL exceeds critical elevation (Design) at node Id= A22-c Run # 122
Upstream HGL exceeds critical elevation (Analysis)at node Id= A22-c Run # 122
Run# 14 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A12 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= A12 Run # 14
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11 Run # 13
Run# 106 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-a Run # 106
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-a Run # 106
Run# 114 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-b Run # 114
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-b Run # 114
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A10 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= A10 Run # 12
Run# 113 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-e Run # 113
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-e Run # 113
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A9 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= A9 Run # 11
Run# 110 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-f Run # 110
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-f Run # 110
Run# 112 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-c Run # 112
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-c Run # 112
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A8 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= A8 Run # 10
Run# 109 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-g Run # 109
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-g Run # 109
Run# 111 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-d Run # 111
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-d Run # 111
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A7 Run # 9
Upstream HGL exceeds critical elevation (Analysis)at node Id= A7 Run # 9
Run# 108 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-h Run # 108
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-h Run # 108
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-a Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-a Run # 8
Run# 105 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-b Run # 105
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-b Run # 105
Run# 107 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A11-i Run # 107
Upstream HGL exceeds critical elevation (Analysis)at node Id= A11-i Run # 107
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A610N Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= A610N Run # 7
Run# 104 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-c Run # 104
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-c Run # 104
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A610S Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= A610S Run # 6
Run# 103 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A6-d Run # 103
Upstream HGL exceeds critical elevation (Analysis)at node Id= A6-d Run # 103

Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-a Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-a Run # 5
Run# 102 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-b Run # 102
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-b Run # 102
Run# 4 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A4-a Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= A4-a Run # 4
Run# 100 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A4-b Run # 100
Upstream HGL exceeds critical elevation (Analysis)at node Id= A4-b Run # 100
Run# 101 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A5-c Run # 101
Upstream HGL exceeds critical elevation (Analysis)at node Id= A5-c Run # 101
Upstream HGL exceeds critical elevation (Design) at node Id= A3 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= A3 Run # 3
Upstream HGL exceeds critical elevation (Design) at node Id= A2 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= A2 Run # 2
Upstream HGL exceeds critical elevation (Design) at node Id= A1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= A1 Run # 1

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
NA DATE:

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(GAS SERVICE LINES ARE NOT SHOWN)
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SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM A
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE:
P:\City of Houston\2006-05_NSR 451\DRAWINGS\C-41 STM SYS A PR 2 Yr.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 27 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/30/2009 8:53:35 AM

PROJECT NAME : NSR 451
JOB NUMBER : 001
PROJECT DESCRIPTION : SYSTEM B - EXISTING
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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-3	0.55	9.25	19.05	19.05	3.88	0.000	19.732
B-29	0.55	11.36	18.71	18.71	3.91	0.000	24.429
B-9	0.55	2.53	14.00	14.00	4.41	0.000	6.137
B-10	0.55	3.14	13.33	13.33	4.49	0.000	7.760
B-12	0.55	1.14	12.83	12.83	4.56	0.000	2.858
B-13	0.55	5.42	15.12	15.12	4.28	0.000	12.756
B-28	0.55	5.90	17.26	17.26	4.05	0.000	13.143
B-27	0.55	5.87	17.26	17.26	4.05	0.000	13.076
B-26	0.55	4.08	17.26	17.26	4.05	0.000	9.089
B-30a	0.55	2.13	18.76	18.76	3.91	0.000	4.575
B-30b	0.55	2.00	18.76	18.76	3.91	0.000	4.296
B-31a	0.55	1.54	14.05	14.05	4.40	0.000	3.731
B-31b	0.55	1.54	22.02	22.02	3.63	0.000	3.071
B-31c	0.55	1.54	22.02	22.02	3.63	0.000	3.071
B-14	0.55	2.47	14.83	14.83	4.31	0.000	5.858
B-15	0.55	5.74	14.67	14.67	4.33	0.000	13.672
B-16	0.55	10.31	19.21	19.21	3.86	0.000	21.910
B-17	0.55	6.54	17.62	17.62	4.01	0.000	14.439
B-18	0.55	7.83	15.10	15.10	4.28	0.000	18.437
B-19	0.55	11.37	20.71	20.71	3.73	0.000	23.343
B-24	0.55	3.42	14.00	14.00	4.41	0.000	8.296
B-32a	0.55	2.59	16.40	16.40	4.14	0.000	5.896
B-32b	0.55	2.60	15.33	15.33	4.26	0.000	6.085

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)
B-30a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-30b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31c	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

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-30a	Curb	5.00	n/a	n/a	4.575	7.601	0.366	10.65	10.65
B-30b	Curb	5.00	n/a	n/a	4.296	7.601	0.352	10.40	10.40
B-31a	Curb	5.00	n/a	n/a	3.731	7.601	0.327	9.85	9.85
B-31b	Curb	5.00	n/a	n/a	3.071	7.601	0.302	9.15	9.15
B-31c	Curb	5.00	n/a	n/a	3.071	7.601	0.302	9.15	9.15
B-32a	Curb	5.00	n/a	n/a	5.896	7.601	0.443	11.70	11.70
B-32b	Curb	5.00	n/a	n/a	6.085	7.601	0.455	11.85	11.85

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-5	CrcMh	0.550	96.93	25.71	3.36		0.00	179.055
B-6	CrcMh	0.550	92.31	25.63	3.36		0.00	170.774
B-7	CrcMh	0.550	87.12	24.78	3.42		0.00	163.948
B-8	CrcMh	0.550	80.58	24.01	3.48		0.00	154.052
B-9	CrcMh	0.550	53.37	23.95	3.48		0.00	102.176
B-10	CrcMh	0.550	50.84	22.50	3.59		0.00	100.338
B-11	CrcMh	0.550	47.70	22.25	3.61		0.00	94.666
B-12	CrcMh	0.550	47.70	22.25	3.61		0.00	94.666
B-13	CrcMh	0.550	35.31	21.60	3.66		0.00	71.067
B-30	CrcMh	0.550	4.13	18.86	3.90		0.00	8.849
B-29	CrcMh	0.550	11.36	18.71	3.91		0.00	24.429
B-28	CrcMh	0.550	17.26	19.58	3.83		0.00	36.367
B-27	CrcMh	0.550	23.13	20.45	3.75		0.00	47.764
B-26	CrcMh	0.550	27.21	21.16	3.70		0.00	55.303
B-31	CrcMh	0.550	4.62	22.17	3.61		0.00	9.184
B-32	CrcMh	0.550	5.19	16.43	4.14		0.00	11.805
B-30a	Curb	0.550	2.13	18.76	3.91		0.00	4.575
B-30b	Curb	0.550	2.00	18.76	3.91		0.00	4.296
B-31a	Curb	0.550	1.54	14.05	4.40		0.00	3.731
B-31b	Curb	0.550	1.54	22.02	3.63		0.00	3.071
B-31c	Curb	0.550	1.54	22.02	3.63		0.00	3.071
B-32a	Curb	0.550	2.59	16.40	4.14		0.00	5.896
B-32b	Curb	0.550	2.60	15.33	4.26		0.00	6.085
B-14	CrcMh	0.550	29.89	20.83	3.72		0.00	61.203
B-15	CrcMh	0.550	16.05	20.05	3.79		0.00	33.449
B-16	CrcMh	0.550	10.31	19.21	3.86		0.00	21.910
B-17	CrcMh	0.550	6.54	17.62	4.01		0.00	14.439
B-18	CrcMh	0.550	11.25	15.10	4.28		0.00	26.490
B-19	CrcMh	0.550	11.37	20.71	3.73		0.00	23.343
B-24	CrcMh	0.550	3.42	14.00	4.41		0.00	8.296
B-2	CrcMh	0.550	110.31	26.15	3.33		0.00	202.012
B-3	CrcMh	0.550	110.31	26.15	3.33		0.00	202.012
B-4	CrcMh	0.550	96.93	25.71	3.36		0.00	179.055
OUT	Outlt	0.550	110.31	26.15	3.33		0.00	202.012

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
22	B-2	OUT	28.64	24.00	Cir 1	0.00	6.50	103.0	4.509	0.013
23	B-26	B-8	44.13	43.90	Cir 1	0.00	3.50	17.0	1.353	0.013
24	B-27	B-26	44.67	44.13	Cir 1	0.00	3.50	240.0	0.225	0.013
40	B-30a	B-30	42.64	42.59	Cir 1	0.00	2.00	21.0	0.238	0.013
41	B-30b	B-30	42.64	42.59	Cir 1	0.00	2.00	7.0	0.714	0.013
42	B-31a	B-31	42.38	42.32	Cir 1	0.00	2.00	20.0	0.300	0.013
43	B-31b	B-31	42.34	42.32	Cir 1	0.00	2.00	20.0	0.100	0.013
44	B-31c	B-31	42.34	42.32	Cir 1	0.00	2.00	7.0	0.286	0.013
45	B-32a	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
46	B-32b	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
25	B-28	B-27	45.13	44.67	Cir 1	0.00	3.50	260.0	0.177	0.013
26	B-29	B-28	45.62	45.13	Cir 1	0.00	3.00	245.0	0.200	0.013
27	B-30	B-3	42.52	42.00	Cir 1	0.00	2.00	265.0	0.196	0.013
28	B-31	B-5	41.77	41.09	Cir 1	0.00	2.00	340.0	0.200	0.013
29	B-32	B-6	41.64	40.50	Cir 1	0.00	2.00	400.0	0.285	0.013
5	B-19	B-14	39.40	39.23	Cir 1	0.00	2.50	32.0	0.531	0.013
6	B-18	B-12	37.51	37.37	Cir 1	0.00	2.50	27.0	0.519	0.013
7	B-17	B-7	41.50	39.66	Cir 1	0.00	2.00	420.0	0.438	0.013
8	B-16	B-15	35.37	34.61	Cir 1	0.00	2.50	260.0	0.292	0.013
9	B-15	B-14	34.61	33.80	Cir 1	0.00	3.00	272.0	0.298	0.013
10	B-14	B-13	33.80	33.29	Cir 1	0.00	4.00	265.0	0.192	0.013
11	B-13	B-12	33.29	32.66	Cir 1	0.00	4.00	252.0	0.250	0.013
12	B-12	B-11	32.66	32.09	Cir 1	0.00	4.50	232.0	0.246	0.013
13	B-11	B-10	32.09	31.84	Cir 1	0.00	4.50	106.0	0.236	0.013
14	B-10	B-9	31.84	30.24	Cir 1	0.00	4.50	619.0	0.258	0.013
15	B-9	B-8	30.24	30.15	Cir 1	0.00	4.50	31.0	0.290	0.013
16	B-8	B-7	30.15	29.75	Cir 1	0.00	6.00	292.0	0.137	0.013
17	B-7	B-6	29.75	29.22	Cir 1	0.00	6.00	343.0	0.155	0.013
18	B-6	B-5	29.22	29.19	Cir 1	0.00	6.50	27.0	0.111	0.013
19	B-5	B-4	29.19	28.93	Cir 1	0.00	6.50	218.0	0.119	0.013
30	B-24	B-18	38.52	37.50	Cir 1	0.00	2.00	220.0	0.464	0.013
20	B-4	B-3	28.93	28.73	Cir 1	0.00	6.50	165.0	0.121	0.013
21	B-3	B-2	28.73	28.64	Cir 1	0.00	6.50	56.0	0.161	0.013

Conveyance Hydraulic Computations. Tailwater = 30.500 (ft)

Run #	Hyd. Gr. 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)
22*	32.43	30.50	48.00	0.147	1.87	6.50	25.48	6.09	202.0	1118.1	0.000
23*	47.45	47.40	52.00	0.300	1.69	3.50	11.99	8.14	55.3	117.5	0.000
24	47.54	47.45	52.00	0.223	2.87	3.32	5.65	5.06	47.8	47.9	0.000
40	44.14	44.10	46.40	0.041	0.90	1.51	3.34	1.80	4.6	11.1	0.000
41*	44.10	44.10	46.40	0.036	0.64	1.51	4.91	4.16	4.3	19.2	0.000
42	43.28	43.26	47.00	0.027	0.75	0.94	3.45	2.56	3.7	12.4	0.000
43	43.26	43.26	46.73	0.018	0.91	0.94	2.20	2.11	3.1	7.2	0.000
44	43.28	43.26	46.73	0.018	0.69	0.94	3.21	2.11	3.1	12.1	0.000
45*	43.43	43.24	47.12	0.067	0.46	1.64	10.66	2.14	5.9	50.1	0.000
46*	43.44	43.24	47.12	0.072	0.47	1.64	10.75	2.21	6.1	50.1	0.000
25	47.63	47.54	53.00	0.130	2.50	2.87	4.94	4.31	36.4	42.5	0.000
26	47.68	47.63	53.00	0.133	2.06	2.50	4.71	3.88	24.4	30.0	0.000
27	44.10	44.00	52.00	0.152	1.46	2.00	3.60	2.82	8.8	10.1	0.000
28	43.26	43.09	52.00	0.163	1.49	2.00	3.65	2.92	9.2	10.2	0.000
29	43.24	42.50	52.00	0.270	1.60	2.00	4.38	3.76	11.8	12.1	0.000
5	41.80	41.73	49.00	0.321	1.66	2.50	6.73	4.76	23.3	30.0	0.000
6	39.89	39.87	48.50	0.414	1.85	2.50	6.81	5.40	26.5	29.7	0.000
7	43.08	41.66	48.50	0.404	1.58	2.00	5.43	4.60	14.4	15.0	0.000
8	37.39	37.05	48.50	0.283	2.02	2.44	5.15	4.49	21.9	22.3	0.000
9	37.05	36.99	48.50	0.249	2.27	3.00	5.84	4.73	33.4	36.6	0.000
10	36.99	36.52	48.50	0.180	3.19	3.23	5.70	5.62	61.2	63.3	0.000
11	36.52	36.24	48.50	0.243	3.23	3.58	6.53	5.99	71.1	72.1	0.000
12	36.24	35.75	48.50	0.230	3.58	3.66	6.98	6.84	94.7	97.9	0.000
13	35.75	35.55	48.50	0.230	3.66	3.71	6.84	6.75	94.7	95.9	0.000
14	35.55	34.99	48.50	0.258	3.71	4.50	7.16	6.31	100.3	100.4	0.000
15	34.99	34.98	48.50	0.268	3.55	4.50	7.59	6.42	102.2	106.4	0.000
16	34.98	34.58	48.50	0.131	4.83	4.83	6.32	6.32	154.1	157.4	0.000
17	34.58	34.40	48.50	0.149	4.83	5.18	6.72	6.32	163.9	167.2	0.000
18	34.40	34.40	48.50	0.105	5.18	5.21	6.02	5.99	170.8	175.5	0.000
19	34.40	33.75	48.00	0.116	5.28	5.28	6.20	6.20	179.1	181.8	0.000
30	40.62	39.89	52.00	0.133	1.04	2.00	5.00	2.64	8.3	15.5	0.000
20	33.75	33.13	48.00	0.116	5.23	5.23	6.26	6.26	179.1	183.3	0.000
21	33.13	32.43	48.00	0.147	5.13	5.13	7.19	7.19	202.0	211.1	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	6.5	0.0	5	569.0
Circular	Concrete	3.5	0.0	3	517.0
Circular	Concrete	2.0	0.0	12	1760.0
Circular	Concrete	3.0	0.0	2	517.0
Circular	Concrete	2.5	0.0	3	319.0
Circular	Concrete	4.0	0.0	2	517.0
Circular	Concrete	4.5	0.0	4	988.0
Circular	Concrete	6.0	0.0	2	635.0

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	26
Curb In Sag		5.0	0.0	0.0	0.0	0.0	7
Outlet		0.0	0.0	0.0	0.0	0.0	1

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Consulting Engineers — Planners
FIRM F-596

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DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE:
P:\City of Houston\2006-05_NSR 451\DRAIN\90%_WS STORM SYS B 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 28 OF 131

PUBLIC WORKS AND ENGINEERING
APP. FILED
49097
REGISTERED NUMBER
HOUSTON, TEXAS

Revisions
No. Date Appr.

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-3	0.55	9.25	19.05	19.05	7.76	0.000	39.483
B-29	0.55	11.36	18.71	18.71	7.81	0.000	48.794
B-9	0.55	2.53	14.00	14.00	8.57	0.000	11.923
B-10	0.55	3.14	13.33	13.33	8.69	0.000	15.008
B-12	0.55	1.14	12.83	12.83	8.78	0.000	5.508
B-13	0.55	5.42	15.12	15.12	8.37	0.000	24.958
B-28	0.55	5.90	17.26	17.26	8.03	0.000	26.044
B-27	0.55	5.87	17.26	17.26	8.03	0.000	25.912
B-26	0.55	4.08	17.26	17.26	8.03	0.000	18.010
B-30a	0.55	2.13	18.76	18.76	7.80	0.000	9.140
B-30b	0.55	2.00	18.76	18.76	7.80	0.000	8.583
B-31a	0.55	1.54	14.05	14.05	8.56	0.000	7.250
B-31b	0.55	1.54	22.02	22.02	7.36	0.000	6.236
B-31c	0.55	1.54	22.02	22.02	7.36	0.000	6.236
B-14	0.55	2.47	14.83	14.83	8.42	0.000	11.441
B-15	0.55	5.74	14.67	14.67	8.45	0.000	26.676
B-16	0.55	10.31	19.21	19.21	7.74	0.000	43.878
B-17	0.55	6.54	17.62	17.62	7.97	0.000	28.672
B-18	0.55	7.83	15.10	15.10	8.38	0.000	36.071
B-19	0.55	11.37	20.71	20.71	7.53	0.000	47.103
B-24	0.55	3.42	14.00	14.00	8.57	0.000	16.117
B-32a	0.55	2.59	16.40	16.40	8.16	0.000	11.626
B-32b	0.55	2.60	15.33	15.33	8.34	0.000	11.922

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)
B-30a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-30b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31c	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

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-30a	Curb	5.00	n/a	n/a	9.140	7.601	0.713	13.80	13.80
B-30b	Curb	5.00	n/a	n/a	8.583	7.601	0.658	13.50	13.50
B-31a	Curb	5.00	n/a	n/a	7.250	7.601	0.541	12.65	12.65
B-31b	Curb	5.00	n/a	n/a	6.236	7.601	0.465	11.95	11.95
B-31c	Curb	5.00	n/a	n/a	6.236	7.601	0.465	11.95	11.95
B-32a	Curb	5.00	n/a	n/a	11.626	7.601	0.999	15.10	15.10
B-32b	Curb	5.00	n/a	n/a	11.922	7.601	1.037	15.25	15.25

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)
B-5	CrcMh	0.550	96.93	23.49	7.18		0.00	382.953
B-6	CrcMh	0.550	92.31	23.45	7.19		0.00	364.948
B-7	CrcMh	0.550	87.12	22.98	7.24		0.00	347.112
B-8	CrcMh	0.550	80.58	22.55	7.30		0.00	323.362
B-9	CrcMh	0.550	53.37	22.52	7.30		0.00	214.309
B-10	CrcMh	0.550	50.84	21.72	7.40		0.00	206.933
B-11	CrcMh	0.550	47.70	21.58	7.42		0.00	194.637
B-12	CrcMh	0.550	47.70	21.58	7.42		0.00	194.637
B-13	CrcMh	0.550	35.31	21.21	7.47		0.00	144.994
B-30	CrcMh	0.550	4.13	18.85	7.79		0.00	17.694
B-29	CrcMh	0.550	11.36	18.71	7.81		0.00	48.794
B-28	CrcMh	0.550	17.26	19.30	7.73		0.00	73.334
B-27	CrcMh	0.550	23.13	19.87	7.65		0.00	97.268
B-26	CrcMh	0.550	27.21	20.27	7.59		0.00	113.617
B-31	CrcMh	0.550	4.62	22.15	7.35		0.00	18.667
B-32	CrcMh	0.550	5.19	16.43	8.16		0.00	23.284
B-30a	Curb	0.550	2.13	18.76	7.80		0.00	9.140
B-30b	Curb	0.550	2.00	18.76	7.80		0.00	8.583
B-31a	Curb	0.550	1.54	14.05	8.56		0.00	7.250
B-31b	Curb	0.550	1.54	22.02	7.36		0.00	6.236
B-31c	Curb	0.550	1.54	22.02	7.36		0.00	6.236
B-32a	Curb	0.550	2.59	16.40	8.16		0.00	11.626
B-32b	Curb	0.550	2.60	15.33	8.34		0.00	11.922
B-14	CrcMh	0.550	29.89	20.77	7.52		0.00	123.706
B-15	CrcMh	0.550	16.05	19.69	7.67		0.00	67.708
B-16	CrcMh	0.550	10.31	19.21	7.74		0.00	43.878
B-17	CrcMh	0.550	6.54	17.62	7.97		0.00	28.672
B-18	CrcMh	0.550	11.25	15.10	8.38		0.00	51.825
B-19	CrcMh	0.550	11.37	20.71	7.53		0.00	47.103
B-24	CrcMh	0.550	3.42	14.00	8.57		0.00	16.117
B-2	CrcMh	0.550	110.31	23.72	7.16		0.00	434.103
B-3	CrcMh	0.550	110.31	23.72	7.16		0.00	434.103
B-4	CrcMh	0.550	96.93	23.49	7.18		0.00	382.953
OUT	Outlt	0.550	110.31	23.72	7.16		0.00	434.103

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
22	B-2	OUT	28.64	24.00	Cir 1	0.00	6.50	103.0	4.509	0.013
23	B-26	B-8	44.13	43.90	Cir 1	0.00	3.50	17.0	1.353	0.013
24	B-27	B-26	44.67	44.13	Cir 1	0.00	3.50	240.0	0.225	0.013
40	B-30a	B-30	42.64	42.59	Cir 1	0.00	2.00	21.0	0.238	0.013
41	B-30b	B-30	42.64	42.59	Cir 1	0.00	2.00	7.0	0.714	0.013
42	B-31a	B-31	42.38	42.32	Cir 1	0.00	2.00	20.0	0.300	0.013
43	B-31b	B-31	42.34	42.32	Cir 1	0.00	2.00	20.0	0.100	0.013
44	B-31c	B-31	42.34	42.32	Cir 1	0.00	2.00	7.0	0.286	0.013
45	B-32a	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
46	B-32b	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
25	B-28	B-27	45.13	44.67	Cir 1	0.00	3.50	260.0	0.177	0.013
26	B-29	B-28	45.62	45.13	Cir 1	0.00	3.00	245.0	0.200	0.013
27	B-30	B-3	42.52	42.00	Cir 1	0.00	2.00	265.0	0.196	0.013
28	B-31	B-5	41.77	41.09	Cir 1	0.00	2.00	340.0	0.200	0.013
29	B-32	B-6	41.64	40.50	Cir 1	0.00	2.00	400.0	0.285	0.013
5	B-19	B-14	39.40	39.23	Cir 1	0.00	2.50	32.0	0.531	0.013
6	B-18	B-12	37.51	37.37	Cir 1	0.00	2.50	27.0	0.519	0.013
7	B-17	B-7	41.50	39.66	Cir 1	0.00	2.00	420.0	0.438	0.013
8	B-16	B-15	35.37	34.61	Cir 1	0.00	2.50	260.0	0.292	0.013
9	B-15	B-14	34.61	33.80	Cir 1	0.00	3.00	272.0	0.298	0.013
10	B-14	B-13	33.80	33.29	Cir 1	0.00	4.00	265.0	0.192	0.013
11	B-13	B-12	33.29	32.66	Cir 1	0.00	4.00	252.0	0.250	0.013
12	B-12	B-11	32.66	32.09	Cir 1	0.00	4.50	232.0	0.246	0.013
13	B-11	B-10	32.09	31.84	Cir 1	0.00	4.50	106.0	0.236	0.013
14	B-10	B-9	31.84	30.24	Cir 1	0.00	4.50	619.0	0.258	0.013
15	B-9	B-8	30.24	30.15	Cir 1	0.00	4.50	31.0	0.290	0.013
16	B-8	B-7	30.15	29.75	Cir 1	0.00	6.00	292.0	0.137	0.013
17	B-7	B-6	29.75	29.22	Cir 1	0.00	6.00	343.0	0.155	0.013
18	B-6	B-5	29.22	29.19	Cir 1	0.00	6.50	27.0	0.111	0.013
19	B-5	B-4	29.19	28.93	Cir 1	0.00	6.50	218.0	0.119	0.013
30	B-24	B-18	38.52	37.50	Cir 1	0.00	2.00	220.0	0.464	0.013
20	B-4	B-3	28.93	28.73	Cir 1	0.00	6.50	165.0	0.121	0.013
21	B-3	B-2	28.73	28.64	Cir 1	0.00	6.50	56.0	0.161	0.013

Conveyance Hydraulic Computations. Tailwater = 44.800 (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)
22*	45.50	44.80	49.00	0.680	2.82	6.50	31.47	14.44	434.1	1118.1	0.000
23*	52.22	52.01	53.00	1.264	2.78	3.50	13.86	12.32	113.6	117.5	0.000
24	54.45	52.22	53.00	0.927	3.50	3.50	10.11	10.11	97.3	47.9	0.000
40	47.51	47.49	47.40	0.162	1.39	2.00	3.93	2.91	9.1	11.1	0.000
41*	47.50	47.49	47.40	0.143	0.94	2.00	5.92	5.17	8.6	19.2	0.000
42	50.24	50.20	48.00	0.102	1.10	2.00	4.10	2.31	7.2	12.4	0.000
43	50.21	50.20	47.73	0.075	1.45	2.00	2.57	1.99	6.2	7.2	0.000
44	50.22	50.20	47.73	0.075	1.02	2.00	3.87	1.99	6.2	12.1	0.000
45*	52.29	52.24	48.12	0.262	0.66	2.00	12.94	5.77	11.6	50.1	0.000
46*	52.29	52.24	48.12	0.275	0.67	2.00	13.03	5.83	11.9	50.1	0.000
25	55.82	54.45	54.00	0.527	3.50	3.50	7.62	7.62	73.3	42.5	0.000
26	57.12	55.82	54.00	0.531	3.00	3.00	6.90	6.90	48.8	30.0	0.000
27	47.49	45.88	53.00	0.607	2.00	2.00	5.63	5.63	17.7	10.1	0.000
28	50.20	47.91	53.00	0.675	2.00	2.00	5.94	5.94	18.7	10.2	0.000
29	52.24	48.04	53.00	1.050	2.00	2.00	7.41	7.41	23.3	12.1	0.000
5	67.37	66.95	50.00	1.308	2.50	2.50	9.60	9.60	47.1	30.0	0.000
6	62.88	62.45	49.50	1.583	2.50	2.50	10.56	10.56	51.8	29.7	0.000
7	57.01	50.32	49.50	1.593	2.00	2.00	9.13	9.13	28.7	15.0	0.000
8	72.68	69.73	49.50	1.135	2.50	2.50	8.94	8.94	43.9	22.3	0.000
9	69.73	66.95	49.50	1.022	3.00	3.00	9.58	9.58	67.7	36.6	0.000
10	66.95	65.00	49.50	0.735	4.00	4.00	9.84	9.84	123.7	63.3	0.000
11	65.00	62.45	49.50	1.010	4.00	4.00	11.54	11.54	145.0	72.1	0.000
12	62.45	60.20	49.50	0.971	4.50	4.50	12.24	12.24	194.6	97.9	0.000
13	60.20	59.17	49.50	0.971	4.50	4.50	12.24	12.24	194.6	95.9	0.000
14	59.17	52.37	49.50	1.098	4.50	4.50	13.01	13.01	206.9	100.4	0.000
15	52.37	52.01	49.50	1.178	4.50	4.50	13.47	13.47	214.3	106.4	0.000
16	52.01	50.32	49.50	0.578	6.00	6.00	11.44	11.44	323.4	157.4	0.000
17	50.32	48.04	49.50	0.666	6.00	6.00	12.28	12.28	347.1	167.2	0.000
18	48.04	47.91	49.50	0.480	6.50	6.50	11.00	11.00	364.9	175.5	0.000
19	47.91	46.75	49.00	0.529	6.50	6.50	11.54	11.54	383.0	181.8	0.000
30	63.99	62.88	53.00	0.503	1.74	2.00	5.56	5.13	16.1	15.5	0.000
20	46.75	45.88	49.00	0.529	6.50	6.50	11.54	11.54	383.0	183.3	0.000
21	45.88	45.50	49.00	0.680	6.50	6.50	13.08	13.08	434.1	211.1	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	6.5	0.0	5	569.0
Circular	Concrete	3.5	0.0	3	517.0
Circular	Concrete	2.0	0.0	12	1760.0
Circular	Concrete	3.0	0.0	2	517.0
Circular	Concrete	2.5	0.0	3	319.0
Circular	Concrete	4.0	0.0	2	517.0
Circular	Concrete	4.5	0.0	4	988.0
Circular	Concrete	6.0	0.0	2	635.0

Rev. | Revisions | Date | No.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
EXISTING 2–YEAR
HOUSTORM CALCULATIONS

WBS N–000383–0001–4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\I–K STORM SYS B 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 29 OF 131

PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

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	26
Curb In Sag		5.0	0.0	0.0	0.0	0.0	7
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-11 Previous intensity used.
Discharge decreased downstream node Id= B-4 Previous intensity used.
Discharge decreased downstream node Id= B-2 Previous intensity used.
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# 29
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 7
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# 6
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 5

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= B-11 Previous intensity used.
Discharge decreased downstream node Id= B-4 Previous intensity used.
Discharge decreased downstream node Id= B-2 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= B-30a
Computed left ponded width exceeds allowable width at inlet Id= B-30a
Capacity of sag inlet exceeded at inlet Id= B-30a
Computed right ponded width exceeds allowable width at inlet Id= B-30b
Computed left ponded width exceeds allowable width at inlet Id= B-30b
Capacity of sag inlet exceeded at inlet Id= B-30b
Computed right ponded width exceeds allowable width at inlet Id= B-31a
Computed left ponded width exceeds allowable width at inlet Id= B-31a
Computed right ponded width exceeds allowable width at inlet Id= B-32a
Computed left ponded width exceeds allowable width at inlet Id= B-32a
Capacity of sag inlet exceeded at inlet Id= B-32a
Computed right ponded width exceeds allowable width at inlet Id= B-32b
Computed left ponded width exceeds allowable width at inlet Id= B-32b
Capacity of sag inlet exceeded at inlet Id= B-32b
Run# 21 Insufficient capacity.
Run# 27 Insufficient capacity.
Run# 20 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-30a Run # 40
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-30a Run # 40
Upstream HGL exceeds critical elevation (Design) at node Id= B-30b Run # 41
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-30b Run # 41
Run# 19 Insufficient capacity.
Run# 28 Insufficient capacity.
Run# 18 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-31a Run # 42
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31a Run # 42
Upstream HGL exceeds critical elevation (Design) at node Id= B-31b Run # 43
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31b Run # 43
Upstream HGL exceeds critical elevation (Design) at node Id= B-31c Run # 44
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31c Run # 44
Run# 29 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-32 Run # 29
Run# 17 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-7 Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7 Run # 17
Upstream HGL exceeds critical elevation (Design) at node Id= B-32a Run # 45
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-32a Run # 45
Upstream HGL exceeds critical elevation (Design) at node Id= B-32b Run # 46
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-32b Run # 46
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-17 Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-17 Run # 7
Run# 16 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-8 Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8 Run # 16
Upstream HGL exceeds critical elevation (Design) at node Id= B-26 Run # 23
Run# 24 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-27 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-27 Run # 24
Run# 25 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-28 Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-28 Run # 25
Run# 26 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-29 Run # 26
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-29 Run # 26
Run# 15 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-9 Run # 15
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9 Run # 15
Run# 14 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-10 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-10 Run # 14
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-11 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-11 Run # 13
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-12 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12 Run # 12
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-18 Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-18 Run # 6
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-13 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13 Run # 11
Run# 30 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-24 Run # 30
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-24 Run # 30
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-14 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14 Run # 10
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-19 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-19 Run # 5
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-15 Run # 9
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-15 Run # 9
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-16 Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-16 Run # 8

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAINAGE\I-K STORM SYS B 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 30 OF 131

PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/30/2009 1:05:53 PM

PROJECT NAME : NSR 451
JOB NUMBER : 001
PROJECT DESCRIPTION : SYSTEM B - PROPOSED
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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-3	0.55	9.25	19.05	19.05	3.88	0.000	19.732
B-29	0.55	11.36	18.71	18.71	3.91	0.000	24.429
B-9	0.55	2.53	14.00	14.00	4.41	0.000	6.137
B-10	0.55	3.14	13.33	13.33	4.49	0.000	7.760
B-12	0.55	1.14	12.83	12.83	4.56	0.000	2.858
B-13	0.55	5.42	15.12	15.12	4.28	0.000	12.756
B-28	0.55	5.90	17.26	17.26	4.05	0.000	13.143
B-27	0.55	5.87	17.26	17.26	4.05	0.000	13.076
B-26	0.55	4.08	17.26	17.26	4.05	0.000	9.089
B-30a	0.55	2.13	18.76	18.76	3.91	0.000	4.575
B-30b	0.55	2.00	18.76	18.76	3.91	0.000	4.296
B-31a	0.55	1.54	14.05	14.05	4.40	0.000	3.731
B-31b	0.55	1.54	22.02	22.02	3.63	0.000	3.071
B-31c	0.55	1.54	22.02	22.02	3.63	0.000	3.071
B-14	0.55	2.47	14.83	14.83	4.31	0.000	5.858
B-15	0.55	5.74	14.67	14.67	4.33	0.000	13.672
B-16	0.55	10.31	19.21	19.21	3.86	0.000	21.910
B-17	0.55	6.54	17.62	17.62	4.01	0.000	14.439
B-18	0.55	7.83	15.10	15.10	4.28	0.000	18.437
B-19	0.55	11.37	20.71	20.71	3.73	0.000	23.343
B-24	0.55	3.42	14.00	14.00	4.41	0.000	8.296
B-32a	0.55	2.59	16.40	16.40	4.14	0.000	5.896
B-32b	0.55	2.60	15.33	15.33	4.26	0.000	6.085

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)
B-30a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-30b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31c	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

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)	Ponded Right (ft)	Width
B-30a	Curb	5.00	n/a	n/a	4.575	7.601	0.366	10.65	10.65	
B-30b	Curb	5.00	n/a	n/a	4.296	7.601	0.352	10.40	10.40	
B-31a	Curb	5.00	n/a	n/a	3.731	7.601	0.327	9.85	9.85	
B-31b	Curb	5.00	n/a	n/a	3.071	7.601	0.302	9.15	9.15	
B-31c	Curb	5.00	n/a	n/a	3.071	7.601	0.302	9.15	9.15	
B-32a	Curb	5.00	n/a	n/a	5.896	7.601	0.443	11.70	11.70	
B-32b	Curb	5.00	n/a	n/a	6.085	7.601	0.455	11.85	11.85	

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-5	CrcMh	0.550	96.93	25.71	3.36		0.00	179.055
B-6	CrcMh	0.550	92.31	25.63	3.36		0.00	170.774
B-7	CrcMh	0.550	87.12	24.78	3.42		0.00	163.947
B-8	CrcMh	0.550	80.58	24.01	3.48		0.00	154.051
B-9	CrcMh	0.550	53.37	23.95	3.48		0.00	102.176
B-10	CrcMh	0.550	50.84	22.50	3.59		0.00	100.338
B-11	CrcMh	0.550	47.70	22.25	3.61		0.00	94.666
B-12	CrcMh	0.550	47.70	22.25	3.61		0.00	94.666
B-13	CrcMh	0.550	35.31	21.60	3.66		0.00	71.067
B-30	CrcMh	0.550	4.13	18.86	3.90		0.00	8.849
B-29	CrcMh	0.550	11.36	18.71	3.91		0.00	24.429
B-28	CrcMh	0.550	17.26	19.58	3.83		0.00	36.367
B-27	CrcMh	0.550	23.13	20.45	3.75		0.00	47.764
B-26	CrcMh	0.550	27.21	21.16	3.70		0.00	55.303
B-31	CrcMh	0.550	4.62	22.17	3.61		0.00	9.184
B-32	CrcMh	0.550	5.19	16.43	4.14		0.00	11.805
B-30a	Curb	0.550	2.13	18.76	3.91		0.00	4.575
B-30b	Curb	0.550	2.00	18.76	3.91		0.00	4.296
B-31a	Curb	0.550	1.54	14.05	4.40		0.00	3.731
B-31b	Curb	0.550	1.54	22.02	3.63		0.00	3.071
B-14	CrcMh	0.550	29.89	20.83	3.72		0.00	61.198
B-15	CrcMh	0.550	16.05	20.06	3.79		0.00	33.445
B-16	CrcMh	0.550	10.31	19.21	3.86		0.00	21.910
B-17	CrcMh	0.550	6.54	17.62	4.01		0.00	14.439
B-18	CrcMh	0.550	11.25	15.10	4.28		0.00	26.490
B-19	CrcMh	0.550	11.37	20.71	3.73		0.00	23.343
B-24	CrcMh	0.550	3.42	14.00	4.41		0.00	8.296
B-2	CrcMh	0.550	110.31	26.15	3.33		0.00	202.011
B-3	CrcMh	0.550	110.31	26.15	3.33		0.00	202.011
B-4	CrcMh	0.550	96.93	25.71	3.36		0.00	179.055
B-31c	Curb	0.550	1.54	22.02	3.63		0.00	3.071
B-32a	Curb	0.550	2.59	16.40	4.14		0.00	5.896
B-32b	Curb	0.550	2.60	15.33	4.26		0.00	6.085
OUT	Outlt	0.550	110.31	26.15	3.33		0.00	202.011

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
25	B-28	B-27	45.13	44.67	Cir 1	0.00	3.50	260.0	0.177	0.013
26	B-29	B-28	45.62	45.13	Cir 1	0.00	3.00	245.0	0.200	0.013
27	B-30	B-3	42.52	42.00	Cir 1	0.00	2.00	265.0	0.196	0.013
28	B-31	B-5	41.77	41.09	Cir 1	0.00	2.00	340.0	0.200	0.013
29	B-32	B-6	41.64	40.50	Cir 1	0.00	2.00	400.0	0.285	0.013
5	B-19	B-14	39.40	39.23	Cir 1	0.00	2.50	32.0	0.531	0.013
6	B-18	B-12	37.51	37.37	Cir 1	0.00	2.50	27.0	0.519	0.013
7	B-17	B-7	41.50	39.66	Cir 1	0.00	2.00	420.0	0.438	0.013
8	B-16	B-15	44.65	43.90	Cir 1	0.00	2.50	260.0	0.288	0.013
9	B-15	B-14	34.61	33.80	Cir 1	0.00	3.00	272.0	0.298	0.013
10	B-14	B-13	33.80	33.29	Cir 1	0.00	4.00	265.0	0.192	0.013
11	B-13	B-12	33.29	32.66	Cir 1	0.00	4.00	252.0	0.250	0.013
12	B-12	B-11	32.66	32.09	Cir 1	0.00	4.50	232.0	0.246	0.013
13	B-11	B-10	32.09	31.84	Cir 1	0.00	4.50	106.0	0.236	0.013
14	B-10	B-9	31.84	30.24	Cir 1	0.00	4.50	619.0	0.258	0.013
15	B-9	B-8	30.24	30.15	Cir 1	0.00	4.50	31.0	0.290	0.013
16	B-8	B-7	30.15	29.75	Cir 1	0.00	6.00	292.0	0.137	0.013
17	B-7	B-6	29.75	29.22	Cir 1	0.00	6.00	343.0	0.155	0.013
18	B-6	B-5	29.22	29.19	Cir 1	0.00	6.50	27.0	0.111	0.013
19	B-5	B-4	29.19	28.93	Cir 1	0.00	6.50	218.0	0.119	0.013
30	B-24	B-18	38.52	37.50	Cir 1	0.00	2.00	220.0	0.464	0.013
20	B-4	B-3	28.93	28.73	Cir 1	0.00	6.50	165.0	0.121	0.013
21	B-3	B-2	28.73	28.64	Cir 1	0.00	6.50	56.0	0.161	0.013
22	B-2	OUT	28.64	24.00	Cir 1	0.00	6.50	103.0	4.509	0.013
23	B-26	B-8	44.13	43.90	Cir 1	0.00	3.50	17.0	1.353	0.013
24	B-27	B-26	44.67	44.13	Cir 1	0.00	3.50	240.0	0.225	0.013
40	B-30a	B-30	42.64	42.59	Cir 1	0.00	2.00	21.0	0.238	0.013
41	B-30b	B-30	42.64	42.59	Cir 1	0.00	2.00	7.0	0.714	0.013
42	B-31a	B-31	42.38	42.32	Cir 1	0.00	2.00	20.0	0.300	0.013
43	B-31b	B-31	42.34	42.32	Cir 1	0.00	2.00	20.0	0.100	0.013
44	B-31c	B-31	42.34	42.32	Cir 1	0.00	2.00	7.0	0.286	0.013
45	B-32a	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
46	B-32b	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013

Conveyance Hydraulic Computations. Tailwater = 30.500 (ft)

Run #	Hyd. Gr.line US (ft)	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)
25	47.63	47.54	53.00	0.130	2.50	2.87	4.94	4.31	36.4	42.5	0.000
26	47.68	47.63	53.00	0.133	2.06	2.50	4.71	3.88	24.4	30.0	0.000
27	44.10	44.00	46.40	0.152	1.46	2.00	3.60	2.82	8.8	10.1	0.000
28	43.26	43.09	46.38	0.163	1.49	2.00	3.65	2.92	9.2	10.2	0.000
29	43.24	42.50	46.87	0.270	1.60	2.00	4.38	3.76	11.8	12.1	0.000
5	41.80	41.73	49.00	0.321	1.66	2.50	6.73	4.76	23.3	30.0	0.000
6	39.89	39.87	48.50	0.414	1.85	2.50	6.81	5.40	26.5	29.7	0.000
7	43.08	41.66	48.50	0.404	1.58	2.00	5.43	4.60	14.4	15.0	0.000
8	46.69	46.40	48.50	0.283	2.04	2.50	5.12	4.46	21.9	22.1	0.000
9	37.03	36.97	48.50	0.249	2.26	3.00	5.85	4.73	33.4	36.6	0.000
10	36.97	36.52	48.50	0.180	3.17	3.23	5.73	5.62	61.2	63.3	0.000
11	36.52	36.24	48.50	0.243	3.23	3.58	6.53	5.99	71.1	72.1	0.000
12	36.24	35.75	48.50	0.230	3.58	3.66	6.98	6.84	94.7	97.9	0.000
13	35.75	35.55	48.50	0.230	3.66	3.71	6.84	6.75	94.7	95.9	0.000
14	35.55	34.99	48.50	0.258	3.71	4.50	7.16	6.31	100.3	100.4	0.000
15	34.99	34.98	48.50	0.268	3.55	4.50	7.59	6.42	102.2	106.4	0.000
16	34.98	34.58	48.50	0.131	4.83	4.83	6.32	6.32	154.1	157.4	0.000
17	34.58	34.40	48.50	0.149	4.83	5.18	6.72	6.32	163.9	167.2	0.000
18	34.40	34.40	48.50	0.105	5.18	5.21	6.02	5.99	170.8	175.5	0.000
19	34.40	33.75	48.42	0.116	5.28	5.28	6.20	6.20	179.1	181.8	0.000
30	40.62	39.89	52.00	0.133	1.04	2.00	5.00	2.64	8.3	15.5	0.000
20	33.75	33.13	48.00	0.116	5.23	5.23	6.26	6.26	179.1	183.3	0.000
21	33.13	32.43	48.00	0.147	5.13	5.13	7.19	7.19	202.0	211.1	0.000
22*	32.43	30.50	48.00	0.147	1.87	6.50	25.48	6.09	202.0	1118.1	0.000
23*	47.45	47.40	52.00	0.300	1.69	3.50	11.99	8.14	55.3	117.5	0.000
24	47.54	47.45	52.00	0.223	2.87	3.32	5.65	5.06	47.8	47.9	0.000
40	44.14	44.10	45.90	0.041	0.90	1.51	3.34	1.80	4.6	11.1	0.000
41*	44.10	44.10	45.90	0.036	0.64	1.51	4.91	4.16	4.3	19.2	0.000
42	43.28	43.26	46.23	0.027	0.75	0.94	3.45	2.56	3.7	12.4	0.000
43	43.26	43.26	46.23	0.018	0.91	0.94	2.20	2.11	3.1	7.2	0.000
44	43.28	43.26	46.23	0.018	0.69	0.94	3.21	2.11	3.1	12.1	0.000
45*	43.43	43.24	46.62	0.067	0.46	1.64	10.66	2.14	5.9	50.1	0.000
46*	43.44	43.24	46.62	0.072	0.47	1.64	10.75	2.21	6.1	50.1	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	3.5	0.0	3	517.0
Circular	Concrete	3.0	0.0	2	517.0
Circular	Concrete	2.0	0.0	12	1760.0
Circular	Concrete	2.5	0.0	3	319.0
Circular	Concrete	4.0	0.0	2	517.0
Circular	Concrete	4.5	0.0	4	988.0
Circular	Concrete	6.0	0.0	2	635.0
Circular	Concrete	6.5	0.0	5	569.0

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	26
Curb In Sag		5.0	0.0	0.0	0.0	0.0	7
Outlet		0.0	0.0	0.0	0.0	0.0	1

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAINAGE\1-H STM SYS B PR 2 YR.dgn
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 31 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — LICENSE NUMBER — HOUSTON, TEXAS

No.	Date	Revisions	App.

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
B-3	0.55	9.25	19.05	19.05	7.76	0.000	39.483
B-29	0.55	11.36	18.71	18.71	7.81	0.000	48.794
B-9	0.55	2.53	14.00	14.00	8.57	0.000	11.923
B-10	0.55	3.14	13.33	13.33	8.69	0.000	15.008
B-12	0.55	1.14	12.83	12.83	8.78	0.000	5.508
B-13	0.55	5.42	15.12	15.12	8.37	0.000	24.958
B-28	0.55	5.90	17.26	17.26	8.03	0.000	26.044
B-27	0.55	5.87	17.26	17.26	8.03	0.000	25.912
B-26	0.55	4.08	17.26	17.26	8.03	0.000	18.010
B-30a	0.55	2.13	18.76	18.76	7.80	0.000	9.140
B-30b	0.55	2.00	18.76	18.76	7.80	0.000	8.583
B-31a	0.55	1.54	14.05	14.05	8.56	0.000	7.250
B-31b	0.55	1.54	22.02	22.02	7.36	0.000	6.236
B-31c	0.55	1.54	22.02	22.02	7.36	0.000	6.236
B-14	0.55	2.47	14.83	14.83	8.42	0.000	11.441
B-15	0.55	5.74	14.67	14.67	8.45	0.000	26.676
B-16	0.55	10.31	19.21	19.21	7.74	0.000	43.878
B-17	0.55	6.54	17.62	17.62	7.97	0.000	28.672
B-18	0.55	7.83	15.10	15.10	8.38	0.000	36.071
B-19	0.55	11.37	20.71	20.71	7.53	0.000	47.103
B-24	0.55	3.42	14.00	14.00	8.57	0.000	16.117
B-32a	0.55	2.59	16.40	16.40	8.16	0.000	11.626
B-32b	0.55	2.60	15.33	15.33	8.34	0.000	11.922

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)
B-30a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-30b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-31c	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32a	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
B-32b	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

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-30a	Curb	5.00	n/a	n/a	9.140	7.601	0.713	13.80	13.80
B-30b	Curb	5.00	n/a	n/a	8.583	7.601	0.658	13.50	13.50
B-31a	Curb	5.00	n/a	n/a	7.250	7.601	0.541	12.65	12.65
B-31b	Curb	5.00	n/a	n/a	6.236	7.601	0.465	11.95	11.95
B-31c	Curb	5.00	n/a	n/a	6.236	7.601	0.465	11.95	11.95
B-32a	Curb	5.00	n/a	n/a	11.626	7.601	0.999	15.10	15.10
B-32b	Curb	5.00	n/a	n/a	11.922	7.601	1.037	15.25	15.25

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)
B-5	CrcMh	0.550	96.93	23.49	7.18		0.00	382.953
B-6	CrcMh	0.550	92.31	23.45	7.19		0.00	364.948
B-7	CrcMh	0.550	87.12	22.98	7.24		0.00	347.112
B-8	CrcMh	0.550	80.58	22.55	7.30		0.00	323.362
B-9	CrcMh	0.550	53.37	22.52	7.30		0.00	214.309
B-10	CrcMh	0.550	50.84	21.72	7.40		0.00	206.933
B-11	CrcMh	0.550	47.70	21.58	7.42		0.00	194.637
B-12	CrcMh	0.550	47.70	21.58	7.42		0.00	194.637
B-13	CrcMh	0.550	35.31	21.21	7.47		0.00	144.994
B-30	CrcMh	0.550	4.13	18.85	7.79		0.00	17.694
B-29	CrcMh	0.550	11.36	18.71	7.81		0.00	48.794
B-28	CrcMh	0.550	17.26	19.30	7.73		0.00	73.334
B-27	CrcMh	0.550	23.13	19.87	7.65		0.00	97.268
B-26	CrcMh	0.550	27.21	20.27	7.59		0.00	113.617
B-31	CrcMh	0.550	4.62	22.15	7.35		0.00	18.667
B-32	CrcMh	0.550	5.19	16.43	8.16		0.00	23.284
B-30a	Curb	0.550	2.13	18.76	7.80		0.00	9.140
B-30b	Curb	0.550	2.00	18.76	7.80		0.00	8.583
B-31a	Curb	0.550	1.54	14.05	8.56		0.00	7.250
B-31b	Curb	0.550	1.54	22.02	7.36		0.00	6.236
B-14	CrcMh	0.550	29.89	20.77	7.52		0.00	123.706
B-15	CrcMh	0.550	16.05	19.69	7.67		0.00	67.708
B-16	CrcMh	0.550	10.31	19.21	7.74		0.00	43.878
B-17	CrcMh	0.550	6.54	17.62	7.97		0.00	28.672
B-18	CrcMh	0.550	11.25	15.10	8.38		0.00	51.825
B-19	CrcMh	0.550	11.37	20.71	7.53		0.00	47.103
B-24	CrcMh	0.550	3.42	14.00	8.57		0.00	16.117
B-2	CrcMh	0.550	110.31	23.72	7.16		0.00	434.103
B-3	CrcMh	0.550	110.31	23.72	7.16		0.00	434.103
B-4	CrcMh	0.550	96.93	23.49	7.18		0.00	382.953
B-31c	Curb	0.550	1.54	22.02	7.36		0.00	6.236
B-32a	Curb	0.550	2.59	16.40	8.16		0.00	11.626
B-32b	Curb	0.550	2.60	15.33	8.34		0.00	11.922
OUT	Outlt	0.550	110.31	23.72	7.16		0.00	434.103

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
25	B-28	B-27	45.13	44.67	Cir 1	0.00	3.50	260.0	0.177	0.013
26	B-29	B-28	45.62	45.13	Cir 1	0.00	3.00	245.0	0.200	0.013
27	B-30	B-3	42.52	42.00	Cir 1	0.00	2.00	265.0	0.196	0.013
28	B-31	B-5	41.77	41.09	Cir 1	0.00	2.00	340.0	0.200	0.013
29	B-32	B-6	41.64	40.50	Cir 1	0.00	2.00	400.0	0.285	0.013
5	B-19	B-14	39.40	39.23	Cir 1	0.00	2.50	32.0	0.531	0.013
6	B-18	B-12	37.51	37.37	Cir 1	0.00	2.50	27.0	0.519	0.013
7	B-17	B-7	41.50	39.66	Cir 1	0.00	2.00	420.0	0.438	0.013
8	B-16	B-15	44.65	43.90	Cir 1	0.00	2.50	260.0	0.288	0.013
9	B-15	B-14	34.61	33.80	Cir 1	0.00	3.00	272.0	0.298	0.013
10	B-14	B-13	33.80	33.29	Cir 1	0.00	4.00	265.0	0.192	0.013
11	B-13	B-12	33.29	32.66	Cir 1	0.00	4.00	252.0	0.250	0.013
12	B-12	B-11	32.66	32.09	Cir 1	0.00	4.50	232.0	0.246	0.013
13	B-11	B-10	32.09	31.84	Cir 1	0.00	4.50	106.0	0.236	0.013
14	B-10	B-9	31.84	30.24	Cir 1	0.00	4.50	619.0	0.258	0.013
15	B-9	B-8	30.24	30.15	Cir 1	0.00	4.50	31.0	0.290	0.013
16	B-8	B-7	30.15	29.75	Cir 1	0.00	6.00	292.0	0.137	0.013
17	B-7	B-6	29.75	29.22	Cir 1	0.00	6.00	343.0	0.155	0.013
18	B-6	B-5	29.22	29.19	Cir 1	0.00	6.50	27.0	0.111	0.013
19	B-5	B-4	29.19	28.93	Cir 1	0.00	6.50	218.0	0.119	0.013
30	B-24	B-18	38.52	37.50	Cir 1	0.00	2.00	220.0	0.464	0.013
20	B-4	B-3	28.93	28.73	Cir 1	0.00	6.50	165.0	0.121	0.013
21	B-3	B-2	28.73	28.64	Cir 1	0.00	6.50	56.0	0.161	0.013
22	B-2	OUT	28.64	24.00	Cir 1	0.00	6.50	103.0	4.509	0.013
23	B-26	B-8	44.13	43.90	Cir 1	0.00	3.50	17.0	1.353	0.013
24	B-27	B-26	44.67	44.13	Cir 1	0.00	3.50	240.0	0.225	0.013
40	B-30a	B-30	42.64	42.59	Cir 1	0.00	2.00	21.0	0.238	0.013
41	B-30b	B-30	42.64	42.59	Cir 1	0.00	2.00	7.0	0.714	0.013
42	B-31a	B-31	42.38	42.32	Cir 1	0.00	2.00	20.0	0.300	0.013
43	B-31b	B-31	42.34	42.32	Cir 1	0.00	2.00	20.0	0.100	0.013
44	B-31c	B-31	42.34	42.32	Cir 1	0.00	2.00	7.0	0.286	0.013
45	B-32a	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013
46	B-32b	B-32	42.57	41.60	Cir 1	0.00	2.00	20.0	4.856	0.013

Conveyance Hydraulic Computations. Tailwater = 44.800 (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)
25	55.82	54.45	54.00	0.527	3.50	3.50	7.62	7.62	73.3	42.5	0.000
26	57.12	55.82	54.00	0.531	3.00	3.00	6.90	6.90	48.8	30.0	0.000
27	47.49	45.88	47.89	0.607	2.00	2.00	5.63	5.63	17.7	10.1	0.000
28	50.20	47.91	48.69	0.675	2.00	2.00	5.94	5.94	18.7	10.2	0.000
29	52.24	48.04	48.09	1.050	2.00	2.00	7.41	7.41	23.3	12.1	0.000
5	67.37	66.95	50.00	1.308	2.50	2.50	9.60	9.60	47.1	30.0	0.000
6	62.88	62.45	49.50	1.583	2.50	2.50	10.56	10.56	51.8	29.7	0.000
7	57.01	50.32	49.50	1.593	2.00	2.00	9.13	9.13	28.7	15.0	0.000
8	72.68	69.73	49.50	1.135	2.50	2.50	8.94	8.94	43.9	22.1	0.000
9	69.73	66.95	49.50	1.022	3.00	3.00	9.58	9.58	67.7	36.6	0.000
10	66.95	65.00	49.50	0.735	4.00	4.00	9.84	9.84	123.7	63.3	0.000
11	65.00	62.45	49.50	1.010	4.00	4.00	11.54	11.54	145.0	72.1	0.000
12	62.45	60.20	49.50	0.971	4.50	4.50	12.24	12.24	194.6	97.9	0.000
13	60.20	59.17	49.50	0.971	4.50	4.50	12.24	12.24	194.6	95.9	0.000
14	59.17	52.37	49.50	1.098	4.50	4.50	13.01	13.01	206.9	100.4	0.000
15	52.37	52.01	49.50	1.178	4.50	4.50	13.47	13.47	214.3	106.4	0.000
16	52.01	50.32	49.50	0.578	6.00	6.00	11.44	11.44	323.4	157.4	0.000
17	50.32	48.04	49.50	0.666	6.00	6.00	12.28	12.28	347.1	167.2	0.000
18	48.04	47.91	49.50	0.480	6.50	6.50	11.00	11.00	364.9	175.5	0.000
19	47.91	46.75	49.42	0.529	6.50	6.50	11.54	11.54	383.0	181.8	0.000
30	63.99	62.88	53.00	0.503	1.74	2.00	5.56	5.13	16.1	15.5	0.000
20	46.75	45.88	49.00	0.529	6.50	6.50	11.54	11.54	383.0	183.3	0.000
21	45.88	45.50	49.00	0.680	6.50	6.50	13.08	13.08	434.1	211.1	0.000
22*	45.50	44.80	49.00	0.680	2.82	6.50	31.47	14.44	434.1	1118.1	0.000
23*	52.22	52.01	53.00	1.264	2.78	3.50	13.86	12.32	113.6	117.5	0.000
24	54.45	52.22	53.00	0.927	3.50	3.50	10.11	10.11	97.3	47.9	0.000
40	47.51	47.49	47.89	0.162	1.39	2.00	3.93	2.91	9.1	11.1	0.000
41*	47.50	47.49	47.89	0.143	0.94	2.00	5.92	5.17	8.6	19.2	0.000
42	50.24	50.20	48.69	0.102	1.10	2.00	4.10	2.31	7.2	12.4	0.000
43	50.21	50.20	48.69	0.075	1.45	2.00	2.57	1.99	6.2	7.2	0.000
44	50.22	50.20	48.69	0.075	1.02	2.00	3.87	1.99	6.2	12.1	0.000
45*	52.29	52.24	48.09	0.262	0.66	2.00	12.94	5.77	11.6	50.1	0.000
46*	52.29	52.24	48.09	0.275	0.67	2.00	13.03	5.83	11.9	50.1	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.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
n/a DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
PROPOSED 2–YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: K:\City of Houston\2006-05_NSR 451\DRAWINGS\L-N STM SYS B PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 32 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	3.5	0.0	3	517.0
Circular	Concrete	3.0	0.0	2	517.0
Circular	Concrete	2.0	0.0	12	1760.0
Circular	Concrete	2.5	0.0	3	319.0
Circular	Concrete	4.0	0.0	2	517.0
Circular	Concrete	4.5	0.0	4	988.0
Circular	Concrete	6.0	0.0	2	635.0
Circular	Concrete	6.5	0.0	5	569.0

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	26
Curb In Sag		5.0	0.0	0.0	0.0	0.0	7
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-11 Previous intensity used.
Discharge decreased downstream node Id= B-4 Previous intensity used.
Discharge decreased downstream node Id= B-2 Previous intensity used.
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# 29
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 7
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# 6
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 5
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 8

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= B-11 Previous intensity used.
Discharge decreased downstream node Id= B-4 Previous intensity used.
Discharge decreased downstream node Id= B-2 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= B-30a
Computed left ponded width exceeds allowable width at inlet Id= B-30a
Capacity of sag inlet exceeded at inlet Id= B-30a
Computed right ponded width exceeds allowable width at inlet Id= B-30b
Computed left ponded width exceeds allowable width at inlet Id= B-30b
Capacity of sag inlet exceeded at inlet Id= B-30b
Computed right ponded width exceeds allowable width at inlet Id= B-31a
Computed left ponded width exceeds allowable width at inlet Id= B-31a
Computed right ponded width exceeds allowable width at inlet Id= B-32a
Computed left ponded width exceeds allowable width at inlet Id= B-32a
Capacity of sag inlet exceeded at inlet Id= B-32a
Computed right ponded width exceeds allowable width at inlet Id= B-32b
Computed left ponded width exceeds allowable width at inlet Id= B-32b
Capacity of sag inlet exceeded at inlet Id= B-32b
Run# 21 Insufficient capacity.
Run# 27 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-30 Run # 27
Run# 20 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-30a Run # 40
Upstream HGL exceeds critical elevation (Design) at node Id= B-30b Run # 41
Run# 19 Insufficient capacity.
Run# 28 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-31 Run # 28
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31 Run # 28
Run# 18 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-31a Run # 42
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31a Run # 42
Upstream HGL exceeds critical elevation (Design) at node Id= B-31b Run # 43
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31b Run # 43
Upstream HGL exceeds critical elevation (Design) at node Id= B-31c Run # 44
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-31c Run # 44
Run# 29 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-32 Run # 29
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-32 Run # 29
Run# 17 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-7 Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-7 Run # 17
Upstream HGL exceeds critical elevation (Design) at node Id= B-32a Run # 45
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-32a Run # 45
Upstream HGL exceeds critical elevation (Design) at node Id= B-32b Run # 46
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-32b Run # 46
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-17 Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-17 Run # 7
Run# 16 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-8 Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-8 Run # 16
Upstream HGL exceeds critical elevation (Design) at node Id= B-26 Run # 23
Run# 24 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-27 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-27 Run # 24
Run# 25 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-28 Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-28 Run # 25
Run# 26 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-29 Run # 26
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-29 Run # 26
Run# 15 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-9 Run # 15
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-9 Run # 15
Run# 14 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-10 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-10 Run # 14
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-11 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-11 Run # 13
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-12 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-12 Run # 12
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-18 Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-18 Run # 6
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-13 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-13 Run # 11
Run# 30 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-24 Run # 30
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-24 Run # 30
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-14 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-14 Run # 10
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-19 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-19 Run # 5
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-15 Run # 9
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-15 Run # 9
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B-16 Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= B-16 Run # 8

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
n/a DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM B
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\L-H STM SYS B PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 33 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 2/3/2009 11:04:59 AM

PROJECT NAME : NSR 451 - COH
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM C - EXISTING
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
C3-B	0.55	2.08	17.02	17.02	4.07	0.000	4.661
C3-C	0.55	2.08	17.02	17.02	4.07	0.000	4.661
C5-A	0.55	0.72	15.36	15.36	4.25	0.000	1.684
C5-B	0.55	1.79	16.67	16.67	4.11	0.000	4.047
C5-C	0.55	1.54	17.26	17.26	4.05	0.000	3.431
C6-A	0.55	0.96	18.93	18.93	3.89	0.000	2.054
C6-B	0.55	2.00	21.43	21.43	3.67	0.000	4.041
C1-A	0.55	1.35	14.29	14.29	4.38	0.000	3.249
C1-B	0.55	2.11	14.07	14.07	4.40	0.000	5.109
C1-C	0.55	1.83	12.71	12.71	4.57	0.000	4.603
C2-A	0.55	1.20	14.29	14.29	4.38	0.000	2.888
C2-B	0.55	2.05	17.86	17.86	3.99	0.000	4.500
C2-C	0.55	1.73	17.86	17.86	3.99	0.000	3.797
C3-A	0.55	0.66	13.79	13.79	4.44	0.000	1.610

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)
C2-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C2-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C3-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C3-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C3-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C5-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C5-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C6-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C6-B	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C1-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C2-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
C2-B	Curb	5.00	n/a	n/a	4.500	7.601	0.362	11.65	10.60
C2-C	Curb	5.00	n/a	n/a	3.797	7.601	0.330	9.95	10.95
C3-A	Curb	5.00	n/a	n/a	1.610	7.601	0.264	7.20	7.20
C3-B	Curb	5.00	n/a	n/a	4.661	7.601	0.370	11.80	10.70
C3-C	Curb	5.00	n/a	n/a	4.661	7.601	0.370	10.70	11.80
C5-A	Curb	5.00	n/a	n/a	1.684	7.601	0.266	7.30	7.30
C5-B	Curb	5.00	n/a	n/a	4.047	7.601	0.341	11.20	10.15
C5-C	Curb	5.00	n/a	n/a	3.431	7.601	0.315	9.55	10.50
C6-A	Curb	5.00	n/a	n/a	2.054	7.601	0.273	7.90	7.90
C6-B	Curb	5.00	n/a	n/a	4.041	7.601	0.340	10.15	10.15
C1-A	Curb	5.00	n/a	n/a	3.249	7.601	0.308	9.35	9.35
C1-B	Curb	5.00	n/a	n/a	5.109	7.601	0.395	12.20	11.10
C1-C	Curb	5.00	n/a	n/a	4.603	7.601	0.367	10.65	11.75
C2-A	Curb	5.00	n/a	n/a	2.888	7.601	0.296	8.95	8.95

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)
C2-B	Curb	0.550	3.78	17.91	3.99		0.00	8.287
C2-C	Curb	0.550	1.73	17.86	3.99		0.00	3.797
C3-A	Curb	0.550	0.66	13.79	4.44		0.00	1.610
C3-B	Curb	0.550	4.16	17.10	4.07		0.00	9.303
C3-C	Curb	0.550	2.08	17.02	4.07		0.00	4.661
C5-A	Curb	0.550	0.72	15.36	4.25		0.00	1.684
C5-B	Curb	0.550	1.79	16.67	4.11		0.00	4.047
C5-C	Curb	0.550	3.33	17.26	4.05		0.00	7.418
C6-A	Curb	0.550	0.96	18.93	3.89		0.00	2.054
C1-1	CrcMh	0.550	5.29	14.52	4.35		0.00	12.651
C2-1	CrcMh	0.550	10.27	18.02	3.98		0.00	22.457
C3-1	CrcMh	0.550	15.09	18.56	3.92		0.00	32.567
C4-1	CrcMh	0.550	22.10	22.49	3.59		0.00	43.632
C5-1	CrcMh	0.550	4.05	17.36	4.04		0.00	8.999
C6-B	Curb	0.550	2.96	21.43	3.67		0.00	5.980
C1-A	Curb	0.550	1.35	14.29	4.38		0.00	3.249
C1-B	Curb	0.550	3.94	14.07	4.40		0.00	9.539
C1-C	Curb	0.550	1.83	12.71	4.57		0.00	4.603
C2-A	Curb	0.550	1.20	14.29	4.38		0.00	2.888
OUT	Outlt	0.550	22.10	22.49	3.59		0.00	43.632

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
29	C6-A	C6-B	40.54	40.34	Cir 1	0.00	2.00	55.0	0.364	0.013
1	C1-1	C2-1	41.63	40.76	Cir 1	0.00	2.00	250.0	0.348	0.013
2	C2-1	C3-1	40.76	37.50	Cir 1	0.00	2.00	285.0	1.144	0.013
3	C3-1	C4-1	37.50	35.00	Cir 1	0.00	2.50	230.0	1.087	0.013
4	C4-1	OUT	35.00	22.33	Cir 1	0.00	2.50	150.0	8.477	0.013
5	C5-1	C4-1	40.65	40.00	Cir 1	0.00	2.00	190.0	0.342	0.013
6	C6-B	C4-1	40.34	40.00	Cir 1	0.00	2.00	200.0	0.170	0.013
10	C1-A	C1-1	41.71	41.63	Cir 1	0.00	1.50	40.0	0.200	0.013
12	C1-C	C1-B	42.50	42.00	Cir 1	0.00	1.50	25.0	2.000	0.013
16	C1-B	C1-1	42.00	41.43	Cir 1	0.00	1.50	54.0	1.056	0.013
17	C2-A	C2-1	43.00	40.85	Cir 1	0.00	1.50	35.0	6.154	0.013
19	C2-C	C2-B	43.12	42.28	Cir 1	0.00	1.50	25.0	3.362	0.013
20	C2-B	C2-1	42.28	40.76	Cir 1	0.00	1.50	60.0	2.534	0.013
21	C3-A	C3-1	43.00	40.57	Cir 1	0.00	1.50	35.0	6.960	0.013
23	C3-C	C3-B	43.33	43.16	Cir 1	0.00	1.50	25.0	0.680	0.013
24	C3-B	C3-1	43.11	40.57	Cir 1	0.00	1.50	59.0	4.309	0.013
25	C5-A	C5-1	43.00	40.85	Cir 1	0.00	2.00	35.0	6.154	0.013
27	C5-B	C5-C	43.32	42.36	Cir 1	0.00	1.50	25.0	3.843	0.013
28	C5-C	C5-1	42.26	40.65	Cir 1	0.00	1.50	58.0	2.777	0.013

Conveyance Hydraulic Computations. Tailwater = 24.830 (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. (ft/s)	Velocity Actual (ft/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
29	42.41	42.21	47.00	0.008	0.52	1.87	3.13	0.67	2.1	13.7	0.000
1	43.18	42.45	47.23	0.310	1.55	1.69	4.83	4.47	12.7	13.4	0.000
2*	42.45	39.44	46.96	0.977	1.52	1.94	8.75	7.21	22.5	24.3	0.000
3*	39.44	37.20	47.17	0.625	1.63	2.20	9.59	7.11	32.6	42.9	0.000
4*	37.20	24.83	46.75	1.122	1.05	2.50	22.43	8.89	43.6	119.9	0.000
5	42.36	42.00	46.75	0.157	1.21	2.00	4.53	2.86	9.0	13.3	0.000
6	42.21	42.00	48.20	0.069	1.16	2.00	3.15	1.90	6.0	9.4	0.000
10	43.23	43.18	46.66	0.095	0.92	1.50	2.87	1.84	3.2	4.7	0.000
12*	43.67	43.63	46.66	0.190	0.57	1.50	7.41	4.63	4.6	14.9	0.000
16*	43.63	43.18	46.66	0.818	1.10	1.50	6.90	5.40	9.5	10.8	0.000
17*	43.65	42.45	46.68	0.075	0.34	1.50	9.72	1.63	2.9	26.2	0.000
19*	43.86	43.40	46.62	0.130	0.45	1.12	8.48	2.70	3.8	19.3	0.000
20*	43.40	42.45	46.68	0.617	0.75	1.50	9.44	4.69	8.3	16.8	0.000
21*	43.48	42.07	46.26	0.023	0.25	1.50	8.54	0.91	1.6	27.8	0.000
23*	44.34	44.29	46.33	0.195	0.78	1.13	4.99	4.64	4.7	8.7	0.000
24*	44.29	42.07	46.30	0.778	0.68	1.50	11.85	5.26	9.3	21.9	0.000
25*	43.45	42.36	46.37	0.005	0.24	1.51	7.99	0.66	1.7	56.4	0.000
27*	44.09	43.32	46.37	0.147	0.45	0.96	9.05	3.41	4.0	20.7	0.000
28*	43.32	42.36	46.46	0.494	0.68	1.50	9.50	4.20	7.4	17.6	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	6	1015.0
Circular	Concrete	2.5	0.0	2	380.0
Circular	Concrete	1.5	0.0	11	441.0

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		5.0	0.0	0.0	0.0	0.0	14
Circular Manhole		0.0	0.0	0.0	0.0	0.0	5
Outlet		0.0	0.0	0.0	0.0	0.0	1

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
C3-B	0.55	2.08	17.02	17.02	8.06	0.000	9.224
C3-C	0.55	2.08	17.02	17.02	8.06	0.000	9.224
C5-A	0.55	0.72	15.36	15.36	8.33	0.000	3.299
C5-B	0.55	1.79	16.67	16.67	8.12	0.000	7.992
C5-C	0.55	1.54	17.26	17.26	8.03	0.000	6.798
C6-A	0.55	0.96	18.93	18.93	7.78	0.000	4.107
C6-B	0.55	2.00	21.43	21.43	7.44	0.000	8.182
C1-A	0.55	1.35	14.29	14.29	8.52	0.000	6.323
C1-B	0.55	2.11	14.07	14.07	8.56	0.000	9.929
C1-C	0.55	1.83	12.71	12.71	8.81	0.000	8.864
C2-A	0.55	1.20	14.29	14.29	8.52	0.000	5.621
C2-B	0.55	2.05	17.86	17.86	7.93	0.000	8.946
C2-C	0.55	1.73	17.86	17.86	7.93	0.000	7.550
C3-A	0.55	0.66	13.79	13.79	8.61	0.000	3.124

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)
C2-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C2-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C3-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C3-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C3-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C5-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C5-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C6-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C6-B	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C1-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C2-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57

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)
C2-B	Curb	5.00	n/a	n/a	8.946	7.601	0.693	15.05	13.70
C2-C	Curb	5.00	n/a	n/a	7.550	7.601	0.566	12.85	14.15
C3-A	Curb	5.00	n/a	n/a	3.124	7.601	0.304	9.25	9.25
C3-B	Curb	5.00	n/a	n/a	9.224	7.601	0.721	15.25	13.85
C3-C	Curb	5.00	n/a	n/a	9.224	7.601	0.721	13.85	15.25
C5-A	Curb	5.00	n/a	n/a	3.299	7.601	0.310	9.40	9.40
C5-B	Curb	5.00	n/a	n/a	7.992	7.601	0.604	14.45	13.10
C5-C	Curb	5.00	n/a	n/a	6.798	7.601	0.506	12.35	13.60
C6-A	Curb	5.00	n/a	n/a	4.107	7.601	0.343	10.20	10.20
C6-B	Curb	5.00	n/a	n/a	8.182	7.601	0.621	13.25	13.25
C1-A	Curb	5.00	n/a	n/a	6.323	7.601	0.471	12.00	12.00
C1-B	Curb	5.00	n/a	n/a	9.929	7.601	0.796	15.65	14.25
C1-C	Curb	5.00	n/a	n/a	8.864	7.601	0.685	13.65	15.00
C2-A	Curb	5.00	n/a	n/a	5.621	7.601	0.425	11.50	11.50

Revisions: No. | Date | Appd.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM C
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys C 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 34 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CITY ENGINEER
HOUSTON, TEXAS

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)
C2-B	Curb	0.550	3.78	17.90	7.93		0.00	16.484
C2-C	Curb	0.550	1.73	17.86	7.93		0.00	7.550
C3-A	Curb	0.550	0.66	13.79	8.61		0.00	3.124
C3-B	Curb	0.550	4.16	17.10	8.05		0.00	18.422
C3-C	Curb	0.550	2.08	17.02	8.06		0.00	9.224
C5-A	Curb	0.550	0.72	15.36	8.33		0.00	3.299
C5-B	Curb	0.550	1.79	16.67	8.12		0.00	7.992
C5-C	Curb	0.550	3.33	17.26	8.03		0.00	14.700
C6-A	Curb	0.550	0.96	18.93	7.78		0.00	4.107
C1-1	CrcMh	0.550	5.29	14.48	8.48		0.00	24.683
C2-1	CrcMh	0.550	10.27	17.99	7.91		0.00	44.707
C3-1	CrcMh	0.550	15.09	18.33	7.87		0.00	65.279
C4-1	CrcMh	0.550	22.10	22.29	7.33		0.00	89.076
C5-1	CrcMh	0.550	4.05	17.35	8.01		0.00	17.848
C6-B	Curb	0.550	2.96	21.43	7.44		0.00	12.109
C1-A	Curb	0.550	1.35	14.29	8.52		0.00	6.323
C1-B	Curb	0.550	3.94	14.07	8.56		0.00	18.540
C1-C	Curb	0.550	1.83	12.71	8.81		0.00	8.864
C2-A	Curb	0.550	1.20	14.29	8.52		0.00	5.621
OUT	Outlt	0.550	22.10	22.29	7.33		0.00	89.076

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
29	C6-A	C6-B	40.54	40.34	Cir 1	0.00	2.00	55.0	0.364	0.013
1	C1-1	C2-1	41.63	40.76	Cir 1	0.00	2.00	250.0	0.348	0.013
2	C2-1	C3-1	40.76	37.50	Cir 1	0.00	2.00	285.0	1.144	0.013
3	C3-1	C4-1	37.50	35.00	Cir 1	0.00	2.50	230.0	1.087	0.013
4	C4-1	OUT	35.00	22.33	Cir 1	0.00	2.50	150.0	8.477	0.013
5	C5-1	C4-1	40.65	40.00	Cir 1	0.00	2.00	190.0	0.342	0.013
6	C6-B	C4-1	40.34	40.00	Cir 1	0.00	2.00	200.0	0.170	0.013
10	C1-A	C1-1	41.71	41.63	Cir 1	0.00	1.50	40.0	0.200	0.013
12	C1-C	C1-B	42.50	42.00	Cir 1	0.00	1.50	25.0	2.000	0.013
16	C1-B	C1-1	42.00	41.43	Cir 1	0.00	1.50	54.0	1.056	0.013
17	C2-A	C2-1	43.00	40.85	Cir 1	0.00	1.50	35.0	6.154	0.013
19	C2-C	C2-B	43.12	42.28	Cir 1	0.00	1.50	25.0	3.362	0.013
20	C2-B	C2-1	42.28	40.76	Cir 1	0.00	1.50	60.0	2.534	0.013
21	C3-A	C3-1	43.00	40.57	Cir 1	0.00	1.50	35.0	6.960	0.013
23	C3-C	C3-B	43.33	43.16	Cir 1	0.00	1.50	25.0	0.680	0.013
24	C3-B	C3-1	43.11	40.57	Cir 1	0.00	1.50	59.0	4.309	0.013
25	C5-A	C5-1	43.00	40.85	Cir 1	0.00	2.00	35.0	6.154	0.013
27	C5-B	C5-C	43.32	42.36	Cir 1	0.00	1.50	25.0	3.843	0.013
28	C5-C	C5-1	42.26	40.65	Cir 1	0.00	1.50	58.0	2.777	0.013

Conveyance Hydraulic Computations. Tailwater = 44.100 (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)
29	51.87	51.68	48.00	0.033	0.75	2.00	3.80	1.31	4.1	13.7	0.000
1	70.88	67.93	48.23	1.180	2.00	2.00	7.86	7.86	24.7	13.4	0.000
2	67.93	56.89	47.96	3.872	2.00	2.00	14.23	14.23	44.7	24.3	0.000
3	56.89	51.11	48.17	2.511	2.50	2.50	13.30	13.30	65.3	42.9	0.000
4*	51.11	44.10	47.75	4.676	1.61	2.50	26.67	18.17	89.1	119.9	0.000
5	52.29	51.11	47.75	0.617	2.00	2.00	5.68	5.68	17.8	13.3	0.000
6	51.68	51.11	49.30	0.284	2.00	2.00	3.85	3.85	12.1	9.4	0.000
10	71.02	70.88	48.00	0.359	1.50	1.50	3.58	3.58	6.3	4.7	0.000
12*	72.72	72.55	48.00	0.706	0.83	1.50	8.78	6.09	8.9	14.9	0.000
16	72.55	70.88	48.00	3.089	1.50	1.50	10.49	10.49	18.5	10.8	0.000
17*	68.03	67.93	48.00	0.284	0.47	1.50	11.76	4.98	5.6	26.2	0.000
19*	69.52	69.39	48.00	0.512	0.65	1.50	10.24	5.63	7.5	19.3	0.000
20*	69.39	67.93	48.00	2.442	1.21	1.50	10.79	9.48	16.5	16.8	0.000
21*	56.92	56.89	48.00	0.088	0.34	1.50	10.38	4.07	3.1	27.8	0.000
23	58.88	58.69	48.00	0.765	1.35	1.50	5.51	5.22	9.2	8.7	0.000
24*	58.69	56.89	48.00	3.049	1.06	1.50	13.84	10.52	18.4	21.9	0.000
25*	52.29	52.29	48.00	0.021	0.33	2.00	9.77	3.84	3.3	56.4	0.000
27*	53.56	53.41	48.00	0.574	0.65	1.50	10.92	5.78	8.0	20.7	0.000
28*	53.41	52.29	48.00	1.942	1.05	1.50	11.10	8.57	14.7	17.6	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	6	1015.0
Circular	Concrete	2.5	0.0	2	380.0
Circular	Concrete	1.5	0.0	11	441.0

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		5.0	0.0	0.0	0.0	0.0	14
Circular Manhole		0.0	0.0	0.0	0.0	0.0	5
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
Computed left ponded width exceeds allowable width at inlet Id= C1-B
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 5
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 6
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 21
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 24

Runoff Frequency of: 100 Years
Computed right ponded width exceeds allowable width at inlet Id= C2-B
Computed left ponded width exceeds allowable width at inlet Id= C2-B
Capacity of sag inlet exceeded at inlet Id= C2-B
Computed right ponded width exceeds allowable width at inlet Id= C2-C
Computed left ponded width exceeds allowable width at inlet Id= C2-C
Computed right ponded width exceeds allowable width at inlet Id= C3-B
Computed left ponded width exceeds allowable width at inlet Id= C3-B
Capacity of sag inlet exceeded at inlet Id= C3-B
Computed right ponded width exceeds allowable width at inlet Id= C3-C
Computed left ponded width exceeds allowable width at inlet Id= C3-C
Capacity of sag inlet exceeded at inlet Id= C3-C
Computed right ponded width exceeds allowable width at inlet Id= C5-B
Computed left ponded width exceeds allowable width at inlet Id= C5-B
Capacity of sag inlet exceeded at inlet Id= C5-B
Computed right ponded width exceeds allowable width at inlet Id= C5-C
Computed left ponded width exceeds allowable width at inlet Id= C5-C
Computed right ponded width exceeds allowable width at inlet Id= C6-B
Computed left ponded width exceeds allowable width at inlet Id= C6-B
Capacity of sag inlet exceeded at inlet Id= C6-B
Computed right ponded width exceeds allowable width at inlet Id= C1-A
Computed left ponded width exceeds allowable width at inlet Id= C1-A
Computed right ponded width exceeds allowable width at inlet Id= C1-B
Computed left ponded width exceeds allowable width at inlet Id= C1-B
Capacity of sag inlet exceeded at inlet Id= C1-B
Computed right ponded width exceeds allowable width at inlet Id= C1-C
Computed left ponded width exceeds allowable width at inlet Id= C1-B
Capacity of sag inlet exceeded at inlet Id= C1-C
Upstream HGL exceeds critical elevation (Design) at node Id= C4-1 Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= C4-1 Run # 4
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C5-1 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-1 Run # 5
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C6-B Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= C6-B Run # 6
Upstream HGL exceeds critical elevation (Design) at node Id= C5-A Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-A Run # 25
Upstream HGL exceeds critical elevation (Design) at node Id= C5-C Run # 28
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-C Run # 28
Upstream HGL exceeds critical elevation (Design) at node Id= C6-A Run # 29
Upstream HGL exceeds critical elevation (Analysis)at node Id= C6-A Run # 29
Run# 3 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C3-1 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-1 Run # 3
Upstream HGL exceeds critical elevation (Design) at node Id= C3-A Run # 21
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-A Run # 21
Upstream HGL exceeds critical elevation (Design) at node Id= C3-B Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-B Run # 24
Upstream HGL exceeds critical elevation (Design) at node Id= C5-B Run # 27
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-B Run # 27
Run# 2 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C2-1 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-1 Run # 2
Upstream HGL exceeds critical elevation (Design) at node Id= C2-A Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-A Run # 17
Upstream HGL exceeds critical elevation (Design) at node Id= C2-B Run # 20
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-B Run # 20
Run# 23 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C3-C Run # 23
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-C Run # 23
Run# 1 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-1 Run # 1
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-A Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-A Run # 10
Run# 16 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-B Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-B Run # 16
Upstream HGL exceeds critical elevation (Design) at node Id= C2-C Run # 19
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-C Run # 19
Upstream HGL exceeds critical elevation (Design) at node Id= C1-C Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-C Run # 12

