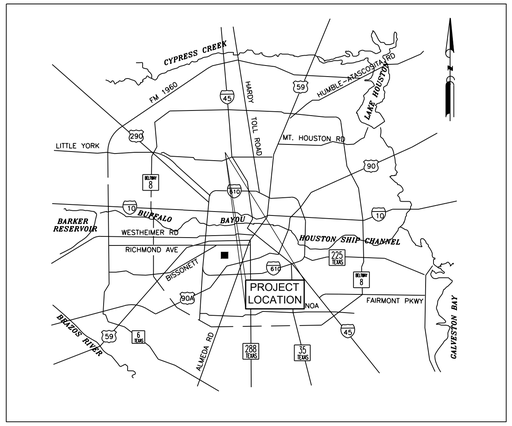
CITY OF HOUSTON

HOUSTON PUBLIC WORKS
CAPITAL PROJECTS

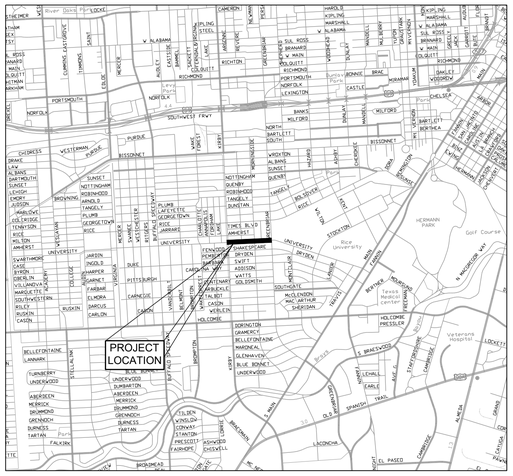
SUB PROJECT 1 - UNIVERSITY BOULEVARD: PAVING AND DRAINAGE FROM KIRBY DRIVE TO GREENBRIAR DRIVE

WBS NO. N-100006-0001-3

FEBRUARY 2026



LOCATION MAP



NOT TO SCALE

VICINITY MAP

KEY MAP NO 532-C
GIMS MAP NO 5255-B

90% DRAFT SUBMITTAL

MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT COUNCIL MEMBERS

AMY PECK, DISTRICT A
TARSHA JACKSON, DISTRICT B
ABBIE KAMIN, DISTRICT C
CAROLYN EVANS-SHABAZZ, Ed.D., DISTRICT D
FRED FLICKINGER, DISTRICT E
TIFFANY D. THOMAS, DISTRICT F
MARY NAN HUFFMAN, DISTRICT G
MARIO CASTILLO, DISTRICT H
JOAQUIN MARTINEZ, DISTRICT I
EDWARD POLLARD, DISTRICT J
MARTHA CASTEX-TATUM, DISTRICT K

COUNCIL MEMBERS AT-LARGE

JULIAN RAMIREZ, POSITION 1
WILLIE DAVIS, POSITION 2
TWILA CARTER, POSITION 3
ALEJANDRA SALINAS, POSITION 4
SALLIE ALCORN, POSITION 5

TDLR EABPR _____

GC ENGINEERING, INC.
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TBPE Registration No. F-7889

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A. MAHENDRA RODRIGO
TBPE NO: 87523
February 4, 2026

SURVEYED BY: WESTERN GROUP CONSULTANT
FB NO. P-6199

PARKS-FORESTRY DEPT.

METRO

HOUSTON WATER

TRANSPORTATION & DRAINAGE OPERATIONS

CAPITAL PROJECTS

SURVEY

CITY ENGINEER DATE

DIRECTOR OF HOUSTON PUBLIC WORKS DATE

FOR CITY OF HOUSTON USE ONLY

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* PLAN SHEETS FROM 102-114 OF 139 HAVE BEEN DEVELOPED BY A THIRD PARTY CONSULTANT AND ARE INCLUDED FOR REFERENCE ONLY. TREE PLANTING, 2" PVC IRRIGATION SLEEVES, AND STRUCTURAL SOIL WILL BE CONSTRUCTED AS PART OF THIS CONTRACT.

MK.	DATE	REVISION	APP

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SHEET INDEX

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 02 OF 139	

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EXISTING PLAN VIEW

- WATER METER
- WATER VALVE (GATE)
- WATER VALVE (BUTTERFLY)
- FIRE HYDRANT/FLUSHING VALVE
- TAPPING SLEEVE & VALVE
- REDUCER (8" 6")
- ROUND CONNECTION
- SANITARY SEWER CLEANOUT & MANHOLE (CO, SAN MH)
- STORM SEWER MANHOLE (STM MH)
- STORM SEWER INLETS ('B' 'B–B' 'C' 'C–1' 'C–2' 'C–2A' 'GRATE')
- CULVERT PIPE AND HEADWALL
- TOP OF CURB ELEVATION (TC=XX.XX)
- GUTTER ELEVATION (G=XX.XX)
- TOP OF PAVEMENT ELEVATION (TP=XX.XX)
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- DIMENSION LINE (28" 3–17)
- CENTERPOINT ENERGY AERIAL LINE (P P P)
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- PIPELINE OR WESTERN UNION CONDUIT (IDENTIFY CONDUIT)
- AT&T CONDUIT
- CABLE TV
- RAILROAD LINE
- WATER LINE (20" (AND SMALLER) WATER; 24" (LARGER THAN 20") WATER)
- SANITARY SEWER LINE (24" (AND SMALLER) SANITARY SEWER; 30" (LARGER THAN 24") SANITARY SEWER)
- STORM SEWER LINE (24" (AND SMALLER) STORM SEWER; 30" (LARGER THAN 24") STORM SEWER)
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE (RWL RWL)
- NON–POTABLE WATER LINE (NPW NPW)
- GAS METER
- GAS VALVE
- MISC UNDERGROUND PIPELINE LABLE (A2)

PROPOSED PLAN VIEW

- WATER METER (WM)
- WATER VALVE (GATE) (WV)
- WATER VALVE (BUTTERFLY) (BFWV)
- FIRE HYDRANT/FLUSHING VALVE (FH, WV)
- TAPPING SLEEVE & VALVE (TS&V)
- REDUCER (12" 8")
- ROUND CONNECTION
- SANITARY SEWER CLEANOUT & MANHOLE (CO, SAN MH)
- STORM SEWER MANHOLE (STM MH)
- STORM SEWER INLETS ('B' 'B–B' 'C' 'C–1' 'C–2' 'C–2A' 'GRATE')
- CULVERT PIPE AND HEADWALL
- TOP OF CURB ELEVATION (TC=XX.XX)
- GUTTER ELEVATION (G=XX.XX)
- TOP OF PAVEMENT ELEVATION (TP=XX.XX)
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- DIMENSION LINE (28" 3–17)
- CENTERPOINT ENERGY AERIAL LINE (P P P)
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- PIPELINE OR WESTERN UNION CONDUIT (IDENTIFY CONDUIT)
- AT&T CONDUIT
- CABLE TV
- MATCH LINE
- RAILROAD LINE
- WATER LINE (20" (AND SMALLER) WATER; 24" (LARGER THAN 20") WATER)
- SANITARY SEWER LINE (24" (AND SMALLER) SANITARY SEWER; 30" (LARGER THAN 24") SANITARY SEWER)
- STORM SEWER LINE (24" (AND SMALLER) STORM SEWER; 30" (LARGER THAN 24") STORM SEWER)
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE (RWL RWL)
- NON–POTABLE WATER LINE (NPW NPW)
- GAS METER
- GAS VALVE
- MISC UNDERGROUND PIPELINE LABLE (A2)

EXISTING PLAN VIEW

- PAVING HEADER
- BUILDING, RESIDENTIAL (RES. 1–STORY BR BLDG.)
- BUILDING, COMMERCIAL (COMM. 1–STORY BR BLDG.)
- TREE
- HEDGE
- IRON PIPE OR IRON ROD MONUMENT (3/4" IP)
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)
- POWER POLE (P P)
- POWER POLE W/DOWN GUY

PROPOSED PLAN VIEW

- PAVING HEADER
- BUILDING, RESIDENTIAL (RES. 1–STORY BR BLDG.)
- BUILDING, COMMERCIAL (COMM. 1–STORY BR BLDG.)
- TREE
- HEDGE
- IRON PIPE OR IRON ROD MONUMENT (3/4" IP)
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)
- POWER POLE (P P)
- POWER POLE W/DOWN GUY

EXISTING PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST CULVERT (CULVERT)
- SOUTH OR WEST CULVERT (CULVERT)
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT (CENTERPOINT ENERGY CONDUIT)
- GAS LINE (GAS LINE)
- WESTERN UNION (WESTERN UNION)
- AT&T CONDUIT (AT&T CONDUIT)
- WATER LINE (20" (AND SMALLER) WATER LINE; 24" (LARGER THAN 20") WATER)
- SANITARY SEWER LINE (24" (AND SMALLER) SANITARY SEWER; 30" (LARGER THAN 24") SANITARY SEWER)
- STORM SEWER LINE (24" (AND SMALLER) STORM SEWER; 30" (LARGER THAN 24") STORM SEWER)
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE (RWL RWL)
- NON–POTABLE WATER LINE (NPW NPW)
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

PROPOSED PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST CULVERT (CULVERT)
- SOUTH OR WEST CULVERT (CULVERT)
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT (CENTERPOINT ENERGY CONDUIT)
- GAS LINE (GAS LINE)
- WESTERN UNION (WESTERN UNION)
- AT&T CONDUIT (AT&T CONDUIT)
- WATER LINE (20" (AND SMALLER) WATER LINE; 24" (LARGER THAN 20") WATER)
- SANITARY SEWER LINE (24" (AND SMALLER) SANITARY SEWER; 30" (LARGER THAN 24") SANITARY SEWER)
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- SANITARY SEWER FORCE MAIN
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- CENTERPOINT ENERGY MANHOLE
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- STORM SEWER MANHOLE
- STORM SEWER INLET

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DRAWING SCALE	
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MICHELLE RANDON, PE	
SHEET NO. 03 OF 139	

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GENERAL NOTES – INSIDE CITY LIMITS

1. UNLESS OTHERWISE NOTED AND APPROVED ON DRAWINGS, CONSTRUCT CIVIL INFRASTRUCTURE IN ACCORDANCE WITH THE EFFECTIVE EDITION OF THE HOUSTON PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS, STANDARD CONSTRUCTION DETAILS, AND SUPPLEMENTS, ADDENDA AND AMENDMENTS THERETO. THE LATEST EDITION OF THE ABOVE PUBLICATIONS CAN BE FOUND AT: HTTP://WWW.HOUSTONPERMITTINGCENTER.ORG/OFFICE-CITY-ENGINEER/DESIGN-AND-CONSTRUCTION-STANDARDS.
2. THE DESIGN MUST BE CONSISTENT WITH THE EFFECTIVE EDITION OF HOUSTON PUBLIC WORKS INFRASTRUCTURE DESIGN MANUAL AND TCEQ (TEXAS COMMISSION ON ENVIRONMENTAL QUALITY) REQUIREMENTS.
3. 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 HOUSTON PUBLIC WORKS. SOILS REPORT WAS PREPARED BY [GEOTECHNICAL ENGINEERING FIRM] REPORT NO. [NO. OF REPORT], DATED [DATE OF REPORT].
4. 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 713-223-4567811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
5. 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 EFFECTIVE EDITION OF HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC, REFERENCED ABOVE AND SUPPLEMENTS, ADDENDA AND AMENDMENTS THERETO, AT NO ADDITIONAL COST TO THE CITY OF HOUSTON.
6. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER AND TO THE SATISFACTION OF THE OWNING AUTHORITY.
8. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
9. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
10. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE AS-BUILT DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STREET & BRIDGE CONSTRUCTION NOTES

1. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
2. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
3. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
4. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
5. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
6. EXPOSED 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C-C DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.
7. WHEELCHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
8. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
9. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

STORM CONSTRUCTION NOTES

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 2317-02, 02317-3, 02317-05, 02317-06, AND 02317-07 (JULY 2019) AS APPLICABLE UNLESS OTHERWISW SHOWN ON THE DRAWINGS.
2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASMENT SHALL BE R.C.P (C-76, CLASSIII) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 AS APPLICABLE.
3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABLIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.
4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHNICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMACTION TEST (ASTM D-698/AASHTO T99).
5. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C-76, CLASSIII).
7. ALL PRPOSED PIPE STUB-OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
8. MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 24-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS, AND VALAVE BOXES TO GRADE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
12. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

GENERAL NOTES – METRO

SWPPP CONSTRUCTION NOTES

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
   - DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
   - AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
   - STRUCTURAL CONTROL MEASURES.
   - LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

TRAFFIC NOTES

CONTRACTOR OR OWNER SHALL SUBMIT TRAFFIC CONTROL PLANS WITH THE MOBILITY PERMIT APPLICATION. THE PLANS SHALL BE DRAWN TO SCALE AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS.

THE GENERAL NOTES THAT SHALL BE INCLUDED ON THE TRAFFIC CONTROL PLAN CAN BE FOUND IN CHAPTER 15 (15.12 TRAFFIC CONTROL PLAN) OF THE CITY OF HOUSTONS (CITY) INFRASTRUCTURE DESIGN MANUAL (IDM). BELOW ARE SEVERAL KEY NOTES FROM THE IDM TO BE AWARE OF:

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) LATEST EDITION WITH REVISIONS DURING THE ENTIRE CONSTRUCTION PERIOD.
2. NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00PM TO 7:00AM.
3. CONTRACTOR SHALL MAINTAIN APPROVED NUMBER OF LANES OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION WORKING HOURS. TRAFFIC CONTROL PLANS SHALL INCLUDE ONE-WAY AND/OR DETOUR PLANS. CONTRACTOR SHALL MAINTAIN ADA COMPLAINT PEDESTRIAN ACCESS TO BUS STOPS AND ADEQUATE BUS ACCESS TO THE BUS STOP.
4. CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, OPEN LANES FOR NORMAL TRAFFIC FLOW WHEN FEASIBLE.
5. CONTRACTOR SHALL SECURE ROADWAY/SIDEWALK/STREET/BICYCLE FACILITY PERMITS AS DESCRIBED IN CITY OF HOUSTON ORDINANCE, CHAPTER 40 - STREETS & SIDEWALKS, SECTION 40-361 FROM HOUSTON PERMITTING CENTER (MOBILITY PERMIT SECTION AT HTTPS://GEOHUB.HOUSTONTX.GOV) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN BUSINESS DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.
6. CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES
7. ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE. ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A MINIMUM OF ONE TRAVEL LANE SHALL BE MAINTAINED ACROSS THE DRIVEWAY, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE CITY OF HOUSTON.
8. ADDITIONAL OFF DUTY POLICE OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DIRECTION OF THE CITY EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON THE PROJECT PLANS.

WATER CONSTRUCTION NOTES

1. ALL 4" THROUGH 12" WATER LINE TO BE AWWA C-900 PVC DR-18 BLUE PRESSURE RATED WATER MAIN WITH 2" AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4" THRU 54" DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8-MIL POLYETHYLENE SHEETS.
2. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING PIPE MOVEMENT IS NECESSARY DUE TO THRUST.
3. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.
4. ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.
5. ALL WATER VALVES SHALL BE SUPPLIED AND INS TALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
6. ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTMINATION PERSISTS.
7. ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.
8. 4" THRU 12" FITTINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.
9. HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE INCLUDED IN THE PROJECT.
10. ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
11. CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

GRADING NOTES

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

SANITARY SEWER CONSTRUCTION NOTES

1. ALL SEWERS SHALL BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE THE LATEST VERSION AS APPLICABLE.
3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.
4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C-900 DR-18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.
5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C-900 GREEN DR-18 PVC GREEN PRESSURED TO BE UTILIZING IN-BETWEEN TWO SS MHS. OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D-3034 PVC GRAVITY PIPE TO DI-OD AWWA C-900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP FITTINGS.
7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-03 AS APPLICABLE, WITH 1 ½ SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
8. ALL NEW SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER, PROVIDE MINIMUM 2 FOOT SEPARATION.
9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3" - 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317-02.
12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 217.57 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.
13. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.57 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.

A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.

B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:

6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398'
8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'
10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'
12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199'
15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'
18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'

WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.

14. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEX-HEAD COARSE THREADED ½"-13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS.

MK.	DATE	REVISION	APP.

NOTICE:
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VERIFICATION OF PRIVATE UTILITY LINES

DATE:

CenterPoint Energy/Natural Gas utilities shown (gas service lines are not shown).
(This Signature not to be used for conflict verification.)
Signature valid for six months.

DATE:

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
(This signature verifies existing underground facilities – not to be used for conflict verification.)
Signature Valid for six months.

DATE:

Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

GENERAL NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 04 OF 139	

CENTERPOINT ENERGY NOTES:

CENTERPOINT ENERGY

CAUTION: UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-2111 OR (713) 207-4200.

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

WARNING: OVERHEAD ELECTRICAL LINES

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

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

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

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207- 6348 OR (713) 207-5769.

WARNING: UNDERGROUND ELECTRICAL UTILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- ALL INFORMATION CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTORS ARE RESPONSIBLE MAKING THEIR OWN DETERMINATIONS AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND PIPELINES, CONDUITS, AND STRUCTURES BY CONTACTING OWNERS OF UNDERGROUND UTILITIES OR BY EXCAVATING IN ADVANCE OF CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES WHEN AND WHERE THEY FALL IN THE PATH OF CONSTRUCTION.
- THE CONTRACTOR IS ALSO RESPONSIBLE FOR CONTACTING THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 AND TEXAS ONE CALL AT 1-800-245-4545, FORTY-EIGHT (48) HOURS PRIOR TO ANY CONSTRUCTION.
- THE LOCATION OF ANY CENTERPOINT ENERGY UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. THEY AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
- ALL PROPOSED FACILITIES SHALL MAINTAIN 12" CLEAR FROM ALL EXISTING UTILITIES.

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 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 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES 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. 6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER KEVIN RAY (713) 614-1983 OR E-MAIL HIM AT KR7896@ATT.COM IF CABLE LOCATE REQUESTS ARE NOT COMPLETED FOR OUR AT&T.

APP.	REVISION	DATE	MK.

NOTICE:
For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground line can be marked. This signature does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES

DATE:

CenterPoint Energy/Natural Gas utilities shown (gas service lines are not shown).
(This Signature not to be used for conflict verification.)
Signature valid for six months.

DATE:

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
(This signature verifies existing underground facilities – not to be used for conflict verification.)
Signature Valid for six months.

DATE:

Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

UTILITY NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 05 OF 139	

GC Engineering, Inc.
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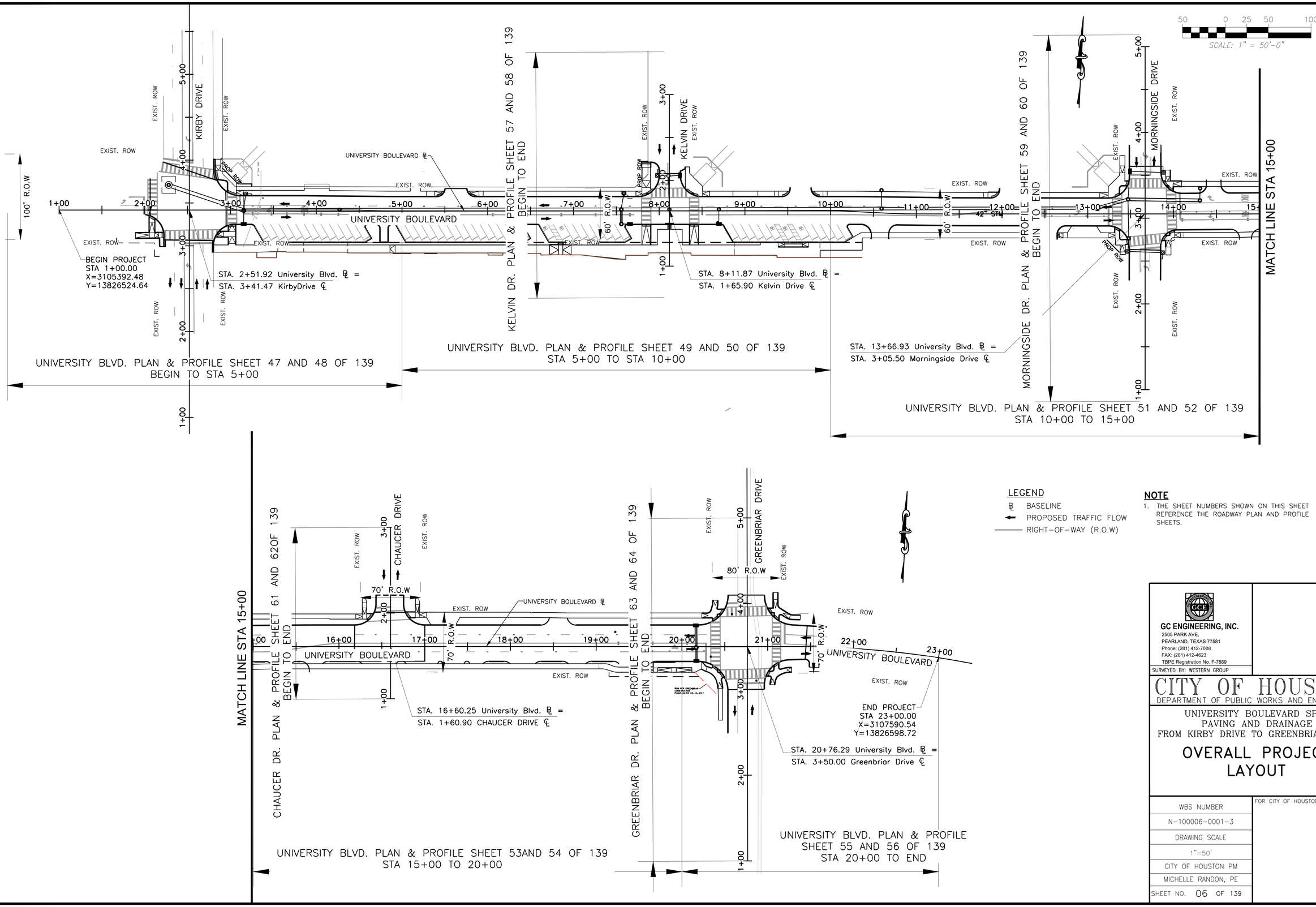

LEGEND

- ℄ BASELINE
- PROPOSED TRAFFIC FLOW
- RIGHT-OF-WAY (R.O.W)

NOTE

1. THE SHEET NUMBERS SHOWN ON THIS SHEET REFERENCE THE ROADWAY PLAN AND PROFILE SHEETS.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

OVERALL PROJECT LAYOUT

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=50'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 06 OF 139	

GC Engineering, Inc.
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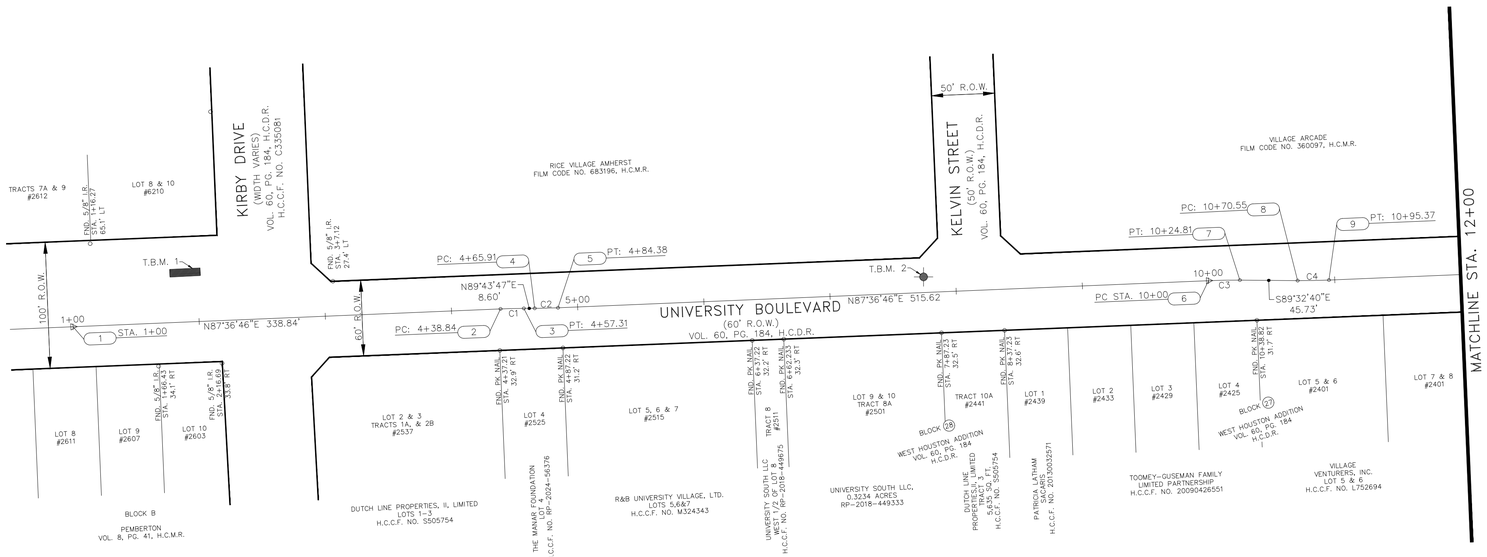


T.B.M. NO.	GRID COORDINATES	
	Y-COORD.	X-COORD.
1	13,824,972.74	3,105,123.91
2	13,824,975.20	3,106,602.11
3	13,824,972.72	3,105,708.55

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER NO. 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION
OF UNIVERSITY BOULEVARD AND LANIER DRIVE.

PUBLISHED ELEVATION (USED) = 43.77

TEMPORARY BENCHMARKS:

T.B.M. #1: SET SQUARE CUT ON A "BB" INLET LOCATED AT THE NORTHWEST CORNER OF UNIVERSITY BOULEVARD AND KIRBY DRIVE.
STA. 1+91.87', 35.7' LT
ELEV.=45.50'

T.B.M. #2: TOP BOLT IN THE WORD "MULLER" ON FIRE HYDRANT LOCATED AT THE NORTHWEST CORNER OF KELVIN DRIVE AND UNIVERSITY BOULEVARD.
STA. 7+74.79', 13.0' LT
ELEV.=48.22'

T.B.M. #3: TOP BOLT IN THE WORD "MULLER" ON FIRE HYDRANT NO. 5892991 LOCATED ALONG THE SOUTH SIDE OF UNIVERSITY BOULEVARD AT ADDRESS #2325.
STA. 16+67.79', 18.5' RT
ELEV.=49.02'

SCALE: 1"=60'
KEY MAP NO. 532C
0' 60' 120' 180'

CITY OF HOUSTON

CITY SURVEY 5355
SITE CONTROL MONUMENT 7309

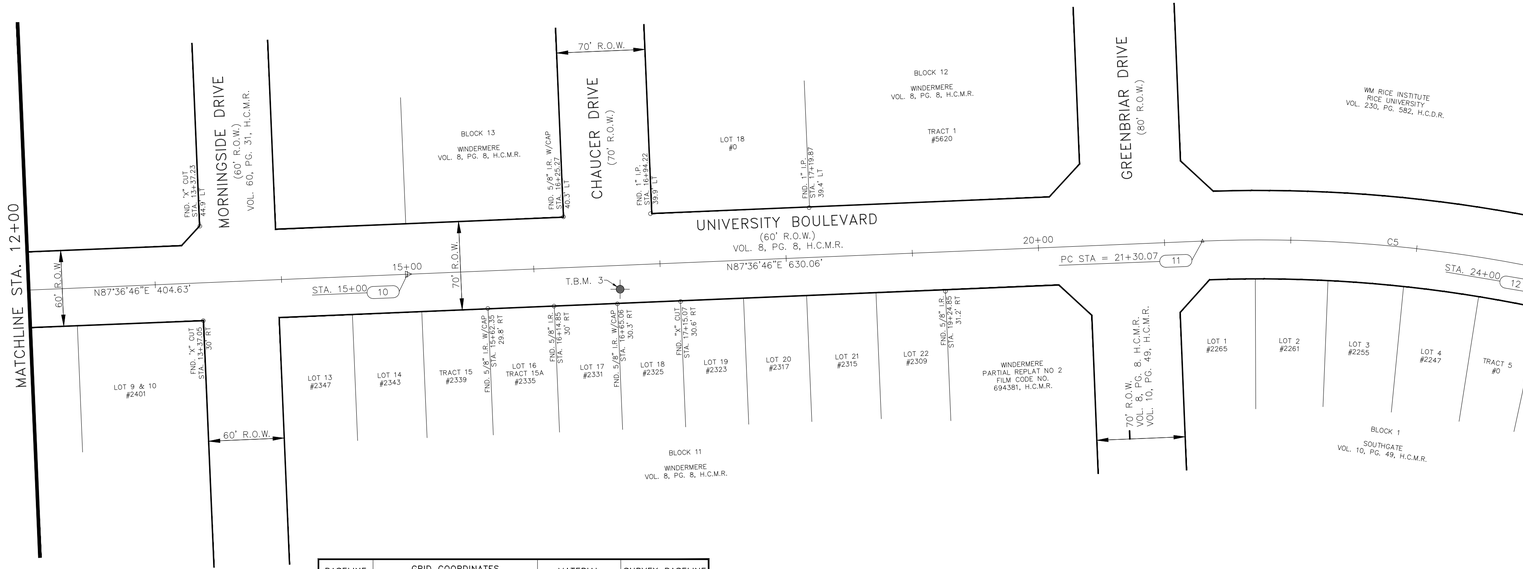
Project WBS# N-100006-0001-3
Texas Coordinate System of 1983, South Central Zone, U. S. Survey Feet
X= 3,109,737.52
Y= 13,824,137.19
Lat.= 29°42'44.83058"N
Long.= 095°24'14.98810"W
Reference Frame Used: EPOCH 2010
Vertical Adjustment Used: NAVD '88 (CORS '96)
General Location: At the southeast corner of Lanier Dr. and University Blvd.
Date Set: 8-13-2015 Type of Mark: 4B
3 Nearest project control points (bearings and distances stated below):

Keymap Page: 532-H
Orthometric Elevation = 43.77'
Ellipsoid Height = -13.953
Geoid: GEOID '12A
Datum Source & Adjustment: NAD '83 (2011)

NOTE:
1. Bearings are grid bearings.
2. Scale Factor = (0.999884905).
3. Surface = Grid / S.F.