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
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HOUSTON TX. 77042
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SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
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EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\O-P STORM SYS C 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 35 OF 131

CITY OF HOUSTON
PUBLIC WORKS AND ENGINEERING
49097
CHECKED
NUMBER
HOUSTON, TEXAS

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 2/3/2009 1:40:53 PM

PROJECT NAME : NSR 451 - COH
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM C - PROPOSED
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
C2-C	0.55	1.73	17.86	17.86	3.99	0.000	3.797
C3-A	0.55	0.66	13.79	13.79	4.44	0.000	1.610
C3-B	0.55	2.08	17.02	17.02	4.07	0.000	4.661
C3-C	0.55	2.08	17.02	17.02	4.07	0.000	4.661
C5-A	0.55	0.72	15.36	15.36	4.25	0.000	1.684
C5-B	0.55	1.41	16.67	16.67	4.11	0.000	3.188
C5-C	0.55	1.21	17.26	17.26	4.05	0.000	2.695
C6-A	0.55	0.96	18.93	18.93	3.89	0.000	2.054
C6-B	0.55	2.00	21.43	21.43	3.67	0.000	4.041
C5-D	0.55	0.38	14.00	14.00	4.41	0.000	0.922
C5-E	0.55	0.33	14.00	14.00	4.41	0.000	0.801
C1-A	0.55	1.35	14.29	14.29	4.38	0.000	3.249
C1-B	0.55	0.62	14.07	14.07	4.40	0.000	1.501
C1-C	0.55	0.34	12.71	12.71	4.57	0.000	0.855
C1-D	0.55	1.49	16.67	16.67	4.11	0.000	3.369
C1-E	0.55	1.49	16.67	16.67	4.11	0.000	3.369
C2-A	0.55	1.20	14.29	14.29	4.38	0.000	2.888
C2-B	0.55	2.05	17.86	17.86	3.99	0.000	4.500

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)
C1-E	Curb	5.00	0.00	0.82	2.00	0.30	2.00	0.014	1.50	0.57
C2-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C2-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	1.57
C2-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C3-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C3-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C3-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C5-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C5-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C6-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-D	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-E	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C6-B	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C1-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C1-D	Curb	5.00	0.00	0.30	2.00	0.82	2.00	0.014	1.50	0.57

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)
C1-E	Curb	5.00	n/a	n/a	3.369	7.601	0.313	8.65	10.45
C2-A	Curb	5.00	n/a	n/a	2.888	7.601	0.296	8.95	8.95
C2-B	Curb	5.00	n/a	n/a	4.500	15.437	0.362	11.65	10.60
C2-C	Curb	5.00	n/a	n/a	3.797	7.601	0.330	9.95	10.95
C3-A	Curb	5.00	n/a	n/a	1.610	7.601	0.264	7.20	7.20
C3-B	Curb	5.00	n/a	n/a	4.661	7.601	0.370	11.80	10.70
C3-C	Curb	5.00	n/a	n/a	4.661	7.601	0.370	10.70	11.80
C5-A	Curb	5.00	n/a	n/a	1.684	7.601	0.266	7.30	7.30
C5-B	Curb	5.00	n/a	n/a	3.188	7.601	0.306	10.25	9.30
C5-C	Curb	5.00	n/a	n/a	2.695	7.601	0.290	8.75	9.60
C6-A	Curb	5.00	n/a	n/a	2.054	7.601	0.273	7.90	7.90
C5-D	Curb	5.00	n/a	n/a	0.922	7.601	0.255	5.85	5.85
C5-E	Curb	5.00	n/a	n/a	0.801	7.601	0.254	5.55	5.55
C6-B	Curb	5.00	n/a	n/a	4.041	7.601	0.340	10.15	10.15
C1-A	Curb	5.00	n/a	n/a	3.249	7.601	0.308	9.35	9.35
C1-B	Curb	5.00	n/a	n/a	1.501	7.601	0.262	7.70	7.00
C1-C	Curb	5.00	n/a	n/a	0.855	7.601	0.254	5.65	6.25
C1-D	Curb	5.00	n/a	n/a	3.369	7.601	0.313	10.45	8.65

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)
C1-E	Curb	0.550	1.49	16.67	4.11		0.00	3.369
C2-A	Curb	0.550	1.20	14.29	4.38		0.00	2.888
C2-B	Curb	0.550	2.05	17.86	3.99		0.00	4.500
C2-C	Curb	0.550	1.73	17.86	3.99		0.00	3.797
C3-A	Curb	0.550	0.66	13.79	4.44		0.00	1.610
C3-B	Curb	0.550	2.08	17.02	4.07		0.00	4.661
C3-C	Curb	0.550	2.08	17.02	4.07		0.00	4.661
C5-A	Curb	0.550	0.72	15.36	4.25		0.00	1.684
C5-B	Curb	0.550	1.41	16.67	4.11		0.00	3.188
C5-C	Curb	0.550	1.21	17.26	4.05		0.00	2.695
C6-A	Curb	0.550	0.96	18.93	3.89		0.00	2.054
C1-2	CrcMh	0.550	3.94	17.30	4.05		0.00	8.768
C1-4	CrcMh	0.550	2.98	16.79	4.10		0.00	6.718
C2-2	CrcMh	0.550	3.78	17.90	3.99		0.00	8.288
C3-2	CrcMh	0.550	4.16	17.12	4.06		0.00	9.300
C5-2	CrcMh	0.550	3.33	17.37	4.04		0.00	7.396
C5-D	Curb	0.550	0.38	14.00	4.41		0.00	0.922
C5-E	Curb	0.550	0.33	14.00	4.41		0.00	0.801
C5-3	CrcMh	0.550	0.71	14.13	4.39		0.00	1.716
C5-4	CrcMh	0.550	0.71	14.13	4.39		0.00	1.716
C1-3	CrcMh	0.550	2.98	16.79	4.10		0.00	6.718
C1-1	CrcMh	0.550	5.29	17.42	4.03		0.00	11.739
C2-1	CrcMh	0.550	10.27	18.29	3.95		0.00	22.310
C3-1	CrcMh	0.550	15.09	18.87	3.89		0.00	32.323
C4-1	CrcMh	0.550	22.10	22.49	3.59		0.00	43.632
C5-1	CrcMh	0.550	4.05	17.57	4.02		0.00	8.953
C6-B	Curb	0.550	2.96	21.43	3.67		0.00	5.980
C1-A	Curb	0.550	1.35	14.29	4.38		0.00	3.249
C1-B	Curb	0.550	0.62	14.07	4.40		0.00	1.501
C1-C	Curb	0.550	0.34	12.71	4.57		0.00	0.855
C1-D	Curb	0.550	1.49	16.67	4.11		0.00	3.369
OUT	Outlt	0.550	22.10	22.49	3.59		0.00	43.632

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	C1-1	C2-1	41.63	40.76	Cir 1	0.00	2.00	250.0	0.348	0.013
2	C2-1	C3-1	40.76	38.00	Cir 1	0.00	2.00	285.0	0.968	0.013
3	C3-1	C4-1	38.00	35.00	Cir 1	0.00	2.50	230.0	1.304	0.013
4	C4-1	OUT	35.00	22.33	Cir 1	0.00	2.50	150.0	8.477	0.013
5	C5-1	C4-1	40.65	40.00	Cir 1	0.00	2.00	190.0	0.342	0.013
6	C6-B	C4-1	40.34	40.00	Cir 1	0.00	2.00	200.0	0.170	0.013
10	C1-A	C1-1	41.71	41.63	Cir 1	0.00	1.50	40.0	0.200	0.013
11	C1-B	C1-2	42.59	42.49	Cir 1	0.00	2.00	7.0	1.429	0.013
12	C1-C	C1-2	42.53	42.49	Cir 1	0.00	2.00	21.0	0.190	0.013
13	C1-D	C1-4	42.82	42.78	Cir 1	0.00	2.00	6.0	0.667	0.013
14	C1-E	C1-4	42.82	42.78	Cir 1	0.00	2.00	20.0	0.200	0.013
15	C1-4	C1-3	42.78	42.60	Cir 1	0.00	2.00	95.0	0.189	0.013
16	C1-2	C1-1	42.49	41.63	Cir 1	0.00	2.00	55.0	1.564	0.013
17	C2-A	C2-1	43.00	40.85	Cir 1	0.00	1.50	35.0	6.154	0.013
18	C2-B	C2-2	41.95	41.21	Cir 1	0.00	2.00	7.0	10.631	0.013
19	C2-C	C2-2	41.95	41.21	Cir 1	0.00	2.00	21.0	3.526	0.013
20	C2-2	C2-1	41.21	40.76	Cir 1	0.00	2.00	60.0	0.750	0.013
21	C3-A	C3-1	43.00	40.57	Cir 1	0.00	1.50	35.0	6.960	0.013
22	C3-B	C3-2	40.91	40.89	Cir 1	0.00	2.00	7.0	0.286	0.013
23	C3-C	C3-2	40.95	40.89	Cir 1	0.00	2.00	21.0	0.286	0.013
24	C3-2	C3-1	40.89	40.57	Cir 1	0.00	2.00	59.0	0.542	0.013
25	C5-A	C5-1	43.00	40.85	Cir 1	0.00	2.00	35.0	6.154	0.013
26	C5-B	C5-2	40.92	40.90	Cir 1	0.00	2.00	7.0	0.286	0.013
27	C5-C	C5-2	40.94	40.90	Cir 1	0.00	2.00	18.0	0.222	0.013
28	C5-2	C5-1	40.90	40.65	Cir 1	0.00	2.00	58.0	0.431	0.013
29	C6-A	C6-B	40.54	40.34	Cir 1	0.00	2.00	55.0	0.364	0.013
30	C5-D	C5-4	42.40	42.28	Cir 1	0.00	2.00	6.0	2.000	0.013
31	C5-E	C5-4	42.40	42.28	Cir 1	0.00	2.00	22.0	0.545	0.013
32	C5-4	C5-3	42.28	41.27	Cir 1	0.00	2.00	327.0	0.309	0.013
33	C5-3	C5-2	41.27	40.90	Cir 1	0.00	2.00	121.0	0.306	0.013
34	C1-3	C1-2	42.60	42.49	Cir 1	0.00	2.00	88.0	0.125	0.013

Conveyance Hydraulic Computations. Tailwater = 24.830 (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	43.09	42.45	47.23	0.267	1.46	1.69	4.79	4.16	11.7	13.4	0.000
2*	42.45	39.94	46.96	0.964	1.64	1.94	8.08	7.17	22.3	22.4	0.000
3*	39.94	37.20	47.17	0.616	1.53	2.20	10.29	7.06	32.3	47.0	0.000
4*	37.20	24.83	46.75	1.122	1.05	2.50	22.43	8.89	43.6	119.9	0.000
5	42.36	42.00	46.75	0.155	1.21	2.00	4.53	2.85	9.0	13.3	0.000
6	42.21	42.00	47.00	0.069	1.16	2.00	3.15	1.90	6.0	9.4	0.000
10	43.13	43.09	48.00	0.095	0.92	1.46	2.87	1.85	3.2	4.7	0.000
11*	43.55	43.55	46.10	0.004	0.32	1.06	4.63	3.10	1.5	27.2	0.000
12	43.59	43.55	46.10	0.001	0.40	1.06	1.93	0.51	0.9	9.9	0.000
13*	43.99	43.99	45.60	0.022	0.58	1.21	4.47	3.87	3.4	18.6	0.000
14	44.02	43.99	46.10	0.022	0.79	1.21	2.90	1.69	3.4	10.2	0.000
15	43.99	43.93	46.10	0.087	1.21	1.33	3.38	3.03	6.7	9.9	0.000
16*	43.55	43.09	46.25	0.149	0.76	1.46	7.94	3.58	8.8	28.4	0.000
17*	43.65	42.45	49.00	0.075	0.34	1.50	9.72	1.63	2.9	26.2	0.000
18*	42.70	42.52	46.00	0.039	0.34	1.31	12.98	2.05	4.5	74.1	0.000
19*	42.63	42.52	46.00	0.028	0.40	1.31	8.37	1.73	3.8	42.7	0.000
20*	42.52	42.45	46.50	0.133	0.91	1.69	5.97	5.11	8.3	19.7	0.000
21*	43.48	42.07	48.00	0.023	0.25	1.50	8.54	0.91	1.6	27.8	0.000
22	42.69	42.67	45.80	0.042	0.86	1.78	3.60	1.58	4.7	12.1	0.000
23	42.72	42.67	45.80	0.042	0.86	1.78	3.60	1.58	4.7	12.1	0.000
24*	42.67	42.57	45.83	0.168	1.07	2.00	5.45	5.32	9.3	16.7	0.000
25*	43.45	42.36	48.00	0.005	0.24	1.51	7.99	0.66	1.7	56.4	0.000
26	42.56	42.54	45.90	0.020	0.70	1.64	3.25	1.15	3.2	12.1	0.000
27	42.58	42.54	45.90	0.014	0.69	1.64	2.83	0.98	2.7	10.7	0.000
28	42.54	42.36	46.04	0.106	1.00	1.71	4.72	2.59	7.4	14.9	0.000
29	42.41	42.21	48.00	0.008	0.52	1.87	3.13	0.67	2.1	13.7	0.000
30*	43.90	43.90	46.33	0.002	0.23	1.62	4.50	2.65	0.9	32.1	0.000
31*	43.90	43.90	46.33	0.001	0.30	1.62	2.74	2.60	0.8	16.8	0.000
32	43.90	42.91	46.33	0.006	0.50	1.64	2.80	0.62	1.7	12.6	0.000
33	42.91	42.54	46.27	0.006	0.50	1.64	2.79	0.62	1.7	12.6	0.000
34	43.93	43.55	46.88	0.087	1.41	1.41	2.85	2.85	6.7	8.0	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	26	2041.0
Circular	Concrete	2.5	0.0	2	380.0
Circular	Concrete	1.5	0.0	3	110.0

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		5.0	0.0	0.0	0.0	0.0	18
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

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
C2-C	0.55	1.73	17.86	17.86	7.93	0.000	7.550
C3-A	0.55	0.66	13.79	13.79	8.61	0.000	3.124
C3-B	0.55	2.08	17.02	17.02	8.06	0.000	9.224
C3-C	0.55	2.08	17.02	17.02	8.06	0.000	9.224
C5-A	0.55	0.72	15.36	15.36	8.33	0.000	3.299
C5-B	0.55	1.41	16.67	16.67	8.12	0.000	6.296
C5-C	0.55	1.21	17.26	17.26	8.03	0.000	5.341
C6-A	0.55	0.96	18.93	18.93	7.78	0.000	4.107
C6-B	0.55	2.00	21.43	21.43	7.44	0.000	8.182
C5-D	0.55	0.38	14.00	14.00	8.57	0.000	1.791
C5-E	0.55	0.33	14.00	14.00	8.57	0.000	1.555
C1-A	0.55	1.35	14.29	14.29	8.52	0.000	6.323
C1-B	0.55	0.62	14.07	14.07	8.56	0.000	2.917
C1-C	0.55	0.34	12.71	12.71	8.81	0.000	1.647
C1-D	0.55	1.49	16.67	16.67	8.12	0.000	6.653
C1-E	0.55	1.49	16.67	16.67	8.12	0.000	6.653
C2-A	0.55	1.20	14.29	14.29	8.52	0.000	5.621
C2-B	0.55	2.05	17.86	17.86	7.93	0.000	8.946

Revisions

No.	Date	Revisions
		Apps

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
n/a DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM C
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\C-R STM SYS C PR 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER
HOUSTON, TEXAS

SHEET NO. 36 OF 131

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)
C1-E	Curb	5.00	0.00	0.82	2.00	0.30	2.00	0.014	1.50	0.57
C2-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C2-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	1.57
C2-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C3-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C3-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C3-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C5-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C5-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C6-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-D	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C5-E	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C6-B	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-A	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.57
C1-B	Curb	5.00	0.00	0.30	2.00	0.50	2.00	0.014	1.50	0.57
C1-C	Curb	5.00	0.00	0.50	2.00	0.30	2.00	0.014	1.50	0.57
C1-D	Curb	5.00	0.00	0.30	2.00	0.82	2.00	0.014	1.50	0.57

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)
C1-E	Curb	5.00	n/a	n/a	6.653	7.601	0.495	11.15	13.50
C2-A	Curb	5.00	n/a	n/a	5.621	7.601	0.425	11.50	11.50
C2-B	Curb	5.00	n/a	n/a	8.946	15.437	0.693	15.05	13.70
C2-C	Curb	5.00	n/a	n/a	7.550	7.601	0.566	12.85	14.15
C3-A	Curb	5.00	n/a	n/a	3.124	7.601	0.304	9.25	9.25
C3-B	Curb	5.00	n/a	n/a	9.224	7.601	0.721	15.25	13.85
C3-C	Curb	5.00	n/a	n/a	9.224	7.601	0.721	13.85	15.25
C5-A	Curb	5.00	n/a	n/a	3.299	7.601	0.310	9.40	9.40
C5-B	Curb	5.00	n/a	n/a	6.296	7.601	0.470	13.20	12.00
C5-C	Curb	5.00	n/a	n/a	5.341	7.601	0.408	11.30	12.40
C6-A	Curb	5.00	n/a	n/a	4.107	7.601	0.343	10.20	10.20
C5-D	Curb	5.00	n/a	n/a	1.791	7.601	0.268	7.50	7.50
C5-E	Curb	5.00	n/a	n/a	1.555	7.601	0.263	7.10	7.10
C6-B	Curb	5.00	n/a	n/a	8.182	7.601	0.621	13.25	13.25
C1-A	Curb	5.00	n/a	n/a	6.323	7.601	0.471	12.00	12.00
C1-B	Curb	5.00	n/a	n/a	2.917	7.601	0.297	9.90	9.00
C1-C	Curb	5.00	n/a	n/a	1.647	7.601	0.265	7.25	8.00
C1-D	Curb	5.00	n/a	n/a	6.653	7.601	0.495	13.50	11.15

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)
C1-E	Curb	0.550	1.49	16.67	8.12	0.00		6.653
C2-A	Curb	0.550	1.20	14.29	8.52	0.00		5.621
C2-B	Curb	0.550	2.05	17.86	7.93	0.00		8.946
C2-C	Curb	0.550	1.73	17.86	7.93	0.00		7.550
C3-A	Curb	0.550	0.66	13.79	8.61	0.00		3.124
C3-B	Curb	0.550	2.08	17.02	8.06	0.00		9.224
C3-C	Curb	0.550	2.08	17.02	8.06	0.00		9.224
C5-A	Curb	0.550	0.72	15.36	8.33	0.00		3.299
C5-B	Curb	0.550	1.41	16.67	8.12	0.00		6.296
C5-C	Curb	0.550	1.21	17.26	8.03	0.00		5.341
C6-A	Curb	0.550	0.96	18.93	7.78	0.00		4.107
C1-2	CrcMh	0.550	3.94	17.11	8.05	0.00		17.441
C1-4	CrcMh	0.550	2.98	16.77	8.10	0.00		13.281
C2-2	CrcMh	0.550	3.78	17.89	7.93	0.00		16.486
C3-2	CrcMh	0.550	4.16	17.10	8.05	0.00		18.419
C5-2	CrcMh	0.550	3.33	17.35	8.01	0.00		14.675
C5-D	Curb	0.550	0.38	14.00	8.57	0.00		1.791
C5-E	Curb	0.550	0.33	14.00	8.57	0.00		1.555
C5-3	CrcMh	0.550	0.71	14.11	8.55	0.00		3.338
C5-4	CrcMh	0.550	0.71	14.11	8.55	0.00		3.338
C1-3	CrcMh	0.550	2.98	16.77	8.10	0.00		13.281
C1-1	CrcMh	0.550	5.29	17.21	8.03	0.00		23.374
C2-1	CrcMh	0.550	10.27	18.04	7.91	0.00		44.670
C3-1	CrcMh	0.550	15.09	18.37	7.86	0.00		65.225
C4-1	CrcMh	0.550	22.10	22.29	7.33	0.00		89.076
C5-1	CrcMh	0.550	4.05	17.53	7.99	0.00		17.787
C6-B	Curb	0.550	2.96	21.43	7.44	0.00		12.109
C1-A	Curb	0.550	1.35	14.29	8.52	0.00		6.323
C1-B	Curb	0.550	0.62	14.07	8.56	0.00		2.917
C1-C	Curb	0.550	0.34	12.71	8.81	0.00		1.647
C1-D	Curb	0.550	1.49	16.67	8.12	0.00		6.653
OUT	Outlt	0.550	22.10	22.29	7.33	0.00		89.076

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	C1-1	C2-1		41.63	40.76	Cir 1	0.00	2.00	250.0	0.348	0.013
2	C2-1	C3-1		40.76	38.00	Cir 1	0.00	2.00	285.0	0.968	0.013
3	C3-1	C4-1		38.00	35.00	Cir 1	0.00	2.50	230.0	1.304	0.013
4	C4-1	OUT		35.00	22.33	Cir 1	0.00	2.50	150.0	8.477	0.013
5	C5-1	C4-1		40.65	40.00	Cir 1	0.00	2.00	190.0	0.342	0.013
6	C6-B	C4-1		40.34	40.00	Cir 1	0.00	2.00	200.0	0.170	0.013
10	C1-A	C1-1		41.71	41.63	Cir 1	0.00	1.50	40.0	0.200	0.013
11	C1-B	C1-2		42.59	42.49	Cir 1	0.00	2.00	7.0	1.429	0.013
12	C1-C	C1-2		42.53	42.49	Cir 1	0.00	2.00	21.0	0.190	0.013
13	C1-D	C1-4		42.82	42.78	Cir 1	0.00	2.00	6.0	0.667	0.013
14	C1-E	C1-4		42.82	42.78	Cir 1	0.00	2.00	20.0	0.200	0.013
15	C1-4	C1-3		42.78	42.60	Cir 1	0.00	2.00	95.0	0.189	0.013
16	C1-2	C1-1		42.49	41.63	Cir 1	0.00	2.00	55.0	1.564	0.013
17	C2-A	C2-1		43.00	40.85	Cir 1	0.00	1.50	35.0	6.154	0.013
18	C2-B	C2-2		41.95	41.21	Cir 1	0.00	2.00	7.0	10.631	0.013
19	C2-C	C2-2		41.95	41.21	Cir 1	0.00	2.00	21.0	3.526	0.013
20	C2-2	C2-1		41.21	40.76	Cir 1	0.00	2.00	60.0	0.750	0.013
21	C3-A	C3-1		43.00	40.57	Cir 1	0.00	1.50	35.0	6.960	0.013
22	C3-B	C3-2		40.91	40.89	Cir 1	0.00	2.00	7.0	0.286	0.013
23	C3-C	C3-2		40.95	40.89	Cir 1	0.00	2.00	21.0	0.286	0.013
24	C3-2	C3-1		40.89	40.57	Cir 1	0.00	2.00	59.0	0.542	0.013
25	C5-A	C5-1		43.00	40.85	Cir 1	0.00	2.00	35.0	6.154	0.013
26	C5-B	C5-2		40.92	40.90	Cir 1	0.00	2.00	7.0	0.286	0.013
27	C5-C	C5-2		40.94	40.90	Cir 1	0.00	2.00	18.0	0.222	0.013
28	C5-2	C5-1		40.90	40.65	Cir 1	0.00	2.00	58.0	0.431	0.013
29	C6-A	C6-B		40.54	40.34	Cir 1	0.00	2.00	55.0	0.364	0.013
30	C5-D	C5-4		42.40	42.28	Cir 1	0.00	2.00	6.0	2.000	0.013
31	C5-E	C5-4		42.40	42.28	Cir 1	0.00	2.00	22.0	0.545	0.013
32	C5-4	C5-3		42.28	41.27	Cir 1	0.00	2.00	327.0	0.309	0.013
33	C5-3	C5-2		41.27	40.90	Cir 1	0.00	2.00	121.0	0.306	0.013
34	C1-3	C1-2		42.60	42.49	Cir 1	0.00	2.00	88.0	0.125	0.013

Conveyance Hydraulic Computations. Tailwater = 44.100 (ft)

Run #	Hyd. US (ft)	Gr.line DS (ft)	Crit.Elev US (ft)	Fr.Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (ft/s)	Velocity Actual (ft/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	70.54	67.90	48.00	1.058	2.00	2.00	7.44	7.44	23.4	13.4	0.000
2	67.90	56.88	48.00	3.866	2.00	2.00	14.22	14.22	44.7	22.4	0.000
3	56.88	51.11	48.00	2.507	2.50	2.50	13.29	13.29	65.2	47.0	0.000
4*	51.11	44.10	48.00	4.676	1.61	2.50	26.67	18.17	89.1	119.9	0.000
5	52.28	51.11	48.00	0.613	2.00	2.00	5.66	5.66	17.8	13.3	0.000
6	51.68	51.11	48.00	0.284	2.00	2.00	3.85	3.85	12.1	9.4	0.000
10	70.69	70.54	49.00	0.359	1.50	1.50	3.58	3.58	6.3	4.7	0.000
11*	70.87	70.87	48.31	0.016	0.44	2.00	5.63	3.71	2.9	27.2	0.000
12	70.91	70.87	48.31	0.005	0.55	2.00	2.33	0.52	1.6	9.9	0.000
13*	71.50	71.49	47.95	0.086	0.83	2.00	5.40	4.75	6.7	18.6	0.000
14	71.52	71.49	47.95	0.086	1.18	2.00	3.44	2.12	6.7	10.2	0.000
15	71.49	71.17	47.95	0.342	2.00	2.00	4.23	4.23	13.3	9.9	0.000
16*	70.87	70.54	48.31	0.589	1.14	2.00	9.47	6.88	17.4	28.4	0.000
17*	68.00	67.90	50.00	0.284	0.47	1.50	11.76	4.98	5.6	26.2	0.000
18*	68.23	68.21	47.86	0.155	0.47	2.00	15.88	5.25	8.9	74.1	0.000
19*	68.24	68.21	47.86	0.110	0.57	2.00	10.21	4.95	7.5	42.7	0.000
20*	68.21	67.90	47.86	0.527	1.41	2.00	6.99	6.69	16.5	19.7	0.000
21*	56.91	56.88	49.00	0.088	0.34	1.50	10.38	4.07	3.1	27.8	0.000
22	57.28	57.27	48.20	0.165	1.31	2.00	4.24	2.94	9.2	12.1	0.000
23	57.29	57.27	48.20	0.165	1.31	2.00	4.24	2.94	9.2	12.1	0.000
24	57.27	56.88	48.20	0.657	2.00	2.00	5.86	5.86	18.4	16.7	0.000
25*	52.29	52.28	49.00	0.021	0.33	2.00	9.77	3.84	3.3	56.4	0.000
26	52.30	52.29	47.47	0.077	1.02	2.00	3.89	2.00	6.3	12.1	0.000
27	52.32	52.29	47.47	0.055	1.00	2.00	3.40	1.70	5.3	10.7	0.000
28	52.29	52.28	47.47	0.417	1.62	2.00	5.39	4.67	14.7	14.9	0.000
29	51.87	51.68	49.00	0.033	0.75	2.00	3.80	1.31	4.1	13.7	0.000
30*	53.57	53.57	47.43	0.006	0.32	2.00	5.49	3.25	1.8	32.1	0.000
31*	53.57	53.57	47.84	0.005	0.41	2.00	3.33	3.13	1.6	16.8	0.000
32	53.57	52.63	47.43	0.022	0.70	2.00	3.39	1.06	3.3	12.6	0.000
33	52.63	52.29	47.27	0.022	0.71	2.00	3.37	1.06	3.3	12.6	0.000
34	71.17	70.87	47.88	0.342	2.00	2.00	4.23	4.23	13.3	8.0	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 Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	26	2041.0
Circular	Concrete	2.5	0.0	2	380.0
Circular	Concrete	1.5	0.0	3	110.0