Western Group Consultants

Western Group Consultants
11111 Katy Freeway
Suite 520
Houston, TX 77079
(713) 465-6655



BASELINE POINT NO.	GRID COORDINATES		MATERIAL SET	SURVEY BASELINE STATION
	Y-COORD.	X-COORD.		
1	13,824,933.28	3,105,035.06	SET "X" MARK	1+00
2	13,824,947.39	3,105,373.57	SET MAG NAIL	4+38.84
3	13,824,947.82	3,105,392.04	SET MAG NAIL	4.57.31
4	13,824,947.86	3,105,400.63	SET MAG NAIL	4+65.91
5	13,824,948.29	3,105,419.10	SET MAG NAIL	4+84.38
6	13,824,969.76	3,105,934.21	SET MAG NAIL	10+00
7	13,824,970.18	3,105,959.01	SET MAG NAIL	10+24.81
8	13,824,969.82	3,106,004.74	SET MAG NAIL	10+70.55
9	13,824,970.23	3,106,029.56	SET MAG NAIL	10+95.37
10	13,824,987.09	3,106,433.79	SET MAG NAIL	15+00
11	13,825,013.33	3,107,063.23	SET MAG NAIL	21+30.07
12	13,824,991.69	3,107,331.59	SET MAG NAIL	24+00

Curve Table					
Curve #	Radius	Delta	Chord	Chord Bearing	Length
C1	500.00	02°07'01"	18.47	N88°40'16"E	18.47
C2	500.00	02°07'01"	18.47	N88°40'16"E	18.47
C3	500.00	02°50'37"	24.81	N89°02'04"E	24.81
C4	500.00	02°50'40"	24.82	N89°02'02"E	24.82
C5	1,105.11	15°32'02"	298.70	S84°37'14"E	299.61

NOTES:

1) THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON TEXAS SOUTH CENTRAL ZONE NO. 4204, STATE PLANE GRID COORDINATES (NAD83).
2) COORDINATES FOR THE SURVEY BASELINE ARE GRID VALUES, SCALE FACTOR = 0.999884905.
3) ALL DISTANCES SHOWN ARE SURFACE VALUES.
4) CITY OF HOUSTON MARKER NO. 5355-7309 WAS RECOVERED ON AUGUST 11, 2025 AND WAS FOUND IN GOOD CONDITION.
THE PUBLISHED ELEVATION WAS VERIFIED AGAINST GPS OBSERVATIONS AND OTHER PROJECT TEMPORARY BENCHMARKS.

SURVEYOR'S CERTIFICATION:

I, RAYMOND A. RAHAMAN HEREBY CERTIFY THAT THIS SURVEY CONTROL MAP CORRECTLY REPRESENTS THE FACTS FOUND AS A RESULT OF AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION DURING THE MONTH OF AUGUST 2025.

RAYMOND A. RAHAMAN R.P.L.S. NO. 4354
FIRM CERTIFICATE OF REGISTRATION NO. 10038100

STATE OF TEXAS
REGISTERED
RAYMOND A. RAHAMAN
4354
PROFESSIONAL
LAND SURVEYOR

1-23-2026

WGC
WESTERN GROUP CONSULTANTS
11111 Katy Freeway, Suite 520
Houston, Texas 77079
Phone: 713/465-6655

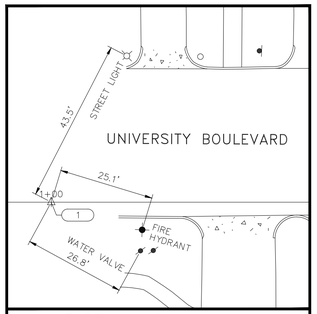
SURVEYED BY:
Western Group Consultants

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

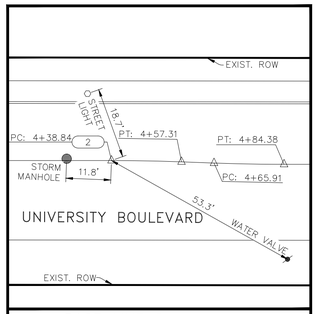
UNIVERSITY BOULEVARD PAVING AND DRAINAGE IMPROVEMENTS

SURVEY CONTROL MAP SHEET 1 OF 2

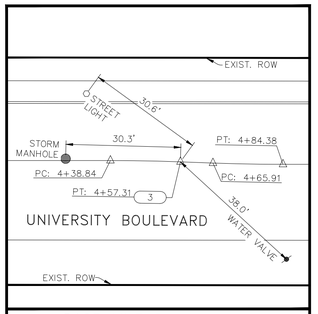
WBS NUMBER
N-100006-0001-3
DRAWING SCALE
SCALE: 1"=60'
CITY OF HOUSTON PM
SHEET NO. 07 OF 139



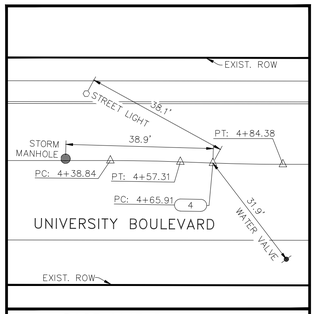
BASE LINE POINT NO. 1
STA. 1+00
SET "X" MARK



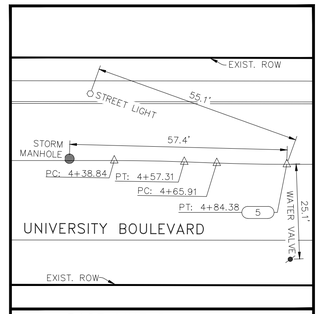
BASE LINE POINT NO. 2
STA. 4+38.84
"SET MAG NAIL"



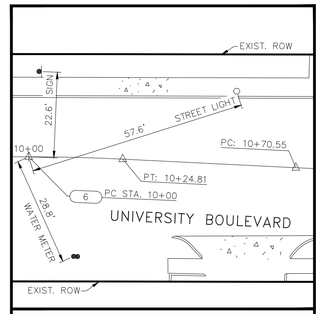
BASE LINE POINT NO. 3
STA. 4+57.31
"SET MAG NAIL"



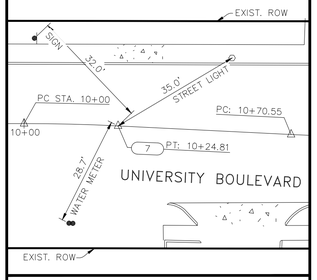
BASE LINE POINT NO. 4
STA. 4+65.91
"SET MAG NAIL"



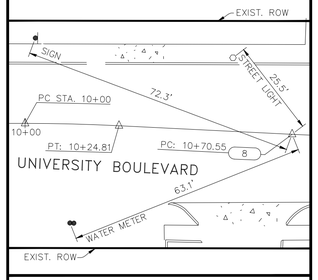
BASE LINE POINT NO. 5
STA. 4+84.38
"SET MAG NAIL"



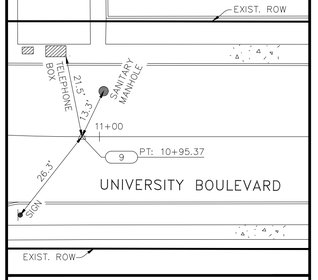
BASE LINE POINT NO. 6
STA. 10+00
"SET MAG NAIL"



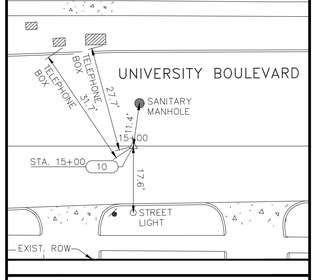
BASE LINE POINT NO. 7
STA. 10+24.81
"SET MAG NAIL"



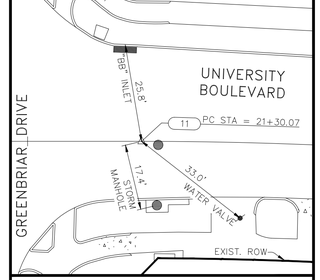
BASE LINE POINT NO. 8
STA. 10+70.55
"SET MAG NAIL"



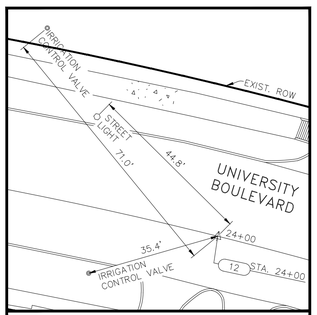
BASE LINE POINT NO. 9
STA. 10+95.37
"SET MAG NAIL"



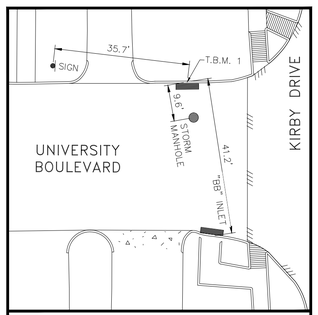
BASE LINE POINT NO. 10
STA. 15+00
"SET MAG NAIL"



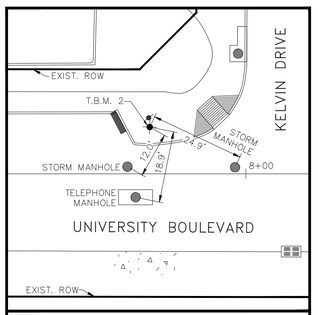
BASE LINE POINT NO. 11
STA. 21+30.07
"SET MAG NAIL"



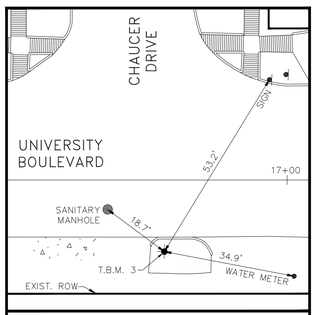
BASE LINE POINT NO. 12
STA. 24+00
"SET MAG NAIL"



T.B.M. 1
"SET SQUARE CUT"



T.B.M. 2
FIRE HYDRANT



T.B.M. 3
FIRE HYDRANT

NOTES:

1) THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON TEXAS SOUTH CENTRAL ZONE NO. 4204, STATE PLANE GRID COORDINATES (NAD83).
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3) ALL DISTANCES SHOWN ARE SURFACE VALUES.
4) CITY OF HOUSTON MARKER NO. 5355-7309 WAS RECOVERED ON AUGUST 11, 2025 AND WAS FOUND IN GOOD CONDITION. THE PUBLISHED ELEVATION WAS VERIFIED AGAINST GPS OBSERVATIONS AND OTHER PROJECT TEMPORARY BENCHMARKS.

SURVEYOR'S CERTIFICATION:

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RAYMOND A. RAHAMAN
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LAND SURVEYOR

1-23-2026

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Phone: 713/465-6655

SURVEYED BY:
Western Group Consultants

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

UNIVERSITY BOULEVARD
PAVING AND DRAINAGE IMPROVEMENTS

SURVEY CONTROL MAP
SHEET 2 OF 2

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
SCALE: 1"=20'
CITY OF HOUSTON PM
SHEET NO. 08 OF 139

LOG OF BORING

PROJECT: 1946-G-Paving and Drainage
1300 - 2600 University Bouleveard
Houston, Texas

CLIENT: GC Engineering
2505 Park Avenue, Pearland, Texas 77581

BORING NO. B-1
PROJECT NO. 1946
DATE 12-20-15
SURFACE ELEVATION 46.5
NORTH 13826545.735600
EAST 3105699.124300

DRILLING METHOD(S):
Continuous Flight Auger (CFA)

GROUNDWATER INFORMATION:
Free groundwater was encountered at a depth of 17 feet on drilling tools during drilling

FIELD DATA				LABORATORY DATA							
DEPTH (FT)	SOIL SYMBOL	SAMPLES	N: BLOWS/FT T: TONS/SQ FT P: TONS/SQ FT R: PERCENT RQD: PERCENT	MOISTURE CONTENT (%)	DRY DENSITY POUNDS/CU FT	ATTERBERG LIMITS (%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	Minus #200 (%)	Shear Strength (TSF)	DESCRIPTION OF STRATUM
0											0.4 Asphalt
											1.0 Concrete
2			P=4.5	19		50	19	31	54		Very stiff to hard, gray and tan SANDY FAT CLAY
			P=4.0	21							
4											
			P=3.5	19							
6											
			P=4.5	17							
8											
			P=4.5	18	101					0.86	
10											10.0
			P=1.0	14		45	17	28	31		Stiff, light brown CLAYEY SAND
12											12.0
			N=11	7							Loose to medium dense, light brown SILTY SAND
14			N=8	12							
16			N=9	23							
18			N=13	23							
20											
			N=12	23							
22											
24			N=9	23							26.0

N - STANDARD PENETRATION TEST RESISTANCE
T - TORVANE
P - POCKET PENETROMETER RESISTANCE
R - PERCENTAGE OF ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

Kenall Inc.
Geotechnical, Environmental & Material Engineers

PLATE NO. A- 1

LOG OF BORING

PROJECT: 1946-G-Paving and Drainage
1300 - 2600 University Bouleveard
Houston, Texas

CLIENT: GC Engineering
2505 Park Avenue, Pearland, Texas 77581

BORING NO. B-2
PROJECT NO. 1946
DATE 12-20-15
SURFACE ELEVATION 45.8
NORTH 13826542.429700
EAST 3106160.489200

DRILLING METHOD(S):
Continuous Flight Auger (CFA)

GROUNDWATER INFORMATION:
No groundwater was encountered

FIELD DATA				LABORATORY DATA							
DEPTH (FT)	SOIL SYMBOL	SAMPLES	N: BLOWS/FT T: TONS/SQ FT P: TONS/SQ FT R: PERCENT RQD: PERCENT	MOISTURE CONTENT (%)	DRY DENSITY POUNDS/CU FT	ATTERBERG LIMITS (%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	Minus #200 (%)	Shear Strength (TSF)	DESCRIPTION OF STRATUM
0											0.3 Asphalt
											0.8 Concrete
2			P=3.0	22							Very stiff to hard, gray and tan SANDY FAT CLAY with calcareous nodules
			P=4.5	19							
4											
			P=3.5	20		62	21	41	69		
6											
			P=2.5	21							
8											
			P=3.0	23	103					0.76	
10											10.0
			N=11	15							Loose to medium dense, light gray and tan SILTY SAND
12											
			N=2	22							
14											
			N=9 Non plastic	22					6		
16											
			N=6	22							
18											
			N=29	20							
20											
			N=27	20							
22											
24			N=11	20							26.0

N - STANDARD PENETRATION TEST RESISTANCE
T - TORVANE
P - POCKET PENETROMETER RESISTANCE
R - PERCENTAGE OF ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

Kenall Inc.
Geotechnical, Environmental & Material Engineers

PLATE NO. A- 2

LOG OF BORING 1946.GPJ KENALL.GDT 1/13/16

GC Engineering, Inc.
M:\Projects\G - 07778-COH-UnivBlvd-SP1\Drawings\Boring Logs-G07778.dwg Feb 04, 2026 - 7:07pm nburroms\ku

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SOIL BORING LOGS
B-1, B-2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 9 OF 139	

LOG OF BORING

PROJECT: 1946-G-Paving and Drainage
1300 - 2600 University Bouleveard
Houston, Texas

CLIENT: GC Engineering
2505 Park Avenue, Pearland, Texas 77581

BORING NO. B-3
PROJECT NO. 1946
DATE 12-20-15
SURFACE ELEVATION 46.4
NORTH 13826600.047500
EAST 3106857.106000

DRILLING METHOD(S):
Continuous Flight Auger (CFA)

GROUNDWATER INFORMATION:
No groundwater was encountered

DEPTH (FT)	SOIL SYMBOL	SAMPLES	N: BLOWS/FT T: TONS/SQ FT P: TONS/SQ FT R: PERCENT RQD: PERCENT	MOISTURE CONTENT (%)	DRY DENSITY POUNDS/CU FT	ATTERBERG LIMITS (%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	Minus #200 (%)	Shear Strength (TSF)	DESCRIPTION OF STRATUM
											0.7 Asphalt
											1.0 Concrete
2			P=1.25	25							Firm to very stiff, gray, tan and reddish brown FAT CLAY with calcareous nodules
			P=1.75	26							
4											
			P=2.0	27							
6											
			P=3.75	27		75	25	50	97		
8											
			P=3.25	19							
10											10.0
			P=1.75	18							Stiff to hard, gray, tan and reddish brown LEAN CLAY with calcareous nodules and sand
12											
			P=2.0	17							
14											
			P=3.0	17							
16											
			P=3.0	20	101					0.71	
18											
			P=4.5	15		46	17	29	75		
20											
			P=4.5	15							
22											22.0
24											

N - STANDARD PENETRATION TEST RESISTANCE
T - TORVANE
P - POCKET PENETROMETER RESISTANCE
R - PERCENTAGE OF ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

Kenall Inc.
Geotechnical, Environmental & Material Engineers

PLATE NO. A- 3

LOG OF BORING

PROJECT: 1946-G-Paving and Drainage
1300 - 2600 University Bouleveard
Houston, Texas

CLIENT: GC Engineering
2505 Park Avenue, Pearland, Texas 77581

BORING NO. B-4
PROJECT NO. 1946
DATE 12-20-15
SURFACE ELEVATION 45.8
NORTH 13826613.123600
EAST 3107212.527600

DRILLING METHOD(S):
Continuous Flight Auger (CFA)

GROUNDWATER INFORMATION:
No groundwater was encountered

DEPTH (FT)	SOIL SYMBOL	SAMPLES	N: BLOWS/FT T: TONS/SQ FT P: TONS/SQ FT R: PERCENT RQD: PERCENT	MOISTURE CONTENT (%)	DRY DENSITY POUNDS/CU FT	ATTERBERG LIMITS (%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	Minus #200 (%)	Shear Strength (TSF)	DESCRIPTION OF STRATUM
											0.8 Asphalt
2			P=2.75	25							Very stiff to hard, light gray, tan and reddish brown FAT CLAY with calcareous nodules
			P=4.5	23		63	21	42	93		
4											
			P=4.5	23							
6											
			P=4.5	25							
8											
			P=4.5	25							
10											
			P=4.5	11							
12											
			P=4.5	14							
14											
			P=4.5	17							
16											16.0
			P=4.5	16	105					0.68	Hard, tan and reddish brown FAT CLAY with sand
18											
			P=4.5	16		50	18	32	82		
20											
			P=4.5	17							
22											22.0
24											

N - STANDARD PENETRATION TEST RESISTANCE
T - TORVANE
P - POCKET PENETROMETER RESISTANCE
R - PERCENTAGE OF ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

Kenall Inc.
Geotechnical, Environmental & Material Engineers

PLATE NO. A- 4

LOG OF BORING 1946.GPJ KENALL.GDT 1/13/16

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SOIL BORING LOGS
B-3, B-4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 10 OF 139	

GC Engineering, Inc.
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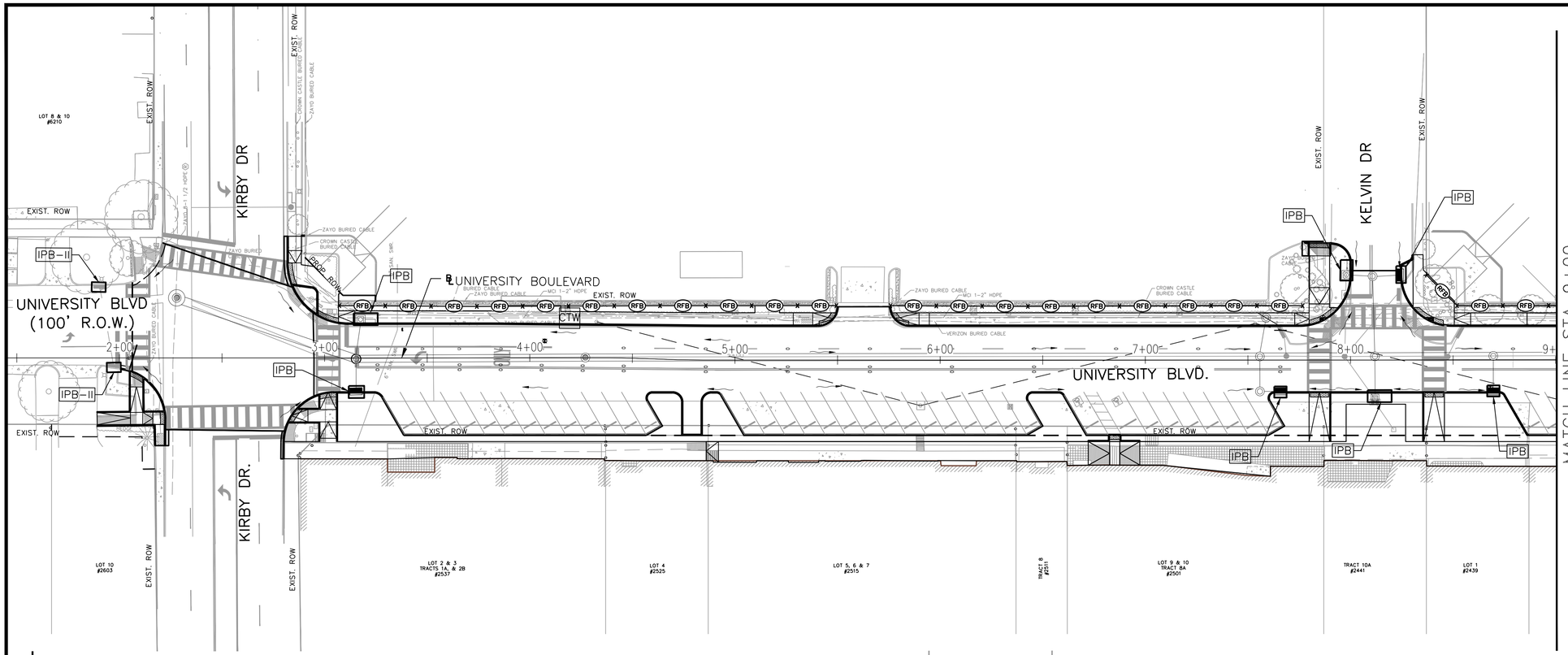

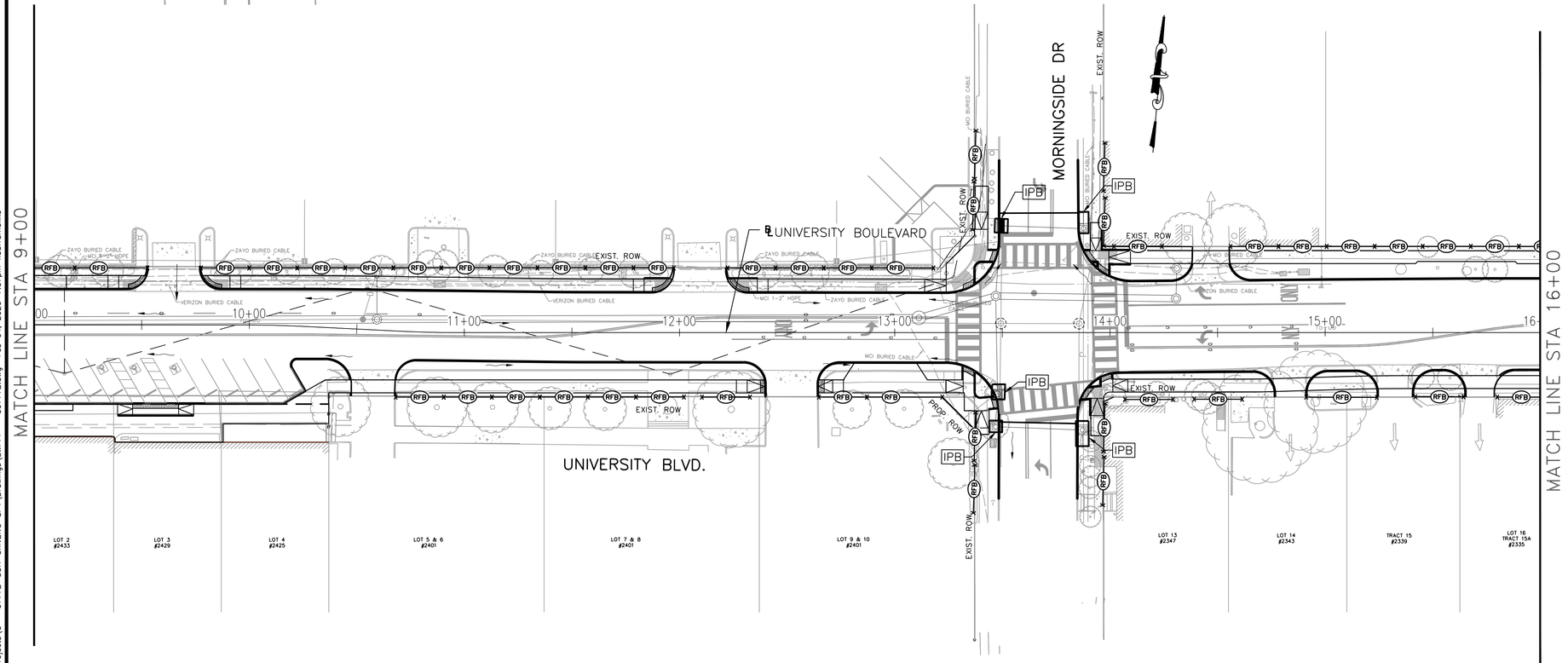

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- RFB — REINFORCED FILTER FABRIC BARRIER
- RIGHT OF WAY (R.O.W)
- IPB — INLET PROTECTION BARRIER (IPB) STAGE I & II
- IPB-II — IPB STAGE II ONLY
- SHEET FLOW

NOTES

1. CONTRACTOR TO INSTALL IPB STAGE-I FOR INLETS PRIOR TO INSTALLATION OF STAGE II INLET. AFTER CURB & PAVEMENT CONSTRUCTION IS COMPLETED INSTALL IPB STAGE-II, SAND BAGS AROUND INLETS.
2. MEASUREMENT FOR IPB STAGE-I SHALL BE 24 LF PER INLET TO INSTALL AND REMOVE. ALL INLET TYPES
3. FOR BEST MANAGEMENT PRACTICES (BMP), REFER TO SWPPP DETAIL SHEET 13 OF 139

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STORM WATER POLLUTION PREVENTION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"1"= =3030'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 11 OF 139	

GC Engineering, Inc.
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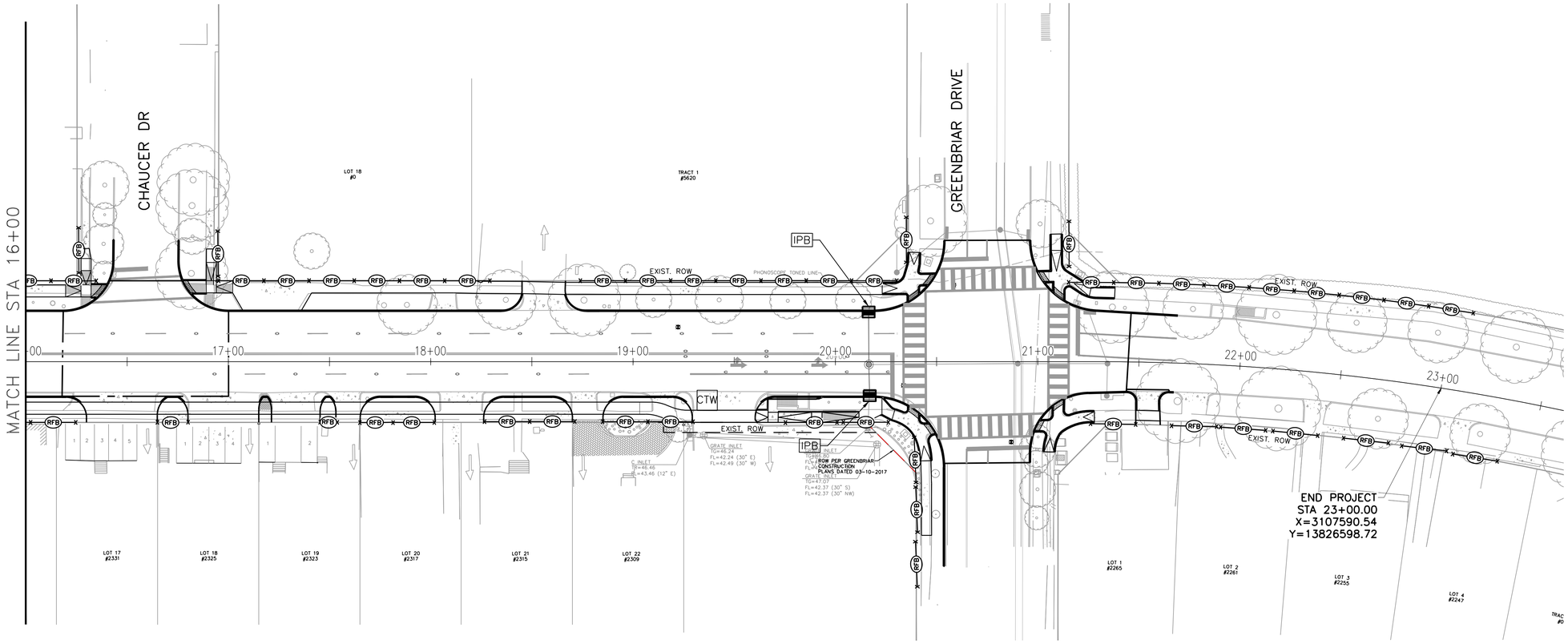

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- RFB — REINFORCED FILTER FABRIC BARRIER
- RIGHT OF WAY (R.O.W)
- IPB — INLET PROTECTION BARRIER (IPB) STAGE I & II
- SHEET FLOW

NOTES

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MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STORM WATER POLLUTION PREVENTION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"1"= =3030'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 12 OF 139	

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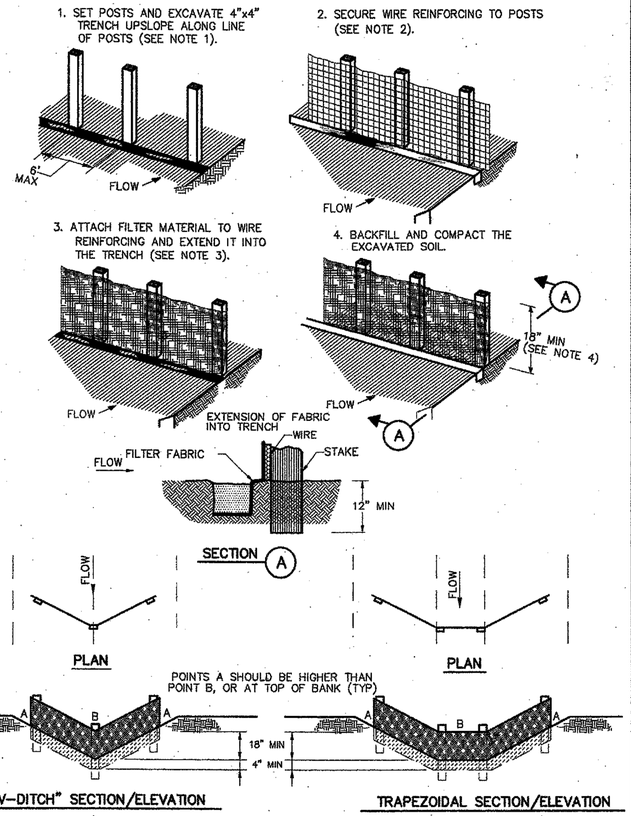
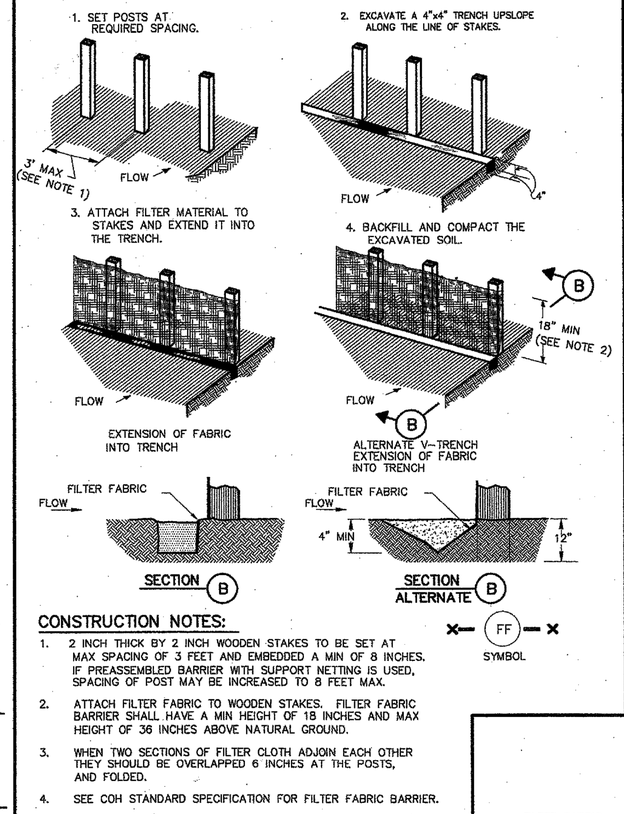


CONSTRUCTION NOTES:

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

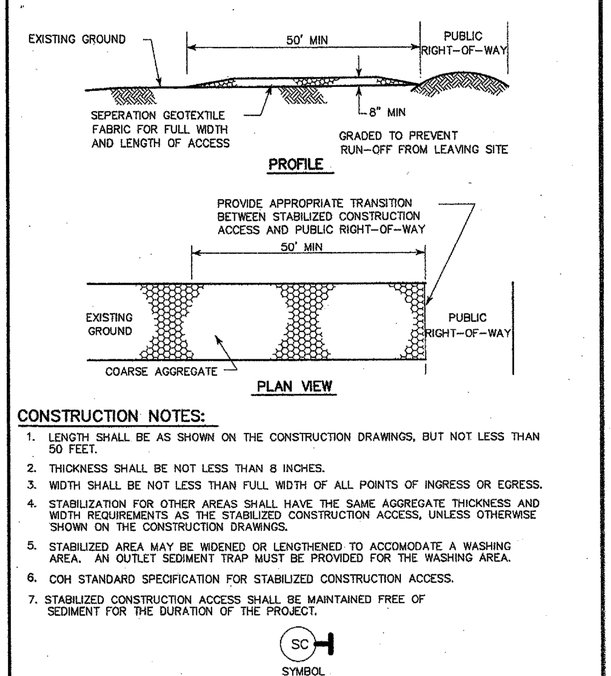


CONSTRUCTION NOTES:

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

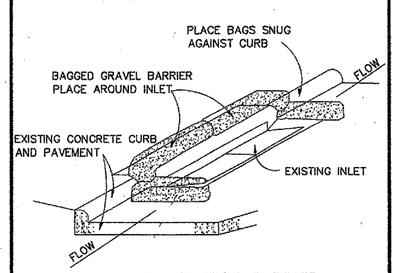


CONSTRUCTION NOTES:

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.

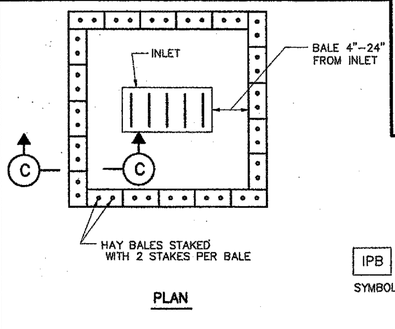
SC
SYMBOL

STABILIZED CONSTRUCTION ACCESS

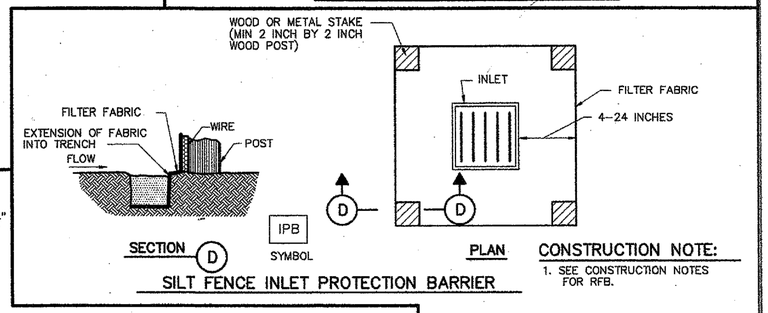


INLET PROTECTION BARRIER

(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.

GC ENGINEERING, INC.
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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010
DWG NO: 01571-01

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – STORM WATER POLLUTION PREVENTION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 13 OF 139	

GC Engineering, Inc.
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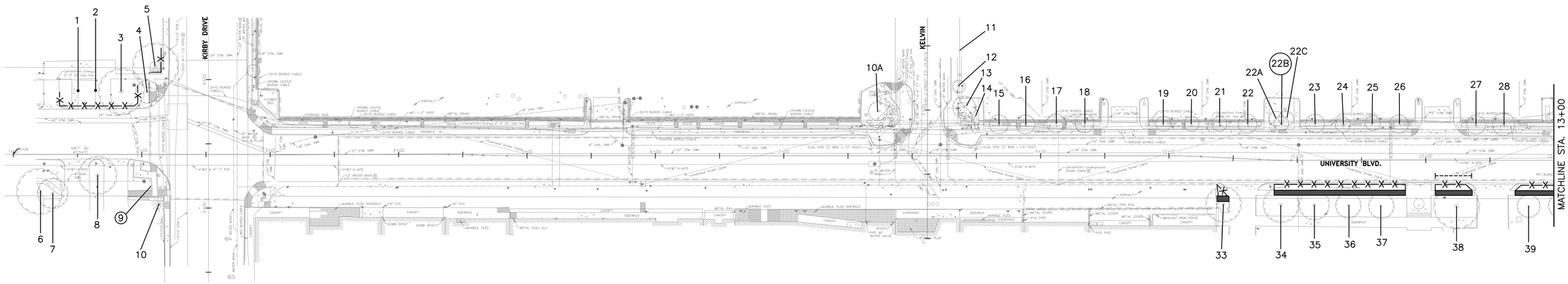

Tree No.	Location	Description	Comments	Treatment
1	2604 University	17" American Elm	West U Ordinance tree, Thin canopy	Fence
2	2604 University	31" American Elm	West U Ordinance tree, Large deadwood	Fence
3	2604 University	23" Green Ash	West U Ordinance tree, Thin canopy	Fence
4	2604 University	15" Magnolia	West U Ordinance tree, Thin canopy, Contractor to coordinate traffic signal installation with City of West University Place Forester and Public Works	Contractor to coordinate with City of West University Place City Forester and Public Works prior to starting any demolition or construction for traffic signal - tree protection to be finalized with City of West University review, Fence, Clearance prune
5	2604 University	22" Pecan	West U Ordinance tree, Private tree	Fence
6	2607 University	18" Arizona Ash	West U Ordinance tree, Thin canopy	
7	2607 University	15" Arizona Ash	West U Ordinance tree, Thin canopy	
8	2607 University	18" Live Oak	West U Ordinance tree	
9	2607 University	20' Palm	Not protected by West U ordinance, Remove for new signal pole & mast arm	Remove tree, No replacement required
10	2607 University	40' Palm	Private tree	
10A	2607 University	9" Live Oak	Private tree	
11	2414 University	6" Lacebark Elm	Ordinance tree	
12	2414 University	9" Lacebark Elm	Ordinance tree	
13	2414 University	3" Italian Cypress	Not Ordinance tree	
14	2414 University	3" Italian Cypress	Not Ordinance tree	
15	2414 University	11" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
16	2414 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
17	2414 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
18	2414 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
19	2414 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
20	2414 University	9" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
21	2414 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
22	2414 University	11" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
22A	2414 University	6" Crepe Myrtle	Private tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
22B	2414 University	6" Crepe Myrtle	Not ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
22C	2414 University	6" Crepe Myrtle	Private tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
23	2400 University	11" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
24	2400 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
25	2400 University	8" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
26	2400 University	10" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
27	2400 University	11" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
28	2400 University	11" Lacebark Elm	Restricted grow space, Thin, Ordinance tree, Will have to remove for 6' wide sidewalk, Preservation will require field changes during construction	Contractor to coordinate with HPW project manager and City of Houston forestry prior to doing any demolition of existing or excavation for proposed walk
33	2401 University	11" Live Oak	Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
34	2401 University	11" Live Oak	Ordinance tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
35	2401 University	12" Live Oak	Ordinance tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
36	2401 University	9" Live Oak	Ordinance tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
37	2401 University	10" Live Oak	Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
38	2401 University	21" Live Oak	Private tree	Root prune for street, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
39	2401 University	11" Live Oak	Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune

NOTE:

1. THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED JANUARY 2026. THE PLAN CONSIDERS ALL FITTINGS, VERTICAL OFFSETS AND AREAS OF NECESSARY EXCAVATION. CHANGES MADE TO DESIGN MAY COMPROMISE THE TREE PROTECTION PLAN. REFER SPECIFICATIONS 01562 AND 02915. CONDITION OF EACH TREE IS BASED ON VISUAL EVALUATION AT TIME OF DESIGN. CONDITION AND STRUCTURAL INTEGRITY OF EACH TREE IS NOT GUARANTEED BY DESIGNER AT ANY POINT IN THE FUTURE, AS ENVIRONMENTAL AND MAINTENANCE INFLUENCES ON EACH TREE CAN NOT BE DETERMINED BY DESIGNER.
2. IN AREAS WHERE INDIVIDUAL TREES HAVE NOT BEEN TIED IN BY SURVEY APPROXIMATE LOCATION IS INDICATED ON TPP. ACCURACY OF REPRESENTED LOCATION CAN'T, AND IS NOT GUARANTEED BY DESIGNER.
3. THE CONTRACTOR'S ARBORTIST WILL MARK LOCATIONS OF THE NEW TREES AND OBTAIN APPROVAL BY THE CITY ENGINEER AND CITY FORESTER BEFORE PURCHASING AND PLANTING TREES.

TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- —X—X— TREE PROTECTION FENCE
- ROOT PRUNING TRENCH
- ⑨ TREE TO BE REMOVED
- DEMO AND/OR FORM WALK WITHOUT DAMAGE TO ROOTS 1" DIAMETER OR LARGER
- OCC — ZERO CURB CUTBACK
- REPLACEMENT PLANTING SPECIES AND SIZE/TYPE

SCALE: 1"=40'

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. ◦ Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com
Approved : Craig N Koehl 01-26-2026

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

TREE PROTECTION PLAN

SHEET 1 OF 3

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
AS SHOWN	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 14 OF 139	

GC Engineering, Inc.
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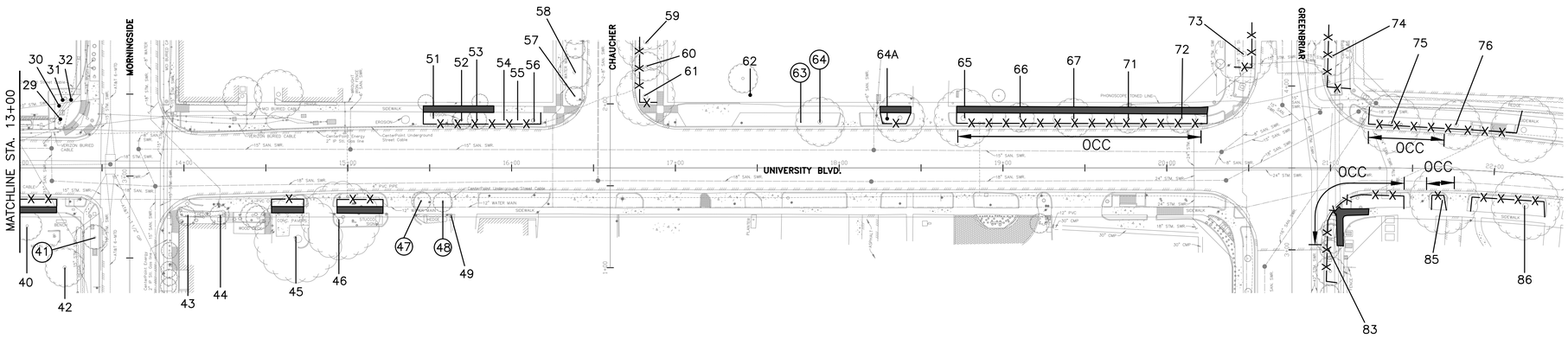

Tree No.	Location	Description	Comments	Treatment
29	2400 University	12" Italian Cypress	Not Ordinance tree	
30	2400 University	12" Italian Cypress	Not Ordinance tree	
31	2400 University	12" Italian Cypress	Not Ordinance tree	
32	2400 University	12" Italian Cypress	Not Ordinance tree	
40	2401 University	12" Live Oak	Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
41	2401 University	10" Live Oak	Ordinance tree, Remove for inlet and storm	Remove tree, 10" replacement required per Chapter 33
42	2401 University	16" Live Oak	Private tree	
43	2347 University	4" Crepe Myrtle	Not Ordinance tree	
44	2347 University	4" Crepe Myrtle	Not Ordinance tree	
45	2343 University	43" Live Oak	65% dieback, Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence
46	2343 University	31" Live Oak	80% dieback, Private tree	Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence
47	2339 University	11" Live Oak	Remove for walk, Ordinance tree	Remove tree, Provide 11" in replacement planting
48	2339 University	12" Live Oak	Remove for walk, Ordinance tree	Remove tree, Provide 12" in replacement planting
49	2339 University	2" Photinia	Not Ordinance tree	
51	2332 University	10" Magnolia	Ordinance tree	Demo street & curb without disturbance back of curb, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
52	2332 University	11" Magnolia	Ordinance tree	Demo street & curb without disturbance back of curb, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
53	2332 University	12" Magnolia	Ordinance tree	Demo street & curb without disturbance back of curb, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
54	2332 University	3" Lead tree	Not ordinance tree, Visibility triangle concerns, Should be reviewed by COH traffic engineers	Fence
55	2332 University	3" Citrus	Not ordinance tree, Visibility triangle concerns, Should be reviewed by COH traffic engineers	Fence
56	2332 University	3" Lead tree	Not ordinance tree, Visibility triangle concerns, Should be reviewed by COH traffic engineers	Fence
57	2332 University	9" Crepe Myrtle	Not Ordinance tree	
58	2332 University	11" Crepe Myrtle	Not Ordinance tree	
59	Rice University	18" Crepe Myrtle	Not Ordinance tree	Fence
60	Rice University	4" Crepe Myrtle	Not Ordinance tree	Fence
61	Rice University	20" Crepe Myrtle	Ordinance tree, Dieback	Demo street & curb without disturbance back of curb, Fence, Clearance prune
62	Rice University	16" Sugarberry	Private tree	
63	Rice University	Stump	Remove for walk	Remove stump, No replacement required
64	Rice University	12" Crepe Myrtle	Remove for walk, Not ordinance tree	Remove tree, No replacement required
64A	Rice University	18" Live Oak	Ordinance tree	Demo street & curb without disturbance back of curb, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
65	Rice University	23" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
66	Rice University	14" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
67	Rice University	21" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
71	Rice University	17" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
72	Rice University	14" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
73	Rice University	26" Live Oak	Ordinance tree	Fence
74	Rice University	20" Live Oak	Thin canopy, Ordinance tree	Fence
75	Rice University	18" Live Oak	Ordinance tree	Zero Curb Cutback, Fence, Clearance prune
76	Rice University	21" Live Oak	Trunk scars, Ordinance tree	Fence, Clearance prune
83	2265 University	11" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune
85	2265 University	30" Live Oak	40% dieback, Ordinance tree	Zero Curb Cutback, Fence, Clearance prune
86	2261 University	29" Live Oak	Ordinance tree	Zero Curb Cutback, Demo-form-pour walk without damage to tree roots 1" diameter or larger, Fence, Clearance prune

TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- —X—X— TREE PROTECTION FENCE
- ROOT PRUNING TRENCH
- (9) TREE TO BE REMOVED
- DEMO AND/OR FORM WALK WITHOUT DAMAGE TO ROOTS 1" DIAMETER OR LARGER
- OCC — ZERO CURB CUTBACK
- REPLACEMENT PLANTING SPECIES AND SIZE/TYPE

40 0 40
SCALE: 1"=40'

NOTE:

1. THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED JANUARY 2026. THE PLAN CONSIDERS ALL FITTINGS, VERTICAL OFFSETS AND AREAS OF NECESSARY EXCAVATION. CHANGES MADE TO DESIGN MAY COMPROMISE THE TREE PROTECTION PLAN. REFER SPECIFICATIONS 01562 AND 02915. CONDITION OF EACH TREE IS BASED ON VISUAL EVALUATION AT TIME OF DESIGN. CONDITION AND STRUCTURAL INTEGRITY OF EACH TREE IS NOT GUARANTEED BY DESIGNER AT ANY POINT IN THE FUTURE, AS ENVIRONMENTAL AND MAINTENANCE INFLUENCES ON EACH TREE CAN NOT BE DETERMINED BY DESIGNER.
2. IN AREAS WHERE INDIVIDUAL TREES HAVE NOT BEEN TIED IN BY SURVEY APPROXIMATE LOCATION IS INDICATED ON TPP. ACCURACY OF REPRESENTED LOCATION CAN'T, AND IS NOT GUARANTEED BY DESIGNER.
3. THE CONTRACTOR'S ARBORTIST WILL MARK LOCATIONS OF THE NEW TREES AND OBTAIN APPROVAL BY THE CITY ENGINEER AND CITY FORESTER BEFORE PURCHASING AND PLANTING TREES.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. ◦ Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com
Approved : Craig N. Koehl 01-26-2026

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

TREE PROTECTION PLAN

SHEET 2 OF 3

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
AS SHOWN	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 15 OF 139	

GC Engineering, Inc.
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Tree Removal List

Tree No.	Location	Description	Replacement requirement
9	2607 University	20' Palm	0
41	2401 University	10" Live Oak	10
47	2339 University	11" Live Oak	11
48	2339 University	12" Live Oak	12
63	Rice University	Stump	0
64	Rice University	12" Crepe Myrtle	0
		TOTAL REPLACEMENT INCHES REQUIRED	**23**

Tree Replacement List

Quantity	Caliper Size	Species	Container/Tree Spade size
	TOTAL REPLACEMENT INCHES INCLUDED IN PLAN		**0**

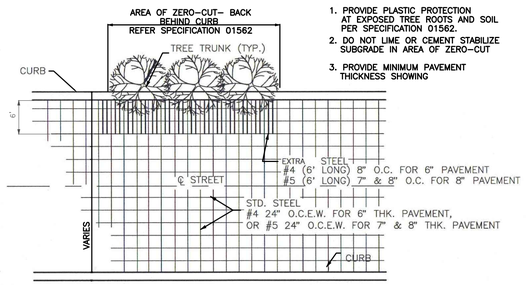
NOTE: Tree replacement locations are not shown on plans. Contractor must coordinate with City of Houston Urban Forestry and Houston Public Works prior to PURCHASING trees. This project may not have adequate room for all required replacement trees withou

Trees are to be maintained and watered for 2 years following planting per standard spec 02915. Timing of planting may be delayed in periods of drought with mandatory water restrictions in place-timing to be coordinated with City of Houston Forestry.

Tree replacement locations shall comply with Houston Public Works spec sections 02811, 02911, 02912, 02915, 02921 & 02922. In general trees along sides of street right of ways shall be no closer than 3' to back of curb or 20' from another tree. Trees in

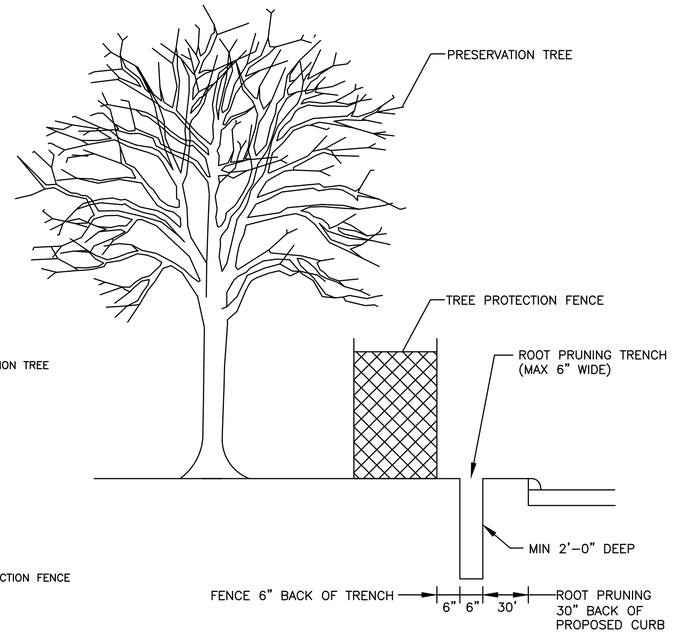
Cash Allowance Due Parks from HPW for Balance of Mitigation Not Planted on Project

	Required Mitigation total	Mitigation rate/inch	
0-5.99"	0	$ 297.98	$ -
6-11.99"	21	496.64	$ 10,429.44
12" +	12	662.19	$ 7,946.28
		TOTAL REQUIRED MITIGATION FEE	**$ 18,375.72**

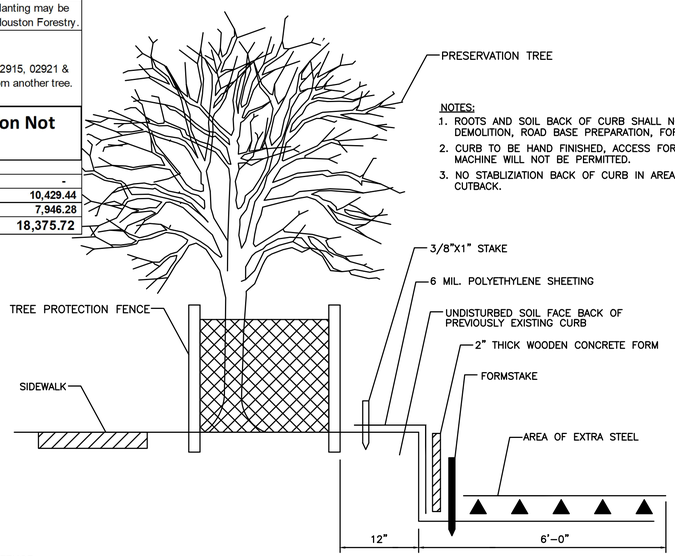


NOTE:
1. PROVIDE PLASTIC PROTECTION AT EXPOSED TREE ROOTS AND SOIL PER SPECIFICATION 01562.
2. DO NOT LIME OR CEMENT STABILIZE SUBGRADE IN AREA OF ZERO-CUT
3. PROVIDE MINIMUM PAVEMENT THICKNESS SHOWING

ZERO CURB CUTBACK DETAIL
EXTRA STEEL BEHIND CURB
NOT TO SCALE

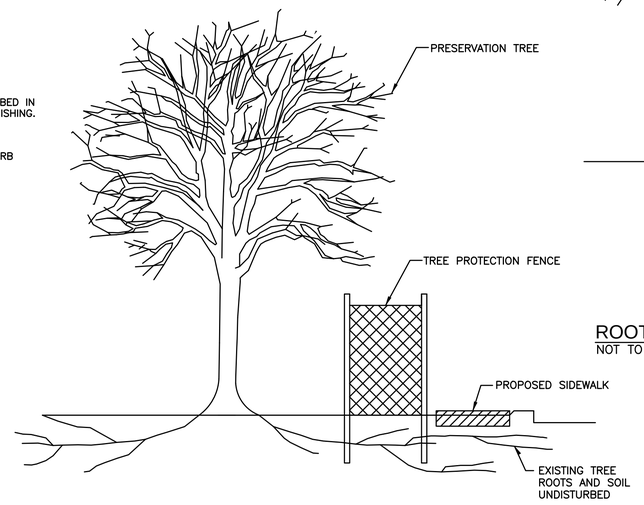


ROOT PRUNE FOR STREET-CURB & GUTTER - NO 0CC
NOT TO SCALE

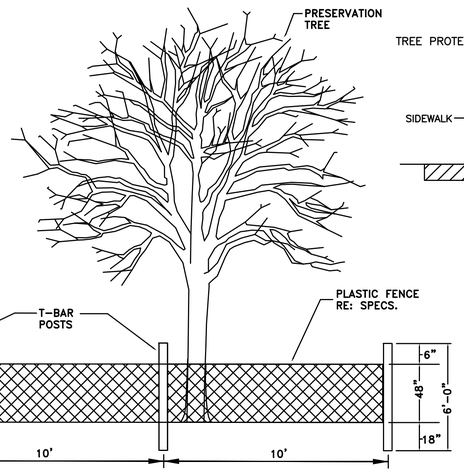


NOTES:
1. ROOTS AND SOIL BACK OF CURB SHALL NOT BE DISTURBED IN DEMOLITION, ROAD BASE PREPARATION, FORMING, OR FINISHING.
2. CURB TO BE HAND FINISHED, ACCESS FOR SLIP CURB MACHINE WILL NOT BE PERMITTED.
3. NO STABLIZIATION BACK OF CURB IN AREA OF ZERO CURB CUTBACK.