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		5.0	0.0	0.0	0.0	0.0	18
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= C5-3 Previous intensity used.
Discharge decreased downstream node Id= C1-3 Previous intensity used.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 5
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 6
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 21
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 24
        Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= C5-3 Previous intensity used.
Discharge decreased downstream node Id= C1-3 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= C1-E
Computed right ponded width exceeds allowable width at inlet Id= C2-B
Computed left ponded width exceeds allowable width at inlet Id= C2-B
Computed right ponded width exceeds allowable width at inlet Id= C2-C
Computed left ponded width exceeds allowable width at inlet Id= C2-C
Computed right ponded width exceeds allowable width at inlet Id= C3-B
Computed left ponded width exceeds allowable width at inlet Id= C3-B
Capacity of sag inlet exceeded at inlet Id= C3-B
Computed right ponded width exceeds allowable width at inlet Id= C3-C
Computed left ponded width exceeds allowable width at inlet Id= C3-C
Capacity of sag inlet exceeded at inlet Id= C3-C
Computed right ponded width exceeds allowable width at inlet Id= C5-B
Computed left ponded width exceeds allowable width at inlet Id= C5-B
Computed right ponded width exceeds allowable width at inlet Id= C5-C
Computed right ponded width exceeds allowable width at inlet Id= C6-B
Computed left ponded width exceeds allowable width at inlet Id= C6-B
Capacity of sag inlet exceeded at inlet Id= C6-B
Computed right ponded width exceeds allowable width at inlet Id= C1-A
Computed left ponded width exceeds allowable width at inlet Id= C1-A
Computed left ponded width exceeds allowable width at inlet Id= C1-D
Upstream HGL exceeds critical elevation (Design) at node Id= C4-1 Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= C4-1 Run # 4
Run# 5  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C5-1 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-1 Run # 5
Run# 6  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C6-B Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= C6-B Run # 6
Upstream HGL exceeds critical elevation (Design) at node Id= C5-A Run # 25
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-A Run # 25
Upstream HGL exceeds critical elevation (Design) at node Id= C5-2 Run # 28
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-2 Run # 28
Upstream HGL exceeds critical elevation (Design) at node Id= C6-A Run # 29
Upstream HGL exceeds critical elevation (Analysis)at node Id= C6-A Run # 29
Upstream HGL exceeds critical elevation (Design) at node Id= C5-3 Run # 33
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-3 Run # 33
Run# 3  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C3-1 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-1 Run # 3
Upstream HGL exceeds critical elevation (Design) at node Id= C3-A Run # 21
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-A Run # 21
Run# 24  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C3-2 Run # 24
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-2 Run # 24
Upstream HGL exceeds critical elevation (Design) at node Id= C5-B Run # 26
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-B Run # 26
Upstream HGL exceeds critical elevation (Design) at node Id= C5-C Run # 27
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-C Run # 27
Upstream HGL exceeds critical elevation (Design) at node Id= C5-4 Run # 32
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-4 Run # 32
Run# 2  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C2-1 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-1 Run # 2
Upstream HGL exceeds critical elevation (Design) at node Id= C2-A Run # 17
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-A Run # 17
Upstream HGL exceeds critical elevation (Design) at node Id= C2-2 Run # 20
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-2 Run # 20
Upstream HGL exceeds critical elevation (Design) at node Id= C3-B Run # 22
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-B Run # 22
Upstream HGL exceeds critical elevation (Design) at node Id= C3-C Run # 23
Upstream HGL exceeds critical elevation (Analysis)at node Id= C3-C Run # 23
Upstream HGL exceeds critical elevation (Design) at node Id= C5-D Run # 30
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-D Run # 30
Upstream HGL exceeds critical elevation (Design) at node Id= C5-E Run # 31
Upstream HGL exceeds critical elevation (Analysis)at node Id= C5-E Run # 31
Run# 1  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-1 Run # 1
Run# 10  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-A Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-A Run # 10
Upstream HGL exceeds critical elevation (Design) at node Id= C1-2 Run # 16
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-2 Run # 16
Upstream HGL exceeds critical elevation (Design) at node Id= C2-B Run # 18
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-B Run # 18
Upstream HGL exceeds critical elevation (Design) at node Id= C2-C Run # 19
Upstream HGL exceeds critical elevation (Analysis)at node Id= C2-C Run # 19
Run# 34  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-3 Run # 34
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-3 Run # 34
Upstream HGL exceeds critical elevation (Design) at node Id= C1-B Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-B Run # 11
Upstream HGL exceeds critical elevation (Design) at node Id= C1-C Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-C Run # 12
Run# 15  Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= C1-4 Run # 15
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-4 Run # 15
Upstream HGL exceeds critical elevation (Design) at node Id= C1-D Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-D Run # 13
Upstream HGL exceeds critical elevation (Design) at node Id= C1-E Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= C1-E Run # 14
```

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

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STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM C
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE:
H:\City of Houston\2006-05_NSR 451\DRAINAGE\Q-H STM SYT C PR 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — HOUSTON, TEXAS

SHEET NO. 37 OF 131

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 2/3/2009 2:38:53 PM

PROJECT NAME : NSR 451 - COH
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM D - EXISTING
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
D8	0.55	4.06	13.42	13.42	4.48	0.000	10.009
D9	0.55	5.12	20.83	20.83	3.72	0.000	10.483
D10	0.55	6.16	17.86	17.86	3.99	0.000	13.521
D11	0.55	3.07	16.67	16.67	4.11	0.000	6.941
D13	0.55	3.38	16.25	16.25	4.15	0.000	7.724
D1	0.55	3.03	16.17	16.17	4.16	0.000	6.938
D2	0.55	4.13	18.71	18.71	3.91	0.000	8.881
D3	0.55	2.45	16.33	16.33	4.15	0.000	5.587
D4	0.55	2.76	16.33	16.33	4.15	0.000	6.294
D5	0.55	6.49	19.31	19.31	3.85	0.000	13.760
D6	0.55	6.13	19.88	19.88	3.80	0.000	12.826
D7	0.55	5.94	19.88	19.88	3.80	0.000	12.428
D14	0.55	5.15	17.52	17.52	4.02	0.000	11.399

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)
D1	CrcMh	0.550	3.03	16.17	4.16		0.00	6.938
D2	CrcMh	0.550	19.77	21.39	3.68		0.00	39.978
D3	CrcMh	0.550	22.22	21.76	3.65		0.00	44.569
D4	CrcMh	0.550	24.98	22.44	3.59		0.00	49.364
D5	CrcMh	0.550	31.47	23.11	3.54		0.00	61.315
D6	CrcMh	0.550	37.60	23.88	3.49		0.00	72.091
D7	CrcMh	0.550	43.54	24.37	3.45		0.00	82.627
D8	CrcMh	0.550	52.75	25.07	3.40		0.00	98.701
D9	CrcMh	0.550	57.87	25.71	3.36		0.00	106.894
D10	CrcMh	0.550	6.16	17.86	3.99		0.00	13.521
D11	CrcMh	0.550	9.23	18.92	3.89		0.00	19.749
D12	CrcMh	0.550	9.23	18.92	3.89		0.00	19.749
D13	CrcMh	0.550	12.61	21.21	3.69		0.00	25.604
D14	CrcMh	0.550	5.15	17.52	4.02		0.00	11.399
OUT	Outlt	0.550	57.87	25.71	3.36		0.00	106.894

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	D1	D2	40.70	39.90	Cir 1	0.00	3.50	300.0	0.267	0.013
2	D2	D3	39.90	39.20	Cir 1	0.00	4.00	160.0	0.438	0.013
3	D3	D4	39.20	38.30	Cir 1	0.00	4.00	275.0	0.327	0.013
4	D4	D5	38.30	37.55	Cir 1	0.00	4.50	260.0	0.288	0.013
5	D5	D6	37.55	36.80	Cir 1	0.00	4.50	300.0	0.250	0.013
6	D6	D7	36.80	35.36	Cir 1	0.00	4.50	270.0	0.533	0.013
7	D7	D8	35.36	34.67	Cir 1	0.00	4.50	285.0	0.242	0.013
8	D8	D9	34.67	34.12	Cir 1	0.00	5.50	265.0	0.208	0.013
9	D9	OUT	34.12	33.57	Cir 1	0.00	5.50	270.0	0.204	0.013
10	D10	D11	42.50	41.30	Cir 1	0.00	2.00	320.0	0.375	0.013
11	D11	D12	41.30	40.38	Cir 1	0.00	2.50	380.0	0.242	0.013
12	D12	D13	40.38	39.99	Cir 1	0.00	3.00	440.0	0.089	0.013
13	D13	D2	39.99	39.90	Cir 1	0.00	3.00	50.0	0.180	0.013
14	D14	D8	40.70	38.98	Cir 1	0.00	2.00	200.0	0.860	0.013

Conveyance Hydraulic Computations. Tailwater = 39.070 (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	42.54	41.79	47.00	0.005	0.86	1.89	3.76	1.31	6.9	52.2	0.000
2*	41.79	41.30	46.50	0.077	1.81	2.10	7.23	5.99	40.0	95.4	0.000
3	41.30	40.46	47.00	0.095	2.10	2.16	6.68	6.43	44.6	82.5	0.000
4	40.46	40.44	46.50	0.062	2.16	2.89	6.53	4.58	49.4	106.1	0.000
5	40.44	40.25	46.30	0.096	2.58	3.45	6.52	4.68	61.3	98.7	0.000
6*	40.25	39.89	44.50	0.133	2.25	4.50	9.04	8.03	72.1	144.2	0.000
7	39.89	39.70	45.00	0.175	3.20	4.50	6.83	5.20	82.6	97.2	0.000
8	39.70	39.36	44.50	0.086	3.21	5.24	6.85	4.23	98.7	153.6	0.000
9	39.36	39.07	44.50	0.100	3.41	5.50	6.92	4.50	106.9	152.2	0.000
10	44.10	43.30	47.50	0.354	1.60	2.00	5.03	4.30	13.5	13.9	0.000
11	43.30	42.82	47.00	0.230	2.00	2.44	4.69	4.05	19.7	20.3	0.000
12	42.82	42.10	46.50	0.087	2.44	2.44	3.21	3.21	19.7	19.9	0.000
13	42.10	41.79	46.41	0.146	2.24	2.24	4.53	4.53	25.6	28.4	0.000
14*	41.75	39.70	44.50	0.252	1.05	1.05	6.82	6.82	11.4	21.1	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	3.5	0.0	1	300.0
Circular	Concrete	4.0	0.0	2	435.0
Circular	Concrete	4.5	0.0	4	1115.0
Circular	Concrete	5.5	0.0	2	535.0
Circular	Concrete	2.0	0.0	2	520.0
Circular	Concrete	2.5	0.0	1	380.0
Circular	Concrete	3.0	0.0	2	490.0

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
Outlet		0.0	0.0	0.0	0.0	0.0	1

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
D8	0.55	4.06	13.42	13.42	8.67	0.000	19.368
D9	0.55	5.12	20.83	20.83	7.52	0.000	21.166
D10	0.55	6.16	17.86	17.86	7.93	0.000	26.883
D11	0.55	3.07	16.67	16.67	8.12	0.000	13.707
D13	0.55	3.38	16.25	16.25	8.19	0.000	15.216
D1	0.55	3.03	16.17	16.17	8.20	0.000	13.662
D2	0.55	4.13	18.71	18.71	7.81	0.000	17.739
D3	0.55	2.45	16.33	16.33	8.17	0.000	11.012
D4	0.55	2.76	16.33	16.33	8.17	0.000	12.406
D5	0.55	6.49	19.31	19.31	7.72	0.000	27.570
D6	0.55	6.13	19.88	19.88	7.64	0.000	25.774
D7	0.55	5.94	19.88	19.88	7.64	0.000	24.975
D14	0.55	5.15	17.52	17.52	7.99	0.000	22.621

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)
D1	CrcMh	0.550	3.03	16.17	8.20		0.00	13.662
D2	CrcMh	0.550	19.77	19.90	7.64		0.00	83.099
D3	CrcMh	0.550	22.22	20.21	7.60		0.00	92.874
D4	CrcMh	0.550	24.98	20.83	7.52		0.00	103.269
D5	CrcMh	0.550	31.47	21.40	7.44		0.00	128.804
D6	CrcMh	0.550	37.60	22.02	7.36		0.00	152.264
D7	CrcMh	0.550	43.54	22.46	7.31		0.00	174.996
D8	CrcMh	0.550	52.75	22.89	7.25		0.00	210.475
D9	CrcMh	0.550	57.87	23.39	7.19		0.00	228.991
D10	CrcMh	0.550	6.16	17.86	7.93		0.00	26.883
D11	CrcMh	0.550	9.23	18.48	7.84		0.00	39.812
D12	CrcMh	0.550	9.23	18.48	7.84		0.00	39.812
D13	CrcMh	0.550	12.61	19.79	7.66		0.00	53.109
D14	CrcMh	0.550	5.15	17.52	7.99		0.00	22.621
OUT	Outlt	0.550	57.87	23.39	7.19		0.00	228.991

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	D1	D2	40.70	39.90	Cir 1	0.00	3.50	300.0	0.267	0.013
2	D2	D3	39.90	39.20	Cir 1	0.00	4.00	160.0	0.438	0.013
3	D3	D4	39.20	38.30	Cir 1	0.00	4.00	275.0	0.327	0.013
4	D4	D5	38.30	37.55	Cir 1	0.00	4.50	260.0	0.288	0.013
5	D5	D6	37.55	36.80	Cir 1	0.00	4.50	300.0	0.250	0.013
6	D6	D7	36.80	35.36	Cir 1	0.00	4.50	270.0	0.533	0.013
7	D7	D8	35.36	34.67	Cir 1	0.00	4.50	285.0	0.242	0.013
8	D8	D9	34.67	34.12	Cir 1	0.00	5.50	265.0	0.208	0.013
9	D9	OUT	34.12	33.57	Cir 1	0.00	5.50	270.0	0.204	0.013
10	D10	D11	42.50	41.30	Cir 1	0.00	2.00	320.0	0.375	0.013
11	D11	D12	41.30	40.38	Cir 1	0.00	2.50	380.0	0.242	0.013
12	D12	D13	40.38	39.99	Cir 1	0.00	3.00	440.0	0.089	0.013
13	D13	D2	39.99	39.90	Cir 1	0.00	3.00	50.0	0.180	0.013
14	D14	D8	40.70	38.98	Cir 1	0.00	2.00	200.0	0.860	0.013

Conveyance Hydraulic Computations. Tailwater = 43.800 (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	53.29	52.55	48.00	0.018	1.23	3.50	4.55	1.42	13.7	52.2	0.000
2	52.55	52.38	47.50	0.332	2.90	4.00	8.52	6.61	83.1	95.4	0.000
3	52.38	51.24	48.00	0.415	4.00	4.00	7.39	7.39	92.9	82.5	0.000
4	51.24	51.20	47.50	0.273	3.60	4.50	7.56	6.49	103.3	105.1	0.000
5	51.20	49.92	47.30	0.425	4.50	4.50	8.10	8.10	128.8	98.7	0.000
6	49.92	48.31	45.50	0.594	4.01	4.50	10.18	9.57	152.3	144.2	0.000
7	48.31	46.08	46.00	0.785	4.50	4.50	11.00	11.00	175.0	97.2	0.000
8	46.08	45.04	45.50	0.390	5.50	5.50	8.86	8.86	210.5	153.6	0.000
9	45.04	43.80	45.50	0.461	5.50	5.50	9.64	9.64	229.0	152.2	0.000
10	62.44	57.96	48.50	1.400	2.00	2.00	8.56	8.56	26.9	13.9	0.000
11	57.96	54.41	48.00	0.934	2.50	2.50	8.11	8.11	39.8	20.3	0.000
12	54.41	52.86	47.50	0.353	3.00	3.00	5.63	5.63	39.8	19.9	0.000
13	52.86	52.55	48.00	0.629	3.00	3.00	7.51	7.51	53.1	28.4	0.000
14	48.06	46.08	45.50	0.991	2.00	2.00	7.20	7.20	22.6	21.1	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	3.5	0.0	1	300.0
Circular	Concrete	4.0	0.0	2	435.0
Circular	Concrete	4.5	0.0	4	1115.0
Circular	Concrete	5.5	0.0	2	535.0
Circular	Concrete	2.0	0.0	2	520.0
Circular	Concrete	2.5	0.0	1	380.0
Circular	Concrete	3.0	0.0	2	490.0

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
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= D12 Previous intensity used.
Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= D12 Previous intensity used.
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D9 Run # 9
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D8 Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= D8 Run # 8
Run# 14 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D14 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14 Run # 14
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D7 Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= D7 Run # 7
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D6 Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= D6 Run # 6
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D5 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5 Run # 5
Upstream HGL exceeds critical elevation (Design) at node Id= D4 Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= D4 Run # 4
Run# 3 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D3 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= D3 Run # 3
Upstream HGL exceeds critical elevation (Design) at node Id= D2 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= D2 Run # 2
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D13 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= D13 Run # 13
Upstream HGL exceeds critical elevation (Design) at node Id= D1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= D1 Run # 1
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D12 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= D12 Run # 12
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D11 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= D11 Run # 11
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D10 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= D10 Run # 10

App.
Revisions
Date
No.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-595

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM D
EXISTING 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\S STORM SYS D 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 38 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 2/3/2009 3:39:35 PM

PROJECT NAME : NSR 451 - COH
JOB NUMBER : SBB
PROJECT DESCRIPTION : SYSTEM D - PROPOSED
PROJECT File: P:\City of Houston\2006-05_NSR 451\DRAIN\90% WS Runs\NSR 451 Sys

DESIGN FREQUENCY : 2 Years
ANALYSYS FREQUENCY : 100 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)
D8-1	0.55	2.48	13.42	13.42	4.48	0.000	6.114
D9	0.55	5.12	20.83	20.83	3.72	0.000	10.483
D10	0.55	6.16	17.86	17.86	3.99	0.000	13.521
D11	0.55	3.07	16.67	16.67	4.11	0.000	6.941
D13	0.55	3.38	16.25	16.25	4.15	0.000	7.724
D5-A	0.55	1.79	16.07	16.07	4.17	0.000	4.109
D5-B	0.55	1.38	16.07	16.07	4.17	0.000	3.168
D1	0.55	3.03	16.17	16.17	4.16	0.000	6.938
D2	0.55	2.47	21.10	21.10	3.70	0.000	5.027
D3	0.55	2.45	16.33	16.33	4.15	0.000	5.587
D4	0.55	2.76	16.33	16.33	4.15	0.000	6.294
D5-1	0.55	2.24	16.33	16.33	4.15	0.000	5.108
D6	0.55	6.13	19.88	19.88	3.80	0.000	12.826
D7	0.55	5.94	19.88	19.88	3.80	0.000	12.428
D5-C	0.55	1.02	15.74	15.74	4.21	0.000	2.362
D5-D	0.55	1.72	14.67	14.67	4.33	0.000	4.097
D8-2	0.55	1.58	14.58	14.58	4.34	0.000	3.773
D14-A	0.55	1.71	17.52	17.52	4.02	0.000	3.785
D14-B	0.55	1.71	17.86	17.86	3.99	0.000	3.753
D14-C	0.55	1.73	17.86	17.86	3.99	0.000	3.797

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)
D5-A	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
D5-B	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
D14-A	Curb	5.00	0.00	0.68	2.00	0.50	2.00	0.014	1.50	0.57
D14-B	Curb	5.00	0.00	0.50	2.00	0.68	2.00	0.014	1.50	0.57
D14-C	Curb	5.00	0.00	0.50	2.00	0.44	2.00	0.014	1.50	0.57
D5-C	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57

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)
D5-A	Curb	5.00	n/a	n/a	4.109	7.601	0.344	11.25	11.25
D5-B	Curb	5.00	n/a	n/a	3.168	7.601	0.306	10.20	10.20
D14-A	Curb	5.00	n/a	n/a	3.785	7.601	0.329	9.35	9.90
D14-B	Curb	5.00	n/a	n/a	3.753	7.601	0.328	9.90	9.35
D14-C	Curb	5.00	n/a	n/a	3.797	7.601	0.330	9.95	10.15
D5-C	Curb	5.00	n/a	n/a	2.362	7.601	0.281	9.15	9.15

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)
D1	CrcMh	0.550	3.03	16.17	4.16		0.00	6.938
D2	CrcMh	0.550	18.11	21.39	3.68		0.00	36.621
D3	CrcMh	0.550	20.56	21.77	3.65		0.00	41.232
D4	CrcMh	0.550	23.32	22.47	3.59		0.00	46.062
D5-1	CrcMh	0.550	31.47	23.14	3.54		0.00	61.271
D6	CrcMh	0.550	37.60	23.91	3.48		0.00	72.038
D7	CrcMh	0.550	43.54	24.41	3.45		0.00	82.567
D8-1	CrcMh	0.550	52.75	25.10	3.40		0.00	98.630
D9	CrcMh	0.550	57.87	25.75	3.36		0.00	106.817
D10	CrcMh	0.550	6.16	17.86	3.99		0.00	13.521
D11	CrcMh	0.550	9.23	18.92	3.89		0.00	19.749
D12	CrcMh	0.550	9.23	18.92	3.89		0.00	19.749
D13	CrcMh	0.550	12.61	21.21	3.69		0.00	25.604
D8-2	CrcMh	0.550	6.73	18.82	3.90		0.00	14.436
D5-A	Curb	0.550	1.79	16.07	4.17		0.00	4.109
D5-B	Curb	0.550	3.17	16.20	4.16		0.00	7.254
D5-2	CrcMh	0.550	4.19	16.31	4.15		0.00	9.560
D5-3	CrcMh	0.550	4.19	16.31	4.15		0.00	9.560
D14-A	Curb	0.550	1.71	17.52	4.02		0.00	3.785
D14-B	Curb	0.550	1.71	17.86	3.99		0.00	3.753
D14-C	Curb	0.550	1.73	17.86	3.99		0.00	3.797
D14-1	CrcMh	0.550	5.15	18.10	3.97		0.00	11.238
D14-2	CrcMh	0.550	3.42	17.89	3.99		0.00	7.502
D5-C	Curb	0.550	1.02	15.74	4.21		0.00	2.362
D5-D	CrcMh	0.550	5.91	16.74	4.10		0.00	13.337
OUT	Outlt	0.550	57.87	25.75	3.36		0.00	106.817

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	D1	D2	40.70	39.90	Cir 1	0.00	3.50	300.0	0.267	0.013
2	D2	D3	39.90	39.20	Cir 1	0.00	4.00	160.0	0.438	0.013
3	D3	D4	39.20	38.30	Cir 1	0.00	4.00	275.0	0.327	0.013
4	D4	D5-1	38.30	37.55	Cir 1	0.00	4.50	260.0	0.288	0.013
5	D5-1	D6	37.55	36.80	Cir 1	0.00	4.50	300.0	0.250	0.013
6	D6	D7	36.80	35.36	Cir 1	0.00	4.50	270.0	0.533	0.013
7	D7	D8-1	35.36	34.67	Cir 1	0.00	4.50	285.0	0.242	0.013
8	D8-1	D9	34.67	34.12	Cir 1	0.00	5.50	265.0	0.208	0.013
9	D9	OUT	34.12	33.57	Cir 1	0.00	5.50	270.0	0.204	0.013
10	D10	D11	42.50	41.30	Cir 1	0.00	2.00	320.0	0.375	0.013
11	D11	D12	41.30	40.38	Cir 1	0.00	2.50	380.0	0.242	0.013
12	D12	D13	40.38	39.99	Cir 1	0.00	3.00	440.0	0.089	0.013
13	D13	D2	39.99	39.90	Cir 1	0.00	3.00	50.0	0.180	0.013
14	D8-2	D8-1	40.38	38.98	Cir 1	0.00	2.00	30.0	4.672	0.013
100	D5-A	D5-B	42.91	42.83	Cir 1	0.00	2.00	27.0	0.296	0.013
101	D5-B	D5-3	42.83	42.65	Cir 1	0.00	2.00	34.0	0.529	0.013
102	D5-C	D5-3	42.79	42.65	Cir 1	0.00	2.00	24.0	0.583	0.013
103	D5-3	D5-2	42.65	42.26	Cir 1	0.00	2.00	220.0	0.177	0.013
104	D5-2	D5-D	42.26	42.10	Cir 1	0.00	2.00	90.0	0.178	0.013
105	D5-D	D5-1	42.10	40.47	Cir 1	0.00	2.00	35.0	4.662	0.013
106	D14-A	D14-2	40.94	40.90	Cir 1	0.00	2.00	22.0	0.182	0.013
107	D14-B	D14-2	40.92	40.90	Cir 1	0.00	2.00	6.0	0.333	0.013
108	D14-2	D14-1	40.90	40.81	Cir 1	0.00	2.00	45.0	0.200	0.013
109	D14-C	D14-1	40.82	40.81	Cir 1	0.00	2.00	6.0	0.167	0.013
110	D14-1	D8-2	40.81	40.38	Cir 1	0.00	2.00	175.0	0.246	0.013

Conveyance Hydraulic Computations. Tailwater = 39.070 (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	42.45	41.70	47.00	0.005	0.86	1.80	3.76	1.39	6.9	52.2	0.000
2*	41.70	41.20	46.50	0.064	1.72	2.00	7.07	5.81	36.6	95.4	0.000
3	41.20	40.70	47.00	0.082	2.00	2.40	6.55	5.24	41.2	82.5	0.000
4	40.70	40.44	46.50	0.054	2.08	2.89	6.41	4.27	46.1	106.1	0.000
5	40.44	40.25	46.30	0.096	2.58	3.45	6.51	4.68	61.3	98.7	0.000
6*	40.25	39.89	44.50	0.133	2.25	4.50	9.04	8.03	72.0	144.2	0.000
7	39.89	39.70	45.00	0.175	3.20	4.50	6.83	5.19	82.6	97.2	0.000
8	39.70	39.36	44.50	0.086	3.21	5.24	6.85	4.22	98.6	153.6	0.000
9	39.36	39.07	44.50	0.100	3.41	5.50	6.91	4.50	106.8	152.2	0.000
10	44.10	43.30	47.50	0.354	1.60	2.00	5.03	4.30	13.5	13.9	0.000
11	43.30	42.82	47.00	0.230	2.00	2.44	4.69	4.05	19.7	20.3	0.000
12	42.82	42.06	46.50	0.087	2.44	2.44	3.21	3.21	19.7	19.9	0.000
13	42.06	41.70	46.41	0.146	2.24	2.24	4.53	4.53	25.6	28.4	0.000
14*	41.12	39.70	44.43	0.404	0.74	0.74	13.55	13.55	14.4	49.1	0.000
100	44.40	44.33	45.70	0.033	0.80	1.50	3.53	1.62	4.1	12.4	0.000
101*	44.33	44.30	45.70	0.102	0.93	1.65	5.07	4.89	7.3	16.5	0.000
102*	44.30	44.30	46.01	0.011	0.50	1.65	3.85	3.51	2.4	17.4	0.000
103	44.30	43.88	46.13	0.177	1.65	1.65	3.45	3.45	9.6	9.6	0.000
104	43.88	43.41	45.90	0.177	1.64	1.64	3.47	3.47	9.6	9.6	0.000
105*	43.41	42.47	45.70	0.345	0.71	2.00	13.24	4.25	13.3	49.1	0.000
106	42.52	42.48	44.00	0.028	0.87	1.58	2.88	1.42	3.8	9.7	0.000
107	42.50	42.48	44.00	0.027	0.73	1.58	3.59	1.41	3.8	13.1	0.000
108	42.48	42.45	44.50	0.109	1.28	1.64	3.53	2.72	7.5	10.2	0.000
109	42.46	42.45	46.01	0.028	0.89	1.64	2.79	1.38	3.8	9.3	0.000
110	42.45	41.12	44.45	0.245	1.64	1.64	4.07	4.07	11.2	11.3	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	3.5	0.0	1	300.0
Circular	Concrete	4.0	0.0	2	435.0
Circular	Concrete	4.5	0.0	4	1115.0
Circular	Concrete	5.5	0.0	2	535.0
Circular	Concrete	2.0	0.0	13	1034.0
Circular	Concrete	2.5	0.0	1	380.0
Circular	Concrete	3.0	0.0	2	490.0

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	19
Curb In Sag		5.0	0.0	0.0	0.0	0.0	6
Outlet		0.0	0.0	0.0	0.0	0.0	1

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
D8-1	0.55	2.48	13.42	13.42	8.67	0.000	11.831
D9	0.55	5.12	20.83	20.83	7.52	0.000	21.166
D10	0.55	6.16	17.86	17.86	7.93	0.000	26.883
D11	0.55	3.07	16.67	16.67	8.12	0.000	13.707
D13	0.55	3.38	16.25	16.25	8.19	0.000	15.216
D5-A	0.55	1.79	16.07	16.07	8.21	0.000	8.087
D5-B	0.55	1.38	16.07	16.07	8.21	0.000	6.235
D1	0.55	3.03	16.17	16.17	8.20	0.000	13.662
D2	0.55	2.47	21.10	21.10	7.48	0.000	10.163
D3	0.55	2.45	16.33	16.33	8.17	0.000	11.012
D4	0.55	2.76	16.33	16.33	8.17	0.000	12.406
D5-1	0.55	2.24	16.33	16.33	8.17	0.000	10.068
D6	0.55	6.13	19.88	19.88	7.64	0.000	25.774
D7	0.55	5.94	19.88	19.88	7.64	0.000	24.975
D5-C	0.55	1.02	15.74	15.74	8.27	0.000	4.639
D5-D	0.55	1.72	14.67	14.67	8.45	0.000	7.993
D8-2	0.55	1.58	14.58	14.58	8.47	0.000	7.356
D14-A	0.55	1.71	17.52	17.52	7.99	0.000	7.511
D14-B	0.55	1.71	17.86	17.86	7.93	0.000	7.463
D14-C	0.55	1.73	17.86	17.86	7.93	0.000	7.550

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)
D5-A	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
D5-B	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57
D14-A	Curb	5.00	0.00	0.68	2.00	0.50	2.00	0.014	1.50	0.57
D14-B	Curb	5.00	0.00	0.50	2.00	0.68	2.00	0.014	1.50	0.57
D14-C	Curb	5.00	0.00	0.50	2.00	0.44	2.00	0.014	1.50	0.57
D5-C	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.57

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)
D5-A	Curb	5.00	n/a	n/a	8.087	7.601	0.612	14.50	14.50
D5-B	Curb	5.00	n/a	n/a	6.235	7.601	0.465	13.15	13.15
D14-A	Curb	5.00	n/a	n/a	7.511	7.601	0.562	12.10	12.80
D14-B	Curb	5.00	n/a	n/a	7.463	7.601	0.558	12.80	12.05
D14-C	Curb	5.00	n/a	n/a	7.550	7.601	0.566	12.85	13.15
D5-C	Curb	5.00	n/a	n/a	4.639	7.601	0.369	11.80	11.80

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)
D1	CrcMh	0.550	3.03	16.17	8.20		0.00	13.662
D2	CrcMh	0.550	18.11	21.10	7.48		0.00	74.514
D3	CrcMh	0.550	20.56	21.42	7.44		0.00	84.126
D4	CrcMh	0.550	23.32	22.03	7.36		0.00	94.411
D5-1	CrcMh	0.550	31.47	22.61	7.29		0.00	126.161
D6	CrcMh	0.550	37.60	23.24	7.21		0.00	149.151
D7	CrcMh	0.550	43.54	23.68	7.16		0.00	171.463
D8-1	CrcMh	0.550	52.75	24.12	7.11		0.00	206.236
D9	CrcMh	0.550	57.87	24.63	7.05		0.00	224.391
D10	CrcMh	0.550	6.16	17.86	7.93		0.00	26.883
D11	CrcMh	0.550	9.23	18.48	7.84		0.00	39.812
D12	CrcMh	0.550	9.23	18.48	7.84		0.00	39.812
D13	CrcMh	0.550	12.61	19.79	7.66		0.00	53.109
D8-2	CrcMh	0.550	6.73	18.45	7.85		0.00	29.047
D5-A	Curb	0.550	1.79	16.07	8.21		0.00	8.087
D5-B	Curb	0.550	3.17	16.18	8.20		0.00	14.291
D5-2	CrcMh	0.550	4.19	16.27	8.18		0.00	18.854
D5-3	CrcMh	0.550	4.19	16.27	8.18		0.00	18.854
D14-A	Curb	0.550	1.71	17.52	7.99		0.00	7.511
D14-B	Curb	0.550	1.71	17.86	7.93		0.00	7.463
D14-C	Curb	0.550	1.73	17.86	7.93		0.00	7.550
D14-1	CrcMh	0.550	5.15	18.04	7.91		0.00	22.398
D14-2	CrcMh	0.550	3.42	17.88	7.93		0.00	14.919
D5-C	Curb	0.550	1.02	15.74	8.27		0.00	4.639
D5-D	CrcMh	0.550	5.91	16.52	8.14		0.00	26.463
OUT	Outlt	0.550	57.87	24.63	7.05		0.00	224.391

App. | No. | Date | Revisions

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM D
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAIN\SYS-D 2 YR.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 39 OF 131

PUBLIC WORKS AND ENGINEERING — 49097 — LICENSED — HOUSTON, TEXAS

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	D1	D2	40.70	39.90	Cir 1	0.00	3.50	300.0	0.267	0.013
2	D2	D3	39.90	39.20	Cir 1	0.00	4.00	160.0	0.438	0.013
3	D3	D4	39.20	38.30	Cir 1	0.00	4.00	275.0	0.327	0.013
4	D4	D5-1	38.30	37.55	Cir 1	0.00	4.50	260.0	0.288	0.013
5	D5-1	D6	37.55	36.80	Cir 1	0.00	4.50	300.0	0.250	0.013
6	D6	D7	36.80	35.36	Cir 1	0.00	4.50	270.0	0.533	0.013
7	D7	D8-1	35.36	34.67	Cir 1	0.00	4.50	285.0	0.242	0.013
8	D8-1	D9	34.67	34.12	Cir 1	0.00	5.50	265.0	0.208	0.013
9	D9	OUT	34.12	33.57	Cir 1	0.00	5.50	270.0	0.204	0.013
10	D10	D11	42.50	41.30	Cir 1	0.00	2.00	320.0	0.375	0.013
11	D11	D12	41.30	40.38	Cir 1	0.00	2.50	380.0	0.242	0.013
12	D12	D13	40.38	39.99	Cir 1	0.00	3.00	440.0	0.089	0.013
13	D13	D2	39.99	39.90	Cir 1	0.00	3.00	50.0	0.180	0.013
14	D8-2	D8-1	40.38	38.98	Cir 1	0.00	2.00	30.0	4.672	0.013
100	D5-A	D5-B	42.91	42.83	Cir 1	0.00	2.00	27.0	0.296	0.013
101	D5-B	D5-3	42.83	42.65	Cir 1	0.00	2.00	34.0	0.529	0.013
102	D5-C	D5-3	42.79	42.65	Cir 1	0.00	2.00	24.0	0.583	0.013
103	D5-3	D5-2	42.65	42.26	Cir 1	0.00	2.00	220.0	0.177	0.013
104	D5-2	D5-D	42.26	42.10	Cir 1	0.00	2.00	90.0	0.178	0.013
105	D5-D	D5-1	42.10	40.47	Cir 1	0.00	2.00	35.0	4.662	0.013
106	D14-A	D14-2	40.94	40.90	Cir 1	0.00	2.00	22.0	0.182	0.013
107	D14-B	D14-2	40.92	40.90	Cir 1	0.00	2.00	6.0	0.333	0.013
108	D14-2	D14-1	40.90	40.81	Cir 1	0.00	2.00	45.0	0.200	0.013
109	D14-C	D14-1	40.82	40.81	Cir 1	0.00	2.00	6.0	0.167	0.013
110	D14-1	D8-2	40.81	40.38	Cir 1	0.00	2.00	175.0	0.246	0.013

Conveyance Hydraulic Computations. Tailwater = 43.800 (ft)

Run #	Hyd. Gr.line US (ft)	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	53.01	52.26	48.00	0.018	1.23	3.50	4.55	1.42	13.7	52.2	0.000
2	52.26	51.99	47.50	0.267	2.67	4.00	8.37	5.93	74.5	95.4	0.000
3	51.99	51.06	48.00	0.340	3.38	4.00	7.44	6.69	84.1	82.5	0.000
4	51.06	50.90	47.50	0.229	3.32	4.50	7.50	5.94	94.4	106.1	0.000
5	50.90	49.67	47.30	0.408	4.50	4.50	7.93	7.93	126.2	98.7	0.000
6	49.67	48.13	45.50	0.570	3.87	4.50	10.26	9.38	149.2	144.2	0.000
7	48.13	45.99	46.00	0.754	4.50	4.50	10.78	10.78	171.5	97.2	0.000
8	45.99	45.00	45.50	0.374	5.50	5.50	8.68	8.68	206.2	153.6	0.000
9	45.00	43.80	45.50	0.443	5.50	5.50	9.44	9.44	224.4	152.2	0.000
10	62.16	57.68	48.50	1.400	2.00	2.00	8.56	8.56	26.9	13.9	0.000
11	57.68	54.13	48.00	0.934	2.50	2.50	8.11	8.11	39.8	20.3	0.000
12	54.13	52.58	47.50	0.353	3.00	3.00	5.63	5.63	39.8	19.9	0.000
13	52.58	52.26	48.00	0.629	3.00	3.00	7.51	7.51	53.1	28.4	0.000
14*	46.48	45.99	46.00	1.635	1.11	2.00	16.23	9.58	29.0	49.1	0.000
100	53.60	53.55	46.50	0.127	1.18	2.00	4.18	2.57	8.1	12.4	0.000
101	53.55	53.51	46.45	0.396	1.44	2.00	5.90	4.55	14.3	16.5	0.000
102*	53.52	53.51	47.14	0.042	0.71	2.00	4.66	4.28	4.6	17.4	0.000
103	53.51	51.99	47.00	0.689	2.00	2.00	6.00	6.00	18.9	9.6	0.000
104	51.99	51.37	47.00	0.689	2.00	2.00	6.00	6.00	18.9	9.6	0.000
105*	51.37	50.90	47.14	1.357	1.05	2.00	15.86	8.90	26.5	49.1	0.000
106	48.39	48.37	45.12	0.109	1.33	2.00	3.39	2.39	7.5	9.7	0.000
107	48.39	48.37	45.12	0.108	1.08	2.00	4.29	2.38	7.5	13.1	0.000
108	48.37	48.18	45.50	0.431	2.00	2.00	4.75	4.75	14.9	10.2	0.000
109	48.18	48.18	47.14	0.110	1.38	2.00	3.28	2.40	7.5	9.3	0.000
110	48.18	46.48	46.00	0.972	2.00	2.00	7.13	7.13	22.4	11.3	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	3.5	0.0	1	300.0
Circular	Concrete	4.0	0.0	2	435.0
Circular	Concrete	4.5	0.0	4	1115.0
Circular	Concrete	5.5	0.0	2	535.0
Circular	Concrete	2.0	0.0	13	1034.0
Circular	Concrete	2.5	0.0	1	380.0
Circular	Concrete	3.0	0.0	2	490.0

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	19
Curb In Sag		5.0	0.0	0.0	0.0	0.0	6
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= D12 Previous intensity used.
Discharge decreased downstream node Id= D5-2 Previous intensity used.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 105

Runoff Frequency of: 100 Years
Discharge decreased downstream node Id= D12 Previous intensity used.
Discharge decreased downstream node Id= D5-2 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= D5-A
Computed left ponded width exceeds allowable width at inlet Id= D5-A
Capacity of sag inlet exceeded at inlet Id= D5-A
Computed right ponded width exceeds allowable width at inlet Id= D5-B
Computed left ponded width exceeds allowable width at inlet Id= D5-B
Computed right ponded width exceeds allowable width at inlet Id= D14-A
Computed left ponded width exceeds allowable width at inlet Id= D14-A
Computed right ponded width exceeds allowable width at inlet Id= D14-B
Computed left ponded width exceeds allowable width at inlet Id= D14-B
Computed right ponded width exceeds allowable width at inlet Id= D14-C
Computed left ponded width exceeds allowable width at inlet Id= D14-C
Run# 9 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D9 Run # 9
Run# 8 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D8-1 Run # 8
Upstream HGL exceeds critical elevation (Analysis)at node Id= D8-1 Run # 8
Upstream HGL exceeds critical elevation (Design) at node Id= D8-2 Run # 14
Upstream HGL exceeds critical elevation (Analysis)at node Id= D8-2 Run # 14
Run# 110 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D14-1 Run # 110
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14-1 Run # 110
Run# 7 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D7 Run # 7
Upstream HGL exceeds critical elevation (Analysis)at node Id= D7 Run # 7
Run# 108 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D14-2 Run # 108
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14-2 Run # 108
Upstream HGL exceeds critical elevation (Design) at node Id= D14-C Run # 109
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14-C Run # 109
Run# 6 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D6 Run # 6
Upstream HGL exceeds critical elevation (Analysis)at node Id= D6 Run # 6
Upstream HGL exceeds critical elevation (Design) at node Id= D14-A Run # 106
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14-A Run # 106
Upstream HGL exceeds critical elevation (Design) at node Id= D14-B Run # 107
Upstream HGL exceeds critical elevation (Analysis)at node Id= D14-B Run # 107
Run# 5 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D5-1 Run # 5
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-1 Run # 5
Upstream HGL exceeds critical elevation (Design) at node Id= D5-D Run # 105
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-D Run # 105
Upstream HGL exceeds critical elevation (Design) at node Id= D4 Run # 4
Upstream HGL exceeds critical elevation (Analysis)at node Id= D4 Run # 4
Run# 104 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D5-2 Run # 104
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-2 Run # 104
Run# 3 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D3 Run # 3
Upstream HGL exceeds critical elevation (Analysis)at node Id= D3 Run # 3
Run# 103 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D5-3 Run # 103
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-3 Run # 103
Upstream HGL exceeds critical elevation (Design) at node Id= D2 Run # 2
Upstream HGL exceeds critical elevation (Analysis)at node Id= D2 Run # 2
Run# 13 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D13 Run # 13
Upstream HGL exceeds critical elevation (Analysis)at node Id= D13 Run # 13
Upstream HGL exceeds critical elevation (Design) at node Id= D5-B Run # 101
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-B Run # 101
Upstream HGL exceeds critical elevation (Design) at node Id= D5-C Run # 102
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-C Run # 102
Upstream HGL exceeds critical elevation (Design) at node Id= D1 Run # 1
Upstream HGL exceeds critical elevation (Analysis)at node Id= D1 Run # 1
Run# 12 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D12 Run # 12
Upstream HGL exceeds critical elevation (Analysis)at node Id= D12 Run # 12
Upstream HGL exceeds critical elevation (Design) at node Id= D5-A Run # 100
Upstream HGL exceeds critical elevation (Analysis)at node Id= D5-A Run # 100
Run# 11 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D11 Run # 11
Upstream HGL exceeds critical elevation (Analysis)at node Id= D11 Run # 11
Run# 10 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= D10 Run # 10
Upstream HGL exceeds critical elevation (Analysis)at node Id= D10 Run # 10

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
SYSTEM D
PROPOSED 2-YEAR
HOUSTORM CALCULATIONS

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\T-U STORM SYS D 2 YR.dwg

DRAWING SCALE
N.T.S.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 40 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER
HOUSTON, TEXAS

SYSTEM A

560.09 ACRES

STORM EVENT	FLOW RATE	WSEL
EXISTING 2-YR.	622.18 CFS	34.37
EXISTING 100-YR.	1,423.28 CFS	45.00
PROPOSED 2-YR.	622.19 CFS	34.37
PROPOSED 100-YR.	1,423.31 CFS	45.00

SYSTEM B

110.31 ACRES

STORM EVENT	FLOW RATE	WSEL
EXISTING 2-YR.	197.85 CFS	30.50
EXISTING 100-YR.	434.10 CFS	44.80
PROPOSED 2-YR.	197.85 CFS	30.50
PROPOSED 100-YR.	434.10 CFS	44.80

SYSTEM C

20.71 ACRES

STORM EVENT	FLOW RATE	WSEL
EXISTING 2-YR.	40.89 CFS	24.83
EXISTING 100-YR.	83.47 CFS	44.10
PROPOSED 2-YR.	40.89 CFS	24.83
PROPOSED 100-YR.	83.47 CFS	44.10

SYSTEM D

57.87 ACRES

STORM EVENT	FLOW RATE	WSEL
EXISTING 2-YR.	106.40 CFS	39.62
EXISTING 100-YR.	228.99 CFS	43.80
PROPOSED 2-YR.	106.33 CFS	39.62
PROPOSED 100-YR.	224.39 CFS	43.80

SUMMARY OF DRAINAGE AREAS
(LOCATED WITHIN PROJECT BOUNDARY)

SYSTEM A	20.05 ACRES
SYSTEM B	12.63 ACRES
SYSTEM C	15.42 ACRES
SYSTEM D	23.28 ACRES
TOTAL	71.38 ACRES

DETENTION ANALYSIS
EXISTING CONDITIONS % IMP. = 55%
PROPOSED CONDITIONS % IMP. = 55%
INCREASE IN IMP. AREA = 0.00 ACRES
REQUIRED DETENTION = 0.00 AC.-FT.

PROJECT TERRAIN

BASED ON PROJECT STREETS PROFILE GEOMETRY, THE OVERLAND FLOW IS ROUTED ALONG STREETS DOWNHILL TOWARD THE OUTFALL SYSTEMS.

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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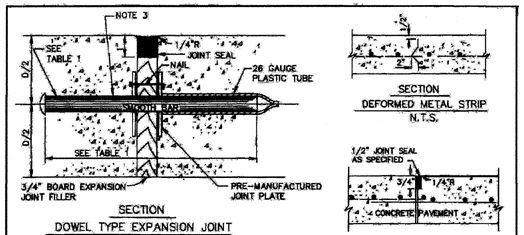
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

SUMMARY OF 2- & 100-YEAR HOUSTORM CALCULATIONS AND DETENTION ANALYSIS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\V SUM STM SWR ANYSIS.dwg
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 41 OF 131

PUBLIC WORKS AND ENGINEERING
49097
REGISTERED
HOUSTON, TEXAS



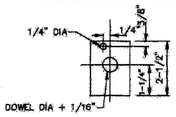
SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S