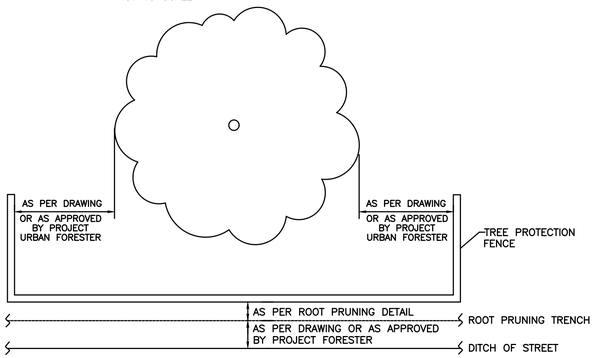
ZERO CURB CUTBACK DETAIL-PROFILE VIEW
NOT TO SCALE



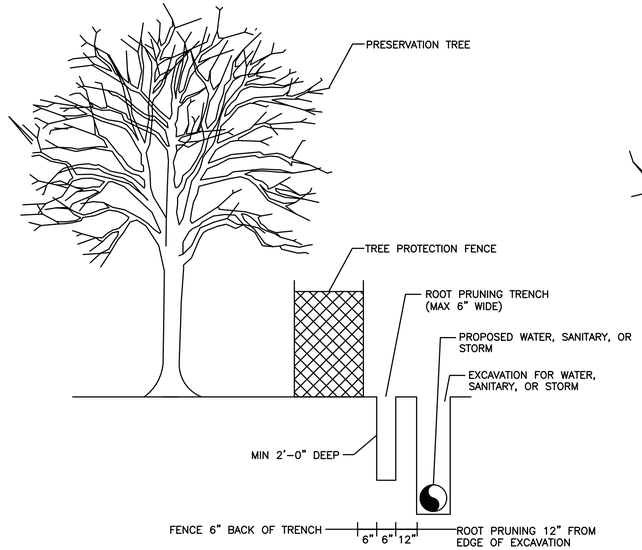
DEMO-FORM-POUR WALK WITHOUT DAMAGE TO TREE ROOTS 1" DIAMETER OR LARGER
NOT TO SCALE



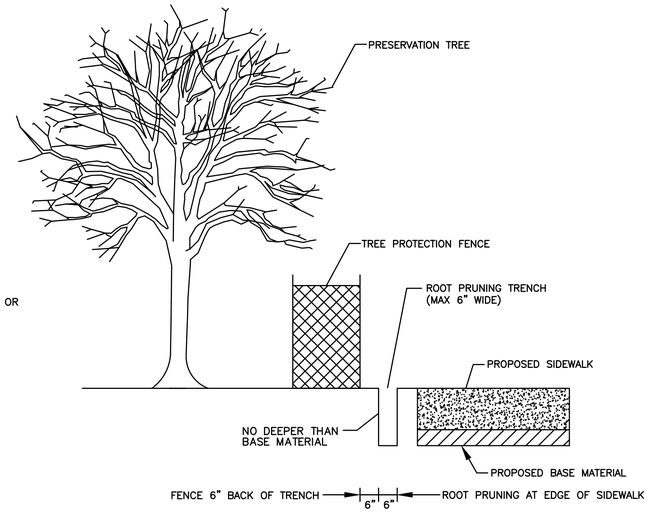
TREE PROTECTION FENCING DETAIL A
NOT TO SCALE



TREE PROTECTION FENCING DETAIL B
NOT TO SCALE



ROOT PRUNE FOR WATER, SANITARY, OR STORM LINE
NOT TO SCALE



ROOT PRUNE FOR SIDEWALK
NOT TO SCALE

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Approved : Craig N Koehl 01-26-2026

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

TREE PROTECTION PLAN

SHEET 3 OF 3

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
AS SHOWN	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 16 OF 139	

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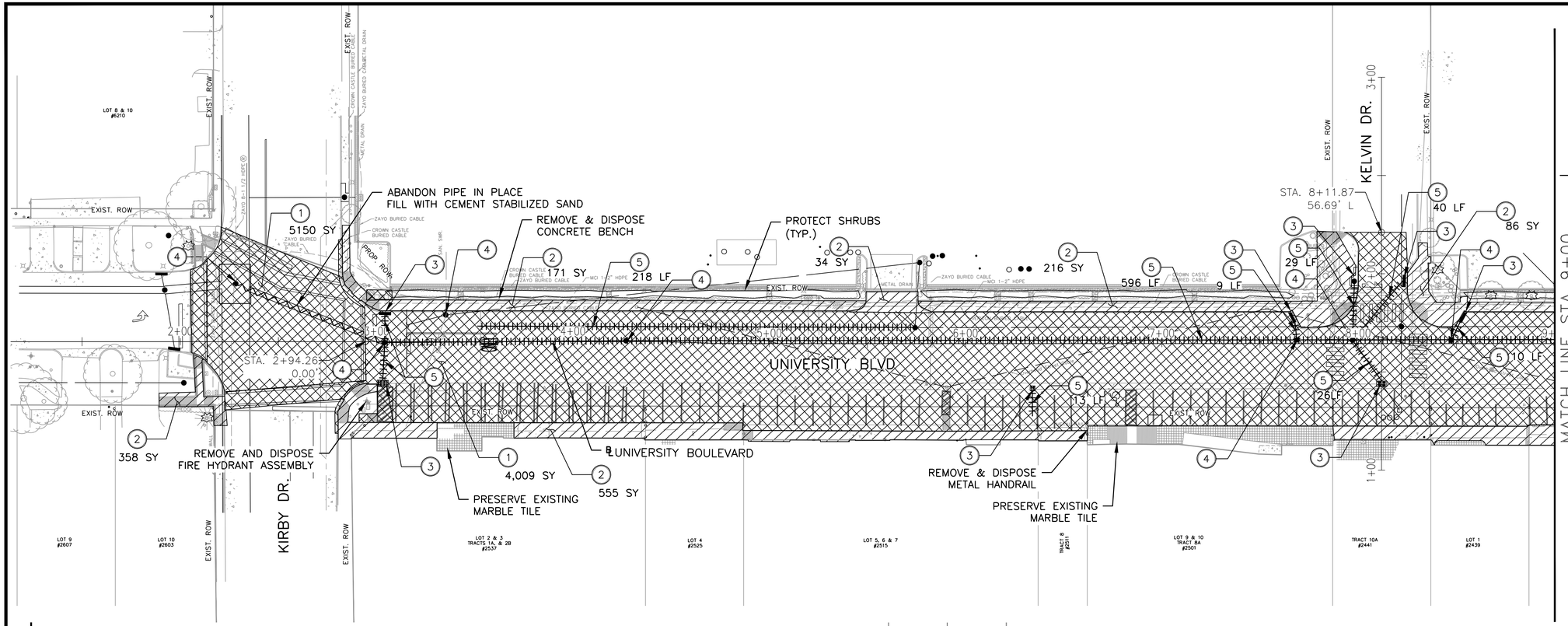

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

REMOVAL LAYOUT

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 17 OF 139	

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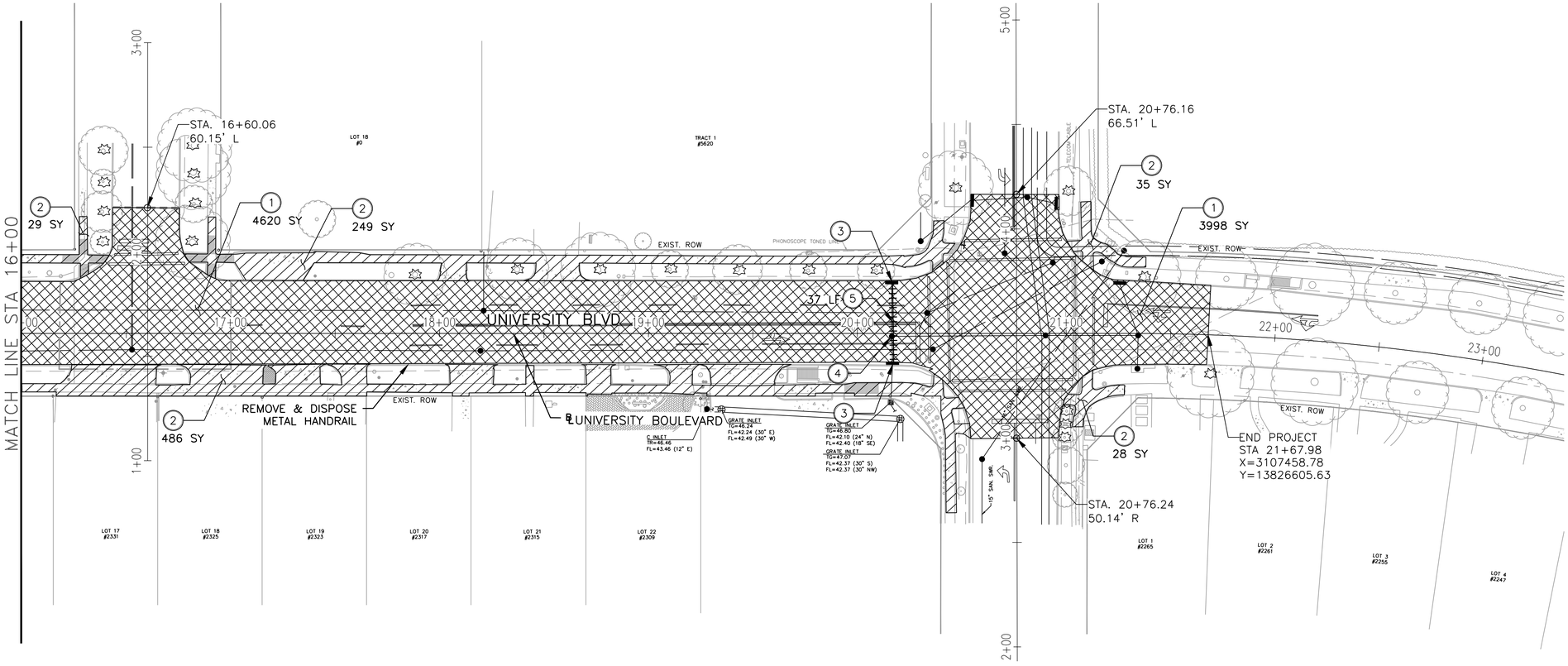

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- BASELINE
- PROTECTED TREES/SHRUBS
- RIGHT-OF-WAY (R.O.W)
- EXIST. CONCRETE PAVEMENT WITH OR WITHOUT ASPHALT OVERLAY (TO BE REMOVED)
- EXIST. SIDEWALK AND DRIVEWAYS (TO BE REMOVED)

(1) REMOVE & DISPOSE OF CONCRETE PAVEMENT WITH OR WITHOUT ASPHALT OVERLAY, INCLUDING CURBS AND EXCAVATION (ALL DEPTHS AND THICKNESSES)

(2) REMOVE & DISPOSE OF CONCRETE SIDEWALK AND DRIVEWAYS (VARYING DEPTH)

(3) REMOVE STRUCTURE (INLET)(ALL TYPES)

(4) REMOVE STRUCTURE (MANHOLE)

(5) REMOVE STRUCTURE (PIPE) (ALL SIZES AND DEPTHS)

NOTE

1. THE CONTRACTOR SHALL REMOVE THE CONCRETE PAVEMENT, ASPHALT PAVEMENT, AND CONCRETE AND ASPHALT DRIVEWAYS WITHIN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL SAWCUT THE DRIVEWAYS, AND ROADWAYS AT THE LIMIT OF REMOVAL AREAS PRIOR TO DEMOLITION WORK. ALL WORK INCLUDING BUT NOT LIMITED TO BASE, PAVEMENT REMOVAL, SAW CUTTING, HAULING, AND OFF-SITE DISPOSAL SHALL BE INCIDENTAL TO RELATED BID ITEMS.
2. FOR REMOVAL OF EXISTING TRAFFIC SIGNS, SEE SIGNING AND PAVEMENT MARKING SHEET.
3. THE CONTRACTOR SHALL PROTECT ALL TREES WITHIN THE PROJECT LIMITS, AND AS DIRECTED BY THE ENGINEER. REFER TO TREE PROTECTION PLAN FOR ADDITIONAL DETAILS.
4. FOR REMOVAL OF EXISTING PUBLIC UTILITIES, SEE "UTILITY LAYOUT", SHEET.
5. REMOVAL OF CONCRETE CURB SHALL BE INCIDENTAL TO "REMOVE AND DISPOSE OF REINFORCED CONCRETE PAYMENT" PAY ITEM 02221.

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

REMOVAL LAYOUT

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 18 OF 139	

GC Engineering, Inc.
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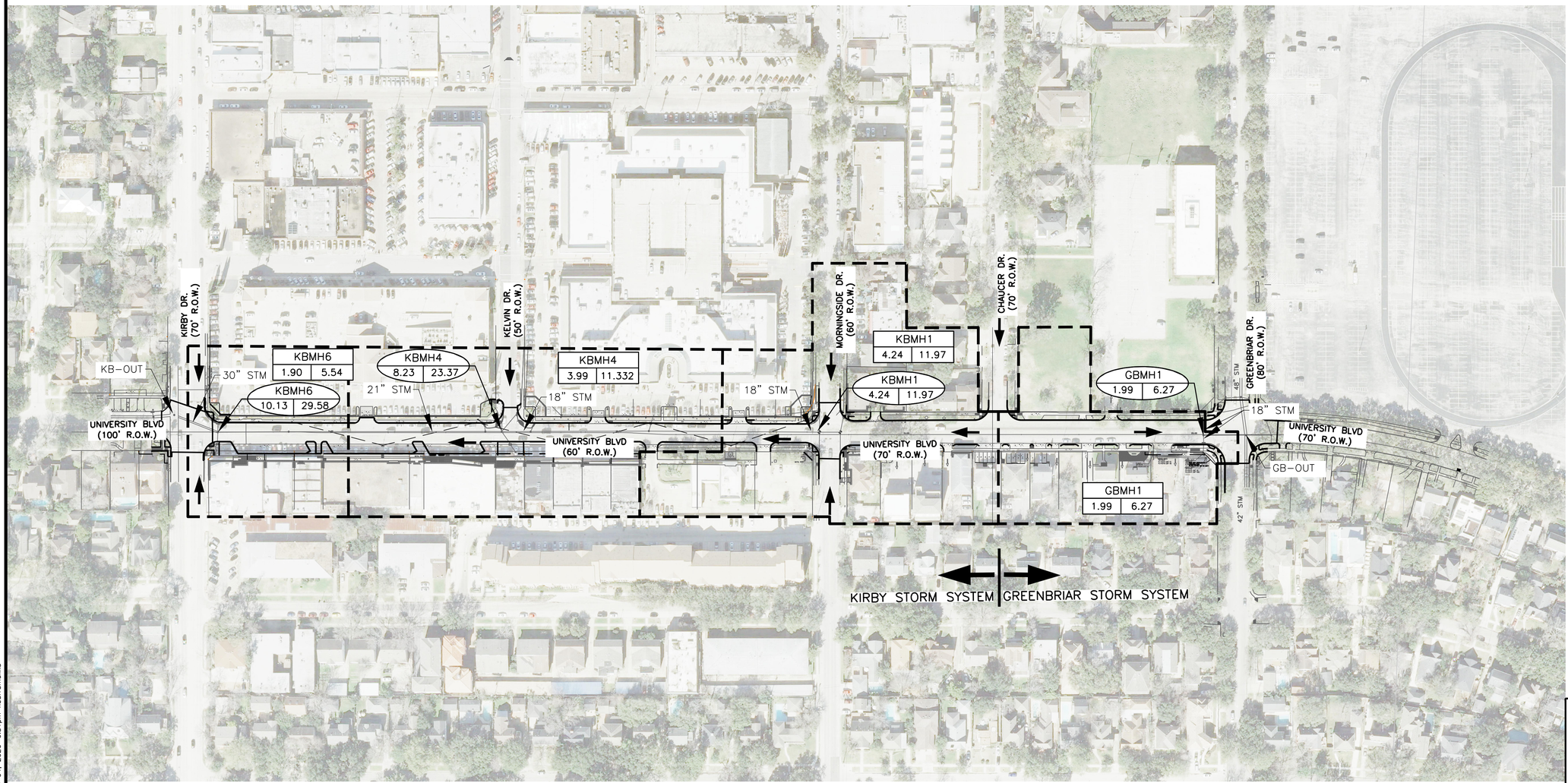

100 0 50 100 200

SCALE: 1"=100' (22x34)

MK.	DATE	REVISION	APP.

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID. / DRAINAGE AREA IN ACRES: GBMH1 | 1.99 | 5.80 — 2-YR FLOW IN CFS
- CUMULATIVE DRAINAGE AREA IN ACRES: GBMH1 | 1.99 | 5.80 — DRAINAGE ID / CUMULATIVE FLOW IN CFS

FLOODPLAIN NOTE:

ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP NO. 48201C0860L DATED JUNE 18, 2007, THE PROJECT AREA IS WITHIN ZONE X DEFINED AS 0.2% (500-YEAR) ANNUAL CHANCE FLOODPLAIN.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

OVERALL DRAINAGE AREA MAP

EXISTING AND PROPOSED

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=100'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 19 OF 139	

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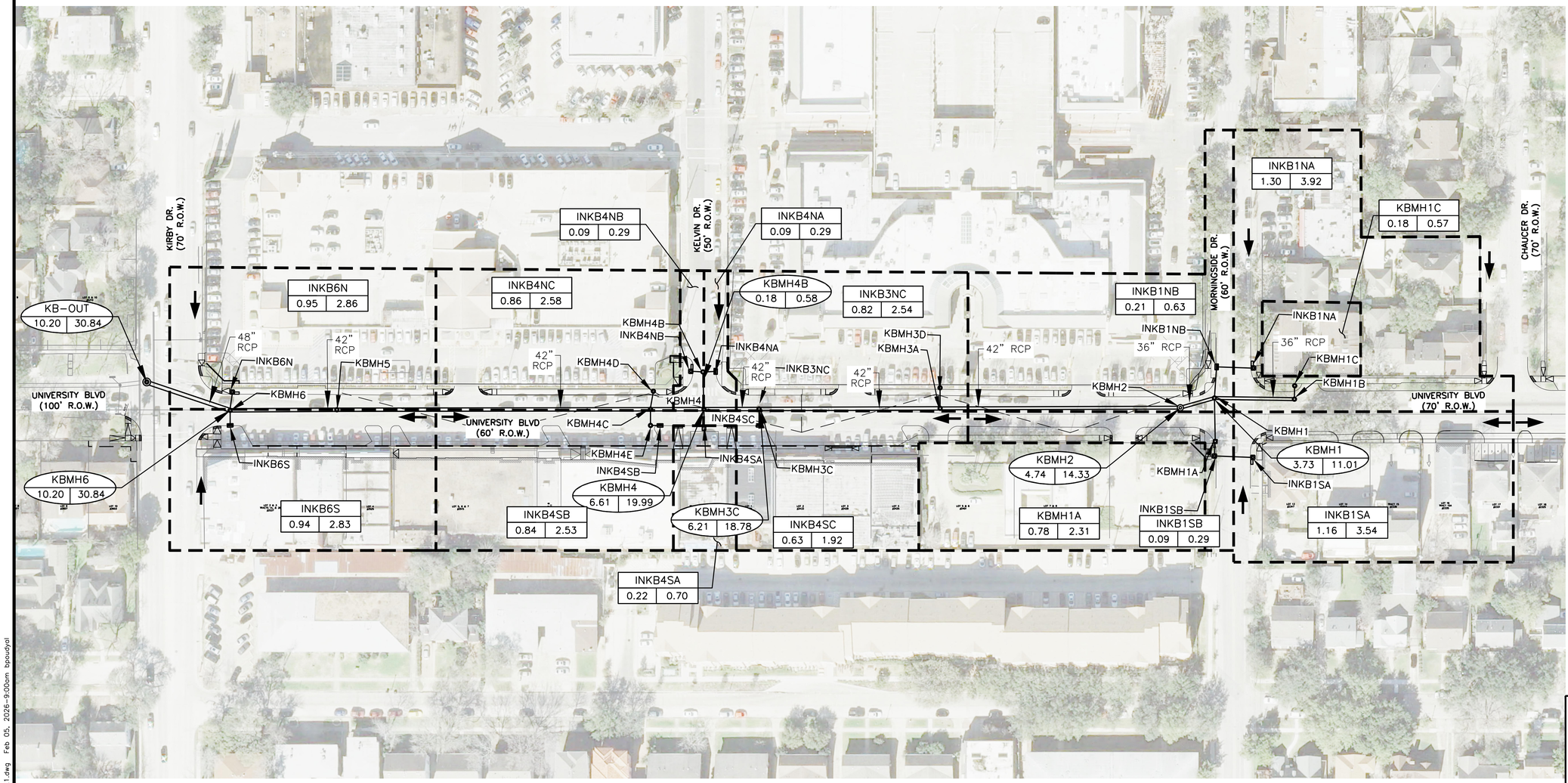

60 0 30 60 120

SCALE: 1"=60' (22x34)

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID. / DRAINAGE AREA IN ACRES — INKB6S 0.88 | 2.65 — 2-YR FLOW IN CFS
- CUMULATIVE DRAINAGE AREA IN ACRES — KBMH6 10.26 | 32.40 — DRAINAGE ID / CUMULATIVE FLOW IN CFS
- PROPOSED STORM SEWER
- TYPE C INLET
- MANHOLE
- TYPE B-B INLET

MK.	DATE	REVISION	APP.

FLOODPLAIN NOTE:

ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP NO. 48201C0860L DATED JUNE 18, 2007, THE PROJECT AREA IS WITHIN ZONE X DEFINED AS 0.2% (500-YEAR) ANNUAL CHANCE FLOODPLAIN.

GC ENGINEERING, INC.
2505 PARK AVE,
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Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED DRAINAGE AREA MAP KIRBY STORM SYSTEM

SHEET 01 OF 02

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=60'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 20 OF 139	

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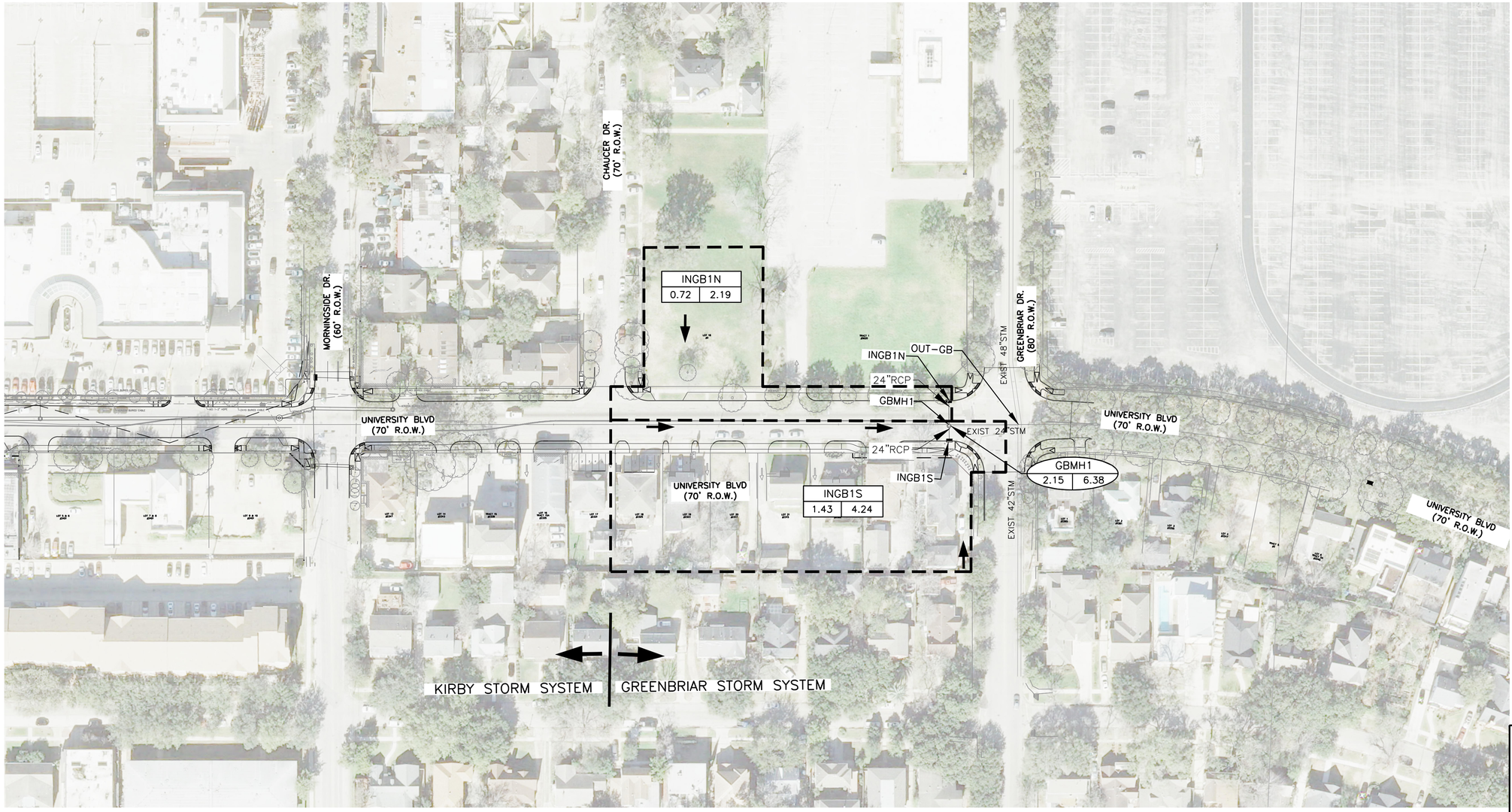

60 0 30 60 120

SCALE: 1"=60' (22x34)

MK.	DATE	REVISION	APP.

LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- DRAINAGE AREA ID. / DRAINAGE AREA IN ACRES: INGB1N | 0.67 | 2.00 — 2-YR FLOW IN CFS
- CUMULATIVE DRAINAGE AREA IN ACRES: GBMH1 | 1.99 | 5.80 — CUMULATIVE FLOW IN CFS; DRAINAGE ID
- PROPOSED STORM SEWER
- TYPE C INLET
- MANHOLE
- TYPE B-B INLET

FLOODPLAIN NOTE:

ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP NO. 48201C0860L DATED JUNE 18, 2007, THE PROJECT AREA IS WITHIN ZONE X DEFINED AS 0.2% (500-YEAR) ANNUAL CHANCE FLOODPLAIN.

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2505 PARK AVE,
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Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED DRAINAGE AREA MAP GREENBRIAR STORM SYSTEM

SHEET 02 OF 02

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=60'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 21 OF 139	

GC Engineering, Inc.
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HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 2:55:29 PM

PROJECT NAME : University Blvd-KB Sys (West)
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Kirby Drive (KB) System (West) - EXISTING CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\221209-

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
KBMH1	0.8	4.24	27.96	27.96	3.53	0.000	11.974
KBMH4	0.8	3.99	27.68	27.68	3.55	0.000	11.332
KBMH6	0.8	1.90	26.33	26.33	3.65	0.000	5.548

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)
KBMH1	CrcMh	0.800	4.24	27.96	3.53		0.00	11.974
KBMH4	CrcMh	0.800	8.23	29.36	3.55		0.00	23.373
KBMH6	CrcMh	0.800	10.13	30.20	3.65		0.00	29.580
OUT-KB	JctBx	0.800	10.13	30.20	3.65		0.00	29.580

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	KBMH1	KBMH4		42.77	42.03	Cir 1	0.00	1.50	568.0	0.130	0.013
2	KBMH4	KBMH6		42.03	40.73	Cir 1	0.00	1.75	492.0	0.264	0.013
3	KBMH6	OUT-KB		39.53	39.29	Cir 1	0.00	2.50	80.0	0.300	0.013

Conveyance Hydraulic Computations. Tailwater = 41.790 (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	60.38	53.07	45.00	1.288	1.50	1.50	6.78	6.78	12.0	3.8	0.000
2	53.07	42.20	44.00	2.158	1.75	1.75	9.72	9.72	23.4	8.2	0.000
3	42.20	41.79	45.50	0.516	2.50	2.50	6.03	6.03	29.6	22.6	0.000

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	1.5	0.0	1	568.0
Circular	Concrete	1.75	0.0	1	492.0
Circular	Concrete	2.5	0.0	1	80.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	3
Junction Box		0.0	0.0	0.0	0.0	0.0	1

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Run# 3 Insufficient capacity.
Run# 2 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= KBMH4 Run # 2
Run# 1 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= KBMH1 Run # 1

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 2:58:06 PM

PROJECT NAME : University Blvd-KB Sys (West)
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Kirby Drive (KB) System (West) - EXISTING CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\221209-

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
KBMH1	0.8	4.24	27.96	27.96	3.53	0.000	11.974
KBMH4	0.8	3.99	27.68	27.68	3.55	0.000	11.332
KBMH6	0.8	1.90	26.33	26.33	3.65	0.000	5.548

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)
KBMH1	CrcMh	0.800	4.24	27.96	3.53		0.00	11.974
KBMH4	CrcMh	0.800	8.23	29.36	3.55		0.00	23.373
KBMH6	CrcMh	0.800	10.13	30.20	3.65		0.00	29.580
OUT-KB	JctBx	0.800	10.13	30.20	3.65		0.00	29.580

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	KBMH1	KBMH4		42.77	42.03	Cir 1	0.00	1.50	568.0	0.130	0.013
2	KBMH4	KBMH6		42.03	40.73	Cir 1	0.00	1.75	492.0	0.264	0.013
3	KBMH6	OUT-KB		39.53	39.29	Cir 1	0.00	2.50	80.0	0.300	0.013

Conveyance Hydraulic Computations. Tailwater = 42.790 (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	61.14	53.82	46.00	1.288	1.50	1.50	6.78	6.78	12.0	3.8	0.000
2	53.82	43.20	45.00	2.158	1.75	1.75	9.72	9.72	23.4	8.2	0.000
3	43.20	42.79	46.50	0.516	2.50	2.50	6.03	6.03	29.6	22.6	0.000

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	1.5	0.0	1	568.0
Circular	Concrete	1.75	0.0	1	492.0
Circular	Concrete	2.5	0.0	1	80.0

NODES:

Type of Inlet Structure	Type of Grate	Inlet Length (ft)	Grate Width (ft)	Grate Length (ft)	Grate Area (ft)	Grate Perimeter (ft)	Quantity (each)
Circular Manhole		0.0	0.0	0.0	0.0	0.0	3
Junction Box		0.0	0.0	0.0	0.0	0.0	1

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years
Run# 3 Insufficient capacity.
Run# 2 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= KBMH4 Run # 2
Run# 1 Insufficient capacity.
Upstream HGL exceeds critical elevation (Analysis)at node Id= KBMH1 Run # 1

GC ENGINEERING, INC.
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRAINAGE HYDRAULIC DATA

KIRBY DRAINAGE SYSTEM
EXISTING CONDITION
2 & 100 YEAR STORM EVENTS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
NTS	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 22 OF 139	

REVISION | APP. | DATE | MK.