SECTION
DEFORMED METAL STRIP
N.T.S.

SECTION
CONSTRUCTION JOINT SEAL
N.T.S.



PLAN – JOINT PLATE



ELEVATION – JOINT PLATE
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

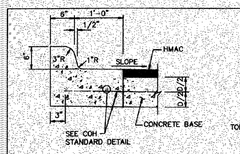
TABLE 1

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

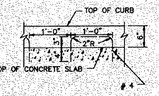
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)

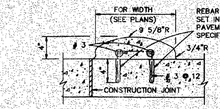
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: June-01-2003 | DWG NO: 02752-01



ESPLANADE CURB CONNECTED TO CONCRETE BASE



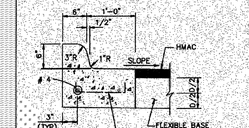
ALTERNATE CONCRETE CURB REINFORCEMENT



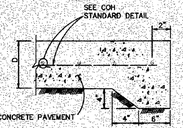
MOUNTABLE CURB

4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

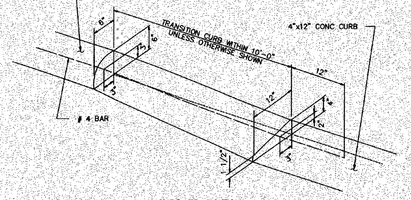
1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS NON-RESIDENTIAL STREETS, AND RESIDENTIAL STREETS.
2. TRANSITIONS FROM 6-INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FOOT TRANSITION CURB IS NOT POURED MONOLITHICLY WITH THE PAVEMENT, THEN REINFORCING STEEL AS SHOWN IN "4-INCH x 12-INCH TRANSITION CURB" IS TO BE INSTALLED.



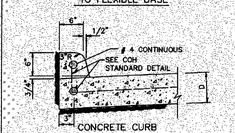
ESPLANADE CURB CONNECTED TO FLEXIBLE BASE



STANDARD CONCRETE PAVING HEADER

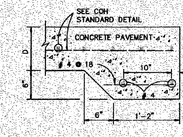


CURB TRANSITION

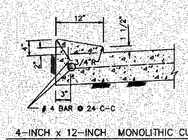


CONCRETE CURB

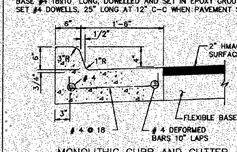
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE #4 18x10" LONG, DOWELED AND SET IN EPOXY GROUT SET #4 DOWELS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



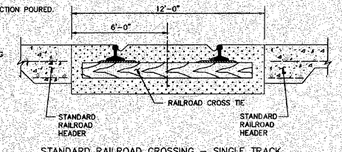
STANDARD RAILROAD HEADER



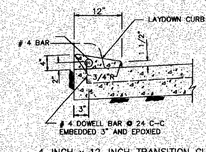
4-INCH x 12-INCH MONOLITHIC CURB



MONOLITHIC CURB AND GUTTER



STANDARD RAILROAD CROSSING – SINGLE TRACK

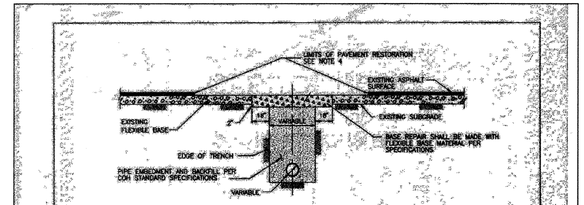


4-INCH x 12-INCH TRANSITION CURB

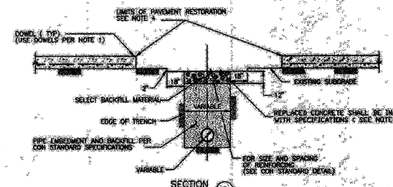
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

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 (A)
REPAIR OF FLEXIBLE BASE PAVEMENT



SECTION (B)
REPAIR OF REINFORCED CONCRETE PAVEMENT

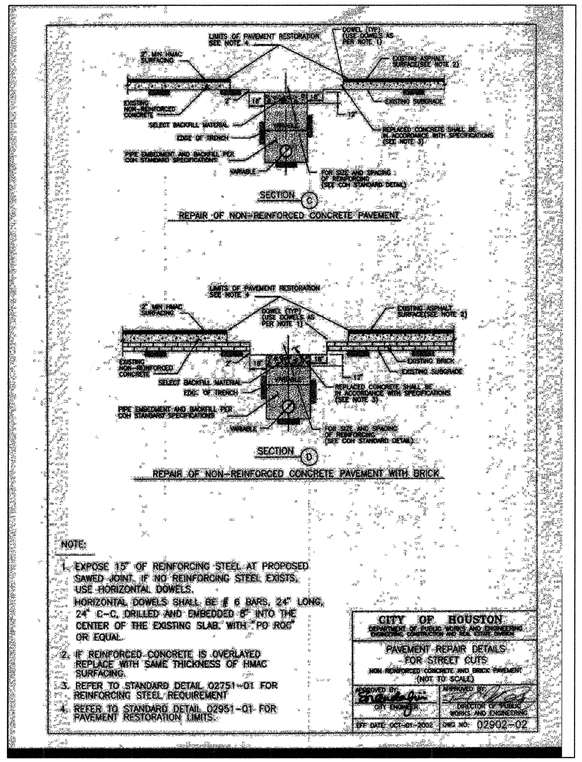
NOTE:

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

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

PAVEMENT REPAIR DETAILS FOR STREET CUTS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: OCT-01-2002 | DWG NO: 02902-01



SECTION (C)
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT

SECTION (D)
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT WITH BRICK

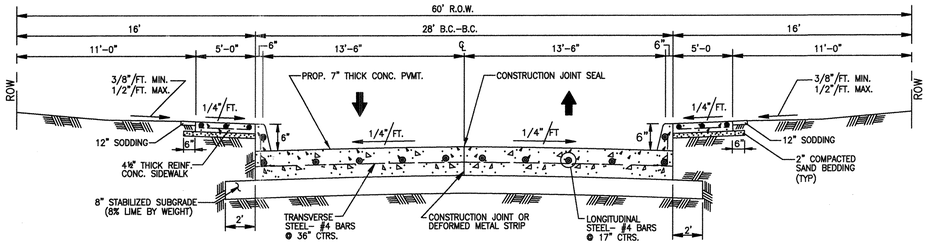
NOTE:

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

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

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

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 | DWG NO: 02902-02



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

SCALE: 1"= 10' HALF
1"= 5' FULL

TABLE 1

REINFORCING STEEL BAR SIZES AND SPACING FOR VARIOUS PAVEMENT THICKNESSES (D) WITH:
EXPANSION JOINT SPACING = 80 FT fc' = 3,000 PSI AND fy = 60,000 PSI
MINIMUM LAP LENGTH = 22 INCHES

NOTE: ALL EARTHEN AREAS ARE TO BE HYDROMULCHED

MW

FILE: 07W TYPCROS&PAV.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TYPICAL CROSS SECTION STANDARD PAVING DETAILS

WBS N-000383-0001-4
FILE: X:\City of Houston\2006-05_NSR 451\DRAWINGS\W TYPICAL CROSS SECTIONS.dgn
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 42 OF 131

PUBLIC WORKS AND ENGINEERING — REGISTERED — 49097 — CHIEF ENGINEER — HOUSTON, TEXAS

℄ CURVE NO. 1 DATA:

PC STA 10+24.69
PI STA 11+00.83
PT STA 11+70.19
Δ = 41°41'7"
R = 200'
L = 147.32'
T = 76.14

℄ CURVE NO. 2 DATA:

PC STA 12+11.39
PI STA 13+69.49
PT STA 14+93.33
Δ = 64°37'1"
R = 250'
L = 281.94'
T = 158.09

BENCHMARK MONUMENT
COH 5254-0810
CORNER OF LOOKOUT & S BRAESWOOD
EL= 46.92

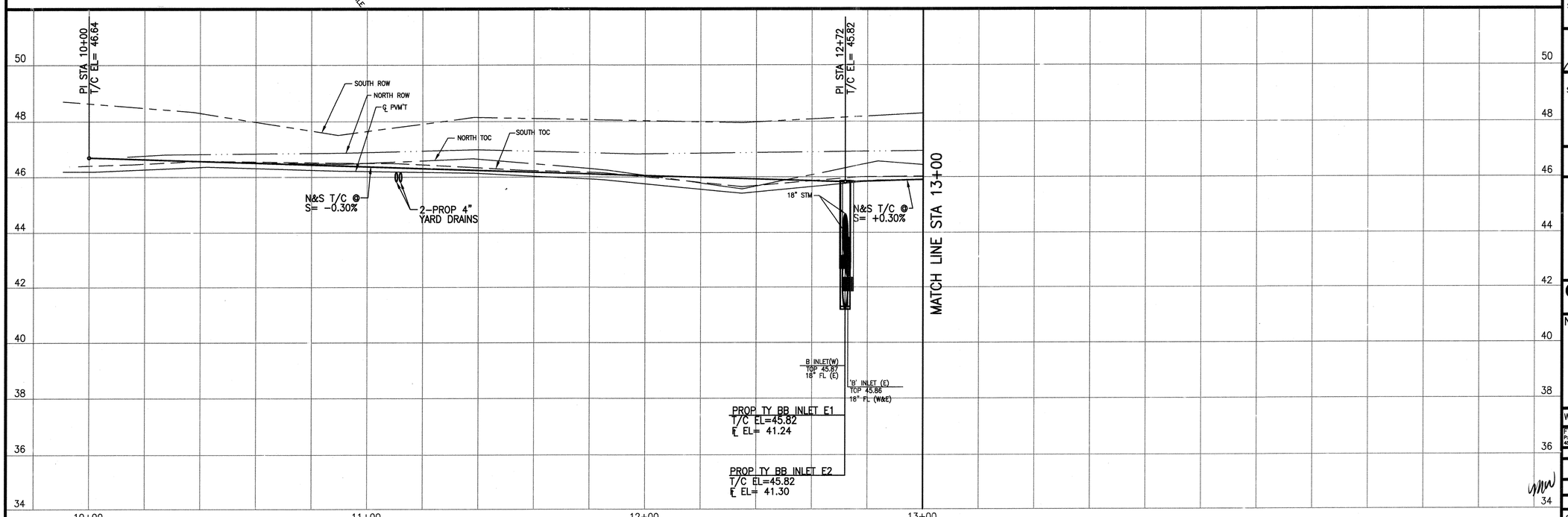
NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

LOOKOUT COURT

BRAES MANOR SECTION TWO BLOCK 9

PI STA 11+00.83
PC STA 10+24.69
PT STA 11+70.19
PC STA 12+11.39
℄ LOOKOUT COURT N 77°14'17" E
℄ LOOKOUT COURT S 61°04'36" E= 41.19'
BEGIN PROP PVMT STA 10+00
SOUTH ROW
NORTH ROW
PROP 6" CONC CURB
PROP CURB
PROP 7" CONC PVMT
DRIVEWAY R= 5' (TYP)
EXIST ASPHALT HIKE/BIKE TRAIL TO REMAIN
28' B-B
60' ROW
VARIES
29' CONC DRIVE ℄ STA 10+07
9' CONC DRIVE ℄ STA 10+94
20' CONC DRIVE ℄ STA 11+64
(TYP FOR ALL 3 DRIVEWAYS)
10' CONC DRIVE ℄ STA 12+14
15' CONC DRIVE ℄ STA 12+96
RELOCATE EXIST TRAFFIC SIGN
REPLACE 2 EXIST YARD DRAINS (SEE DETAIL SHEET 97)
2" AC WATER LINE (ABANDONED)
4" WATER LINE (ABANDONED)
6" I.P.C. WATER LINE
MATCH EXIST SIDEWALK (TYP)
PROP 5' CONC SIDEWALK
3' WALKWAY
PROP 24"x 28' RCP @ S= 0.20% (SEE NOTE 1)
REMOVE AND REPLACE EXIST RAMP 31
PROP TY BB INLET E1 STA 12+72, 14' LT (CONNECT EXIST 24"N)
PROP TY C MH STA 12+72, 23' LT (CONNECT EXIST & PROP RCP) FL=41.23
EXIST 18" RCP (DRAINS TO BAYOU)
PROP 24"x 6' RCP @ S= 0.20%
32 EXIST BACKFLOW DRAINS TO REMAIN
PROP TY BB INLET E2 STA 12+72, 14' RT
MATCH LINE STA 13+00 (SEE SHEET 44)
B INLET(W) TOP 45.87 18" FL (E)
'B' INLET (E) TOP 45.86 18" FL (W&E)
HIKE/BIKE TRAIL (ASPH PVM'T)
METAL GUARD RAIL
CLUSTER
TYPE "B" INLET
TRAFFIC SIGN
28" HACKBERRY
16" HACKBERRY 15' TREE
4" CREPE MYRTLE
14" HACKBERRY
6" CREPE MYRTLE
TRAFFIC LIGHT POLE 15' TREE
6" CONIFER
8" CONIFER
10" CONIFER
10" TREE
6" CREPE MYRTLE
8" WATER METER
CREPE MYRTLE
HEDGE
TRAFFIC SIGN
CONC DR.
WATER METER
22" CREPE MYRTLE
12" TREE
TYPE "B" INLET
TRAFFIC SIGN
2 BACKFLOW DRAINS
BRICK WALK



SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/14/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/14/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3369 FAX: (713) 748-3748

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

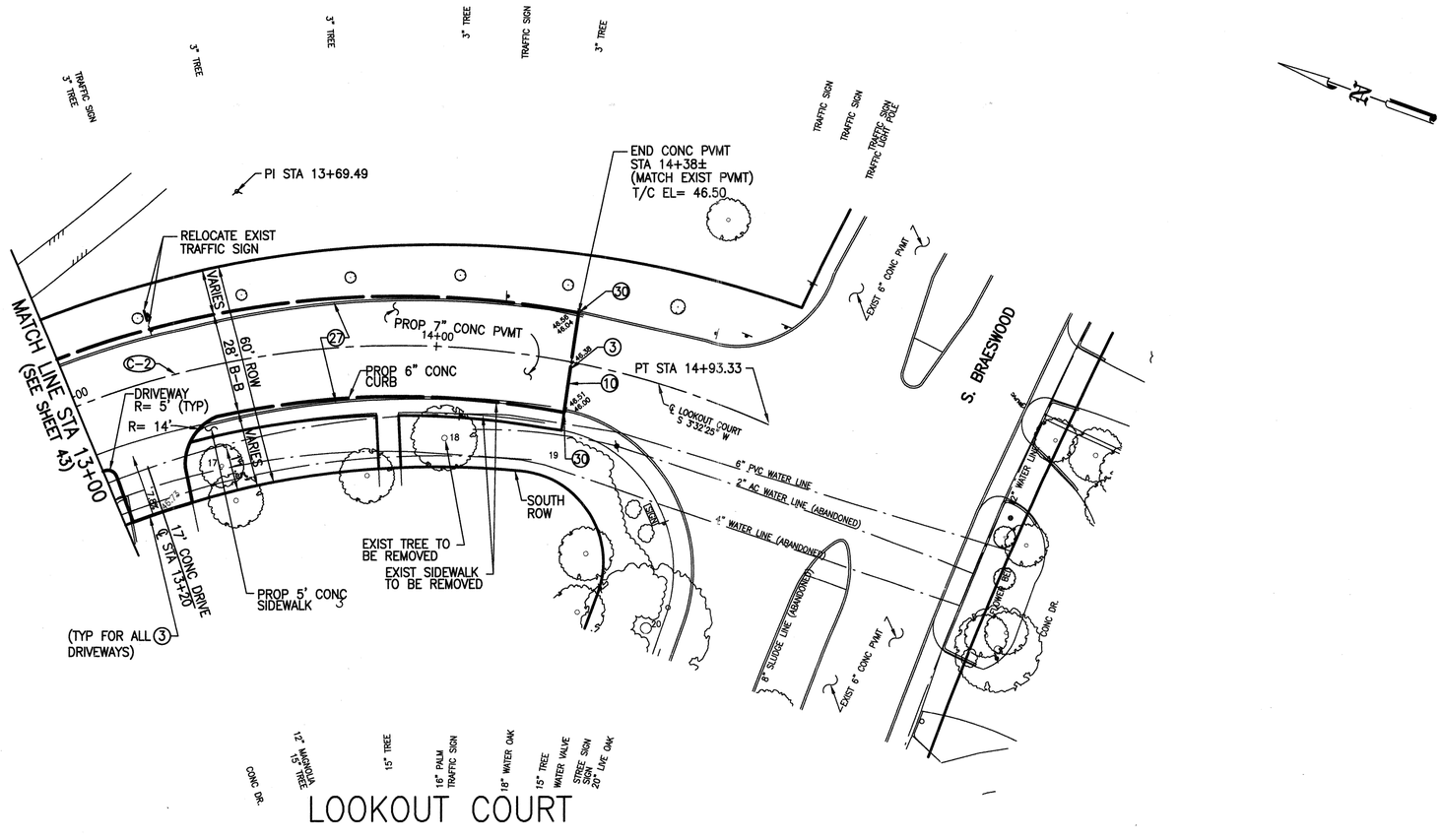
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

LOOKOUT COURT PLAN AND PROFILE
STA 10+00 TO STA 13+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-LOOKOUT1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 43 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

App.
Revisions
No. Date



LOOKOUT COURT

BENCHMARK MONUMENT
COH 5254–0810
CORNER OF LOOKOUT & S BRAESWOOD
EL= 46.92

℄ CURVE NO. 2 DATA:
PC STA 12+11.39
PI STA 13+69.49
PT STA 14+93.33
Δ = 64°37'1"
R = 250'
L = 281.94'
T = 158.09

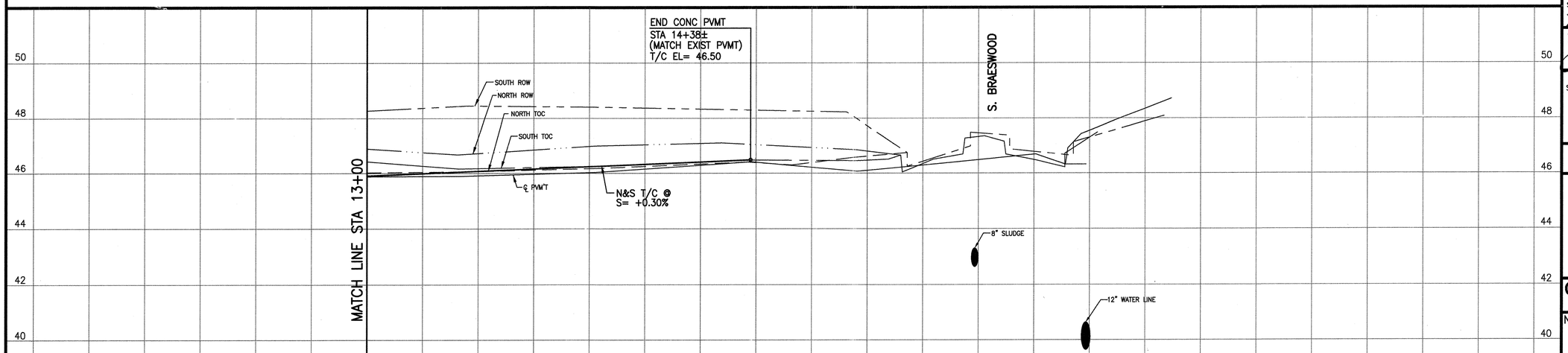
NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No.	Date	Revisions	Appr.

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS



SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-02

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3366 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

LOOKOUT COURT
PLAN AND PROFILE
STA 13+00 TO STA 15+50

WBS N–000383–0001–4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-LOOKOUT2.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 44 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
LICENSE NUMBER
HOUSTON, TEXAS

TBM #9
SET NAIL IN CONC
CENTER OF BROADMEAD DR
500 FT EAST OF ILONA LN
EL= 46.71

℄ CURVE NO. 3 DATA:

PC STA 10+29.63
PI STA 11+60.97
PT STA 12+90.62
Δ = 15°38'21"
R = 956'
L = 260.94'
T = 131.29

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS

BROADMEAD

ILONA

PC STA 10+14.00, 39' LT
TC EL= 47.53
PROP 8" RESTRAINED JOINT PIPE SECTION
1-8"x8" TEE, AB
1-8"x6" TEE, AB
1-8" GV w/BOX
1-6" GV w/BOX
1-F.H. 7' BC
PT STA 10+39 14' LT
TC EL= 47.92
PC STA 10+14.00, 39' RT
TC EL= 47.66
PROP 24" RCP
CENTER ONE JOINT OVER EXIST SAN SWR
PC STA 10+29.63
PI STA 11+60.97
PT STA 12+90.62
PROP 8" WATER LINE
PROP 5' CONC SIDEWALK
PROP 6" CONC CURB
PROP 7" CONC PVMT
RELOCATE EXIST WATER METER
RELOCATE EXIST YARD DRAIN
REPLACE EXIST YARD DRAIN
REPLACE EXIST YARD DRAIN TO ROW
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
MATCH LINE STA 15+00 (SEE SHEET 47)
(SEE SHEET 53)
NORTH ROW
SOUTH ROW
EXIST SIDEWALK
EXIST CONC PVMT
6" AC WATER LINE
8" WATER LINE
STREETLIGHT CABLE
℄ BROADMEAD S 62°6'26" E- 42.85'
℄ BROADMEAD S 78°37'31" E- 236.47'
DRIVEWAY R= 5' (TYP) 11+00
(TYP FOR ALL 3 DRIVEWAYS)
12' CONC DRIVE ℄ STA 11+19
11' CONC DRIVE ℄ STA 11+86
8' CONC DRIVE ℄ STA 11+78
9' CONC DRIVE ℄ STA 11+94
9' CONC DRIVE ℄ STA 12+48
9' CONC DRIVE ℄ STA 13+21
12' CONC DRIVE ℄ STA 13+40
5' CONC DRIVE ℄ STA 13+24
8' CONC DRIVE ℄ STA 14+44
9' CONC DRIVE ℄ STA 14+59
12' CONC DRIVE ℄ STA 14+11
12' CONC DRIVE ℄ STA 14+36
60' ROW
28' B-B
16'
15'
R= 85'
22+00
12+00
13+00
14+00
21 3642
20 3638
19 3634
18 3630
17 3626
16 3622
22 3646
3647 1
3643 2
3639 3
3635 4
3631 5
3627 6
STOP SIGN
H.L.& P. BOX
18" TALLOW
18" TALLOW
WATER METER
30" OAK
6" CREPE MYRTLE
CONC DR.
6" MAGNOLIA
12" OAK
20" WATER OAK
20" PINE
WATER METER
STREET LIGHT
15" PINE
CONC DR.
WATER METER
15" LIVE OAK
32" OAK
10" LIVE OAK
CONC DR.
18" OAK
WATER METER
LANDSCAPE BORDER
30" LIVE OAK
CONC DR.
LANDSCAPE BORDER
SPRINKLER HEAD
WATER METER
34" WATER OAK
LANDSCAPE BORDER
24" OAK
3" CREPE MYRTLE
SPRINKLER HEAD
H.L.& P. BOX
8" MAGNOLIA
WATER METER
SPRINKLER HEAD
4" PVC
28" WATER OAK
SPRINKLER HEAD
3" CREPE MYRTLE
CONC DR.
CONC DR.
4" CREPE MYRTLE
14" MAGNOLIA
BUSH

WATER VALVE
WATER METER
18" TALLOW
15" OAK
WATER METER
24" ASH
15" OAK
CONC WALK
LANDSCAPE BORDER
4" PVC
24" LIVE OAK
WATER METER
CONC WALK
34" LIVE OAK
CONC DR.
CONC DR.
WATER METER
42" OAK
15" CEDAR
4" PVC
20" OAK
28" LIVE OAK
SPRINKLER VALVE
WATER METER
CONC DR.
30" OAK
CONC DR.
WATER METER
30" LIVE OAK
55 FEET LIGHT
41 LANDSCAPE BORDER
CONC DR.
2" OAK
CONC DR.
24" PINE

PROFILE

ILONA
PT STA 10+14 T/C = 47.53 T/C = 47.66
PT STA 10+39 T/C = 47.92
PT STA 10+65 T/C = 48.00
SOUTH T.O.C.
NORTH T.O.C.
℄ PVMT
NORTH R.O.W.
SOUTH R.O.W.
PROP 24" RCP
1-20' JOINT OF 8" PIPE WITH RESTRAINED JOINTS CENTERED OVER EXIST SANITARY SEWER
PROP 6" FH LEAD
PROP 4" YARD DRAIN
N&S T/C @ S= -0.30%
PROP 4" YARD DRAIN
PROP 4" YARD DRAIN
6" WATER LINE
PROP. 8" WATER LINE
MIN. 4' COVER
12" MIN. CLEAR
2' (ABS) MIN CLEAR
PROP 8" WATER LINE
6" SAN.
LIMITS OF PROP 8" RESTRAINED JOINT PIPE SECTION SEE COH STD. DETAIL 02511-01
MATCH LINE STA 15+00
50
48
46
44
42
40
38
36
34
10+00
11+00
12+00
13+00
14+00
15+00
FILE: PP-BROADMEAD1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3369 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

BROADMEAD
PLAN AND PROFILE
STA 10+00 TO STA 15+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-BROADMEAD1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 46 OF 131

PUBLIC WORKS AND ENGINEERING
49097
REGISTERED
HOUSTON, TEXAS

No.	Date	Revisions	App.

TBM #9
SET NAIL IN CONC
CENTER OF BROADMEAD DR
500 FT EAST OF ILONA LN
EL= 46.71

℄ CURVE NO. 4 DATA:

PC STA 15+27.13
PI STA 17+08.62
PT STA 18+87.85
Δ = 15°38'2"
R = 1322'
L = 360.72'
T = 181.49

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

BROADMEAD

MATCH LINE STA 15+00 (SEE SHEET 46)

PROP TY BB INLET (MOD) A27-A W/TYPE C MH BOTTOM STA 15+90, 14' LT

4-8"x45° BENDS, AB
1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC

PROP TY C MH, A 27 STA 15+90, 23' LT

PROP 24"x 30' RCP

PROP 8" WATER LINE

EXIST TREES TO BE REMOVED

RELOCATE EXIST WATER METER

PROP 24"x 7' RCP

PROP 24"x 28' RCP @ S= 0.18% (SEE NOTE 1)

PC STA 15+27.13

REMOVE & SALVAGE EXIST FIRE HYDRANT

PROP TY BB INLET A27-B STA 15+90, 14' RT

BB INLET (N)
TOP 46.30
18" FL (S&NE) 42.8

BB INLET (S)
TOP 46.40
18" FL (N) 43.10

STM. MANHOLE A27
RIM 47.48
24" FL (E) 42.38
18" FL (SW) 42.58

PROP 24" CONC COLLAR STA 16+21, 22' LT

REPLACE EXIST YARD DRAIN

PROP 6" CONC CURB

22'x 5' ROE

(TYP FOR ALL DRIVEWAYS)

PROP 5' CONC SIDEWALK

(TYPICAL FOR ALL DRIVEWAYS)

PI STA 17+08.62

DRIVEWAY R= 5' (TYP)

PROP 7" CONC PVMT

EXIST 24" RCP TO REMAIN

EXIST CONC PVMT

PT STA 18+87.85

PC STA 18+79.41, 14' RT
TC EL= 47.90

PT STA 19+04.41, 39' RT
TC EL= 48.33

PT STA 19+04.41, 39' LT
TC EL= 48.10

CRITICAL LOCATION SEE COH SPEC. SEC. 02317

1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 3' BC

PC STA 18+79.41, 14' LT
TC EL= 47.90

1-12"x8" TEE, AB
1-8" GV w/BOX

PROP 12" WATER LINE

℄ BROADMEAD STA 19+18.41 =
℄ TIMBERSIDE STA 17+09.57

ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

FND 1/2" IR STA 7+74.52 O/S 29.81' RT

CENTERPOINT ENERGY 1 1/4" ø HP STL GAS LINE

8" AC WATER LINE

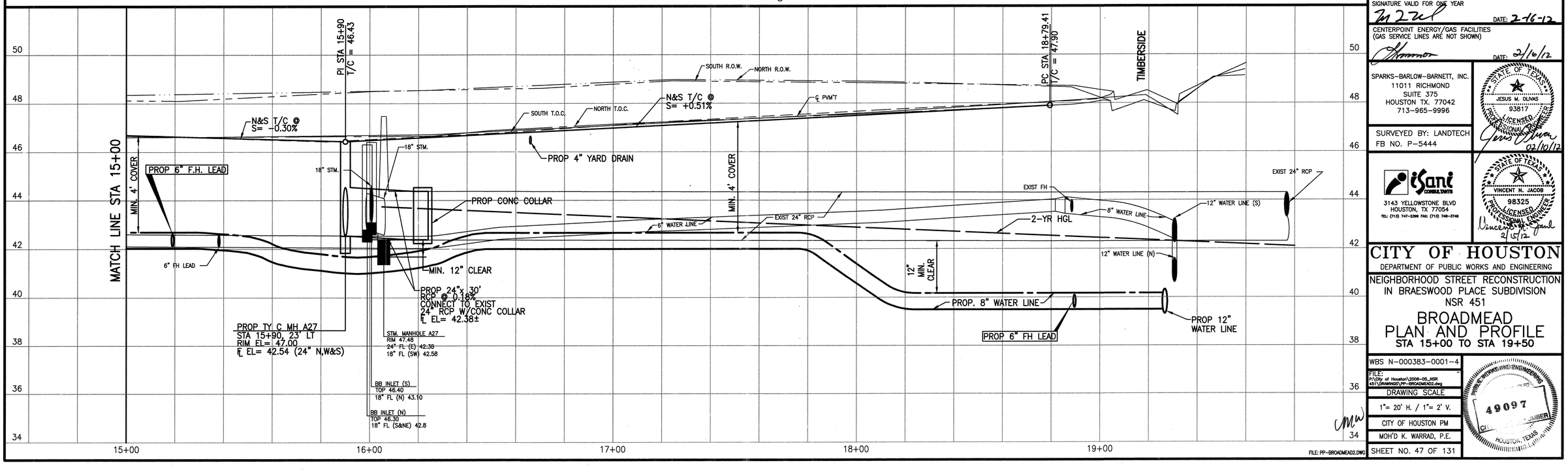
6" AC WATER LINE

STREET LIGHT CABLE

NORTH ROW

SOUTH ROW

TIMBERSIDE



FILE: PP-BROADMEAD2.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FUR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/10/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/10/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

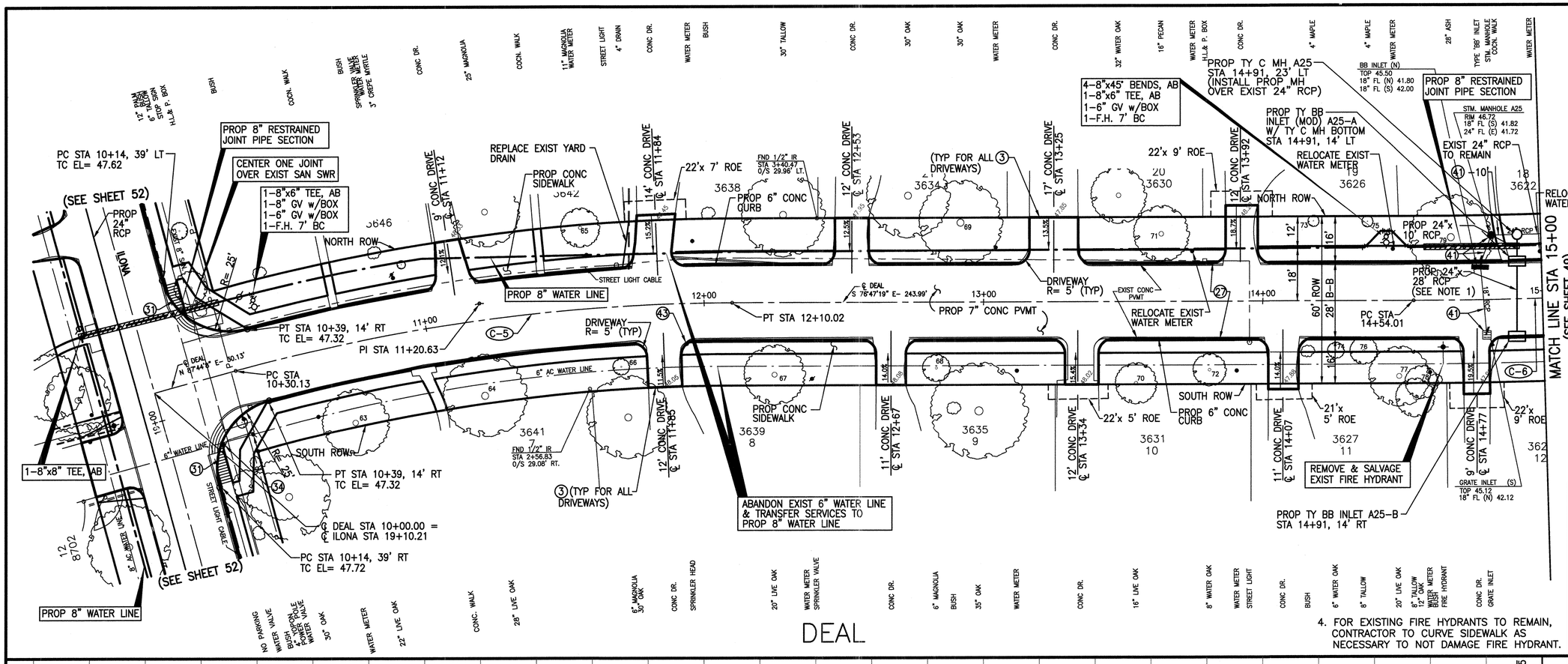
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

BROADMEAD
PLAN AND PROFILE
STA 15+00 TO STA 19+50

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-BROADMEAD2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 47 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	Asp.



TBM #8
SET NAIL IN CONC
CENTER OF DEAL ST
500 FT EAST OF ILONA LN
EL= 45.74

℄ CURVE NO. 5 DATA:

PC STA 10+30.13
PI STA 11+20.63
PT STA 12+10.02
Δ = 15°28'33"
R = 666'
L = 179.89
T = 90.50

℄ CURVE NO. 6 DATA:

PC STA 14+54.01
PI STA 16+72.97
PT STA 18+89.27
Δ = 15°28'14"
R = 1612
L = 435.26
T = 218.96

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

No. | Date | Revisions | Apps

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS · JESUS M. OLIVAS · 93817 · LICENSED PROFESSIONAL ENGINEER · 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748

STATE OF TEXAS · VINCENT N. JACOB · 98325 · LICENSED PROFESSIONAL ENGINEER · 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

DEAL
PLAN AND PROFILE
STA 10+00 TO STA 15+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-DEAL1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MCH'D K. WARRAD, P.E.
SHEET NO. 48 OF 131

PUBLIC WORKS AND ENGINEERING · FILED · 49097 · HOUSTON, TEXAS

℄ CURVE NO. 6 DATA:

PC STA 14+54.01
PI STA 16+72.97
PT STA 18+89.27
Δ = 15°28'14"
R = 1612
L = 435.26
T = 218.96

TBM #8
SET NAIL IN CONC
CENTER OF DEAL ST
500 FT EAST OF ILONA LN
EL= 45.74

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

(SEE SHEET 48) MATCH LINE STA 15+00

(SEE SHEET 56)

(SEE SHEET 56)

DEAL

TIMBERSIDE

MANOR

PROP 8" WATER LINE
RELOCATE EXIST WATER METER
(TYP FOR ALL 3 DRIVEWAYS)
PROP 6" CONC CURB
PROP 5' CONC SIDEWALK
PROP TY BB INLET A26-A STA 18+76, 14' LT
PC STA 18+79.94, 14' LT TC EL= 47.50
PROP 24"x 30' RCP
REMOVE & REPLACE EXIST MH
PT STA 19+04.94, 39' LT TC EL= 47.90
EXIST 24" STORM SEWER TO REMAIN
℄ DEAL STA 19+18.21 = ℄ TIMBERSIDE STA 14+19.57
EXIST 24" RCP STM TO REMAIN
DRIVEWAY R= 5' (TYP)
REPLACE EXIST YARD DRAIN
PROP 7" CONC PVMT
1-8"x45° BEND, AB
PROP 24"x 20' RCP (SEE NOTE 1)
PT STA 18+89.27
PROP TY C MH A26 STA 18+76, 4' RT
PROP TY BB INLET A26-B STA 18+76, 14' RT
1-8"x6" TEE, AB
1-6" GV w/BOX
1-8" GV w/BOX
1-F.H. 7' BC
1-8"X45° BEND, AB
PC STA 18+79.94, 14' RT TC EL= 47.50
REMOVE & SALVAGE EXIST FIRE HYDRANT
PT STA 19+04.94, 39' RT TC EL= 47.90
PROP 24"x 8' RCP
PROP 24"x 54' RCP
1-8"x8" TEE, AB
PROP 12" WATER LINE
PROP TY BB INLET A26-C (SEE SHEET 56 FOR STATION & OFFSET)
CRITICAL LOCATION SEE COH SPEC. SEC. 02317
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
PROP TY C MH A26 STA 18+76, 4' RT
RELOCATE EXIST WATER METER
PROP 5' CONC SIDEWALK
PROP 6" CONC CURB
21'x 6' ROE
22'x 5' ROE
PI STA 16+72.97
FND 1/2" IR STA 6+34.94 O/S 28.92' RT.
FND 1/2" IR STA 6+21.34 O/S 29.80' LT.
STREET LIGHT CABLE
CENTERPOINT ENERGY 2" IP STL. GAS LINE
6" AC WATER LINE
12" AC WATER LINE
B INLET TOP 47.31 18" FL (N) 43.01 18" FL (S) 43.01 18" FL (E) 43.31
B INLET TOP 47.49 18" FL (S) 44.19
STM MANHOLE A26 RIM 47.91 18 FL (S) 43.11 24" FL (E) 40.01
B INLET TOP 47.62 8" FL (W) 43.97
B INLET (N) TOP 47.31 18" FL (N) 43.01 18" FL (S) 43.01 18" FL (E) 43.31
B INLET (S) TOP 47.49 18" FL (N) 44.19
B INLET (E) TOP 47.62 8" FL (W) 43.97
STM MANHOLE A26 RIM 47.91 18 FL (S) 43.11 24" FL (E) 40.01
PROP TY C MH A26 STA 18+76, 4' RT RIM EL= 47.18 ℄ EL= 41.72 (24" N,S,E) ℄ EL= 41.22 (24" NE)
PROP TY BB INLET A26-C ℄ EL= 41.82 (24") T/C EL= 47.81 (SEE SHEET 56 FOR STATION & OFFSET)
PROP 6" FH LEAD
PROP TY C MH REMOVE & REPLACE EXIST MH RIM=47.91 ℄=40.01
PI STA 18+00 T/C EL= 47.74
PI STA 18+76.00 T/C EL= 47.48
PI STA 19+04.94 T/C EL= 47.90
N&S T/C @ S= +0.64%
N&S T/C @ S= -0.34%
N&S T/C @ S= +1.00%
PROP 4" YARD DRAIN
NORTH TOC
SOUTH TOC
℄ PVM'T
MIN. 4' COVER
2-YR HGL
PROP. 8" WATER LINE
EXIST 24" RCP TO REMAIN
PROP 24"x 54' RCP @ S= -0.18%
18" STM (N&S)
12" MIN. CLEAR
6" F.H. LEAD
8" WATER LINE
℄=41.16
12" WATER LINE (S)
12" WATER LINE (N)
24" STM
NORTH ROW
SOUTH ROW
TIMBERSIDE

15+00 16+00 17+00 18+00 19+00 20+00

FILE: PP-DEAL2.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3269 FAX: (713) 748-3748

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

DEAL
PLAN AND PROFILE
STA 15+00 TO END

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-DEAL2.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

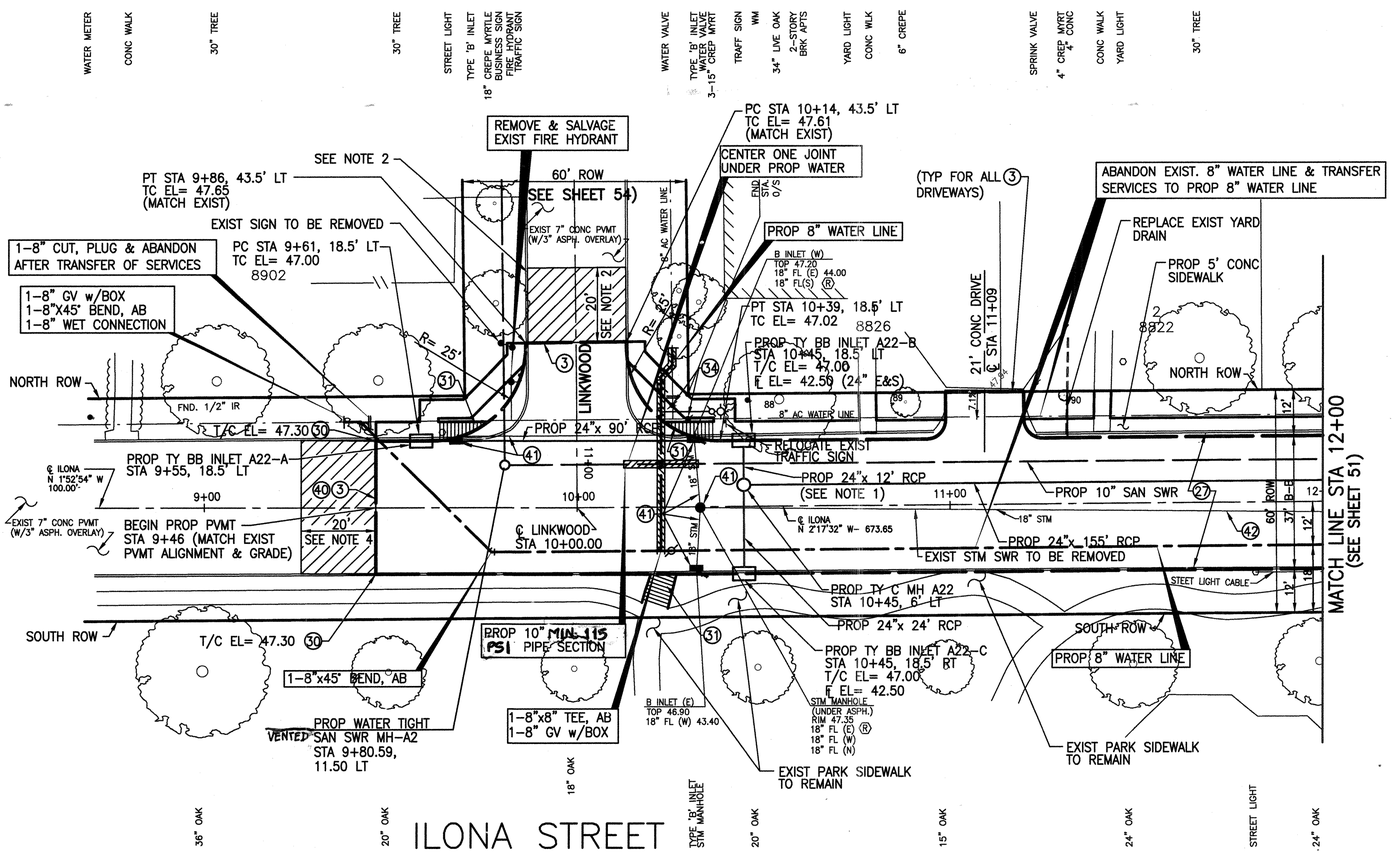
CITY OF HOUSTON PM

MOH'D K. WARRAD, P.E.

SHEET NO. 49 OF 131

PUBLIC WORKS AND ENGINEERING — 49097 — CITY NUMBER — HOUSTON, TEXAS

No.	Date	Revisions	App.



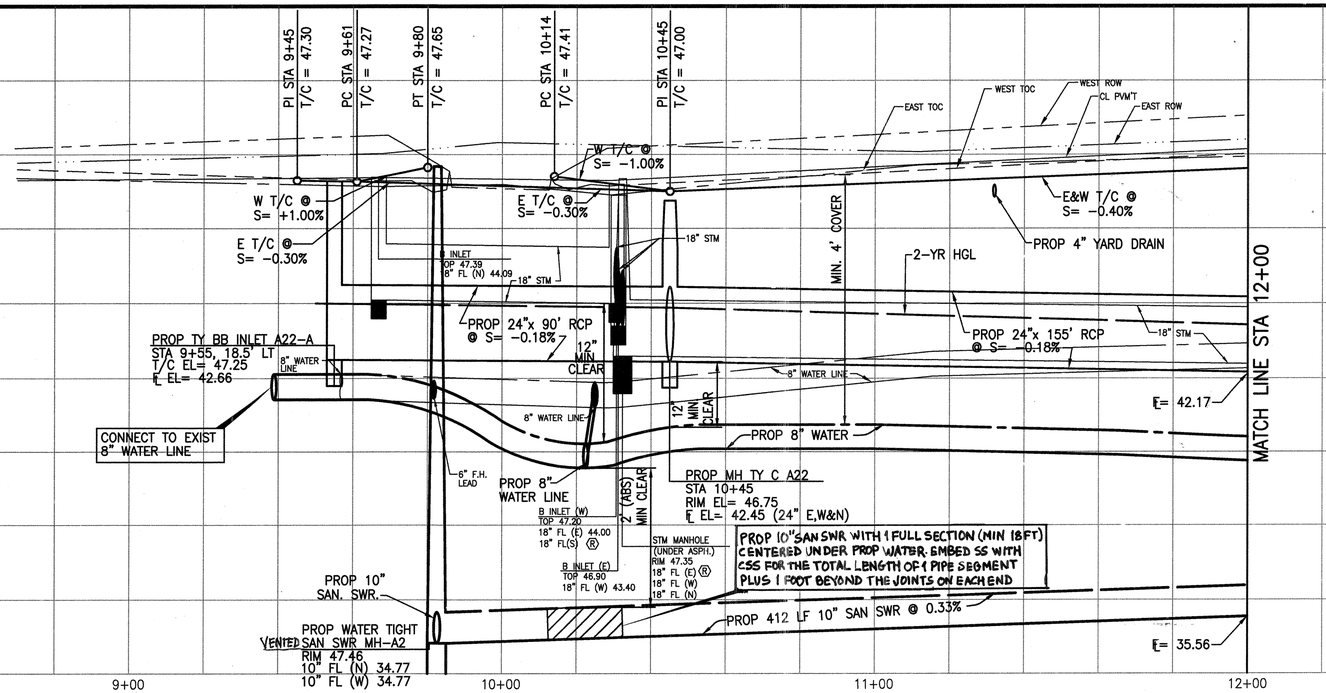
ILONA STREET

TBM #10
PK NAIL IN CONC @ INTERSEC
OF ILONA ST & LINKWOOD
EL= 47.37

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. MILL EXIST ASPH OVERLAY. SAWCUT, REMOVE AND REPLACE EXIST CONCRETE PVMT (2" MIN SAWCUT DEPTH) AT PROP PVMT LINE. TIE EXIST REINFORCING STEEL MIN 18" LENGTH AND CONNECT TO PROP REINFORCING STEEL PROVIDE ASPHALT TRANSITION TO MATCH EXIST & PROP PAVEMENT.
5. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No	Date	Revisions	App

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS



FILE: PP-ILONA1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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CENTERPOINT ENERGY/ELECTRIC FACILITIES
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CENTERPOINT ENERGY/GAS FACILITIES
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DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

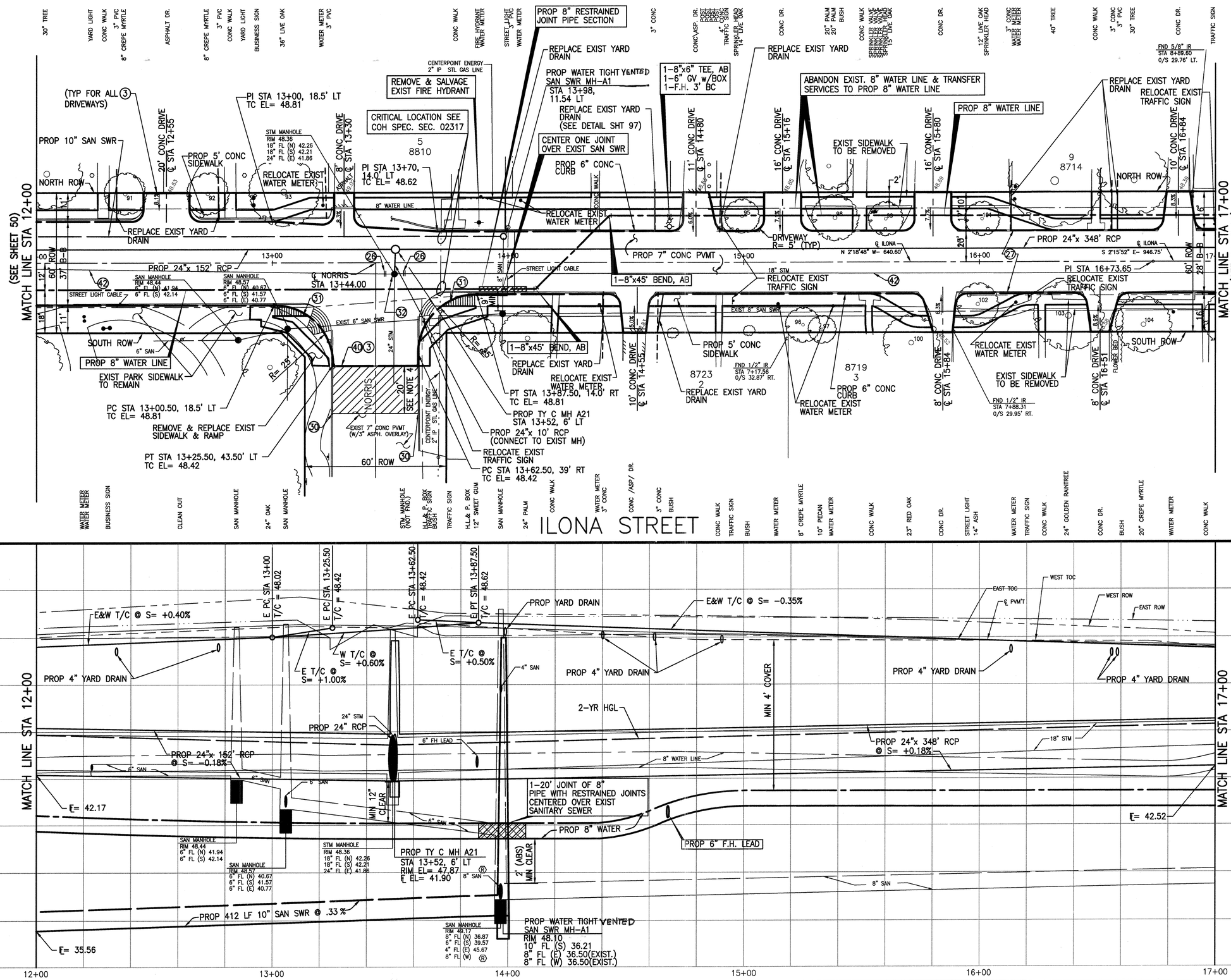
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

ILONA STREET
PLAN AND PROFILE
STA 8+50 TO STA 12+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-ILONA1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 50 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS



NOTES:
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2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. MILL EXIST ASPH OVERLAY, SAWCUT EXIST PVMT 2" DEPTH AT BEGIN PROP PVMT LINE. TIE EXIST REINFORCING STEEL MIN 18" LENGTH AND CONNECT TO PROP REINFORCING STEEL PROVIDE ASPHALT TRANSITION TO MATCH EXIST & PROP PAVEMENT.
5. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No. | Date | Revisions | App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

ILONA STREET
PLAN AND PROFILE
STA 12+00 TO STA 17+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-ILONA2.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 51 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — CITY SECRETARY — HOUSTON, TEXAS

FILE: PP-ILONA2.DWG

TBM #10
PK NAIL IN CONC @ INTERSEC
OF ILONA ST & LINKWOOD
EL= 47.37

NOTES:
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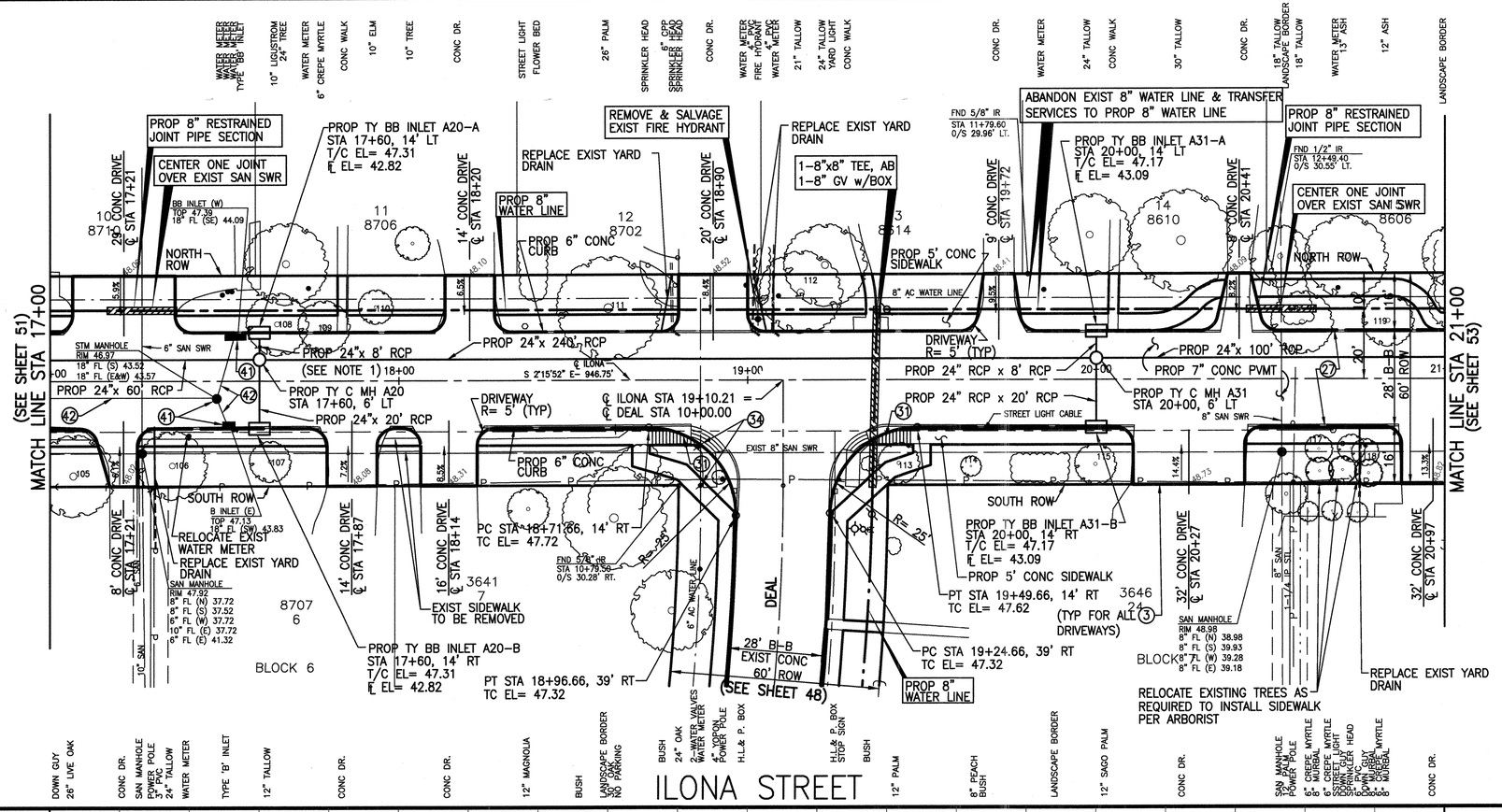
No.	Date	Revisions	App.



WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY
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CENTERPOINT ENERGY/GAS FACILITIES (GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2388 FAX: (713) 748-3745

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

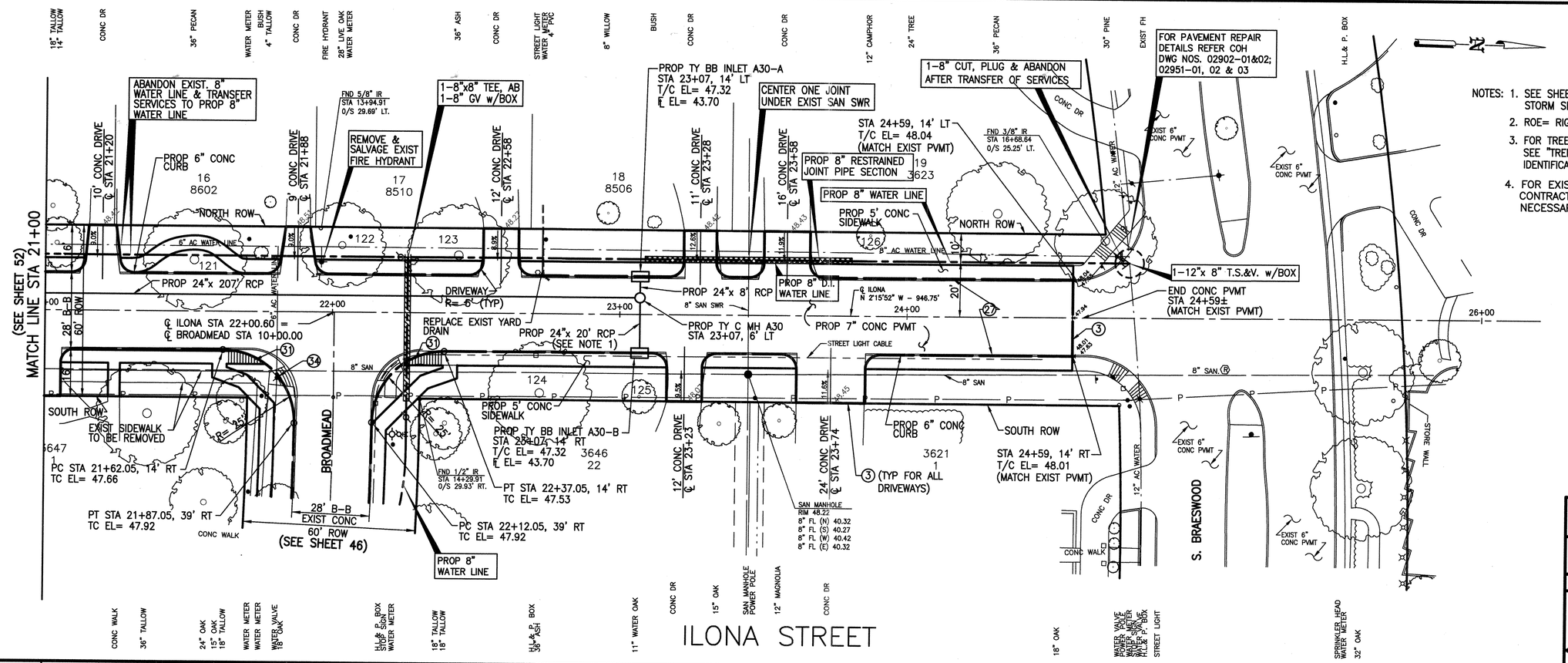
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

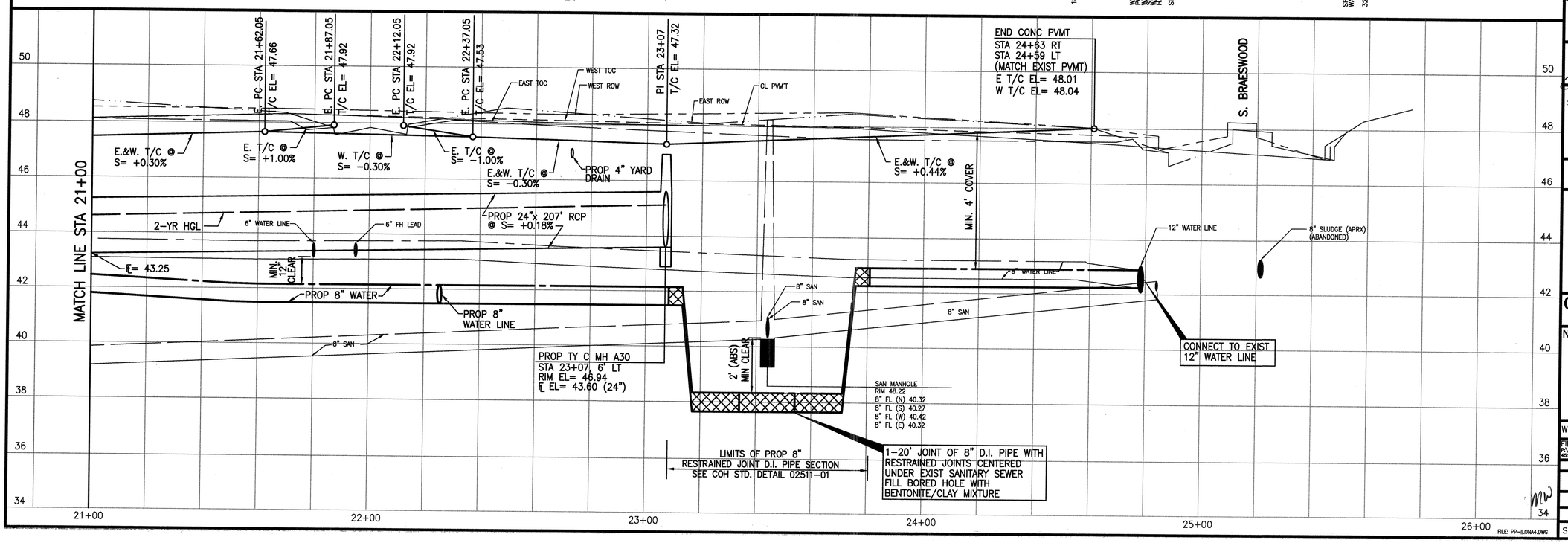
ILONA STREET
PLAN AND PROFILE
STA 17+00 TO STA 21+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-ILONA3.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 52 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — LICENSED PROFESSIONAL ENGINEER — STATE OF TEXAS

FILE: PP-ILONA3.DWG





SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR
DATE: 2-18-12

CENTERPOINT ENERGY/GAS FACILITIES (GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS JESUS M. OLIVAS 93817 LICENSED PROFESSIONAL ENGINEER 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3366 FAX: (713) 748-3748

STATE OF TEXAS VINCENT N. JACOB 98325 LICENSED PROFESSIONAL ENGINEER 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

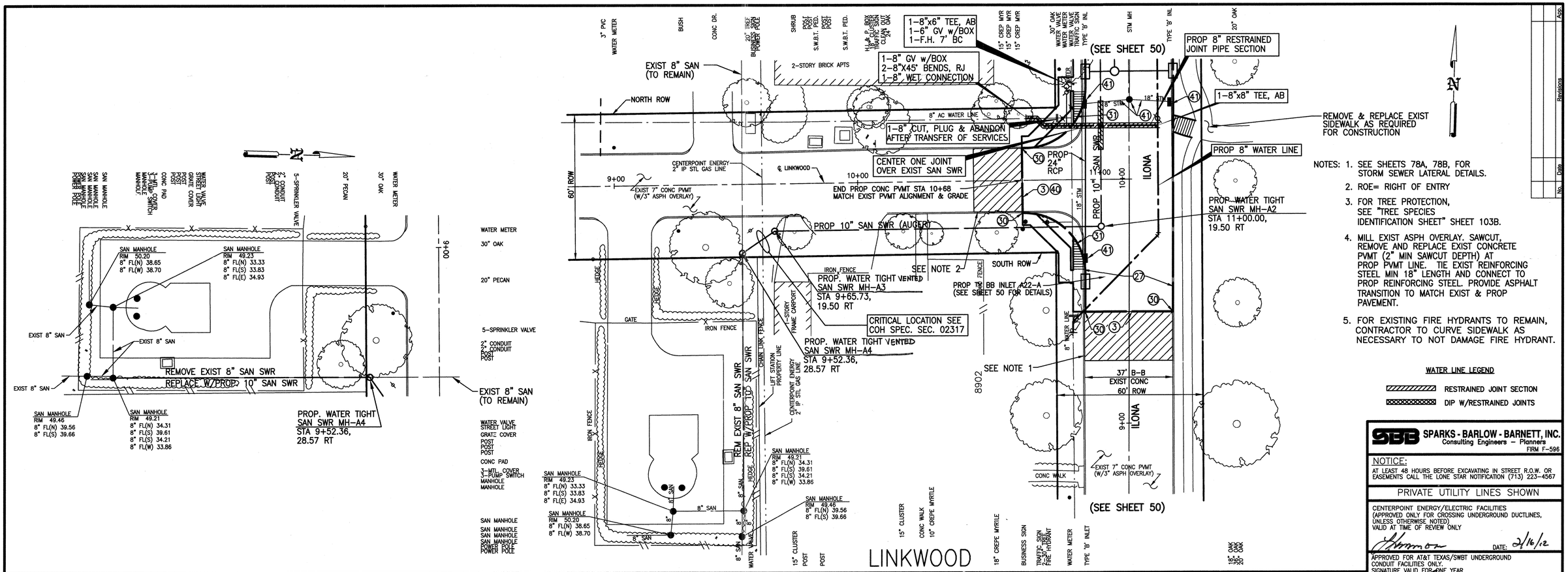
NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

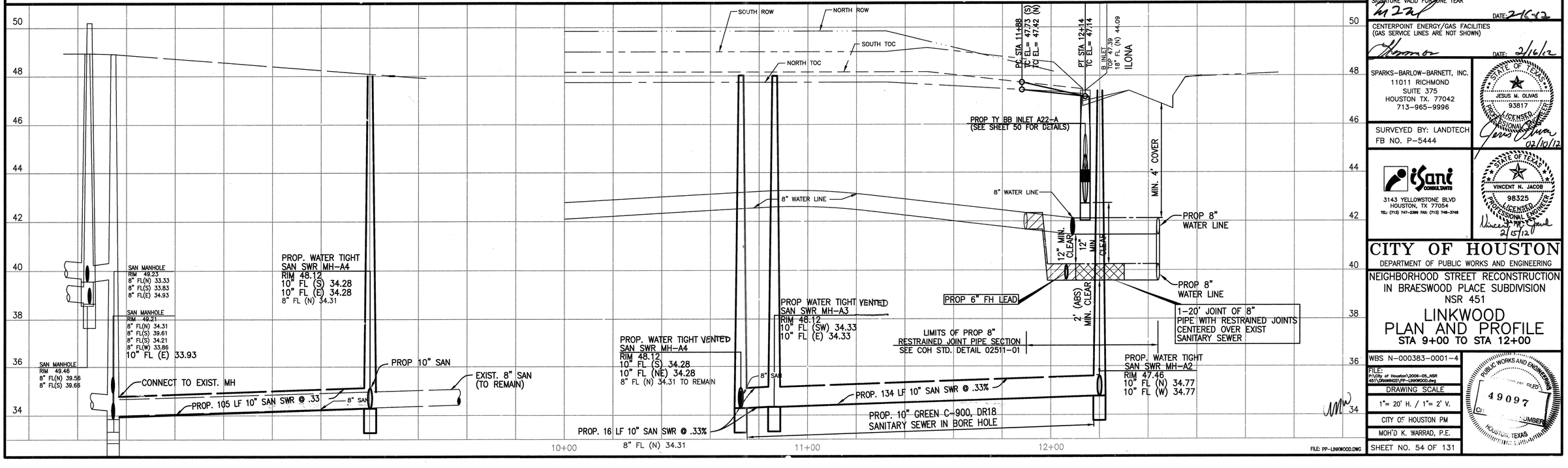
ILONA STREET PLAN AND PROFILE
STA 21+00 TO STA 26+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-ILONA4.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 53 OF 131

PUBLIC WORKS AND ENGINEERING FILED 49097 NUMBER HOUSTON, TEXAS

App. | Revisions | No. | Date





NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. MILL EXIST ASPH OVERLAY. SAWCUT, REMOVE AND REPLACE EXIST CONCRETE PVMT (2" MIN SAWCUT DEPTH) AT PROP PVMT LINE. TIE EXIST REINFORCING STEEL MIN 18" LENGTH AND CONNECT TO PROP REINFORCING STEEL. PROVIDE ASPHALT TRANSITION TO MATCH EXIST & PROP PAVEMENT.
5. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2/16/12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2266 FAX: (713) 748-3748

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

LINKWOOD
PLAN AND PROFILE
STA 9+00 TO STA 12+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-LINKWOOD.dwg

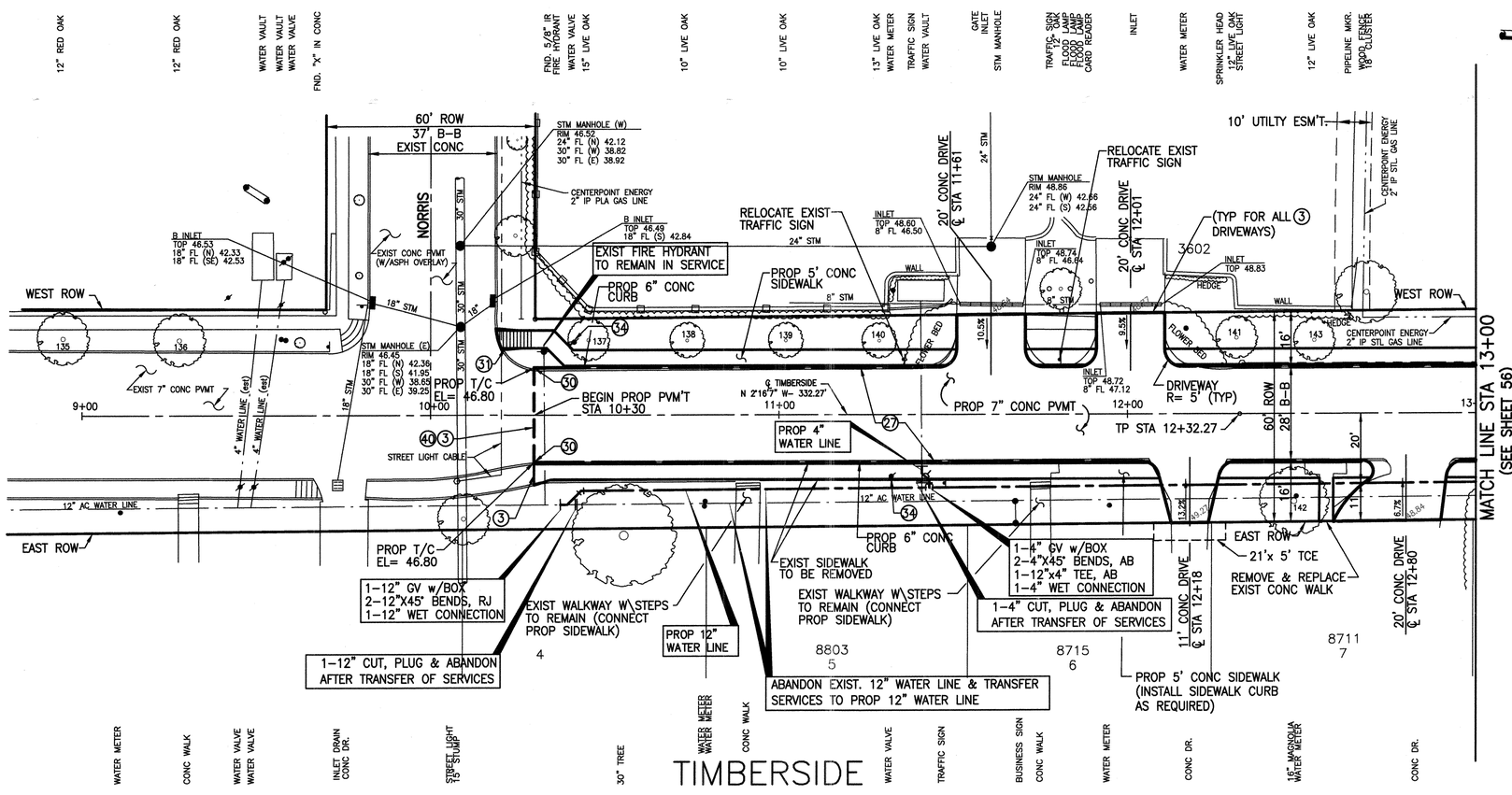
DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — CITY SECRETARY — HOUSTON, TEXAS

SHEET NO. 54 OF 131

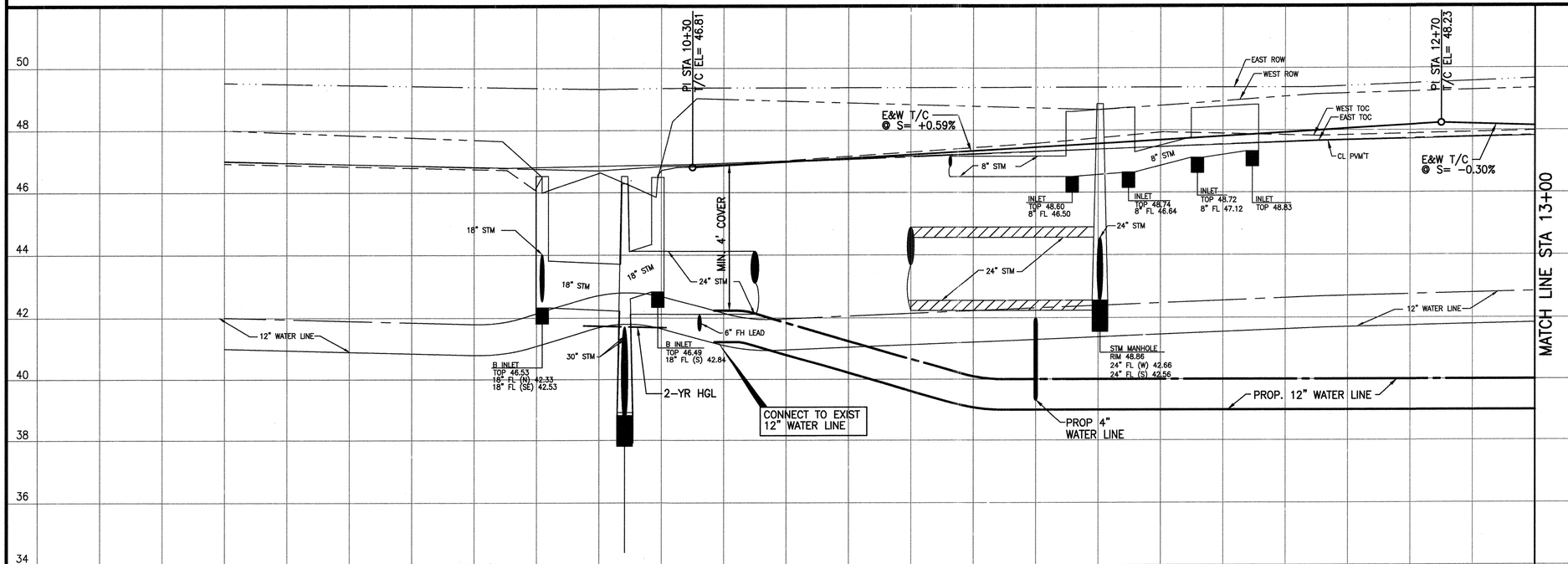
FILE: PP-LINKWOOD.DWG



TBM #7
SET NAIL W/ SHINER @ INTERSEC
OF NORRIS & TIMBERSIDE ST
EL= 46.85

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS



FILE: PP-TIMBERSIDE1.DWG

No.	Date	Revisions	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2369 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
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PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TIMBERSIDE
PLAN AND PROFILE
STA 9+00 TO STA 13+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-06_NSR 451\DRAWINGS\PP-TIMBERSIDE1.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 55 OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED AND FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

TBM #6
SET "X" IN CONC @ INTERSEC
OF S BRAESWOOD & TIMBERSIDE ST
EL= 46.19

PT STA 14+06.10, 39' LT
TC EL= 47.50

PC STA 14+34.10, 39' LT
TC EL= 47.50

(SEE SHEET 49
FOR STM SWR CALLOUTS)
(SEE SHEET 49)

PT STA 14+59.10, 14' LT
TC EL= 47.90

PROP 8" WATER LINE

PC STA 13+81.10, 14' LT
TC EL= 47.90

PROP 6" CONC CURB

PROP 5' CONC SIDEWALK

RELOCATE EXIST TRAFFIC SIGN

PC STA 16+71.10, 14' LT
TC EL= 48.33

PT STA 16+96.10, 39' LT
TC EL= 47.90

(SEE SHEET 47)

PC STA 17+24.10, 39' LT
TC EL= 47.90

PT STA 17+49.10, 14' LT
TC EL= 48.10

CRITICAL LOCATION SEE
COH SPEC. SEC. 02317

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

(SEE SHEET 55)
MATCH LINE STA 13+00

MATCH LINE STA 18+00
(SEE SHEET 57)

TIMBERSIDE STA 14+19.57=
DEAL STA 19+18.21

TIMBERSIDE STA 17+09.57 =
BROADMEAD STA 19+18.41

PROP 7" CONC PVMT

DRIVEWAY
R= 5' (TYP)

PROP 12" WATER LINE

1-12" GV w/BOX
1-12"x8" TEE, AB

PROP TY BB INLET A26-C
STA 14+12, 14' RT

(TYP FOR ALL DRIVEWAYS)

ABANDON EXIST. 12" WATER LINE & TRANSFER SERVICES TO PROP 12" WATER LINE

PROP 8" WATER LINE

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

TIMBERSIDE

PROP 8" WATER LINE
PROP. 12" WATER LINE
PROP TY BB INLET A26-C
STA 14+12, 14' RT
T/C EL= 47.81
℄ EL= 41.82 (24" W)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2/16/12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2300 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

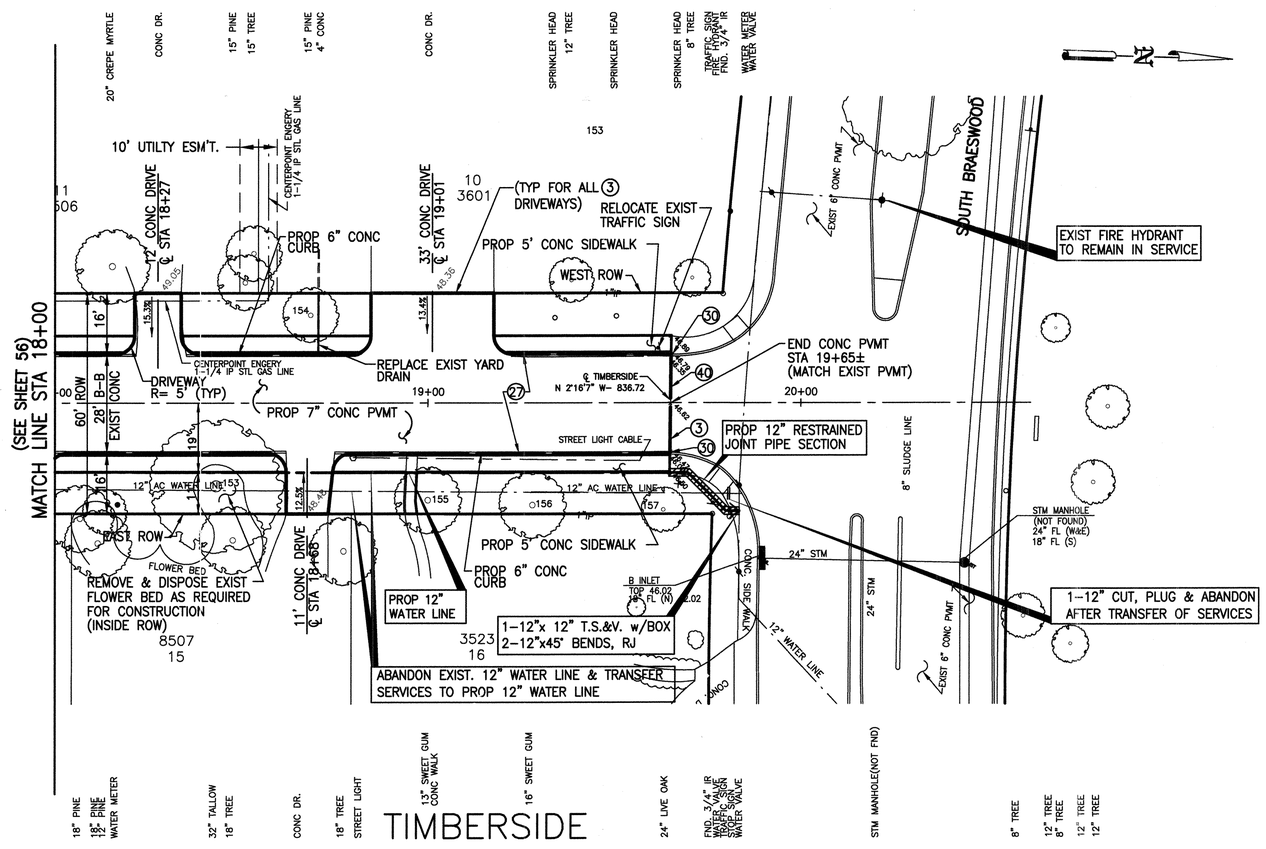
TIMBERSIDE
PLAN AND PROFILE
STA 13+00 TO STA 18+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-TIMBERSIDE2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 56 OF 131

FILED
49097
CITY NUMBER
PUBLIC WORKS AND ENGINEERING
HOUSTON, TEXAS

FILE: PP-TIMBERSIDE2.DWG

No. | Date | Revisions | App.



TBM #6
SET "X" IN CONC @ INTERSEC
OF S BRAESWOOD & TIMBERSIDE ST
EL.= 46.19

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
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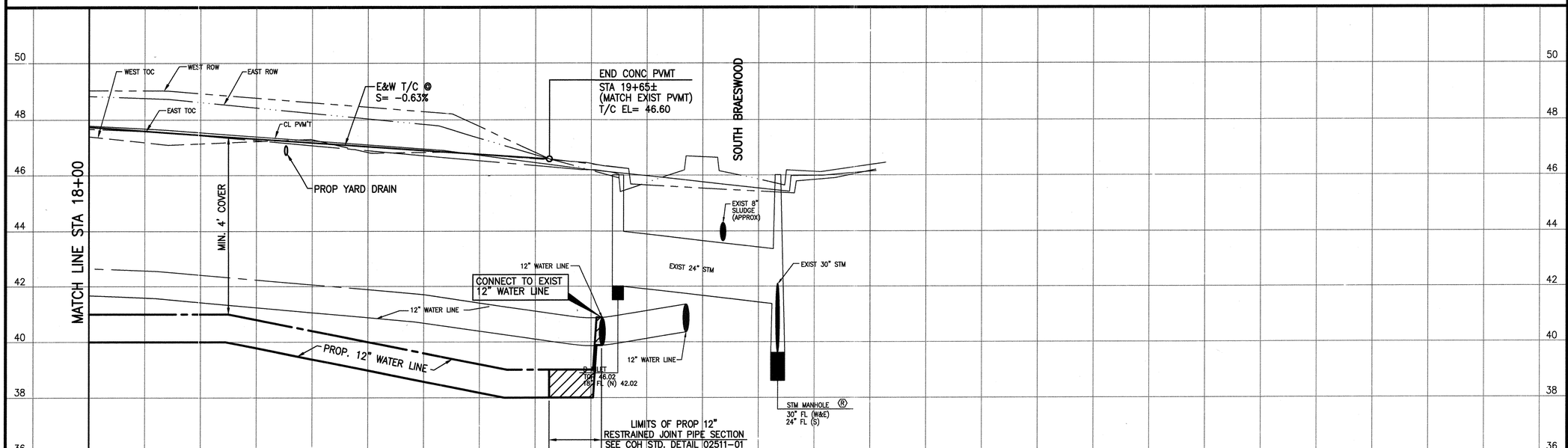
No.	Date	Revisions	App.

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS



FILE: PP-TIMBERSIDE3.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2369 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED
PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TIMBERSIDE
PLAN AND PROFILE
STA 18+00 TO STA 20+50

WBS N-000383-0001-4

FILE: C:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-TIMBERSIDE3.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

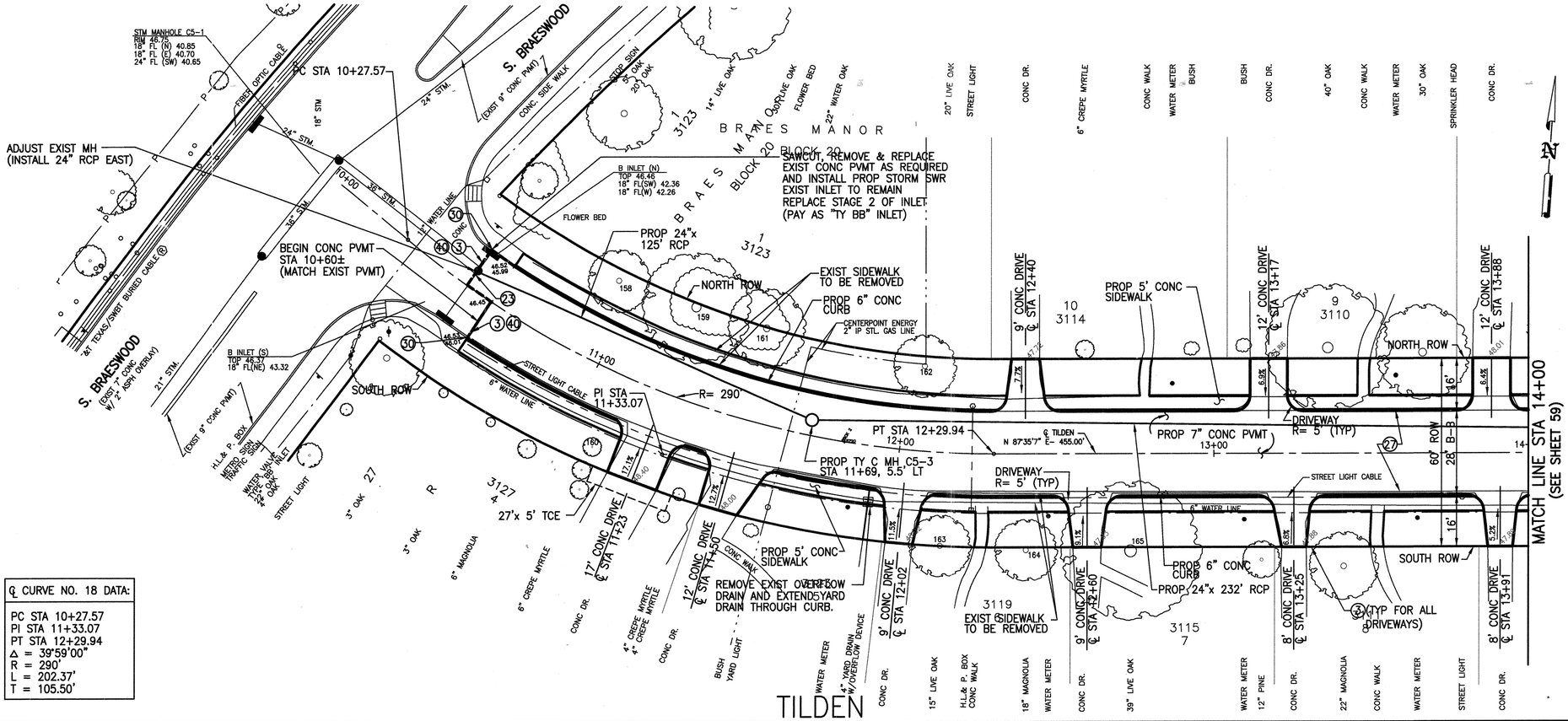
SHEET NO. 57 OF 131

PUBLIC WORKS AND ENGINEERING
PLAN FILED
49097
CITY NUMBER
HOUSTON, TEXAS

BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL= 44.98

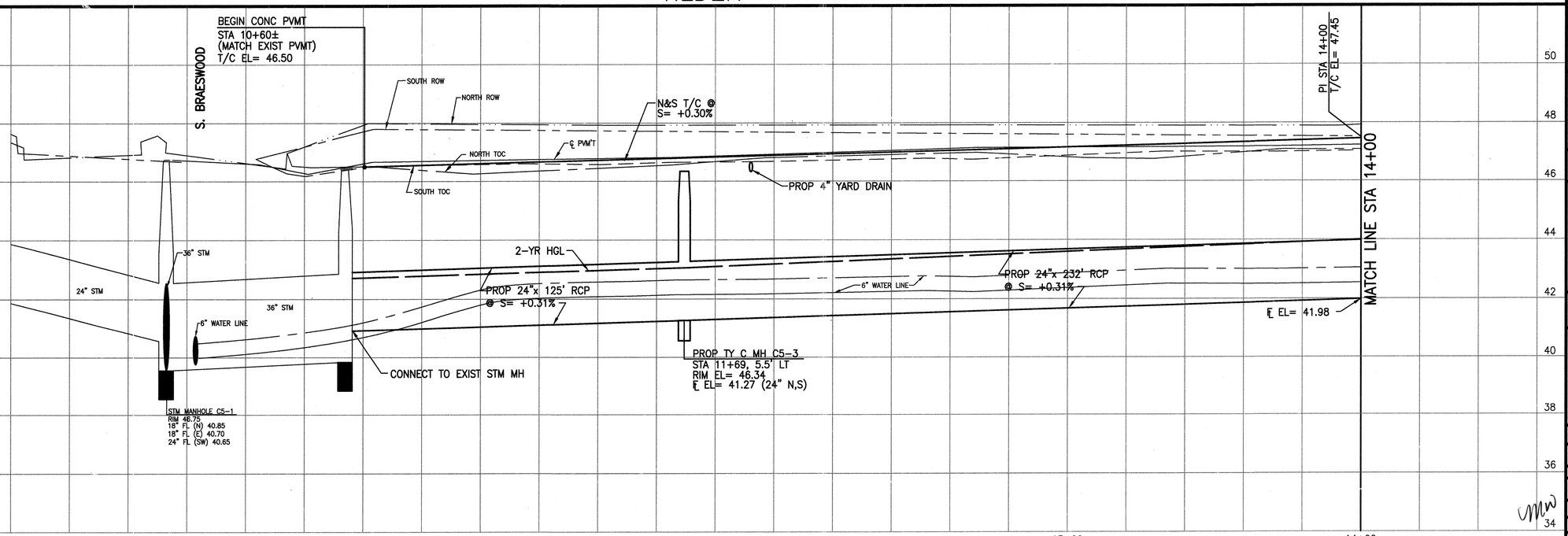
NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No.	Date	Revisions	App'd



℄ CURVE NO. 18 DATA:
PC STA 10+27.57
PI STA 11+33.07
PT STA 12+29.94
Δ = 39°59'00"
R = 290'
L = 202.37'
T = 105.50'

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS



FILE: PP-TILDEN1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

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3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2389 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

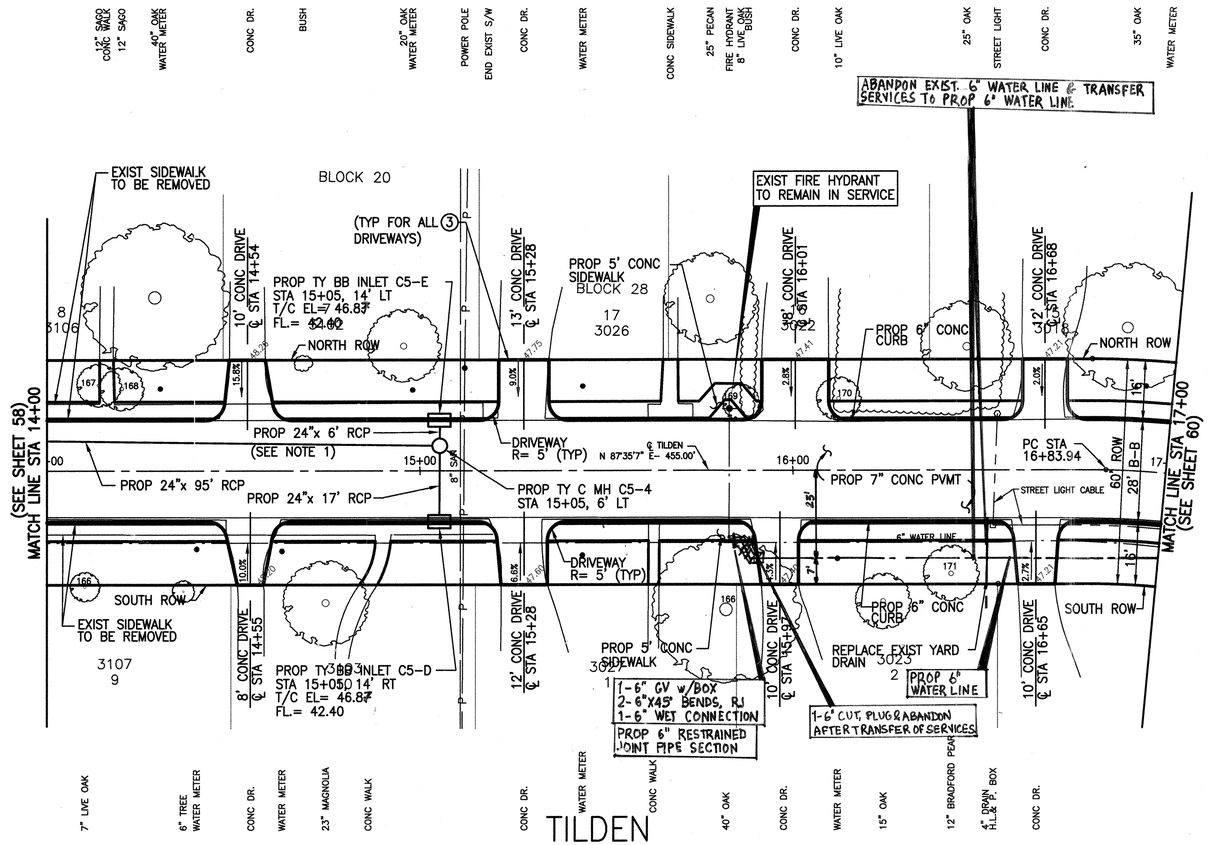
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TILDEN
PLAN AND PROFILE
STA 10+00 TO STA 14+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-TILDEN1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 58 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CITY REGISTRATION NUMBER
HOUSTON, TEXAS



℄ CURVE NO. 19 DATA:
PC STA 16+83.94
PI STA 18+56.74
PT STA 19+81.22
Δ = 75°29'26"
R = 230.00'
L = 297.28'
T = 172.80'

BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL= 44.98

NOTES:
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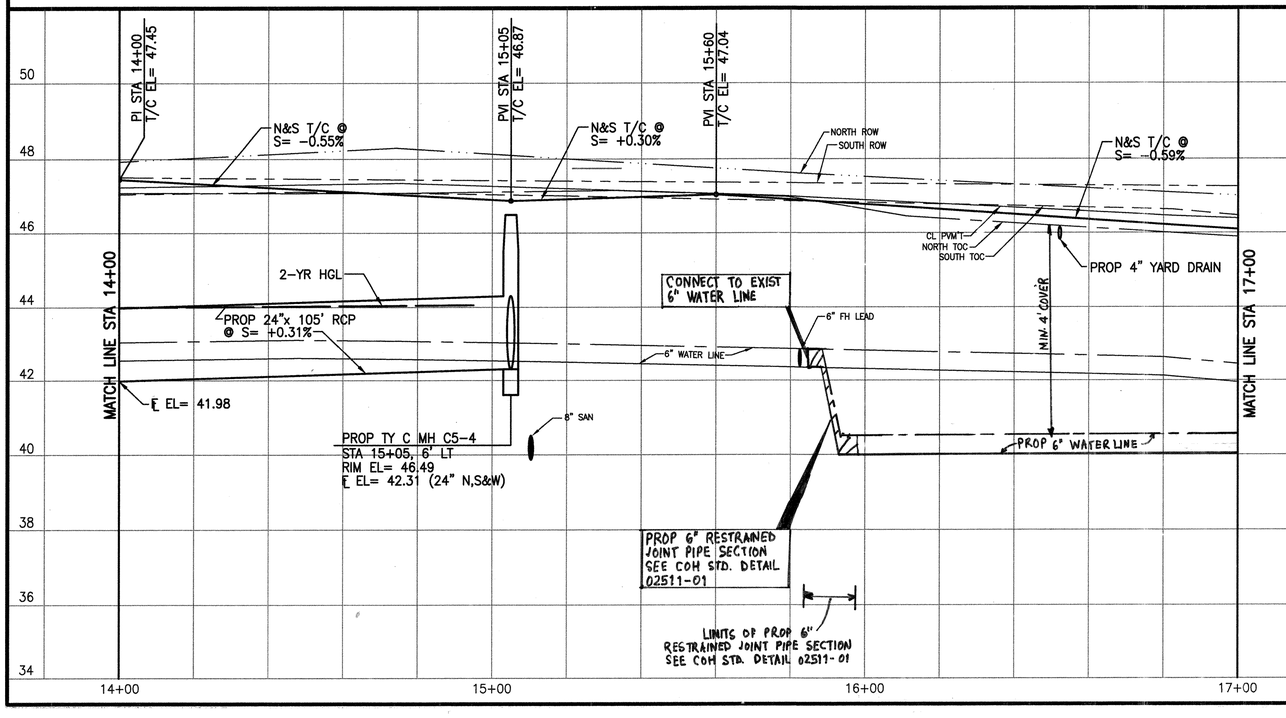
WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS



SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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SPARKS-BARLOW-BARNETT, INC.
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HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

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TEL: (713) 747-2389 FAX: (713) 748-3748

STATE OF TEXAS
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02/10/12

STATE OF TEXAS
VINCENT N. JACOB
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2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TILDEN
PLAN AND PROFILE
STA 14+00 TO STA 17+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-TILDEN2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 59 OF 131

PUBLIC WORKS AND ENGINEERING
CERT. FILE NO.
49097
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	Appr.

FILE: PP-TILDEN2.DWG

℄ CURVE NO. 19 DATA:

PC STA 16+83.94
PI STA 18+56.74
PT STA 19+81.22
Δ = 75°29'26"
R = 230.00'
L = 297.28'
T = 172.80'

BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL= 44.98

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No.	Date	Revisions	App.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

PI STA 18+56.74
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 6" WATER LINE
PROP TY C MH STA 19+90, 16' LT (CONNECT TO EXIST 18" RCP)
PROP 24"x 6' RCP (TIE TO EXIST 18" RCP)
PC STA 19+83.04, 14' LT TC EL= 44.58
PROP TY BB INLET D14-A STA 19+80, 14' LT T/C EL= 44.58 ℄ EL= 40.92
PT STA 20+08.04, 39' LT TC EL= 44.89
(TYP FOR ALL DRIVEWAYS)
EXIST SIDEWALK TO BE REMOVED
PROP 5' CONC SIDEWALK
RELOCATE EXIST WATER METER
PROP 7" CONC PVMT.
DRIVEWAY R= 5' (TYP)
PROP 24"x 6' RCP (SEE NOTE 1)
PROP TY C MH D14-2 STA 19+80, 6' LT
PROP 24"x 45' RCP
PROP TY C MH D14-1 ℄ EL= 40.70 (24")
PROP 24"x 6' RCP
PROP 8" WATER LINE
PROP 24"x 17' RCP
PROP 6" CONC CURB
PROP 6" WATER LINE
PROP TY BB INLET D14-B STA 19+80, 14' RT T/C EL= 44.58 ℄ EL= 40.94
1-6" GV w/BOX
PROP 6" RESTRAINED JOINT PIPE SECTION
PC STA 19+83.04, 14' RT TC EL= 44.58
PT STA 20+08.04, 39' RT TC EL= 45.00
℄ TILDEN STA 20+20.50 = ℄ WINSLOW STA 19+70.87
1-8"x8" TEE, AB
PROP. 6" WATER LINE
MATCH LINE STA 17+00 (SEE SHEET 59)
(SEE SHEET 63)
NORTH ROW
SOUTH ROW
60' ROW 28' B-B
WINSLOW
EXIST CONC
STM MANHOLE 21" FL (E) 18" FL(N) 18" FL (S)
B INLET TOP 45.74 18" FL(N) 41.49
12' CONC DRIVE ℄ STA 17+30
10' CONC DRIVE ℄ STA 18+20
12' CONC DRIVE ℄ STA 18+53
19' CONC DRIVE ℄ STA 19+21
16' CONC DRIVE ℄ STA 18+92
TILDEN S 16°55'27" E 39.28'
STREET LIGHT CABLE
6" AC WATER LINE
WOOD FENCE
CONC DR.
CONC WALK
WATER METER
STREET LIGHT
TYPE 'B' INLET
BUSH
STM MH
AC METER
5" OAK
25" OAK
6" PECAN
15" CREPE MYRTLE
19" LIVE OAK
18" OAK
37" LIVE OAK
25" OAK BUSH
22" TALLOW
17" SYCAMORE
20" CREPE MYRTLE
6" CREPE MYRTLE
18" PECAN

TILDEN

MATCH LINE STA 17+00
N&S T/C @ S= -0.59%
SOUTH ROW
NORTH ROW
PI STA 19+80.00 T/C EL= 44.58
CL PVM'T
SOUTH TOC
NORTH TOC
MIN. 4' COVER
6" WATER LINE
PROP. 6" WATER LINE
2-YR HGL
PROP 24"x 6' RCP @ S= 0.18%
PROP 24"x 45' RCP @ S= -0.18%
18" STM
21" STM
B INLET TOP 45.74 18" FL(N) 41.49
PROP TY C MH D14-2 STA 19+80 RIM EL= 44.20 ℄ EL= 40.78 (24" SE&NE)
12" MIN CLR
PROP TY BB INLET D14-C ℄ EL= 40.82 (24")
PROP 8" WATER LINE
PROP TY C MH D14-1 RIM EL= 44.22 ℄ EL= 40.70 (24")
PROP 6" RESTRAINED JOINT PIPE SECTION SEE COH STD. DETAIL 02511-01
6" WATER (ABANDONED)
B INLET TOP 44.58 18" FL(W) 40.78 18" FL(E) 40.73 18" FL(S) 40.78
B INLET TOP 44.89 18" FL(E) 41.29
STM MANHOLE 21" FL (E) 18" FL(N) 18" FL (S)
LIMITS OF PROP 6" RESTRAINED JOINT PIPE SECTION SEE COH STD. DETAIL 02511-01
50 48 46 44 42 40 38 36 34
17+00 18+00 19+00 20+00 21+00

FILE: PP-TILDEN3.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2369 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TILDEN
PLAN AND PROFILE
STA 17+00 TO 20+20

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-TILDEN3.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 60 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL.= 44.98

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS

MATCH LINE STA 14+50 (SEE SHEET 62)

WINSLOW

BUFFALO SPEEDWAY

REPLACE EXIST YARD DRAIN TO ROW
1-6" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES
EXIST TY BB INLET C3-C STA 10+52, 14' LT TO REMAIN MODIFY INLET TOP STAGE 2 (PAID AS TY BB INLET)
REPLACE EXIST YARD DRAIN
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
PROP 5' CONC SIDEWALK
EXIST SIDEWALK TO BE REMOVED
(TYP FOR ALL DRIVEWAYS)
PROP 6" CONC CURB
NORTH ROW
SOUTH ROW
EXIST 18" RCP TO REMAIN
DRIVEWAY R= 5' (TYP)
PROP 7" CONC PVMT
RELOCATE EXIST WATER METER
STA 10+32 BEGIN PROP PAVEMENT
EXIST TY BB INLET C3-B STA 10+52, 14' RT TO REMAIN MODIFY INLET TOP AS STAGE 2 (PAID AS TY BB INLET)
PROP 5' CONC SIDEWALK
REPLACE EXIST YARD DRAIN
PROP 8" WATER LINE
EXIST SIDEWALK TO BE REMOVED
1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC
1-12"x 8" T.S.&V. w/BOX
CRITICAL LOCATION SEE COH SPEC. SEC. 02317
EXIST FIRE HYDRANT TO REMAIN IN SERVICE
EXIST INLET C3-A TO REMAIN
6" AC WATER LINE
STREET LIGHT CABLE
CENTERPOINT ENERGY 2" IP STL. GAS LINE
STREET CONDUIT
EXIST 7" CONC PVMT
PH. MANHOLE RIM 47.33 THROAT 43.68 BOTTOM 37.73 T/C 43.93
STM MANHOLE C3-1 RIM 47.17 30" FL (N) 40.57 24" FL (S) 40.57 18" FL (SW) 40.57 18" FL (SE) 40.42
B INLET (N) TOP 46.33 18" FL (S) 43.33
B INLET (S) TOP 48.28 18" FL (N) 43.16 18" FL (NW)43.11
FIRE HYDRANT TYPE 'B'
C WINSLOW S 87°39'19" W- 520.59'
60' ROW 28' B-B 16' 16'

STA	CURVE	DIRECTION	DISTANCE
10+00	1	N	0.00
11+00	2	N	100.00
12+00	3	N	200.00
13+00	4	N	300.00
14+00	5	N	400.00

STA	CURVE	DIRECTION	DISTANCE
10+00	30	N	0.00
11+00	31	N	100.00
12+00	32	N	200.00
13+00	33	N	300.00
14+00	34	N	400.00

STA	CURVE	DIRECTION	DISTANCE
10+00	40	N	0.00
11+00	41	N	100.00
12+00	42	N	200.00
13+00	43	N	300.00
14+00	44	N	400.00

PI STA 10+32 T/C = 46.43±
PI STA 10+50 T/C = 46.33±
PT STA 14+35 T/C = 47.45
N&S T/C @ S= +0.30%
N&S T/C @ S= -0.50%
PROP 4" YARD DRAIN
NORTH TOC
SOUTH TOC
MIN. 4' COVER
PROP. 8" WATER LINE
6" WATER LINE
PROP 6" FH LEAD
2-YR HGL
12" WATER LINE
32-4" DUCTS SWBT
CONNECT TO EXIST 12" WATER LINE

FILE: PP-winslow1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers - Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

*APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2366 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

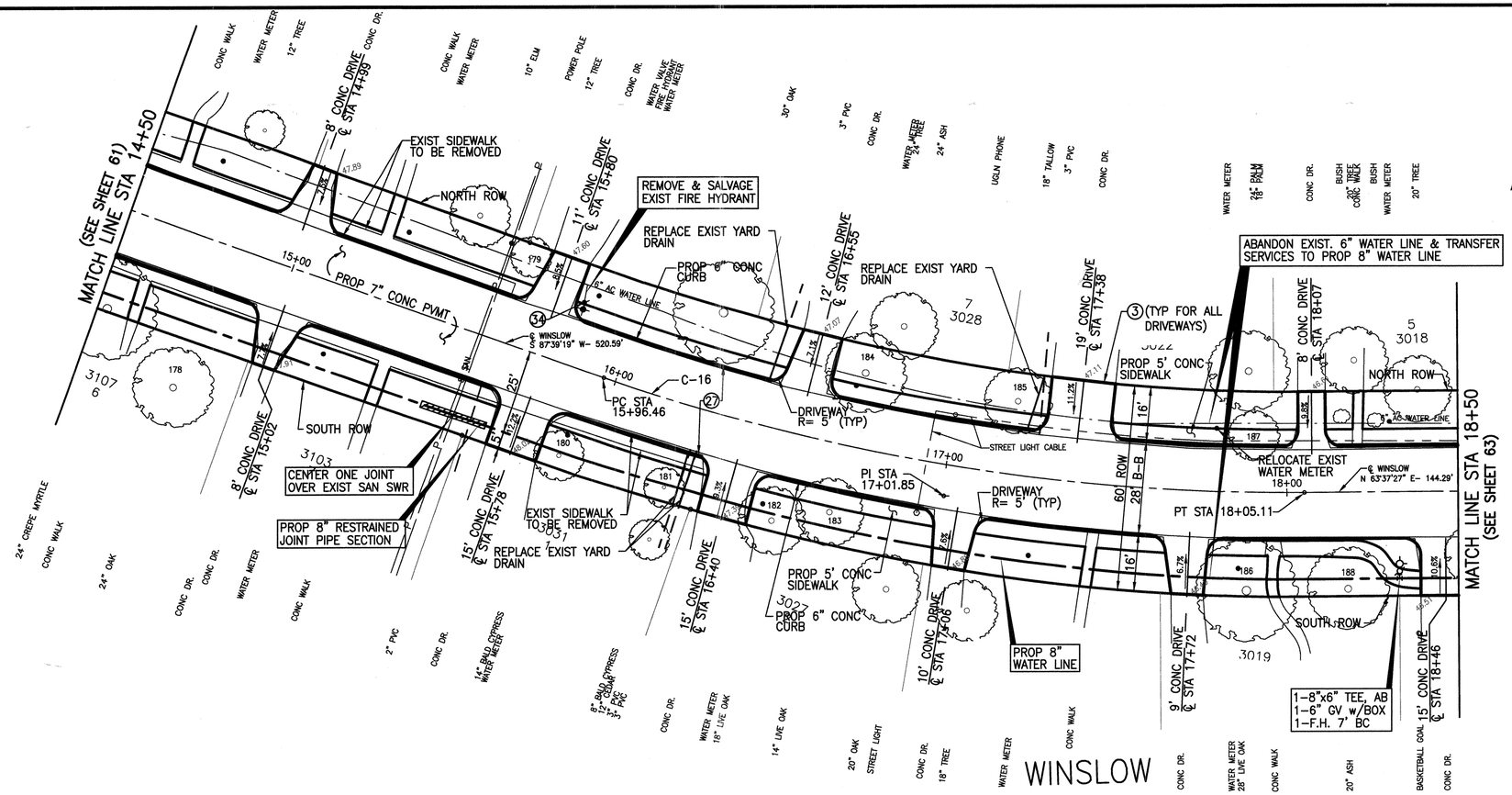
WINSLOW
PLAN AND PROFILE
STA 10+00 TO STA 14+50

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-WINSLOW1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 61 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY REGISTRATION NUMBER
HOUSTON, TEXAS

No. Date Revisions App.

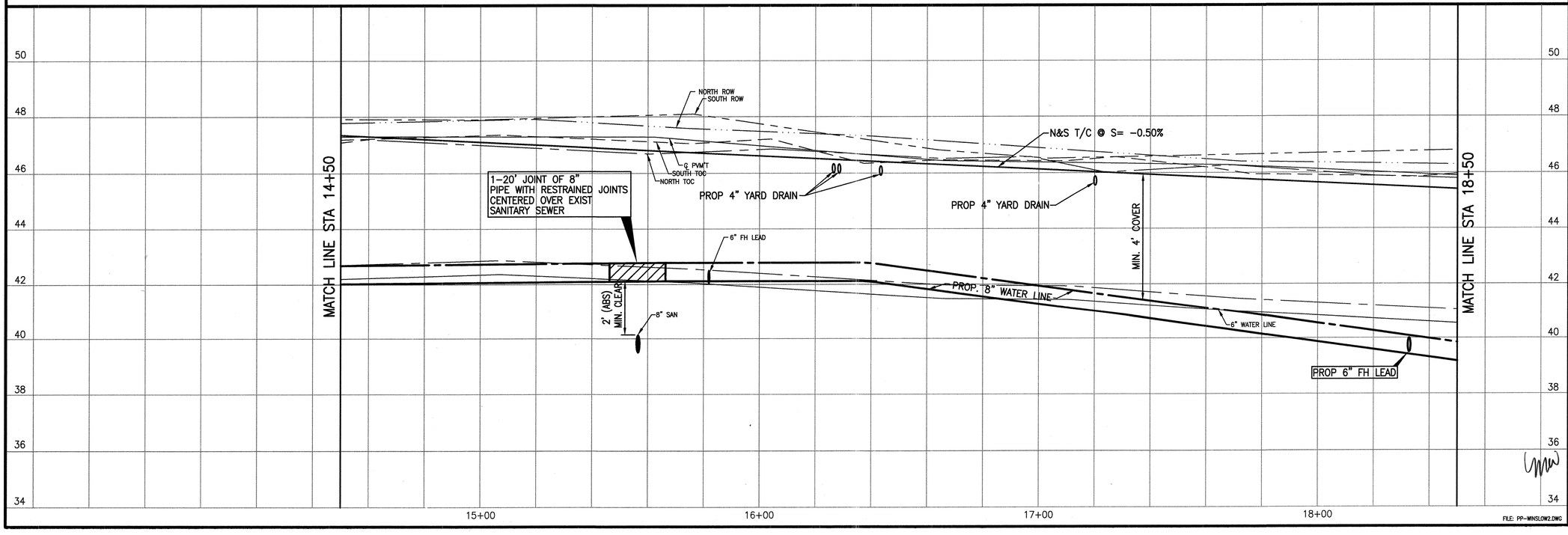
℄ CURVE NO. 16 DATA:
PC STA 15+96.46
PI STA 17+01.85
PT STA 18+05.11
Δ = 19°55'29"
R = 600.00'
L = 208.65'
T = 105.39'



BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL.= 44.98

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS



SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
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HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

WINSLOW
PLAN AND PROFILE
STA 14+50 TO STA 18+50

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-WINSLOW2.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 62 OF 131

PUBLIC WORKS AND ENGINEERING — DATE FILED: — 49097 — CHRON NUMBER — HOUSTON, TEXAS

FILE: PP-WINSLOW2.DWG

No.	Date	Revisions	Apv.

℄ CURVE NO. 17 DATA:

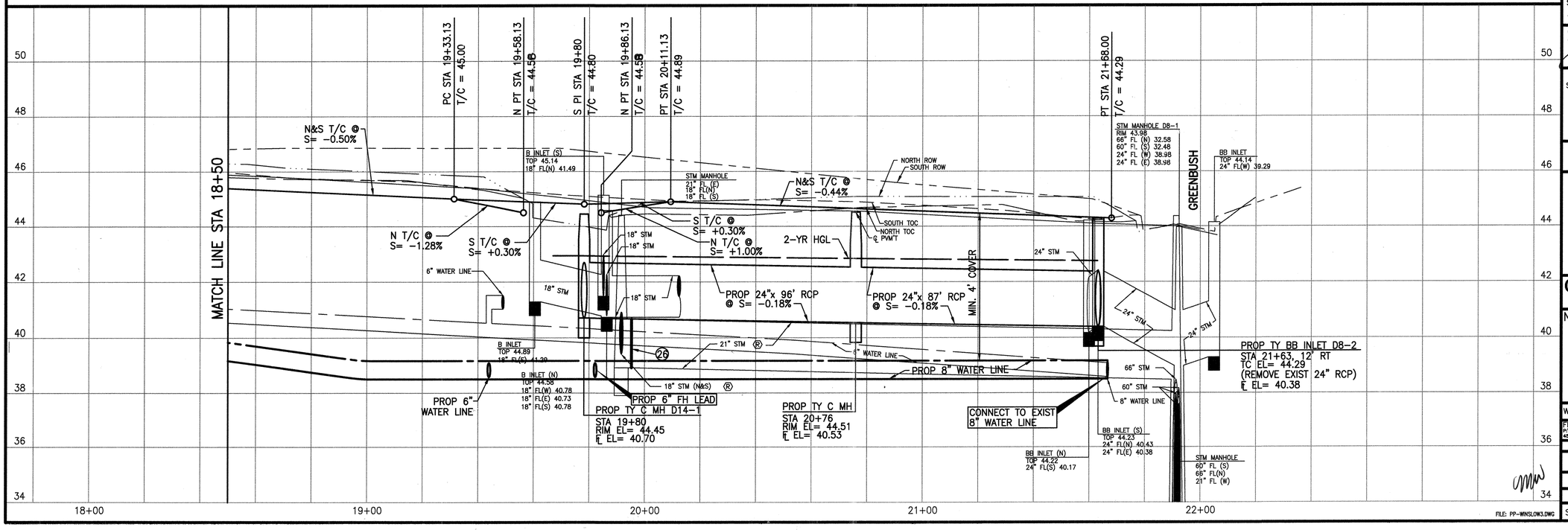
PC STA 19+16.14
PI STA 20+21.43
PT STA 21+24.60
Δ = 19°54'22"
R = 600.00'
L = 208.46'
T = 105.29'

BENCHMARK MONUMENT
COH 5254-8313
CORNER OF GREENBUSH & WINSLOW
EL= 44.98

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

(SEE SHEET 60)
(SEE SHEET 62) MATCH LINE STA 18+50
PROP 6" WATER LINE
PT STA 19+58.13, 39' LT TC EL= 44.50
PC STA 19+33.13, 14' LT TC EL= 45.58
PC STA 19+16.14
PT STA 19+86.13, 39' LT TC EL= 44.58
PT STA 20+11.13, 14' LT TC EL= 44.89
PI STA 20+21.43
PT STA 21+24.60
ABANDON EXIST 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
1-6" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES
PROP 5' CONC SIDEWALK
PROP 6" CONC CURB
RELOCATE EXIST WATER METER
PROP TY BB INLET D8-1 STA 21+63, 14' LT TC= 44.29 FL EL= 40.43
PROP TY C MH D14-1 20+00 STA 19+80, 7' RT
PROP TY C MH STA 20+76, 7' RT
PROP 7" CONC PVMT
PROP 24" x 46' RCP
PROP 24" x 28' RCP (SEE NOTE 1)
PROP 24" x 96' RCP
PROP 24" x 87' RCP
PROP 8" WATER LINE (TYP FOR ALL 3 DRIVEWAYS)
PROP 6" CONC CURB
PROP 5' CONC SIDEWALK
PROP TY BB INLET (MOD) D8-2 W/TY C MH BOTTOM STA 21+63, 14' RT (CONNECT TO EXIST 24" RCP)
PROP TY BB INLET D14-C STA 19+80, 14' RT FL EL= 40.80
1-8"x6" TEE, AB 1-6" GV w/BOX 1-F.H. 7' BC
1-8"x8" T.S.&V. w/BOX
EXIST FIRE HYDRANT TO REMAIN IN SERVICE
EXIST 24" RCP TO REMAIN
END PROP PVMT STA 21+68
5048"x6" TEE, AB 1-8" GV w/BOX
EXIST SIDEWALK TO BE REMOVED
℄ WINSLOW STA 19+72.13 = ℄ TILDEN STA 20+20.50
℄ WINSLOW N 63°37'27" E 144.29
℄ WINSLOW S 62°26'26" E 67.96'
DRIVEWAY R= 5' (TYP)
16' CONC DRIVE ℄ STA 19+27
14' CONC DRIVE ℄ STA 20+05
18' CONC DRIVE ℄ STA 20+91
TILDEN
GREENBUSH
WINSLOW
NORTH ROW
SOUTH ROW
STREET LIGHT CABLE
8" AC WATER LINE
B INLET (N) TOP 44.58 18" FL(W) 40.78 18" FL(E) 40.73 18" FL(S) 40.78
B INLET (S) TOP 45.14 18" FL(N) 41.49
B INLET TOP 44.89 18" FL(E) 41.29
STM MANHOLE 21" FL (E) 18" FL(N) 18" FL (S)
STM MANHOLE 60" FL (S) 66" FL(N) 21" FL (W)
STM MANHOLE RIM 43.98 66" FL (N) 32.58 60" FL (S) 32.48 24" FL (W) 38.98 24" FL (E) 38.98
STM MANHOLE D8-1 RIM 43.98 66" FL (N) 32.58 60" FL (S) 32.48 24" FL (W) 38.98 24" FL (E) 38.98
BB INLET (N) TOP 44.22 24" FL(S) 40.17
BB INLET (S) TOP 44.23 24" FL(N) 40.43 24" FL(E) 40.38
BB INLET TOP 44.14 24" FL(W) 39.29
9.3%
14.5%
10.5%



FILE: PP-WINSLOW3.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3269 FAX: (713) 748-3748

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

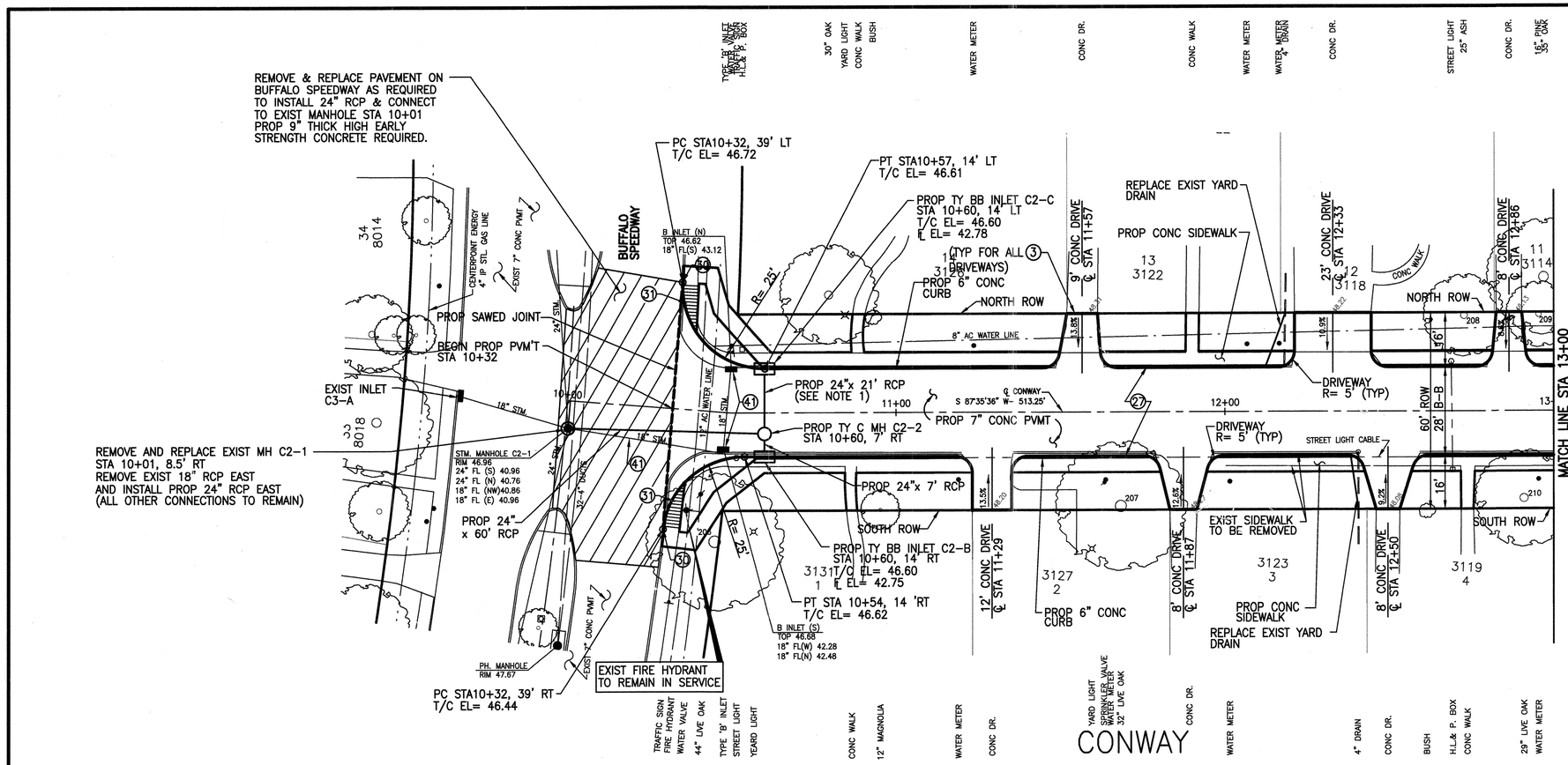
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

WINSLOW
PLAN AND PROFILE
STA 18+50 TO END

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-WINSLOW3.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 63 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — LICENSE NUMBER — HOUSTON, TEXAS

No.	Date	Revisions	App.



TBM #1
SET NAIL W/ SHINER @ INTERSEC OF BUFFALO SPDWY & CONWAY
EL= 47.02

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

Revisions | No. | Date | App.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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CENTERPOINT ENERGY/ELECTRIC FACILITIES
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SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS · JESUS M. OLIVAS · 93817 · LICENSED PROFESSIONAL ENGINEER · 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2389 FAX: (713) 746-3748

STATE OF TEXAS · VINCENT N. JACOB · 98325 · LICENSED PROFESSIONAL ENGINEER · 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

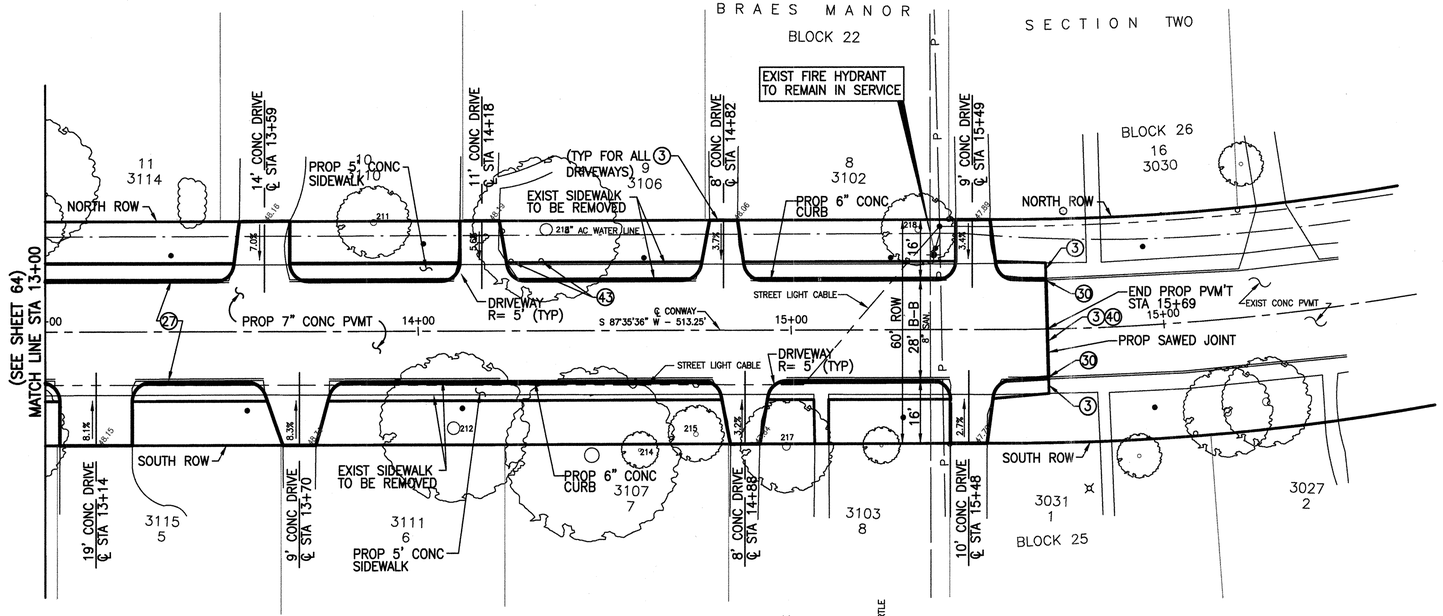
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

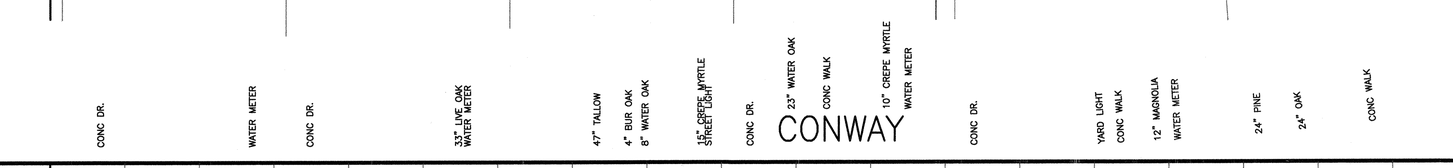
CONWAY
PLAN AND PROFILE
STA 10+00 TO STA 13+00

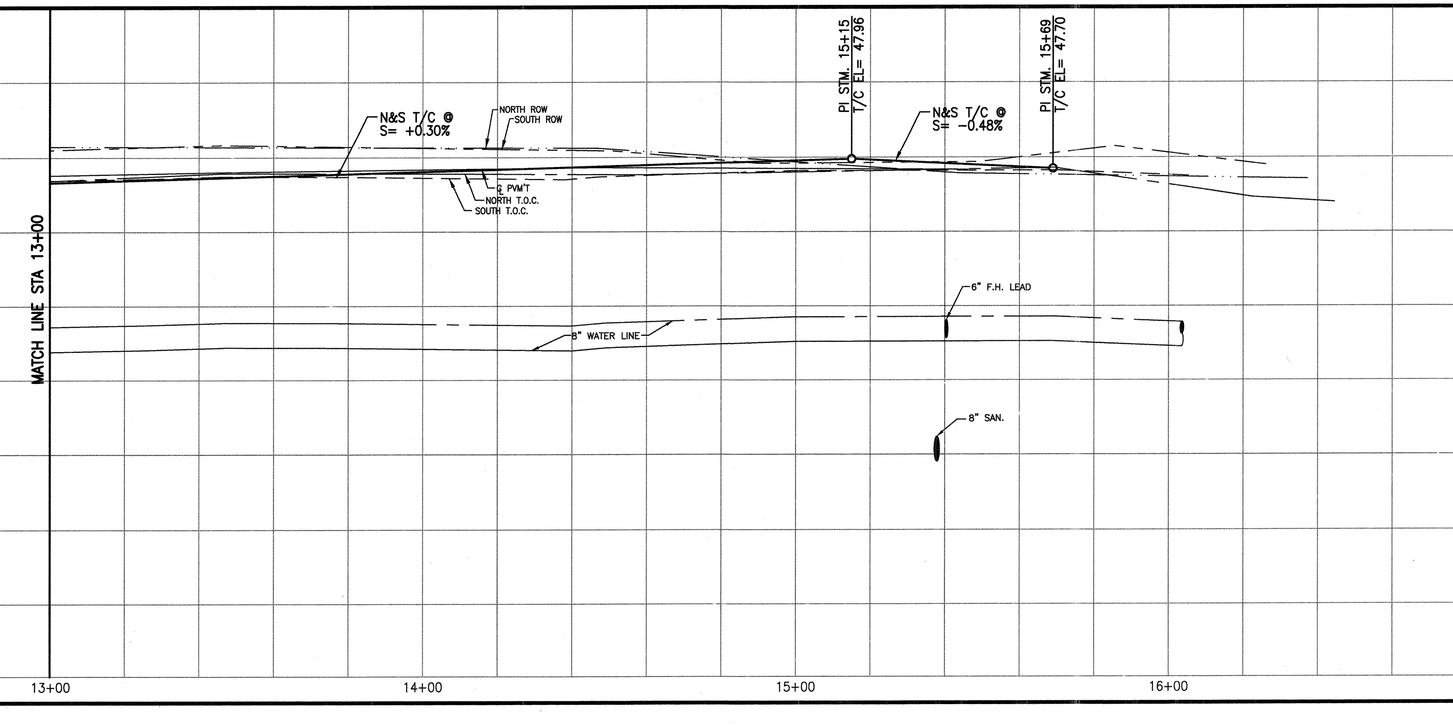
WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-CONWAY1.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 64 OF 131

PUBLIC WORKS AND ENGINEERING · FILED · 49097 · NUMBER · HOUSTON, TEXAS

FILE: PP-CONWAY1.DWG







TBM #1
SET NAIL W/ SHINER @ INTERSEC
OF BUFFALO SPDWY & CONWAY
EL= 47.02

N

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

CONWAY
PLAN AND PROFILE
STA 13+00 TO END

WBS N-000383-0001-4
FILE: J:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-CONWAY2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 65 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
CITY ENGINEER
HOUSTON, TEXAS

FILE: PP-CONWAY2.DWG

REMOVE & REPLACE PAVEMENT ON BUFFALO SPEEDWAY AS REQUIRED PROP 9" THICK HIGH EARLY STRENGTH CONCRETE REQUIRED.

1-12" GV w/BOX
2-12"X45° BENDS, RJ
1-12" WET CONNECTION

PC STA10+32, 39' LT
T/C EL= 46.94

EXIST 7" CONC PVMT

STM MANHOLE C1-1
RIM 47.23
24" FL (N) 41.73
18" FL (SW) 41.63
18" FL (SE) 41.43

REMOVE AND REPLACE EXIST MH STA 10+00, 1' RT
REMOVE EXIST 18" RCP EAST AND INSTALL PROP 18.5"x28" CONC ARCH PIPE (ALL OTHER CONNECTIONS TO REMAIN)

BEGIN PROP PVMT STA 10+33

CENTERPOINT ENERGY 4" & 8" STL GAS LINE

10+00

EXIST INLET C1-A

B INLET (S)
TOP 46.66
18" FL (N) 43.06
18" FL (NW) 42.96

PROP SAWED JOINT

PROP 18.5"x 28"x 82' CONC ARCH PIPE

CRITICAL LOCATION SEE COH SPEC. SEC. 02317

EXIST 7" CONC PVMT

PC STA10+32, 39' RT
T/C EL= 47.01

EXIST FIRE HYDRANT TO REMAIN IN SERVICE

CRITICAL LOCATION SEE COH SPEC. SEC. 02317

BUFFALO SPEEDWAY

PT STA10+57, 14 'RT
T/C EL= 46.77

1-12" GV w/BOX
2-12"X45° BENDS, RJ
1-12" WET CONNECTION

TRAFFIC SIGN
S.W.B.T. MANHOLE
STOP SIGN
W/ B INLET
HEAD BOX

CRITICAL LOCATION SEE COH SPEC. SEC. 02317

1-12" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

PROP 12" RESTRAINED JOINT PIPE SECTION

PT STA 10+57, 14' LT
T/C EL= 46.28

PROP 12" WATER LINE

PROP TY BB INLET C1-C
STA 10+80, 14' LT
T/C EL= 46.70
FL EL= 42.42

PROP 18"x 28.5" x 21' RCP CONC ARCH PIPE (SEE NOTE 1)

NORTH ROW

6" AC WATER LINE

PC STA 10+48.32

PI STA 10+99.60

PROP TY C MH C1-2
STA 10+80, 7' RT

PT STA 11+47.43

PROP 5' CONC SIDEWALK

PROP 18"x 28.5" x7' RCP CONC ARCH PIPE

1-12"x8" REDUCER, SEB

PROP TY BB INLET C1-B
STA 10+80, 14' RT
T/C EL= 46.28
FL EL= 42.39

1-12"x12" TEE, AB
1-8" GV w/BOX

1-12" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

1-12" GV w/BOX
2-12"X45° BENDS, RJ
1-12" WET CONNECTION

ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

EXIST SIDEWALK TO BE REMOVED

REPLACE EXIST YARD DRAIN

PROP 6" CONC CURB

REPLACE EXIST YARD DRAIN

(TYP FOR ALL 3 DRIVEWAYS)

EXIST YARD LIGHT (TO REMAIN)

8' CONC DRIVE ℄ STA 11+86

8' CONC DRIVE ℄ STA 12+45

12' CONC DRIVE ℄ STA 13+21

12' CONC DRIVE ℄ STA 13+71

DRIVEWAY S 87°35'0" W- 599.15'

℄ STANTON

DRIVEWAY R= 5' (TYP)

PROP 7" CONC PVMT

PROP 8" WATER LINE

8' CONC DRIVE ℄ STA 11+35

8' CONC DRIVE ℄ STA 11+93

13' CONC DRIVE ℄ STA 12+63

8' CONC DRIVE ℄ STA 13+43

8' CONC DRIVE ℄ STA 13+77

PROP 6" CONC CURB

1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC

EXIST SIDEWALK TO BE REMOVED

FND. 1/2" IR

3/4" IR

(TYP FOR ALL 3 DRIVEWAYS)

STREET LIGHT CABLE

60' ROW
28' B-B

SOUTH ROW

NORTH ROW

MATCH LINE STA 14+00 (SEE SHEET 67)

STANTON

POWER POLE
WATER VALVE
FIRE HYDRANT
TYPE 'B' INLET
STREET LIGHT
12" CREPE MYRTLE
18" MAGNOLIA
CONC WALK
34" MAGNOLIA
30" OAK
WATER METER
CONC DR.
30" OAK
CONC WALK
WATER METER
4" PVC
CONC DR.
10" OAK
CONC WALK
WATER METER
30" OAK
CONC DR.
WATER METER
30" OAK
CONC DR.
CONC WALK
10" BALD CYPRESS
WATER METER
LANDSCAPE BORDER
CONC DR.
12" PINE
24" MAGNOLIA

TBM #2
NAIL WASHER IN PVMT
CENTER OF STANTON ST
800 FT EAST OF BUFFALO SPDWY
EL= 46.70

℄ CURVE NO. 13 DATA:

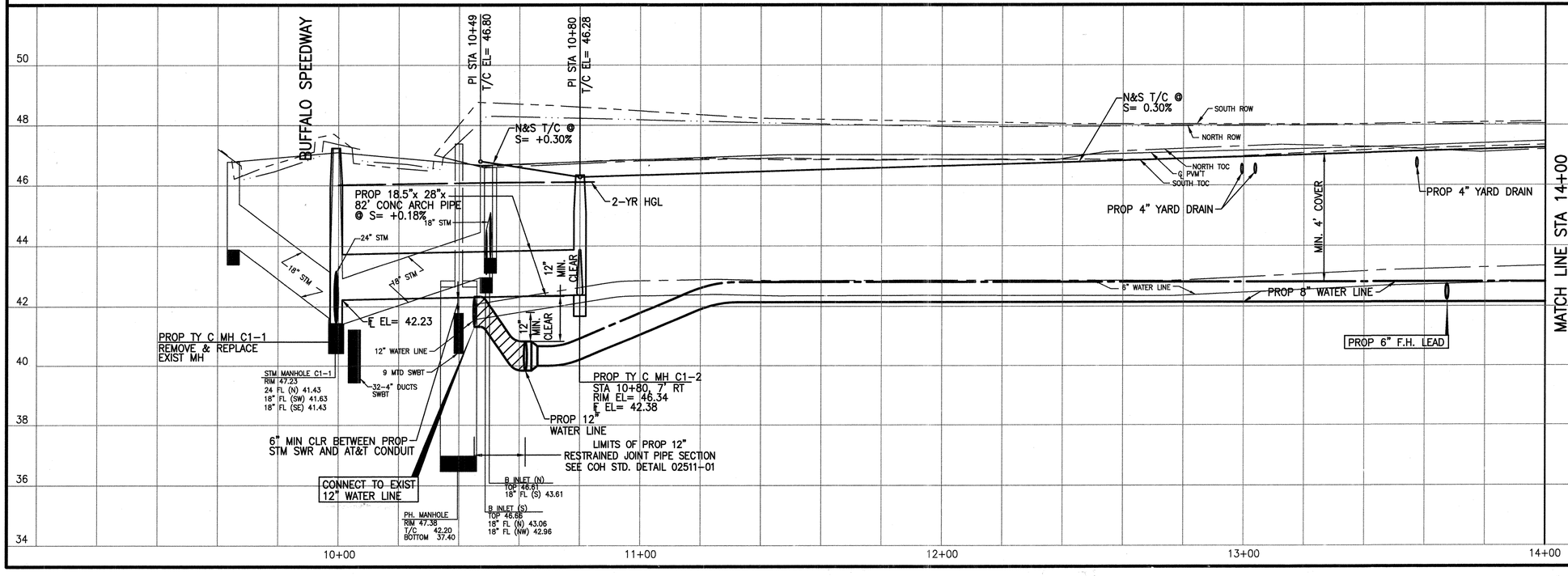
PC STA 10+48.32
PI STA 10+99.60
PT STA 11+47.43
Δ = 19°33'57"
R = 281.23'
L = 99.11'
T = 51.28'

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS



FILE: PP-STANTON1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANTON
PLAN AND PROFILE
STA 10+00 TO STA 14+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-STANTON1.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 66 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — LICENSE NUMBER — HOUSTON, TEXAS

No.	Date	Revisions	App.

TBM #2
NAIL WASHER IN PVMT
CENTER OF STANTON ST
800 FT EAST OF BUFFALO SPDWY
EL= 46.70

℄ CURVE NO. 14 DATA:

PC STA 16+42.73
PI STA 17+78.53
PT STA 19+10.36
Δ = 23°57'33"
R = 640'
L =267.63'
T = 135.80'

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC

SECTION TWO
KNOLLWOOD VILLAGE
BRAES MANOR
SECTION THREE
STANTON

(SEE SHEET 66) MATCH LINE STA 14+00
(SEE SHEET 68) MATCH LINE STA 19+00
MATCH LINE STA 15+00

REMOVE EXIST OVERFLOW DRAIN AND AND EXTEND YARD DRAIN THROUGH CURBS.
EXIST SIDEWALK TO BE REMOVED
NORTH ROW
SOUTH ROW
ASPHALT PAVEMENT W/CONCRETE CURB & GUTTER (60' ROW)
REPLACE EXIST YARD DRAIN
EXIST SPRINKLER HEADS IN CONFLICT WITH PROP CONSTRUCTION TO BE REMOVED. CAP EXIST PVC LINES
(TYP FOR ALL 3 DRIVEWAYS)
REMOVE & SALVAGE EXIST FIRE HYDRANT
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
PROP 5' CONC SIDEWALK
REPLACE EXIST YARD DRAIN
PROP 6" CONC CURB
DRIVEWAY R= 5' (TYP)
PROP 7" CONC PVMT
PC STA 16+42.73
PROP 8" RESTRAINED JOINT PIPE SECTION
CENTER ONE JOINT OVER EXIST SAN SWR
EXIST SIDEWALK TO BE REMOVED
REPLACE EXIST YARD DRAIN
PROP 8" WATER LINE
PI STA 17+78.53
STREET LIGHT CABLE
STREET LIGHT
C-14
6" AC WATER LINE
℄ STANTON S 87°35'0" W- 495.29'

8' CONC DRIVE ℄ STA 14+33
8' CONC DRIVE ℄ STA 14+74
8' CONC DRIVE ℄ STA 14+91
8' CONC DRIVE ℄ STA 14+91
8' CONC DRIVE ℄ STA 15+52
11' CONC DRIVE ℄ STA 15+97
12' CONC DRIVE ℄ STA 16+20
14' CONC DRIVE ℄ STA 16+19
14' CONC DRIVE ℄ STA 16+88
13' CONC DRIVE ℄ STA 17+02
11' CONC DRIVE ℄ STA 17+53
12' CONC DRIVE ℄ STA 17+54
12' CONC DRIVE ℄ STA 18+87
15' CONC DRIVE ℄ STA 18+87

BLOCK 25 REPLACE EXIST YARD DRAIN 16 3030
BLOCK 24
3111 7
3107 8
3103 9
3031 1
3027 2
3023 3
3019 4
3110 11
3106 10
3102 9
3022 15

PROP 4" YARD DRAIN
PROP 6" FH LEAD
PROP 8" WATER LINE
6" WATER LINE
1-20' JOINT OF 8" PIPE WITH RESTRAINED JOINTS CENTERED OVER EXIST SANITARY SEWER
2' (ABS) MIN CLEAR
8" SAN
N&S T/C @ S= +0.30%
N&S T/C @ S= -0.52%
PI STA 16+00 T/C EL= 47.84
SOUTH ROW
NORTH ROW
℄ ROW
SOUTH TOC
NORTH TOC
MIN 4' COVER

15+00 16+00 17+00 18+00 19+00

FILE: PP-STANTON2.DWG

SPARKS-BARLOW-BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

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(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

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11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

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2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANTON
PLAN AND PROFILE
STA 14+00 TO STA 19+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-STANTON2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 67 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.

℄ CURVE NO. 14 DATA:

PC STA 16+42.73
PI STA 17+78.53
PT STA 19+10.36
Δ = 23°57'33"
R = 640'
L =267.63'
T = 135.80'

ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

(TYP FOR ALL DRIVEWAYS)

EXIST SIDEWALK TO BE REMOVED

PROP CONC SIDEWALK

NORTH ROW

SOUTH ROW

PROP CONC SIDEWALK

PROP 6" CONC CURB

PROP 7" CONC PVMT

STREET LIGHT CABLE

PROP 8" WATER LINE

REPLACE EXIST YARD DRAIN

REPLACE EXIST YARD DRAIN

DRIVEWAY R= 5' (TYP)

DRIVEWAY R= 5' (TYP)

12' CONC DRIVE ℄ STA 19+49

17' CONC DRIVE ℄ STA 20+27

13' CONC DRIVE ℄ STA 20+95

15' CONC DRIVE ℄ STA 19+66

12' CONC DRIVE ℄ STA 20+36

16' CONC DRIVE ℄ STA 21+23

14' CONC DRIVE ℄ STA 21+83

PC STA 20+54.64

PI STA 21+66.88

END PROP PVM'T STA 22+05

PT STA 19+10.36
℄ STANTON
N 63°37'27" E- 144.29

PT STA 22+75.84

1-6" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

1-8"x8" T.S.&V. w/BOX

EXIST FIRE HYDRANT TO REMAIN IN SERVICE

BB INLET (N)
TOP 44.22
24" FL (S) 40.37
24" FL (E) 40.32

BB INLET (S)
TOP 44.36
24" FL (N) 40.56

BB INLET (S)
TOP 44.34
24" FL (N) 39.74

GREENBUSH DRIVE

STM MANHOLE

6" AC WATER LINE

8" AC WATER LINE

STREET LIGHT CABLE

ASPHALT CONC

EXIST CONC PVMT

24" STM

60" STM

54" STM

TBM #2
NAIL WASHER IN PVMT
CENTER OF STANTON ST
800 FT EAST OF BUFFALO SPDWY
EL.= 46.70

℄ CURVE NO. 15 DATA:

PC STA 20+54.64
PI STA 21+66.88
PT STA 22+75.84
Δ = 23°54'48"
R = 530.00'
L = 221.20'
T = 112.24'

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
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4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS

STANTON

PI STA 22+05.00
T/C EL.= 44.70

N&S T/C @ S= -0.52%

SOUTH ROW
NORTH ROW

℄ PVM'T

NORTH TOC
SOUTH TOC

PROP 4" YARD DRAIN

PROP 4" YARD DRAIN

MIN 4' COVER

6" WATER LINE

PROP 8" WATER LINE

8" WATER LINE

4" WATER LINE

CONNECT TO EXIST 8" WATER LINE

STM MANHOLE
RIM 44.53
60" FL (N) 34.03
54" FL (S) 34.43
24" FL (W) 39.53
24" FL (E) 38.23

BB INLET (N)
TOP 44.41
24" FL (W) 39.61
24" FL (S) 39.71

MATCH LINE STA 19+00 (SEE SHEET 67)

19+00 20+00 21+00 22+00 23+00 24+00

FILE: PP-STANTON3.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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NSR 451

STANTON
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STA 19+00 TO END

WBS N-000383-0001-4

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DRAWING SCALE

1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM

MOH'D K. WARRAD, P.E.

SHEET NO. 68 OF 131

PUBLIC WORKS AND ENGINEERING
49097
NUMBER
HOUSTON, TEXAS

REMOVE & REPLACE PAVEMENT ON BUFFALO SPEEDWAY AS REQUIRED TO INSTALL 24" RCP & CONNECT TO EXIST MANHOLE STA 10+00 HIGH EARLY STRENGTH CONCRETE REQUIRED.

PC STA 10+33 38' LT
TC EL= 47.19

1-6" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

EXIST INLET B31-A

REMOVE AND REPLACE EXIST MH STA 10+00, 1' RT
REMOVE EXIST 18" RCP EAST AND INSTALL PROP 24" RCP EAST (ALL OTHER CONNECTIONS TO REMAIN)

BEGIN PROP CONC PVMT STA 10+33

PROP 24"x 21' RCP @ S= 0.30% (SEE NOTE 1)

STM MANHOLE
RIM 47.07
18" FL (NW) 41.82
18" FL (E) 41.87
24" FL (S) 41.77

PC STA 10+50.00

PROP 24"x 62' RCP @ S= +0.80%

PC STA 10+34 38' RT
TC EL= 46.74

EXIST FIRE HYDRANT TO REMAIN IN SERVICE

1-12"x8" T.S.&V. w/BOX

BB INLET (S)
TOP 46.73
18" FL (N) 43.43

PROP TY C MH B31
STA 10+60, 7' RT

PROP 24"x 7' RCP @ S= 0.30% (SEE NOTE 1)

PROP TY BB INLET B31-C
STA 10+60, 14' RT
T/C EL= 46.73
L EL= 43.25

PT STA 10+57 14' RT
TC EL= 46.74

PI STA 11+02.76

1-8"x11.25° BEND, AB

PT STA 11+52.60

PROP TY BB INLET B31-B
STA 10+60, 14' LT
T/C EL= 46.73
L EL= 43.28

PT STA 10+57 14' LT
TC EL= 46.74

BB INLET (N)
TOP 46.84
18" FL (SW) 43.14
18" FL (S) 43.24

(3) (TYP FOR ALL DRIVEWAYS)

DRIVEWAY R= 5' (TYP)

13' CONC DRIVE @ STA 12+02

18' CONC DRIVE @ STA 11+45

10' CONC DRIVE @ STA 12+43

10' CONC DRIVE @ STA 13+32

12' CONC DRIVE @ STA 13+16

ABANDON EXIST 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

PROP 8" WATER LINE

REPLACE EXIST YARD DRAIN

PROP 7" CONC PVMT

PROP CONC SIDEWALK

PROP 6" CONC CURB

EXIST SIDEWALK TO BE REMOVED

1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC

PI STA 13+23.20

MATCH LINE STA 14+00 (SEE SHEET 70)

BRAES MANOR
BLOCK 25

BRAES MANOR
BLOCK 26

PRESCOTT

TBM #5
SET NAIL W/ SHINER @ INTERSEC OF PRESCOTT ST & BUFFALO SPDWY
EL= 46.86

℄ CURVE NO. 10 DATA:
PC STA 10+50.00
PI STA 11+02.76
PT STA 11+52.60
Δ = 19°57'21"
R = 300.00'
L = 102.60'
T = 52.76'

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS

PROP TY C MH B31
REMOVE & REPLACE EXIST MH

PROP 24"x 62' RCP @ S= +0.80%

PROP TY C MH B31
STA 10+60, 7' RT
RIM EL= 46.37
℄ EL= 43.24

℄ EL= 43.12

12" MIN CLR

6" MIN CLR BETWEEN PROP STM SWR AND AT&T CONDUIT

CONNECT TO EXIST 12" WATER LINE

PROP. 8" WATER LINE

PROP 6" FH LEAD

MIN 4' COVER

N&S T/C @ S= +0.30%

PROP 4" YARD DRAIN

MATCH LINE STA 14+00

PI STA 10+33 T/C EL= 46.86 ± (MATCH EXIST)

PI STA 10+60 T/C EL= 46.73

STM MANHOLE (ST-B31)
RIM 47.07
18" FL (NW) 41.82
18" FL (E) 41.87
24" FL (S) 41.77

32-4" DUCTS SWBT

9 MTD SWBT

12" WATER LINE

Rev. No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET, R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE 2/16/12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3388 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PRESCOTT
PLAN AND PROFILE
STA 10+00 TO STA 14+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-PRESCOTT1.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 69 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CITY NUMBER
HOUSTON, TEXAS

FILE: PP-PRESCOTT1.DWG

TBM #5
SET NAIL W/ SHINER @ INTERSEC
OF PRESCOTT ST & BUFFALO SPDWY
EL.= 46.86

℄ CURVE NO. 11 DATA:
PC STA 17+51.75
PI STA 18+89.77
PT STA 20+23.88
Δ = 24°8'15"
R = 650.00'
L = 272.13'
T = 140.02

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/6/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-6-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
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02/10/12

iSani CONSULTANTS
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STATE OF TEXAS
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2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PRESCOTT
PLAN AND PROFILE
STA 14+00 TO STA 19+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-PRESCOTT2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 70 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

FILE: PP-PRESCOTT2.DWG

No.	Date	Revisions	App.

℄ CURVE NO. 11 DATA:

PC STA 17+51.75
PI STA 18+89.77
PT STA 20+23.88
Δ = 24°8'15"
R = 650.00'
L = 272.13'
T = 140.02

℄ CURVE NO. 12 DATA:

PC STA 22+04.68
PI STA 23+13.36
PT STA 24+19.06
Δ = 23°10'32"
R = 530.00'
L = 214.38'
T = 108.68'

TBM #5
SET NAIL W/ SHINER @ INTERSEC OF PRESCOTT ST & BUFFALO SPDWY
EL= 46.86

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

REMOVE & SALVAGE EXIST FIRE HYDRANT
EXIST BUSHES TO BE REMOVED
EXIST FIRE HYDRANT TO REMAIN IN SERVICE
1-8"x8" T.S.&V. w/BOX
1-8" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES
1-8"x11.25" BEND, AB
MATCH EXIST CURB T/C EL= 46.05
ABANDON EXIST. 6" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
PROP 8" WATER LINE
PROP TY BB INLET D5-C STA 20+10, 14' LT T EL= 42.79 (24" S) TC=46.51
PROP 24"x 24' RCP (SEE NOTES)
PROP 6" CONC CURB
PROP CONC SIDEWALK
PROP 7" CONC PVMT
END PROP PVM'T STA 23+05 (NORTH SIDE) STA 23+25 (SOUTH SIDE)
EXIST 24" RCP TO REMAIN
PT STA 20+23.88
PT STA 20+37.89, 14' RT TC EL= 46.60
PC STA 22+04.68
PT STA 24+19.06
PROP 24"x 219' RCP
PROP 24"x 85' RCP
PROP TY C MH D5-2 STA 22+29, 7' RT
PROP TY C MH D5-3 STA 20+10, 8' RT
1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC
2-8"x45° BENDS, AB
RELOCATE EXIST WATER METER
ABANDON EXIST 18" RCP
10' UTILITY ESM'T (NO UTILITY)
PROP TY BB INLET D5-D STA 23+19, 18' RT (REMOVE & REPLACE EXIST INLET)
PROP TY BB INLET D5-A STA 19+83, 41' RT
PROP TY BB INLET D5-B STA 20+12, 41' RT
PROP 18"x 28.5"x 27' ARCH PIPE (SEE NOTE 1)
PROP 18"x 28.5"x 34' ARCH PIPE
PC STA 20+12.89, 39' RT TC EL= 46.20
PT STA 19+84.89, 39' RT TC EL= 46.20
PC STA 19+59.89, 14' RT TC EL= 46.60
℄ PRESCOTT STA 19+96.25 = ℄ FAIRHOPE PLACE STA 13+50.71
1-8"x8" TEE, AB
1-8" GV w/BOX
PROP 8" WATER LINE
PROP 6" FH LEAD
PROP TY C MH D5-2 STA 22+29, 7' RT TOP EL= 45.90 T EL= 42.26 (24" W&E)
CONNECT TO EXIST 8" WATER LINE
PROP TY BB INLET D5-A STA 19+83, 41' RT T/C EL= 46.20 T EL= 42.75 (18"x 28.5" ARCH PIPE)
PROP TY C MH D5-3 STA 20+10, 8' RT TOP EL= 46.13 T EL= 42.65 (24" N&E) (18"x 28.5" S)
PROP TY BB INLET D5-D STA 23+19, 18' RT TOP EL= 45.78 T EL= 42.10 (24" W&E) (REMOVE & REPLACE EXIST INLET)

PRESCOTT

MATCH LINE STA 19+00 (SEE SHEET 70)
MATCH LINE STA 19+00 (SEE SHEET 72)

N&S T/C @ S= -0.45%
N T/C @ S= -0.30%
S T/C @ S= -1.00%
N T/C @ S= +0.30%
S T/C @ S= +1.00%
N&S T/C @ S= -0.30%
PROP 24"x 219' RCP @ S= -0.17%
PROP 24"x 91' RCP @ S= -0.17%
2-YR HGL
MIN. 4' COVER
MIN. 12" CLEAR
PROP 18"x 28.5"x 27' ARCH PIPE @ S= -0.18%
6" FH LEAD
4" WATER LINE
6" WATER LINE
8" WATER LINE
PROP 8" WATER LINE
PROP 6" FH LEAD
SOUTH ROW
NORTH ROW
℄ PVM'T
NORTH TOC
SOUTH TOC

PC STA 19+59.89 S. T/C EL= 46.60
PT STA 18+84.89 S. T/C EL= 46.20
PI STA 20+10 N. T/C EL= 46.51
PC STA 20+12.89 S. T/C EL= 46.20
PT STA 20+37.89 T/C EL= 46.60
PC STA20+80 N&S T/C EL= 46.72
END PVM'T STA 23+05 N&S. T/C EL= 46.05

B INLET TOP 46.04 18" FL (W) 42.34 21" FL (E) 42.24 18" FL (N) 42.34
B INLET TOP 46.53 18" FL (S) 43.03
B INLET TOP 46.20 18" FL (E) 42.40
BB INLET TOP 45.52 24" FL (N) 41.77 24" FL (SE) 41.77 18" FL (S) 42.12
BB INLET TOP 45.48 24" FL (S) 41.88
BB INLET (N) TOP 45.57 24" FL (S) 41.22
BB INLET (S) TOP 45.43 24" FL (N) 41.08 24" FL (SW) 40.98
STM MANHOLE RIM 46.30 18" FL (N) 41.20 21" FL (W) 41.20 18" FL (E) 41.30
STM MANHOLE D5-1 RIM 45.22 54" FL (N) 35.27 54" FL (S) 35.32 24" FL (NW) 40.47 24" FL (NE) 40.32

PP-PRESCOTT3.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR
DATE: 2/16/12

CENTERPOINT ENERGY/GAS FACILITIES (GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

PRESCOTT
PLAN AND PROFILE
STA 19+00 TO END

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-PRESCOTT3.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

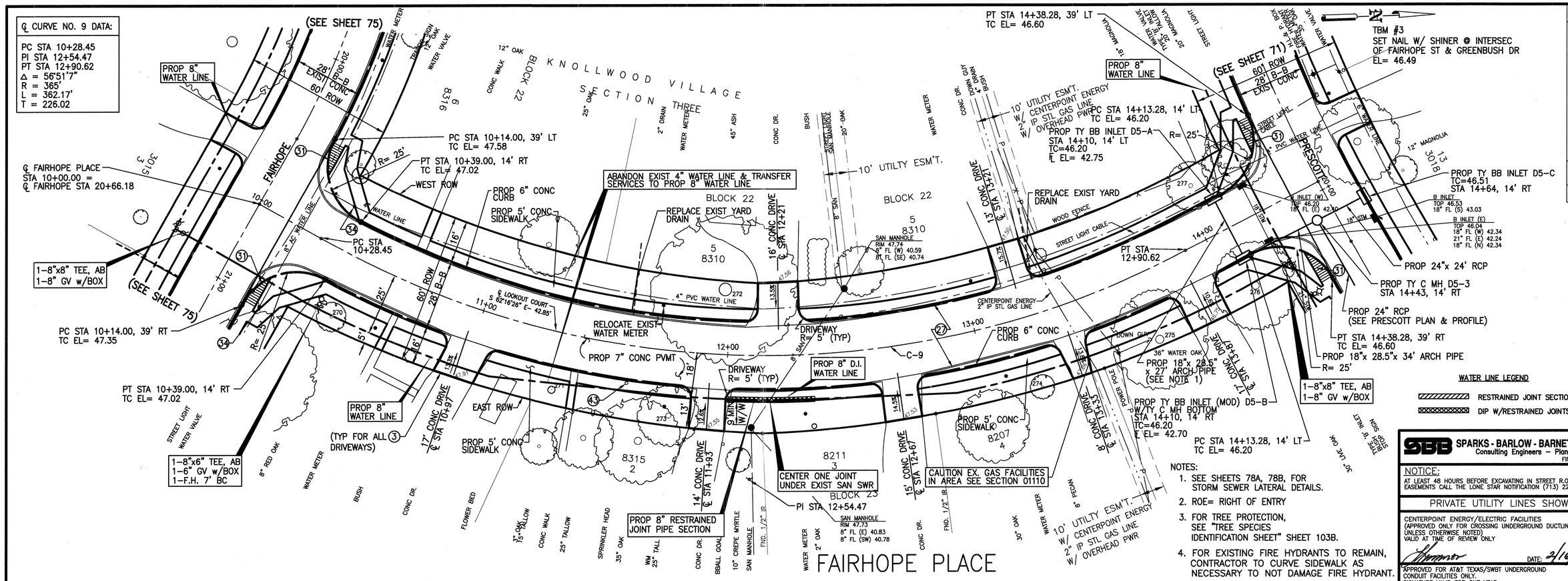
SHEET NO. 71 OF 131

PUBLIC WORKS AND ENGINEERING — 49097 — REGISTERED — HOUSTON, TEXAS

No. Date Revisions Appr.

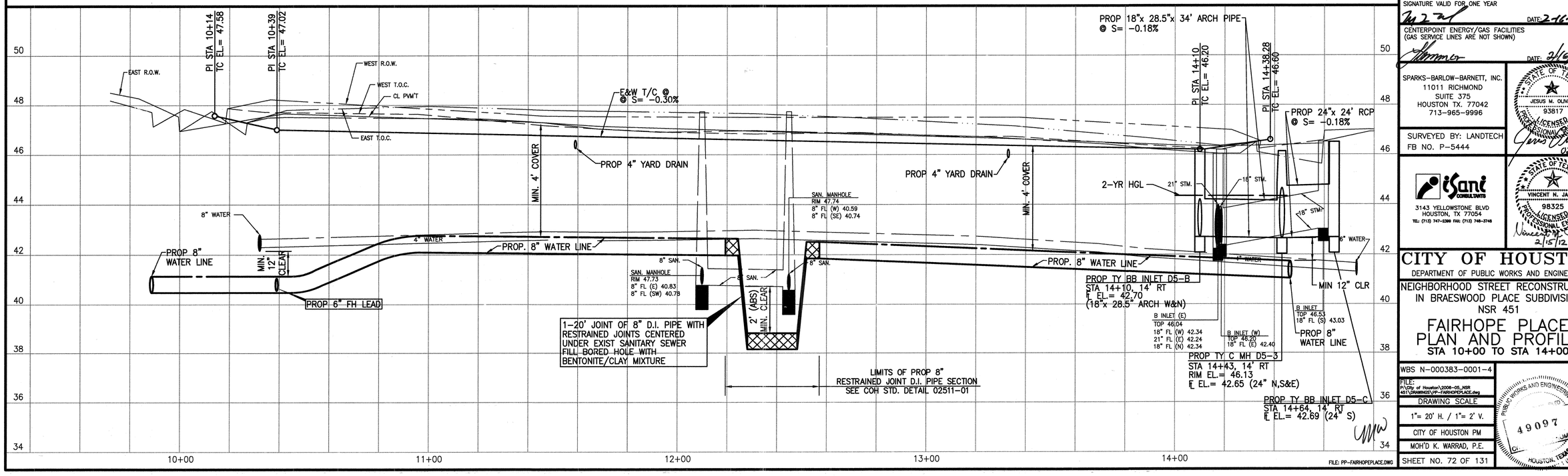
℄ CURVE NO. 9 DATA:

PC STA 10+28.45
PI STA 12+54.47
PT STA 12+90.62
Δ = 56°51'7"
R = 365'
L = 362.17'
T = 226.02



NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
- RESTRAINED JOINT SECTION
- DIP W/RESTRAINED JOINTS



FILE: PP-FAIRHOPEPLACE.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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VALID AT TIME OF REVIEW ONLY
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APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2/16/12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
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STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

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HOUSTON, TX 77054
TEL: (713) 747-3260 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
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LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

FAIRHOPE PLACE PLAN AND PROFILE
STA 10+00 TO STA 14+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-FAIRHOPEPLACE.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 72 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSED
HOUSTON, TEXAS

No. | Date | Revisions | App.

TBM #3
SET NAIL W/ SHINER @ INTERSEC
OF FAIRHOPE ST & GREENBUSH DR
EL= 46.49

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

BRAES MANOR
BLOCK 26

BUFFALO SPEEDWAY

FAIRHOPE

MATCH LINE STA 15+00 (SEE SHEET 74)

EXIST 8" CONC PVMT

EXIST 8" CONC PVMT

3/4" IP

STM MANHOLE B6
RIM 48.42
24" FL (E) 40.82
BOTTOM 29.22

BEGIN PROP PVM'T STA 10+51.00

DRIVEWAY R= 5' (TYP)

RELOCATE EXIST WATER METER

℄ FAIRHOPE N 87°37'8" E- 776.11'

PROP 7" CONC PVMT

EXIST 24" RCP (TO REMAIN)

(TYP FOR ALL DRIVEWAYS)

PROP 5' CONC SIDEWALK

PROP 6" CONC CURB

EXIST SIDEWALK TO BE REMOVED

PROP TY BB INLET B32-A
STA 14+18, 14' LT
T/C EL 47.12
℄ EL= 42.57 (24" S)

PROP TY C MH B32
STA 14+18, 1' RT
CONSTRUCT OVER
EXIST 24" RCP

PROP 24"x 15' RCP

PROP 24"x 13' RCP (SEE NOTE 1)

STM MANHOLE
RIM 47.44
24" FL (W) 41.64
18" FL (N) 41.64
18" FL (S) 41.64

B INLET (N)
TOP 47.38
18" FL (S) 41.88

B INLET (S)
TOP 47.12
18" FL (N) 41.82
21" FL (S) 41.82

1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC

REPLACE EXIST YARD DRAINS

REMOVE & SALVAGE EXIST FIRE HYDRANT

PROP 8" WATER LINE

ABANDON EXIST 8" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

1-12"x8" T.S.&V. w/BOX

1-8" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

EXIST FIRE HYDRANT TO REMAIN IN SERVICE

EXIST SIDEWALK TO BE REMOVED

PROP 5' CONC SIDEWALK

PROP 6" CONC CURB

PROP CONC SIDEWALK

EXIST CONC PVM'T

STREET LIGHT CABLE

8" WATER LINE

4" WATER LINE

12" AC WATER LINE

60' ROW
28' B-B

CONNECT TO EXIST 12" WATER LINE

PROP. 8" WATER LINE

EXIST 24" RCP TO REMAIN

2-YR HGL

MIN. 4' COVER

PI STA 10+51
T/C EL= 48.22 ±
(MATCH EXIST)

PI STA 14+18
T/C EL= 47.12

NORTH ROW
SOUTH ROW

CL PVM'T

NORTH TOC
SOUTH TOC

N&S T/C @ S= -0.30%

N&S T/C @ S= +0.30%

2-PROP 4" YARD DRAIN

PROP 6" FH LEAD

6" FH LEAD

12" MIN. CLEAR

12" MIN. CLEAR

21" STM

24" STM

18" STM

18" STM

72" STM

78" STM

78" STM

32-4" DUCTS S.W.B.T.

9 MTD. S.W.B.T.

STM MANHOLE

STM MANHOLE B6
RIM 48.42
24" FL (E) 40.82
BOTTOM 29.22

INSTALL PROP TY C MH B32
OVER EXIST 24" RCP
INSTALL BRICK PLUG
IN 24" RCP EAST
IN MANHOLE
RIM EL= 46.87
℄ = 41.63

LIMITS OF 24" STM REMOVAL

FILE: PP-FAIRHOPE1.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
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SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
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LICENSED PROFESSIONAL ENGINEER
02/10/12

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STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

FAIRHOPE
PLAN AND PROFILE
STA 10+00 TO STA 15+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-FAIRHOPE1.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 73 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

No. | Date | Revisions | App.

TBM #3
SET NAIL W/ SHINER @ INTERSEC OF FAIRHOPE ST & GREENBUSH DR
EL= 46.49

℄ CURVE NO. 8 DATA:
PC STA 18+31.38
PI STA 19+36.82
PT STA 20+35.49
Δ = 35°26'15"
R = 330'
L = 204.11'
T = 105.44'

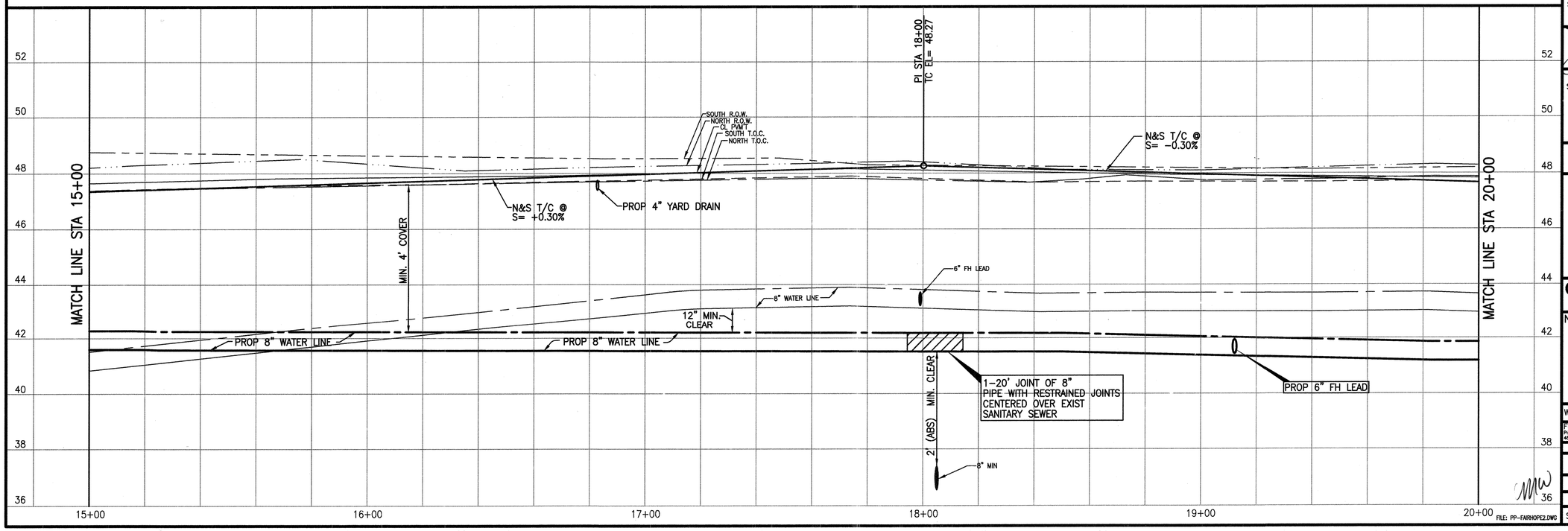
NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

(SEE SHEET 73) MATCH LINE STA 15+00

EXIST SIDEWALK TO BE REMOVED
PROP 6" CONC CURB
REPLACE EXIST YARD DRAIN
(TYP FOR ALL 3 DRIVEWAYS)
PROP 5' CONC SIDEWALK
RELOCATE EXIST WATER METER
REMOVE & SALVAGE EXIST FIRE HYDRANT
SOUTH ROW
NORTH ROW
STREET LIGHT CABLE
PROP 7" CONC PVMT
DRIVEWAY R= 5' (TYP)
℄ FAIRHOPE N 87°37'E- 831.38'
6" SAN
6" AC WATER LINE
PC STA 18+31.38
PI STA 19+36.82
RELOCATE EXIST WATER METER
PROP 8" WATER LINE
EXIST SIDEWALK TO BE REMOVED
PROP 5' CONC SIDEWALK
PROP 6" CONC CURB
ABANDON EXIST 8" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE
CENTER ONE JOINT OVER EXIST SAN SWR
PROP 8" RESTRAINED JOINT PIPE SECTION
1-8"x6" TEE, AB
1-6" GV w/BOX
1-F.H. 7' BC
MATCH LINE STA 20+00 (SEE SHEET 75)

BRAES MANOR BLOCK 26
BRAES MANOR BLOCK 27
BLOCK 22
BLOCK 21
FAIRHOPE



FILE: PP-FAIRHOPE2.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-5369 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

FAIRHOPE
PLAN AND PROFILE
STA 15+00 TO STA 20+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-FAIRHOPE2.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 74 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

No.	Date	Revisions	App.

℄ CURVE NO. 8 DATA:

PC STA 18+31.38
PI STA 19+36.82
PT STA 20+35.49
Δ = 35°26'15"
R = 330'
L = 204.11'
T = 105.44'

(SEE SHEET 72)

(SEE SHEET 74) MATCH LINE STA 20+00

SECTION THREE

FAIRHOPE PLACE

BLOCK 23

PROP 8" WATER LINE

PC STA 20+81.35, 39' LT
TC EL= 47.02

(TYP FOR ALL DRIVEWAYS)

PT STA 20+53.35, 39' LT
TC EL= 47.02

PC STA 20+28.35, 14' LT
TC EL= 47.58

PT STA 21+06.35, 14' LT
TC EL= 47.35

ABANDON EXIST 8" WATER LINE & TRANSFER SERVICES TO PROP 8" WATER LINE

1-8" CUT, PLUG & ABANDON AFTER TRANSFER OF SERVICES

PROP 5' CONC SIDEWALK

PROP 6" CONC CURB

NORTH ROW

SOUTH ROW

PT STA 20+35.49
C-8

℄ FAIRHOPE STA 20+66.18 =
℄ FAIRHOPE PLACE STA 10+00.00

℄ FAIRHOPE
S 56°56'37" E- 365.68'

END PROP PVM'T
STA 23+26
23+00

PROP 7" CONC PVMT

DRIVEWAY
R= 5' (TYP)

8" AC WATER LINE

8" WATER LINE

24" STM

42" STM

48" STM

EXIST CONC PVMT (W/ASPH. OVERLAY)

EXIST INLETS TO REMAIN

1-8"x8" TEE, AB
1-8" GV w/BOX

REPLACE EXIST YARD DRAIN

PROP CONC SIDEWALK

PROP 8" WATER LINE

2-8"X45° BENDS, AB
1-8"x8" T.S.&V. w/BOX

EXIST FIRE HYDRANT TO REMAIN IN SERVICE

12' CONC DRIVE ℄ STA 20+47

13' CONC DRIVE ℄ STA 21+27

18' CONC DRIVE ℄ STA 21+97

13' CONC DRIVE ℄ STA 22+70

13' CONC DRIVE ℄ STA 21+92

60' ROW
28' B-B

STREET LIGHT CABLE

STM MANHOLE (N)
RIM 46.31
54" FL (N) 36.91
48" FL (S) 37.41
24" FL (SE) 38.69

BB INLET (N)
TOP 46.44
24" FL (S) 41.94
24" FL (E) 41.84

BB INLET (S)
TOP 46.43
24" FL (N) 42.13

BB INLET (N)
TOP 46.49
24" FL (W) 41.39
24" FL (S) 41.49

BB INLET (S)
TOP 46.52
24" FL (N) 41.42

STM MANHOLE (S)
RIM 46.41
48" FL (N) 37.51
42" FL (S) 37.61
24" FL (W) 41.21
24" FL (E) 40.01

1 STROY BLDG.

TBM #3
SET NAIL W/ SHINER @ INTERSEC OF FAIRHOPE ST & GREENBUSH DR
EL= 46.49

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

FAIRHOPE

GREENBUSH

N. PC STA 20+28.35 T/C EL= 47.58
N. PT STA 20+53.35 T/C EL= 47.02
N. PC STA 20+81.35 T/C EL= 47.02
N. PT STA 21+06.35 T/C EL= 47.35
PI STA 20+26 T/C EL= 46.69 (MATCH EXIST)

SOUTH R.O.W.
NORTH R.O.W.
CL PVM'T
NORTH T.O.C.
SOUTH T.O.C.

N T/C @ S= -0.40%
N T/C @ S= +0.83%
N&S T/C @ S= -0.30%

PROP 4" YARD DRAIN
4" WATER LINE
8" WATER LINE
PROP. 8" WATER LINE
PROP 8" WATER LINE
CONNECT TO EXIST 8" WATER LINE
MIN. 4' COVER

EXIST INLETS TO REMAIN

24" STM
54" STM
48" STM
42" STM

BB INLET (S) TOP 46.43 24" FL (N) 42.13
BB INLET (N) TOP 46.44 24" FL (S) 41.94 24" FL (E) 41.84
BB INLET (N) TOP 46.49 24" FL (W) 41.39 24" FL (S) 41.49
BB INLET (S) TOP 46.52 24" FL (N) 41.42

STM MANHOLE (N) RIM 46.31 54" FL (N) 36.91 48" FL (S) 37.41 24" FL (SE) 38.69
STM MANHOLE (S) RIM 46.41 48" FL (N) 37.51 42" FL (S) 37.61 24" FL (W) 41.21 24" FL (E) 40.01

FILE: PP-FAIRHOPE3.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
DATE: 2/16/12

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
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2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

FAIRHOPE
PLAN AND PROFILE
STA 20+00 TO END

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\PP-FAIRHOPE3.dwg

DRAWING SCALE
1"= 20' H. / 1"= 2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 75 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.

℄ CURVE NO. 7 DATA:

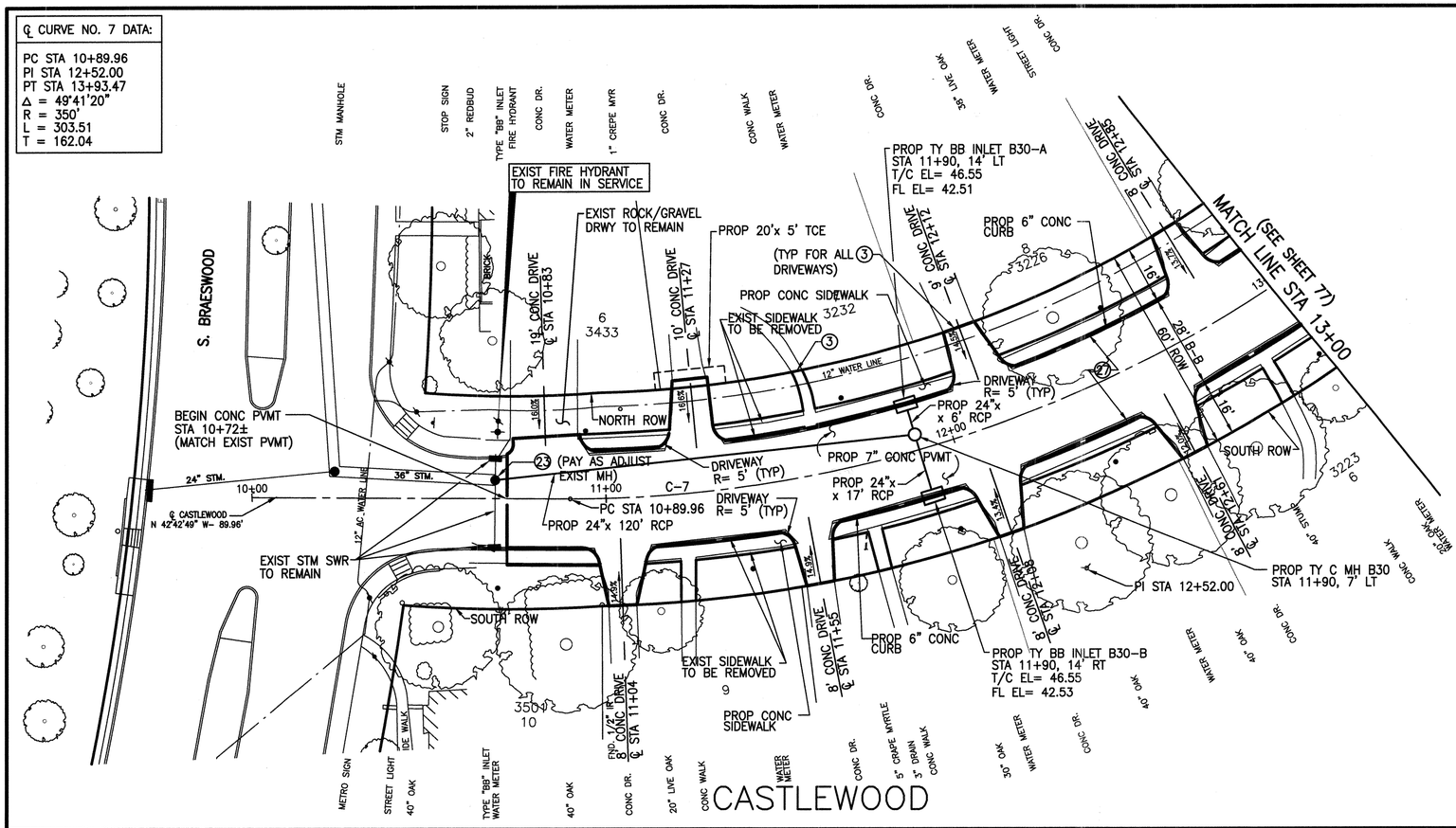
PC STA 10+89.96
PI STA 12+52.00
PT STA 13+93.47
Δ = 49°41'20"
R = 350'
L = 303.51
T = 162.04

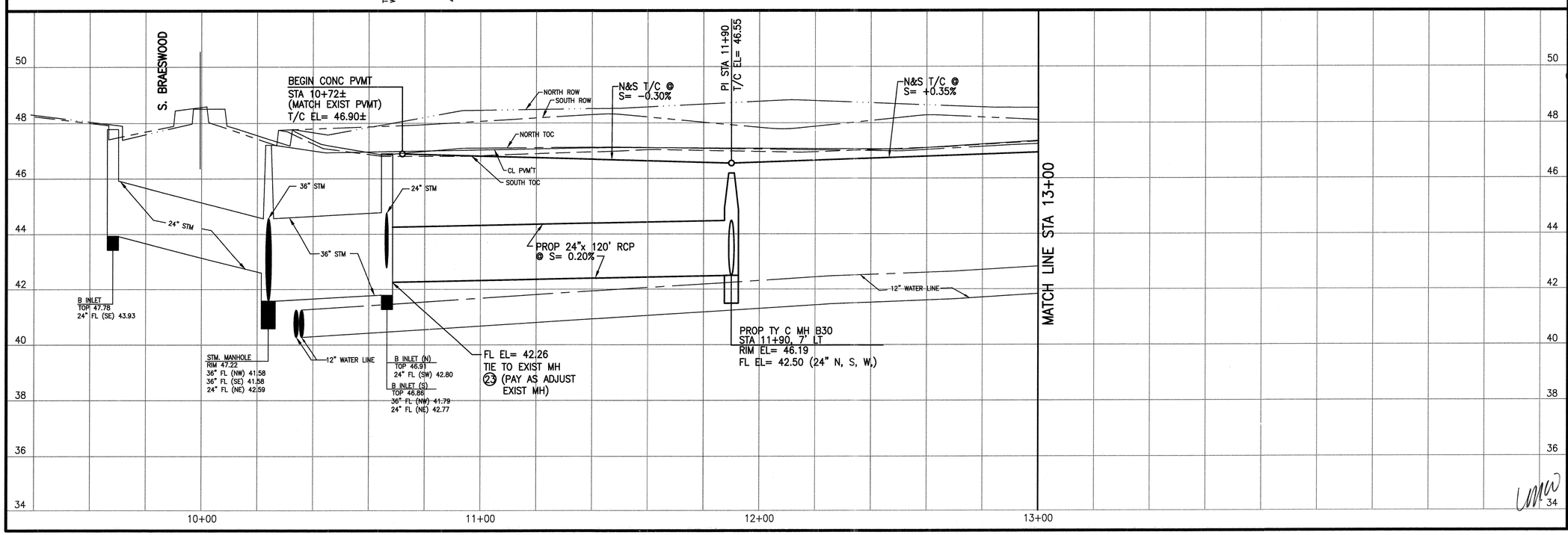
BENCHMARK MONUMENT
COH 5254-1010
INTERSEC OF S BRAESWOOD & CASTLEWOOD
EL.= 47.71

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

(1) REMOVE EXISTING INLETS AND INLET LEAD.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS





SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

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DATE: 2-16-12

CENTERPOINT ENERGY/GAS FACILITIES (GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
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LICENSED PROFESSIONAL ENGINEER
02/10/12

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STATE OF TEXAS
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2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CASTLEWOOD PLAN AND PROFILE
STA 10+00 TO STA 13+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\PP-CASTLEWOOD1_NEW.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 76 OF 131

PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

No.	Date	Revisions	App.

℄ CURVE NO. 7 DATA:

PC STA 10+89.96
PI STA 12+52.00
PT STA 13+93.47
Δ = 49°41'20"
R = 350'
L = 303.51
T = 162.04

TBM #4
SET NAIL W/ SHINER @ INTERSEC
OF CASTLEWOOD & BUFFALO SPDWY
EL.= 48.31

NOTES:
1. SEE SHEETS 78A, 78B, FOR STORM SEWER LATERAL DETAILS.
2. ROE= RIGHT OF ENTRY
3. FOR TREE PROTECTION, SEE "TREE SPECIES IDENTIFICATION SHEET" SHEET 103B.
4. FOR EXISTING FIRE HYDRANTS TO REMAIN, CONTRACTOR TO CURVE SIDEWALK AS NECESSARY TO NOT DAMAGE FIRE HYDRANT.

WATER LINE LEGEND
RESTRAINED JOINT SECTION
DIP W/RESTRAINED JOINTS

REMOVE AND REPLACE EXIST MH
STA 10+01, 8.5' RT
REMOVE EXIST 18" RCP EAST
AND INSTALL PROP 24" RCP EAST
(ALL OTHER CONNECTIONS TO REMAIN)

CASTLEWOOD

BUFFALO SPEEDWAY

MATCH LINE STA 13+00

PI STA 16+12
T/C EL.= 48.03±
(MATCH EXIST PVM'T)

N&S T/C @
S= +0.35%

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748

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PRIVATE UTILITY LINES SHOWN

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(GAS SERVICE LINES ARE NOT SHOWN)
DATE: 2/16/12

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

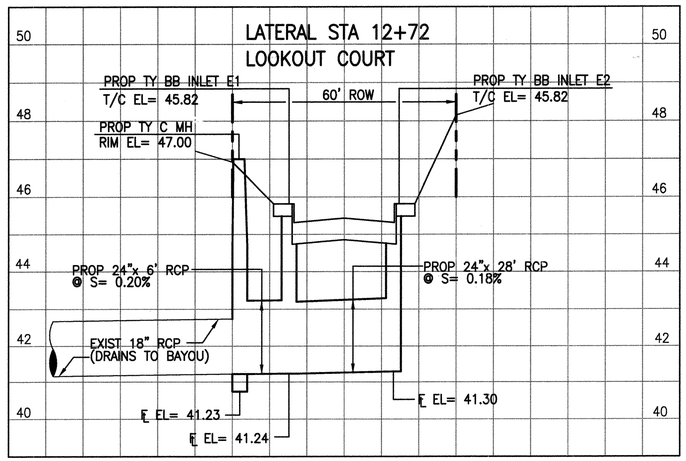
CASTLEWOOD
PLAN AND PROFILE
STA 13+00 TO STA 17+00

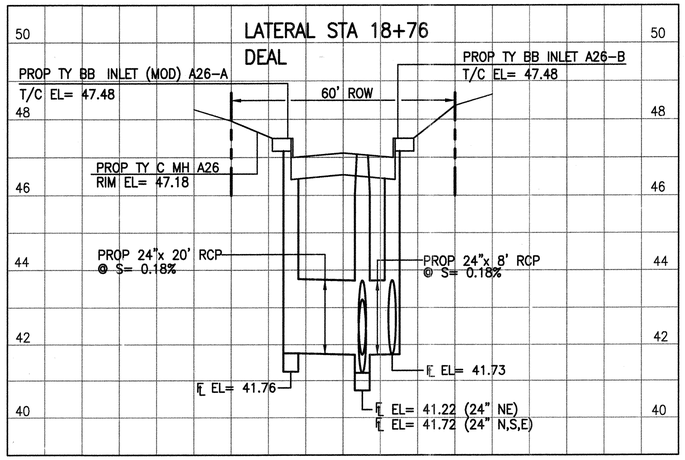
WBS N-000383-0001-4
FILE: P:\City of Houston\2006-03_NSR 451\DRAWINGS\PP-CASTLEWOOD_NEW.dwg
DRAWING SCALE
1"= 20' H. / 1"= 2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 77 OF 131

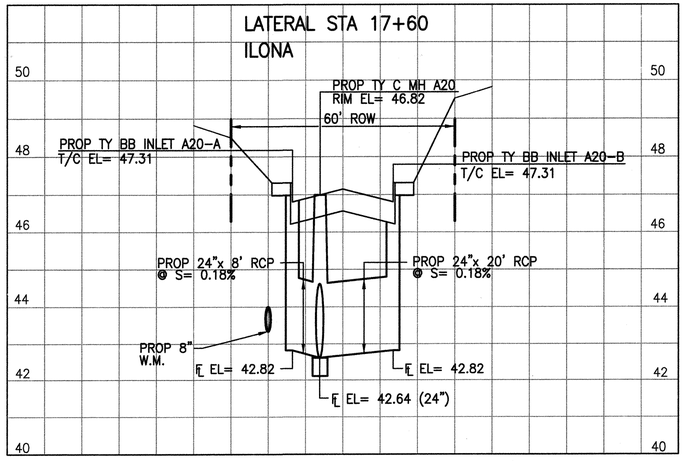
PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

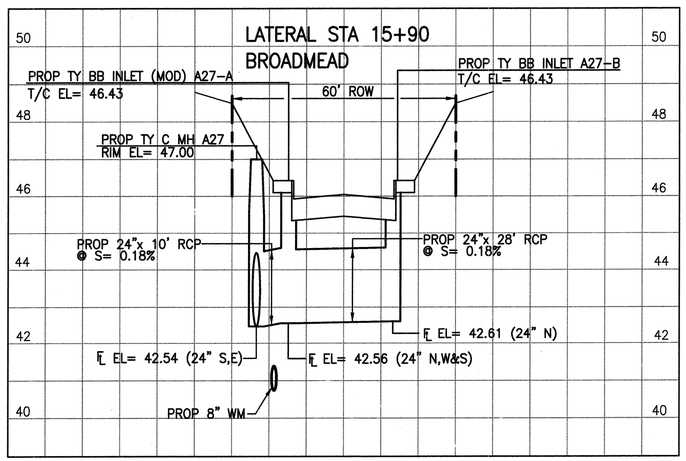
FILE: PP-CASTLEWOOD2.DWG

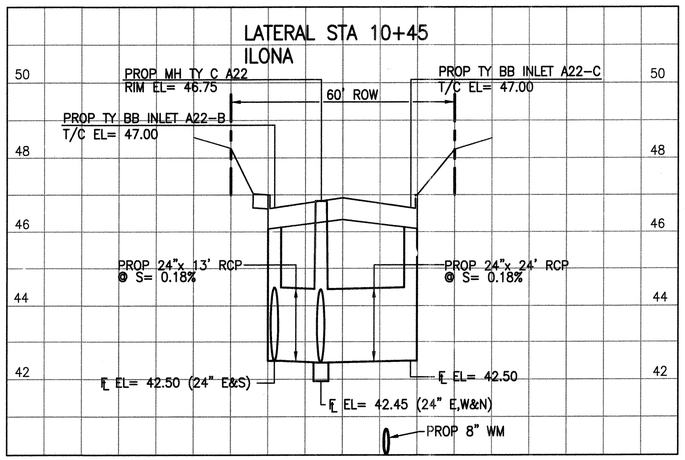
No.	Date	Revisions	App.

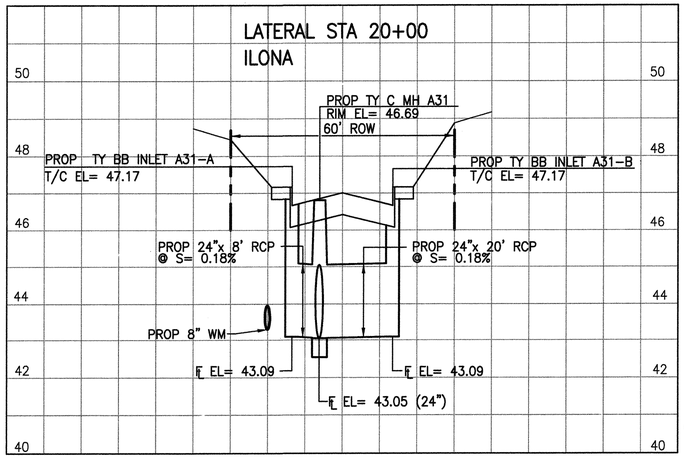


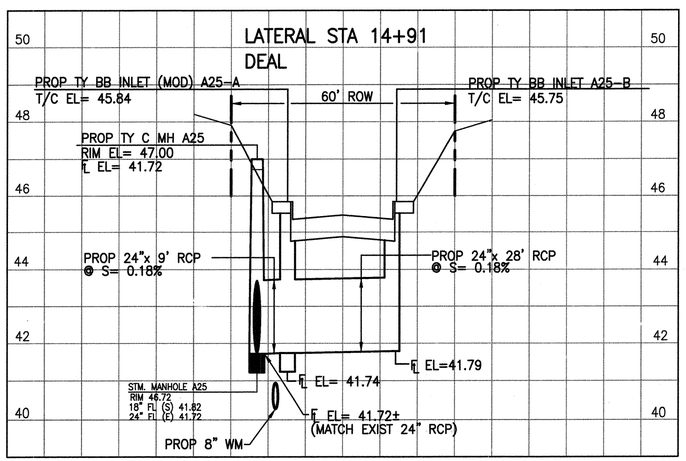


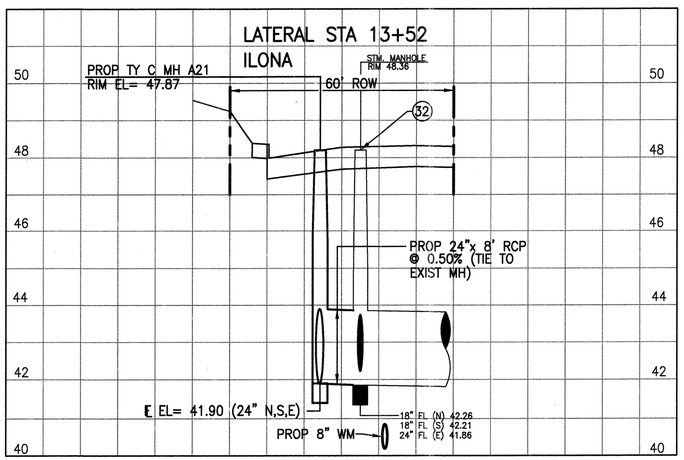


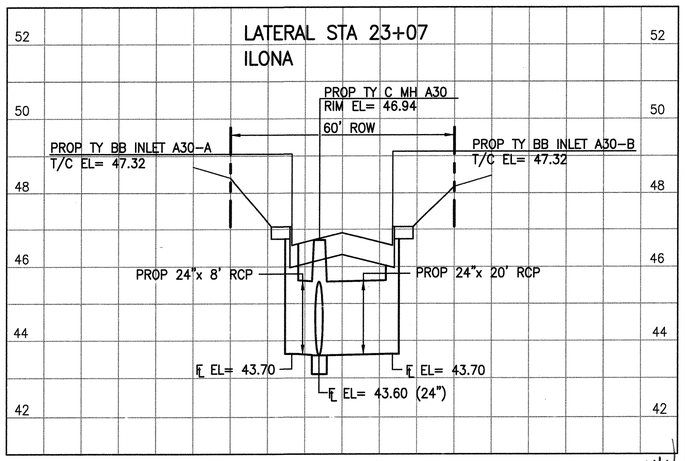












FILE: LATERAL1.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
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LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM SEWER LATERALS
SHEET 1

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\LATERAL1.dwg

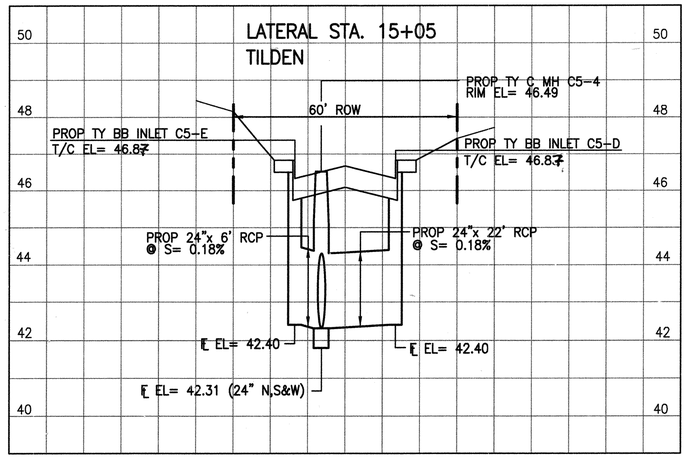
DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

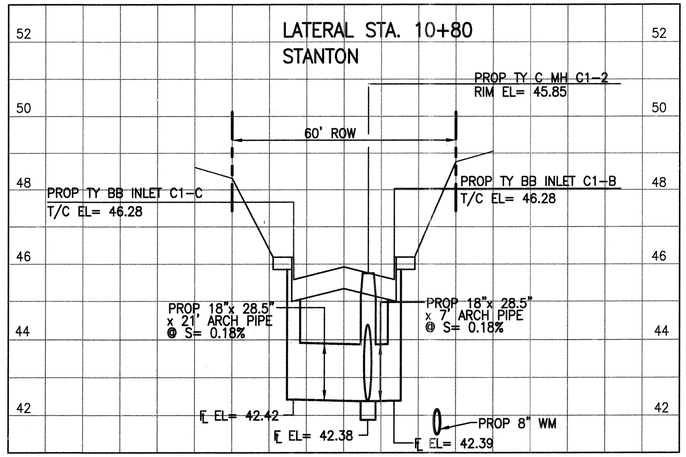
SHEET NO. 78A OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

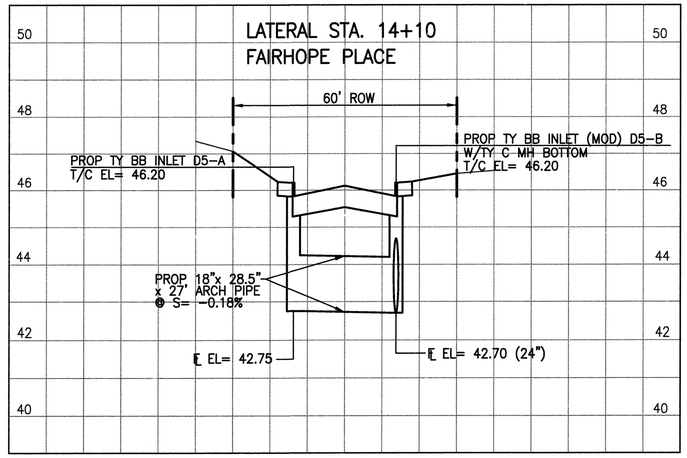
LATERAL STA. 15+05
TILDEN



LATERAL STA. 10+80
STANTON



LATERAL STA. 14+10
FAIRHOPE PLACE



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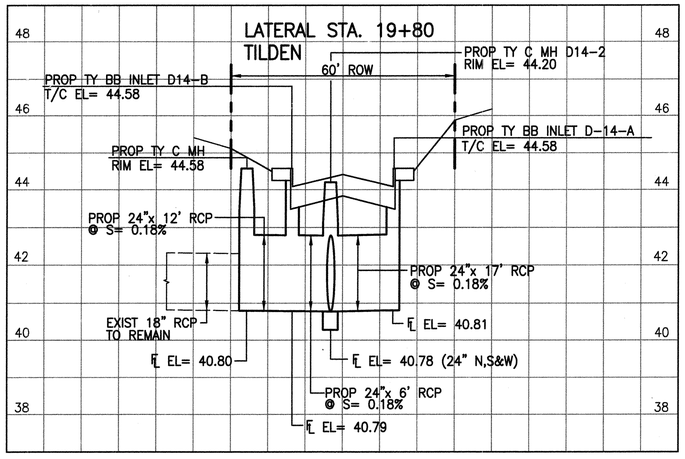
TILDEN



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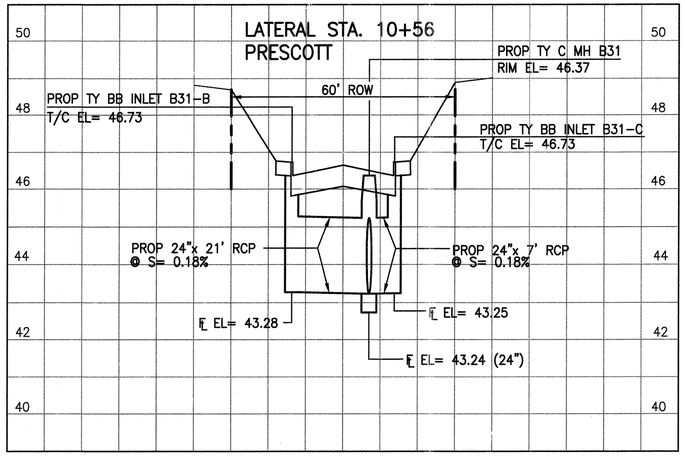
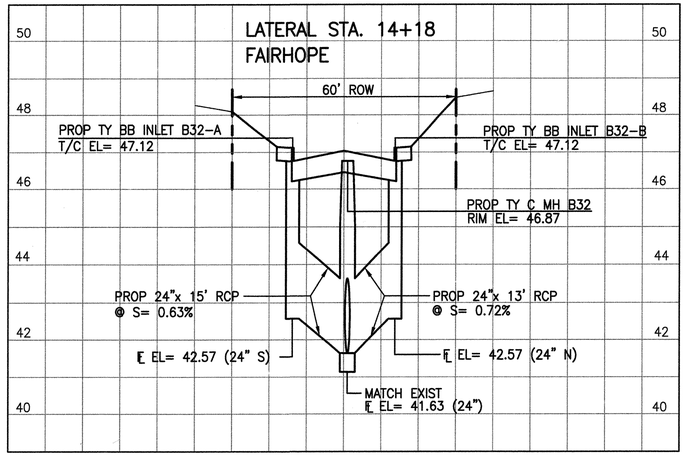
PRESCOTT



LATERAL STA. 14+18
FAIRHOPE



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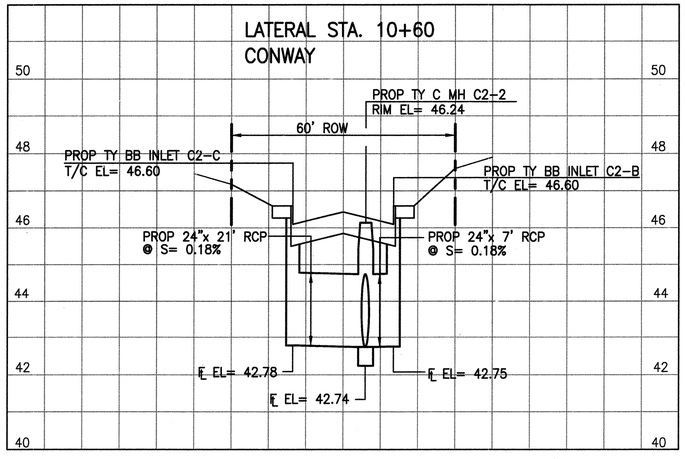
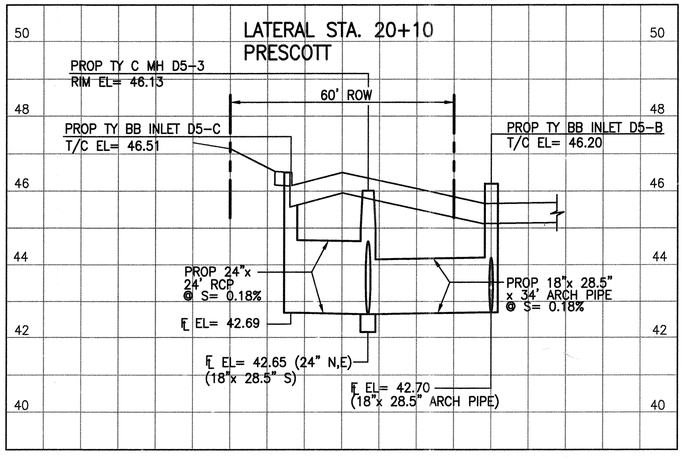
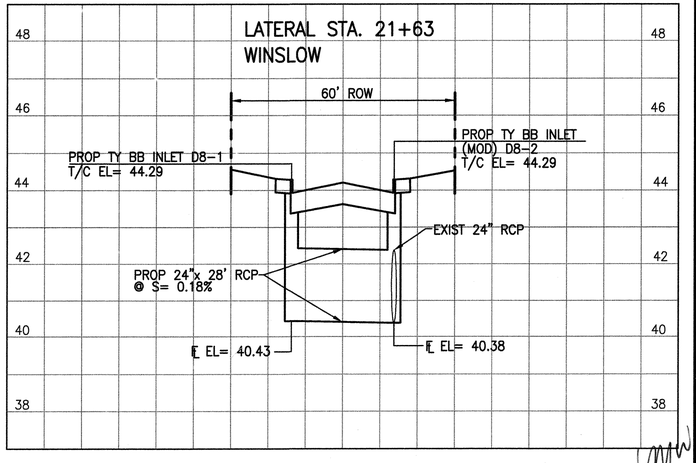
CONWAY



LATERAL STA. 20+10
PRESCOTT



LATERAL STA. 21+63
WINSLOW



FILE: LATERAL1.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

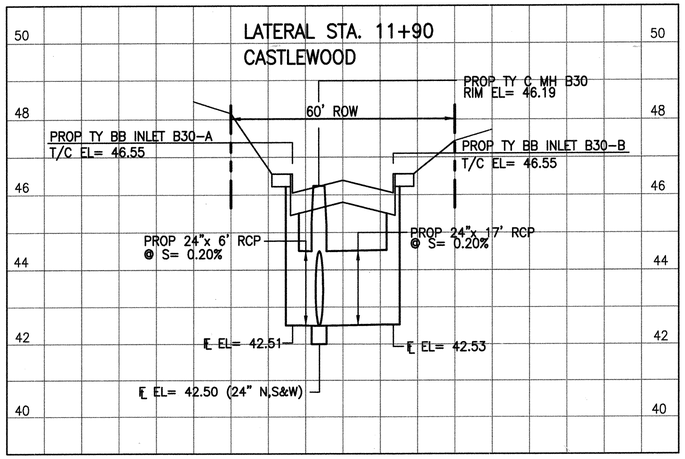
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM SEWER LATERALS
SHEET 2

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\B LATERAL2.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 78B OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS



FILE: LATERAL3.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

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STATE OF TEXAS
JESUS M. OLIVAS
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02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM SEWER LATERALS
SHEET 3

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\C LATERAL3.dwg

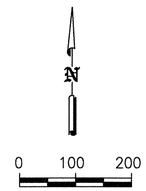
DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 78C OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS





1A LOOKOUT CT 0000 / S. BRAESWOOD 3600	1G TIMBERSIDE 8500 / S. BRAESWOOD 3500	1M TILDEN 3000	1S FAIRHOPE 3100 / BUFFALO SPDWY 8300
1B ILONA 8500 / S. BRAESWOOD 3600	1H BROADMEAD 3600 / TIMBERSIDE 8600	1N CONWAY 3100 / BUFFALO SPDWY 8000	1T FAIRHOPE PLACE 8300 / FAIRHOPE 3000
1C ILONA 8500 / BROADMEAD 3600	1I DEAL 3600 / TIMBERSIDE 8700	1O WINSLOW 3000 / BUFFALO SPDWY 7900	1U TIMBERSIDE CIRCLE DR / TIMBERSIDE DR
1D DEAL 3600 / ILONA 8700	1J CASTLEWOOD 3200 / S. BRAESWOOD 3400	1P STANTON 3000 / BUFFALO SPDWY 8100	
1E NORRIS 3600 / ILONA 8700	1K CASTLEWOOD 3200 / BUFFALO SPDWY 8500	1Q PRESCOTT 3100 / BUFFALO SPDWY 8200	
1F LINKWOOD 3600 / ILONA 8900	1L TILDEN 3100 / S. BRAESWOOD 3100	1R FAIRHOPE PLACE 8200 / PRESCOTT 3000	

1	STREET 500 / STREET 500 — STREET NAME SIGN	4	S1-1	7	R8-3	10	7:15 – 8:15 / 2:45 – 3:30 — S4-1
2	STOP — R1-1	5	AHEAD — W16-9P	8	NO PARKING ANY TIME — R7-1	11	END SCHOOL ZONE / SPEED LIMIT 30
3	DEAD END — W14-1P	6	W16-7PL	9	SCHOOL / SPEED LIMIT 20 — S5-1	12	DEAD END — W14-1

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

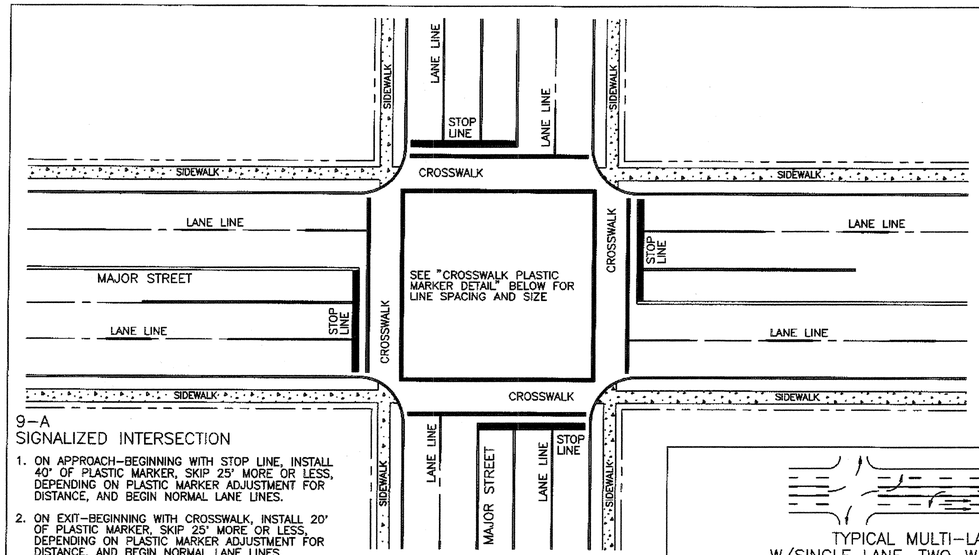
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

SIGNING PLAN

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SIGNING PLAN.dwg
DRAWING SCALE
1" = 400' HALF
1" = 200' FULL
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 79 OF 131

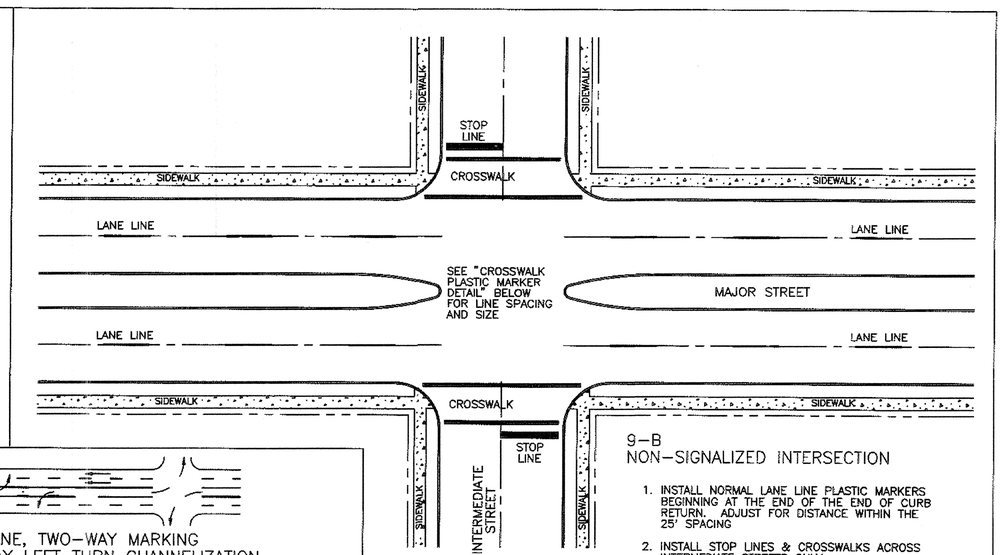
FILED — PUBLIC WORKS AND ENGINEERING — 49097 — NUMBER — HOUSTON, TEXAS

FILE: SIGNING PLAN.dwg



9-A
SIGNALIZED INTERSECTION

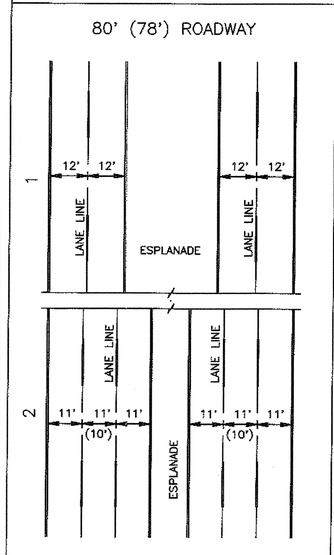
1. ON APPROACH-BEGINNING WITH STOP LINE, INSTALL 40' OF PLASTIC MARKER, SKIP 25' MORE OR LESS, DEPENDING ON PLASTIC MARKER ADJUSTMENT FOR DISTANCE, AND BEGIN NORMAL LANE LINES.
2. ON EXIT-BEGINNING WITH CROSSWALK, INSTALL 20' OF PLASTIC MARKER, SKIP 25' MORE OR LESS, DEPENDING ON PLASTIC MARKER ADJUSTMENT FOR DISTANCE, AND BEGIN NORMAL LANE LINES.

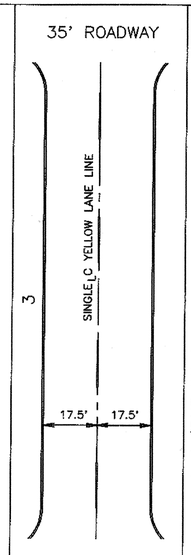


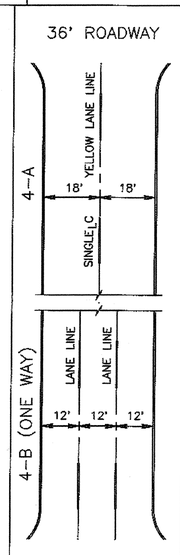
9-B
NON-SIGNALIZED INTERSECTION

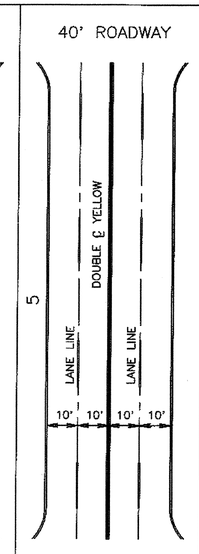
1. INSTALL NORMAL LANE LINE PLASTIC MARKERS BEGINNING AT THE END OF THE END OF CURB RETURN. ADJUST FOR DISTANCE WITHIN THE 25' SPACING
2. INSTALL STOP LINES & CROSSWALKS ACROSS INTERMEDIATE STREETS ONLY.

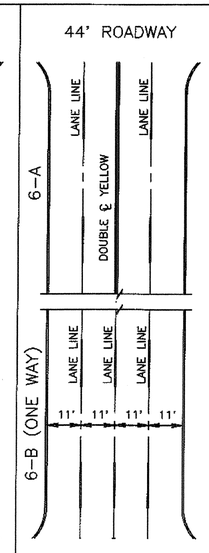
TYPICAL MULTI-LANE, TWO-WAY MARKING
W/SINGLE LANE, TWO-WAY LEFT TURN CHANNELIZATION

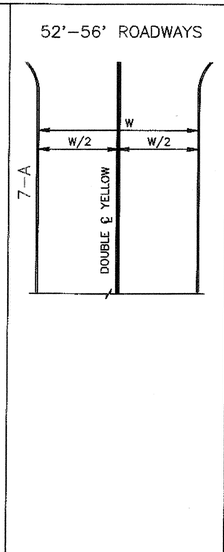


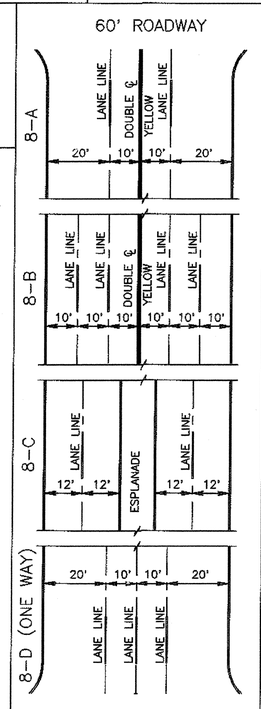


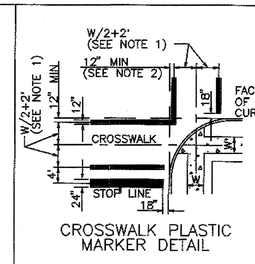










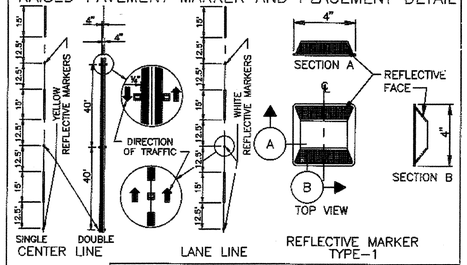


CROSSWALK PLASTIC MARKER DETAIL

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 >5 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.

RAISED PAVEMENT MARKER AND PLACEMENT DETAIL



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

PAVEMENT MARKING DETAILS

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 DWG NO: 02763-01

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers - Planners
FIRM F-596

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SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PAVEMENT MARKING DETAILS

WBS N-000383-0001-4

FILE: J:\City of Houston\2006-05_NSR 451\DRAWINGS\PAVMENT MARKING DETAILS.dwg

DRAWING SCALE
NTS

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 80 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

FILE: PVMTMRKNGDTL.DWG

GENERAL NOTES FOR TRAFFIC HANDLING

1. THE CONSTRUCTION TRAFFIC CONTROL SIGNS, DEVICES, AND BARRICADES ON THESE DRAWINGS CONSTITUTE MINIMUM REQUIREMENTS AND ARE NOT INCLUDED 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 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 ON MAJOR THOROUGHFARES MAY BE BLOCKED FROM 6:00 AM TO 9:00 AM AND 4:00 PM TO 7:00 PM UNLESS OUTLINED IN THE MOBILITY PERMIT.
6. CONTRACTOR SHALL MAINTAIN ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS WHENEVER POSSIBLE, ELSE SHOULD MAINTAIN THE TRAFFIC AS SHOWN IN THE TRAFFIC CONTROL PLANS.
7. CONTRACTOR SHALL PROVIDE ACCESS TO ALL BUSINESSES ALONG THIS PROJECT AT ALL TIMES DURING CONSTRUCTION UNLESS OTHERWISE AUTHORIZED SPECIFICALLY BY THE ENGINEER.