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Hydraulic Data.dwg Feb 04, 2026 - 6:32pm rburrmaukiu

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 2:19:11 PM

PROJECT NAME : University Blvd
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : KB System_Proposed 2yr
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INKB4NB	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB4SA	0.8	0.22	22.66	22.66	3.95	0.000	0.695
KBMH1C	0.8	0.18	22.39	22.39	3.98	0.000	0.573
KBMH1A	0.8	0.78	25.73	25.73	3.70	0.000	2.309
INKB2NA	0.8	0.82	24.70	24.70	3.78	0.000	2.480
INKB3SB	0.8	0.04	20.67	20.67	4.14	0.000	0.132
INKB3NC	0.8	0.84	24.66	24.66	3.78	0.000	2.540
INKB4NC	0.8	0.86	24.87	24.87	3.76	0.000	2.587
INKB4SC	0.8	0.63	24.22	24.22	3.82	0.000	1.925
INKB4SB	0.8	0.84	24.84	24.84	3.77	0.000	2.533
INKB6N	0.8	0.95	24.78	24.78	3.77	0.000	2.865
INKB6S	0.8	0.94	24.78	24.78	3.77	0.000	2.835
INKB1NA	0.8	1.30	24.84	24.84	3.77	0.000	3.921
INKB1NB	0.8	0.21	25.20	25.20	3.74	0.000	0.628
INKB1SA	0.8	1.16	24.19	24.19	3.82	0.000	3.545
INKB1SB	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB4NA	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB2SA	0.8	0.20	22.53	22.53	3.96	0.000	0.634

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
INKB3SB	Curb	5.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
INKB3SB	Curb	0.132	0.132	0.000	0.000		1.63	5.00	3.65

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Area (sf)	Grate Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
INKB4SA	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB6N	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB6S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB3NC	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NC	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1NA	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1NB	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1SA	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB2SA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1SB	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NB	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB2NA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4SB	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4SC	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INKB4SACurb		3.00	n/a	n/a	0.695	4.031	0.257	5.25	5.25
INKB6N Curb		6.67	n/a	n/a	2.865	7.619	0.260	8.95	8.95
INKB6S Curb		5.00	n/a	n/a	2.835	6.261	0.295	8.90	8.90
INKB3NCCurb		5.00	n/a	n/a	2.540	6.261	0.274	8.55	8.55
INKB4NCCurb		3.00	n/a	n/a	2.587	4.031	0.353	8.60	8.60
INKB1NACurb		6.67	n/a	n/a	3.921	7.619	0.321	10.05	10.05
INKB1NBCurb		5.00	n/a	n/a	0.628	6.261	0.108	5.05	5.05
INKB1SACurb		6.67	n/a	n/a	3.545	7.619	0.300	9.65	9.65
INKB2SACurb		5.00	n/a	n/a	0.634	6.261	0.109	5.05	5.05
INKB1SBCurb		3.00	n/a	n/a	0.292	4.031	0.251	3.80	3.80
INKB4NACurb		5.00	n/a	n/a	0.292	6.261	0.065	3.80	3.80
INKB4NBCurb		6.67	n/a	n/a	0.292	7.619	0.057	3.80	3.80
INKB2NACurb		5.00	n/a	n/a	2.480	6.261	0.270	8.45	8.45
INKB4SBCurb		5.00	n/a	n/a	2.533	6.261	0.274	8.55	8.55
INKB4SCCurb		5.00	n/a	n/a	1.925	6.261	0.228	7.70	7.70

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)
KBMH3B	CrcMh	0.800	4.74	27.41	3.78		0.00	14.334
INKB4SA	Curb	0.800	0.22	22.66	3.95		0.00	0.695
INKB6N	Curb	0.800	0.95	24.78	3.77		0.00	2.865

INKB6S	Curb	0.800	0.94	24.78	3.77		0.00	2.835
KBMH3A	CrcMh	0.800	4.74	27.21	3.78		0.00	14.334
KBMH2	CrcMh	0.800	4.74	25.91	3.78		0.00	14.334
KBMH4B	CrcMh	0.800	0.18	21.72	4.06		0.00	0.585
KBMH5	CrcMh	0.800	8.31	29.40	3.78		0.00	25.129
KBMH1	CrcMh	0.800	3.72	25.82	3.70		0.00	11.011
KBMH6	CrcMh	0.800	10.20	29.52	3.78		0.00	30.845
INKB3NC	Curb	0.800	0.84	24.66	3.78		0.00	2.540
KBMH3C	CrcMh	0.800	6.21	28.26	3.78		0.00	18.779
INKB4NC	Curb	0.800	0.86	24.87	3.76		0.00	2.587
INKB3SB	Curb	0.000	0.00	0.00	0.00		0.00	0.000
KBMH4A	CrcMh	0.800	7.47	28.74	3.78		0.00	22.589
KB-OUT	JctBx	0.800	10.20	29.52	3.78		0.00	30.845
INKB1NA	Curb	0.800	1.30	24.84	3.77		0.00	3.921
INKB1NB	Curb	0.800	1.51	25.20	3.74		0.00	4.518
INKB1SA	Curb	0.800	1.16	24.19	3.82		0.00	3.545
KBMH4	CrcMh	0.800	6.61	28.49	3.78		0.00	19.989
INKB2SA	Curb	0.800	0.20	22.53	3.96		0.00	0.634
INKB1SB	Curb	0.800	1.25	24.42	4.06		0.00	4.060
INKB4NA	Curb	0.800	0.09	21.54	4.06		0.00	0.292
INKB4NB	Curb	0.800	0.09	21.54	4.06		0.00	0.292
KBMH1C	CrcMh	0.800	0.18	22.39	3.98		0.00	0.573
KBMH1A	CrcMh	0.800	2.03	25.73	3.70		0.00	6.009
INKB2NA	Curb	0.800	0.82	24.70	3.78		0.00	2.480
INKB4SB	Curb	0.800	0.84	24.84	3.77		0.00	2.533
KBMH4C	CrcMh	0.800	8.31	28.78	3.78		0.00	25.129
KBMH4E	CrcMh	0.800	0.84	24.89	3.95		0.00	2.654
INKB4SC	Curb	0.800	0.63	24.22	3.82		0.00	1.925
KBMH3D	CrcMh	0.800	0.00	0.00	0.00		0.00	0.000
KBMH1B	CrcMh	0.800	0.18	22.54	3.98		0.00	0.573

Conveyance Configuration Data

Run #	Node US	Node DS	I.D. FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	KBMH1C	KBMH1B	40.36	40.33	Cir 1	0.00	2.00	15.0	0.180	0.013
2	KBMH1B	KBMH1	40.33	40.24	Cir 1	0.00	3.00	85.0	0.111	0.013
13	KBMH3A	KBMH3B	39.47	39.44	Cir 1	0.00	3.50	36.0	0.083	0.013
14	INKB4S	KBMH4E	41.08	41.05	Cir 1	0.00	2.00	10.0	0.300	0.013
15	KBMH3B	KBMH3C	39.44	39.30	Cir 1	0.00	3.50	157.0	0.090	0.013
16	INKB4S	KBMH3C	39.38	39.20	Cir 1	0.00	2.00	18.0	1.000	0.013
17	KBMH3C	KBMH4	39.20	39.10	Cir 1	0.00	3.50	59.0	0.169	0.013
18	INKB4S	KBMH4	40.17	39.05	Cir 1	0.00	2.00	21.0	5.341	0.013
32	KBMH4E	KBMH4C	41.05	39.00	Cir 1	0.00	2.00	17.0	12.147	0.013
33	KBMH4C	KBMH5	39.00	35.43	Cir 1	0.00	3.50	329.0	1.085	0.013
19	INKB4N	KBMH4B	39.93	39.90	Cir 1	0.00	2.00	14.0	0.214	0.013
20	INKB4N	KBMH4B	39.93	39.90	Cir 1	0.00	2.00	15.0	0.200	0.013
21	KBMH4B	KBMH4	39.90	39.05	Cir 1	0.00	2.00	31.0	2.743	0.013
22	KBMH4	KBMH4A	39.05	39.01	Cir 1	0.00	3.50	48.0	0.083	0.013
31	INKB2S	KBMH2	42.35	39.69	Cir 1	0.00	2.00	27.0	9.904	0.013
26	KBMH5	KBMH6	35.43	30.24	Cir 1	0.00	3.50	114.0	4.558	0.013
27	INKB6N	KBMH6	40.86	30.24	Cir 1	0.00	2.00	20.0	62.664	0.013
28	INKB6S	KBMH6	41.89	30.24	Cir 1	0.00	2.00	17.0	94.099	0.013

29	KBMH6	KB-OUT	30.24	30.17	Cir 1	0.00	4.00	86.0	0.085	0.013
30	INKB3N	KBMH3C	39.38	39.20	Cir 1	0.00	2.00	6.0	3.001	0.013
23	INKB4N	KBMH4A	40.42	39.01	Cir 1	0.00	2.00	6.0	24.177	0.013
25	KBMH4A	KBMH4C	39.01	39.00	Cir 1	0.00	3.50	10.0	0.100	0.013
3	INKB1N	INKB1N	41.51	41.43	Cir 1	0.00	2.00	40.0	0.200	0.013
4	INKB1N	KBMH1	41.43	40.24	Cir 1	0.00	2.00	33.0	3.608	0.013
5	INKB1S	INKB1S	41.51	41.42	Cir 1	0.00	2.00	42.0	0.214	0.013
6	INKB1S	KBMH1A	41.42	41.38	Cir 1	0.00	2.00	16.0	0.250	0.013
7	KBMH1A	KBMH1	41.38	40.24	Cir 1	0.00	2.00	46.0	2.479	0.013
8	KBMH1	KBMH2	40.24	39.69	Cir 1	0.00	3.00	43.0	1.282	0.013
9	INKB2N	KBMH2	42.31	39.69	Cir 1	0.00	2.00	12.0	22.382	0.013
11	KBMH2	KBMH3A	39.69	39.47	Cir 1	0.00	3.50	242.0	0.090	0.013

Conveyance Hydraulic Computations. Tailwater = 43.000 (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	43.85	43.83	46.73	0.001	0.33	2.00	1.68	0.18	0.6	9.6	0.000
2	43.83	43.73	46.04	0.000	0.33	3.00	1.34	0.08	0.6	22.3	0.000
13	43.55	43.53	46.89	0.020	1.74	3.50	3.01	1.49	14.3	29.2	0.000
14	43.34	43.31	46.32	0.012	0.61	2.00	3.10	0.81	2.5	12.4	0.000
15	43.53	43.42	46.77	0.020	1.70	3.50	3.10	1.49	14.3	30.3	0.000
16*	43.42	43.42	46.38	0.007	0.39	2.00	4.39	3.30	1.9	22.7	0.000
17	43.42	43.34	46.16	0.035	1.65	3.50	4.20	1.95	18.8	41.6	0.000
18*	43.34	43.34	46.14	0.001	0.16	2.00	5.83	2.53	0.7	52.5	0.000
32*	43.31	43.31	45.88	0.014	0.25	2.00	11.62	3.62	2.7	79.2	0.000
33*	43.31	43.10	46.12	0.062	1.17	3.50	8.95	6.15	25.1	105.2	0.000
19	43.37	43.34	45.91	0.000	0.23	2.00	1.46	0.09	0.3	10.5	0.000
20	43.37	43.34	45.94	0.000	0.23	2.00	1.43	0.09	0.3	10.2	0.000
21*	43.34	43.34	45.67	0.001	0.17	2.00	4.38	2.47	0.6	37.6	0.000
22	43.34	43.31	46.00	0.039	2.13	3.50	3.26	2.08	20.0	29.2	0.000
31*	43.72	43.72	46.52	0.001	0.13	2.00	7.02	2.51	0.6	71.5	0.000
26*	43.10	43.03	46.30	0.062	0.81	3.50	14.94	6.15	25.1	215.7	0.000
27*	43.04	43.03	46.04	0.016	0.18	2.00	21.11	3.68	2.9	179.8	0.000
28*	43.04	43.03	45.97	0.016	0.16	2.00	24.25	3.68	2.8	220.4	0.000
29	43.03	43.00	45.80	0.046	2.56	4.00	3.63	2.45	30.8	42.0	0.000
30*	43.42	43.42	46.37	0.013	0.35	2.00	7.02	3.54	2.5	39.4	0.000
23*	43.31	43.31	46.30	0.013	0.21	2.00	14.68	3.60	2.6	111.7	0.000
25	43.31	43.31	46.13	0.050	2.17	3.50	3.60	2.35	22.6	32.0	0.000
3	43.81	43.74	46.27	0.030	0.86	2.00	3.02	1.25	3.9	10.2	0.000
4*	43.74	43.73	46.02	0.040	0.44	2.00	8.88	4.22	4.5	43.2	0.000
5	43.88	43.80	45.85	0.024	0.80	2.00	3.01	1.13	3.5	10.5	0.000
6	43.80	43.76	45.92	0.032	0.83	2.00	3.30	1.29	4.1	11.4	0.000
7*	43.76	43.73	45.61	0.070	0.56	2.00	8.43	4.60	6.0	35.8	0.000
8*	43.73	43.72	45.93	0.027	0.77	3.00	7.62	4.98	11.0	75.8	0.000
9*	43.72	43.72	46.56	0.012	0.21	2.00	14.10	3.55	2.5	107.5	0.000
11	43.72	43.55	46.20	0.020	1.70	3.50	3.10	1.49	14.3	30.4	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	19	406.0
Circular	Concrete	3.0	0.0	2	128.0
Circular	Concrete	3.5	0.0	8	995.0
Circular	Concrete	4.0	0.0	1	86.0

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	16
Curb In Sag		3.0	0.0	0.0	0.0	0.0	3
Curb In Sag		6.67	0.0	0.0	0.0	0.0	4
Curb In Sag		5.0	0.0	0.0	0.0	0.0	8
Curb On Grade		5.0	0.0	0.0	0.0	0.0	1
Junction Box		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

APP.	DATE	MK.	REVISION

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRAINAGE HYDRAULIC DATA

KIRBY DRAINAGE SYSTEM
PROPOSED CONDITION
2 YEAR STORM EVENTS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
NTS	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 23 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Vydraulic Data.dwg Feb 04, 2026 - 6:32pm nburrmauku

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 2:41:52 PM

PROJECT NAME : University Blvd
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : KB System_Proposed 100yr
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INKB4NB	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB4SA	0.8	0.22	22.66	22.66	3.95	0.000	0.695
KBMH1C	0.8	0.18	22.39	22.39	3.98	0.000	0.573
KBMH1A	0.8	0.78	25.73	25.73	3.70	0.000	2.309
INKB2NA	0.8	0.82	24.70	24.70	3.78	0.000	2.480
INKB3SB	0.8	0.04	20.67	20.67	4.14	0.000	0.132
INKB3NC	0.8	0.84	24.66	24.66	3.78	0.000	2.540
INKB4NC	0.8	0.86	24.87	24.87	3.76	0.000	2.587
INKB4SC	0.8	0.63	24.22	24.22	3.82	0.000	1.925
INKB4SB	0.8	0.84	24.84	24.84	3.77	0.000	2.533
INKB6N	0.8	0.95	24.78	24.78	3.77	0.000	2.865
INKB6S	0.8	0.94	24.78	24.78	3.77	0.000	2.835
INKB1NA	0.8	1.30	24.84	24.84	3.77	0.000	3.921
INKB1NB	0.8	0.21	25.20	25.20	3.74	0.000	0.628
INKB1SA	0.8	1.16	24.19	24.19	3.82	0.000	3.545
INKB1SB	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB4NA	0.8	0.09	21.54	21.54	4.06	0.000	0.292
INKB2SA	0.8	0.20	22.53	22.53	3.96	0.000	0.634

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Grate Type	Pond Width Allowed (ft)
INKB3SB	Curb	5.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Q Bypass Allow (cfs)	Q Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
INKB3SB	Curb	0.132	0.132	0.000	0.000		1.63	5.00	3.65

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	Gutter n	Gutter DeprW (ft)	Head Allowed (ft)
INKB4SA	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB6N	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB6S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB3NC	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NC	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1NA	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1NB	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1SA	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB2SA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB1SB	Curb	3.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4NB	Curb	6.67	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB2NA	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4SB	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INKB4SC	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INKB4SACurb		3.00	n/a	n/a	0.695	4.031	0.257	5.25	5.25
INKB6N Curb		6.67	n/a	n/a	2.865	7.619	0.260	8.95	8.95
INKB6S Curb		5.00	n/a	n/a	2.835	6.261	0.295	8.90	8.90
INKB3NCCurb		5.00	n/a	n/a	2.540	6.261	0.274	8.55	8.55
INKB4NCCurb		3.00	n/a	n/a	2.587	4.031	0.353	8.60	8.60
INKB1NACurb		6.67	n/a	n/a	3.921	7.619	0.321	10.05	10.05
INKB1NBCurb		5.00	n/a	n/a	0.628	6.261	0.108	5.05	5.05
INKB1SACurb		6.67	n/a	n/a	3.545	7.619	0.300	9.65	9.65
INKB2SACurb		5.00	n/a	n/a	0.634	6.261	0.109	5.05	5.05
INKB1SBCurb		3.00	n/a	n/a	0.292	4.031	0.251	3.80	3.80
INKB4NACurb		5.00	n/a	n/a	0.292	6.261	0.065	3.80	3.80
INKB4NBCurb		6.67	n/a	n/a	0.292	7.619	0.057	3.80	3.80
INKB2NACurb		5.00	n/a	n/a	2.480	6.261	0.270	8.45	8.45
INKB4SBCurb		5.00	n/a	n/a	2.533	6.261	0.274	8.55	8.55
INKB4SCCurb		5.00	n/a	n/a	1.925	6.261	0.228	7.70	7.70

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. To (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
KBMH3B	CrcMh	0.800	4.74	27.41	3.74	0.00		14.182
INKB4SA	Curb	0.800	0.22	22.66	3.95	0.00		0.695
INKB6N	Curb	0.800	0.95	24.78	3.77	0.00		2.865
INKB6S	Curb	0.800	0.94	24.78	3.77	0.00		2.835
KBMH3A	CrcMh	0.800	4.74	27.21	3.74	0.00		14.182
KBMH2	CrcMh	0.800	4.74	25.91	3.74	0.00		14.182
KBMH4B	CrcMh	0.800	0.18	21.72	4.06	0.00		0.585
KBMH5	CrcMh	0.800	8.31	29.40	3.74	0.00		24.864
KBMH1	CrcMh	0.800	3.72	25.82	3.74	0.00		11.130
KBMH6	CrcMh	0.800	10.20	29.53	3.74	0.00		30.518
INKB3NC	Curb	0.800	0.84	24.66	3.78	0.00		2.540
KBMH3C	CrcMh	0.800	6.21	28.26	3.74	0.00		18.580
INKB4NC	Curb	0.800	0.86	24.87	3.76	0.00		2.587
INKB3SB	Curb	0.000	0.00	0.00	0.00	0.00		0.000
KBMH4A	CrcMh	0.800	7.47	28.74	3.74	0.00		22.350
KB-OUT	JctBx	0.800	10.20	29.53	3.74	0.00		30.518
INKB1NA	Curb	0.800	1.30	24.84	3.77	0.00		3.921
INKB1NB	Curb	0.800	1.51	25.20	3.74	0.00		4.518
INKB1SA	Curb	0.800	1.16	24.19	3.82	0.00		3.545
KBMH4	CrcMh	0.800	6.61	28.50	3.74	0.00		19.777
INKB2SA	Curb	0.800	0.20	22.53	3.96	0.00		0.634
INKB1SB	Curb	0.800	1.25	24.42	4.06	0.00		4.060
INKB4NA	Curb	0.800	0.09	21.54	4.06	0.00		0.292
INKB4NB	Curb	0.800	0.09	21.54	4.06	0.00		0.292
KBMH1C	CrcMh	0.800	0.18	22.39	3.98	0.00		0.573
KBMH1A	CrcMh	0.800	2.03	25.73	3.70	0.00		6.009
INKB2NA	Curb	0.800	0.82	24.70	3.78	0.00		2.480
INKB4SB	Curb	0.800	0.84	24.84	3.77	0.00		2.533
KBMH4C	CrcMh	0.800	8.31	28.79	3.74	0.00		24.864
KBMH4E	CrcMh	0.800	0.84	24.89	3.95	0.00		2.654
INKB4SC	Curb	0.800	0.63	24.22	3.82	0.00		1.925
KBMH3D	CrcMh	0.000	0.00	0.00	0.00	0.00		0.000
KBMH1B	CrcMh	0.800	0.18	22.54	3.98	0.00		0.573

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
5	INKB1S	INKB1S		41.51	41.42	Cir 1	0.00	2.00	42.0	0.214	0.013
6	INKB1S	KBMH1A		41.42	41.38	Cir 1	0.00	2.00	16.0	0.250	0.013
7	KBMH1A	KBMH1		41.38	40.24	Cir 1	0.00	2.00	46.0	2.479	0.013
8	KBMH1	KBMH2		40.24	39.69	Cir 1	0.00	3.00	43.0	1.282	0.013
9	INKB2N	KBMH2		42.31	39.69	Cir 1	0.00	2.00	12.0	22.382	0.013
11	KBMH2	KBMH3A		39.69	39.47	Cir 1	0.00	3.50	242.0	0.090	0.013
1	KBMH1C	KBMH1B		40.36	40.33	Cir 1	0.00	2.00	15.0	0.180	0.013
2	KBMH1B	KBMH1		40.33	40.24	Cir 1	0.00	3.00	85.0	0.111	0.013
13	KBMH3A	KBMH3B		39.47	39.44	Cir 1	0.00	3.50	36.0	0.083	0.013
14	INKB4S	KBMH4E		41.08	41.05	Cir 1	0.00	2.00	10.0	0.300	0.013
15	KBMH3B	KBMH3C		39.44	39.30	Cir 1	0.00	3.50	157.0	0.090	0.013
16	INKB4S	KBMH3C		39.38	39.20	Cir 1	0.00	2.00	18.0	1.000	0.013
17	KBMH3C	KBMH4		39.20	39.10	Cir 1	0.00	3.50	59.0	0.169	0.013
18	INKB4S	KBMH4		40.17	39.05	Cir 1	0.00	2.00	21.0	5.341	0.013
32	KBMH4E	KBMH4C		41.05	39.00	Cir 1	0.00	2.00	17.0	12.147	0.013
33	KBMH4C	KBMH5		39.00	35.43	Cir 1	0.00	3.50	329.0	1.085	0.013
19	INKB4N	KBMH4B		39.93	39.90	Cir 1	0.00	2.00	14.0	0.214	0.013
20	INKB4N	KBMH4B		39.93	39.90	Cir 1	0.00	2.00	15.0	0.200	0.013
21	KBMH4B	KBMH4		39.90	39.05	Cir 1	0.00	2.00	31.0	2.743	0.013
22	KBMH4	KBMH4A		39.05	39.01	Cir 1	0.00	3.50	48.0	0.083	0.013
31	INKB2S	KBMH2		42.35	39.69	Cir 1	0.00	2.00	27.0	9.904	0.013
26	KBMH5	KBMH6		35.43	30.24	Cir 1	0.00	3.50	114.0	4.558	0.013
27	INKB6N	KBMH6		40.86	30.24	Cir 1	0.00	2.00	20.0	62.664	0.013
28	INKB6S	KBMH6		41.89	30.24	Cir 1	0.00	2.00	17.0	94.099	0.013
29	KBMH6	KB-OUT		30.24	30.17	Cir 1	0.00	4.00	86.0	0.085	0.013
30	INKB3N	KBMH3C		39.38	39.20	Cir 1	0.00	2.00	6.0	3.001	0.013
23	INKB4N	KBMH4A		40.42	39.01	Cir 1	0.00	2.00	6.0	24.177	0.013
25	KBMH4A	KBMH4C		39.01	39.00	Cir 1	0.00	3.50	10.0	0.100	0.013
3	INKB1N	INKB1N		41.51	41.43	Cir 1	0.00	2.00	40.0	0.200	0.013
4	INKB1N	KBMH1		41.43	40.24	Cir 1	0.00	2.00	33.0	3.608	0.013

Conveyance Hydraulic Computations. Tailwater = 43.000 (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)
5	43.88	43.80	47.50	0.024	0.80	2.00	3.01	1.13	3.5	10.5	0.000
6	43.80	43.76	47.50	0.032	0.83	2.00	3.30	1.29	4.1	11.4	0.000
7*	43.76	43.73	47.41	0.070	0.56	2.00	8.43	4.60	6.0	35.8	0.000
8*	43.73	43.72	47.49	0.028	0.78	3.00	7.65	5.00	11.1	75.8	0.000
9*	43.72	43.72	48.31	0.012	0.21	2.00	14.10	3.55	2.5	107.5	0.000
11	43.72	43.55	48.36	0.020	1.68	3.50	3.10	1.47	14.2	30.4	0.000
1	43.85	43.82	47.55	0.001	0.33	2.00	1.68	0.18	0.6	9.6	0.000
2	43.82	43.73	0.00	0.000	0.33	3.00	1.34	0.08	0.6	22.3	0.000
13	43.55	43.52	48.18	0.020	1.72	3.50	3.01	1.47	14.2	29.2	0.000
14	43.33	43.31	0.00	0.012	0.61	2.00	3.10	0.81	2.5	12.4	0.000
15	43.52	43.41	48.21	0.020	1.69	3.50	3.09	1.47	14.2	30.3	0.000
16*	43.41	43.41	0.00	0.007	0.39	2.00	4.39	3.30	1.9	22.7	0.000
17	43.41	43.33	47.47	0.034	1.64	3.50	4.20	1.93	18.6	41.6	0.000
18*	43.33	43.33	46.97	0.001	0.16	2.00	5.83	2.53	0.7	52.5	0.000
32*	43.31	43.30	0.00	0.014	0.25	2.00	11.62	3.62	2.7	79.2	0.000
33*	43.30	43.10	0.00	0.061	1.16	3.50	8.92	6.13	24.9	105.2	0.000
19	43.36	43.33	46.90	0.000	0.23	2.00	1.46	0.09	0.3	10.5	0.000
20	43.36	43.33	46.90	0.000	0.23	2.00	1.43	0.09	0.3	10.2	0.000
21*	43.33	43.33	47.20	0.001	0.17	2.00	4.38	2.47	0.6	37.6	0.000
22	43.33	43.31	47.21	0.038	2.12	3.50	3.25	2.06	19.8	29.2	0.000
31*	43.72	43.72	0.00	0.001	0.13	2.00	7.02	2.51	0.6	71.5	0.000
26*	43.10	43.04	47.82	0.061	0.80	3.50	14.90	6.13	24.9	215.7	0.000
27*	43.04	43.04	46.89	0.016	0.18	2.00	21.11	3.68	2.9	179.8	0.000
28*	43.04	43.04	46.99	0.016	0.16	2.00	24.25	3.68	2.8	220.4	0.000
29	43.04	43.00	47.41	0.045	2.53	4.00	3.64	2.43	30.5	42.0	0.000
30*	43.41	43.41	44.97	0.013	0.35	2.00	7.02	3.54	2.5	39.4	0.000
23*	43.31	43.31	47.41	0.013	0.21	2.00	14.68	3.60	2.6	111.7	0.000
25	43.31	43.30	47.43	0.049	2.16	3.50	3.59	2.32	22.4	32.0	0.000
3	43.81	43.74	47.50	0.030	0.86	2.00	3.02	1.25	3.9	10.2	0.000
4*	43.74	43.73	47.50	0.040	0.44	2.00	8.88	4.22	4.5	43.2	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

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

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	2.0	0.0	19	406.0
Circular	Concrete	3.0	0.0	2	128.0
Circular	Concrete	3.5	0.0	8	995.0
Circular	Concrete	4.0	0.0	1	86.0

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	16
Curb In Sag		3.0	0.0	0.0	0.0	0.0	3
Curb In Sag		6.67	0.0	0.0	0.0	0.0	4
Curb In Sag		5.0	0.0	0.0	0.0	0.0	8
Curb On Grade		5.0	0.0	0.0	0.0	0.0	1
Junction Box		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRAINAGE HYDRAULIC DATA

KIRBY DRAINAGE SYSTEM
PROPOSED CONDITION
100 YEAR STORM EVENTS

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 24 OF 139

FOR CITY OF HOUSTON USE ONLY

APP.
REVISION
DATE
MK.

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Hydraulic Data.dwg Feb 04, 2026-6:32pm rburrom.wku

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 9:15:37 AM

PROJECT NAME : University Blvd-GB Sys
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Greenbriar Drive System- EXISTING CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INGB1N	0.8	0.72	24.32	24.32	3.81	0.000	2.195
INGB1S	0.8	1.43	26.29	26.29	3.65	0.000	4.176

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)
INGB1N	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
INGB1S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INGB1N	Curb	5.00	n/a	n/a	2.195	15.022	0.277	8.10	8.10
INGB1S	Curb	5.00	n/a	n/a	4.176	15.022	0.347	10.30	10.30

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)
GBMH1	CrcMh	0.800	2.15	26.31	3.65		0.00	6.278
OUT-GB	CrcMh	0.800	2.15	26.31	3.65		0.00	6.278
INGB1N	Curb	0.800	0.72	24.32	3.81		0.00	2.195
INGB1S	Curb	0.800	1.43	26.29	3.65		0.00	4.176

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	INGB1N	GBMH1	40.44	39.81	Cir 1	0.00	2.00	25.0	2.521	0.013
2	INGB1S	GBMH1	40.44	39.81	Cir 1	0.00	2.00	12.0	5.257	0.013
3	GBMH1	OUT-GB	39.81	39.59	Cir 1	0.00	2.00	72.0	0.306	0.013

Conveyance Hydraulic Computations. Tailwater = 41.490 (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*	41.66	41.66	45.74	0.009	0.34	1.85	6.32	3.43	2.2	36.1	0.000
2*	41.66	41.66	45.30	0.034	0.38	1.85	9.91	4.12	4.2	52.1	0.000
3	41.66	41.49	45.91	0.076	1.00	1.90	3.99	2.04	6.3	12.6	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	3	109.0

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	2
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 9:21:08 AM

PROJECT NAME : University Blvd-GB Sys
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Greenbriar Drive System- EXISTING CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INGB1N	0.8	0.72	24.32	24.32	3.81	0.000	2.195
INGB1S	0.8	1.43	26.29	26.29	3.65	0.000	4.176

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)
INGB1N	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
INGB1S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INGB1N	Curb	5.00	n/a	n/a	2.195	15.022	0.277	8.10	8.10
INGB1S	Curb	5.00	n/a	n/a	4.176	15.022	0.347	10.30	10.30

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)
GBMH1	CrcMh	0.800	2.15	26.31	3.65		0.00	6.278
OUT-GB	CrcMh	0.800	2.15	26.31	3.65		0.00	6.278
INGB1N	Curb	0.800	0.72	24.32	3.81		0.00	2.195
INGB1S	Curb	0.800	1.43	26.29	3.65		0.00	4.176

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	INGB1N	GBMH1	40.44	39.81	Cir 1	0.00	2.00	25.0	2.521	0.013
2	INGB1S	GBMH1	40.44	39.81	Cir 1	0.00	2.00	12.0	5.257	0.013
3	GBMH1	OUT-GB	39.81	39.59	Cir 1	0.00	2.00	72.0	0.306	0.013

Conveyance Hydraulic Computations. Tailwater = 42.490 (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*	42.66	42.66	0.00	0.009	0.34	2.00	6.32	3.43	2.2	36.1	0.000
2*	42.66	42.66	0.00	0.034	0.38	2.00	9.91	4.12	4.2	52.1	0.000
3	42.66	42.49	46.50	0.076	1.00	2.00	3.99	2.00	6.3	12.6	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	3	109.0

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	2
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRAINAGE HYDRAULIC DATA

GREENBRIAR DRAINAGE SYSTEM
EXISTING CONDITION
2 & 100 YEAR STORM EVENTS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
NTS	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 25 OF 139	

APP.	DATE	REVISION	MK.