8. ALL EXISTING STOP SIGNS, STREET NAME SIGNS, AND WARNING SIGNS SHALL BE MAINTAINED IN PLACE DURING THE ENTIRE PERIOD OF CONSTRUCTION BY THE CONTRACTOR.
9. 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.
10. WHEN DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE FLAGGERS TO DIRECT TRAFFIC. FLAGGERS SHALL BE OFF-DUTY UNIFORMED POLICE OFFICERS AND SHALL BE PAID FOR BY THE CONTRACTOR. 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.
11. CONTRACTOR SHALL INSURE THAT ALL BARRICADES, SIGNS, CHANNELIZING DEVICES, WARNING LIGHTS, AND TRAFFIC HANDLING DEVICES ARE MAINTAINED IN CLEAN FUNCTIONAL CONDITION AT ALL TIMES.
12. ALL SIGNS, WARNING DEVICES, AND BARRICADES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, INCLUDING ACTS OF VANDALISM OR ACCIDENT.
13. ALL CONSTRUCTION SIGNS MOUNTED ON BARRICADES SHALL BE EQUIPPED WITH TYPE "A" WARNING LIGHTS (TWO PER STRUCTURE).
14. PORTABLE SIGNS MAY BE PROVIDED BETWEEN LOCATIONS AS REQUIRED FOR CONSTRUCTION. THESE HAVE TO BE APPROVED BY THE TRAFFIC ENGINEER.
15. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE TEMPORARY AND EXISTING PAVEMENT MARKINGS AND SIGNING IN A GOOD VISIBLE CONDITION THROUGHOUT THE LENGTH OF THE PROJECT.
16. THE CONTRACTOR SHALL SEQUENCE THE CONSTRUCTION IN SUCH A MANNER THAT NO ADJACENT CROSS STREETS AND MEDIAN OPENINGS ARE CLOSED AT THE SAME TIME.
17. THE CONTRACTOR SHALL MAINTAIN BARRICADES AND SAFETY FENCES AT EACH SITE WHERE PEDESTRIAN TRAFFIC IS EVIDENT.
18. THE CONTRACTOR SHALL REALIGN AND READJUST SIGNAL HEADS AS REQUIRED AND DIRECTED BY THE CITY OF HOUSTON AND THE FIELD ENGINEER DURING THE ENTIRE CONSTRUCTION ACTIVITY. IMMEDIATELY CALL THE CITY OF HOUSTON, SIGNAL DISPATCHER AT (832) 395-3000.
19. 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.
20. 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.
21. 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.
22. ALL CONSTRUCTION SIGNS, WARNING DEVICES, AND BARRICADES SHALL REMAIN IN PLACE UNTIL THEIR REMOVAL IS DIRECTED BY THESE PLANS OR BY THE ENGINEER.
23. AT THE CONCLUSION OF CONSTRUCTION, THE CONTRACTOR SHALL RESTORE ALL PAVEMENT MARKINGS AND SIGNS, SPEED HUMPS/CUSHIONS TO THEIR ORIGINAL CONDITION WITH TRAFFIC PAINT STRIPES RAISED PAVEMENT MARKER BUTTONS AND RE-INSTALL THE SIGNS AT THEIR EXISTING LOCATION.
24. CONSTRUCTION IN ANY AREA, THAT IS ADVERSELY AFFECTING TRAFFIC FLOW AND SAFETY, MUST BE PURSUED 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.
25. THE "TRAFFIC CONTROL PLANS" EXIST AS A PART OF 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.
26. APPROVED COPIES OF TRAFFIC CONTROL PLANS AND MOBILITY PERMITS SHALL BE MADE AVAILABLE FOR INSPECTION AT THE JOB SITE AT ALL TIMES. CONTRACTOR MUST SECURE "MOBILITY PERMITS" FROM CITY'S TRAFFIC MANAGEMENT AND MAINTENANCE BRANCH BEFORE CLOSING A LANE/SIDEWALK. THE REQUEST MUST BE MADE AT LEAST 10 DAYS IN ADVANCE OF THE CLOSURE. NOTE THAT WORKING HOURS MAY BE RESTRICTED OR THE REQUEST MAY BE DENIED. CALL 832-395-3020 FOR AN APPLICATION OR LOGON TO WWW.GIMS.HOUSTONTX.GOV.
27. CONTRACTOR SHALL COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW.

ADDITIONAL NOTES:

1. CONTRACTOR TO NOTIFY POLICE DEPARTMENT, FIRE DEPARTMENT, SCHOOL, SCHOOL DISTRICT, METRO, AND UNITED STATES POSTAL SERVICE OF ONE WAY OPERATION A MINIMUM OF FIVE (5) WORKING DAYS BEFORE IMPLEMENTATION.

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

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3288 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED
PROFESSIONAL ENGINEER
2/15/12

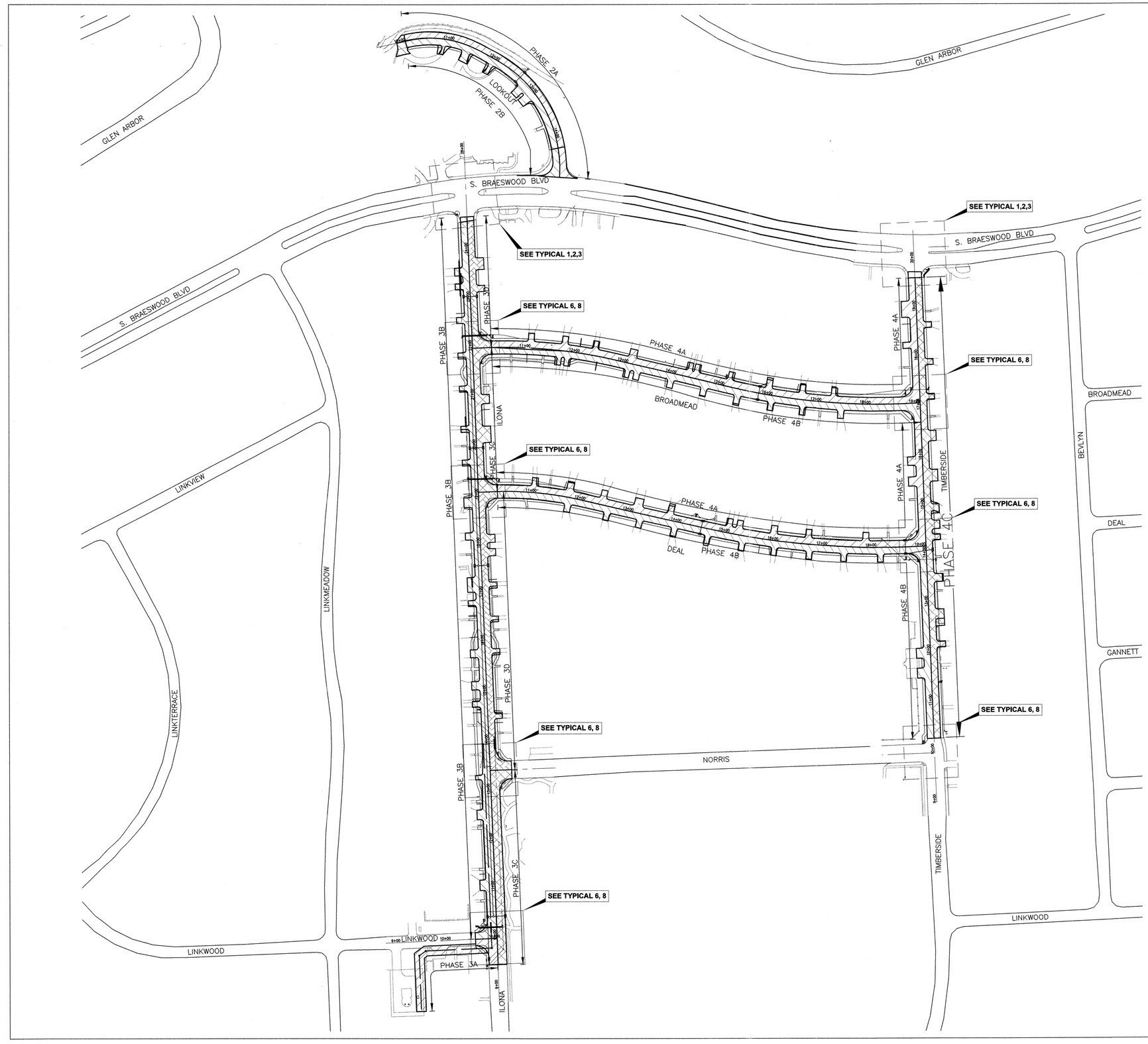
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

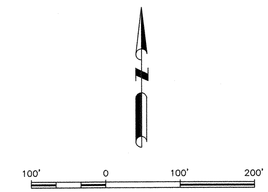
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
GENERAL NOTES
SHEET 01 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 81 OF 131

PUBLIC WORKS AND ENGINEERING
49097





No.	Date	Revisions	App.

LEGEND

- PHASE 2A, 3A, 4A
- PHASE 2B, 3B, 4B
- PHASE 3C, 4C
- PHASE 3D

PHASE 1: WATER LINE INSTALLATION
TYPICAL 4: ALL CONSTRUCTION BETWEEN BLOCKS FOR PHASES 3 THRU 7

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

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3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

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LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
PHASING LAYOUT
SHEET 02 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
1"=100'
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 82 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
JIMBER
HOUSTON, TEXAS



100' 0 100' 200'

SCALE: 1" = 100'

No.	Date	Revisions	App.

LEGEND

- PHASE 5A, 6A, 7A
- PHASE 5B, 6B, 7B
- PHASE 5C, 7C
- PHASE 5D

PHASE 1: WATER LINE INSTALLATION
TYPICAL 4: ALL CONSTRUCTION BETWEEN BLOCKS FOR PHASES 3 THRU 7

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

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N/A DATE:

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HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED
PROFESSIONAL ENGINEER
Vincent N. Jacob
2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

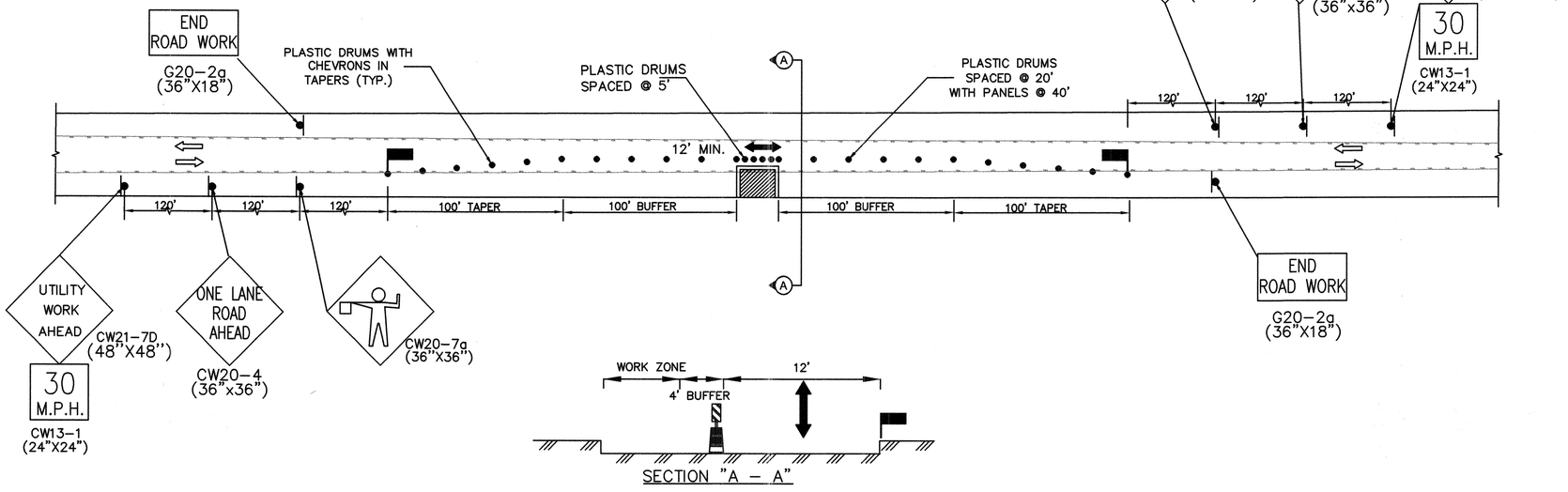
TRAFFIC CONTROL PLAN
PHASING LAYOUT
SHEET 03 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
1"=100'
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 83 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

TYPICAL UTILITY WORK

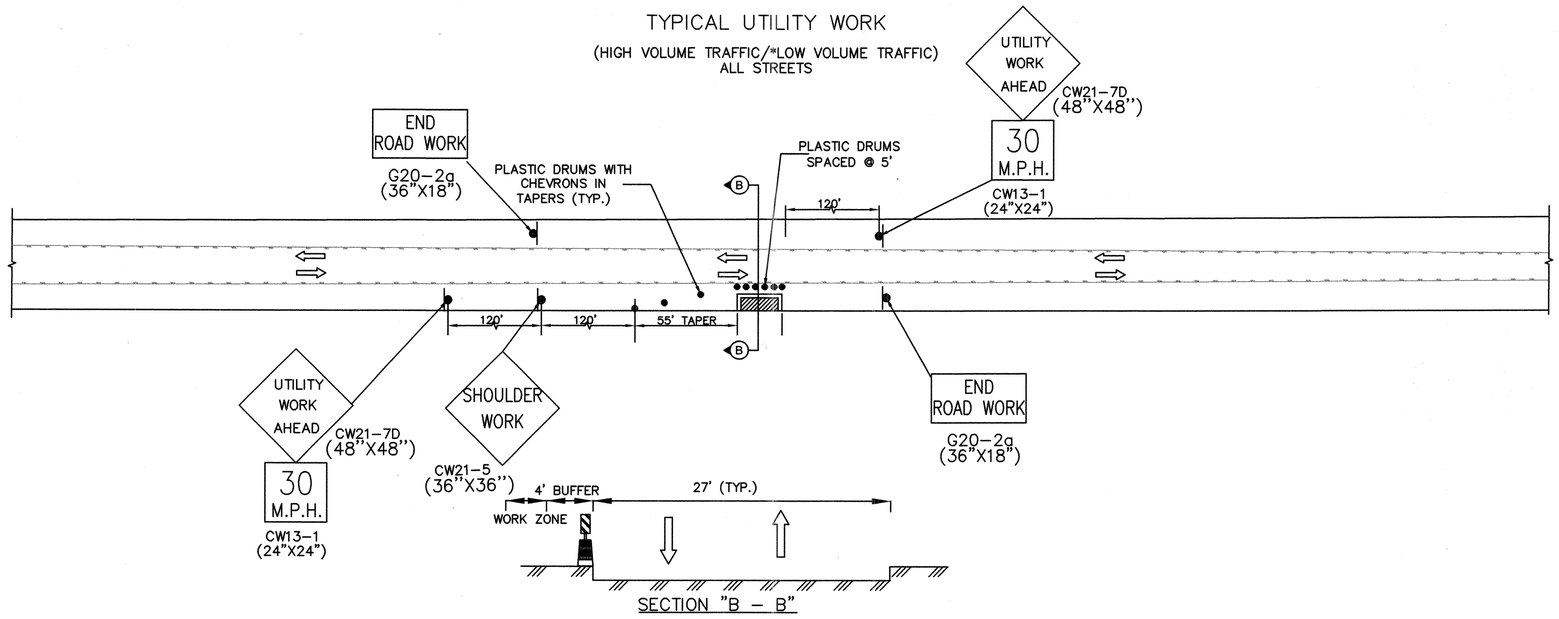
(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)
ALL STREETS



SECTION "A – A"

TYPICAL UTILITY WORK

(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)
ALL STREETS



SECTION "B – B"

LEGEND

- CONSTRUCTION AREA
- OPEN TO TRAFFIC
- SIGN POST
- BARRELS
- VERTICAL PANELS
- TYPE III BARRICADE
- FLAGGER

NOTES

1. FLAGGER MAY BE USED DURING WORKING HOURS ONLY.
2. COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON–WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL (713) 747-0266 FAX (713) 748-2746
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P–5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED
PROFESSIONAL ENGINEER
Vincent N. Jacob
2/5/13

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

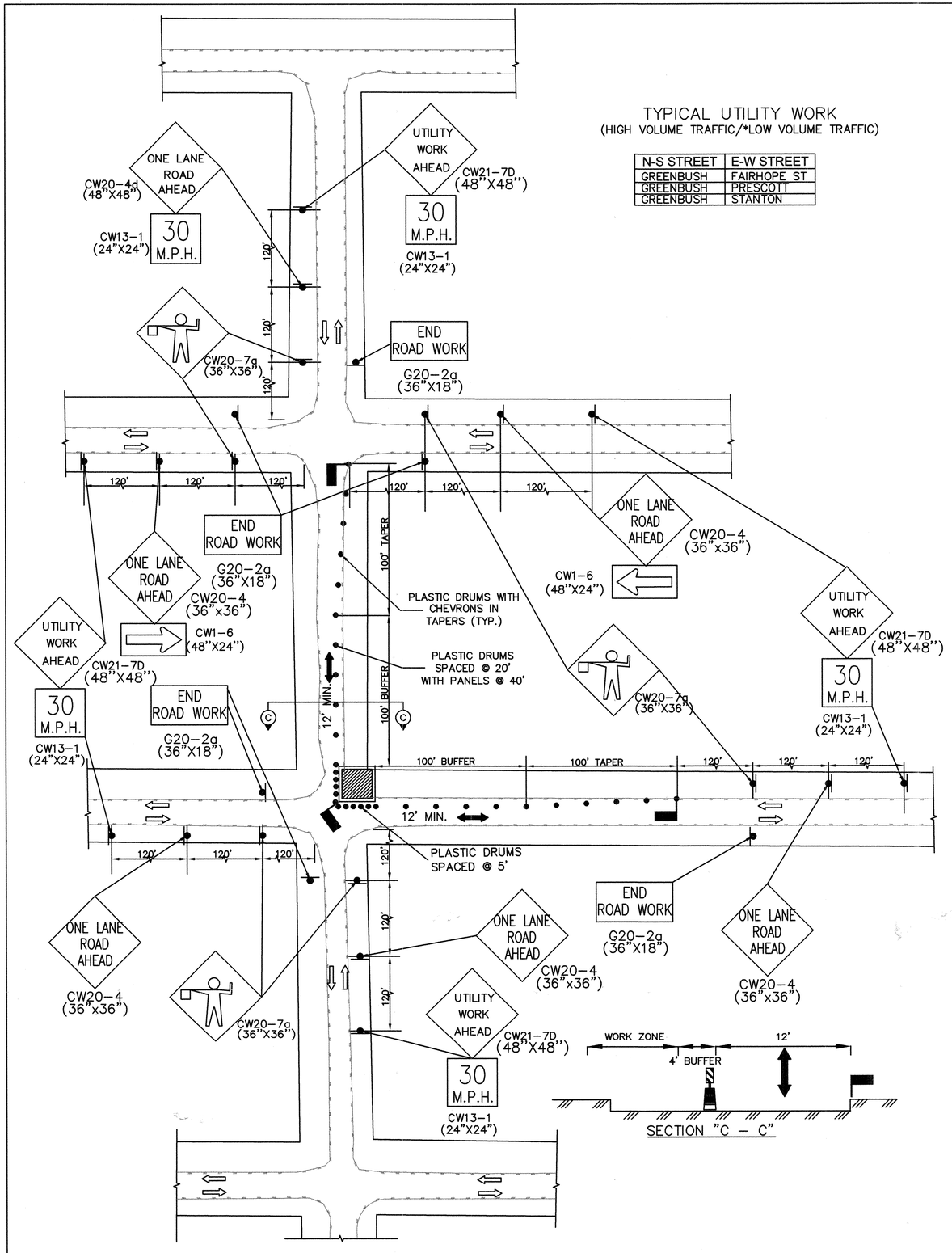
TRAFFIC CONTROL PLAN
PHASE 1 (WATER TYP. 1)
SHEET 04 OF 16

WBS N–000383–0001–4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 84 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
LICENSE NUMBER
HOUSTON, TEXAS

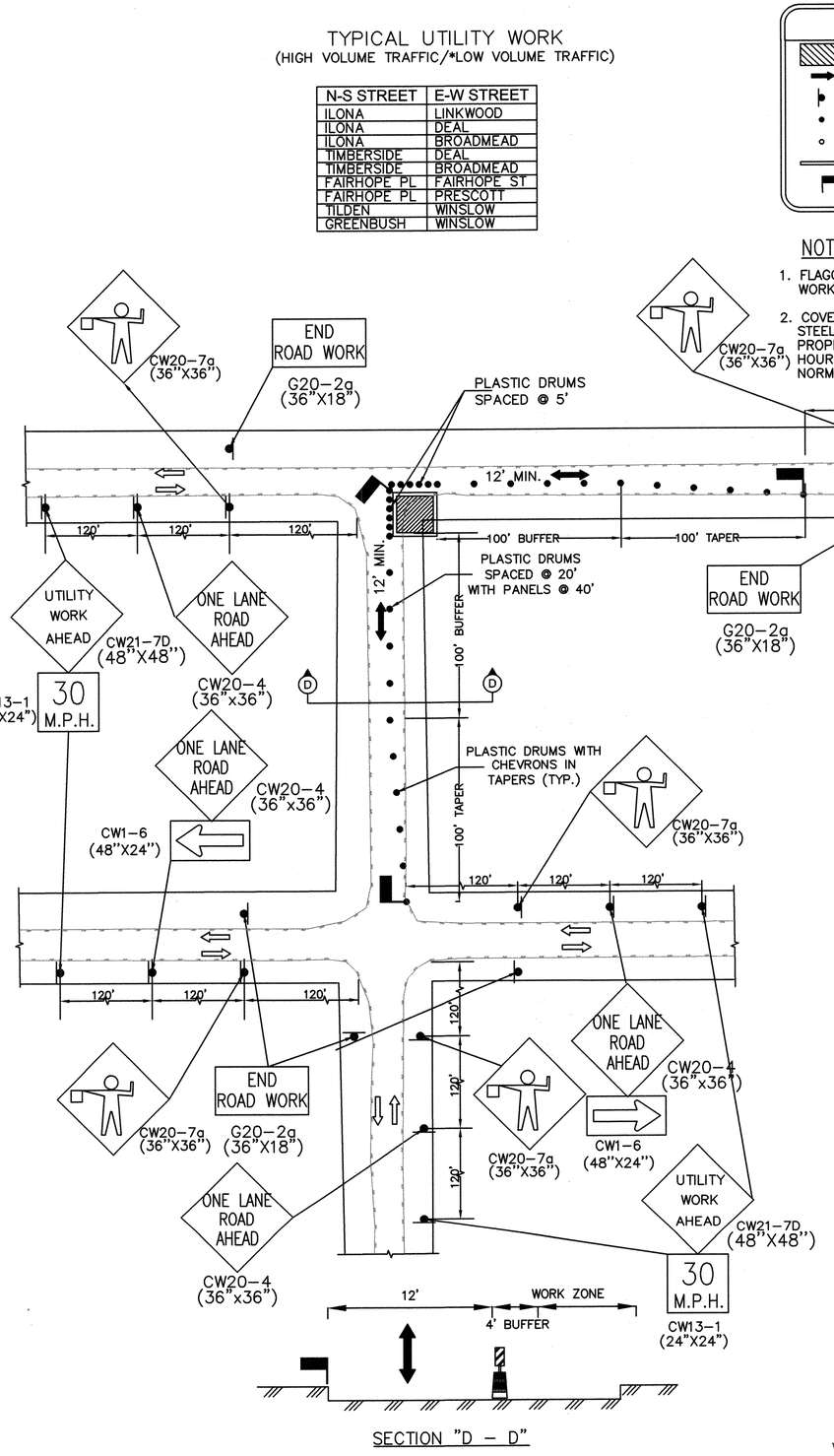
TYPICAL UTILITY WORK
(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)

N-S STREET	E-W STREET
GREENBUSH	FAIRHOPE ST
GREENBUSH	PRESCOTT
GREENBUSH	STANTON



TYPICAL UTILITY WORK
(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)

N-S STREET	E-W STREET
ILONA	LINKWOOD
ILONA	DEAL
ILONA	BROADMEAD
TIMBERSIDE	DEAL
TIMBERSIDE	BROADMEAD
FAIRHOPE PL	FAIRHOPE ST
FAIRHOPE PL	PRESCOTT
TILDEN	WINSLOW
GREENBUSH	WINSLOW



NOTES

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2. COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3388 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

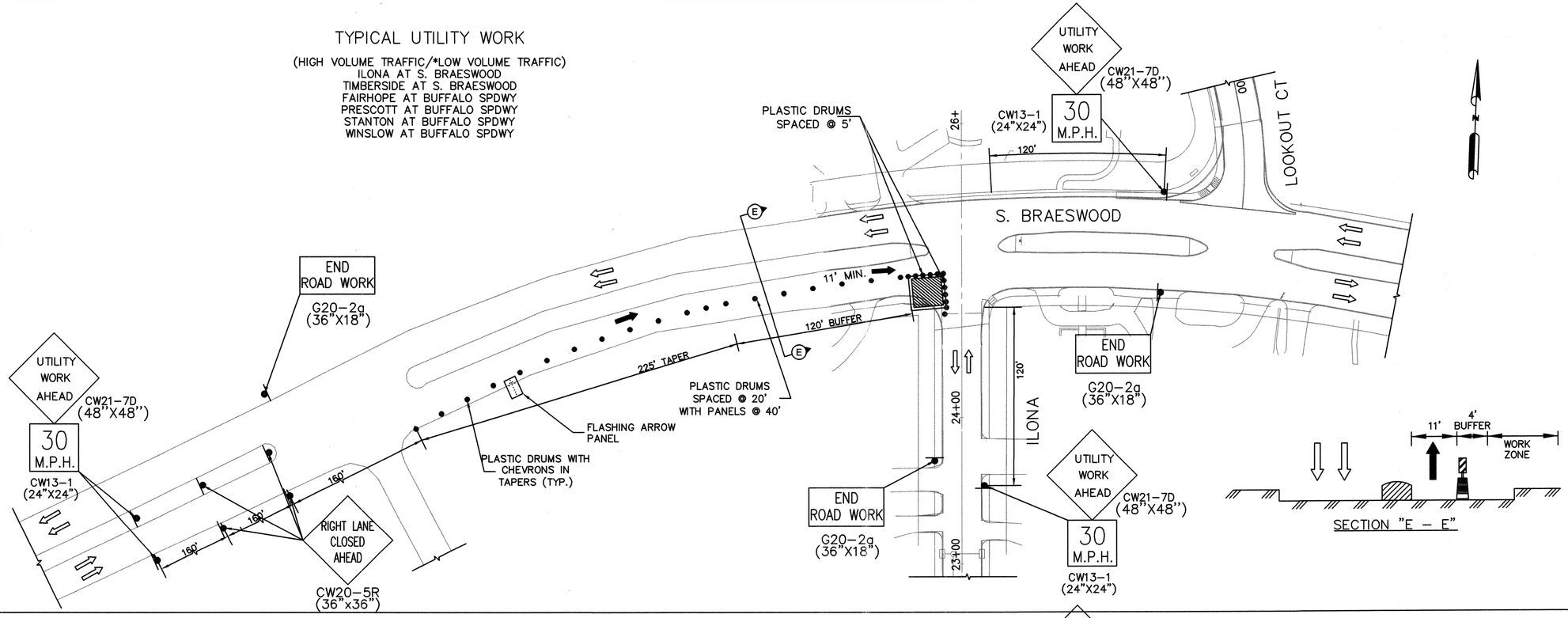
TRAFFIC CONTROL PLAN
PHASE 1 (WATER TYP. 2)
SHEET 05 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 85 OF 131

PUBLIC WORKS AND ENGINEERING
CERTIFICATE NUMBER
49097
HOUSTON, TEXAS

TYPICAL UTILITY WORK

(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)
ILONA AT S. BRAESWOOD
TIMBERSIDE AT S. BRAESWOOD
FAIRHOPE AT BUFFALO SPDWY
PRESCOTT AT BUFFALO SPDWY
STANTON AT BUFFALO SPDWY
WINSLOW AT BUFFALO SPDWY



SECTION "E – E"

LEGEND

- CONSTRUCTION AREA
- OPEN TO TRAFFIC
- SIGN POST
- BARRELS
- VERTICAL PANELS
- TYPE III BARRICADE
- FLAGGER

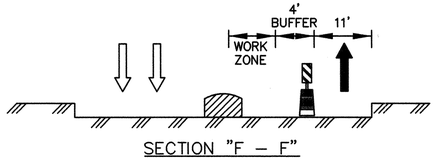
NOTES

1. NO LANES SHALL BE BLOCKED ON S BRAESWOOD OR BUFFALO SPDWY DURING THE HOURS OF 7:00 AM – 9:00 AM OR 3:00 PM – 6:00 PM.
2. COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON–WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW.

No.	Date	Revisions	App.

TYPICAL UTILITY WORK

(HIGH VOLUME TRAFFIC/*LOW VOLUME TRAFFIC)
ILONA AT S. BRAESWOOD



SECTION "F – F"

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

iSani CONSULTING
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3288 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON

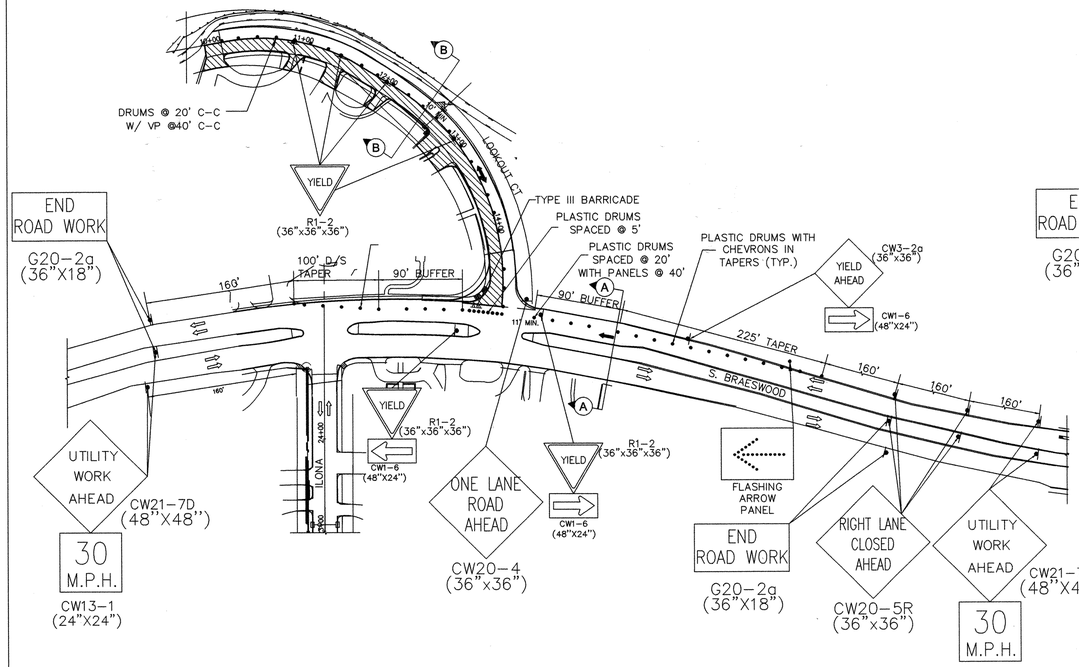
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

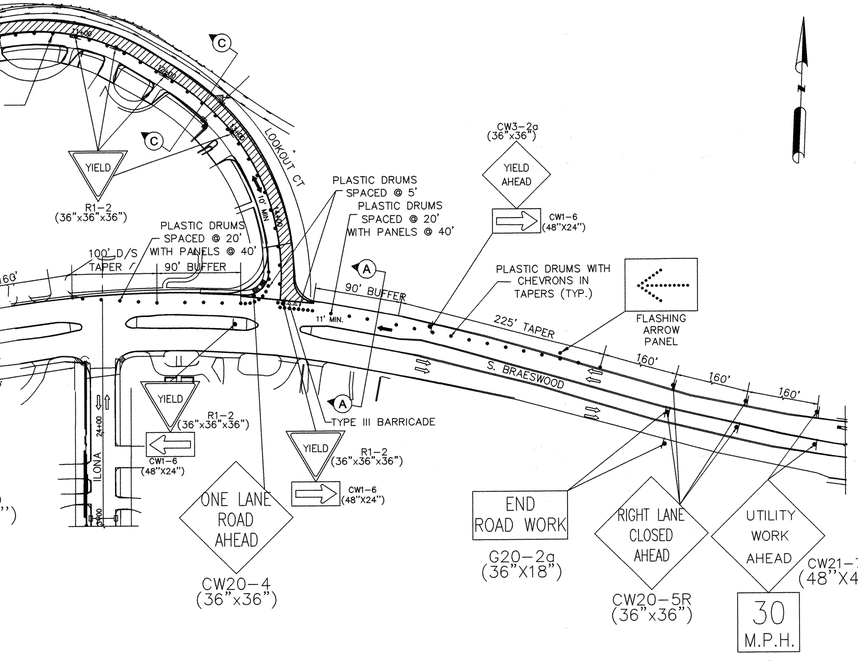
TRAFFIC CONTROL PLAN
PHASE 1 (WATER TYP. 3)
SHEET 06 OF 16

WBS N-000383-0001-4	
FILE:	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 86 OF 131	

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER
HOUSTON, TEXAS



PHASE 2B



PHASE 2A

LEGEND – DEVICES	
	CONSTRUCTION AREA
	TEMPORARY ASPHALT
	TRAFFIC SIGN
	DRUMS
	TUBULAR MARKERS
	EXIST. TRAVEL DIRECTION
	PROP. TRAVEL DIRECTION

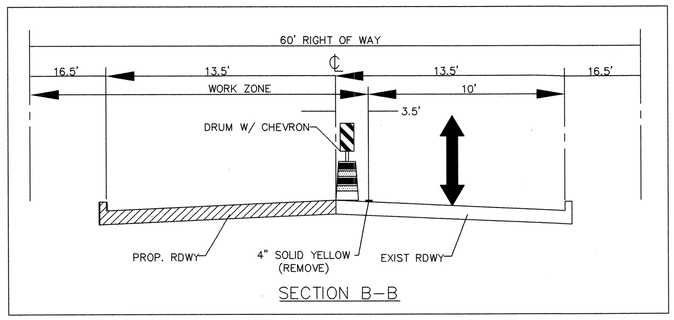
*ON TYPE III BARRICADE
W/2 TYPE A FLASHING LIGHTS

SPEED LIMITS:

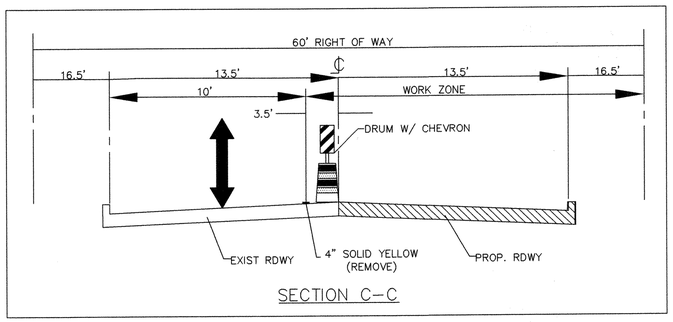
S BRAESWOOD	: 35 MPH
BUFFALO SPEEDWAY	: 35 MPH
OTHERS	: 30 MPH

NOTES

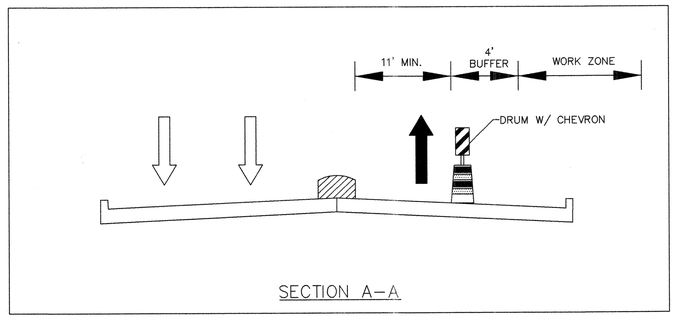
1. NO LANES SHALL BE BLOCKED ON S BRAESWOOD OR BUFFALO SPDWY DURING THE HOURS OF 7:00 AM – 9:00 AM OR 3:00 PM – 6:00 PM.



SECTION B–B



SECTION C–C



SECTION A–A

SBB SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
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N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
Vincent N. Jacob
2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
PHASE 2
SHEET 07 OF 16

WBS N-000383-0001-4	
FILE:	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 87 OF 131	

PUBLIC WORKS AND ENGINEERING
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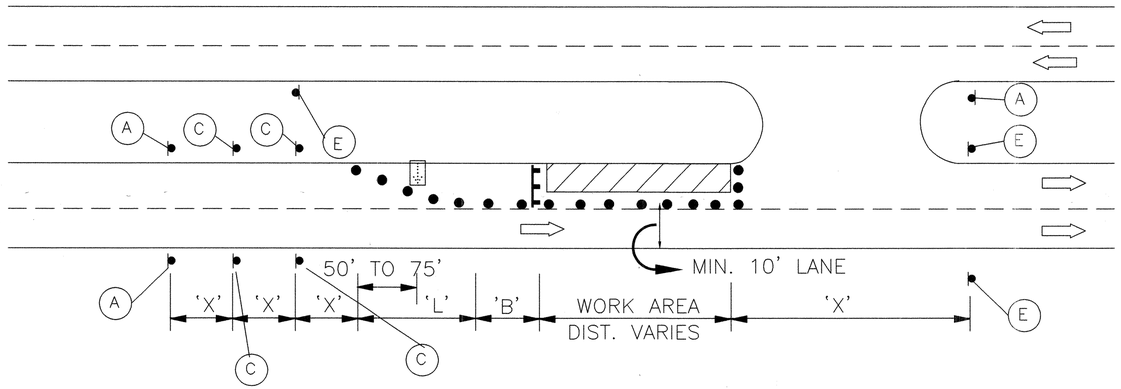
49097
JUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.



TYPICAL LEFT LANE CLOSURE OF A MULTILANE STEET

Length for Longitudinal Buffer	
Posted Speed (mph)	Length in Feet (B)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335

LEGEND (TYPICAL)

- PLASTIC DRUM (see spacing for channelizing devices)
- OFF-DUTY UNIFORMED POLICE OFFICER
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- TUBULAR MARKER

TYPICAL SIGN SPACING AND TAPER LENGTHS.				
		Min. Desirable Taper Length "L"		
Posted Speed (mph)	Sign Spacing "X"	10' Offset	11' Offset	12' Offset
30	120'	150'	165'	180'
35	160'	205'	225'	245'
40	240'	265'	295'	320'
45	320'	450'	495'	540'
50	400'	500'	550'	600'
55	500'	550'	605'	660'

* ENGINEER TO STRIKE THROUGH ALL SPEED LIMITS NOT APPLICABLE

A — UTILITY WORK AHEAD — CW21-7D 48 X 48

C — LEFT LANE CLOSED / AHEAD — CW20-5L 48 X 48 PLAQUE 30 X 12

B — CW4-2L 36 X 36

E — END ROAD WORK — G20-2a 48 X 24

CHEVRON — CW1-8 18 x 24

8"-12" — VP-1

MOUNTING HOLES FOR VERTICAL PANEL OR CHEVRON — 36" — PLASTIC DRUM

SPECIAL TRAFFIC REQUIREMENTS

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.
2. Contractor will be responsible for replacing and maintaining pavement markings which include centerline, barrier lines, lane lines and raised pavement markings.
3. This traffic control plan represents the minimum required by traffic conditions in the field. Contractor to maintain access to adjacent properties at all times.

4a. No lanes shall be closed from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday thru Friday.

4b. No lanes shall be blocked between 7:00 a.m. to 6:00 p.m. Monday thru Friday in downtown area. Exception to these times, if necessary, should be sought during lane closure permit application.

5. Contractor shall cover open pavement excavations with anchored steel plates during non-working hours, and open lanes for normal traffic flow.
6. Off-duty Uniformed Police Officers are required to direct traffic when lanes are blocked.
7. Lane closure time(s) shall be specified on the lane closure permit.
8. If the contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, they 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.
9. Approved copies of Traffic Control Plans and lane closure permits shall be available for inspection at job site at all times. Contractor must secure 'Lane Closure Permits' from City's Traffic Management and Maintenance Branch before closing a lane/sidewalk. The request must be made at least three 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 713-837-7280 for an application.
10. Lanes shall be kept closed during pavement surface restoration and opened only after pavement is restored completely.

SPACING FOR CHANNELIZING DEVICES

1. Plastic drums on merging taper @ 30' c-c with chevron sign @ 60' c-c and type 'C' warning light (for overnight closure)
2. Plastic drums on downstream taper @ 35' c-c
3. Plastic drums on radii @ 5' c-c
4. Plastic drums on tangent @ 35' c- c with vertical panel @ 70' c-c and type 'C' warning light @ 70' c-c (for overnight closure)
5. Plastic drums in front of construction zone @ 20' c-c with vertical panel @ 40' c-c and Type 'A' warning light @ 40' c-c (for overnight closure)
6. 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")
7. Tubular marker @ 20' C-C.

Note: Spacing shown on traffic control plans shall supersede the above spacings.

S BRAESWOOD	35 MPH
BUFFALO SPEEDWAY	35 MPH
STREET NAME	SPEED LIMIT

AJ HAQUE DWG No2

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

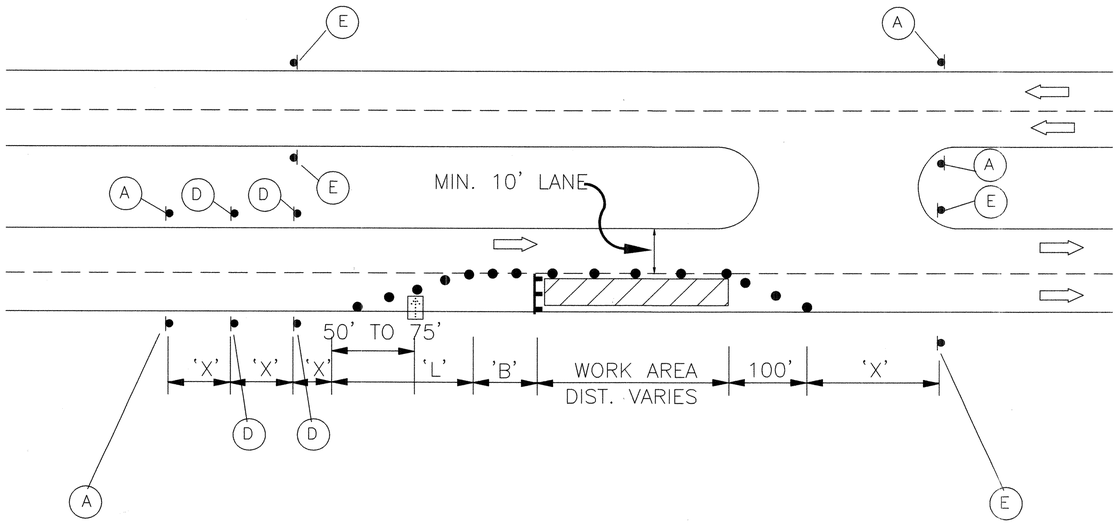
NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 1)
SHEET 08 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 88 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — HOUSTON, TEXAS

DFA Info: C:\Dwg\traffic-dev\tlc-1.dgn, gsbarr1, 12/13/2005 08:36 DMD



TYPICAL RIGHT LANE CLOSURE OF A MULTILANE STREET

SPECIAL TRAFFIC REQUIREMENTS

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.
2. Contractor will be responsible for replacing and maintaining pavement markings which include centerline, barrier lines, lane lines and raised pavement markings.
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4a. No lanes shall be closed from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday thru Friday.

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5. Contractor shall cover open pavement excavations with anchored steel plates during non-working hours, and open lanes for normal traffic flow.
6. Off-duty Uniformed Police Officers are required to direct traffic when lanes are blocked.
7. Lane closure time(s) shall be specified on the lane closure permit.
8. If the contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, they 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.
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10. Lanes shall be kept closed during pavement surface restoration and opened only after pavement is restored completely.

SPACING FOR CHANNELIZING DEVICES

1. Plastic drums on merging taper @ 30' c-c with chevron sign @ 60' c-c and type 'C' warning light (for overnight closure)
2. Plastic drums on downstream taper @ 35' c-c
3. Plastic drums on radii @ 5' c-c
4. Plastic drums on tangent @ 35' c- c with vertical panel @ 70' c-c and type 'C' warning light @ 70' c-c (for overnight closure)
5. Plastic drums in front of construction zone @ 20' c-c with vertical panel @ 40' c-c and Type 'A' warning light @ 40' c-c (for overnight closure)
6. 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")
7. Tubular marker @ 20' C-C.

Note: Spacing shown on traffic control plans shall supersede the above spacings.

Length for Longitudinal Buffer		LEGEND (TYPICAL)	TYPICAL SIGN SPACING AND TAPER LENGTHS.				
					Min. Desirable Taper Length "L"		
Posted Speed (mph)	Length in Feet (B)	• PLASTIC DRUM (see spacing for channelizing devices)	Posted Speed (mph)	Sign Spacing "X"	10' Offset	11' Offset	12' Offset
20	35	OFF-DUTY UNIFORMED POLICE OFFICER					
25	55	TYPE III BARRICADE					
30	85		30	120'	150'	165'	180'
35	120	FLASHING ARROW PANEL	35	160'	205'	225'	245'
40	170		40	240'	265'	295'	320'
45	220		45	320'	450'	495'	540'
50	280	TUBULAR MARKER	50	400'	500'	550'	600'
55	335		55	500'	550'	605'	660'

* ENGINEER TO STRIKE THROUGH ALL SPEED LIMITS NOT APPLICABLE

S BRAESWOOD	35 MPH
BUFFALO SPEEDWAY	35 MPH
STREET NAME	SPEED LIMIT

A — UTILITY WORK AHEAD — CW21-7D 48 X 48

D — RIGHT LANE CLOSED / AHEAD — CW20-5R 48 X 48 PLAQUE 30 X 12

E — END ROAD WORK — G20-2a 48 X 24

F — CW4-2R 36 X 36

CHEVRON — CW1-8 18 x 24

8"-12" — VP-1

MOUNTING HOLES FOR VERTICAL PANEL OR CHEVRON — 36" — PLASTIC DRUM

DFA Info: G:\Data\traffic_dwl\tcp-1.dgn modified: 12/13/2005 08:36 DAVID

AJ HAQUE DWG No1

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

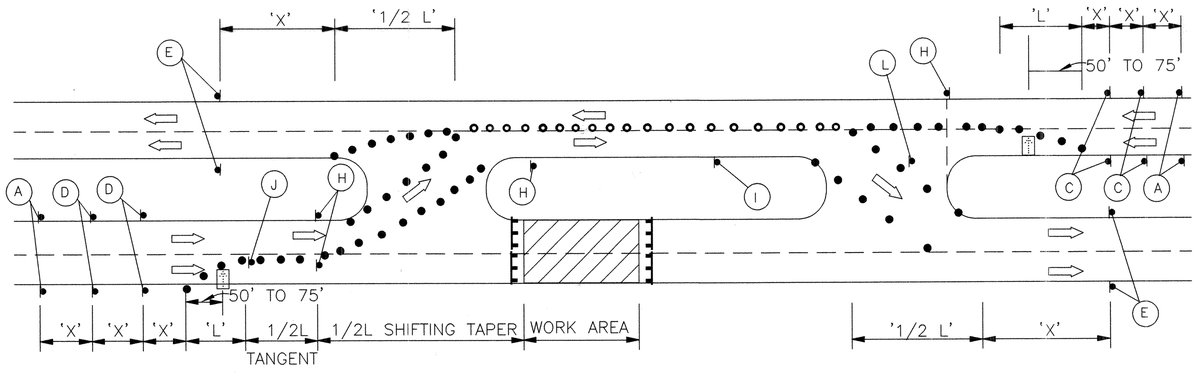
STATE OF TEXAS — VINCENT N. JACOB — 98325 — LICENSED PROFESSIONAL ENGINEER — 2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451
TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 2)
SHEET 09 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 89 OF 131

PUBLIC WORKS AND ENGINEERING — FILED — 49097 — CONTROL NUMBER — HOUSTON, TEXAS



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7. Tubular marker @ 20' C-C.

Note: Spacing shown on traffic control plans shall supersede the above spacings.

TYPICAL CLOSURE OF ONE ROADWAY OF A 4-LANE DIVIDED STREET

Length for Longitudinal Buffer	
Posted Speed (mph)	Length in Feet (B)
20	35
25	55
30	85
35	120
40	170

LEGEND (TYPICAL)

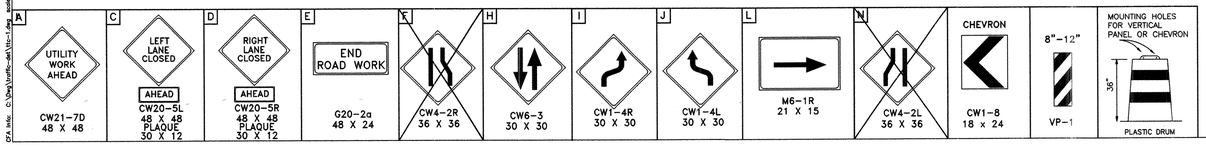
- PLASTIC DRUM (see spacing for channelizing devices)
- OFF-DUTY UNIFORMED POLICE OFFICER
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- TUBULAR MARKER

TYPICAL SIGN SPACING AND TAPER LENGTHS.

Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L" 10' Offset	11' Offset	12' Offset
30	120'	150'	165'	180'
35	160'	205'	225'	245'
40	240'	265'	295'	320'

* ENGINEER TO STRIKE THROUGH ALL SPEED LIMITS NOT APPLICABLE

STREET NAME	SPEED LIMIT
S BRAESWOOD	35 MPH
BUFFALO SPEEDWAY	35 MPH



CFA, Inc. C:\Dwg\traffic-details\tc-1.dwg, scale=1 12/13/2002 09:38 DAVID

AJ HAQUE DWG No.5

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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VALID AT TIME OF REVIEW ONLY
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N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

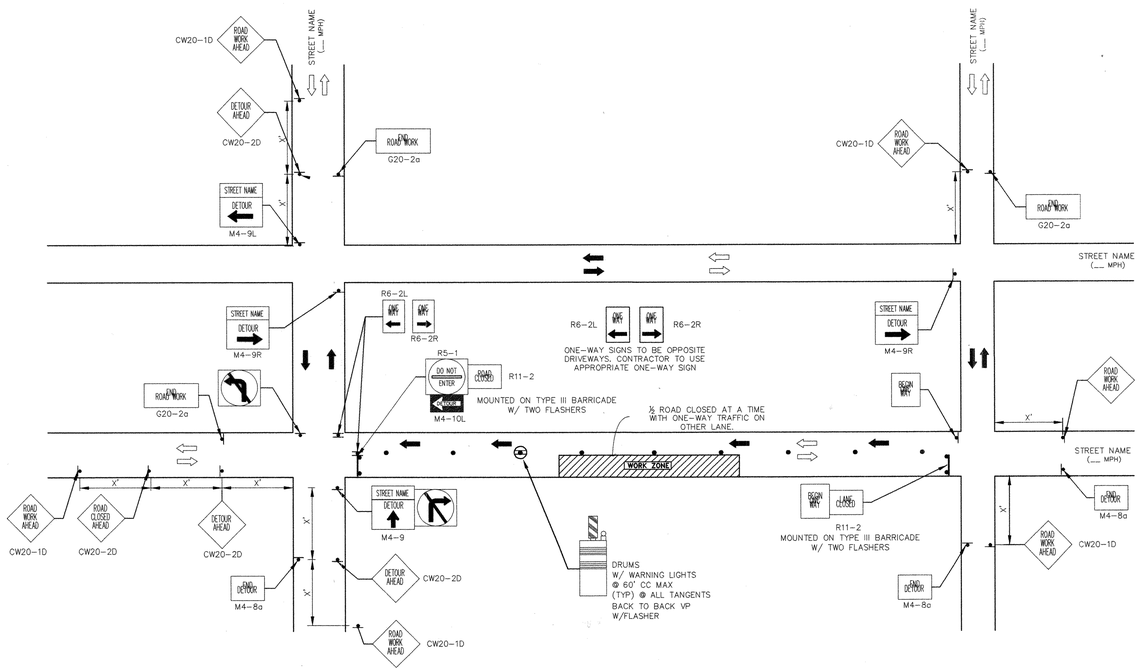
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

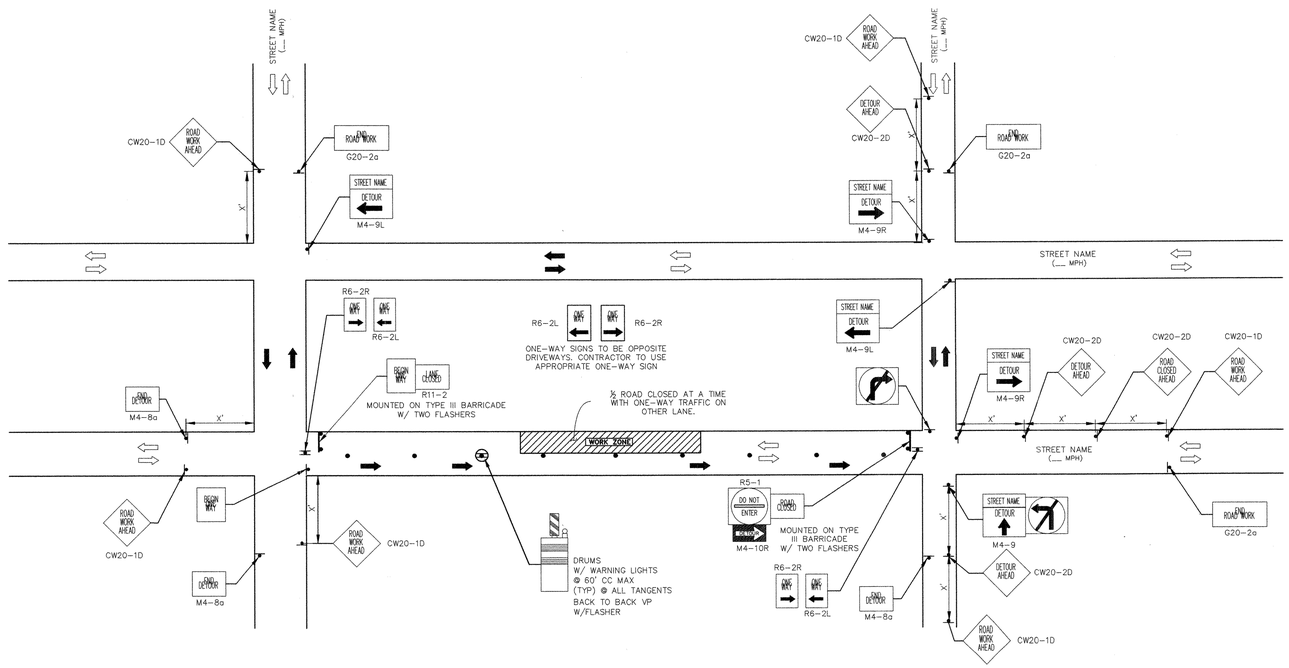
TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 3)
SHEET 10 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 90 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CONTROL NUMBER
HOUSTON, TEXAS



TYPICAL NEIGHBORHOOD STREET DETOUR – EAST/NORTH BOUND



TYPICAL NEIGHBORHOOD STREET DETOUR – WEST/SOUTH BOUND

NOTE:

1. A 10' MINIMUM WIDTH EMERGENCY LANE SHALL BE MADE AVAILABLE AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES.

2. ALL FLASHERS TO CONFORM TO MUTCD BY USE AND TYPE

LEGEND

- TYPE III BARRICADE
- AREA UNDER CONSTRUCTION
- EXISTING TRAVELWAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

SPEED LIMITS:
S BRAESWOOD : 35 MPH
BUFFALO SPEEDWAY : 35 MPH
OTHERS : 30 MPH

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

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HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
Vincent N. Jacob
2/15/12

CITY OF HOUSTON

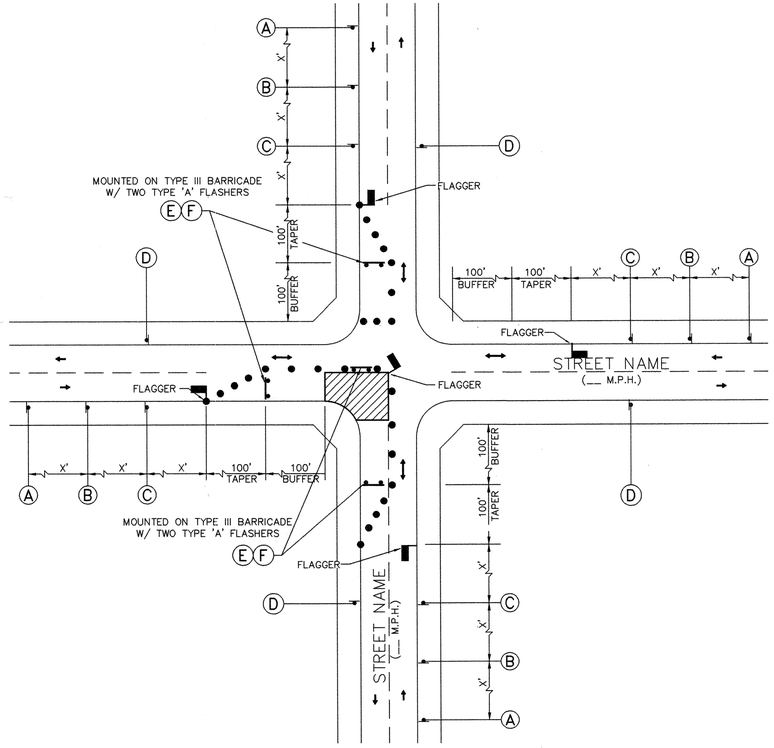
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

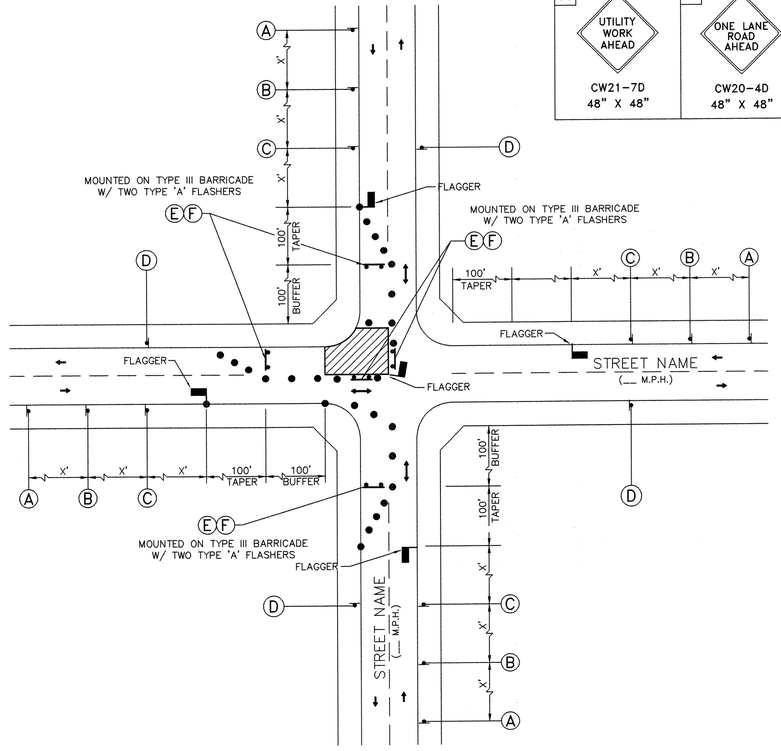
NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 4)
SHEET 11 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 91 OF 131

FILED
49097
CITY NUMBER
PUBLIC WORKS AND ENGINEERING
HOUSTON, TEXAS

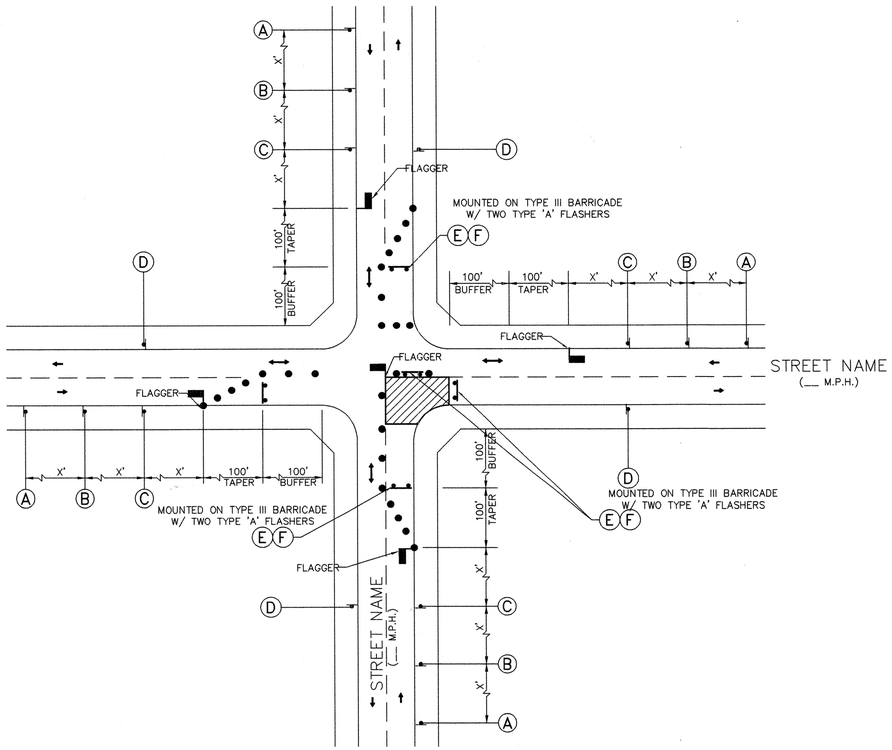


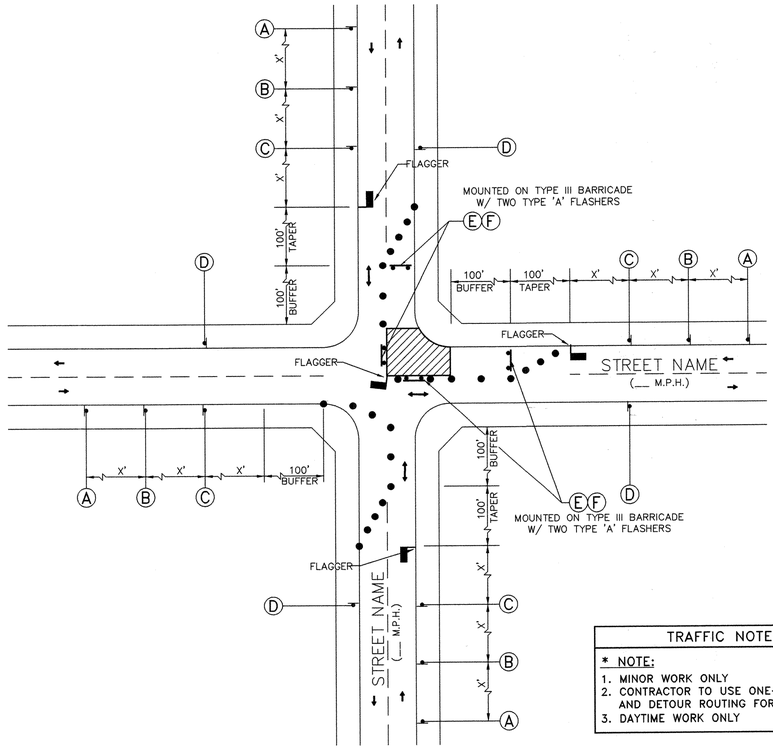


A	B	C	D	E	F
UTILITY WORK AHEAD	ONE LANE ROAD AHEAD		END ROAD WORK	DO NOT ENTER	ROAD CLOSED
CW21-7D 48" X 48"	CW20-4D 48" X 48"	CW20-7a 36" X 36"	G20-2a 48" X 24"	R5-1 48" X 48"	R11-2 48" X 30"

No.	Date	Revisions	App.

SPEED LIMITS:
S BRAESWOOD : 35 MPH
BUFFALO SPEEDWAY : 35 MPH
OTHERS : 30 MPH





SPARKS - BARLOW - BARNETT, INC.
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HOUSTON, TX 77054
TEL: (713) 747-3099 FAX: (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
Vincent N. Jacob
2/15/21

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

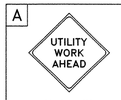
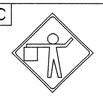
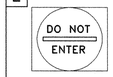
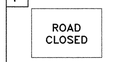
TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 5)
SHEET 12 OF 16

WBS N-000383-0001-4	
FILE:	
DRAWING SCALE	N.T.S.
CITY OF HOUSTON PM	MOH'D K. WARRAD, P.E.
SHEET NO. 92 OF 131	

PUBLIC WORKS AND ENGINEERING
FILED
49097
CONTROL NUMBER
HOUSTON, TEXAS

TRAFFIC NOTE:

* NOTE:
1. MINOR WORK ONLY
2. CONTRACTOR TO USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS
3. DAYTIME WORK ONLY

A	B	C	D	E	F
					
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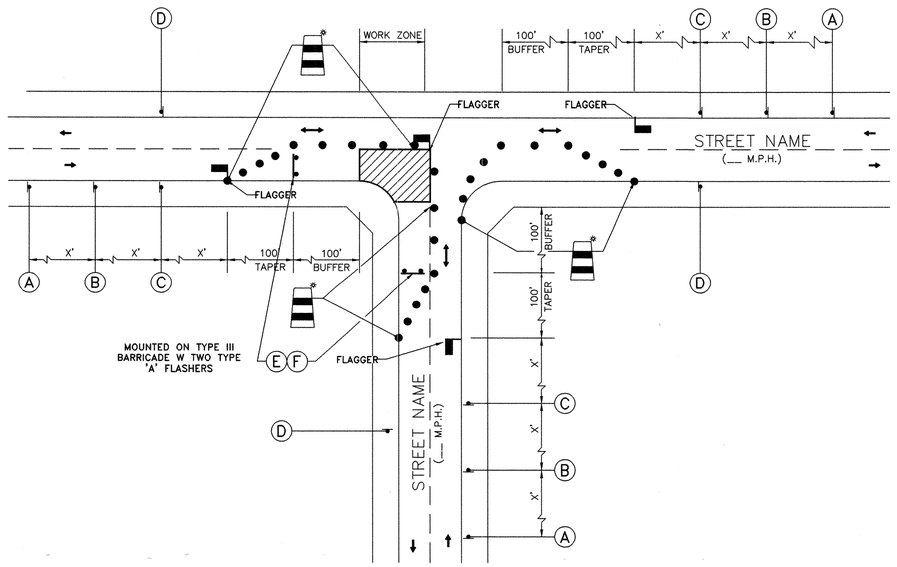
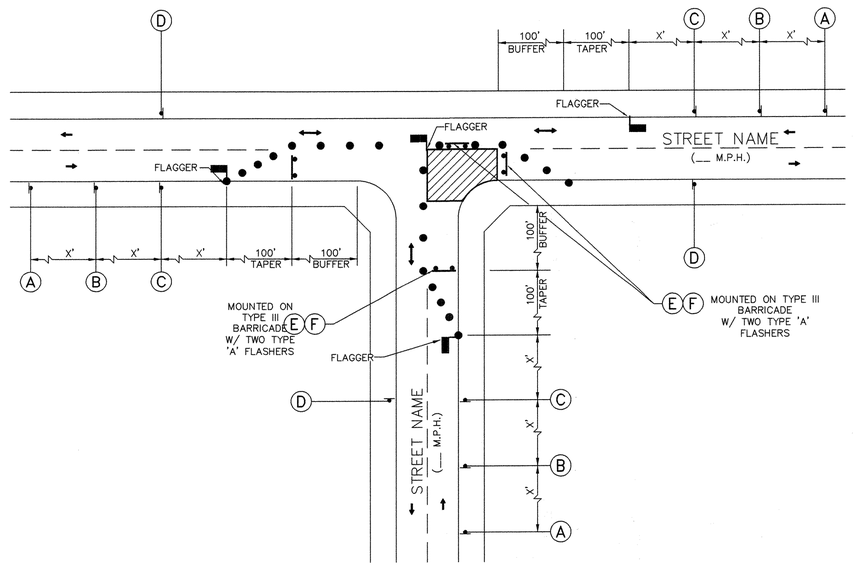
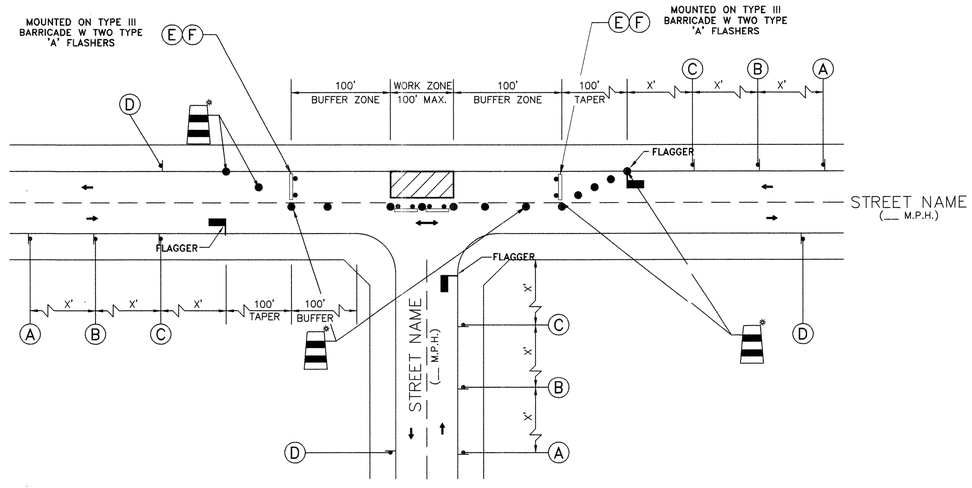




LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- BARRICADE



SPEED LIMITS:

S BRAESWOOD	: 35 MPH
BUFFALO SPEEDWAY	: 35 MPH
OTHERS	: 30 MPH

TRAFFIC NOTE:

* NOTE:

1. MINOR WORK ONLY
2. CONTRACTOR TO USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS
3. DAYTIME WORK ONLY

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2284 FAX: (713) 748-2748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

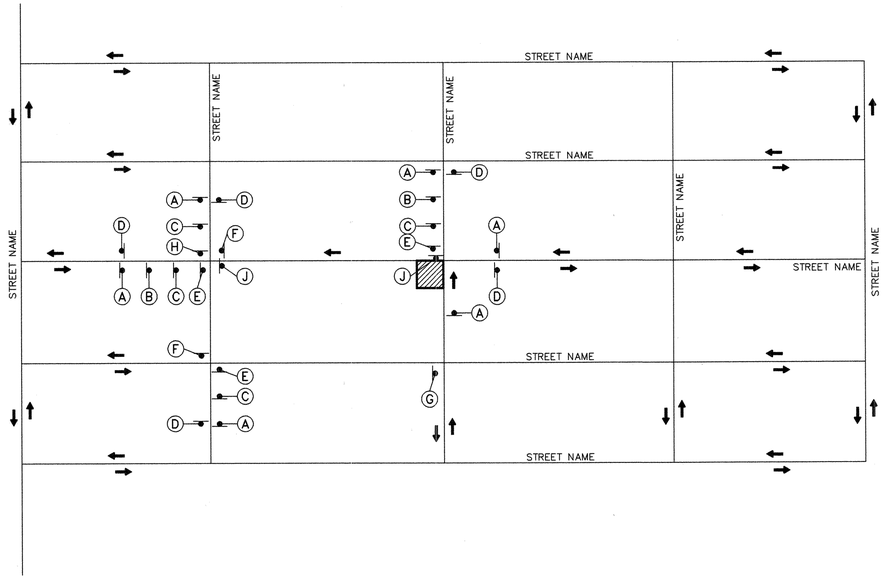
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

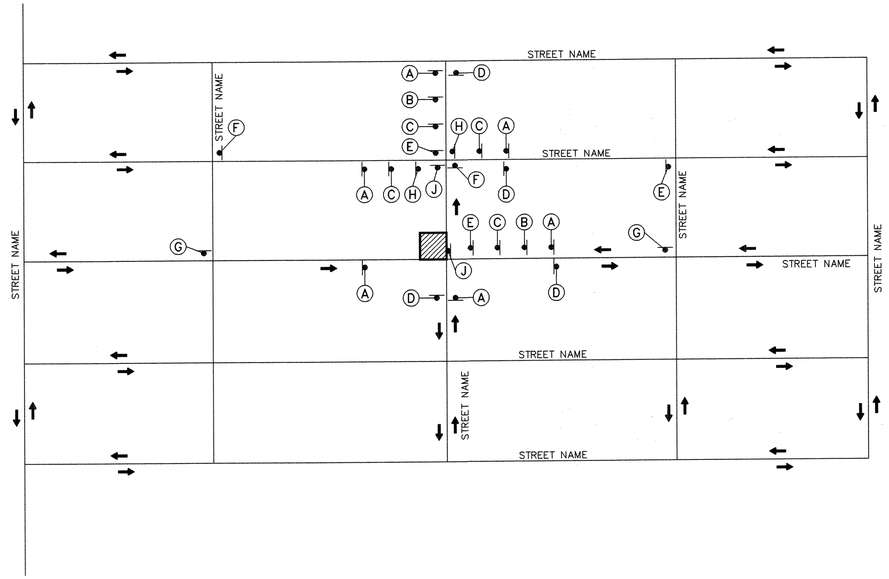
TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 6)
SHEET 13 OF 16

WBS N-000383-0001-4	
FILE:	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 93 OF 131	

FILED
49097
CONTROL NUMBER
PUBLIC WORKS AND ENGINEERING
HOUSTON, TEXAS

A	B	C	D	E	F	G	H	J
ROAD WORK AHEAD	ROAD CLOSED AHEAD	DETOUR AHEAD	END ROAD WORK	STREET NAME DETOUR →	STREET NAME DETOUR ←	END DETOUR	STREET NAME DETOUR ↑	ROAD CLOSED TO THRU TRAFFIC
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	R11-4 60" X 30"





LEGEND

- SIGN
- TRAFFIC FLOW
- WORK ZONE

No.	Date	Revisions	App.

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BUFFALO SPEEDWAY : 35 MPH
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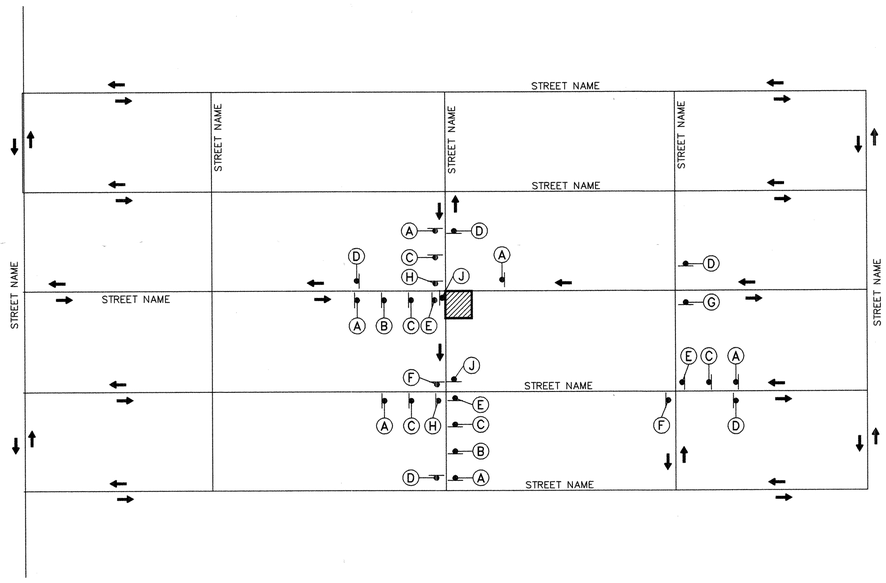

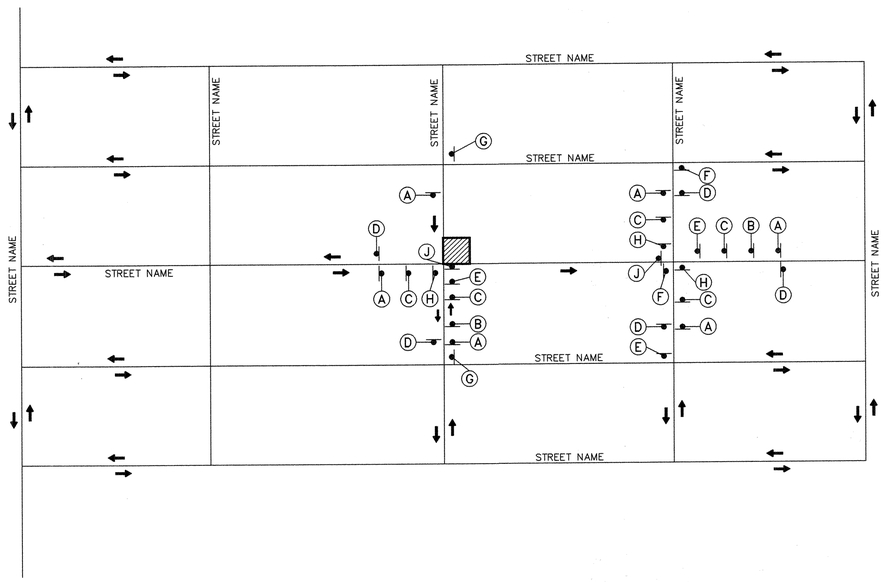

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Consulting Engineers – Planners
FIRM F-596

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HOUSTON, TX 77054
TEL (713) 747-2399 FAX (713) 748-3748
TBPE FIRM REGISTRATION # 4575

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
PHASES 3 THRU 7 (TYP. 7)
SHEET 14 OF 16

WBS N-000383-0001-4	
FILE:	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
MOH'D K. WARRAD, P.E.	
SHEET NO. 94 OF 131	

PUBLIC WORKS AND ENGINEERING
FILED
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

A	B	C	D	E	F	G	H	J
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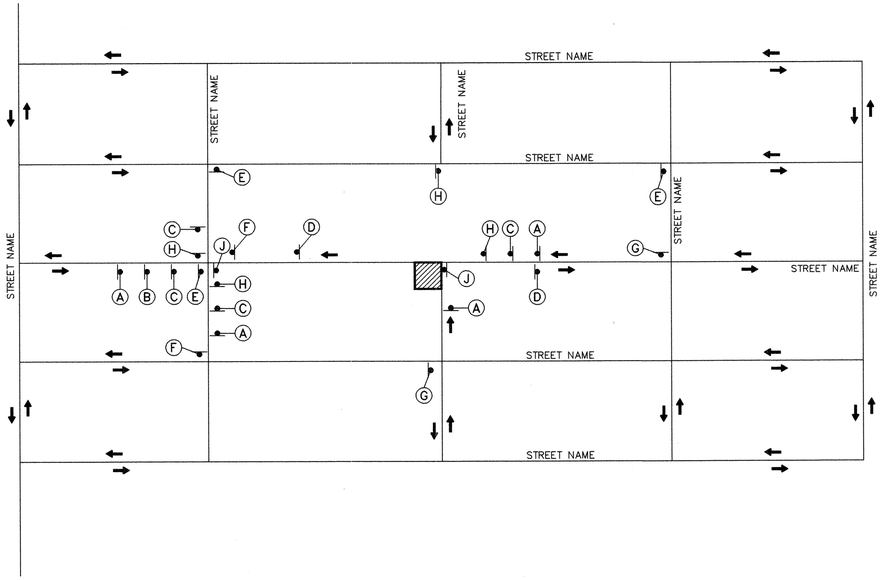

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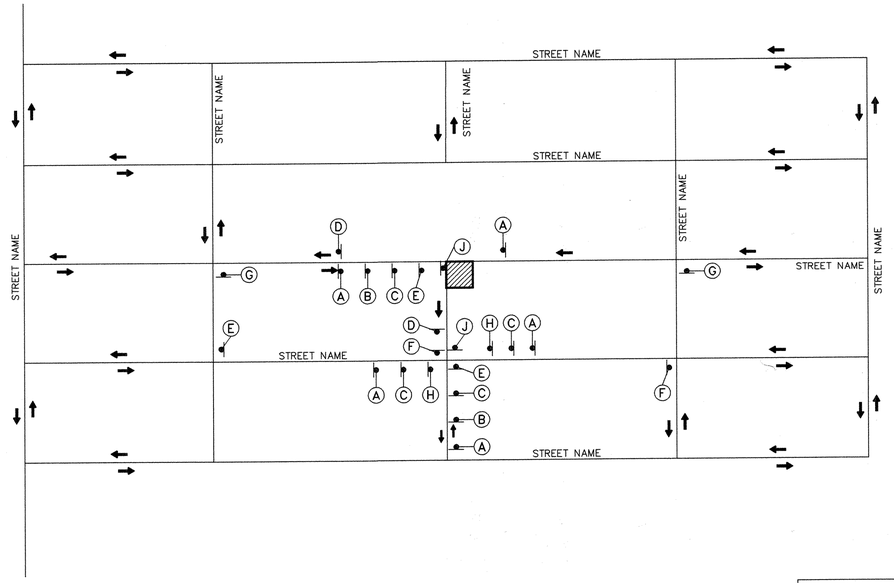
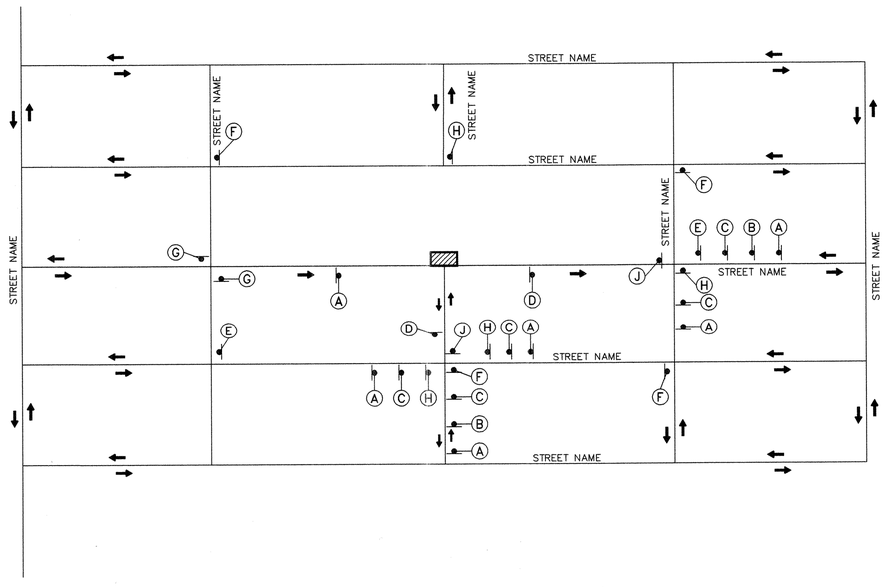
LEGEND
- SIGN
- TRAFFIC FLOW
- WORK ZONE





No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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TRAFFIC CONTROL PLAN
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SHEET 15 OF 16

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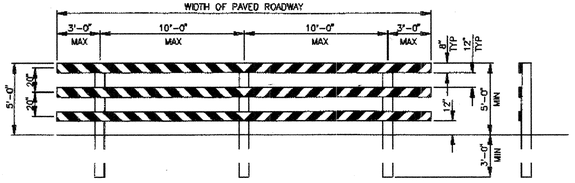
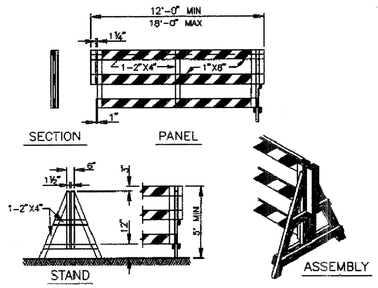


TYPE III BARRICADE
FOR END OF ROAD

FOR TYPE III BARRICADE FOR END OF ROAD, THE THREE (3) RAILS SHALL BE REFLECTIVE RED AND REFLECTIVE 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.

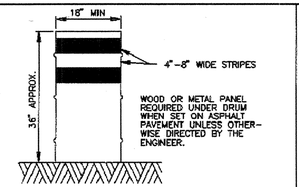
BARRICADES MAY BE DESIGNED AND CONSTRUCTED FROM WOOD OR ANY OTHER SUITABLE MATERIAL IN A MANNER APPROVED BY THE DEPARTMENT OF TRAFFIC AND TRANSPORTATION. THE CONSTRUCTION DETAILS SHOWN HEREON ARE TYPICAL AND ARE SUGGESTED DETAILS FOR WOOD SUPPORT SYSTEMS FOR BARRICADES. THE DETAILS OF RAIL WIDTH AND 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.

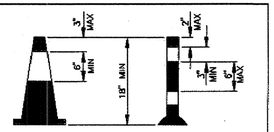
BARRICADES SHALL BE REMOVED UPON COMPLETION OF THE WORK AND/OR THE ELIMINATION OF THE HAZARD ON ANY SECTION.



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-1 VERTICAL PANELS MOUNTED ABOVE DRUMS MAY BE USED AS SUPPLEMENTS TO DRUM DELINEATION.



CONES

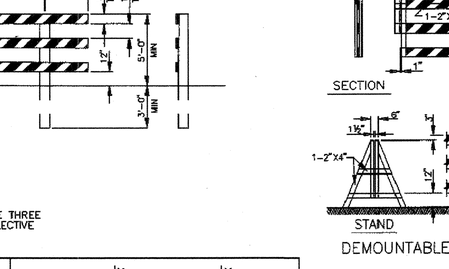
TRAFFIC CONES AND TUBULAR MARKERS SHALL BE A MIN OF 18" INCHES IN HEIGHT WITH A BROADENED BASE AND MAY BE MADE OF VARIOUS MATERIALS TO WITHSTAND IMPACT WITHOUT DAMAGE TO THEMSELVES OR TO VEHICLES. LARGER SIZES SHOULD BE USED ON FREEWAYS AND OTHER ROADWAYS WHERE SPEED ARE RELATIVELY HIGH OR WHERE EVER 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 5" 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)

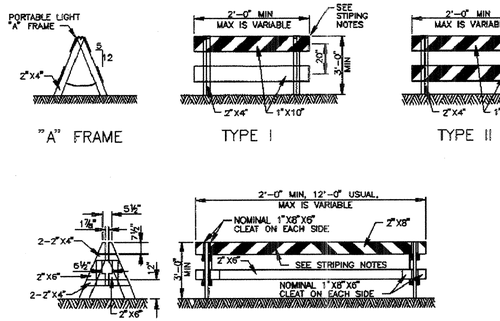
VERTICAL PANELS ARE NORMALLY USED AS CHANNELIZING DEVICES TO INDICATE TANGENT OR NEARLY TANGENT ROADWAY ALIGNMENT WHERE GOOD TARGET VALUE OF A DEVICE IS NEEDED IN DAYTIME AS WELL AS THE NIGHTTIME. IN ADDITION, VERTICAL PANELS SHOULD BE USED AT THE EDGE OF SHOULDER DROP-OFFS AND OTHER SUCH AREAS AS LANE 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.



PLYWOOD FACE TO BE PAINTED CONSTRUCTION ORANGE UPRIGHT TO BE PAINTED WHITE

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

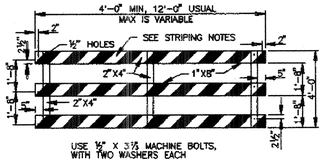
TYPE I

TYPE II

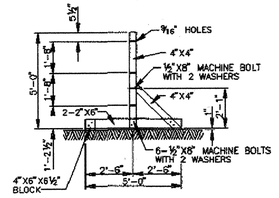
DEMOUNTABLE

TYPE I

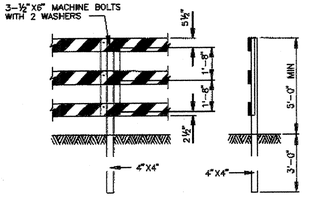
TYPE II



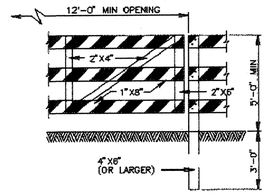
PANEL FOR
TYPE III BARRICADE



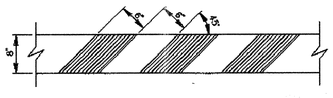
STAND FOR
TYPE III BARRICADE



POST FOR
TYPE III BARRICADE



GATE 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

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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N/A DATE:

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-2398 FAX: (713) 748-2748
TBPE FIRM REGISTRATION # 4575

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
Vincent N. Jacob 8/15/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

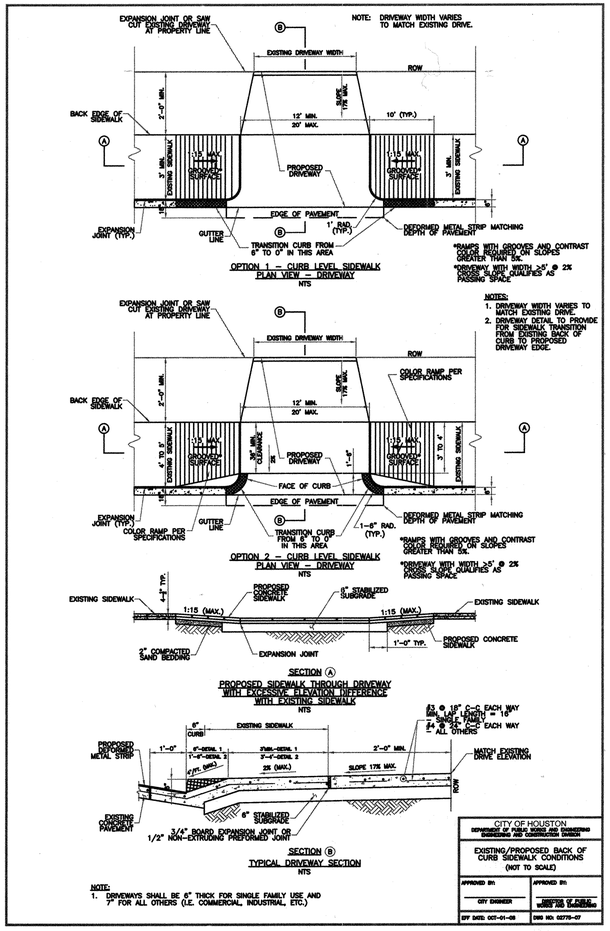
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TRAFFIC CONTROL PLAN
BARRICADE STANDARD
SHEET 16 OF 16

WBS N-000383-0001-4
FILE:
DRAWING SCALE
N.T.S.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 96 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY SECRETARY'S NUMBER
HOUSTON, TEXAS

CWW



OPTION 1 – CURB LEVEL SIDEWALK
PLAN VIEW – DRIVEWAY
NTS

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.

OPTION 2 – CURB LEVEL SIDEWALK
PLAN VIEW – DRIVEWAY
NTS

SECTION (A)
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE WITH EXISTING SIDEWALK
NTS

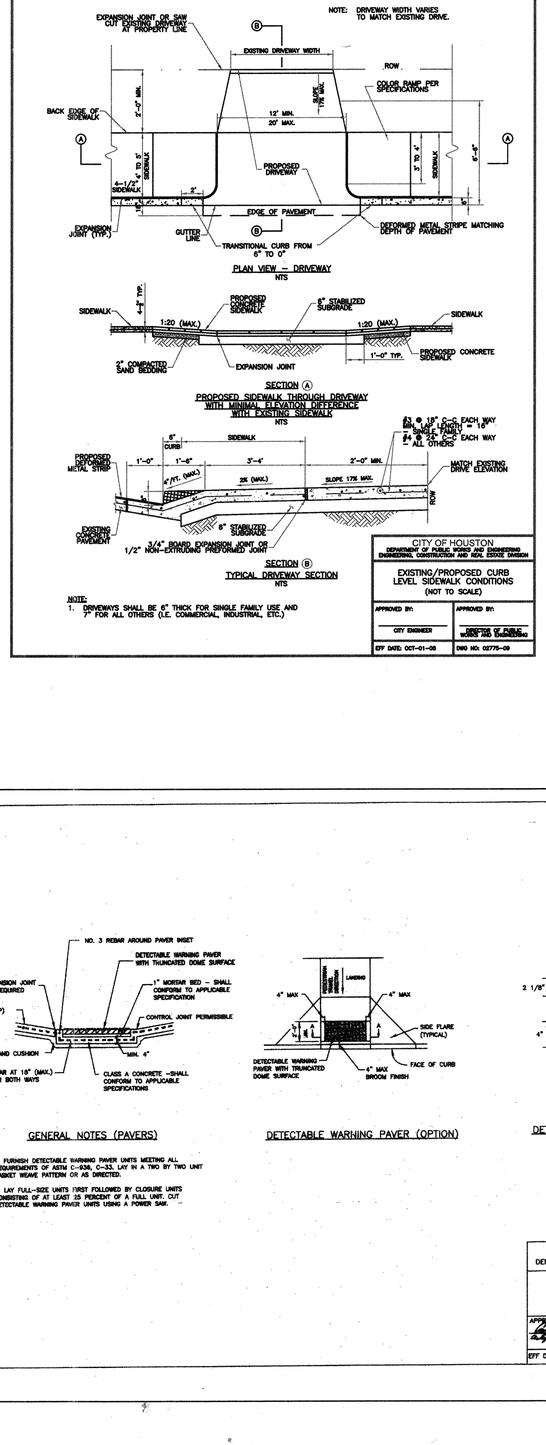
SECTION (B)
TYPICAL DRIVEWAY SECTION
NTS

NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

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

EXISTING/PROPOSED BACK OF CURB SIDEWALK CONDITIONS
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-08	DWG NO. 02775-07



PLAN VIEW – DRIVEWAY
NTS

SECTION (A)
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH MINIMAL ELEVATION DIFFERENCE WITH EXISTING SIDEWALK
NTS

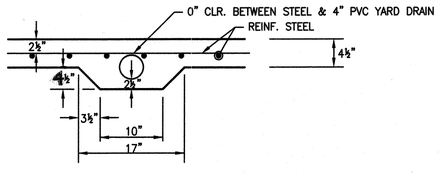
SECTION (B)
TYPICAL DRIVEWAY SECTION
NTS

NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

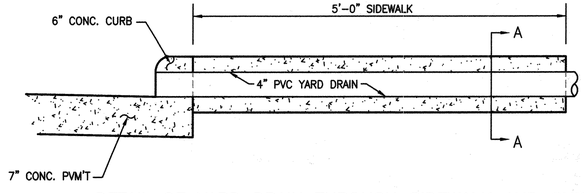
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

EXISTING/PROPOSED CURB LEVEL SIDEWALK CONDITIONS
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-08	DWG NO. 02775-09



DETAIL A–A



DETAIL OF YARD DRAIN THROUGH SIDEWALK AND CURB
N.T.S.

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.

DETECTABLE WARNING PAVER (OPTION)

DETECTABLE WARNING PAVER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DETECTABLE WARNING PAVER (OPTION)
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: APR-18-2011	DWG NO: 02775-07

FILE: TYPSIDEDET.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TYPICAL SIDEWALK AND DRIVEWAY DETAILS

WBS N-000383-0001-4

FILE: N:\City of Houston\2008-05_NSR 451\DRAWINGS\TYPICAL SIDEWALK DET.dwg

DRAWING SCALE
NTS

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 97 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
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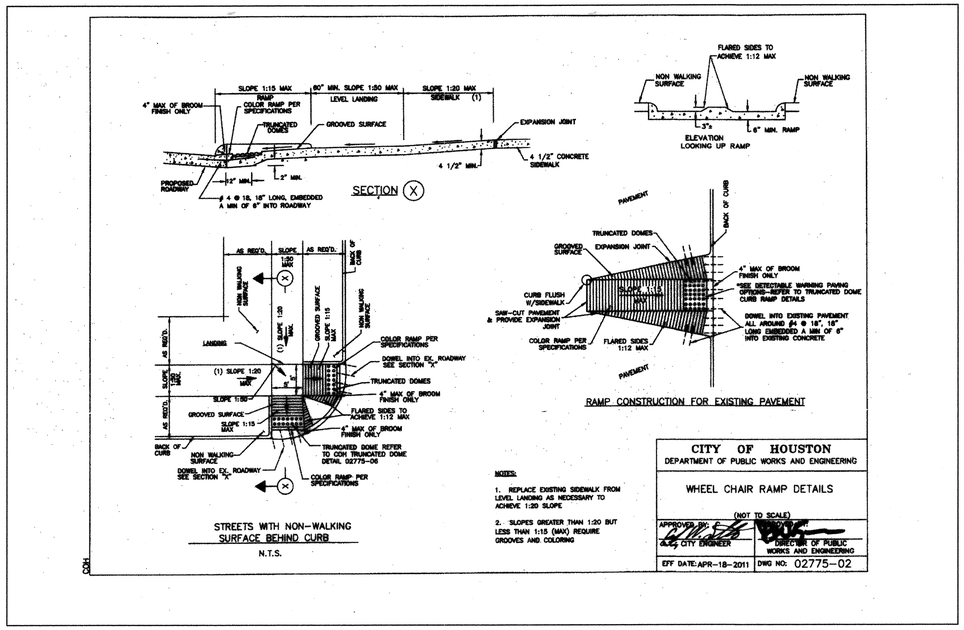
HOUSTON, TEXAS



NOTES:

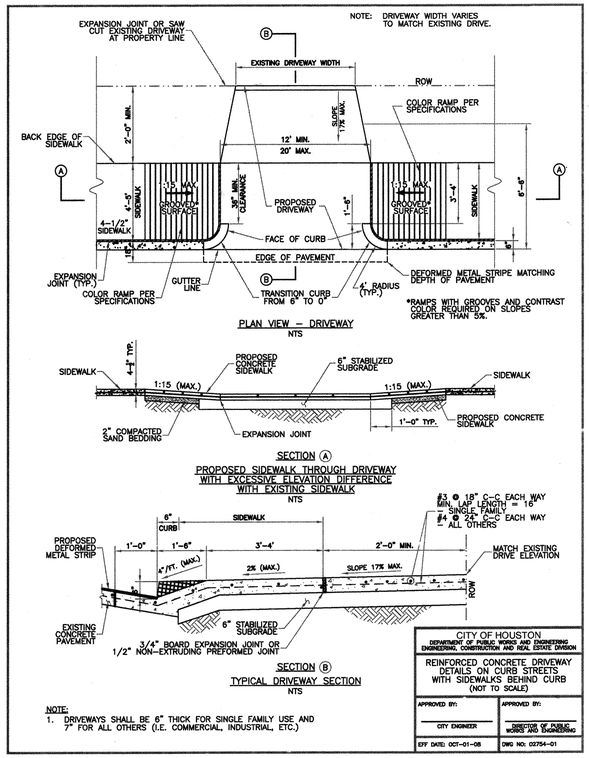
1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE.
2. SLOPES GREATER THAN 1:20 BUT LESS THAN 1:15 (MAX) REQUIRE GROOVES AND COLORING.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WHEEL CHAIR RAMP DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: APR-18-2011	DWG NO: 02775-02

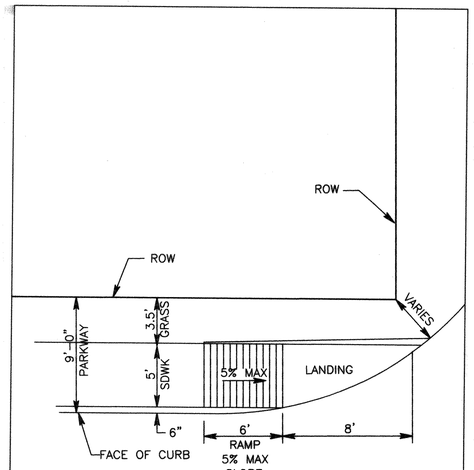


NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

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

REINFORCED CONCRETE DRIVEWAY DETAILS ON CURB STREETS WITH SIDEWALKS BEHIND CURB
(NOT TO SCALE)

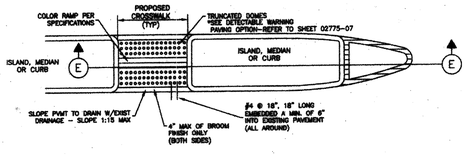
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-08	DWG NO: 02754-01

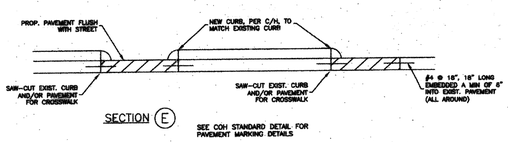


CITY OF HOUSTON

RAMP DETAIL (TYPICAL)

No.	Date	Revisions	App.





SEE COH STANDARD DETAIL FOR PAVEMENT MARKING DETAILS

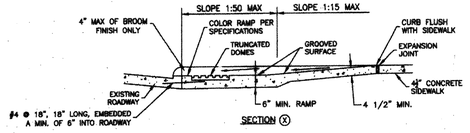
FOR ISLAND, MEDIAN, OR CURB MODIFICATIONS FOR CROSSWALKS

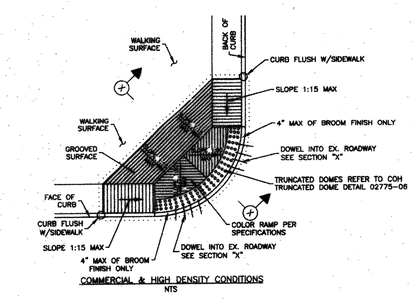
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CURB MODIFICATIONS FOR WHEEL CHAIR RAMPS & CROSSWALKS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: APR-18-2011	DWG NO: 02775-04





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: APR-18-2011	DWG NO: 02775-05

FILE: WHEELRAMP.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

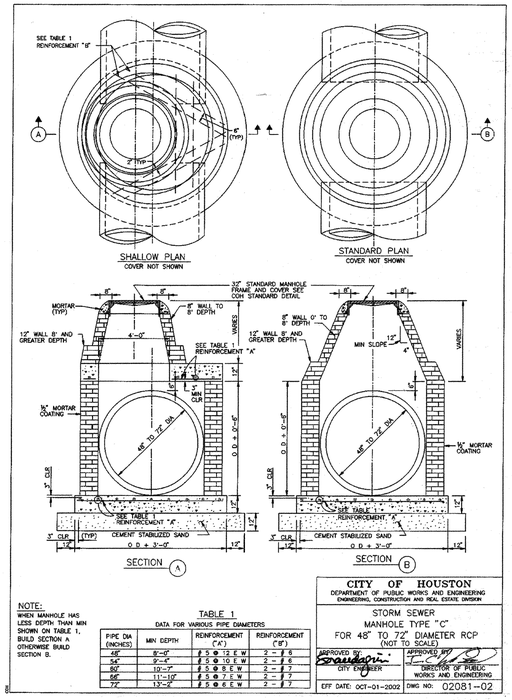
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

WHEELCHAIR RAMP DETAILS

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\WHEELRAMP DETAILS.dwg
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 98 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY REGISTRATION NUMBER
HOUSTON, TEXAS



NOTE:
WHEN MANHOLE HAS LESS DEPTH THAN MIN SHOWN ON TABLE 1, BUILD SECTION A OTHERWISE BUILD SECTION B.

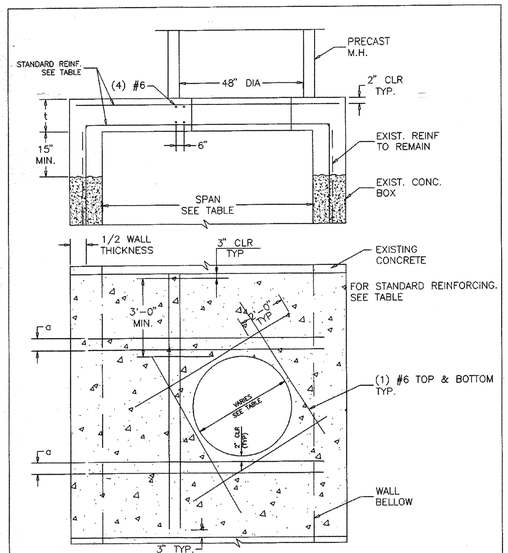
TABLE 1
DATA FOR VARIOUS PIPE DIAMETERS

PIPE DIA (INCHES)	MIN DEPTH	REINFORCEMENT ("A")	REINFORCEMENT ("B")
48"	8'-0"	# 5 @ 12 E.W	2 - # 6
54"	9'-4"	# 5 @ 10 E.W	2 - # 6
60"	10'-7"	# 5 @ 8 E.W	2 - # 7
66"	11'-10"	# 5 @ 7 E.W	2 - # 7
72"	13'-2"	# 5 @ 6 E.W	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



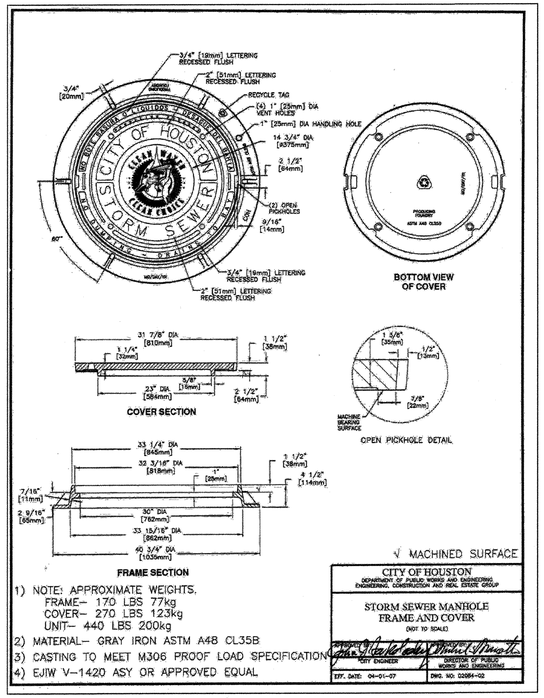
SPAN (ft)	t (in)	STANDARD REINF	OPENING SIZE	a
3	14	#6 @ 11" O.C Ta B	36"f	2#6 @ 5"c.t.c O.C T&B
4	16	#6 @ 9" O.C Ta B	36"f	2#6 @ 4"c.t.c O.C T&B
5	18	#6 @ 8" O.C Ta B	48"f	3#6 @ 4"c.t.c O.C T&B
6	20	#6 @ 7" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
7	20	#6 @ 7" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
8	21	#6 @ 7" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
9	21	#6 @ 7" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
10	22	#6 @ 6" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
11	23	#6 @ 6" O.C Ta B	48"f	4#6 @ 3"c.t.c O.C T&B
12	23	#6 @ 5" O.C Ta B	48"f	5#6 @ 3" O.C T&B

DESIGNED FOR HS 20 W/ 2'-0" COVER TO 20'-0" COVER

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

PROPOSED MANHOLE ON
EXISTING BOX STORM SEWER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02081-08



√ MACHINED SURFACE

1) NOTE: APPROXIMATE WEIGHTS.
FRAME- 170 LBS 77kg
COVER- 270 LBS 123kg
UNIT- 440 LBS 200kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-1420 ASY OR APPROVED EQUAL

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

STORM SEWER MANHOLE
FRAME AND COVER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: 04-01-07 DWG. NO. 02081-02

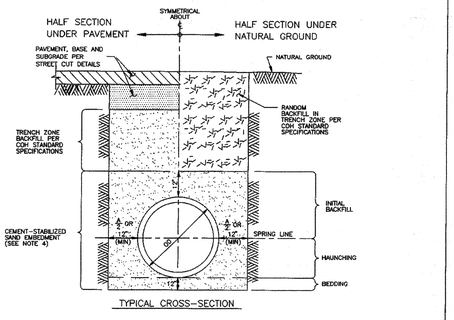
No.	Date	Revisions	App.

NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

3. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS.



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

SANITARY OR STORM SEWER
BEDDING AND BACKFILL
FOR DRY STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02317-03

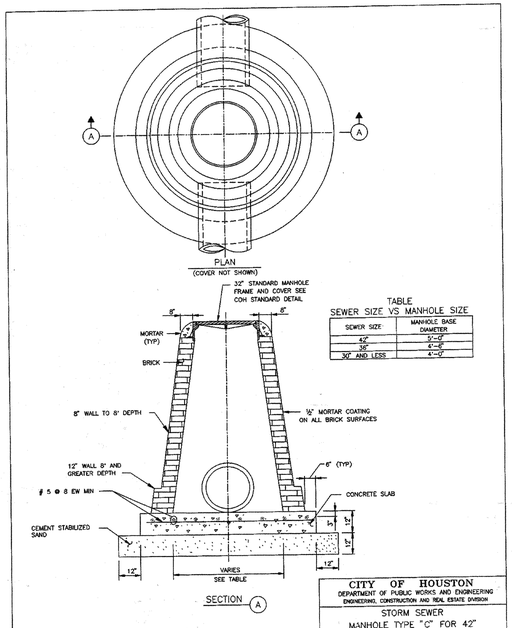


TABLE
SEWER SIZE VS MANHOLE SIZE

SEWER SIZE	MANHOLE BASE DIAMETER
42"	5'-0"
36"	4'-6"
30" AND LESS	4'-0"

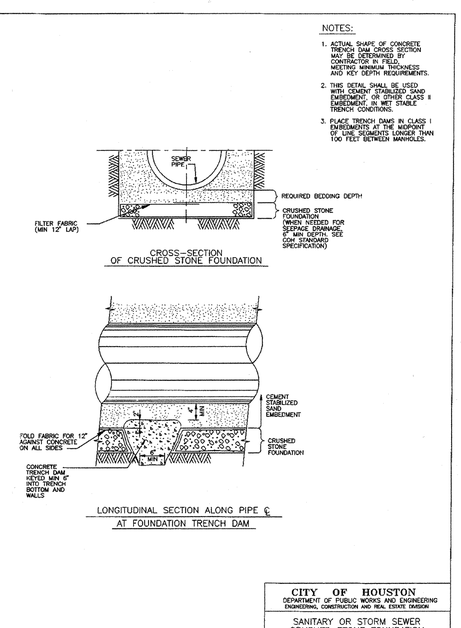
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

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

NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR PROVIDED IT CONTAINS MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT OR OTHER CLASS B EMBEDMENT IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.



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

SANITARY OR STORM SEWER
CRUSHED STONE FOUNDATION
FOR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02317-02

FILE: STMDTL.DWG

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Consulting Engineers — Planners
FIRM F-596

NOTICE:
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STATE OF TEXAS
JESUS M. OLIVAS
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANDARD STORM SEWER DETAILS
SHEET 1 OF 2

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\STORM DETAIL.dwg
DRAWING SCALE
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PUBLIC WORKS AND ENGINEERING
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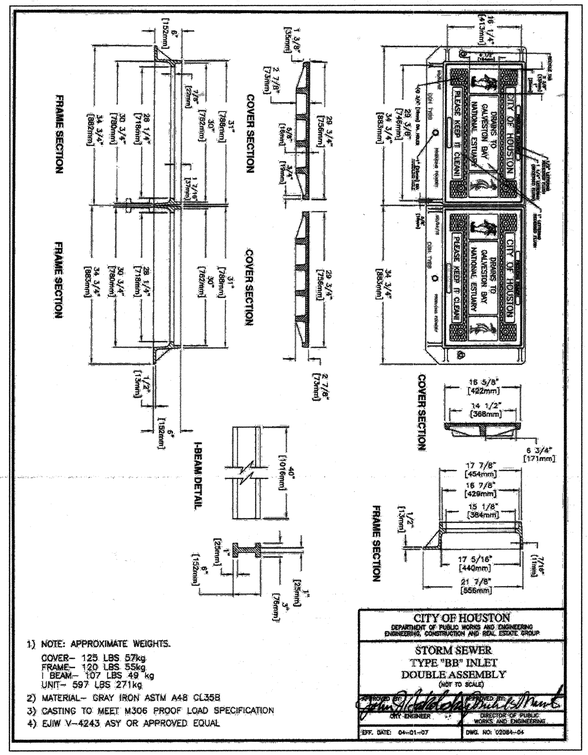
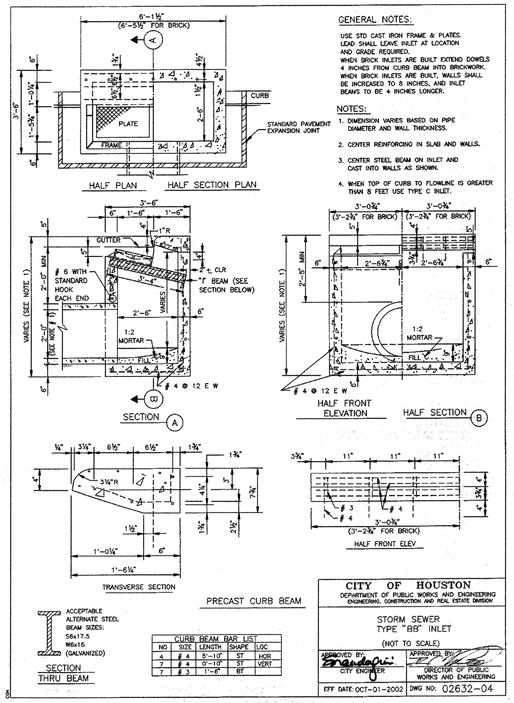
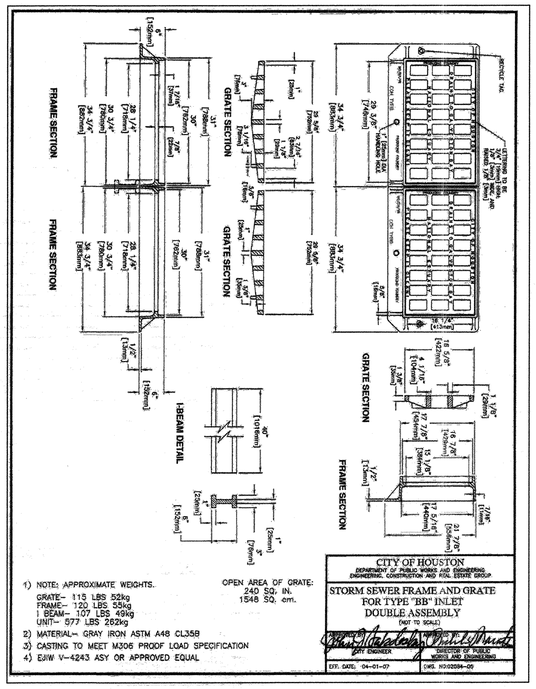


1) NOTE: APPROXIMATE WEIGHTS.
COVER- 125 LBS 57kg
FRAME- 120 LBS 55kg
I BEAM- 107 LBS 49 kg
UNIT- 597 LBS 271kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-4243 ASY OR APPROVED EQUAL





1) NOTE: APPROXIMATE WEIGHTS.
GRATE- 115 LBS 52kg
FRAME- 120 LBS 55kg
I BEAM- 107 LBS 49kg
UNIT- 577 LBS 262kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-4243 ASY OR APPROVED EQUAL

OPEN AREA OF GRATE:
240 SQ. IN.
1548 SQ. cm.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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N/A DATE:

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11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

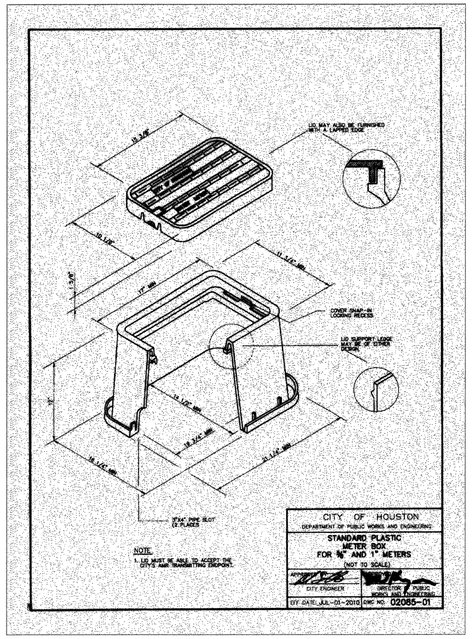
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANDARD STORM SEWER DETAILS
SHEET 2 OF 2

WBS N-000383-0001-4
FILE: N:\City of Houston\2006-05_NSR 451\DRAWINGS\STORM DETAIL 2.dwg
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO.100 OF 131

FILED FOR RECORD
49097
COUNTY CLERK NUMBER
HOUSTON, TEXAS

FILE: STMDTL2.DWG



NOTE:
1. LID MUST BE ABLE TO ACCEPT THE DEVICE ARM TRANSMITTING EQUIPMENT.

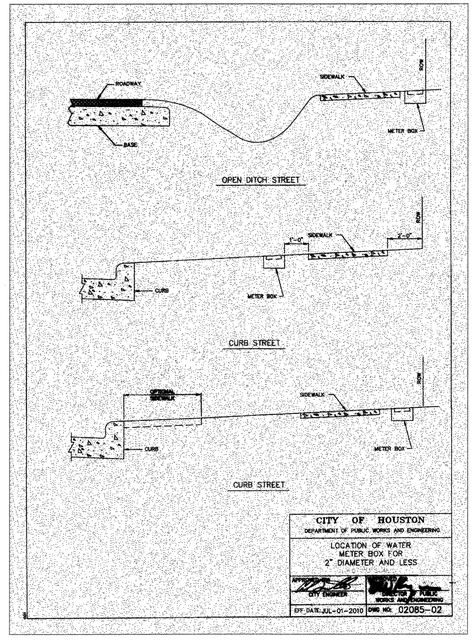
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PLASTIC METER BOX FOR ¾" AND 1" METERS

(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 DWG NO. 02085-01

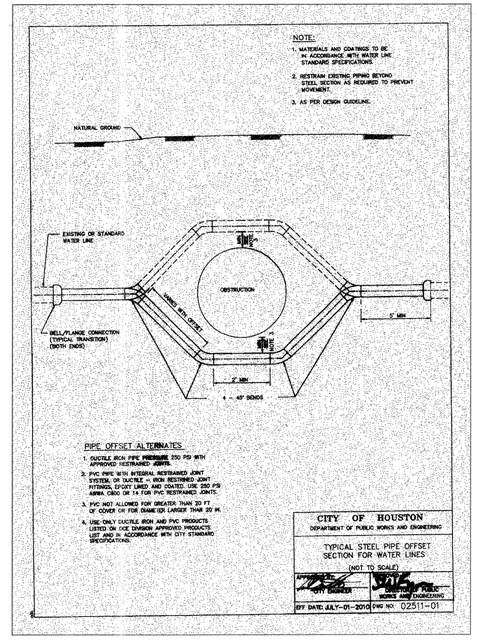


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LOCATION OF WATER METER BOX FOR 2" DIAMETER AND LESS

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 DWG NO. 02085-02



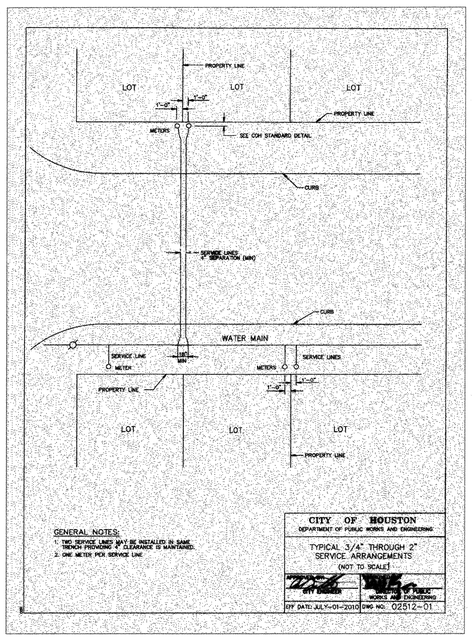
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES

(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO. 02511-01



GENERAL NOTES:
1. TWO SERVICE LINES MAY BE INSTALLED IN SAME TRENCH PROVIDING 6" 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)

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, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
4" ASBESTOS (EXISTING) CEMENT	WSSS	WSSS	DSS, WSSS	DSS, WSSS
4" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" ASBESTOS (EXISTING) CEMENT	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" ASBESTOS (EXISTING) CEMENT	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
16" AND UP CAST IRON OR DUCTILE IRON	DWSSS	DWSSS	DWSSS	DWSSS
16" AND UP ASBESTOS (EXISTING) CEMENT	DWSSS	DWSSS	DWSSS	DWSSS
16" AND UP PVC (AWWA C900)	DWSSS	DWSSS	DWSSS	DWSSS

DSS - DUAL STRAP SADDLES
WSSS - WIDE BAND STRAP SADDLES
DWSSS - DUAL WIDE BAND STRAP SADDLES





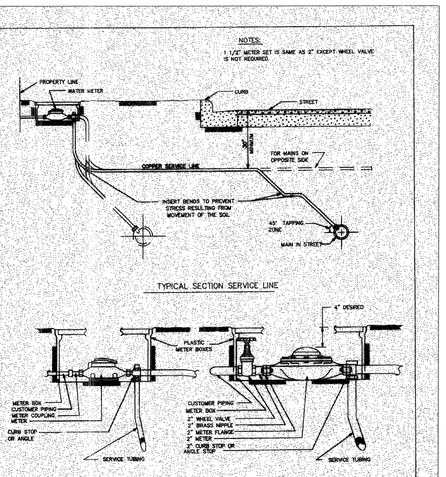
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SERVICE TAPS

(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 DWG NO. 02512-02



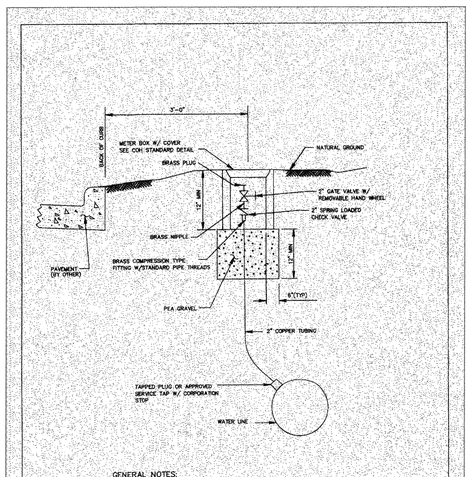
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL METER SETTINGS

(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO. 02526-01



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)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO. 02524-01

FILE: WTRDTL.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

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HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
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02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

iSani CONSULTANTS
3143 YELLOWSTONE BLVD
HOUSTON, TX 77054
TEL: (713) 747-3399 FAX: (713) 748-3748

STATE OF TEXAS
VINCENT N. JACOB
98325
LICENSED PROFESSIONAL ENGINEER
2/15/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANDARD WATER LINE DETAILS

SHEET 1 OF 2

WBS N-000383-0001-4

FILE:
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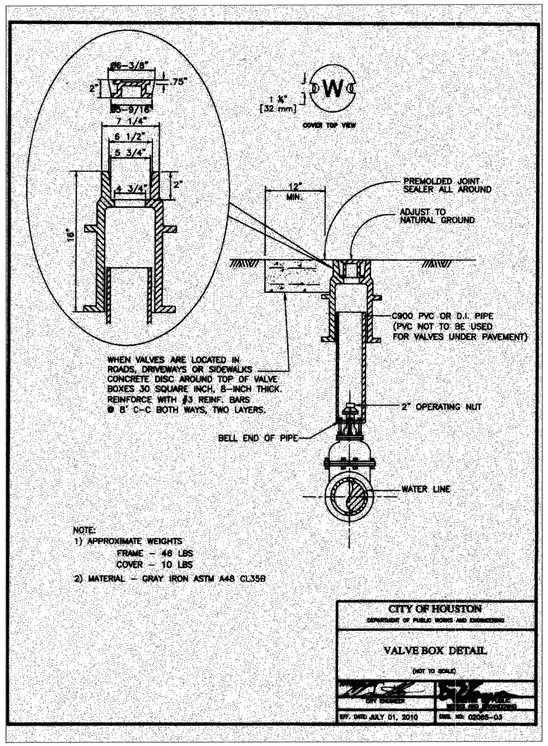
DRAWING SCALE
NTS

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 101 OF 131

PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

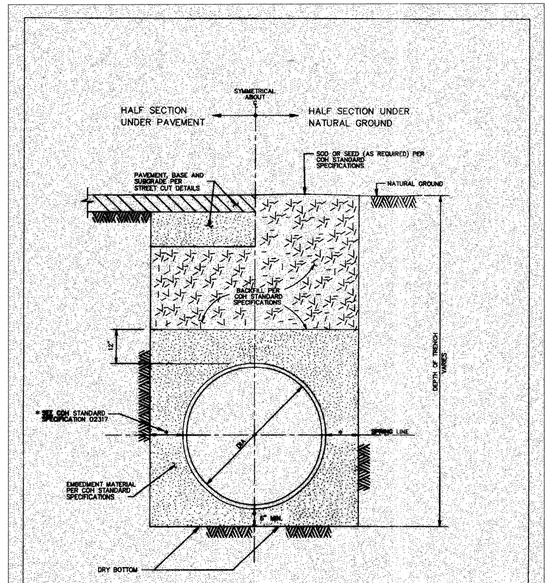


NOTE:
1) APPROXIMATE WEIGHTS
FRAME - 46 LBS
COVER - 10 LBS
2) MATERIAL - GRAY IRON ASTM A48 CL35B

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

VALVE BOX DETAIL
(NOT TO SCALE)

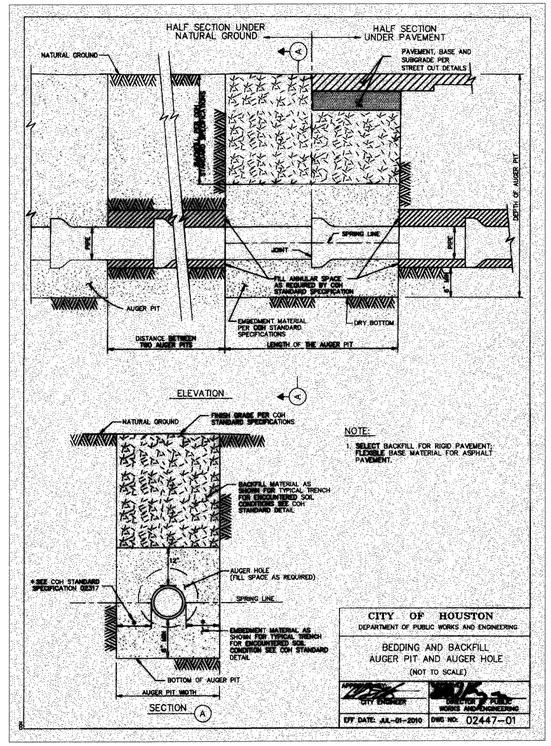
CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY 01, 2010 | DWG NO. 02065-03



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER DISTRIBUTION MAIN BEDDING AND BACKFILL FOR OPEN CUT TRENCHES
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JUL-01-2010 | DWG NO. 02317-04

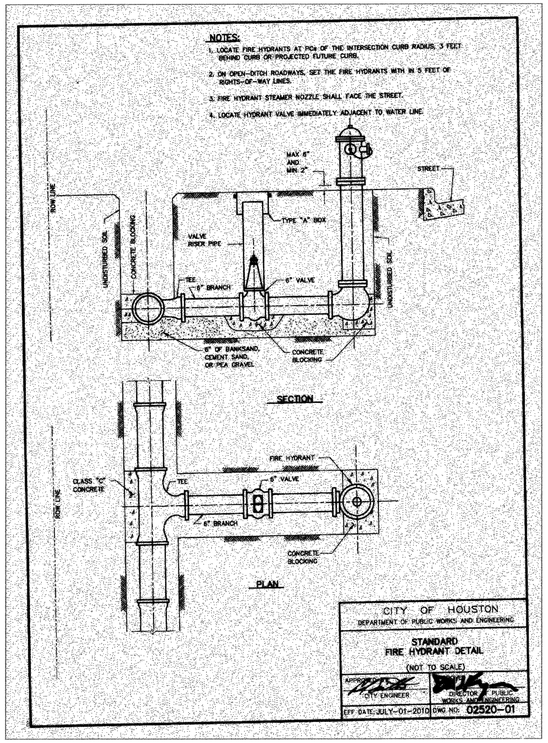


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

BEDDING AND BACKFILL AUGER PIT AND AUGER HOLE
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JUL-01-2010 | DWG NO. 02447-01

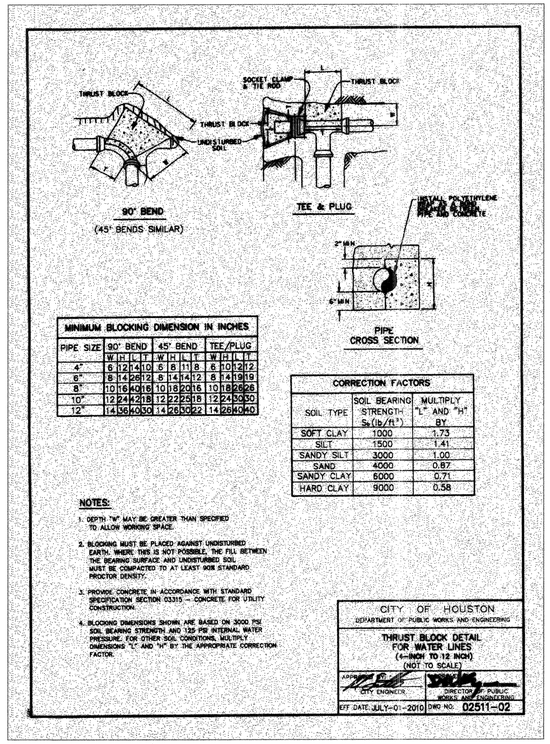
NOTES:
1. LOCATE FIRE HYDRANTS AT PCs OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITH IN 5 FEET OF RIGHTS-OF-WAY LINES.
3. FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET.
4. LOCATE HYDRANT VALVE IMMEDIATELY ADJACENT TO WATER LINE.



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD FIRE HYDRANT DETAIL
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY-01-2010 | DWG NO. 02520-01



MINIMUM BLOCKING DIMENSION IN INCHES

PIPE SIZE	90° BEND				45° BEND				TEE/PLUG			
	W	H	L	T	W	H	L	T	W	H	L	T
4"	6	12	14	10	6	8	11	8	6	10	12	12
6"	8	14	26	12	8	14	14	12	8	14	19	19
8"	10	16	40	16	10	18	20	16	10	18	26	26
10"	12	24	42	18	12	22	25	18	12	24	30	30
12"	14	36	40	30	14	26	30	22	14	26	40	40

CORRECTION FACTORS

SOIL TYPE	SOIL BEARING STRENGTH S_B(lb/ft²)	MULTIPLY "L" AND "H" BY
SOFT CLAY	1000	1.75
SILT	1500	1.41
SANDY SILT	3000	1.00
SAND	4000	0.87
SANDY CLAY	5000	0.71
HARD CLAY	9000	0.58

NOTES:
1. DEPTH "H" MAY BE GREATER THAN SPECIFIED TO ALLOW WORKING SPACE.
2. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.
3. PROVIDE CONCRETE IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 03315 - CONCRETE FOR UTILITY CONSTRUCTION.
4. BLOCKING DIMENSIONS SHOWN ARE BASED ON 3000 PSI SOIL BEARING STRENGTH AND 125 PSI INTERNAL WATER PRESSURE. FOR OTHER SOIL CONDITIONS, MULTIPLY DIMENSIONS "L" AND "H" BY THE APPROPRIATE CORRECTION FACTOR.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

THRUST BLOCK DETAIL FOR WATER LINES
(4-INCH TO 12 INCH)
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY-01-2010 | DWG NO. 02511-02

FILE: WTRDTL2.DWG

WATER LINE LEGEND

RESTRAINED JOINT SECTION

DIP W/RESTRAINED JOINTS

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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CENTERPOINT ENERGY/GAS FACILITIES
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STANDARD WATER LINE DETAILS

SHEET 2 OF 2

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\WATER DETAILS 2.dwg
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO.102 OF 131

PUBLIC WORKS AND ENGINEERING
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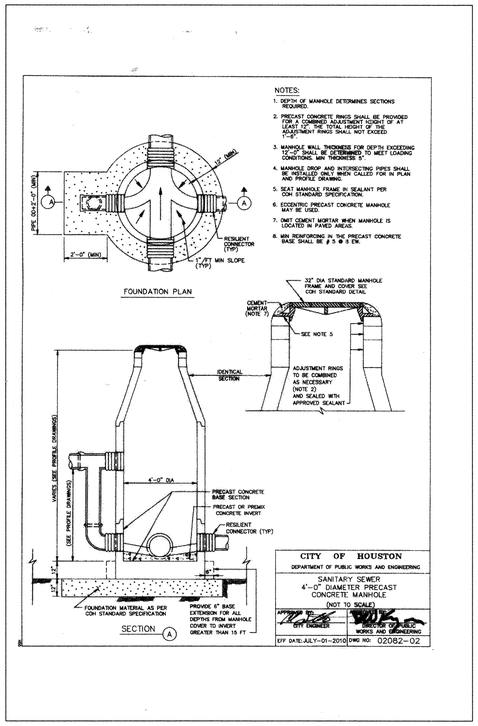
49097
CITY NUMBER
HOUSTON, TEXAS



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

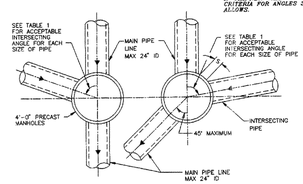
SANITARY SEWER
4'-0" DIAMETER PRECAST CONCRETE MANHOLE
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 02082-02

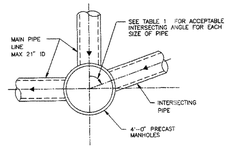
NOTES ON USE OF STANDARD DETAIL 02082-02

NOTES TO SPECIFIER:

1. *"–" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.*
2. *TABLE 1 IS BASED ON A MIN SEPARATION DISTANCE OF 10.5' OR INTERSECTION PIPE OD/2, WHICHEVER IS GREATER, BETWEEN MAIN AND INTERSECTING PIPES ALONG THE MANHOLE INSIDE WALL ARC.*
3. *PIPE WALL THICKNESS USED IN TABLE 1 ARE BASED ON STD WALL PIPES. THE ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLE ALLOWS.*



MAX 24" ID MAIN PIPE ALLOWED FOR STRAIGHT THROUGH TO 45° DEFLECTION



MAX 21" ID MAIN PIPE ALLOWED FOR 45° TO 90° DEFLECTION

TABLE 1
MIN ANGLE AND INTERSECTING PIPE SIZES FOR A 4'-0" DIA MANHOLE

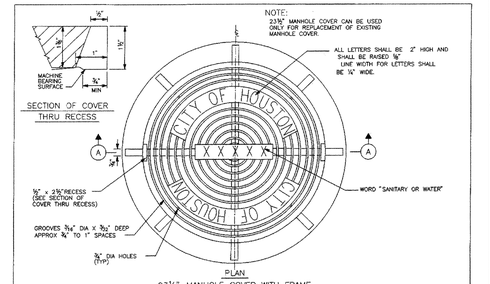
INTERSECTING PIPE SIZE (INCHES)	MIN INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE SIZES IN INCHES							
	6"	8"	10"	12"	15"	18"	21"	24"
6	55	58	60	65	70	75	80	85
8		60	63	68	73	77	82	87
10			66	71	75	80	85	90
12				76	80	85	90	–
15					85	90	–	–
18						–	–	–
21							–	–
24								–

NOT APPLICABLE UNLESS HYDRAULICS DICTATE (INTERSECTING PIPE > MAIN PIPE)

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

SANITARY SEWER
4'-0" DIAMETER PRECAST CONCRETE MANHOLE NOTES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — ASSIGNED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02082N-02

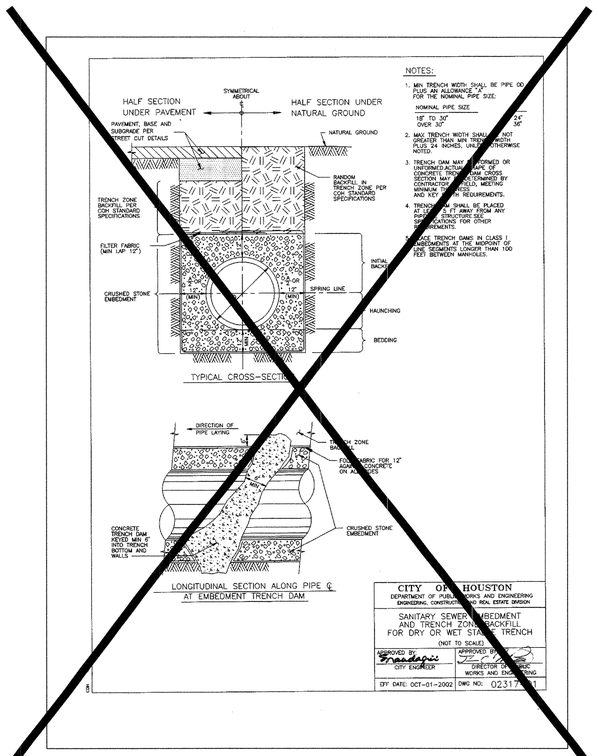


1) NOTE APPROXIMATE WEIGHTS.
FRAME– 170 LBS 77KG
COVER – 270 LBS 123 KG
UNIT 440 LBS 200 KG
2) MATERIAL – OPAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION.
4) MODEL V-1420 ASY OR APPROVED EQUAL

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

SANITARY SEWER AND WATER
MANHOLE FRAME AND COVER
(NOT TO SCALE)

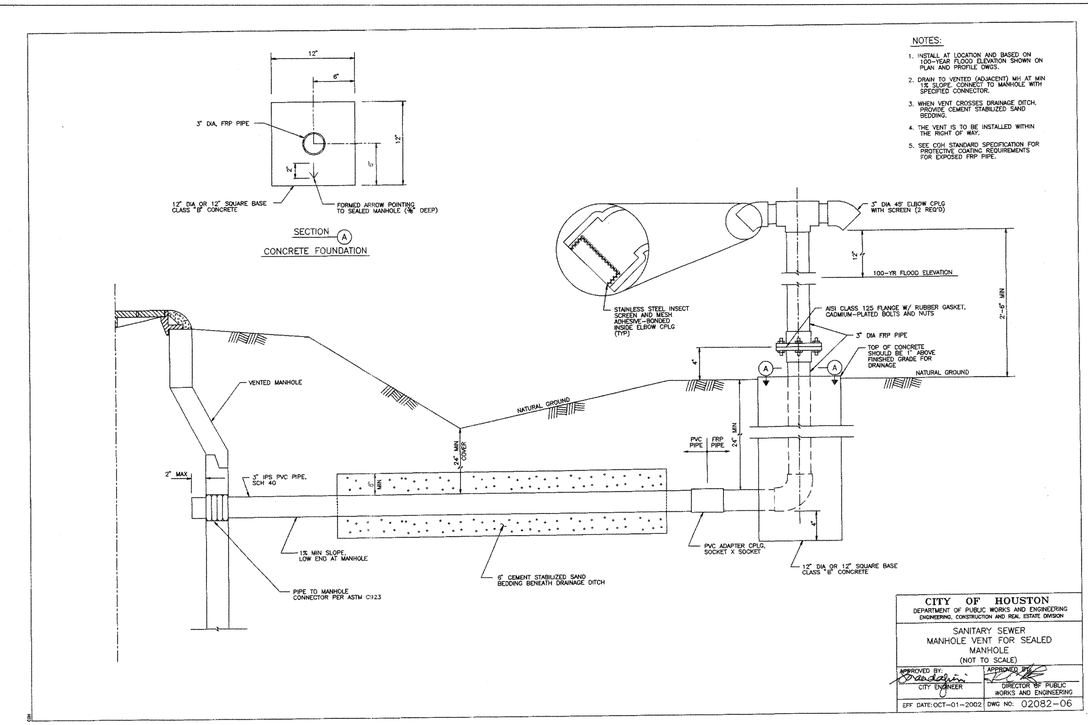
APPROVED BY: CITY ENGINEER — ASSIGNED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02084-01



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

SANITARY SEWER EMBEDMENT AND TRENCH ZONE BACKFILL FOR DRY OR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02317-03



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

SANITARY SEWER
MANHOLE VENT FOR SEALED MANHOLE
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02082-06

FILE: SANITARY SEWER DETAIL.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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(GAS SERVICE LINES ARE NOT SHOWN)
DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P–5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

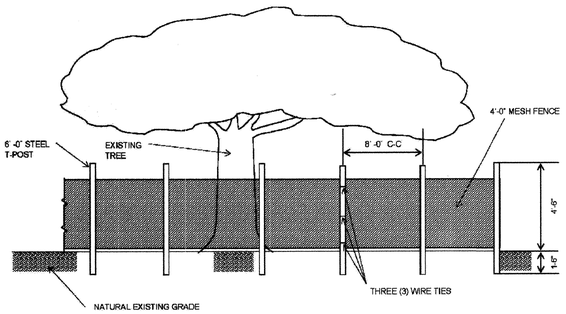
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

SANITARY SEWER DETAILS
SHEET 1 OF 1

WBS N–000383–0001–4
FILE: P:\City of Houston\2006–05_NSR 451\DRAWINGS\SANITARY SEWER DETAIL.dwg
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 103 OF 131

PUBLIC WORKS AND ENGINEERING
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS



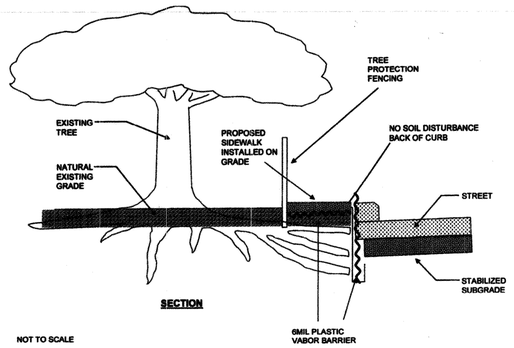
SECTION VIEW

NOT TO SCALE

TREE PROTECTION FENCING

June 2008

S.L. Anderson Company, Ltd.
Consulting Urban Foresters
(713) 974-2208



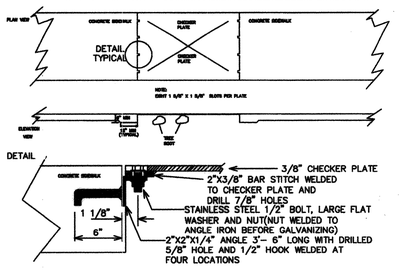
SECTION

NOT TO SCALE

ZERO CURB CUT/VERTICAL AND HORIZONTAL VAPOR BARRIER

JUNE 2008

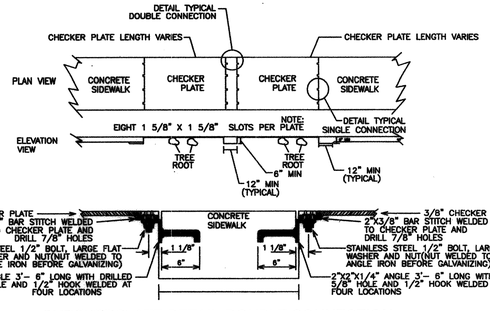
S.L. Anderson Company
Consulting Urban Foresters
(713) 974-2208



CHECKERPLATE DETAIL-SINGLE CONNECTION

NOT TO SCALE

NOTE:
ALL IRONWORK TO BE HOT DIPPED GALVINIZED EXCEPT AS NOTED.



CHECKERPLATE DETAIL-DOUBLE CONNECTION

NOT TO SCALE

NOTE:
ALL IRONWORK TO BE HOT DIPPED GALVINIZED EXCEPT AS NOTED.

TREE PRESERVATION AND TREATMENT NOTES:

THESE NOTES ARE SUPPLEMENTAL TO THE CITY OF HOUSTON STANDARD SPECIFICATIONS, SECTION 01562. TREE AND PLANT PROTECTION

A. GENERAL

1. WORK INCLUDES:
   - A. REMOVAL OPERATION
   - B. MAINTENANCE PRUNING
   - C. FERTILIZATION TREATMENT
   - D. TREE PROTECTION FENCING INSTALLATION
   - E. ROOT PRUNING OPERATION
   - F. ROOT PRUNING/CHEMICAL BARRIER INSTALLATION
   - G. ZERO CURB CUT OPERATION
   - H. SPECIAL CURB CUT OPERATION
   - I. REPAIR/REPLACEMENT OPERATION
2. CONTRACTOR SHALL MEET THE CITY URBAN FORESTER TO REVIEW TREE PRESERVATION PLAN FOR THE SITE BEFORE STARTUP OF SITE WORK.
3. NO SITE CONSTRUCTION SHALL BEGIN IN ANY AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN IMPLEMENTED AND APPROVED.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE TO AND MAINTENANCE OF THE TREE PRESERVATION PLAN.
5. 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 CITY URBAN FORESTER.
6. ANY ROOTS OF PRESERVATION TREES EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE COVERED WITH A LAYER OF LIGHT TOPSOIL OR 6 MI. POLYETHYLENE SHEETING TO PREVENT DESICCATION AND LOSS OF EXPOSED ROOTS.
7. 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 ½" BEING CUT. THIS WORK SHALL BE BY HAND OR WITH APPROVED EQUIPMENT AND ROOT PROTECTION.
8. TREES DAMAGED OR LOST, DUE TO CONTRACTOR'S NEGLIGENCE, DURING THE CONSTRUCTION PERIOD SHALL BE APPRAISED BY CITY URBAN FORESTER AND THE OWNER COMPENSATED.

B. IMPLEMENTATION

1. REMOVAL OPERATION – (TREATMENT A) – FOR TREES LOCATED IN THE RIGHT-OF-WAY:
   - A. MANY LARGE TREES WITHIN 5' OF THE EXISTING BACK OF CURB ARE DESIGNATED FOR REMOVAL DUE TO THE IMPACT OF A NEW CURB TO BE INSTALLED BEHIND THE OLD CURB LINE. THESE POTENTIAL HAZARD TREES NEED TO BE EVALUATED BY THE CITY URBAN FORESTER FOR REMOVAL APPROVAL.
   - B. TREES DESIGNATED TO BE REMOVED BY HAND SHALL BE PAINTED WITH AN "X" BY THE CITY URBAN FORESTER.
   - C. ALL TREE REMOVALS SHALL BE DONE BY A CERTIFIED ARBORIST.
   - D. ALL WOOD AND DEBRIS FROM TREE REMOVAL SHALL BE REMOVED FROM THE SITE IMMEDIATELY.
   - E. ALL STUMPS SHALL BE GROUND DOWN TO 6" BELOW GRADE.
   - F. REPAIR ANY DAMAGE TO PRESERVATION TREES THAT MAY OCCUR DURING THE REMOVAL OPERATION.
2. MAINTENANCE PRUNING – (TREATMENT B):
   - A. TREES TO BE PRUNED SHALL INCLUDE ONLY TREES AFFECTED BY CONSTRUCTION AND THOSE REQUIRING MAINTENANCE IN THE PRESERVATION AREAS.
   - B. TREES TO THE PRESERVED ARE AS DESIGNATED IN THE PLANS AND WILL BE IDENTIFIED BY THE CITY URBAN FORESTER.
   - C. ALL MAINTENANCE PRUNING WORK SHALL BE DONE BY A CERTIFIED ARBORIST.
   - D. PRUNING SHALL CONSIST OF THE FOLLOWING METHOD:
     - (1) PRUNING AS DEFINED BY THE AMERICAN NATIONAL STANDARD FOR TREE CARE OPERATIONS – TREE SHRUB AND OTHER WOOD PLANT MAINTENANCE STANDARDS. THIS WOULD INCLUDE:
       - (A) CROWN CLEANING, THE REMOVAL OF ALL DEAD, DYING, DISEASED WEAK BRANCHES AND WATER SPROUTS FROM THE TREE'S CROWN. THIS WOULD I NCLUDE ALL DEAD BRANCHES AND ABOVE.
       - (B) CROWN RAISING OR CLEARANCE PRUNING SHALL CONSIST OF THE REMOVAL OF THE LOWER BRANCHES OF A TREE TO PROVIDE CLEARANCE FOR RIGHT-OF-WAY CONSTRUCTION.
     - (2) ALL HAZARD WOOD SHALL BE REMOVED FROM DESIGNATED TREES.
     - (3) ALL PRUNING CUTS ON OAK TREES SHALL BE COVERED WITH AN THIN COAT OF WATER-BASED BLACK PAINT APPROVED BY CITY URBAN FORESTER. IF PRUNING IS TO OCCUR IN APRIL, MAY OR JUNE.
     - (4) ALL WOOD AND DEBRIS FROM PRUNING OPERATIONS SHALL BE REMOVED FROM THE SITE.
3. FERTILIZATION TREATMENT – (TREATMENT C):
   - A. INJECTION OF THE FERTILIZER INTO THE ROOT ZONE OF THE TREE SHALL CONSIST OF THE FOLLOWING METHODS:
     - (1) MIX IN A TANK WITH AGITATION CAPABILITY:
       - (A) FERTILIZER – 9 POUNDS BY WEIGHT PER 100 GALLONS WATER.
       - (B) MYCORRHIZAL FUNGI – 1 LB. PER 100 GALLONS WATER.
     - (2) INJECTION THE MIXTURE ON A 2.5 FT. SQUARE GRID AT ¼ GALLON ON MIX PER HOLE OR 4 GALLONS PER 100 SQUARE FEET.
     - (3) INJECTION PRESSURE SHALL BE 100 – 150 PSI AS SOIL CONDITIONS WARRANT.
     - (4) DEPTH OF INJECTION SHALL BE 6 INCHES – 12 INCHES.
     - (5) INJECT THE ROOT ZONE AREAS, WHERE POSSIBLE, IN THE AVAILABLE CANOPY AREAS PLUS 10 FEET BEYOND DRIPLINE, BUT NOT IN ROOT LOSS ZONE.
   - B. CONTRACTOR IS RESPONSIBLE FOR MIXING, APPLYING AND DISPOSAL OF ALL CHEMICALS IN ACCORDANCE WITH STRICT ADHERENCE TO MAUFACTURER'S DIRECTIONS AND OR STATE AND FEDERAL REGULATIONS.
4. TREE PROTECTION FENCING INSTALLATION (TREATMENT D – REFER TO TREE PREVENTION DETAILS):
   - A. FENCING AS FOLLOWS:
     - (1) FABRIC. 4' TALL PLASTIC FENCE.
     - (2) STEEL T-BARS, 6' TALL, PLACED 8'0" ON CENTER, 24" INTO THE GROUND.
     - (3) FENCE IS TO BE ATTACHED TO POSTS WITH PLASTIC TIES PLACED EVERY 24" ON CENTER.
     - (4) FENCE IS TO BE PLACED A MINIMUM OF 1 FOOT FROM THE ROOT PRUNE LINE AND PROPOSED CURB.
   - B. NO ACCESS TO FENCE AREAS SHALL BE PERMITTED WITHOUT PRIOR APPROVAL OF THE CITY URBAN FORESTER.
   - C. CONTRACTOR SHALL PROVIDE FOR MAINTENANCE AND REPAIR OF FENCING DURING SITE WORK CONSTRUCTION.
   - D. CONTRACTOR SHALL REMOVE FENCE UPON COMPLETION OF THE SITE WORK UNLESS OTHERWISE NOTIFIED BY THE OWNER.
5. ROOT PRUNING OPERATION (TREATMENT E–REFER TO TREE PRESERVATION DETAILS):
   - A. TRENCHING AREAS ARE AS DESIGNATED IN THE PLANS AND EXACT LOCATIONS WILL BE MARKED, IN THE FIELD, BY THE CITY URBAN FORESTER.
   - B. TRENCHING DEPTH SHALL BE 2FT. MINIMUM AND NOT TO EXCEED 6" IN WIDTH.
   - C. TRENCHING SHALL BE BACKFILLED AND COMPACTED IMMEDIATELY AFTER TRENCHING.
6. ROOT PRUNING/CHEMICAL BARRIER INSTALLATION (TREATMENT F–REFER TO TREE PRESERVATION DETAILS):
   - A. ROOT PRUNING CHEMICAL BARRIER, BARRIER SHALL BE INSTALLED WHERE ROOT PRUNING IS SCHEDULED TO BE DONE AT LOCATIONS 1' BEHIND THE PROPOSED EXCAVATION FOR THE NEW CURB LINE.
   - B. ALL SPECIFICATIONS FOR ROOT PRUNING TRENCHING SHALL APPLY TO THIS INSTALLATION WITH THE FOLLOWING ADDITIONAL REQUIREMENTS.
     - (1) 6 MIL POLYETHYLENE SHEETING SHALL BE PLACED IN THE TRENCH TO THE BOTTOM OF THE TRENCH.
     - (2) ANCHOR SHEETING AT THE TOP OF THE TRENCH IN ORDER TO BACKFILL THE TRENCH.
     - (3) COVER THE TOP OF THE SHEETING SO THAT NO SHEETING IS EXPOSED.
7. ZERO CURB CUT OPERATIONS (TREATMENT G–REFER TO TREE PRESERVATION DETAILS):
   - A. REMOVAL OF THE OLD CURB LOCATED WITHIN THE CANOPY AREA OF PRESERVATION TREES WILL BE DONE IN THE FOLLOWING MANNER:
     - (1) DIG OUT THE EXISTING STREET IN FRONT OF CURB TO THE BOTTOM OF EXISTING CURB.
     - (2) REMOVE EXISTING CURB BY PULLING IN INTO THE STREET EXCAVATION WITHOUT DIGGING OR CLAWING BEHIND THE CURB.
     - (3) COVER THE EXPOSED SOIL AND ROOTS IMMEDIATELY WITH 6 MIL CLEAR PLASTIC TO PREVENT DESICCATION OF ROOTS.
     - (4) ANCHOR THE PLASTIC COVER WITH WOODEN STAKES DRIVEN INTO THE SOIL (AVOIDING TREE ROOTS) BEHIND THE OLD CURB EDGE.
     - (5) PLASTIC SHALL REMAIN IN PLACE UNTIL BACKFILL OPERATIONS ARE IN PROGRESS. PLASTIC SHALL BE REMOVED AT THE SAME TIME AS BACKFILL IS BEING PLACED SO THAT THE ROOTS ARE NOT EXPOSED TO AIR.
     - (6) NEW CURB INSTALLATION SHALL BE FORMED AND POURED WITHOUT DISTURBANCE OR DAMAGE TO THE EXPOSED ROOTS LOCATED AT THE EDGE OF THE OLD REMOVED CURB.
8. SPECIAL CURB CUT (TREATMENT H):
   - A. IN THE CRITICAL ROOT ZONE AREAS WHERE A NEW CURB IS TO BE INSTALLED BEHIND THE EXISTING CURB LINE, A ROOT PRUNING/CHEMICAL BARRIER TREATMENT WILL BE INSTALLED AT THE BACK OF THE NEW CURB LINE.
   - B. NO STABILIZATION/COMPACTION TREATMENT WILL BE ALLOWED BEYOND THE ROOT PRUNING/CHEMICAL BARRIER.
9. REPAIR/REPLACEMENT OPERATIONS
   - A. IF ANY DAMAGE TO PRESERVATION TREES SHOULD OCCUR BEYOND WHAT IS EXPECTED DURING THE CONSTRUCTION PERIOD, THE CITY URBAN FORESTER SHALL APPRAISE THE DAMAGE AND ORDER THE REPAIR BY THE CONTRACTOR OR RESPONSIBLE PARTY.
   - B. TREES OTHER THAN THOSE DESIGNATED FOR REMOVAL THAT ARE DESTROYED OR IRREPARABLY DAMAGED AS A RESULT OF CONSTRUCTION OPERATION, SHALL BE REMOVED AND REPLACED WITH THE SAME SIZE SPECIES AND VARIETY UP TO AND INCLUDING 8 INCHES IN TRUNK DIAMETER. TREES LARGER THAN 8 INCH DIAMETER SHALL BE REPLACED BY THE CONTRACTOR WITH AN 8-INCH DIAMETER TREE OF THE SAME SPECIES AND VARIETY AT NO ADDITIONAL COST TO THE CITY.

C. MATERIALS

1. FERTILIZER – "XL INJECTO FEED (32-7-7), A PRODUCT OF DOGGET CORPORATION, LEBANON, NJ, (800) 448-1862.
2. MYCORRHIZAL FUNGI – MYCORTREE INJECTABLE, A PRODUCT OF PLANT HEALTH CARE INC., WOODSTOCK, GA, (800) 421-9051.
3. TREE PROTECTION FENCING:
   - A. 4' TALL PLASTIC FENCE.
   - B. 6' TALL STEEL T-BARS.
   - C. WIRE TIES, 6 GAUGE
4. POLYETHYLENE SHEETING: MINIMUM 6 MIL THICKNESS, BLACK.
5. FILL AND BACKFILL TOPSOIL: ENRICHED TOPSOIL WITH COMPOST, A PRODUCT OF LIVING EARTH TECHNOLOGY, HOUSTON, TX (713) 466-7360. 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 CITY URBAN FORESTER.
6. EVERY EFFORT SHALL BE MADE TO UTILIZE CHEMICALS OF AN ORGANIC OR BIODEGRADABLE NATURE IN ORDER TO OFFER THE LEAST IMPACT TO THE ENVIRONMENT.

LEGEND

(REFERENCE TREE TREATMENTS AND TREE PRESERVATION AND TREATMENT SPECIFICATIONS)

- 6 — TREE PRESERVATION TREE WITH CRITICAL ROOT ZONE (CANOPY AREA)
- 252 (X) — REMOVAL TREE (DEAD, HAZZARD, FOR CONSTRUCTION)
- (A) — TREATMENT A – REMOVAL OPERATION – (REQUIRED EVALUATION FOR REMOVAL BY CITY FORESTER)
- (B) — TREATMENT B – MAINTENANCE PRUNING
- (C) — TREATMENT C – FERTILIZATION
- (D) — TREATMENT D – TREE PROTECTION FENCING
- (E) — TREATMENT E – ROOT PRUNING
- (F) — TREATMENT F – ROOT PRUNING/ CHEMICAL BARRIER
- (G) — TREATMENT G – ZERO CURB – CUT
- (H) — TREATMENT H – SPECIAL CURB CUT
- 1 — REQUIRED TREE PROTECTION SEE STANDARD SPECIFICATION SECTION 01562

NOTE:
TREES DESIGNATED FOR PRESERVATION ARE SHOWN ON PLAN AND PROFILE SHEETS 43 THROUGH 78 OF THE PLAN SET.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
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SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
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LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

TREE PRESERVATION DETAILS AND GENERAL NOTES

WBS N-000383-0001-4

FILE:
P:\City of Houston\2006-05_NSR 451\DRAWINGS\TREE PRESERVATION.dwg

DRAWING SCALE
1"=1'-0" FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

SHEET NO.103A OF 131

BRAESWOOD PLACE SUBDIVISION TREE SPECIES IDENTIFICATION

TREE #	SPECIES	SIZE	CONDITION	STREET ADDRESS	TREE PROTECTION REQUIRED
1	Crape Myrtle	6"	Fair	Lookout Court	1
2	Camphor	10"	Fair	Lookout Court	1
3	Camphor	8"	Fair	Lookout Court	1-2
4	Camphor	12"	Fair	Lookout Court	1-2
5	Camphor	6"	Fair	Lookout Court	1-2
6	Crape Myrtle	6"	Fair	Lookout Court	1
7	Crape Myrtle	8"	Fair	Lookout Court	1
12	Crape Myrtle	22"	Fair/Good	Lookout Court	1
16	Crape Myrtle	8"	Fair	Lookout Court	1
17	Magnolia	15"	Fair	Lookout Court	1
18	Palm	16"	Fair	Lookout Court	1
19	Water Oak	18"	Fair	Lookout Court	1
20	Live Oak	20"	Fair	Lookout Court	1-4-5
23	Pine	26"	Fair	Braeswood	1-4-5
24	Live Oak	26"	Fair	Braeswood	1
25	Live Oak	28"	Fair	Braeswood	1
27	Live Oak	16"	Fair	Braeswood	1-4-5
28	Ash	15"	Fair	Broadmead	6*
29	Crape Myrtle	6"	Fair	3642 Broadmead	1
30	Magnolia	4"	Fair	3642 Broadmead	1
31	Live Oak	24"	Fair	3647 Broadmead	1-4-5
32	Water Oak	20"	Fair	3642 Broadmead	1
33	Live Oak	34"	Fair	3643 Broadmead	1-4-5
34	Pine	20"	Fair	3642 Broadmead	1-4-5
35	Pine	18"	Fair	3642 Broadmead	1-4-5
36	Pine	8"	Fair	3628 Broadmead	1-4-5
37	Live Oak	15"	Fair	3638 Broadmead	1-4-5
38	Live Oak	10"	Fair	3638 Broadmead	1-4-5
39	Live Oak	28"	Fair	3635 Broadmead	1-4-5
40	Live Oak	30"	Fair	3630 Broadmead	1-4-5
41	Water Oak	30"	Fair	3630 Broadmead	1-4-5
42	Live Oak	30"	Fair	3631 Broadmead	1-4-5
43	Water Oak	30"	Fair	3626 Broadmead	1-4-5
44	Crape Myrtle	4"	Fair	3622 Broadmead	1-4-5
45	Magnolia	14"	Fair	3622 Broadmead	1
46	Tallow	18"	Fair	3622 Broadmead	1-4-5
47	Crape Myrtle	8"	Fair	3618 Broadmead	1-4-5
48	Sago	10"	Fair	3618 Broadmead	7
49	Sago	10"	Fair	3618 Broadmead	7
50	Tallow	12"	Fair	3618 Broadmead	1
51	Elm	24"	Fair	3618 Broadmead	1-4-5
52	Red Oak	10"	Fair	3614 Broadmead	1
53	Red Oak	10"	Fair	3614 Broadmead	1
54	Ash	6"	Fair	3615 Broadmead	1
55	Crape Myrtle	6"	Fair	3611 Broadmead	1-4-5
56	Cedar	12"	Fair	3611 Broadmead	1
57	Live Oak	8"	Fair	3610 Broadmead	1
58	Palm	20"	Fair	3606 Broadmead	1-4-5
59	Crape Myrtle	6"	Fair	3607 Broadmead	1
60	Crape Myrtle	12"	Fair	3607 Broadmead	1
61	Crape Myrtle	8"	Fair	Broadmead	1
62	Crape Myrtle	4"	Fair	Broadmead	1
63	Live Oak	22"	Fair	Deal	1-4-5
64	Live Oak	28"	Fair/Good	3641 Deal	1-4-5
65	Magnolia	11"	Fair	3642 Deal	1
66	Magnolia	6"	Fair	3639 Deal	1
67	Live Oak	20"	Fair	3639 Deal	1-4-5
68	Magnolia	6"	Fair	3635 Deal	1
69	Water Oak	32"	Fair	3634 Deal	1-4-5
70	Live Oak	16"	Fair	3631 Deal	1
71	Pecan	16"	Fair	3630 Deal	1-4-5
72	Water Oak	8"	Fair	3631 Deal	1
73	Maple	4"	Fair	3626 Deal	1
74	Water Oak	6"	Fair	3627 Deal	6*
75	Maple	4"	Fair	3627 Deal	1
76	Tallow	8"	Fair	3627 Deal	7
77	Live Oak	20"	Fair/Good	3627 Deal	1-4-5
78	Tallow	8"	Fair	3627 Deal	1
79	Ash	28"	Fair	3627 Deal	1-4-5
80	Cedar	4"	Fair	3623 Deal	7
81	Cedar	8"	Fair	3619 Deal	7
82	Pine	20"	Fair	3611 Deal	1
83	Pine	14"	Fair	3610 Deal	1-4-5
84	Pine	10"	Fair	3610 Deal	1-4-5
85	Pine	27"	Fair	3611 Deal	1-4-5
86	Pine	15"	Fair	3606 Deal	1-4-5
87	Water Oak	10"	Fair	3606 Deal	1
88	Live Oak	34"	Fair/Good	Ilona	1-4-5
89	Crape Myrtle	6"	Fair	Ilona	1
90	Crape Myrtle	4"	Fair	Ilona	1
91	Crape Myrtle	8"	Fair	8818 Ilona	1
92	Crape Myrtle	8"	Fair	8814 Ilona	1
93	Live Oak	36"	Fair	8814 Ilona	1-4-5
94	Sweet Gum	12"	Fair	8727 Ilona	1
95	Live Oak	14"	Fair	8802 Ilona	1-4-5
96	Crape Myrtle	8"	Fair	8723 Ilona	1
97	Pecan	10"	Fair	8723 Ilona	1
98	TREE HAS BEEN REMOVED				
99	Live Oak	15"	Fair	8714 Ilona	1-4-5
100	Red Oak	23"	Fair	8719 Ilona	1
101	Live Oak	12	Fair	8714 Ilona	1-4-5
102	Ash	14"	Fair	8715 Ilona	1-4-5
103	Golden Raintree	24"	Fair	8715 Ilona	1-4-5
104	Crape Myrtle	20"	Fair	8711 Ilona	1
105	Live Oak	26"	Fair	8711 Ilona	1-4-5
106	Tallow	24"	Fair	8707 Ilona	1-4-5
107	Tallow	12"	Fair	8707 Ilona	1-4-5
108	Ligustrom	10"	Fair/Good	8706 Ilona	7
109	TREE HAS BEEN REMOVED				
110	Elm	10"	Fair/Good	8706 Ilona	1-4-5
111	Palm	26"	Fair	8702 Ilona	1-4-5
112	Tallow	21"	Fair	8614 Ilona	1
113	Live Oak	12"	Fair/Good	3646 Deal	1
114	Peach	8"	Fair	3646 Deal	1
115	Sago	12"	Fair/Good	3646 Deal	1
116	Ash	13"	Fair	8606 Ilona	1-4-5
117	Crape Myrtle	6"	Fair/Good	8647 Ilona	1-4-5
118	Crape Myrtle	6"	Fair/Good	8647 Ilona	1-4-5
119	Ash	12"	Fair	8606 Ilona	1-4-5
120	Tallow	14"	Fair	8606 Ilona	1-4-5
121	Pecan	36"	Fair	8602 Ilona	1-4-5
122	Live Oak	28"	Fair	8510 Ilona	1-4-5
123	Ash	36"	Fair/Poor	8510 Ilona	1-4-5
124	Ash	36"	Fair/Good	3646 Ilona	1-4-5
125	Water Oak	11"	Fair	3646 Ilona	1
126	Camphor	12"	Fair	3623 Ilona	1
127	Ash	26"	Fair	Liinkwood	1
128	Crape Myrtle	8"	Fair	Linkwood	1
130	Crape Myrtle	15"	Fair	Linkwood	1
131	Crape Myrtle	8"	Fair/Good	Linkwood	1
132	Crape Myrtle	10"	Fair/Good	Linkwood	1
133	Crape Myrtle	8"	Fair/Good	Linkwood	1
134	Live Oak	15"	Fair/Good	Linkwood	1
137	Live Oak	15"	Fair/Good	Timberside	1-4-5
138	Live Oak	10"	Fair/Good	Timberside	1-4-5
139	Live Oak	10"	Fair/Good	Timberside	1-4-5
140	Live Oak	13"	Fair/Good	Timberside	1-4-5
141	Live Oak	12"	Fair	3602 Timberside	1-4-5
142	Magnolia	16"	Fair	8711 Timberside	1-4-5
143	Live Oak	12"	Fair	3602 Timberside	1-4-5
144	Live Oak	28"	Fair	8703 Timberside	1-4-5
145	Magnolia	10"	Fair/Good	8621 Timberside	1-4-5
146	Pecan	14"	Fair/Good	3602 Deal	1-4-5
147	Crape Myrtle	14"	Fair	8611 Timberside	1-4-5
148	Ash	3"	Fair	3603 Broadmead	1
149	Live Oak	10"	Fair	3603 Broadmead	1
150	Pine	12"	Fair	8511 Broadmead	1-4-5
151	Pine	20"	Fair	8511 Broadmead	1-4-5
152	Pine	10"	Fair	8511 Broadmead	1-4-5
153	Tallow	32"	Fair	8507 Timberside	1-4-5
154	Pine	15"	Fair	3601Braeswood	1-4-5
155	Sweet Gum	13"	Fair	3523 Braeswood	1-4-5
156	Sweet Gum	16"	Fair	3523 Braeswood	1-4-5
157	Live Oak	24"	Fair	3523 Braeswood	1-4-5
158	Live Oak	14"	Fair	Tilden	1-4-5
159	Live Oak	30"	Fair	Tilden	1-4-5
160	Crape Myrtle	6"	Fair	Tilden	1
161	Water Oak	22"	Fair/Poor	Tilden	1
162	Live Oak	20"	Fair	Tilden	1-4-5
163	Live Oak	15"	Fair	Tilden	1
164	Magnolia	18"	Fair	Tilden	1
165	Live Oak	39"	Fair	Tllden	1-4-5
166	Live Oak	7"	Fair	Tilden	1
167	Sago	12"	Fair	Tilden	1
168	Sago	12"	Fair	Tilden	1
169	Live Oak	8"	Fair	Tilden	1-4-5
170	Live Oak	10"	Fair	Tilden	1-4-5
171	Bradford Pear	12"	Fair	Tilden	1
172	Live Oak	31"	Fair	Tilden	1-4-5
173	Tallow	22"	Fair	Tilden	1-4-5
174	Sycamore	17"	Fair	Tilden	1-4-5
175	Live Oak	29"	Fair	Tilden	1-4-5
176	Sweet Gum	8"	Fair	Winslow	1
177	Live Oak	32"	Fair	Winslow	1-4-5
178	Crape Myrtle	24"	Fair/Good	Winslow	1-4-5
179	Elm	10"	Fair	Winslow	1-4-5
180	Bald Cypress	14"	Fair/Good	Winslow	1
181	Bald Cypress	8"	Fair/Good	Winslow	1
182	Live Oak	18"	Fair	Winslow	1-4-5
183	Live Oak	14"	Fair	Winslow	1-4-5
184	Ash	24"	Fair	Winslow	1-4-5
185	Tallow	18"	Fair	Winslow	1-4-5
186	Live Oak	28"	Fair	Winslow	1-4-5
187	TREE HAS BEEN REMOVED				
188	Ash	20"	Fair	Winslow	1-4-5
188B	Palm	18"	Fair	Winslow	1-4-5
189	Palm	18"	Fair	Winslow	1-4-5
190	Pecan	17"	Fair	Winslow	1
191	Crape Myrtle	8"	Fair	Winslow	1
192	Live Oak	19"	Fair	Winslow	1
193	Live Oak	14"	Fair	Winslow	1
194	Palm	14"	Fair	Winslow	1-4-5
195	Catalpa	15"	Fair	Winslow	1
196	Tallow	14"	Fair	Winslow	1
197	Pine	22"	Fair	Winslow	1
198	Tallow	10"	Fair	Winslow	1-4-5
199	Tallow	14"	Fair	Winslow	1
200	Tallow	28"	Fair	Winslow	1
201	Water Oak	12"	Fair/Poor	Winslow	1
202	Magnolia	10"	Fair	Greenbush	1
203	Water Oak	24"	Fair	Greenbush	1
204	Live Oak	18"	Fair	Greenbush	1
205	Live Oak	17"	Fair	Greenbush	1
206	Live Oak	44"	Fair	Conway	1
207	Live Oak	32"	Fair	Conway	1-4-5
208	Ash	25"	Fair	Conway	1
209	Pine	16"	Fair	Conway	1
210	Live Oak	29"	Fair	Conway	1-4-5
211	Tallow	20"	Fair	Conway	1-4-5
212	Live Oak	33"	Fair	Conway	1-4-5
213	Live Oak	36"	Fair	Conway	1-4-5
215	Water Oak	8"	Fair	Conway	1
216	Crape Myrtle	8"	Fair	Conway	1
217	Water Oak	23"	Fair	Conway	1
218	Sweet Gum	16"	Fair	Conway	1-4-5
219	Magnolia	34"	Fair	Stanton	1-4-5
220	Magnolia	18"	Fair/Poor	Stanton	1
221	Bald Cypress	10"	Fair	Stanton	1
222	Pine	12"	Fair	Stanton	1
223	Ash	30"	Fair	Stanton	1-4-5
224	Red Oak	6"	Fair	Stanton	1
225	Willow Oak	6"	Fair	Stanton	1
226	Pecan	6"	Fair	Stanton	1
228	Crape Myrtle	6"	Fair	Stanton	1
229	Ash	38"	Fair	Stanton	1-4-5
230	Crape Myrtle	16"	Fair	Stanton	1-4-5
231	Water Oak	16"	Fair	Stanton	1
232	Water Oak	12"	Fair	Stanton	1
233	Palm	13"	Fair	Stanton	1-4-5
234	Sago	10"	Fair	Stanton	1-4-5
235	Live Oak	30"	Fair	Stanton	1-4-5
236	Hibiscus	8"	Fair/Good	Stanton	1-4-5
237	Sago	10"	Fair/Good	Stanton	1-4-5
238	Sago	4"	Fair	Stanton	1
239	Sago	4"	Fair	Stanton	1
240	Camphor	12"	Fair	Stanton	1-4-5
241	Camphor	10"	Fair	Stanton	1
242	Golden Rain Tree	12"	Fair	Stanton	1
243	Sago	8"	Fair/Good	3138 Prescott	1
244	Sago	8"	Fair/Good	3138 Prescott	1
245	Pine	21"	Fair	3126 Prescott	1-4-5
246	Live Oak	30"	Fair	3131 Prescott	1-4-5
247	Sweet Gum	18"	Fair	3121 Prescott	1-4-5
248	Pine	18"	Fair	3148 Prescott	1-4-5
249	Magnolia	24"	Fair	3113 Prescott	1
250	Crape Myrtle	10"	Fair/Good	3102 Prescott	1
251	Willow Oak	30"	Fair	3103 Prescott	1-4-5
252	Water Oak	34"	Fair	3031 Prescott	1-4-5
253	Pine	24"	Fair	3026 Prescott	1
254	Pine	18"	Fair	3027 Prescott	1-4-5
255	Pine	18"	Fair	3027 Prescott	1-4-5
256	Pine	13"	Fair	Prescott	1-4-5
257	Pine	14"	Fair	Prescott	1-4-5
259	Pine	13"	Fair	Prescott	1-4-5
260	Water Oak	32"	Fair	Prescott	1-4-5
261	Ash	25"	Fair	Prescott	1-4-5
262	Magnolia	20"	Fair	Prescott	1-4-5
263	Sweet Gum	22"	Fair	Prescott	1
264	Crape Myrtle	10"	Fair	Prescott	1-4-5
265	Loquat	6"	Fair	Prescott	1
266	Elm	22"	Fair	Prescott	1-4-5
267	Ash	34"	Fair	Prescott	1-4-5
268	Pear	8"	Fair	Prescott	1-4-5
269	Pear	8"	Fair	Prescott	1-4-5
270	Red Oak	8"	Fair/Good	Fairhope Place	1-4-5
271	Tallow	25"	Fair	8315 Fairhope Pl.	1-4-5
272	Ash	45"	Fair	8310 Fairhope Pl.	1-4-5
273	Maple	2"	Fair/Good	8211 Fairhope Pl.	1
274	Pecan	8"	Fair	8207 Fairhope Pl.	1
275	Water Oak	36"	Fair/Good	Fairhope Place	1-4-5
276	Live Oak	30"	Fair	Fairhope Place	1-4-5
277	Magnolia	18"	Fair	Fairhope Place	1-4-5
278	Palm	28"	Fair	Fairhope	1-4-5
279	Palm	18"	Fair	Fairhope	1-4-5
280	Live Oak	23"	Fair	Fairhope	1-4-5
281	Live Oak	5"	Fair	Fairhope	1
282	Magnolia	14"	Fair/Good	Fairhope	1-4-5
283	Wax Myrtle	6"	Fair	Fairhope	1
284	Cedar	6"	Fair	Fairhope	1-4-5
285	Red Oak	12"	Fair	Fairhope	1-4-5
286	Crape Myrtle	12"	Fair	Fairhope	1
287	Live Oak	10"	Fair	Fairhope	1
288	Crape Myrtle	11"	Fair	Fairhope	1-4-5
289	Magnolia	12"	Fair	Fairhope	1
290	Water Oak	15"	Fair	Fairhope	1-4-5
291	Water Oak	15"	Fair	Fairhope	1-4-5
292	Willow Oak	40"	Fair	Fairhope	1-4-5
293	Magnolia	15"	Fair	Fairhope	1-4-5
294	Live Oak	12"	Fair	Fairhope	1
295	Crape Myrtle	10"	Fair	Fairhope	1
296	Catalpa	19"	Fair	Fairhope	1-4-5
297	Live Oak	20"	Fair	Fairhope	1
298	Ash	16"	Fair	Fairhope	1
299	Live Oak	29"	Fair	Fairhope	1
300	Redbud	2"	Fair	Castlewood	1
301	Live Oak	20"	Fair	Castlewood	1
302	Live Oak	38"	Fair	3326 Castlewood	1-4-5
303	Water Oak	14"	Fair	3214 Castlewood	1
304	Willow Oak	10"	Fair	3202 Castlewood	1
305	Ash	22"	Fair	3203 Castlewood	1-4-5

LEGEND OF TREE PROTECTION REQUIREMENTS

1 – FENCE

2 – INSURE WATER LINE IS OUTSIDE OF CRITICAL ROOT ZONE

3 – NOT IMPACTED BY CONSTRUCTION – NO PROTECTION REQUIRED

4 – ZERO CURB CUT

5 – FORM AND POUR SIDEWALK WITHOUT DAMAGING ROOTS 1"ø AND LARGER

6* –REMOVE AND REPLACE PER CITY OF HOUSTON TREE ORDINANCE*

7 – OBTAIN CITY OF HOUSTON PARKS & RECREATION PERMIT AND REMOVE TREE

NOTE: TREES ARE CALLED OUT ON PLAN & PROFILE SHEETS.

* MITIGATION FOR REPLACED TREES

* FOR THE MITIGATION OF THE TWO TREES TO BE REPLACED, PLANT 7 (SEVEN) 3" CALIPER, CEDAR OR WINGED ELM TREES FOR REPLACEMENT TREES. TREE PLANTING LOCATIONS WILL BE RECOMMENDED BY THE CONTRACTOR'S URBAN FORESTER AND REVIEWED AND APPROVED BY THE CITY URBAN FORESTER AND PWE ENGINEER.

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY
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11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

TREE SPECIES IDENTIFICATION SHEET

WBS N-000383-0001-4

FILE: N:\City of Houston\2006-05_NSR 451\DRAWINGS\A-TREE SPECIES.dwg

DRAWING SCALE
1"=1'-0" FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO.103B OF 131

PUBLIC WORKS AND ENGINEERING
REVIEWED
49097
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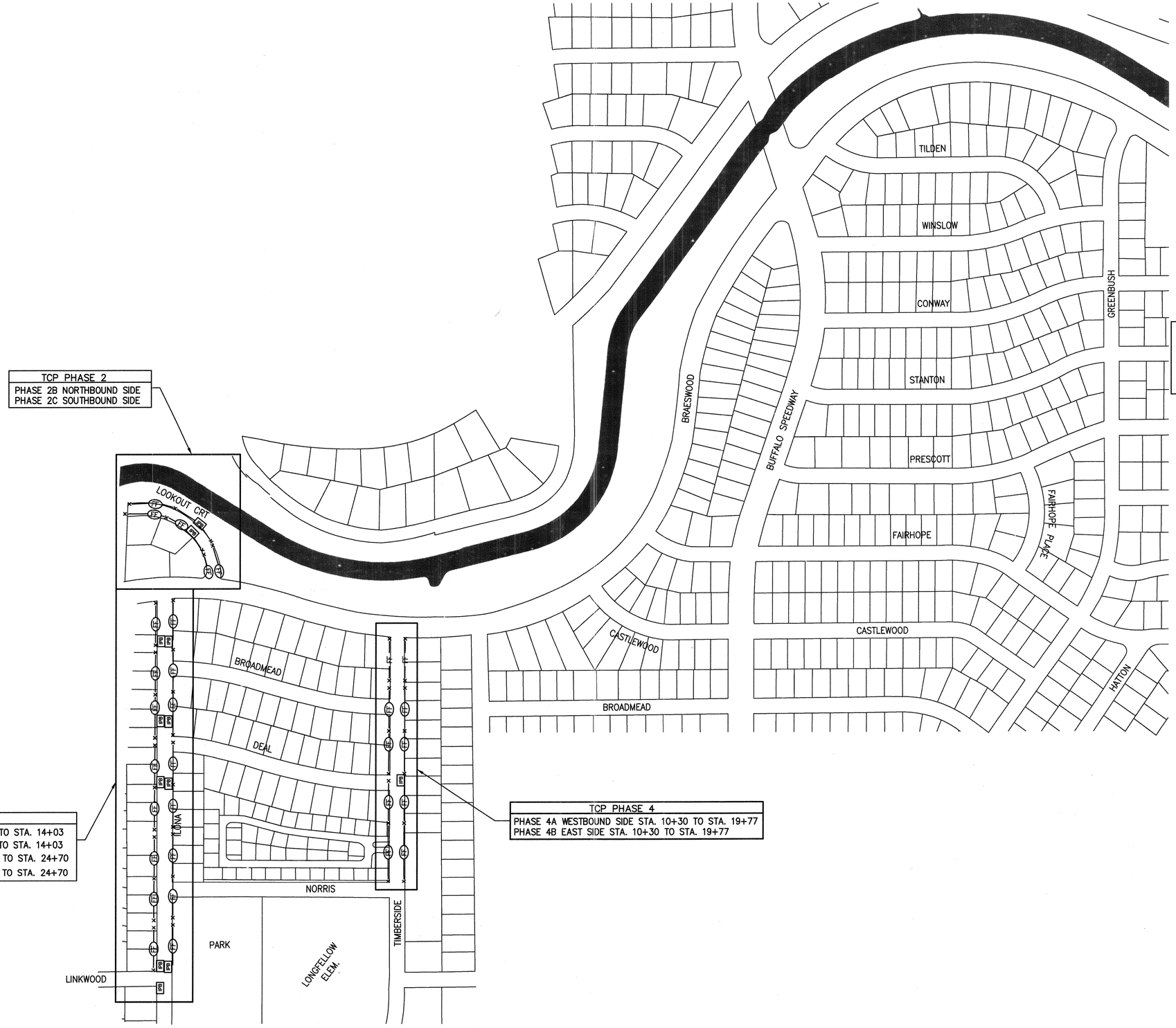
HOUSTON, TEXAS



TCP PHASE 2
PHASE 2B NORTHBOUND SIDE
PHASE 2C SOUTHBOUND SIDE

TCP PHASE 3
PHASE 3A WESTBOUND SIDE STA. 9+46 TO STA. 14+03
PHASE 3B EASTBOUND SIDE STA. 9+46 TO STA. 14+03
PHASE 3C WESTBOUND SIDE STA. 14+03 TO STA. 24+70
PHASE 3D EASTBOUND SIDE STA. 14+03 TO STA. 24+70

TCP PHASE 4
PHASE 4A WESTBOUND SIDE STA. 10+30 TO STA. 19+77
PHASE 4B EAST SIDE STA. 10+30 TO STA. 19+77

LEGEND

IPB — SILT FENCE INLET PROTECTION BARRIER

FF — REINFORCED FILTER FABRIC BARRIER

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM WATER POLLUTION PREVENTION PLAN PHASE 2,3&4

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\swppp MAPS.dwg

DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 104 OF 131

PUBLIC WORKS AND ENGINEERING
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HOUSTON, TEXAS

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N

0 200 400 600 800

LEGEND

IPB — SILT FENCE INLET PROTECTION BARRIER

FF — REINFORCED FILTER FABRIC BARRIER

TCP PHASE 5
PHASE 5A WESTBOUND SIDE STA. 10+38 TO STA. 18+80
PHASE 5B EASTBOUND SIDE STA. 10+38 TO STA. 18+80

TCP PHASE 6
PHASE 6A WESTBOUND SIDE STA. 10+38 TO STA. 18+80
PHASE 6B EASTBOUND SIDE STA. 10+38 TO STA. 18+80

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451
STORM WATER POLLUTION PREVENTION PLAN PHASE 5&6

WBS N-000383-0001-4

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DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

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SHEET NO. 105 OF 131

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PHASE 7A
WESTBOUND SIDE OF CONWAY, AND TILDEN

PHASE 7A
WESTBOUND SIDE OF CASTLEWOOD AND PRESCOTT,

N

0 200 400 600 800

LEGEND

IPB — SILT FENCE INLET PROTECTION BARRIER

FF — REINFORCED FILTER FABRIC BARRIER

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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02/10/12

CITY OF HOUSTON
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NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM WATER POLLUTION PREVENTION PLAN PHASE 7A

WBS N–000383–0001–4

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CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 106 OF 131

PUBLIC WORKS AND ENGINEERING
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LICENSE NUMBER
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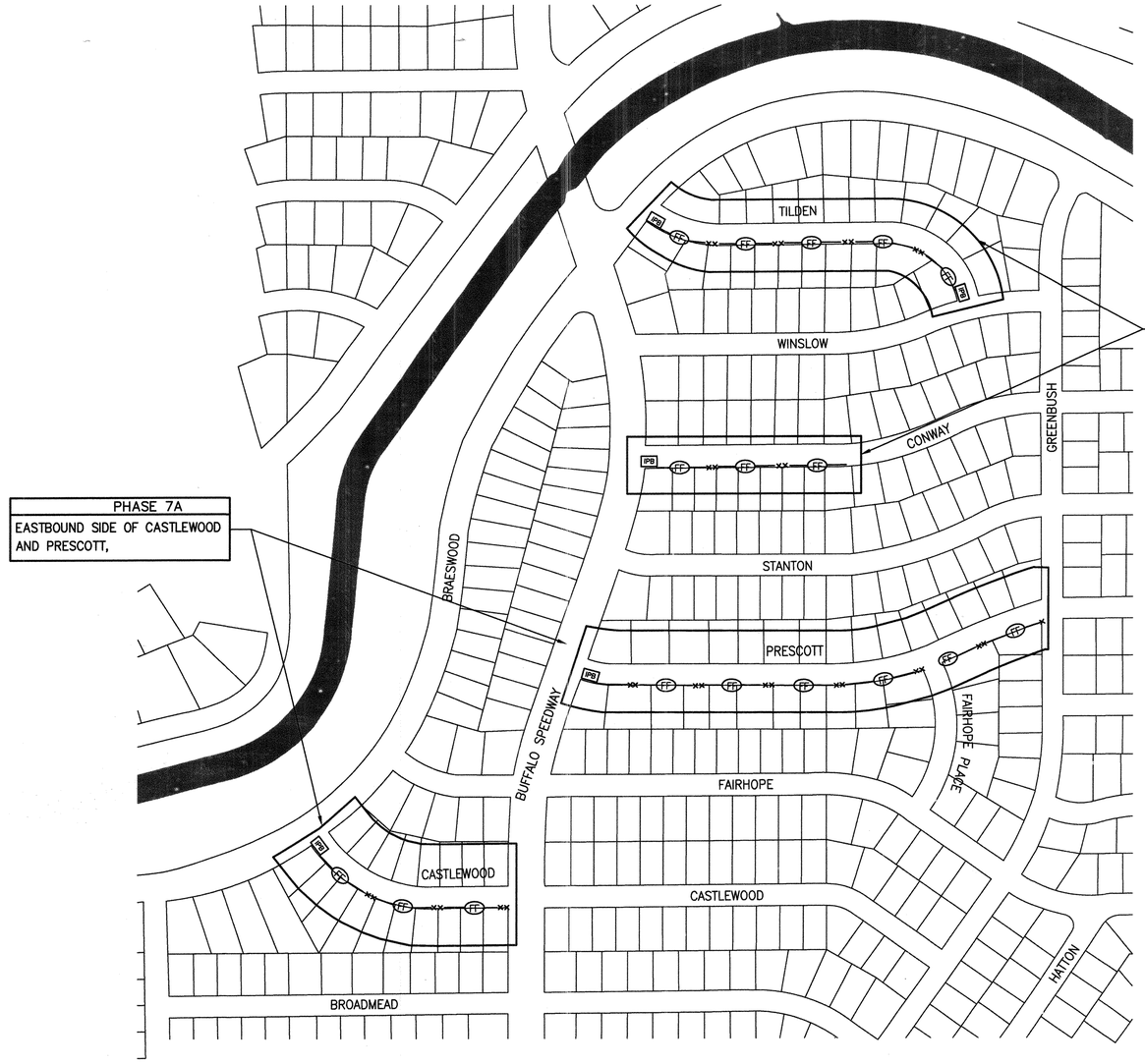
FILE: SWPPP.DWG



PHASE 7A
EASTBOUND SIDE OF CONWAY, AND TILDEN

PHASE 7A
EASTBOUND SIDE OF CASTLEWOOD AND PRESCOTT,

N

0 200 400 600 800

LEGEND

IPB SILT FENCE INLET PROTECTION BARRIER

FF REINFORCED FILTER FABRIC BARRIER

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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HOUSTON TX. 77042
713-965-9996

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STATE OF TEXAS
JESUS M. OLIVAS
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LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM WATER POLLUTION PREVENTION PLAN PHASE 7B

WBS N-000383-0001-4

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1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 107 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
CITY NUMBER
HOUSTON, TEXAS

FILE: SWPPP.DWG



N

0 200 400 600 800

LEGEND

IPB SILT FENCE INLET PROTECTION BARRIER

FF REINFORCED FILTER FABRIC BARRIER

PHASE 8B

WESTBOUND SIDE OF FAIRHOPE ST, STANTON ST, AND WINSLOW ST. SOUTHBOUND SIDE OF FAIRHOPE PLACE

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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HOUSTON TX. 77042
713-965-9996

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STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION NSR 451

STORM WATER POLLUTION PREVENTION PLAN PHASE 8B

WBS N-000383-0001-4

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DRAWING SCALE
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1" = 200' FULL

CITY OF HOUSTON PM

MOH'D K. WARRAD, P.E.

SHEET NO. 108 OF 131

PUBLIC WORKS AND ENGINEERING
49097
REGISTERED
HOUSTON, TEXAS

FILE: SWPPP.DWG



N

0 200 400 600 800

LEGEND

IPB SILT FENCE INLET PROTECTION BARRIER

FF REINFORCED FILTER FABRIC BARRIER

PHASE 8C
EASTBOUND SIDE OF FAIRHOPE ST, STANTON ST, AND WINSLOW ST. NORTHBOUND SIDE OF FAIRHOPE PLACE

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
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11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL
ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM WATER POLLUTION PREVENTION PLAN PHASE 8C

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\swppp MAP5.dwg

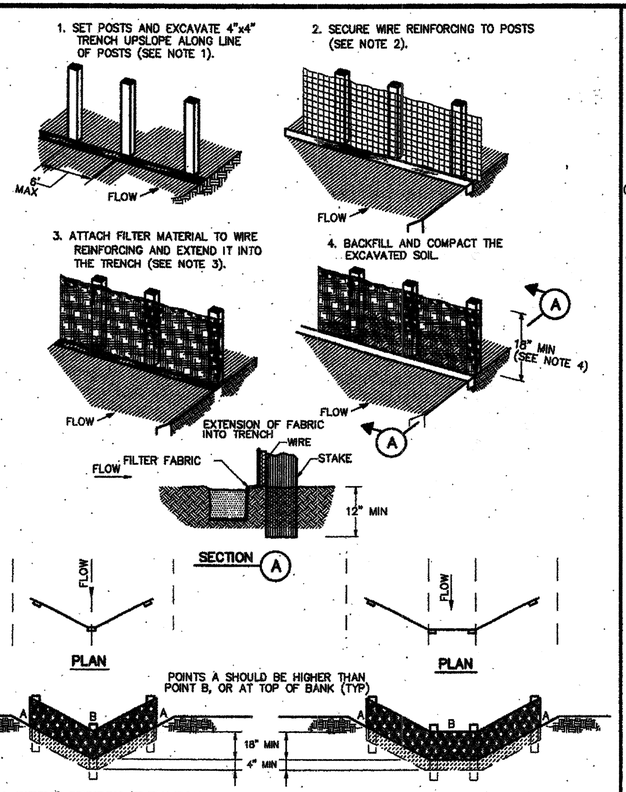
DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 109 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
NUMBER
HOUSTON, TEXAS

FILE: SWPPP.DWG

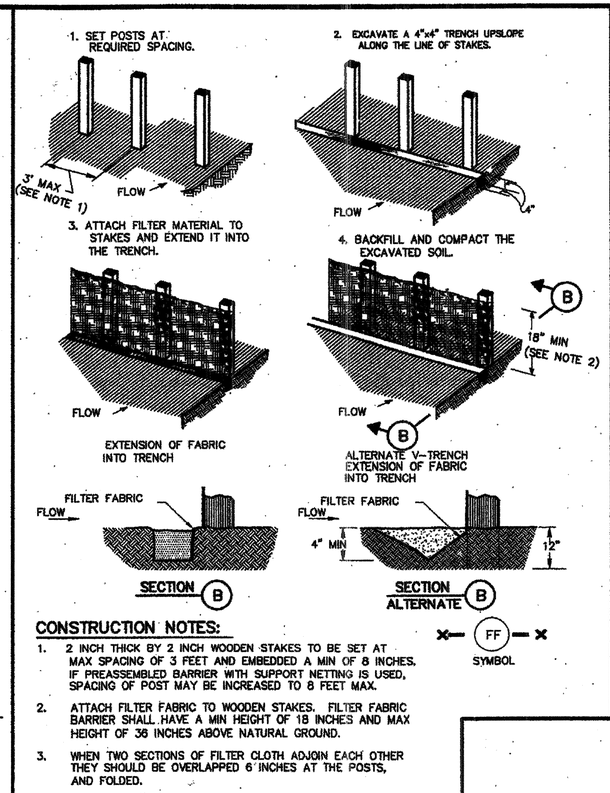


CONSTRUCTION NOTES:

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.

SYMBOL

REINFORCED FILTER FABRIC BARRIER

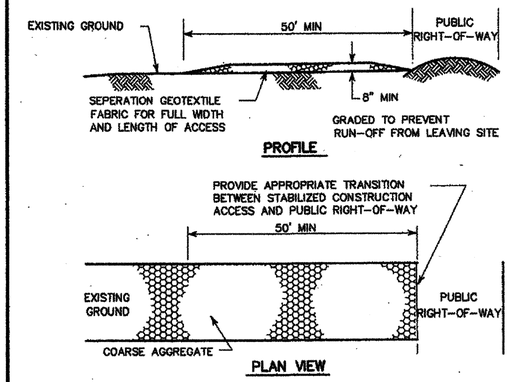


CONSTRUCTION NOTES:

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.

SYMBOL

FILTER FABRIC BARRIER

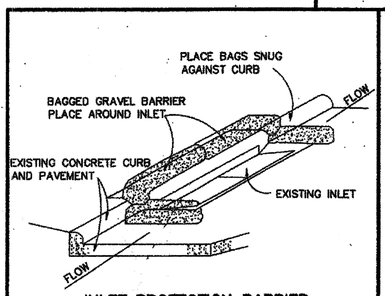


CONSTRUCTION NOTES:

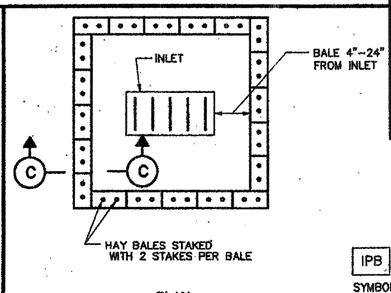
1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS 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

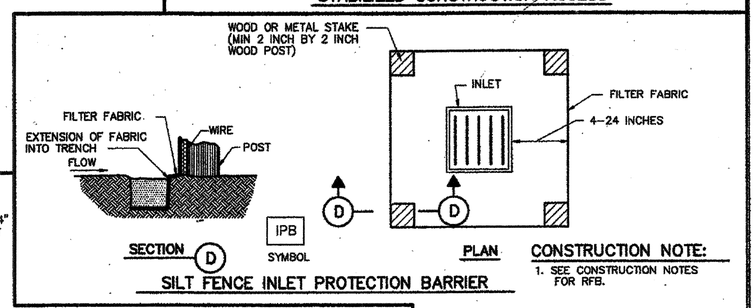
STABILIZED CONSTRUCTION ACCESS



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.

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

FILE: SW3PDET.DWG

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES (APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED) VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES (GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

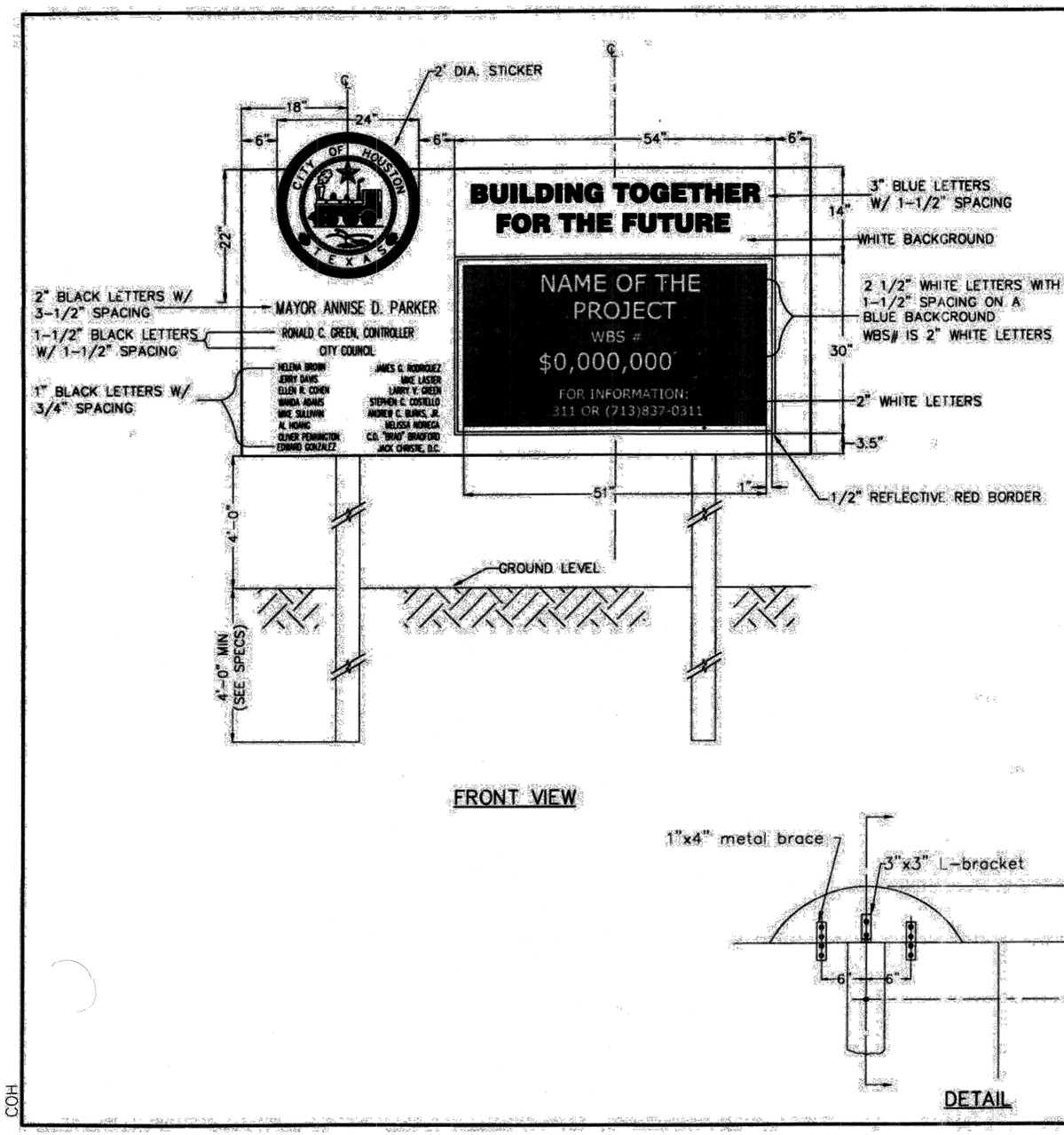
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STORM WATER POLLUTION PREVENTION DETAIL

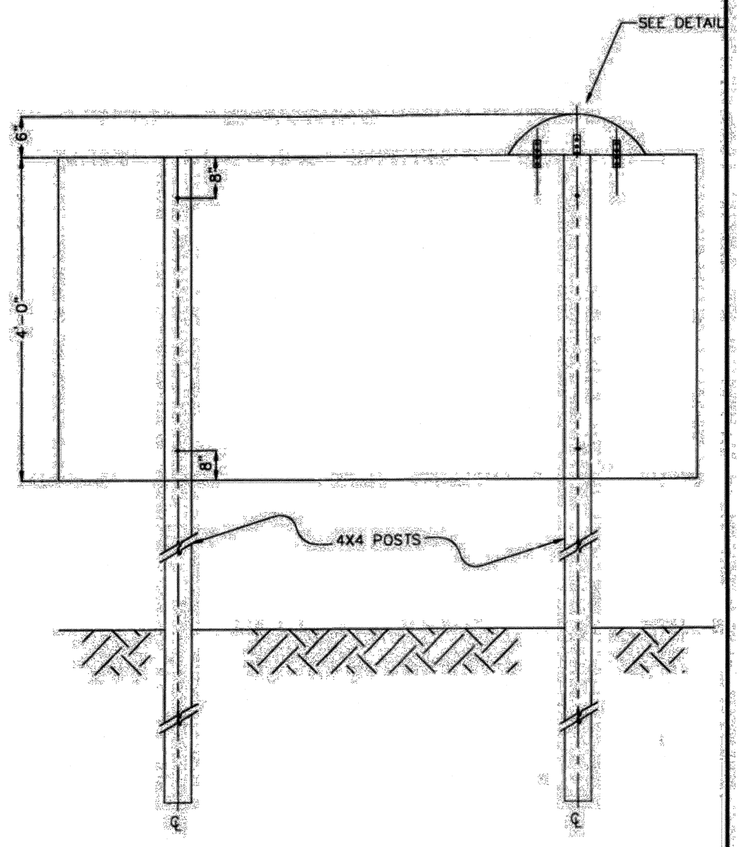
WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\SWPPP DETAILS.dwg
DRAWING SCALE: NTS
CITY OF HOUSTON PM: MOH'D K. WARRAD, P.E.
SHEET NO. 110 OF 131

PUBLIC WORKS AND ENGINEERING
ENGINEER
49097
LICENSED
HOUSTON, TEXAS

No.	Date	Revisions	App.



FRONT VIEW



BACK VIEW

DETAIL

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
CONSTRUCTION SIGN (NOT TO SCALE)	
APPROVED CITY ENGINEER	APPROVED DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JAN-25-2012	DWG NO. 01580-03

COH

FILE: PROJSIGN.DWG