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Hydraulic Data.dwg Feb 04, 2026 - 6:32pm nburrows\ku

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 9:09:34 AM

PROJECT NAME : University Blvd-GB Sys
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Greenbriar Drive System-PROPOSED CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

DESIGN FREQUENCY : 2 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 2 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INGB1N	0.8	0.72	24.32	24.32	3.81	0.000	2.195
INGB1S	0.8	1.43	25.50	25.50	3.71	0.000	4.244

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)
INGB1N	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INGB1S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INGB1N	Curb	5.00	n/a	n/a	2.195	6.261	0.249	8.10	8.10
INGB1S	Curb	5.00	n/a	n/a	4.244	6.261	0.386	10.35	10.35

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)
GBMH1	CrcMh	0.800	2.15	25.57	3.71		0.00	6.381
OUT-GB	CrcMh	0.800	2.15	25.57	3.71		0.00	6.381
INGB1N	Curb	0.800	0.72	24.32	3.81		0.00	2.195
INGB1S	Curb	0.800	1.43	25.50	3.71		0.00	4.244

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	INGB1N	GBMH1	39.86	39.81	Cir 1	0.00	2.00	26.9	0.168	0.013
2	INGB1S	GBMH1	39.86	39.81	Cir 1	0.00	2.00	16.0	0.306	0.013
3	GBMH1	OUT-GB	39.81	39.49	Cir 1	0.00	2.00	72.0	0.444	0.013

Conveyance Hydraulic Computations. Tailwater = 42.000 (ft)

Run #	Hyd. Gr.line US (ft)	Crit.Elev 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	42.31	42.26	45.74	0.009	0.66	2.00	2.42	0.70	2.2	9.3	0.000
2	42.31	42.26	45.30	0.035	0.80	2.00	3.60	1.35	4.2	12.6	0.000
3	42.26	42.00	45.91	0.079	0.91	2.00	4.60	2.03	6.4	15.1	0.000

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	3	114.86

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	2
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2

=END=

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 1/27/2026 9:19:43 AM

PROJECT NAME : University Blvd-GB Sys
JOB NUMBER : C-0777B
PROJECT DESCRIPTION : Greenbriar Drive System-PROPOSED CONDITION
PROJECT File: M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drainage\HouStorm\260120-

ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
INGB1N	0.8	0.72	24.32	24.32	3.81	0.000	2.195
INGB1S	0.8	1.43	25.50	25.50	3.71	0.000	4.244

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)
INGB1N	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
INGB1S	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Left (ft)	Width Right (ft)
INGB1N	Curb	5.00	n/a	n/a	2.195	6.261	0.249	8.10	8.10
INGB1S	Curb	5.00	n/a	n/a	4.244	6.261	0.386	10.35	10.35

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)
GBMH1	CrcMh	0.800	2.15	25.57	3.71		0.00	6.381
OUT-GB	CrcMh	0.800	2.15	25.57	3.71		0.00	6.381
INGB1N	Curb	0.800	0.72	24.32	3.81		0.00	2.195
INGB1S	Curb	0.800	1.43	25.50	3.71		0.00	4.244

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	INGB1N	GBMH1	39.86	39.81	Cir 1	0.00	2.00	26.9	0.168	0.013
2	INGB1S	GBMH1	39.86	39.81	Cir 1	0.00	2.00	16.0	0.306	0.013
3	GBMH1	OUT-GB	39.81	39.49	Cir 1	0.00	2.00	72.0	0.444	0.013

Conveyance Hydraulic Computations. Tailwater = 42.000 (ft)

Run #	Hyd. Gr.line US (ft)	Crit.Elev 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	42.31	42.26	0.00	0.009	0.66	2.00	2.42	0.70	2.2	9.3	0.000
2	42.31	42.26	0.00	0.035	0.80	2.00	3.60	1.35	4.2	12.6	0.000
3	42.26	42.00	46.50	0.079	0.91	2.00	4.60	2.03	6.4	15.1	0.000

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	3	114.86

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	2
Curb In Sag		5.0	0.0	0.0	0.0	0.0	2

=END=

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 100 Years

APP.
REVISION
DATE
MK.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRAINAGE HYDRAULIC DATA

GREENBRIAR DRAINAGE SYSTEM
PROPOSED CONDITION
2 & 100 YEAR STORM EVENTS

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
NTS
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 26 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Hydraulic Data.dwg Feb 04, 2026 - 6:32pm nburrom.ukiu

TRAFFIC SIGNAL GENERAL NOTES

1. ALL EQUIPMENT / MATERIALS AND CONSTRUCTION SHALL MEET OR EXCEED THE REQUIREMENTS CONTAINED IN THE CURRENT CITY OF HOUSTON STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, THE PROJECT SPECIFIC SPECIFICATIONS AND THE PLANS.

2. ALL ELECTRICAL WORK SHALL BE IN CONFORMANCE WITH THE PROVISIONS AND REQUIREMENTS OF THE CITY ELECTRICAL CODE.

3. ALL SIGNS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

4. THE CONTRACTOR SHALL ARRANGE THE INSTALLATION OF SIGNALS, POLES AND CONDUIT SO AS TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL DIRECTIONS AT ALL TIMES. THE CONTRACTOR SHALL NOT CLOSE MORE THAN ONE LANE OF A ROADWAY AT ONE TIME WITHOUT PRIOR APPROVAL OF THE CITY.

5. THE CONTRACTOR SHALL CLEAN UP AND REMOVE FROM THE WORK AREA ALL LOOSE MATERIAL RESULTING FROM CONTRACT OPERATIONS EACH DAY PRIOR TO WORK BEING SUSPENDED FOR THAT DAY.

6. THE CONTRACTOR SHALL CONTACT THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE TO ARRANGE FOR METER AND ELECTRICAL SERVICE CONNECTION FROM THE POWER COMPANY.

7. ALL PEDESTRIAN PUSH BUTTON ASSEMBLIES SHALL MEET ADA REQUIREMENTS. THE SIGNS THAT SHALL BE USED ARE IDENTIFIED IN THE TMUTCD AS R10-3E. CITY OF HOUSTON STANDARDS FOR PEDESTRIAN FACILITIES SHALL BE MET IN ADDITION TO ANY TEXAS ACCESSIBILITY STANDARDS BY THE TEXAS DEPARTMENT OF LICENSING AND REGULATION (TDLR).

8. PEDESTRIANS PUSH BUTTONS SHALL BE SEPARATED BY A MINIMUM OF 10 FEET. EXCEPTIONS ONLY AS SPECIFIED BY THE ENGINEER WITH AUTHORIZATION FROM THE APPROVED CITY OF HOUSTON REPRESENTATIVE.

9. OVERHEAD STREET NAME SIGNS SHALL BE INSTALLED SUCH THAT THE BOTTOM OF THE SIGN IS NO LESS THAN 17 FEET ABOVE THE ROADWAY PAVEMENT OR NO LESS THAN 16 FEET ABOVE THE FINISHED GRADE BEYOND THE SHOULDER.

10. THE LOCATION OF EACH NEW POLE FOUNDATION, PULL BOX, CONTROLLER CABINET FOUNDATION, UPS CABINET FOUNDATION AND ELECTRIC SERVICE PEDESTAL FOUNDATION SHALL BE MARKED IN THE FIELD AS SHOWN ON THE PLANS. THE EXACT LOCATION SHALL BE APPROVED BY THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE PRIOR TO BEGINNING INSTALLATION OF THE FOUNDATION.

11. NO POLES SHALL BE LOCATED IN WHEELCHAIR RAMPS OR SUCH THAT THEY ARE AN OBSTRUCTION TO PEDESTRIANS OR WHEELCHAIRS.

12. THE TOP OF THE POLE FOUNDATION SHALL BE LEVELED WITH THE FINISHED GRADE. IF THE SLOPE OR SHOULDER DROPS OFF FROM FINISHED GRADE, THE CONTRACTOR SHALL GRADE AROUND POLE FOUNDATION. THE TOP OF THE FOUNDATION SHALL EXTEND NO MORE THAN 4 INCHES ABOVE SURROUNDING GRADE. GROUTING SHALL BE USED TO FILL ANY GAP BETWEEN THE POLE BASE AND FOUNDATION.

13. POLES SHALL BE LOCATED SUCH THAT ALL PORTIONS OF THE POLES AND ATTACHED EQUIPMENT HAVE CLEARANCES FROM OVERHEAD UTILITIES IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL UTILITY AND THE NATIONAL ELECTRICAL SAFETY CODE (NESC).

14. ALL CONCRETE USED FOR TRAFFIC SIGNAL POLE AND CABINET FOUNDATIONS SHALL BE CLASS "A" (REFER TO THE CITY OF HOUSTON SPECIFICATION FOR CONCRETE).

15. MAST ARM AND STRAIN POLES SHALL NOT BE INSTALLED ON THE FOUNDATIONS LESS THAN SEVEN DAYS AFTER THE PLACEMENT OF THE CONCRETE FOR THE FOUNDATION.

16. ANCHOR BOLTS FOR SIGNAL POLES SHALL BE SET SO THAT TWO ARE IN COMPRESSION AND TWO ARE IN TENSION. PRIOR TO THE INSTALLATION OF THE NUT, THE THREADS OF THE ANCHOR BOLT SHALL BE COATED WITH PIPE JOINT COMPOUND.

17. ALL UNDERGROUND CONSTRUCTION (CONDUIT, FOUNDATIONS AND PULL BOXES) FOR THE INTERSECTION SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF POLES, SIGNALS AND CABINETS. THE CONTRACTOR SHALL NOT PROCEED TO ABOVE GROUND WORK UNTIL THE ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE HAD CONFIRMED THAT THE MATERIALS FOR A COMPLETE INSTALLATION ARE AVAILABLE.

18. UNDERGROUND CONDUIT FOR SIGNAL CABLE SHALL BE EITHER RIGID STEEL, HOT-DIPPED GALVANIZED CONDUIT OR SCHEDULE 80 ELECTRICAL PVC CONDUIT OF THE DIAMETER SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.

19. ALL ABOVE GROUND CONDUIT FOR SIGNAL CABLE AND INTERCONNECT MEDIA SHALL BE HOT DIPPED GALVANIZED STEEL RIGID METAL CONDUIT OF THE DIAMETERS SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.

20. ONLY NEW CONDUIT AND CABLE SHALL BE INSTALLED.

21. CONDUIT INSTALLED UNDER EXISTING PAVED DRIVEWAYS, ROADWAYS OR SIDEWALKS, WHICH ARE NOT SCHEDULED TO BE RECONSTRUCTED AS PART OF THIS PROJECT, SHALL BE INSTALLED BY MEANS OF BORING. THE CONTRACTOR SHALL NOT CUT OPEN ANY STREET OR DRIVEWAY FOR CONDUIT INSTALLATION WITHOUT THE PRIOR APPROVAL OF THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE.

22. CONDUIT NOT PLACED UNDER PAVED DRIVEWAYS, ROADWAY PAVEMENT OR SIDEWALK MAY BE PLACED BY CUTTING A TRENCH, INSTALLING THE CONDUIT AND BACKFILLING. ANY TRENCHING FOR CONDUIT WIDER THAN THEE (3) INCHES SHALL BE RESODDED.

23. PULL BOXES SHALL NOT BE INSTALLED WITHIN CONCRETE CURB ACCESS RAMPS. IN ADDITION, ANY PULL BOXES INSTALLED BEHIND CURBS SHALL BE INSTALLED BETWEEN THE CURB AND THE PROPOSED / FUTURE SIDEWALK OR BEYOND THE PROPOSED / FUTURE SIDEWALK. AN EXCEPTION TO THIS NOTE WOULD BE PULL BOXES INSTALLED IN A MEDIAN. ANY PULL BOXES INSTALLED ALONG AN UNCURBED ROADWAY SHALL BE INSTALLED ADJACENT TO, BUT NOT WITHIN, THE SHOULDER. DRAINAGE AREAS SHOULD BE AVOIDED WHEN PLACING JUNCTION BOXES.

24. A 5/8 IN. X 10 FT. GROUND ROD SHALL BE INSTALLED IN THE NO. 7 PULL BOX LOCATED ON EACH CORNER. TWO GROUND ROD CLAMPS SHALL BE FURNISHED FOR GROUNDING THE GROUND WIRE.

25. ALL CONDUITS SHALL BE CLEANED BY COMPRESSED AIR AND A PROPERLY SIZED CONDUIT PISTON OR MANDREL SHALL BE PULLED THROUGH THE CONDUIT PRIOR TO CABLE INSTALLATION.

26. WHEN PULLING TRAFFIC SIGNAL SYSTEM CABLES THROUGH CONDUIT, THE CABLES SHALL BE LUBRICATED WITH A LUBRICANT NORMALLY USED FOR THIS PURPOSE. ANY ABRASION TO ANY CONDUCTOR INSULATION WHICH OCCURS WHILE PULLING CABLE FOR THE TRAFFIC SIGNAL SYSTEM WILL BE CAUSE FOR THE IMMEDIATE REJECTION OF THE CABLE. IF THIS OCCURS, THE CONTRACTOR SHALL REMOVE AND REPLACE THE ENTIRE CABLE RUN AT THEIR EXPENSE.

27. A MINIMUM OF THREE (3) FEET OF EACH WIRE AND CABLE MEASURED FROM THE TOP OF THE PULL BOX SHALL BE LEFT IN EACH PULL BOX AND AT EACH POLE BASE.

28. ALL CABLES SHALL BE STRIPPED, FORMED AND TERMINATED IN A NEAT AND UNIFORM MANNER WHETHER IN THE SIGNAL HEAD OR CONTROLLER CABINET. ALL CABLE SHALL BE BROUGHT INTO THE TERMINAL HOUSING OF SIGNALS AND/OR CONTROLLER CABINETS AND A SUFFICIENT LENGTH OF CABLE SHALL BE LEFT SO THAT ALL TERMINAL CONNECTIONS MAY BE MADE WITHOUT THE NECESSITY OF SPLICING THE CABLE.

29. THE HIGH VOLTAGE CABLES SHOULD BE SEPARATED FROM THE LOW VOLTAGE CABLES AS MUCH AS POSSIBLE.

30. NO LOOP DETECTOR SHALL BE CUT IN A PARALLEL EXPANSION JOINT. LOOPS CUT ACROSS EXPANSION JOINTS SHALL HAVE A SLACK IN THE CABLE FOR EXPANSION.

31. ALL VEHICLE ROADWAY DETECTION LOOP CABLES SHALL BE #14 AWG IMSA 51-5-1985 CABLE. LEAD-IN CABLES SHALL BE #16 AWG IMSA 50-2-1984 CABLE. NO SPLICES SHALL BE ALLOWED IN THE ROADWAY DETECTION LOOP CABLE EXCEPT AT THE PULL BOX ADJACENT TO LOOP. THE DETECTOR LEAD-IN CABLE SHALL NOT BE SPLICED.

32. DETECTION LOOP SAW CUTS SHALL BE FLUSHED WITH WATER UNDER PRESSURE AND THEN DRIED WITH AIR UNDER PRESSURE.

33. THERE SHALL BE NO SPLICING IN CONDUCTORS EXCEPT FOR THE NECESSARY SPLICE BETWEEN ROADWAY LOOP WIRE AND DETECTOR LEAD-IN CABLE IN THE PULL BOX ADJACENT TO THE DETECTOR. THESE SPLICES SHALL BE WATERPROOF AND SHALL BE IN COMPLIANCE WITH THE CITY OF HOUSTON STANDARD DRAWINGS FOR TRAFFIC SIGNAL CONSTRUCTION. THESE SPLICES SHALL BE MADE BY THE CONTRACTOR. DO NOT GROUND THE CABLE SHIELD AT THE PULL BOX.

34. TWO #10 AWG-XHHW CONDUCTORS SHALL BE INSTALLED FROM EACH LUMINAIRE TO THE CONTROLLER CABINET, LEAVING THREE FEET OF SLACK FOR EACH CONDUCTOR (MEASURED FROM THE TOP OF THE PULL BOX) IN EACH PULL BOX. ROUTE FOUR CONDUCTORS TO THE LUMINAIRE WITH THE PHOTOELECTRIC CELL. AN IN-LINE FUSE SHALL BE INSTALLED FOR EACH LUMINAIRE IN THE ASSOCIATED PULL BOX.

35. THE EMERGENCY VEHICLE PRE-EMPTION SENSOR CABLE SHALL BE OPTICOM DETECTOR CABLE MODEL NO. 138. THE CABLE SHALL NOT BE SPLICED.

36. ALL VEHICLE AND PEDESTRIAN INDICATIONS SHALL BE LED.

37. THE CONTRACTOR SHALL BAG ALL NEWLY INSTALLED VEHICULAR AND/OR PEDESTRIAN TRAFFIC SIGNAL HEADS WITH BURLAP OR OTHER APPROVED MATERIAL UNTIL THE FINAL INSPECTION AND ACCEPTANCE BY THE CITY TRAFFIC ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE. THE BURLAP OR OTHER APPROVED MATERIAL/DEVICE SHALL COMPLETELY COVER THE TRAFFIC SIGNAL HEAD AND SHALL OBSCURE THE VIEW OF THE TRAFFIC SIGNAL INDICATIONS SO THAT THEY CANNOT BE SEEN UNTIL THE TRAFFIC SIGNAL IS PLACED IN OPERATION. DURING CONSTRUCTION, THE TRAFFIC SIGNAL WILL BE DE-ENERGIZED WHILE NOT IN USE FOR TESTING.

38. THE TRAFFIC SIGNAL OPERATION AT EXISTING SIGNALIZED INTERSECTIONS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.

39. ALL STRIPING AND PAVEMENT MARKINGS ARE TO BE DONE UNDER THIS CONTRACT AND SHALL BE IN PLACE PRIOR TO THE ACTIVATION OF THE TRAFFIC SIGNAL. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL STOP LINES PRIOR TO THE INSTALLATION OF LOOP DETECTORS.

40. ALL CROSSWALK MARKINGS SHALL BE 10-FT. WIDE FOLLOWING CITY OF HOUSTON STANDARD DETAILS

41. ALL CONSTRUCTION SIGNING AND CONSTRUCTION TRAFFIC CONTROL DEVICES SHALL BE IN CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

RESPONSIBILITIES

1. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE FOLLOWING EQUIPMENT AND MATERIALS AS SPECIFIED IN THE PLANS: STEEL POLE ANCHOR BOLTS (WITH NUTS AND WASHERS), CONCRETE POLE FOUNDATIONS WITH REINFORCEMENT (WHERE SPECIFIED), TRAFFIC SIGNAL CONTROLLER CABINET(S) WITH CONTROLLER(S) AND ALL AUXILIARY EQUIPMENT, CONTROLLER CABINET CONCRETE FOUNDATION(S), CONCRETE PULL BOXES, ELECTRICAL CONDUIT, GROUND RODS AND CONNECTORS, BARE BOND WIRE AND ALL OTHER CONDUCTORS, POLES, MAST ARMS, TRAFFIC SIGNALS AND MOUNTING ASSEMBLIES, PEDESTRIAN SIGNALS AND MOUNTING ASSEMBLIES, PEDESTRIAN PUSH BUTTON STATIONS WITH SIGNS, LUMINARIES, PHOTOCELLS, ELECTRIC SERVICE PEDESTAL(S) AND CONCRETE FOUNDATION(S), VIDEO DETECTION SYSTEM EQUIPMENT, VEHICLE DETECTION LOOPS, AND ALL OTHER APPURTENANCES NECESSARY FOR THE OPERATION OF THE TRAFFIC SIGNAL INSTALLATION(S), EXCEPT AS MODIFIED IN THE PLANS.

2. THE CONTRACTOR SHALL DELIVER THE CONTROLLER CABINET(S) WITH THE CONTROLLER(S) AND AUXILIARY EQUIPMENT SPECIFIED IN THE PLANS TO THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER, 2200 PATTERSON STREET FOR TESTING, A MINIMUM OF THREE WEEKS PRIOR TO THE INSTALLATION(S) AT THE INTERSECTION(S). CONTACT THE TRAFFIC MAINTENANCE BRANCH AT LEAST 2 WORKING DAYS PRIOR TO THE DELIVERY OF THE CONTROLLER CABINET(S) TO THE CITY OF HOUSTON. THE CONTRACTOR SHALL PICK UP AND TRANSPORT THE CONTROLLER CABINET(S) FROM THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER TO THE INTERSECTION(S) AFTER CITY OF HOUSTON STAFF HAS TESTED THE EQUIPMENT AND APPROVED IT FOR INSTALLATION.

3. THE CONTRACTOR SHALL INSTALL EACH TRAFFIC CONTROLLER CABINET ON ITS FOUNDATION AND ROUTE ALL OF THE CONDUCTORS INTO THE CONTROLLER CABINET. CONDUCTORS SHALL BE TERMINATED IN THE CABINET BY THE CONTRACTOR UNDER THE OBSERVATION OF AN APPROVED CITY OF HOUSTON REPRESENTATIVE.

4. THE CONTRACTOR SHALL CAREFULLY DISASSEMBLE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL AND STREET LIGHTING EQUIPMENT THAT IS NOT TO REMAIN OR BE RELOCATED. ALL OF THE EQUIPMENT TO BE INSPECTED BY TRAFFIC MAINTENANCE STAFF TO IDENTIFY SALVAGE ITEMS. ITEMS TO BE SALVAGED SHALL BE RETURNED TO THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER, 2200 PATTERSON STREET AND UNLOADED BY THE CONTRACTOR. CONTACT THE TRAFFIC MAINTENANCE BRANCH AT LEAST 2 WORKING DAYS PRIOR TO RETURNING THE EQUIPMENT. ALL NON-SALVAGE ITEMS TO BE DELIVERED BY THE CONTRACTOR TO AN APPROVED CITY OF HOUSTON RECYCLE FACILITY.

5. THE CONTRACTOR SHALL SALVAGE AND REPLANT ANY LANDSCAPING VEGETATION THAT MAY BE DAMAGED BY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM AN APPROVED CITY OF HOUSTON REPRESENTATIVE BEFORE ANY PLANTS ARE MOVED.

6. THE CONTRACTOR SHALL REPAIR/RESTORE ANY LANDSCAPE IRRIGATION COMPONENTS DAMAGED BY CONSTRUCTION ACTIVITY TO THEIR ORIGINAL CONDITION.

7. THE LOCATION OF PUBLIC AND PRIVATE UTILITIES IS SHOWN IN AN APPROXIMATE LOCATION ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES TO UTILITIES THAT ARE THE RESULT OF HIS FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND FACILITIES.

APP.	REVISION	DATE	MK.

GC ENGINEERING, INC.
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PEARLAND, TEXAS 77581
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FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

TRAFFIC SIGNAL GENERAL NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 27 OF 139	

GC Engineering, Inc.
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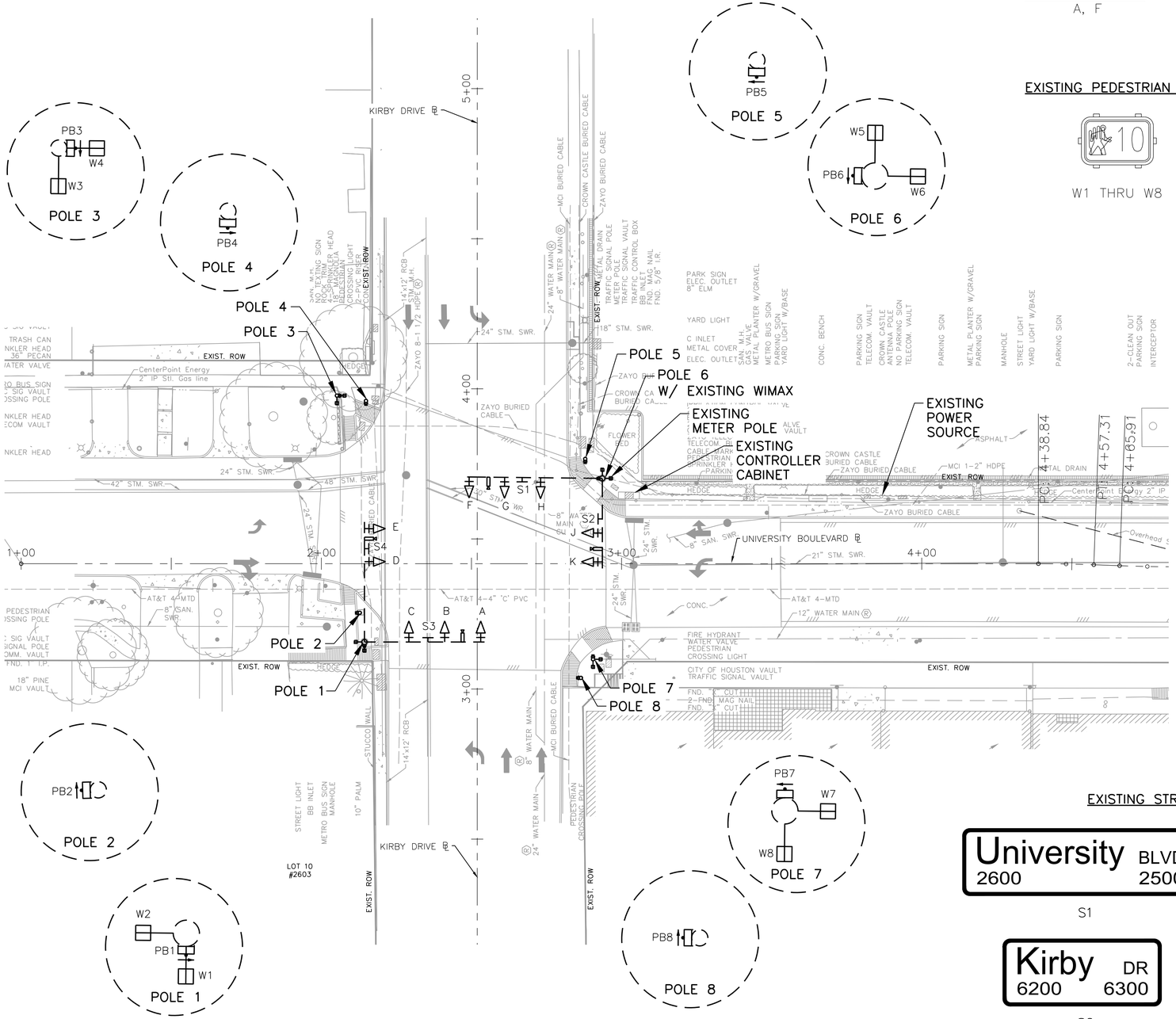
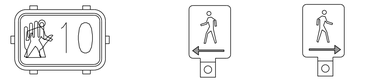


EXISTING SIGNAL HEAD DETAILS

A, F — E, K — B, C, D, G, H, J

EXISTING PEDESTRIAN SIGN AND SIGNAL HEAD DETAILS



W1 THRU W8 — PB2, PB3, PB5, PB8 — PB1, PB4, PB6, PB7

LEGEND

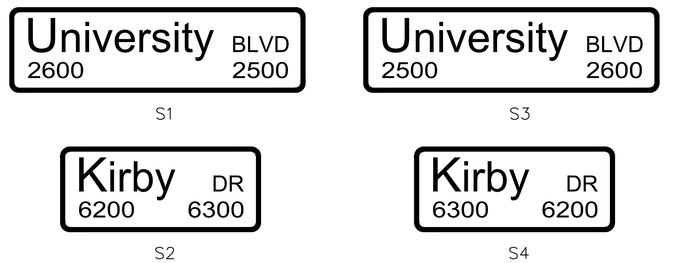
- TRAFFIC SIGNAL POLE – EXISTING
- POLE W/MAST ARM – EXISTING
- VEHICLE SIGNAL HEAD W/BACK PLATE – EXISTING
- MAST ARM SIGN – EXISTING
- PEDESTAL POLE – EXISTING
- PEDESTRIAN PUSH BUTTON – EXISTING
- PEDESTRIAN SIGNAL HEAD – EXISTING

20 0 10 20 40

SCALE: 1"=20' (22x34)
1"=40' (11x17)

MK.	DATE	REVISION	APP.