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

PROJECT SIGN AND MISCELLANEOUS DETAILS

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\Drawings\PROJECT SIGN.dwg

DRAWING SCALE
NTS

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 111 OF 131

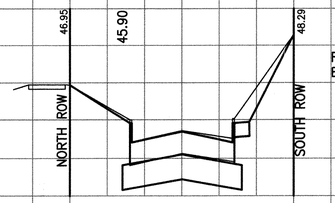
PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

FILL: 0.67 CY
EXCAVATION: 132.0 CY

FMO CALCS:

FILL= 0 SF

CUT= −7.27 SF



FILL: 0 SF
EXCAVATION: 38.8 SF

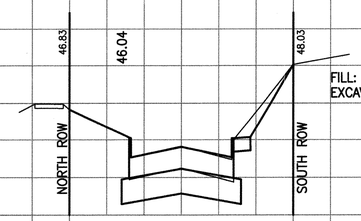
STA. 13+00

FILL: 0.59 CY
EXCAVATION: 126.7 CY

FMO CALCS:

FILL= +0.32 SF

CUT= −4.10 SF



FILL: 0.32 SF
EXCAVATION: 29.6 SF

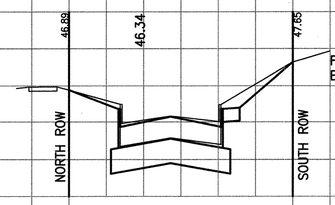
STA. 12+00

FILL: 0.59 CY
EXCAVATION: 110.2 CY

FMO CALCS:

FILL= 0 SF

CUT= −7.28 SF



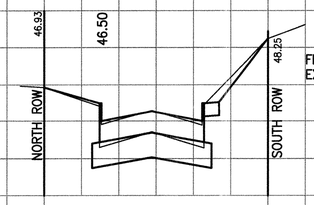
FILL: 0 SF
EXCAVATION: 29.9 SF

STA. 11+00

FMO CALCS:

FILL= +1.13 SF

CUT= −3.51



FILL: 1.13 SF
EXCAVATION: 24.5 SF

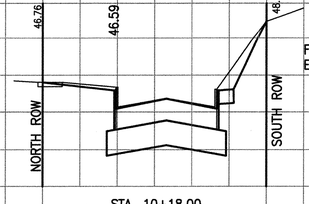
STA. 14+38.00

FILL: 0 CY
EXCAVATION: 77.3 CY

FMO CALCS:

FILL= 0

CUT= −6.80 SF



FILL: 0 SF
EXCAVATION: 21.0 SF

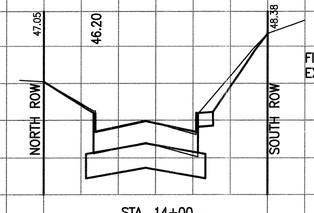
STA. 10+18.00

FILL: 1.05 CY
EXCAVATION: 68.1 CY

FMO CALCS:

FILL= +0.36 SF

CUT= −4.61



FILL: 0.36 SF
EXCAVATION: 32.5 SF

STA. 14+00

SHEET TOTAL
FILL: 2.90 CY
EXCAVATION: 514.3 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-look.dwg

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS LOOKOUT COURT
STA. 10+00 TO STA. 14+75

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-look.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

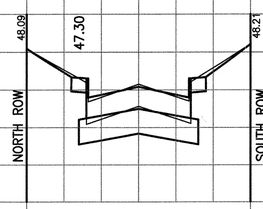
SHEET NO.112 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.

FILL: 3.93 CY
EXCAVATION: 63.9 CY

FMO CALCS:
FILL= +0.87 SF
CUT= −1.81 SF

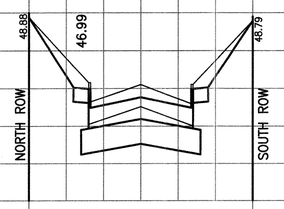


STA. 13+00

FILL: 0.87 SF
EXCAVATION: 13.4 SF

FILL: 0 CY
EXCAVATION: 127.6 CY

FMO CALCS:
FILL= 0
CUT= −15.37 SF

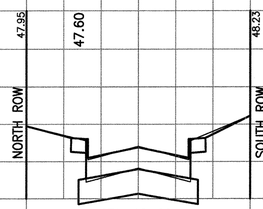


STA. 17+00

FILL: 0 SF
EXCAVATION: 35.9 SF

FILL: 2.35 CY
EXCAVATION: 43.7 CY

FMO CALCS:
FILL= +0.40 SF
CUT= −0.84 SF

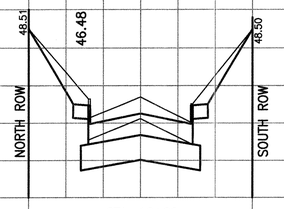


STA. 12+00

FILL: 0.40 SF
EXCAVATION: 10.2 SF

FILL: 0 CY
EXCAVATION: 135.2 CY

FMO CALCS:
FILL= 0 SF
CUT= −16.70 SF

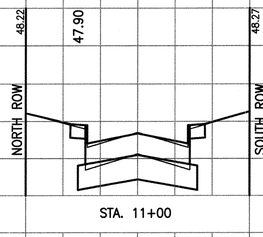


STA. 16+00

FILL: 0 SF
EXCAVATION: 37.1 SF

FILL: 2.83 CY
EXCAVATION: 40.7 CY

FMO CALCS:
FILL= +1.13 SF
CUT= −.30 SF

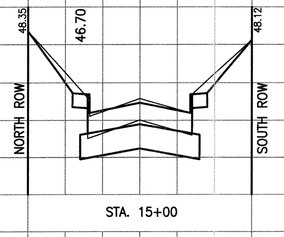


STA. 11+00

FILL: 1.13 SF
EXCAVATION: 11.8 SF

FILL: 0.50 CY
EXCAVATION: 123.9 CY

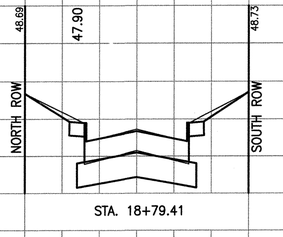
FMO CALCS:
FILL= +0.27 SF
CUT= −6.17 SF



STA. 15+00

FILL: 0.27 SF
EXCAVATION: 29.8 SF

FMO CALCS:
FILL= 0 SF
CUT= −3.18 SF

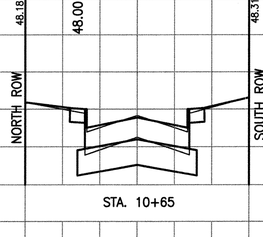


STA. 18+79.41

FILL: 0 SF
EXCAVATION: 28.7 SF

FILL: 1.38 CY
EXCAVATION: 18.0 CY

FMO CALCS:
FILL= +1.00 SF
CUT= −.61 SF

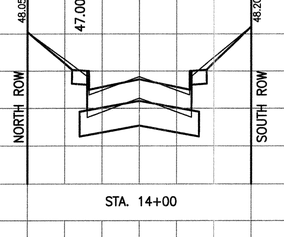


STA. 10+65

FILL: 1.00 SF
EXCAVATION: 16.0 SF

FILL: 2.81 CY
EXCAVATION: 94.3 CY

FMO CALCS:
FILL= +1.25 SF
CUT= −2.39 SF

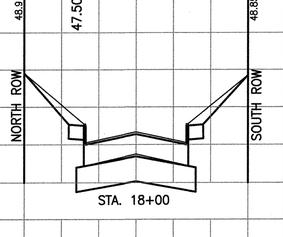


STA. 14+00

FILL: 1.25 SF
EXCAVATION: 21.1 SF

FILL: 0 CY
EXCAVATION: 90.7 CY

FMO CALCS:
FILL= 0 SF
CUT= −7.33 SF



STA. 18+00

FILL: 0 SF
EXCAVATION: 33.0 SF

SHEET TOTAL
FILL: 13.81 CY
EXCAVATION: 738.0 CY

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

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SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
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713–965–9996

SURVEYED BY: LANDTECH
FB NO. P–5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS BROADMEAD
STA. 10+00 TO STA. 19+00

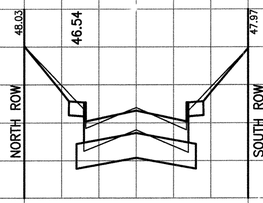
WBS N-000383-0001-4
FILE: P:\City of Houston\2008-05_NSR 451\DRAWINGS\XSEC-broadmead.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO.113 OF 131

PUBLIC WORKS AND ENGINEERING
CITY OF HOUSTON
49097
LICENSE NUMBER
HOUSTON, TEXAS

FILE: XSEC-broadmead.dwg

FILL: 7.22 CY
EXCAVATION: 102.4 CY

48 FMO CALCS:
FILL= +1.93 SF
46 CUT= −2.90 SF
44



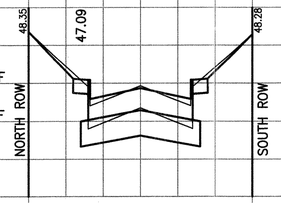
FILL: 1.93 SF
EXCAVATION: 26.1 SF

48 48
46 46
44 44

STA. 13+00

FILL: 8.48 CY
EXCAVATION: 26.5 CY

FMO CALCS:
FILL= +1.81 SF
CUT= −2.17 SF



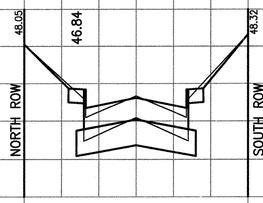
FILL: 1.81 SF
EXCAVATION: 8.2 SF

48
46
44

STA. 17+00

FILL: 8.78 CY
EXCAVATION: 85.6 CY

48 FMO CALCS:
FILL= +2.81 SF
46 CUT= −1.77 SF
44



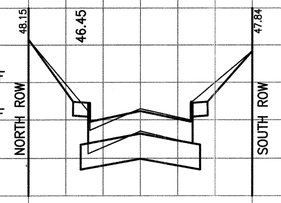
FILL: 2.81 SF
EXCAVATION: 20.1 SF

48 48
46 46
44 44

STA. 12+00

FILL: 5.50 CY
EXCAVATION: 45.2 CY

FMO CALCS:
FILL= +1.16 SF
CUT= −5.26 SF



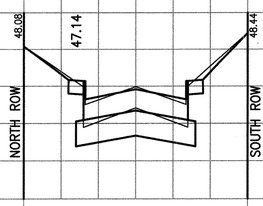
FILL: 1.16 SF
EXCAVATION: 16.2 SF

48
46
44

STA. 16+00

FILL: 7.54 CY
EXCAVATION: 67.4 CY

48 FMO CALCS:
FILL= +1.26 SF
46 CUT= −2.25 SF
44



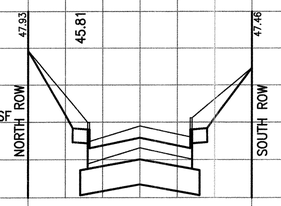
FILL: 1.26 SF
EXCAVATION: 16.3 SF

48 48
46 46
44 44

STA. 11+00

FILL: 2.15 CY
EXCAVATION: 79.8 CY

FMO CALCS:
FILL= 0 SF
CUT= −18.36 SF

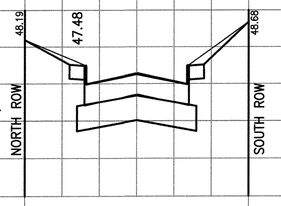


FILL: 0 SF
EXCAVATION: 26.9 SF

48 48
46 46
44 44

STA. 15+00

FMO CALCS:
FILL= 0 SF
CUT= −4.43 SF



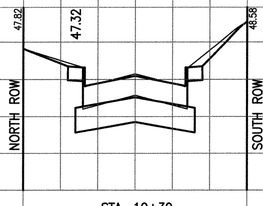
FILL: 0 SF
EXCAVATION: 21.3 SF

48
46
44

18+76.00

FILL: 2.3 CY
EXCAVATION: 34.1 CY

48 FMO CALCS:
FILL= 0 SF
46 CUT= −3.38 SF
44



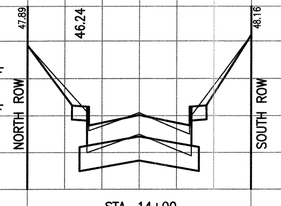
FILL: 0 SF
EXCAVATION: 13.9 SF

48 48
46 46
44 44

STA. 10+39

FILL: 3.65 CY
EXCAVATION: 103.9 CY

FMO CALCS:
FILL= +1.97 SF
CUT= −4.15 SF



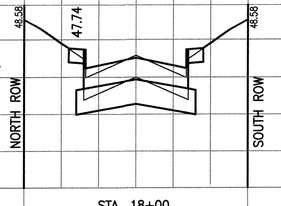
FILL: 1.97 SF
EXCAVATION: 29.2 SF

48 48
46 46
44 44

STA. 14+00

FILL: 5.13 CY
EXCAVATION: 40.6 CY

FMO CALCS:
FILL= +2.77 SF
CUT= −.31 SF



FILL: 2.77 SF
EXCAVATION: 6.1 SF

48
46
44

STA. 18+00

SHEET TOTAL
FILL: 50.75 CY
EXCAVATION: 585.5 CY

FILE: XSEC−deal.dwg

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

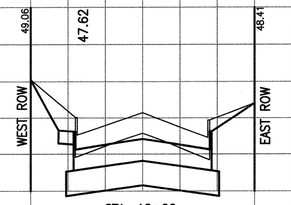
CROSS SECTIONS
DEAL
STA. 10+00 TO STA. 19+00

WBS N−000383−0001−4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC−deal.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 114 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
NUMBER
HOUSTON, TEXAS

FILL: 0 CY
EXCAVATION: 149.6 CY

FMO CALCS:
FILL= 0 SF
CUT= -26.47 SF

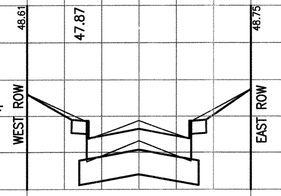


FILL: 0 SF
EXCAVATION: 42.0 SF

STA. 12+00

FILL: 0 CY
EXCAVATION: 100.2 CY

FMO CALCS:
FILL= 0 SF
CUT= -5.48 SF

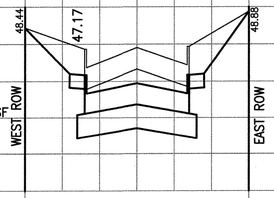


FILL: 0 SF
EXCAVATION: 24.3 SF

STA. 16+00

FILL: 0.0 CY
EXCAVATION: 216.7 CY

FMO CALCS:
FILL= 0 SF
CUT= -34.03 SF

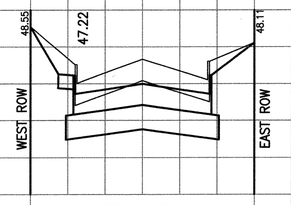


FILL: 0.0 SF
EXCAVATION: 61.3 SF

STA. 20+00

FILL: 0 CY
EXCAVATION: 152.0 CY

FMO CALCS:
FILL= 0 SF
CUT= -25.21 SF

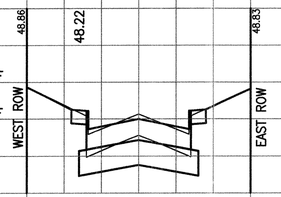


FILL: 0 SF
EXCAVATION: 40.1 SF

STA. 11+00

FILL: 1.80 CY
EXCAVATION: 77.4 CY

FMO CALCS:
FILL= +0.97 SF
CUT= -1.14 SF

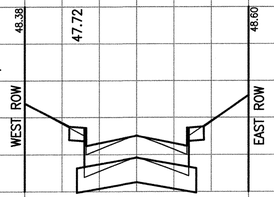


FILL: 0.97 SF
EXCAVATION: 17.5 SF

STA. 15+00

FILL: 5.00 CY
EXCAVATION: 181.8 CY

FMO CALCS:
FILL= +2.70 SF
CUT= -.36 SF

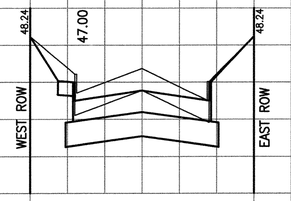


FILL: 2.70 SF
EXCAVATION: 15.2 SF

STA. 18+71.66

FILL: 0 CY
EXCAVATION: 80.1 CY

FMO CALCS:
FILL= 0 SF
CUT= -16.83 SF

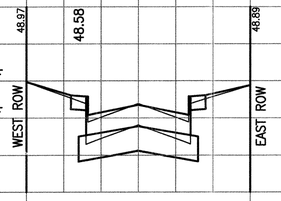


FILL: 0 SF
EXCAVATION: 32.0 SF

STA. 10+40

FILL: 5.87 CY
EXCAVATION: 59.8 CY

FMO CALCS:
FILL= +2.20 SF
CUT= -1.10 SF

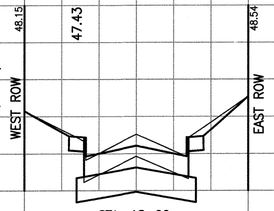


FILL: 2.20 SF
EXCAVATION: 14.8 SF

STA. 14+00

FILL: 5.31 CY
EXCAVATION: 52.8 CY

FMO CALCS:
FILL= +0.17 SF
CUT= -5.93 SF

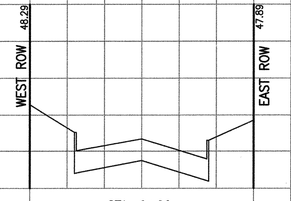


FILL: 0.17 SF
EXCAVATION: 24.6 SF

STA. 18+00

FILL: 0 CY
EXCAVATION: 83.0 CY

FMO CALCS:
FILL= 0 SF
CUT= -.61 SF

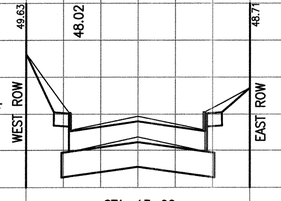


FILL: 0.0 SF
EXCAVATION: 0.0 SF

STA. 9+00

FILL: 4.07 CY
EXCAVATION: 99.3 CY

FMO CALCS:
FILL= 0 SF
CUT= -8.13 SF

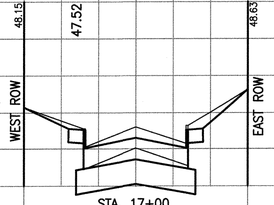


FILL: 0 SF
EXCAVATION: 38.8 SF

STA. 13+00

FILL: 0.31 CY
EXCAVATION: 100.7 CY

FMO CALCS:
FILL= 0 SF
CUT= -9.30 SF



FILL: 0 SF
EXCAVATION: 29.8 SF

STA. 17+00

SHEET TOTAL
FILL: 22.36 CY
EXCAVATION: 1353.4 CY

FILE: XSEC-ILO1.dwg

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
ILONA
STA. 9+00 TO STA. 20+00

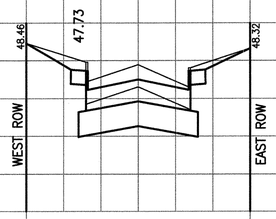
WBS N-000383-0001-4
FILE: A:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-ILO1.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO.115 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

No.	Date	Revisions	App.

FILL: 0.61 CY
EXCAVATION: 92.3 CY

FMO CALCS:
FILL= 0 SF
CUT= -11.80 SF

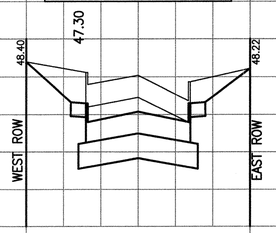


FILL: 0.0 SF
EXCAVATION: 45.3 SF

STA. 24+00

FILL: 0.0 CY
EXCAVATION: 207.6 CY

FMO CALCS:
FILL= 0 SF
CUT= -31.12 SF

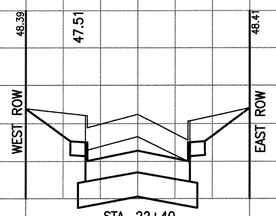


FILL: 0.0 SF
EXCAVATION: 66.8 SF

STA. 23+00

FILL: 0.0 CY
EXCAVATION: 135.2 CY

FMO CALCS:
FILL= 0 SF
CUT= -29.63 SF

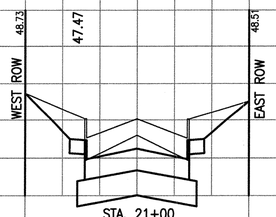


FILL: 0.0 SF
EXCAVATION: 54.9 SF

STA. 22+40

FILL: 0.0 CY
EXCAVATION: 286.7 CY

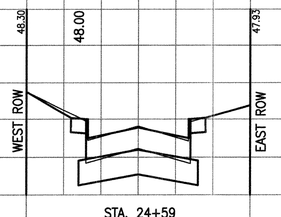
FMO CALCS:
FILL= 0 SF
CUT= -27.14 SF



FILL: 0.0 SF
EXCAVATION: 55.7 SF

STA. 21+00

FMO CALCS:
FILL= +0.56 SF
CUT= -1.10 SF



FILL: 0.56 SF
EXCAVATION: 25.9 SF

STA. 24+59

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SHEET TOTAL
FILL: 0.61 CY
EXCAVATION: 721.8 CY

FILE: XSEC-IL02.dwg

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/17

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

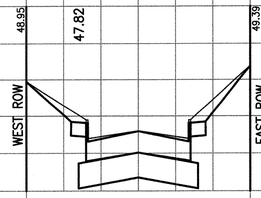
CROSS SECTIONS
ILONA
STA. 21+00 TO STA. 25+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-IL02.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 116 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CERTIFICATE NUMBER
HOUSTON, TEXAS

FILL: 0.52 CY
EXCAVATION: 73.0 CY

FMO CALCS:
FILL= 0 SF
CUT= −7.43 SF

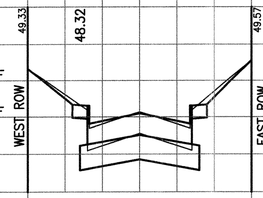


STA. 12+00

FILL: 0 SF
EXCAVATION: 21.9 SF

FILL: 3.80 CY
EXCAVATION: 129.1 CY

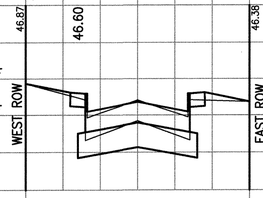
FMO CALCS:
FILL= +1.18 SF
CUT= −2.50 SF



STA. 16+00

FILL: 1.18 SF
EXCAVATION: 28.4 SF

FMO CALCS:
FILL= +3.52 SF
CUT= −0.14 SF

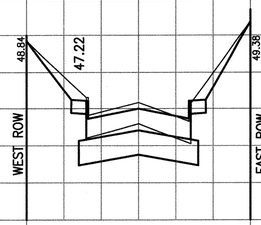


STA. 19+65

FILL: 3.52 SF
EXCAVATION: 0.0 SF

FILL: 0.26 CY
EXCAVATION: 96.3 CY

FMO CALCS:
FILL= +0.14 SF
CUT= −9.86 SF

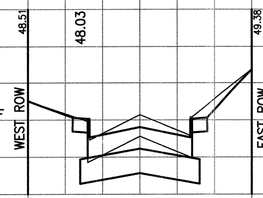


STA. 11+00

FILL: 0.14 SF
EXCAVATION: 30.1 SF

FILL: 2.19 CY
EXCAVATION: 104.3 CY

FMO CALCS:
FILL= 0 SF
CUT= −7.55 SF

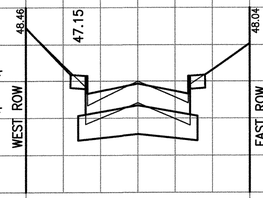


STA. 15+00

FILL: 0 SF
EXCAVATION: 27.9 SF

FILL: 12.07 CY
EXCAVATION: 34.5 CY

FMO CALCS:
FILL= +3.00 SF
CUT= −0.67 SF

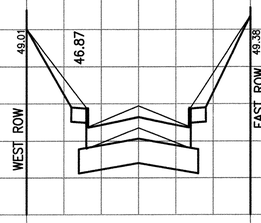


STA. 19+00

FILL: 3.00 SF
EXCAVATION: 23.3 SF

FILL: 0.26 CY
EXCAVATION: 71.2 CY

FMO CALCS:
FILL= 0 SF
CUT= −13.51 SF

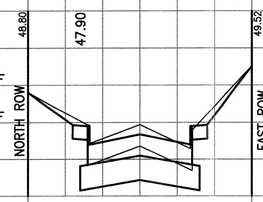


STA. 10+40

FILL: 0 SF
EXCAVATION: 34.0 SF

FILL: 0.41 CY
EXCAVATION: 122.7 CY

FMO CALCS:
FILL= +0.22 SF
CUT= −7.21 SF

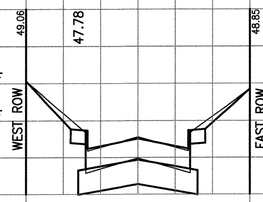


STA. 13+80

FILL: 0.22 SF
EXCAVATION: 27.3 SF

FILL: 7.65 CY
EXCAVATION: 85.2 CY

FMO CALCS:
FILL= +1.13 SF
CUT= −0.47 SF

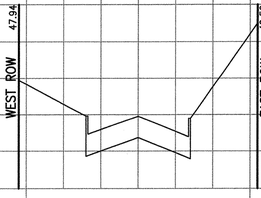


STA. 18+00

FILL: 1.13 SF
EXCAVATION: 22.7 SF

FILL: 0 CY
EXCAVATION: 88.1 CY

FMO CALCS:
FILL= 0 SF
CUT= 0 SF

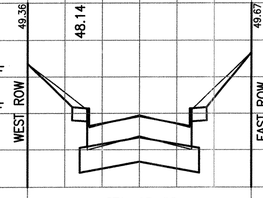


STA. 9+00

FILL: 0 SF
EXCAVATION: 0.0 SF

FILL: 0.93 CY
EXCAVATION: 66.4 CY

FMO CALCS:
FILL= +0.28 SF
CUT= −4.65 SF

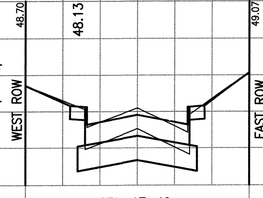


STA. 13+00

FILL: 0.28 SF
EXCAVATION: 17.5 SF

FILL: 3.70 CY
EXCAVATION: 49.0 CY

FMO CALCS:
FILL= +0.87 SF
CUT= −2.29 SF



STA. 17+40

FILL: 0.87 SF
EXCAVATION: 21.4 SF

SHEET TOTAL
FILL: 31.79 CY
EXCAVATION: 919.8 CY

FILE: XSEC-TMB1.DWG

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS TIMBER SIDE

STA. 9+00 TO STA. 20+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-TMB1.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 117 OF 131

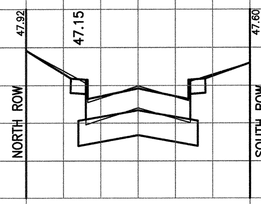
PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

FILL: 4.81 CY
EXCAVATION: 59.8 CY

FMO CALCS:

FILL= +0.50 SF

CUT= −1.42 SF



STA. 13+00

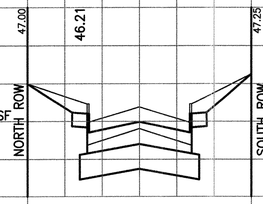
FILL: 0.50 SF
EXCAVATION: 18.6 SF

FILL: 0 CY
EXCAVATION: 93.1 CY

FMO CALCS:

FILL= 0 SF

CUT= −16.35 SF



STA. 17+00

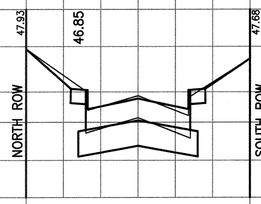
FILL: 0 SF
EXCAVATION: 19.4 SF

FILL: 2.52 CY
EXCAVATION: 80.6 CY

FMO CALCS:

FILL= +0.86 SF

CUT= −2.51 SF



STA. 12+00

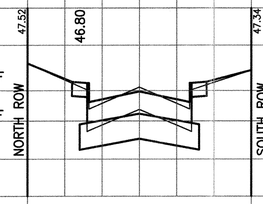
FILL: 0.86 SF
EXCAVATION: 24.9 SF

FILL: 1.09 CY
EXCAVATION: 59.3 CY

FMO CALCS:

FILL= +2.18 SF

CUT= −0.58 SF



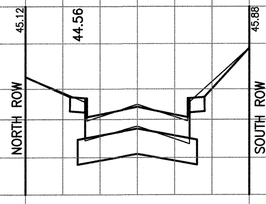
STA. 16+00

FILL: 2.18 SF
EXCAVATION: 12.6 SF

FMO CALCS:

FILL= +0.83 SF

CUT= −2.22 SF



STA. 19+80

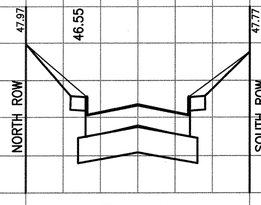
FILL: 0.83 SF
EXCAVATION: 41.2 SF

FILL: 1.59 CY
EXCAVATION: 123.5 CY

FMO CALCS:

FILL= 0 SF

CUT= −6.34 SF



STA. 11+00

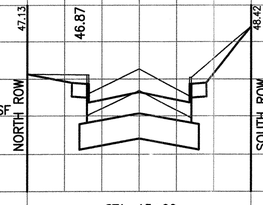
FILL: 0 SF
EXCAVATION: 41.8 SF

FILL: 1.09 CY
EXCAVATION: 96.9 CY

FMO CALCS:

FILL= 0 SF

CUT= −17.60 SF



STA. 15+00

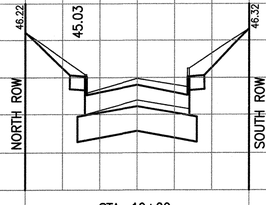
FILL: 0.0 SF
EXCAVATION: 39.7 SF

FILL: 1.23 CY
EXCAVATION: 124.0 CY

FMO CALCS:

FILL= 0 SF

CUT= −10.80 SF



STA. 19+00

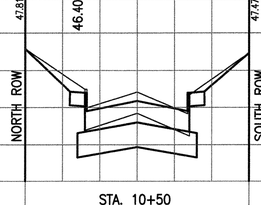
FILL: 0.0 SF
EXCAVATION: 42.5 SF

FILL: 0.20 CY
EXCAVATION: 64.7 CY

FMO CALCS:

FILL= +0.11 SF

CUT= −7.80 SF



STA. 10+50

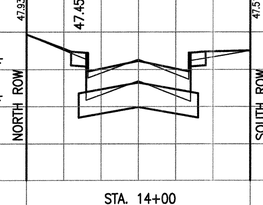
FILL: 0.11 SF
EXCAVATION: 28.1 SF

FILL: 3.89 CY
EXCAVATION: 98.9CY

FMO CALCS:

FILL= +2.10 SF

CUT= −1.40 SF



STA. 14+00

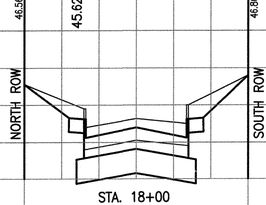
FILL: 2.10 SF
EXCAVATION: 13.7 SF

FILL: 0.0 CY
EXCAVATION: 135.9 CY

FMO CALCS:

FILL= 0.0 SF

CUT= −16.68 SF



STA. 18+00

FILL: 0.0 SF
EXCAVATION: 30.9 SF

SHEET TOTAL
FILL: 16.42 CY
EXCAVATION: 936.7 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-tilden.dwg

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
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APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
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N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

SURVEYED BY: LANDTECH
FB NO. P–5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
TILDEN
STA. 10+50 TO STA. 19+80

WBS N–000383–0001–4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-tilden.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

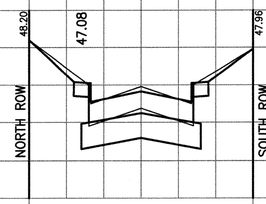
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO.118 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
CITY NUMBER
HOUSTON, TEXAS

FILL: 7.20 CY
EXCAVATION: 67.6 CY

FMO CALCS:
FILL= 0 SF
CUT= -4.18 SF

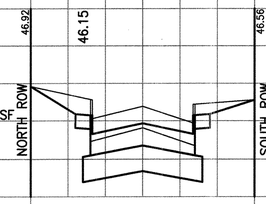


FILL: 0 SF
EXCAVATION: 19.8 SF

STA. 13+00

FILL: 0.0 CY
EXCAVATION: 153.8 CY

FMO CALCS:
FILL= 0 SF
CUT= -18.60 SF

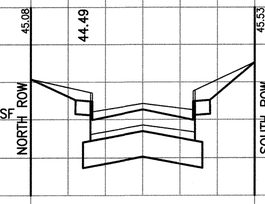


FILL: 0.0 SF
EXCAVATION: 39.3 SF

STA. 17+00

FILL: 0 CY
EXCAVATION: 52.2 CY

FMO CALCS:
FILL= 0 SF
CUT= -12.47 SF

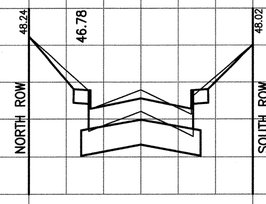


FILL: 0.0 SF
EXCAVATION: 33.0 SF

STA. 21+00

FILL: 0.78 CY
EXCAVATION: 87.6 CY

FMO CALCS:
FILL= +0.42 SF
CUT= -6.24 SF

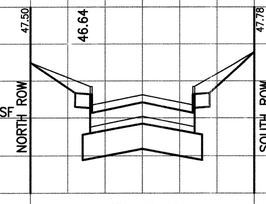


FILL: 0.42 SF
EXCAVATION: 27.5 SF

STA. 12+00

FILL: 0.0 CY
EXCAVATION: 153.3 CY

FMO CALCS:
FILL= 0 SF
CUT= -12.50 SF

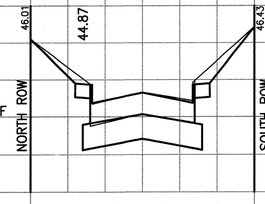


FILL: 0.0 SF
EXCAVATION: 43.5 SF

STA. 16+00

FILL: 0 CY
EXCAVATION: 89.8 CY

FMO CALCS:
FILL= 0 SF
CUT= -4.22 SF

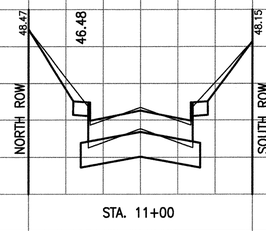


FILL: 0 SF
EXCAVATION: 20.9 SF

STA. 20+10

FILL: 2.53 CY
EXCAVATION: 114.8 CY

FMO CALCS:
FILL= +0.95 SF
CUT= -5.52 SF

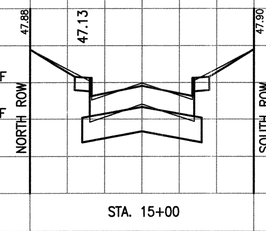


FILL: 0.95 SF
EXCAVATION: 34.5 SF

STA. 11+00

FILL: 1.50 CY
EXCAVATION: 137.0 CY

FMO CALCS:
FILL= +0.81 SF
CUT= -1.92 SF

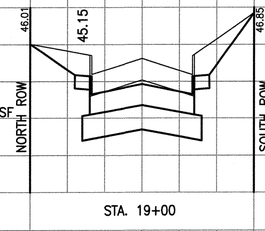


FILL: 0.81 SF
EXCAVATION: 30.5 SF

STA. 15+00

FILL: 0 CY
EXCAVATION: 147.1 CY

FMO CALCS:
FILL= 0 SF
CUT= -29.87 SF

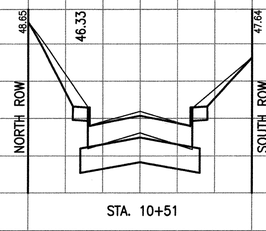


FILL: 0.0 SF
EXCAVATION: 51.3 SF

STA. 19+00

FILL: 0.86 CY
EXCAVATION: 57.3 CY

FMO CALCS:
FILL= 0 SF
CUT= -8.43 SF

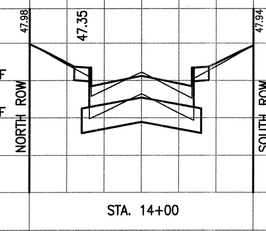


FILL: 0
EXCAVATION: 28.7 SF

STA. 10+51

FILL: 8.70 CY
EXCAVATION: 87.4 CY

FMO CALCS:
FILL= +3.89 SF
CUT= -0.36 SF

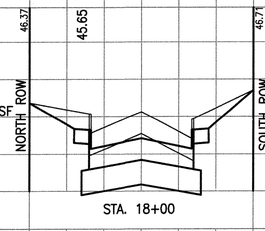


FILL: 3.89 SF
EXCAVATION: 16.7 SF

STA. 14+00

FILL: 0.0 CY
EXCAVATION: 176.1 CY

FMO CALCS:
FILL= 0 SF
CUT= -22.42 SF



FILL: 0.0 SF
EXCAVATION: 43.8 SF

STA. 18+00

SHEET TOTAL
FILL: 21.57 CY
EXCAVATION: 1324.0 CY

FILE: XSEC-winslow.dwg

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

Revisions

No.	Date	Appr.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
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SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
WINSLOW
STA. 10+51 TO STA. 21+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-winslow.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 119 OF 131

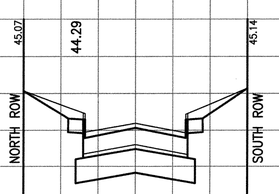
PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

48
46
44
48
46
44
48
46
44
46
44
42

FMO CALCS:

FILL= 0 SF

CUT= -9.33 SF



STA. 21+45

FILL: 0.8 SF
EXCAVATION: 29.6 SF

46
44
42

60 40 20 0 20 40 60

SHEET TOTAL
FILL:
EXCAVATION:

60

FILE: XSEC-winslow2.dwg

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
WINSLOW
STA. 21+45

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-winslow2.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 120 OF 131

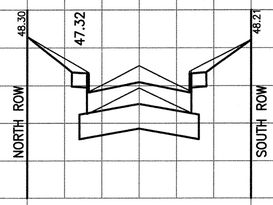
PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSED
HOUSTON, TEXAS

FILL: 0.96 CY
EXCAVATION: 117.8 CY

FMO CALCS:

FILL= 0 SF

CUT= −10.48 SF



STA. 13+00

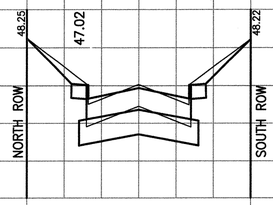
FILL: 0 SF
EXCAVATION: 35.7 SF

FILL: 2.50 CY
EXCAVATION: 138.1 CY

FMO CALCS:

FILL= +1.35 SF

CUT= −5.38 SF



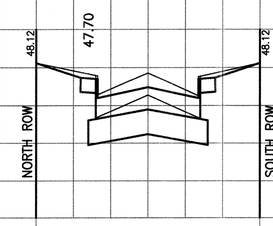
STA. 12+00

FILL: 1.35 SF
EXCAVATION: 38.9 SF

FMO CALCS:

FILL= 0 SF

CUT= −8.30 SF



STA. 15+69

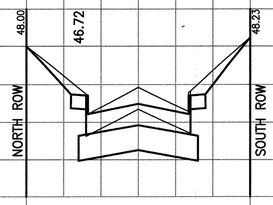
FILL: 0 SF
EXCAVATION: 0.0 SF

FILL: 2.50 CY
EXCAVATION: 142.4 CY

FMO CALCS:

FILL= 0 SF

CUT= −12.69 SF



STA. 11+00

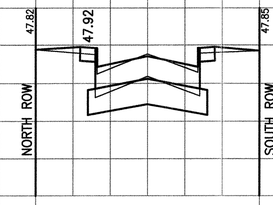
FILL: 0 SF
EXCAVATION: 38.0 SF

FILL: 4.51 CY
EXCAVATION: 33.7 CY

FMO CALCS:

FILL= +3.53 SF

CUT= −1.67 SF



STA. 15+00

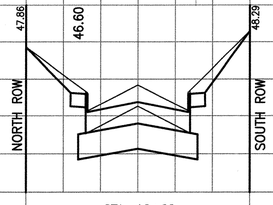
FILL: 3.53 SF
EXCAVATION: 18.2 SF

FILL: 0 CY
EXCAVATION: 56.8 CY

FMO CALCS:

FILL= 0 SF

CUT= −13.45 SF



STA. 10+60

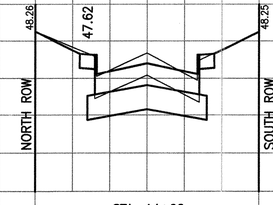
FILL: 0 SF
EXCAVATION: 38.7 SF

FILL: 7.50 CY
EXCAVATION: 85.4 CY

FMO CALCS:

FILL= +0.52 SF

CUT= −3.51 SF



STA. 14+00

FILL: 0.52 SF
EXCAVATION: 27.9 SF

SHEET TOTAL
FILL: 17.97 CY
EXCAVATION: 574.20 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC−conway.dwg

No.	Date	Revisions	App.

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F−596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS−BARLOW−BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713−965−9996

SURVEYED BY: LANDTECH
FB NO. P−5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS CONWAY

STA. 10+60 TO STA. 16+00

WBS N−000383−0001−4

FILE: P:\City of Houston\2008−05_NSR 451\DRAWINGS\XSEC−conway.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

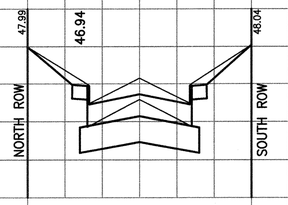
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 121 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
HOUSTON, TEXAS

FILL: 0 CY
EXCAVATION: 173.0 CY

FMO CALCS:
FILL= 0 SF
CUT= −10.96 SF

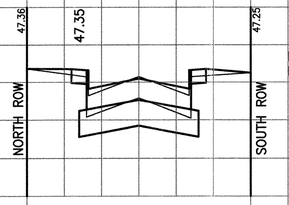


FILL: 0.0 SF
EXCAVATION: 56.3 SF

STA. 13+00

FILL: 10.13 CY
EXCAVATION: 60.6 CY

FMO CALCS:
FILL= +5.47 SF
CUT= −0.16 SF

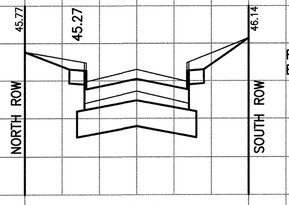


FILL: 5.47 SF
EXCAVATION: 18.5 SF

STA. 17+00

FILL: 4.65 CY
EXCAVATION: 57.8 CY

FMO CALCS:
FILL= 0 SF
CUT= −12.23 SF

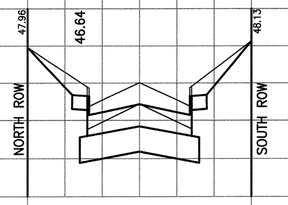


FILL: 0 SF
EXCAVATION: 31.2 SF

STA. 21+00

FILL: 0.0 CY
EXCAVATION: 175.0 CY

FMO CALCS:
FILL= 0 SF
CUT= −20.59 SF

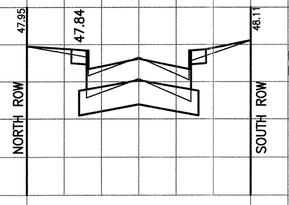


FILL: 0.0 SF
EXCAVATION: 38.2 SF

STA. 12+00

FILL: 21.78 CY
EXCAVATION: 65.0 CY

FMO CALCS:
FILL= +6.29 SF
CUT= −0.09 SF

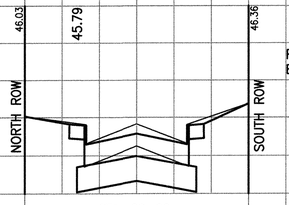


FILL: 6.29 SF
EXCAVATION: 16.6 SF

STA. 16+00

FILL: 0 CY
EXCAVATION: 99.8 CY

FMO CALCS:
FILL= 0 SF
CUT= −5.07 SF

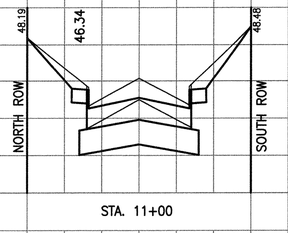


FILL: 0 SF
EXCAVATION: 22.7 SF

STA. 20+00

FILL: 0 CY
EXCAVATION: 138.3 CY

FMO CALCS:
FILL= 0 SF
CUT= −16.05 SF

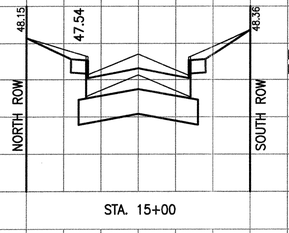


FILL: 0 SF
EXCAVATION: 36.5 SF

STA. 11+00

FILL: 11.64 CY
EXCAVATION: 101.0 CY

FMO CALCS:
FILL= 0 SF
CUT= −10.74 SF

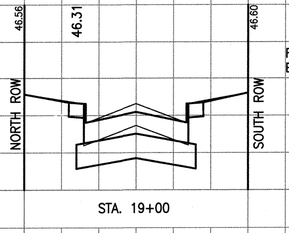


FILL: 0.0 SF
EXCAVATION: 37.9 SF

STA. 15+00

FILL: 0 CY
EXCAVATION: 82.4 CY

FMO CALCS:
FILL= 0 SF
CUT= −3.47 SF

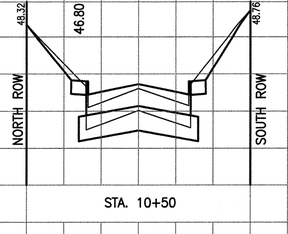


FILL: 0 SF
EXCAVATION: 21.8 SF

STA. 19+00

FILL: 5.42 CY
EXCAVATION: 63.3 CY

FMO CALCS:
FILL= +5.86 SF
CUT= −4.76 SF

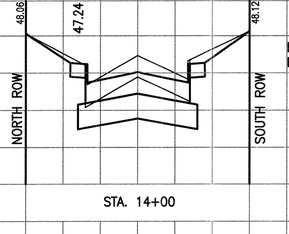


FILL: 5.86 SF
EXCAVATION: 31.9 SF

STA. 10+50

FILL: 0 CY
EXCAVATION: 138.9 CY

FMO CALCS:
FILL= 0 SF
CUT= −9.99 SF

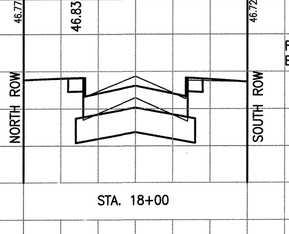


FILL: 0 SF
EXCAVATION: 37.1 SF

STA. 14+00

FILL: 0 CY
EXCAVATION: 66.7 CY

FMO CALCS:
FILL= 0 SF
CUT= −3.04 SF



FILL: 0 SF
EXCAVATION: 14.2 SF

STA. 18+00

SHEET TOTAL
FILL: 53.62 CY
EXCAVATION: 1221.8 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-stanton.dwg

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

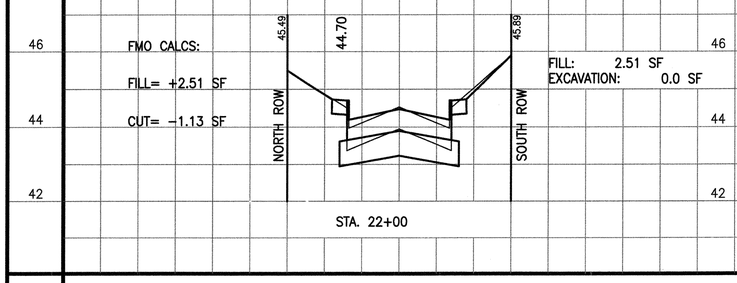
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
STANTON
STA. 10+50 TO STA. 21+00

WBS N–000383–0001–4
FILE: P:\City of Houston\2006–05_NSR 451\DRAWINGS\XSEC–stanton.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 122 OF 131

PUBLIC WORKS AND ENGINEERING FILED 49097 COUNTY HARRIS COUNTY, TEXAS

No.	Date	Revisions	App.



FMO CALCS:

FILL= +2.51 SF

CUT= -1.13 SF

FILL: 2.51 SF
EXCAVATION: 0.0 SF

SHEET TOTAL	
FILL:	0.0 CY
EXCAVATION:	0.0 CY

FILE: XSEC-stanton2.dwg

No.	Date	Revisions	App.

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
STANTON
STA. 22+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-stanton2.dwg

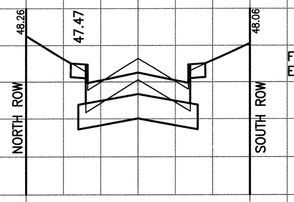
DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

FILED
PUBLIC WORKS AND ENGINEERING
49097
CONTROL NUMBER
HOUSTON, TEXAS

FILL: 13.30 CY
EXCAVATION: 70.2 CY

FMO CALCS:
FILL= +0.86 SF
CUT= -3.71 SF

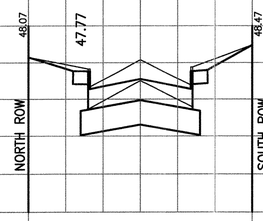


STA. 13+00

FILL: 0.86 SF
EXCAVATION: 22.7 SF

FILL: 0 CY
EXCAVATION: 75.6 CY

FMO CALCS:
FILL= 0 SF
CUT= -11.61 SF

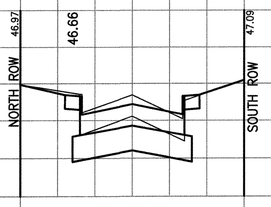


STA. 17+00

FILL: 0 SF
EXCAVATION: 18.2 SF

FILL: 8.25 CY
EXCAVATION: 95.0 CY

FMO CALCS:
FILL= +0.33 SF
CUT= -4.00 SF

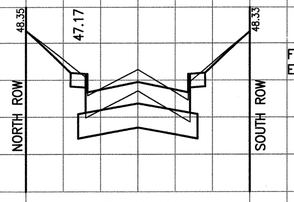


STA. 21+00

FILL: 0.33 SF
EXCAVATION: 23.9 SF

FILL: 2.83 CY
EXCAVATION: 88.0 CY

FMO CALCS:
FILL= +0.67 SF
CUT= -5.40 SF

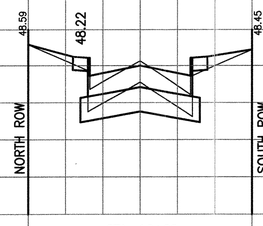


STA. 12+00

FILL: 0.67 SF
EXCAVATION: 24.8 SF

FILL: 14.37 CY
EXCAVATION: 52.6 CY

FMO CALCS:
FILL= +7.76 SF
CUT= -0.43 SF

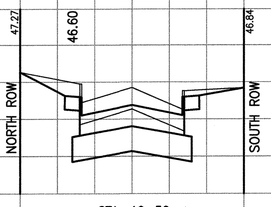


STA. 16+00

FILL: 7.76 SF
EXCAVATION: 10.2 SF

FILL: 8.25 CY
EXCAVATION: 165.6 CY

FMO CALCS:
FILL= 0 SF
CUT= -15.46 SF

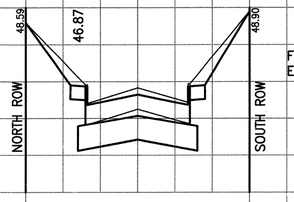


STA. 19+50

FILL: 0 SF
EXCAVATION: 35.7 SF

FILL: 1.24 CY
EXCAVATION: 102.2 CY

FMO CALCS:
FILL= 0 SF
CUT= -11.07 SF

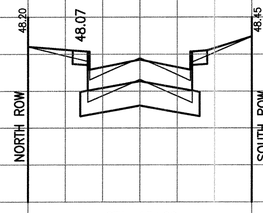


STA. 11+00

FILL: 0 SF
EXCAVATION: 30.4 SF

FILL: 24.07 CY
EXCAVATION: 45.4 CY

FMO CALCS:
FILL= +5.24 SF
CUT= -0.09 SF

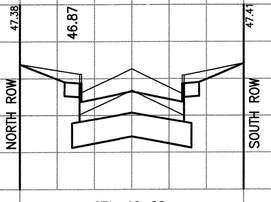


STA. 15+00

FILL: 5.24 SF
EXCAVATION: 14.3 SF

FILL: 0 CY
EXCAVATION: 63.9 CY

FMO CALCS:
FILL= 0 SF
CUT= -17.02 SF

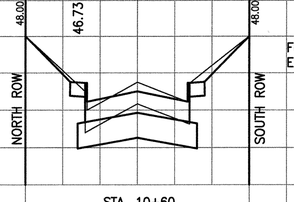


STA. 19+00

FILL: 0 SF
EXCAVATION: 33.3 SF

FILL: 0.56 CY
EXCAVATION: 28.1 CY

FMO CALCS:
FILL= +0.76 SF
CUT= -5.40 SF

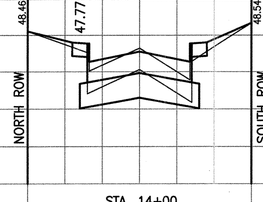


STA. 10+60

FILL: 0.76 SF
EXCAVATION: 0.0 SF

FILL: 21.41 CY
EXCAVATION: 54.6 CY

FMO CALCS:
FILL= +6.32 SF
CUT= -0.27 SF

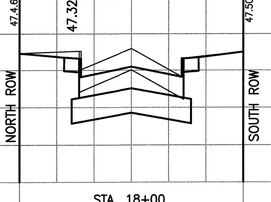


STA. 14+00

FILL: 6.32 SF
EXCAVATION: 15.2 SF

FILL: 0 CY
EXCAVATION: 103.5 CY

FMO CALCS:
FILL= 0 SF
CUT= -9.90 SF



STA. 18+00

FILL: 0 SF
EXCAVATION: 22.6 SF

SHEET TOTAL	
FILL:	94.28 CY
EXCAVATION:	944.7 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-prescott.DWG

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

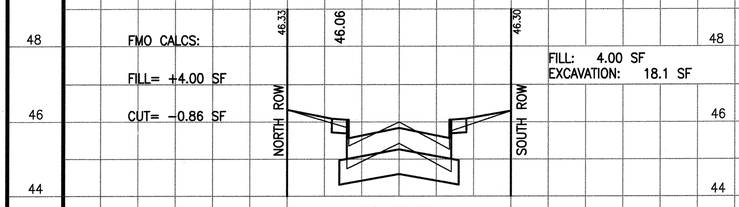
NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
PRESCOTT
STA. 10+50 TO STA. 21+00

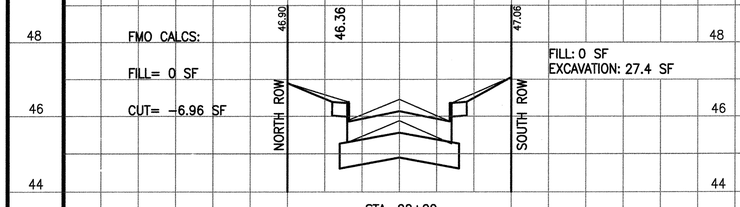
WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-prescott.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 124 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
NUMBER

No.	Date	Revisions	App.



FILL: 8.25 CY
EXCAVATION: 84.3 CY



60 40 20 0 20 40 60

SHEET TOTAL
FILL: 8.25 CY
EXCAVATION: 84.3 CY

FILE: XSEC-prescott2.DWG

No.	Date	Revisions	App.

NOTE:
BFE= 48.76
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPRO'ED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS PRESCOTT
STA. 22+00 TO STA. 23+00

WBS N-000383-0001-4
FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-prescott2.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 125 OF 131

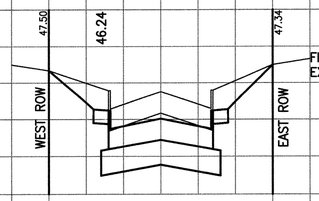
PUBLIC WORKS AND ENGINEERING
49097
HOUSTON, TEXAS

FILL: 2.0 CY
EXCAVATION: 128.7 CY

FMO CALCS:

FILL= 0 SF

CUT= -29.77 SF



FILL: 0.0 SF
EXCAVATION: 41.5 SF

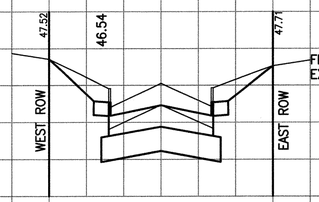
STA. 13+00

FILL: 0.0 CY
EXCAVATION: 150.9 CY

FMO CALCS:

FILL= 0 SF

CUT= -21.51 SF



FILL: 0.0 SF
EXCAVATION: 40.0 SF

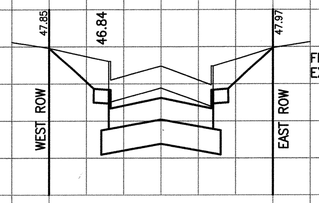
STA. 12+00

FILL: 0.0 CY
EXCAVATION: 175.3 CY

FMO CALCS:

FILL= 0 SF

CUT= -31.97 SF



FILL: 0.0 SF
EXCAVATION: 54.7 SF

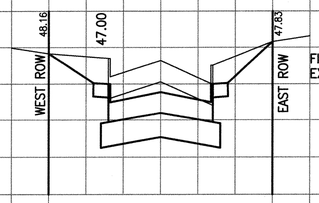
STA. 11+00

FILL: 0.0 CY
EXCAVATION: 100.6 CY

FMO CALCS:

FILL= 0 SF

CUT= -29.96 SF



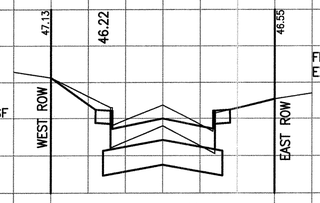
FILL: 0.0 SF
EXCAVATION: 54.0 SF

STA. 10+50

FMO CALCS:

FILL= 0 SF

CUT= -7.71 SF



FILL: 0 SF
EXCAVATION: 28.0 SF

STA. 14+00

SHEET TOTAL
FILL: 0 CY
EXCAVATION: 555.5 CY

FILE: XSEC-fairhopeplace.DWG

No.	Date	Revisions	App.

NOTE:
BFE= 48.46
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY

N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

SURVEYED BY: LANDTECH
FB NO. P-5444

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
FAIRHOPE PLACE
STA. 10+50 TO STA. 14+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-fairhopeplace.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

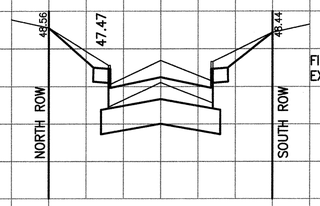
SHEET NO. 126 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
REGISTERED
HOUSTON, TEXAS

60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILL: 0 CY
EXCAVATION: 126.5 CY

FMO CALCS:
FILL= 0 SF
CUT= −13.88 SF

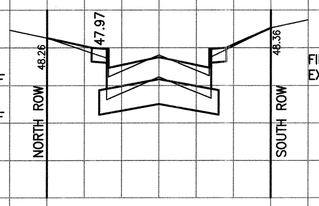


FILL: 0 SF
EXCAVATION: 34.3 SF

STA. 13+00

FILL: 0.65 CY
EXCAVATION: 60.0 CY

FMO CALCS:
FILL= +0.35 SF
CUT= −0.17 SF

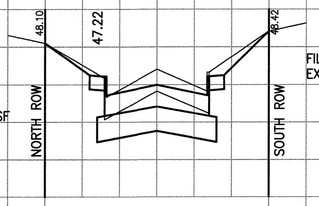


FILL: 0.35 SF
EXCAVATION: 19.8 SF

STA. 17+00

FILL: 0.67 CY
EXCAVATION: 57.0 CY

FMO CALCS:
FILL= 0 SF
CUT= −10.25 SF

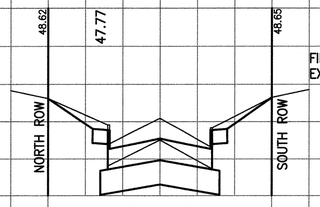


FILL: 0 SF
EXCAVATION: 30.6 SF

STA. 21+50

FILL: 0 CY
EXCAVATION: 126.3 CY

FMO CALCS:
FILL= 0 SF
CUT= 13.35 SF

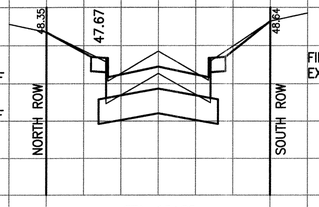


FILL: 0 SF
EXCAVATION: 33.9 SF

STA. 12+00

FILL: 1.05 CY
EXCAVATION: 84.8 CY

FMO CALCS:
FILL= +0.22 SF
CUT= −6.00 SF

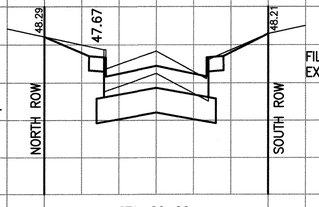


FILL: 0.22 SF
EXCAVATION: 26.0 SF

STA. 16+00

FILL: 0 CY
EXCAVATION: 167.2 CY

FMO CALCS:
FILL= 0 SF
CUT= −9.28 SF

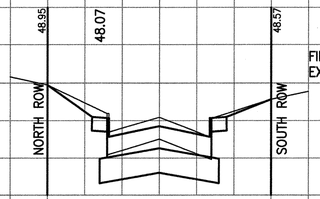


FILL: 0 SF
EXCAVATION: 29.6 SF

STA. 20+00

FILL: 0 CY
EXCAVATION: 113.9 CY

FMO CALCS:
FILL= 0 SF
CUT= −7.24 SF

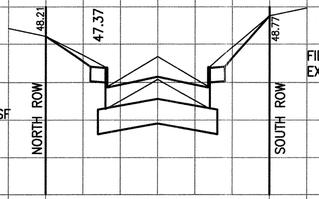


FILL: 0 SF
EXCAVATION: 27.6 SF

STA. 11+00

FILL: 0.41 CY
EXCAVATION: 107.8 CY

FMO CALCS:
FILL= 0 SF
CUT= −11.66 SF

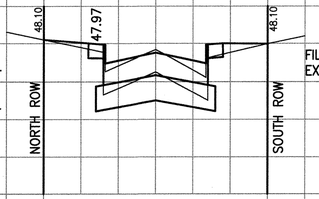


FILL: 0 SF
EXCAVATION: 32.2 SF

STA. 15+00

FILL: 10.56 CY
EXCAVATION: 85.2 CY

FMO CALCS:
FILL= +5.70 SF
CUT= −0.26 SF

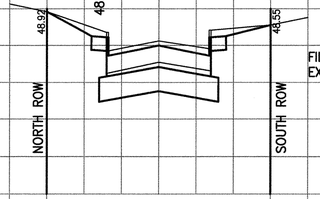


FILL: 5.70 SF
EXCAVATION: 16.4 SF

STA. 19+00

FILL: 0 CY
EXCAVATION: 25.6 CY

FMO CALCS:
FILL= 0 SF
CUT= −8.16 SF

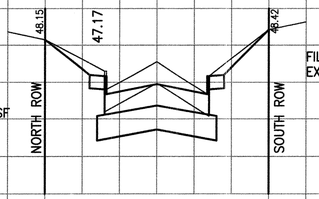


FILL: 0 SF
EXCAVATION: 27.6 SF

STA. 10+50

FILL: 0 CY
EXCAVATION: 122.6 CY

FMO CALCS:
FILL= 0 SF
CUT= −14.10 SF

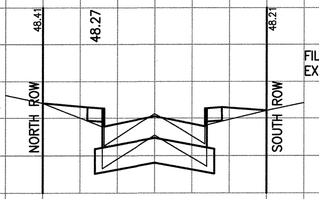


FILL: 0 SF
EXCAVATION: 34.0 SF

STA. 14+00

FILL: 10.56 CY
EXCAVATION: 53.7 CY

FMO CALCS:
FILL= 0 SF
CUT= −8.43 SF



FILL: 0 SF
EXCAVATION: 12.6 SF

STA. 18+00

SHEET TOTAL
FILL: 23.90 CY
EXCAVATION: 1130.6 CY

60 40 20 0 20 40 60 60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-fairhope.dwg

No.	Date	Revisions

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
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PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
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VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS–BARLOW–BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713–965–9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P–5444

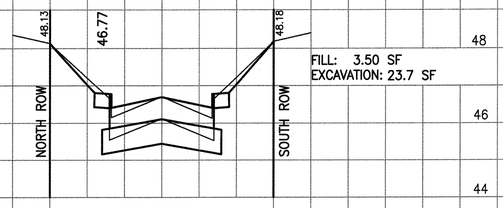
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
FAIRHOPE
STA. 10+50 TO STA. 21+50

WBS N–000383–0001–4
FILE: P:\City of Houston\2006–05_NSR 451\DRAWINGS\XSEC–fairhope.dwg
DRAWING SCALE
1"=20' H. / 1"=2' V.
CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.
SHEET NO. 127 OF 131

PUBLIC WORKS AND ENGINEERING
49097
LICENSE NUMBER
HOUSTON, TEXAS



FMO CALCS:

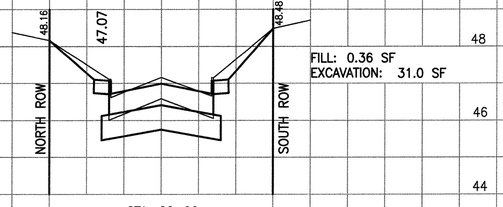
FILL= +3.50 SF

CUT= -3.25 SF

FILL: 3.50 SF
EXCAVATION: 23.7 SF

STA. 23+00

FILL: 7.15 CY
EXCAVATION: 101.3 CY



FMO CALCS:

FILL= +0.36 SF

CUT= -7.14 SF

FILL: 0.36 SF
EXCAVATION: 31.0 SF

STA. 22+00

60 40 20 0 20 40 60

No.	Date	Revisions	App.

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

NOTICE:
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CENTERPOINT ENERGY/ELECTRIC FACILITIES
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SIGNATURE VALID FOR ONE YEAR

N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)

N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED PROFESSIONAL ENGINEER
02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS
FAIRHOPE
STA. 22+00 TO STA. 23+00

SHEET TOTAL
FILL: 7.15 CY
EXCAVATION: 101.3 CY

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-fairhope2.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO. 128 OF 131

PUBLIC WORKS AND ENGINEERING
FILED
49097
LICENSE NUMBER
REGISTERED ENGINEER
TEXAS

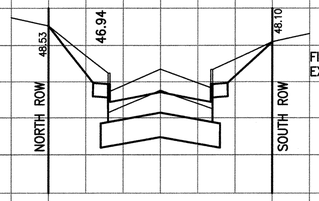
FILE: XSEC-fairhope2.dwg

FILL: 0 CY
EXCAVATION: 97.6 CY

FMO CALCS:

FILL= 0 SF

CUT= -23.85 SF



FILL: 0 SF
EXCAVATION: 26.9 SF

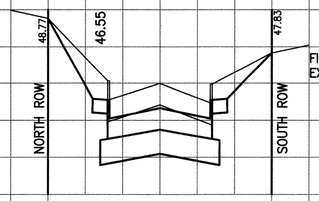
STA. 13+00

FILL: 0 CY
EXCAVATION: 107.8 CY

FMO CALCS:

FILL= 0.00 SF

CUT= -29.16 SF



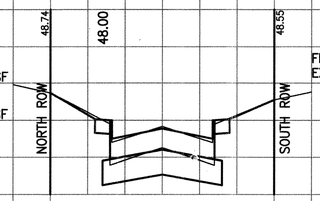
FILL: 0 SF
EXCAVATION: 31.3 SF

STA. 12+00

FMO CALCS:

FILL= +1.22 SF

CUT= -0.80 SF



FILL: 1.22 SF
EXCAVATION: 5.2 SF

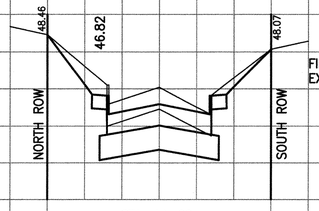
STA. 16+00

FILL: 0 CY
EXCAVATION: 149.8 CY

FMO CALCS:

FILL= 0.00 SF

CUT= -15.75 SF



FILL: 0.0 SF
EXCAVATION: 49.6 SF

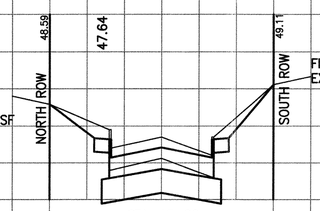
STA. 11+00

FILL: 2.26 CY
EXCAVATION: 39.4 CY

FMO CALCS:

FILL= 0.00 SF

CUT= -14.44 SF



FILL: 0 SF
EXCAVATION: 16.1 SF

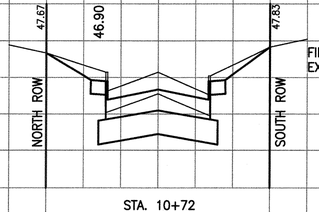
STA. 15+00

FILL: 0.0 CY
EXCAVATION: 82.2 CY

FMO CALCS:

FILL= 0 SF

CUT= -14.96 SF



FILL: 0.0 SF
EXCAVATION: 39.2 SF

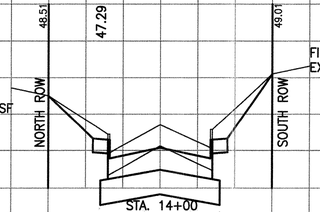
STA. 10+72

FILL: 0 CY
EXCAVATION: 77.6 CY

FMO CALCS:

FILL= 0.00 SF

CUT= -19.76 SF



FILL: 0 SF
EXCAVATION: 25.8 SF

STA. 14+00

60 40 20 0 20 40 60 60 40 20 0 20 40 60

FILE: XSEC-castlewood.deg

SHEET TOTAL
FILL: 2.26 CY
EXCAVATION: 194.1 CY

NOTE:
BFE= 49.00
(BASE FLOOD ELEVATIONS)

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

NOTICE:
AT LEAST 48 HOURS BEFORE EXCAVATING IN STREET R.O.W. OR EASEMENTS CALL THE LONE STAR NOTIFICATION (713) 223-4567

PRIVATE UTILITY LINES SHOWN

CENTERPOINT ENERGY/ELECTRIC FACILITIES
(APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES, UNLESS OTHERWISE NOTED)
VALID AT TIME OF REVIEW ONLY
N/A DATE:

APPROVED FOR AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES ONLY.
SIGNATURE VALID FOR ONE YEAR
N/A DATE:

CENTERPOINT ENERGY/GAS FACILITIES
(GAS SERVICE LINES ARE NOT SHOWN)
N/A DATE:

SPARKS-BARLOW-BARNETT, INC.
11011 RICHMOND
SUITE 375
HOUSTON TX. 77042
713-965-9996

STATE OF TEXAS
JESUS M. OLIVAS
93817
LICENSED
PROFESSIONAL ENGINEER
02/10/17

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

CROSS SECTIONS CASTLEWOOD
STA. 10+50 TO STA. 16+00

WBS N-000383-0001-4

FILE: P:\City of Houston\2006-05_NSR 451\DRAWINGS\XSEC-castlewood.dwg

DRAWING SCALE
1"=20' H. / 1"=2' V.

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO.129 OF 131

PUBLIC WORKS AND ENGINEERING
REGISTERED
49097
LICENSE NUMBER
HOUSTON, TEXAS

EXISTING STREET LIGHT CIRCUIT IN CONDUIT TO REMAIN IN SERVICE DURING CONSTRUCTION

LOOKOUT COURT

BRAYS BAYOU
HCFCD UNIT NO. D 100-00-00
VOL. 46, PG. 30
H.C.M.R.

MATCH LINE

BRAESWOOD

BROADMEAD

DEAL

GANNET

NORRIS

LINKWOOD

ILONA

TIMBERSIDE

INSTALL 1 TP

100W ST LIGHT (REM & RE-INS)

PROP. PULL BOX

EXIST. 100W LP ILONA STA. 22+71

EXIST. 100W LP ILONA STA. 20+48

EXIST. 100W LP ILONA STA. 18+36

EXIST. 100W LP ILONA STA. 15+22

EXIST. 100W LP ILONA STA. 14+00

EXIST. 100W LP ILONA STA. 11+84

EXIST. 100W LP ILONA STA. 9+64

EXIST. 100W LP BROADMEAD STA. 11+76

EXIST. 100W LP BROADMEAD STA. 16+67

EXIST. 100W LP BROADMEAD STA. 14+69

EXIST. 100W LP DEAL STA. 11+36

EXIST. 100W LP DEAL STA. 16+67

EXIST. 100W LP DEAL STA. 14+68

EXIST. 100W LP TIMBERSIDE STA. 18+96

EXIST. 100W LP TIMBERSIDE STA. 16+70

EXIST. 100W LP TIMBERSIDE STA. 14+49

EXIST. 100W LP TIMBERSIDE STA. 12+33

EXIST. 100W LP TIMBERSIDE STA. 10+09

LEGEND

- PULL BOX
- REMOVE & RE-INSTALL 100W STREET LIGHT
- REMOVE & RE-INSTALL 150W STREET LIGHT
- REMOVE & RE-INSTALL 250W STREET LIGHT
- TERMINAL POLE
- EXIST. 70W STREET LIGHT
- EXIST. 100W STREET LIGHT
- EXIST. 150W STREET LIGHT
- EXIST. 175W STREET LIGHT
- EXIST. 250W STREET LIGHT
- EXIST. 400W STREET LIGHT
- EXIST. GUY
- EXIST. WOOD POWER POLE
- OH POWER LINES
- EXIST. CONDUIT
- PROP. CONDUIT

No.	Date	Revisions	App.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers – Planners
FIRM F-596

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SIGNATURE VALID FOR ONE YEAR
DATE: 2-16-12

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(GAS SERVICE LINES ARE NOT SHOWN)
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION
IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STREET LIGHTING PLAN

SHEET 1 of 2

WBS N-000383-0001-4

FILE: N:\City of Houston\2006-05_NSR 451\DRAWINGS\streetlighting MAPS.dwg

DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO.130 OF 131

PUBLIC WORKS AND ENGINEERING
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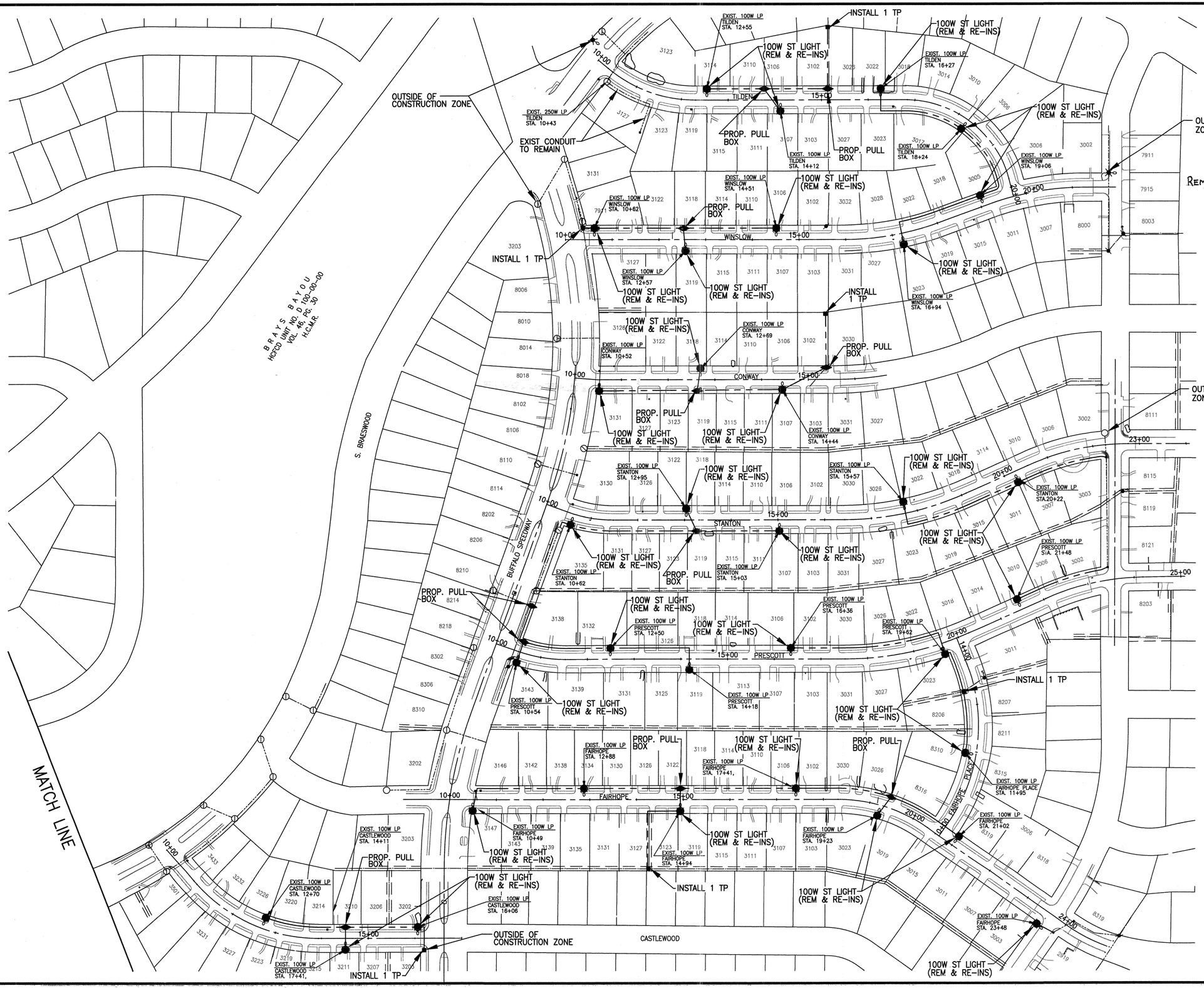
49097
CONTROL NUMBER
HOUSTON, TEXAS



LEGEND

- PULL BOX
- ~~PROP.~~ 100W STREET LIGHT
- ~~PROP.~~ 150W STREET LIGHT
- ~~PROP.~~ 250W STREET LIGHT
- TERMINAL POLE
- EXIST. 100W STREET LIGHT
- EXIST. 100W STREET LIGHT
- EXIST. 150W STREET LIGHT
- EXIST. 175W STREET LIGHT
- EXIST. 250W STREET LIGHT
- EXIST. 400W STREET LIGHT
- EXIST. GUY
- EXIST. WOOD POWER POLE
- OH POWER LINES
- EXIST. CONDUIT
- PROP. CONDUIT

No.	Date	Revisions	Apps.

SPARKS - BARLOW - BARNETT, INC.
Consulting Engineers — Planners
FIRM F-596

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SUITE 375
HOUSTON TX. 77042
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STATE OF TEXAS — JESUS M. OLIVAS — 93817 — LICENSED PROFESSIONAL ENGINEER — 02/10/12

SURVEYED BY: LANDTECH
FB NO. P-5444

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEIGHBORHOOD STREET RECONSTRUCTION IN BRAESWOOD PLACE SUBDIVISION
NSR 451

STREET LIGHTING PLAN

SHEET 2 of 2

WBS N-000383-0001-4

FILE: N:\City of Houston\2006-05_NSR 451\DRAWINGS\streetlighting MAPS.dwg

DRAWING SCALE
1" = 400' HALF
1" = 200' FULL

CITY OF HOUSTON PM
MOH'D K. WARRAD, P.E.

SHEET NO.131 OF 131

PUBLIC WORKS AND ENGINEERING — 49097 — REGISTERED