EXISTING STREET NAME SIGN DETAILS



S1 — S3 — S2 — S4

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

EXISTING TRAFFIC SIGNAL LAYOUT
UNIVERSITY BLVD AT KIRBY DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 28 OF 139	

GC Engineering, Inc.
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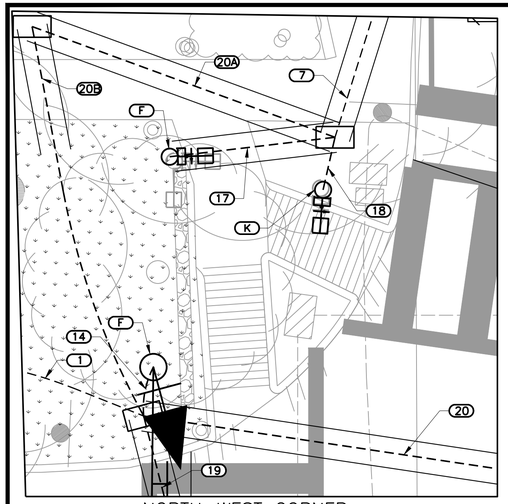
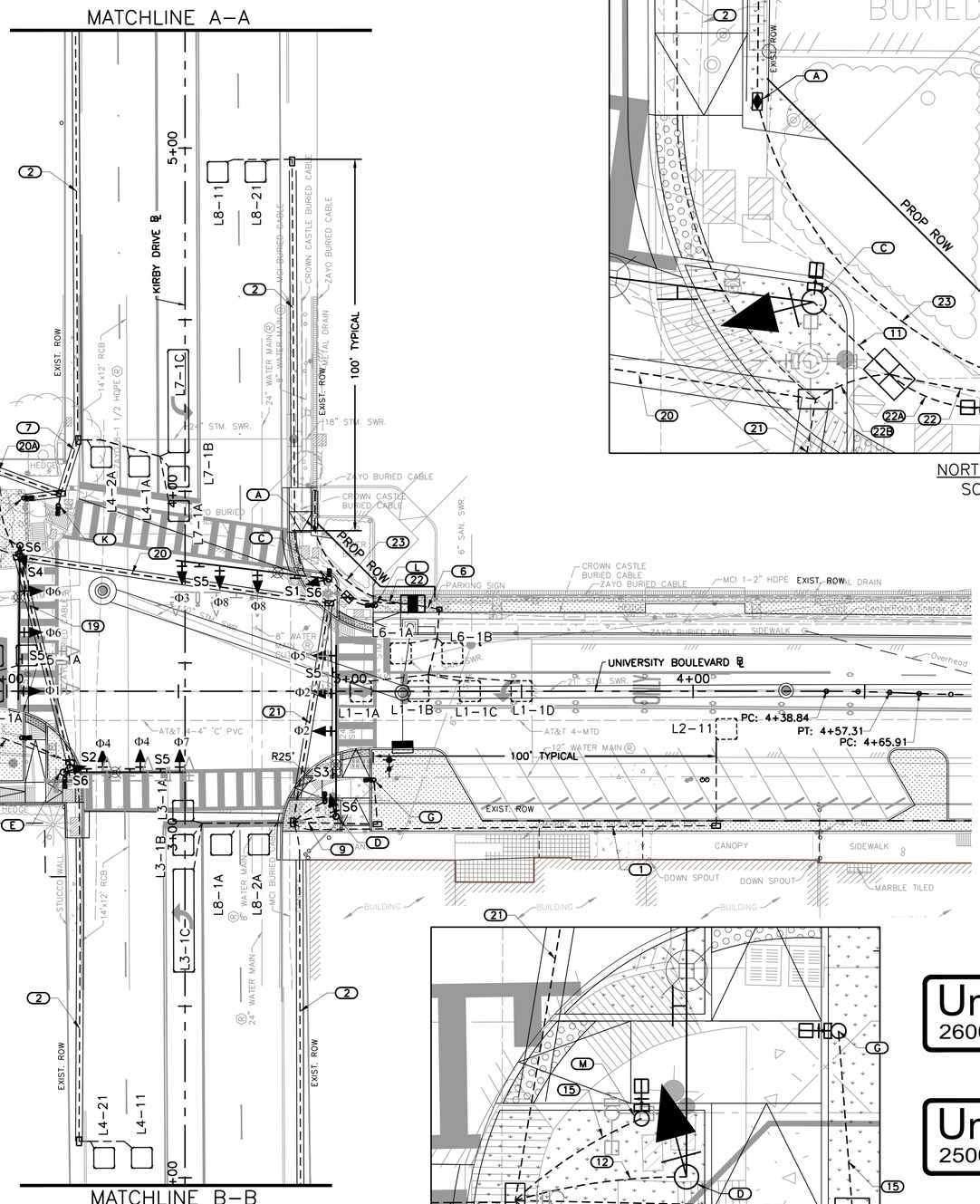
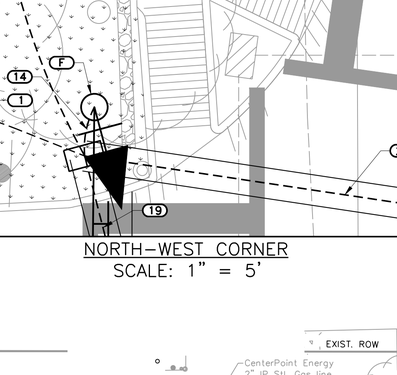


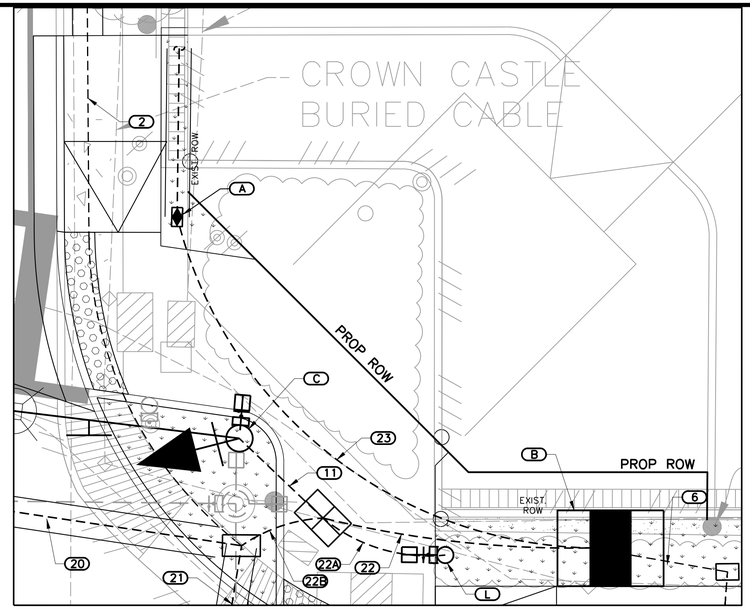
NORTH-WEST CORNER
SCALE: 1" = 5'



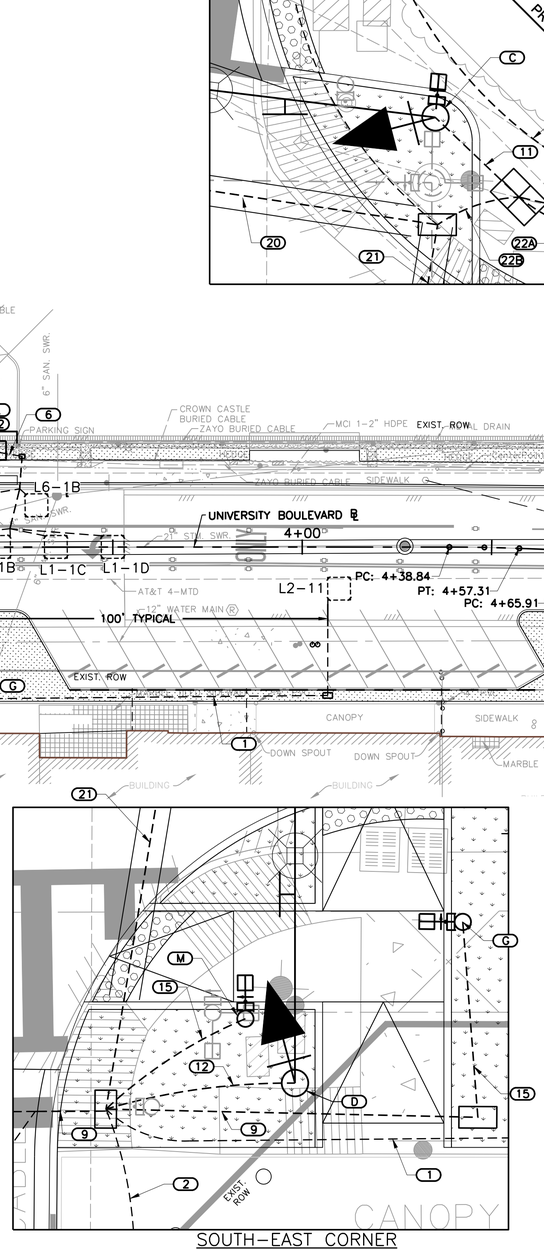
MATCHLINE B-B



SOUTH-WEST CORNER
SCALE: 1" = 5'



NORTH-EAST CORNER
SCALE: 1" = 5'



SOUTH-EAST CORNER
SCALE: 1" = 5'

20 0 10 20 40
SCALE: 1"=20' (22x34)
1"=40' (11x17)

LEGEND

- CONTROLLER CABINET – PROPOSED
- PULL BOX – TYPE C
- PULL BOX – TYPE B
- PULL BOX – TYPE A
- TRAFFIC SIGNAL POLE – RPOPOSED
- POLD W/MAST ARM – PROPOSED
- VEHICLE SIGNAL HEAD W/BACK PLATE – PROPOSED
- MAST ARM SIGN – PROPOSED
- PEDESTAL POLE – PROPOSED
- PEDESTRIAN PUSH BUTTON – PROPOSED
- PEDESTRIAN SIGNAL HEAD – PROPOSED
- METERED POWER PEDESTAL
- LUMINAIRE
- SAW-CUT INDUCTANCE LOOP DETECTOR
- PRE-FORMED INDUCTANCE LOOP DETECTOR

SPEED LIMIT (MPH)	
UNIVERSITY BLVD	30
KIRBY DR	35

MK.	DATE	REVISION	APP.

PROPOSED TRAFFIC SIGNAL PHASING

Φ2 & Φ5	Φ2 & Φ6	Φ1 & Φ6	Φ4 & Φ7	Φ4 & Φ8	Φ8 & Φ3
Φ5 Φ2 PED 2	PED 6 Φ6 Φ2 PED 2	PED 6 Φ6 Φ1	PED 4 Φ4 Φ7	Φ8 PED 4 Φ4 PED 8	Φ8 Φ3 PED 8

NOTES:

1. CONTRACTOR SHALL REMOVE AND SALVAGE THE ENTIRE EXISTING TRAFFIC SIGNAL ASSEMBLIES AND EQUIPMENTS FOR THIS INTERSECTION.

University BLVD 2600 2500
S1

University BLVD 2500 2600
S2

LEFT ON GREEN ARROW ONLY
R10-5
30"X36"
S5

Kirby DR 6200 6300
S3

Kirby DR 6300 6200
S4

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL PLAN

UNIVERSITY BLVD AT KIRBY DR

SHEET 01 OF 02

WBS NUMBER	N-100006-0001-3
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	MICHELLE RANDON, PE
SHEET NO.	29 OF 139

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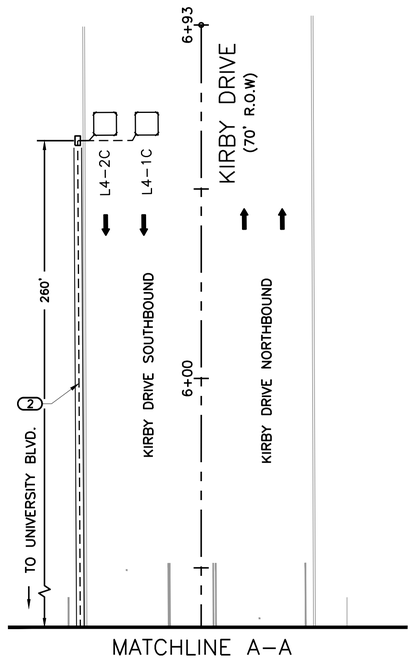
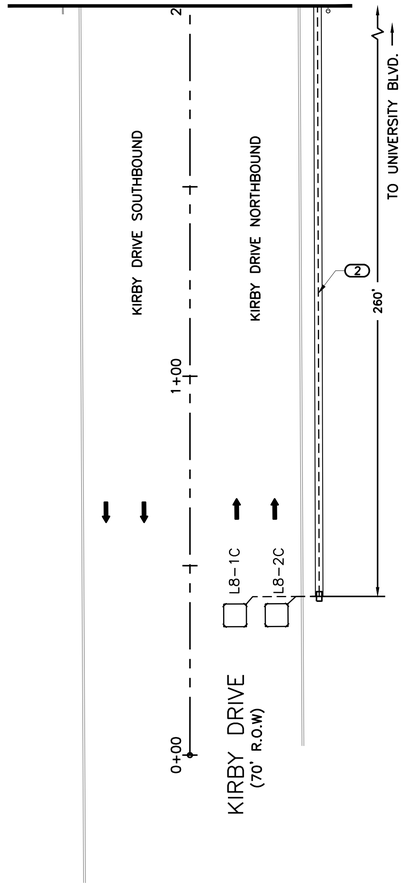




STOP LINE AND LOOP DETECTOR LOCATIONS		
ITEM BY DESCRIPTION	STATION KIRBY DR	OFFSET
NORTHBOUND		
STOP LINE @ GUTTER	3+01.30	25.42' RT
STOP LINE @ LEFT TURN LANE SIDE	3+01.14	6.48' LT
PH 3 PRESENCE LOOP 1A LEADING EDGE	3+03.97	CENTERED IN LANE
PH 3 PRESENCE LOOP 1B LEADING EDGE	2+99.97	CENTERED IN LANE
PH 3 PRESENCE LOOP 1C LEADING EDGE	2+89.97	CENTERED IN LANE
PH 8 CALL LOOP 1A LEADING EDGE	2+90.03	CENTERED IN LANE
PH 8 ADVANCE LOOP 1C LEADING EDGE	0+39.91	CENTERED IN LANE
PH 8 CALL LOOP 2A LEADING EDGE	2+90.08	CENTERED IN LANE
PH 8 ADVANCE LOOP 2C LEADING EDGE	0+39.97	CENTERED IN LANE
PH 8 PULSE LOOP 11 LEADING EDGE	4+96.06	CENTERED IN LANE
PH 8 PULSE LOOP 21 LEADING EDGE	4+96.10	CENTERED IN LANE
SOUTHBOUND		
STOP LINE @ GUTTER	4+06.87	28.79' LT
STOP LINE @ LEFT TURN LANE SIDE	3+98.66	4.55' RT
PH 7 PRESENCE LOOP 1A LEADING EDGE	3+97.25	CENTERED IN LANE
PH 7 PRESENCE LOOP 1B LEADING EDGE	4+07.25	CENTERED IN LANE
PH 7 PRESENCE LOOP 1C LEADING EDGE	4+11.25	CENTERED IN LANE
PH 4 CALL LOOP 1A LEADING EDGE	4+10.24	CENTERED IN LANE
PH 4 ADVANCE LOOP 1C LEADING EDGE	6+64.24	CENTERED IN LANE
PH 4 CALL LOOP 2A LEADING EDGE	4+06.87	CENTERED IN LANE
PH 4 ADVANCE LOOP 2C LEADING EDGE	6+64.19	CENTERED IN LANE
PH 4 PULSE LOOP 11 LEADING EDGE	2+08.82	CENTERED IN LANE
PH 4 PULSE LOOP 21 LEADING EDGE	2+08.77	CENTERED IN LANE
	STATION UNIVERSITY BLVD	OFFSET
EASTBOUND		
STOP LINE THRU LANE @ GUTTER	2+00.38	5.18' RT
STOP LINE @ LEFT TURN LANE SIDE	2+00.28	15.75'LT
PH 5 PRESENCE LOOP 1A LEADING EDGE	2+02.84	CENTERED IN LANE
PH 5 PRESENCE LOOP 1B LEADING EDGE	1+92.86	CENTERED IN LANE
PH 5 PRESENCE LOOP 1C LEADING EDGE	1+88.84	CENTERED IN LANE
PH 2 PRESENCE LOOP 1A LEADING EDGE	1+92.92	CENTERED IN LANE
PH 2 PRESENCE LOOP 1B LEADING EDGE	1+88.97	CENTERED IN LANE
PH 2 PULSE LOOP 11 LEADING EDGE	4+06.75	CENTERED IN LANE
WESTBOUND		
STOP LINE FOR THRU LANE @ GUTTER	3+10.75	16.11' LT
STOP LINE FOR LEFT TURN LANE	3+15.75	6.00' RT
PH 1 PRESENCE LOOP 1A LEADING EDGE	3+06.17	CENTERED IN LANE
PH 1 PRESENCE LOOP 1B LEADING EDGE	3+22.93	CENTERED IN LANE
PH 1 PRESENCE LOOP 1C LEADING EDGE	3+31.93	CENTERED IN LANE
PH 1 PRESENCE LOOP 1D LEADING EDGE	3+46.93	CENTERED IN LANE
PH 6 PRESENCE LOOP 1A LEADING EDGE	3+17.81	CENTERED IN LANE
PH 6 PRESENCE LOOP 1B LEADING EDGE	3+26.81	CENTERED IN LANE
PH 6 PULSE LOOP 11 LEADING EDGE	0+98.41	CENTERED IN LANE

20 0 10 20 40

SCALE: 1"=20' (22x34)
1"=40' (11x17)

LEGEND

- CONTROLLER CABINET – PROPOSED
- PULL BOX – TYPE C
- PULL BOX – TYPE B
- PULL BOX – TYPE A
- TRAFFIC SIGNAL POLE – RPOPOSED
- POLD W/MAST ARM – PROPOSED
- VEHICLE SIGNAL HEAD W/BACK PLATE – PROPOSED
- MAST ARM SIGN – PROPOSED
- PEDESTAL POLE – PROPOSED
- PEDESTRIAN PUSH BUTTON – PROPOSED
- PEDESTRIAN SIGNAL HEAD – PROPOSED
- METERED POWER PEDESTAL
- LUMINAIRE
- SAW-CUT INDUCTANCE LOOP DETECTOR
- PRE-FORMED INDUCTANCE LOOP DETECTOR

SPEED LIMIT (MPH)	
UNIVERSITY BLVD	30
KIRBY DR	35

APP.	DATE	MK.	REVISION

NOTES:

1. CONTRACTOR SHALL REMOVE AND SALVAGE THE ENTIRE EXISTING TRAFFIC SIGNAL ASSEMBLIES AND EQUIPMENTS FOR THIS INTERSECTION.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL PLAN

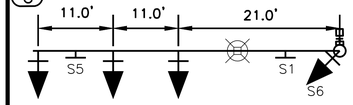
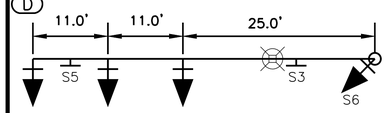
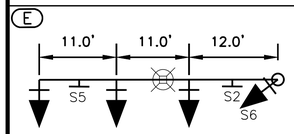
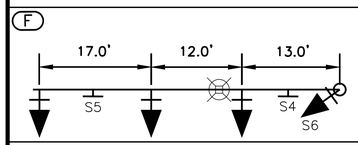
UNIVERSITY BLVD AT KIRBY DR

SHEET 02 OF 02

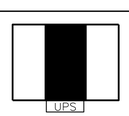
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 30 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0778-COH-UnivBlvd-SP1\Drawings_Traffic Signal_UniversityBlvd.dwg Feb 04, 2026 - 6:33pm nburrsmukku

PROPOSED POLE SCHEDULE

POLE NUMBER	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION	STANDARDS
		SIGNAL	LUMINAIRE	MOUNTING	FACE					
(C) 	TYPE 2	45'	15'	3-ASTROBRAC 1- PED	1-H3L 2-H3 1-V3L 1-CDP	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	POLARA NAVIGATOR R10-3E®(R) R10-3E(L)	PRE-EMPT SENSOR (DUAL TURRETS) WIMAX ANTENNA SPP RADIO SIGNS: S1 = STREET NAME S5 = R10-5 (30"X36") S6 = R10-5 (30"X36")	AT APPROX: STA. 2+93.83, 32.72' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(D) 	TYPE 2	50'	15'	3-ASTROBRAC	1-H3L 2-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	POLARA NAVIGATOR R10-3E(R)	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S3 = STREET NAME S5 = R10-5 (30"X36") S6 = R10-5 (30"X36")	AT APPROX: STA. 2+95.92, 36.48' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(E) 	TYPE 1	35'	15'	3-ASTROBRAC	1-H3L 2-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	R10-3E(L)	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S2 = STREET NAME S5 = R10-5 (30"X36") S6 = R10-5 (30"X36")	AT APPROX: STA. 2+16.44, 23.60' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(F) 	TYPE 2	45'	15'	3-ASTROBRAC	1-H3L 2-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	-	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S4 = STREET NAME S5 = R10-5 (30"X36") S6 = R10-5 (30"X36")	AT APPROX: STA. 2+03.81, 42.42' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(G)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(L)	-	AT APPROX: STA. 3+07.00, 25.84' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(H)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 2+04.26, 13.57' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(J)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(L)	-	AT APPROX: STA. 2+04.88, 56.30' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(K)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 2+15.00, 54.11' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(L)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 3+07.41, 25.03' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(M)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 2+92.66, 32.23' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(N)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 2+16.87, 25.37' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07

TRAFFIC SIGNAL CONTROLLER

CABINET	TYPE	CONTROLLER	AUX. CONTROL	REMARKS	LOCATION	STANDARDS
(A)	UL TYPE 3R	METERED SERVICE PEDESTEL WITH ONE 30 AMP AND ONE 60 AMPBREAKERS AND PHOTOCELL	-	-	AT APPROX: STA. 2+89.72, 47.34' LT (TO CENTER OF THE PEDESTAL) UNIVERSITY BLVD CONST. CL	02893-14
(B) 	TYPE 340 ITS	2070LX CONTROLLER UNIT w/2070-1C CPU MODULE WITH GPS SERIAL COMMUNICATION MODULE & UPS BATTERY BACK-UP SYSTEM	-	STANDARDS SPECIFICATION 16730, 16731, 16732, 16733, 16734 & 16785	AT APPROX: STA. 3+18.32, 25.48' LT (TO CENTER OF THE CABINET) UNIVERSITY BLVD CONST. CL	02893-10C

APP.
REVISION
DATE
MK.

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TBPE Registration No. F-7889

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL POLE SCHEDULE
UNIVERSITY BLVD AT KIRBY DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 31 OF 139	

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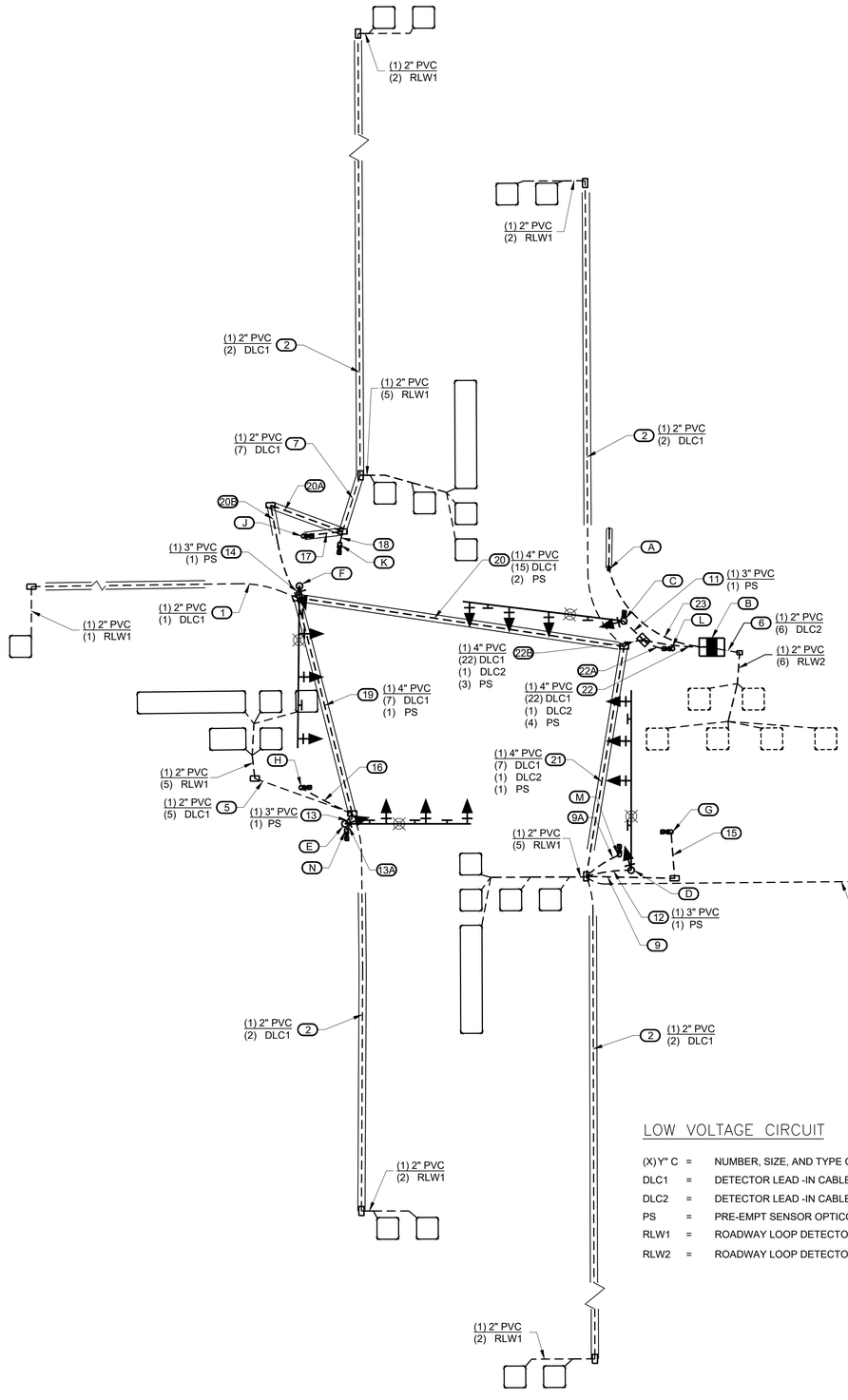
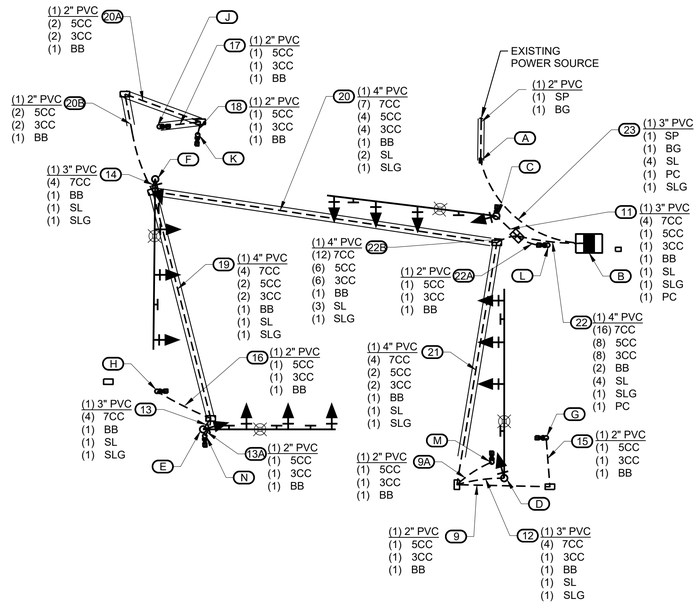
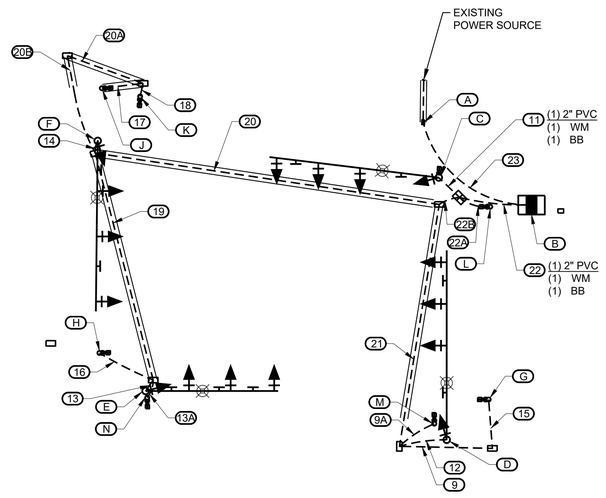


LOW VOLTAGE CIRCUIT

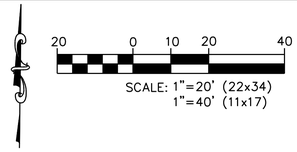
(X) Y" C	=	NUMBER, SIZE, AND TYPE OF CONDUIT
DLC1	=	DETECTOR LEAD -IN CABLE, 14 AWG (I.M.S.A. 50-2-1984) (SAWCUT)
DLC2	=	DETECTOR LEAD -IN CABLE, 2C=16 AWG (PREFORMED)
PS	=	PRE-EMPT SENSOR OPTICOM, 20 3CC-SHIELDED CABLE (3M MODEL 13B) (SAWCUT)
RLW1	=	ROADWAY LOOP DETECTOR WIRE, 14AWG (IMSA 51-5-1985)
RLW2	=	ROADWAY LOOP DETECTOR WIRE, 4C=18 AWG (PREFORMED)





COMMUNICATION CIRCUIT

(X) Y" C	=	NUMBER, SIZE, AND TYPE OF CONDUIT
WM	=	WIMAX POWER CABLE, CAT5E 24 AWG
BB	=	BARE BOND = 8 AWG SOLID



MK.	DATE	REVISION	APP.

HIGH VOLTAGE CIRCUIT

(X) Y" C	=	NUMBER, SIZE, AND TYPE OF CONDUIT
(X)	=	NUMBER OF CABLES (SIGNAL)
CC	=	14 AWG SOLID CONDUCTOR CABLE
BB	=	BARE BOND B AWG SOLID
BG	=	BARE GROUND, 4 AWG SOLID
SP	=	SIGNAL POWER, 6 # 4 THHN
SL	=	STREET LIGHT, 2 # 10 AWG THHN
PC	=	PHOTO CELL, 10 AWG THHN
SLG	=	STREET LIGHT GROUND, 12 AWG THHN

NOTE:
SP SHALL CONSIST OF : 6 # 4 AWG THHN
2 - WHITE
1 - BLACK
1 - RED
2 - GREEN

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL CABLE SCHEMATIC
UNIVERSITY BLVD AT KIRBY DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 32 OF 139	

GC Engineering, Inc.
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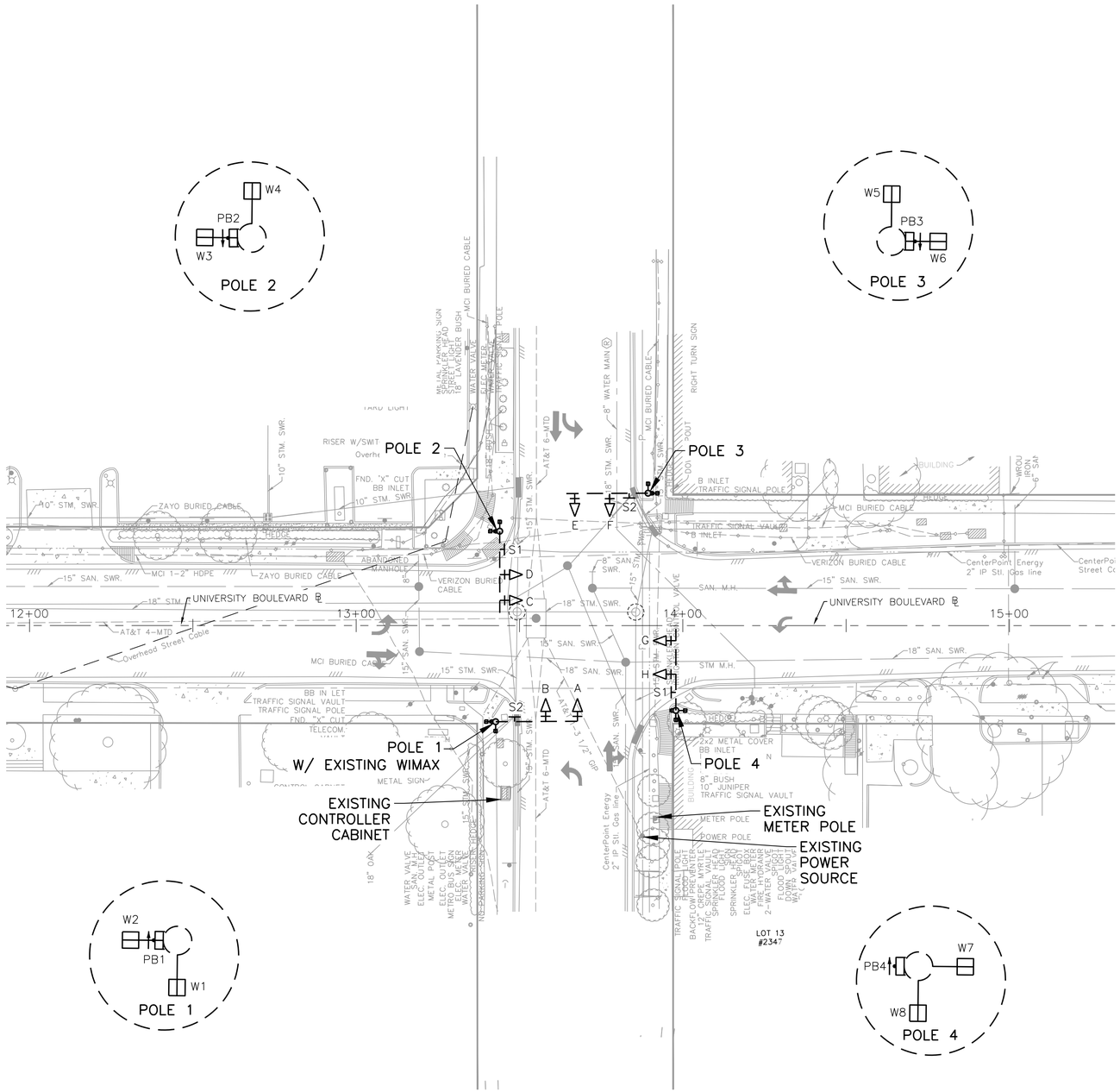
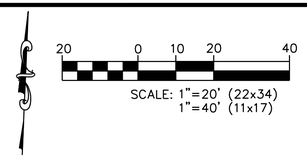
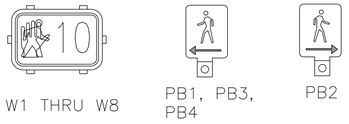




EXISTING SIGNAL HEAD DETAILS

A, B, C, D,
E, F, G, H

EXISTING PEDESTRIAN SIGN AND SIGNAL HEAD DETAILS



W1 THRU W8

PB1, PB3, PB4

PB2

EXISTING STREET NAME SIGN DETAILS

S2

S1

LEGEND

- TRAFFIC SIGNAL POLE – EXISTING
- POLE W/MAST ARM – EXISTING
- VEHICLE SIGNAL HEAD W/BACK PLATE – EXISTING
- MAST ARM SIGN – EXISTING
- PEDESTAL POLE – EXISTING
- PEDESTRIAN PUSH BUTTON – EXISTING
- PEDESTRIAN SIGNAL HEAD – EXISTING

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

EXISTING TRAFFIC SIGNAL LAYOUT

UNIVERSITY BLVD AT MORNINGSIDE DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 32A OF 139	

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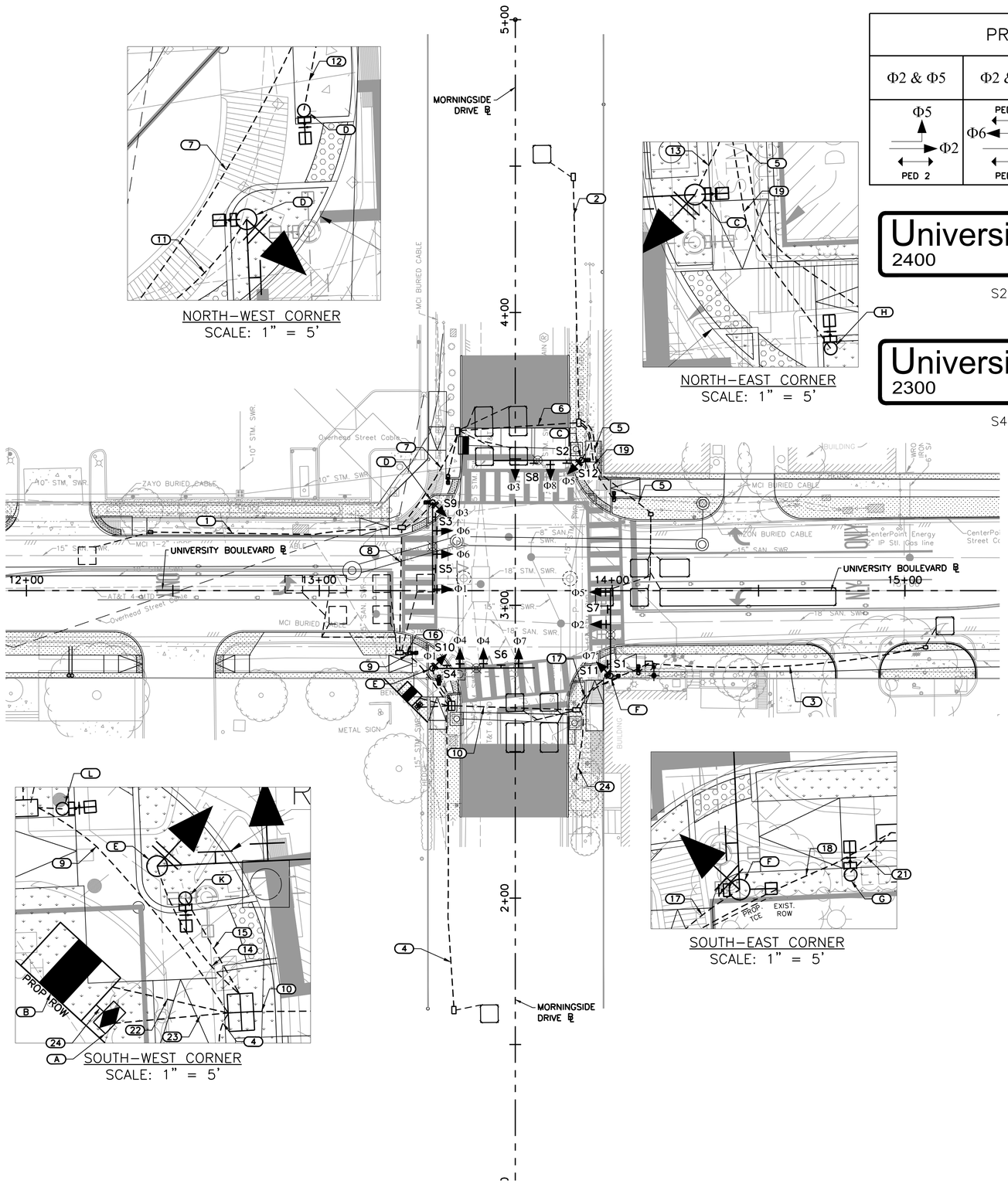
NORTH-WEST CORNER
SCALE: 1" = 5'

NORTH-EAST CORNER
SCALE: 1" = 5'



SOUTH-WEST CORNER
SCALE: 1" = 5'

SOUTH-EAST CORNER
SCALE: 1" = 5'

PROPOSED TRAFFIC SIGNAL PHASING					
Φ2 & Φ5	Φ2 & Φ6	Φ1 & Φ6	Φ4 & Φ7	Φ4 & Φ8	Φ8 & Φ3
Φ5, Φ2, PED 2	PED 6, Φ6, Φ2, PED 2	PED 6, Φ6, Φ1	PED 4, Φ7, Φ4	Φ8, PED 4, PED 8, Φ4	Φ8, Φ3, PED 8

University BLVD
2400 2300

S2

Morningside DR
5600 5700

S1

University BLVD
2300 2400

S4

Morningside DR
5700 5600

S3

LEFT ON GREEN ARROW ONLY

R10-5
30"X36"
S5, S6, S7, S8
S9, S10, S11, S12

20 0 10 20 40
SCALE: 1"=20' (22x34)
1"=40' (11x17)

LEGEND

- CONTROLLER CABINET – PROPOSED
- PULL BOX – TYPE C
- PULL BOX – TYPE B
- PULL BOX – TYPE A
- TRAFFIC SIGNAL POLE – RPOPOSED
- POLD W/MAST ARM – PROPOSED
- VEHICLE SIGNAL HEAD W/BACK PLATE – PROPOSED
- MAST ARM SIGN – PROPOSED
- PEDESTAL POLE – PROPOSED
- PEDESTRIAN PUSH BUTTON – PROPOSED
- PEDESTRIAN SIGNAL HEAD – PROPOSED
- METERED POWER PEDESTAL
- LUMINAIRE
- PRE-FORMED INDUCTANCE LOOP DETECTOR
- SAW-CUT INDUCTANCE LOOP DETECTOR

SPEED LIMIT (MPH)	
UNIVERSITY BLVD	30
MORNINGSIDE DR	30

NOTES:

1. CONTRACTOR SHALL REMOVE AND SALVAGE THE ENTIRE EXISTING TRAFFIC SIGNAL ASSEMBLIES AND EQUIPMENTS FOR THIS INTERSECTION.

STOP LINE AND LOOP DETECTOR LOCATIONS		
ITEM BY DESCRIPTION	STATION MORNINGSIDE DR	OFFSET
NORTHBOUND		
STOP LINE @ GUTTER	2+71.52	18.24' RT
STOP LINE @ LEFT TURN LANE SIDE	2+70.66	6.04' LT
PH 3 PRESENCE LOOP 1A LEADING EDGE	2+69.79	CENTERED IN LANE
PH 3 PRESENCE LOOP 1B LEADING EDGE	2+59.79	CENTERED IN LANE
PH 8 PRESENCE LOOP 1A LEADING EDGE	2+69.92	CENTERED IN LANE
PH 8 PRESENCE LOOP 1B LEADING EDGE	2+59.88	CENTERED IN LANE
PH 8 PULSE LOOP 11 LEADING EDGE	13+79.00	CENTERED IN LANE
SOUTHBOUND		
STOP LINE @ GUTTER	3+46.12	16.32' LT
STOP LINE @ LEFT TURN LANE SIDE	3+46.96	6.66' RT
PH 7 PRESENCE LOOP 1A LEADING EDGE	3+47.87	CENTERED IN LANE
PH 7 PRESENCE LOOP 1B LEADING EDGE	3+57.87	CENTERED IN LANE
PH 4 PRESENCE LOOP 1A LEADING EDGE	3+47.75	CENTERED IN LANE
PH 4 PRESENCE LOOP 1B LEADING EDGE	3+57.71	CENTERED IN LANE
PH 4 PULSE LOOP 11 LEADING EDGE	1+57.48	CENTERED IN LANE
	STATION UNIVERSITY BLVD	OFFSET
EASTBOUND		
STOP LINE @ GUTTER	13+28.36	15.18' RT
STOP LINE @ LEFT TURN LANE SIDE	13+28.32	6.00' LT
PH 5 PRESENCE LOOP 1A LEADING EDGE	13+39.33	CENTERED IN LANE
PH 5 PRESENCE LOOP 1B LEADING EDGE	13+24.33	CENTERED IN LANE
PH 5 PRESENCE LOOP 1C LEADING EDGE	13+09.33	CENTERED IN LANE
PH 5 PRESENCE LOOP 1D LEADING EDGE	12+94.33	CENTERED IN LANE
PH 2 PRESENCE LOOP 1A LEADING EDGE	13+24.35	CENTERED IN LANE
PH 2 PRESENCE LOOP 1B LEADING EDGE	13+09.32	CENTERED IN LANE
PH 2 PULSE LOOP 11 LEADING EDGE	15+16.66	CENTERED IN LANE
WESTBOUND		
STOP LINE @ GUTTER	14+05.34	21.80' LT
STOP LINE @ LEFT TURN LANE SIDE	14+05.08	6.00' RT
PH 1 PRESENCE LOOP 1A LEADING EDGE	13+94.29	CENTERED IN LANE
PH 1 PRESENCE LOOP 1B LEADING EDGE	14+06.28	CENTERED IN LANE
PH 1 PRESENCE LOOP 1C LEADING EDGE	14+16.35	CENTERED IN LANE
PH 6 PRESENCE LOOP 1A LEADING EDGE	14+06.28	CENTERED IN LANE
PH 6 PRESENCE LOOP 1B LEADING EDGE	14+16.30	CENTERED IN LANE
PH 6 PULSE LOOP 11 LEADING EDGE	12+17.68	CENTERED IN LANE

NO.	REVISION	DATE	APP.

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL PLAN
UNIVERSITY BLVD AT MORNINGSIDE DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 32B OF 139	

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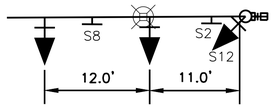
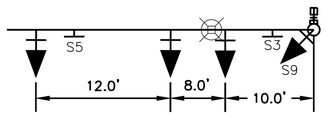
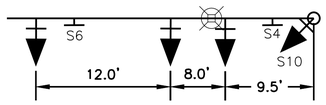
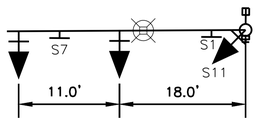
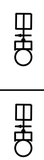
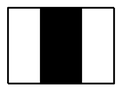
PROPOSED POLE SCHEDULE

POLE NUMBER	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION	STANDARDS
		SIGNAL	LUMINAIRE	MOUNTING	FACE					
(C) 	TYPE 1	30'	15'	2-ASTROBRAC 1 PED	1-H3L 1-H3 1-V3L 1-CDP	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	POLARA NAVIGATOR R10-3E(L)	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S2 = STREET NAME S8 = R10-5 (30"X36") S12 = R10-5 (30"X36")	AT APPROX: STA. 13+89.57, 44.59' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(D) 	TYPE 1	35'	15'	3-ASTROBRAC 1 PED	1-H3L 2-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	POLARA NAVIGATOR R10-3E(R)	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S3 = STREET NAME S5 = R10-5 (30"X36") S9 = R10-5 (30"X36")	AT APPROX: STA. 13+38.67, 30.12' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(E) 	TYPE 1	35'	15'	3-ASTROBRAC	1-H3L 2-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	-	PRE-EMPT SENSOR (DUAL TURRETS) WIMAX ANTENNA SPP RADIO SIGNS: S4 = STREET NAME S6 = R10-5 (30"X36") S10 = R10-5 (30"X36")	AT APPROX: STA. 13+38.59, 26.57' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(F) 	TYPE 1	30'	15'	2-ASTROBRAC	1-H3L 1-H3 1-V3L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	-	PRE-EMPT SENSOR (DUAL TURRETS) SIGNS: S1 = STREET NAME S7 = R10-5 (30"X36") S11 = R10-5 (30"X36")	AT APPROX: STA. 13+99.43, 29.10' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(G) 	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 14+08.95, 28.22' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(H)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 14+00.60, 30.98' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(J)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 13+43.95, 39.21' LT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(K)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 13+40.88, 29.41' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07
(L)	PED POLE 15'	-	-	1 PED	1-CDP	-	POLARA NAVIGATOR R10-3E(R)	-	AT APPROX: STA. 13+30.72, 21.35' RT UNIVERSITY BLVD CONST. CL	02893-02 02893-03 02893-06 02893-07

TRAFFIC SIGNAL CONTROLLER

CABINET	TYPE	CONTROLLER	AUX. CONTROL	REMARKS	LOCATION	STANDARDS
(A)	UL TYPE 3R	METERED SERVICE PEDESTEL WITH ONE 30 AMP AND ONE 60 AMPBREAKERS AND PHOTOCELL	-	-	AT APPROX: STA. 13+34.00, 39.30' RT (TO CENTER OF THE PEDESTAL) UNIVERSITY BLVD CONST. CL	02893-14
(B) 	TYPE 340 ITS	2070LX CONTROLLER UNIT w/2070-1C CPU MODULE WITH GPS SERIAL COMMUNICATION MODULE & UPS BATTERY BACK-UP SYSTEM	-	STANDARDS SPECIFICATION 16730, 16731, 16732, 16733, 16734 & 16785	AT APPROX: STA. 13+30.85, 35.26' RT (TO CENTER OF THE CABINET) UNIVERSITY BLVD CONST. CL	02893-10C

APP.
REVISION
DATE
MK.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL POLE SCHEDULE

UNIVERSITY BLVD AT MORNINGSIDE DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 32C OF 139	

GC Engineering, Inc.
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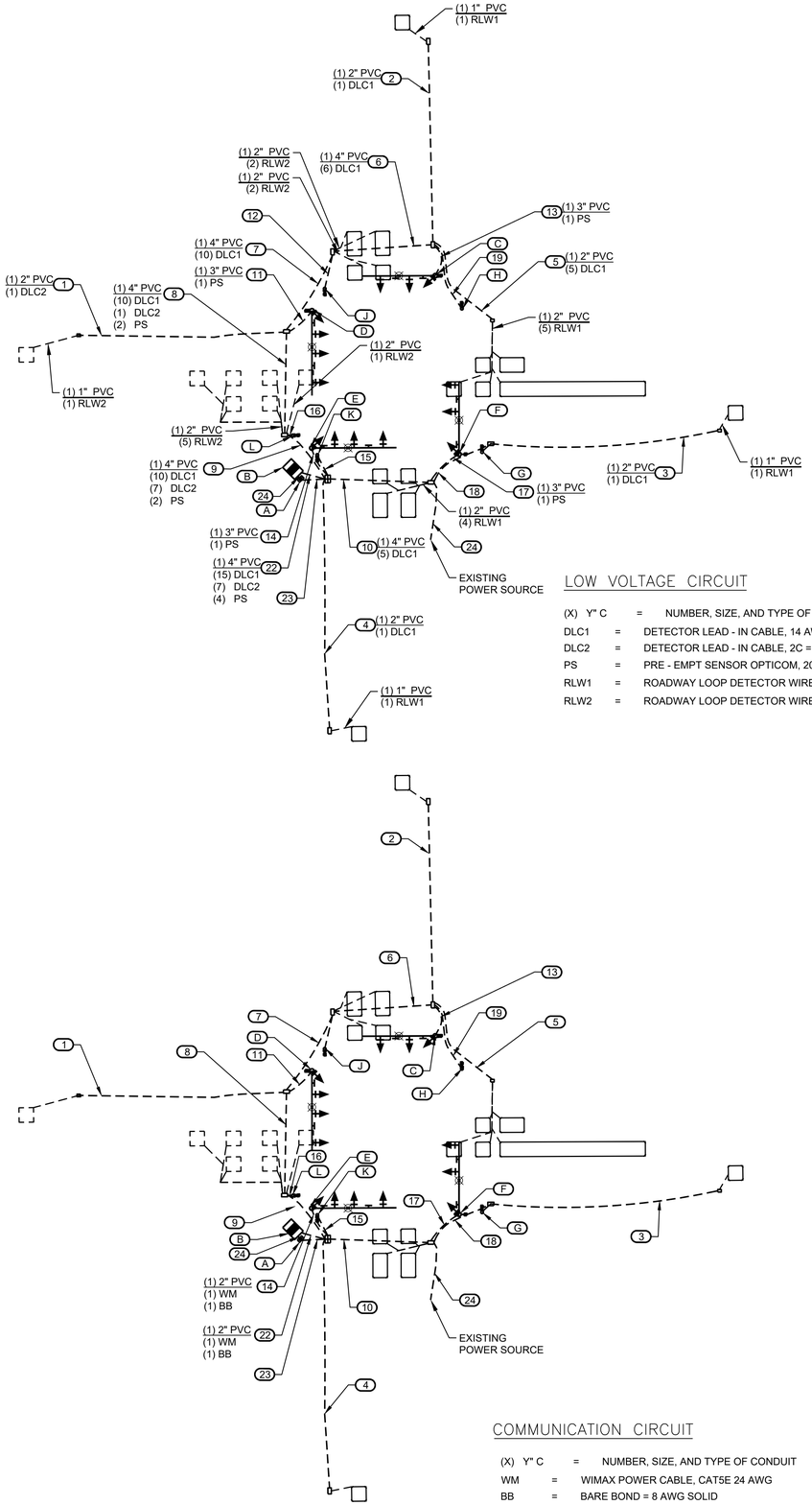
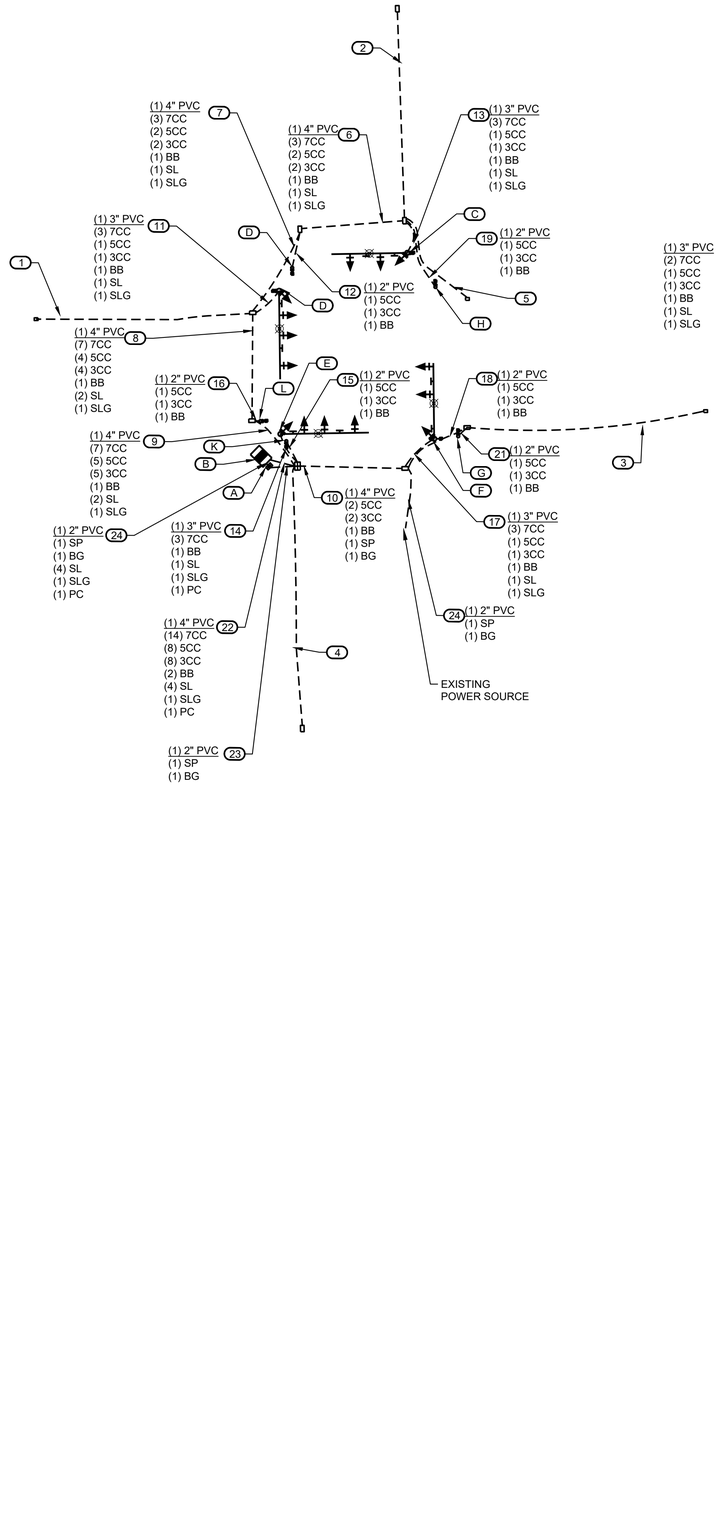


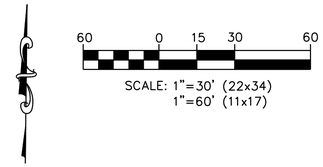
LOW VOLTAGE CIRCUIT

(X) Y" C = NUMBER, SIZE, AND TYPE OF CONDUIT
DLC1 = DETECTOR LEAD - IN CABLE, 14 AWG (1.M.S.A. SO - 2 - 1984) (SAWCUT)
DLC2 = DETECTOR LEAD - IN CABLE, 2C = 16 AWG (PERFORMED)
PS = PRE - EMPT SENSOR OPTICOM, 20 3CC - SHIELDED CABLE (3M MODEL 138) (SAWCUT)
RLW1 = ROADWAY LOOP DETECTOR WIRE, 14 AWG (IMSA 51 - 5 1985)
RLW2 = ROADWAY LOOP DETECTOR WIRE, 4C = 18 AWG (PERFORMED)



COMMUNICATION CIRCUIT

(X) Y" C = NUMBER, SIZE, AND TYPE OF CONDUIT
WM = WIMAX POWER CABLE, CAT5E 24 AWG
BB = BARE BOND = 8 AWG SOLID



HIGH VOLTAGE CIRCUIT

(X) Y" C = NUMBER, SIZE, AND TYPE OF CONDUIT
(X) = NUMBER OF CABLES (SIGNAL)
CC = 14 AWG SOLID CONDUCTOR CABLE
BB = BARE BOND B AWG SOLID
BG = BARE GROUND, 4 AWG SOLID
SP = SIGNAL POWER, 6=4 THHN
SL = STREET LIGHT, 2=10 AWG THHN
PC = PHOTO CELL, 10 AWG THHN
SLG= STREET LIGHT GROUND, 12 AWG THHN

NOTE:
SP SHALL CONSIST OF : 6 = 4 AWG THHN
2 - WHITE
1 - BLACK
1 - RED
2 - GREEN

APP.	REVISION	DATE	MK.

GC ENGINEERING, INC.
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PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TRAFFIC SIGNAL CABLE SCHEMATIC
UNIVERSITY BLVD AT MORNINGSIDE DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1"=30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 32D OF 139	

GC Engineering, Inc.
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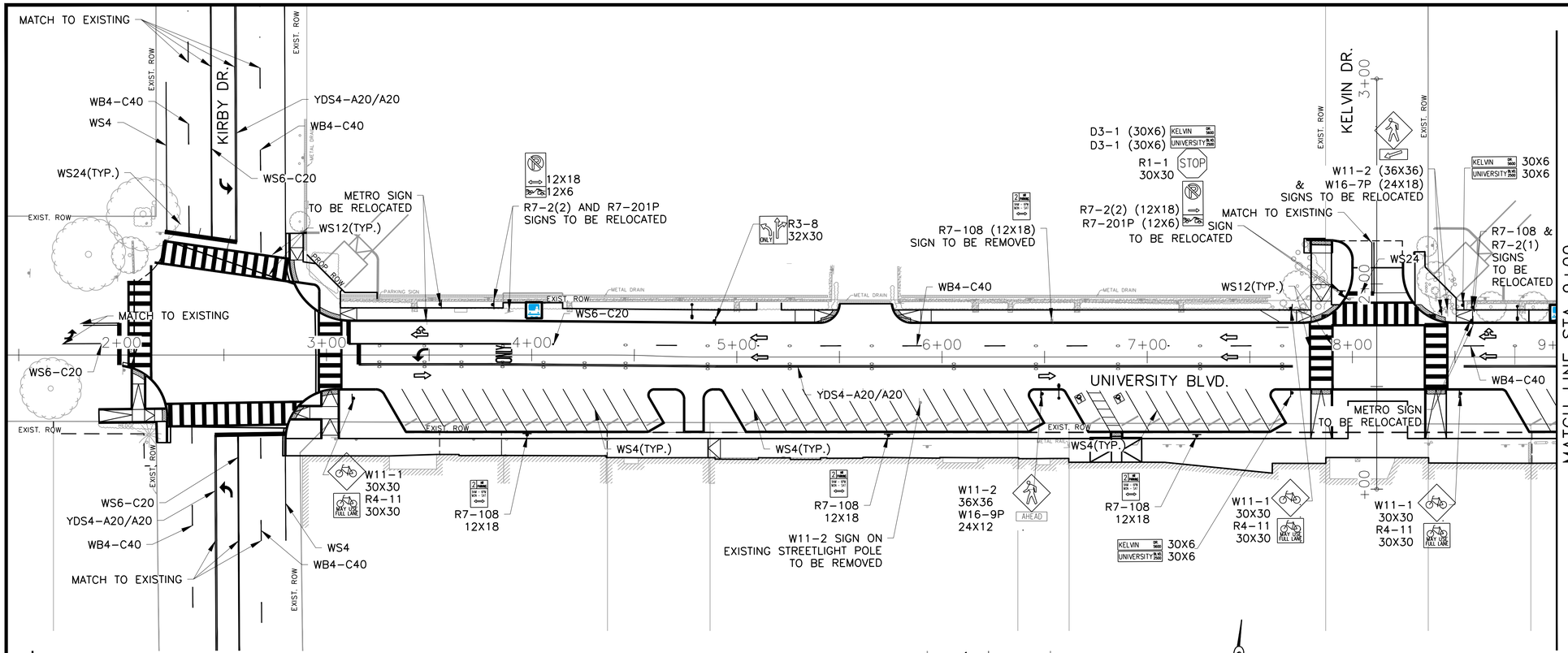

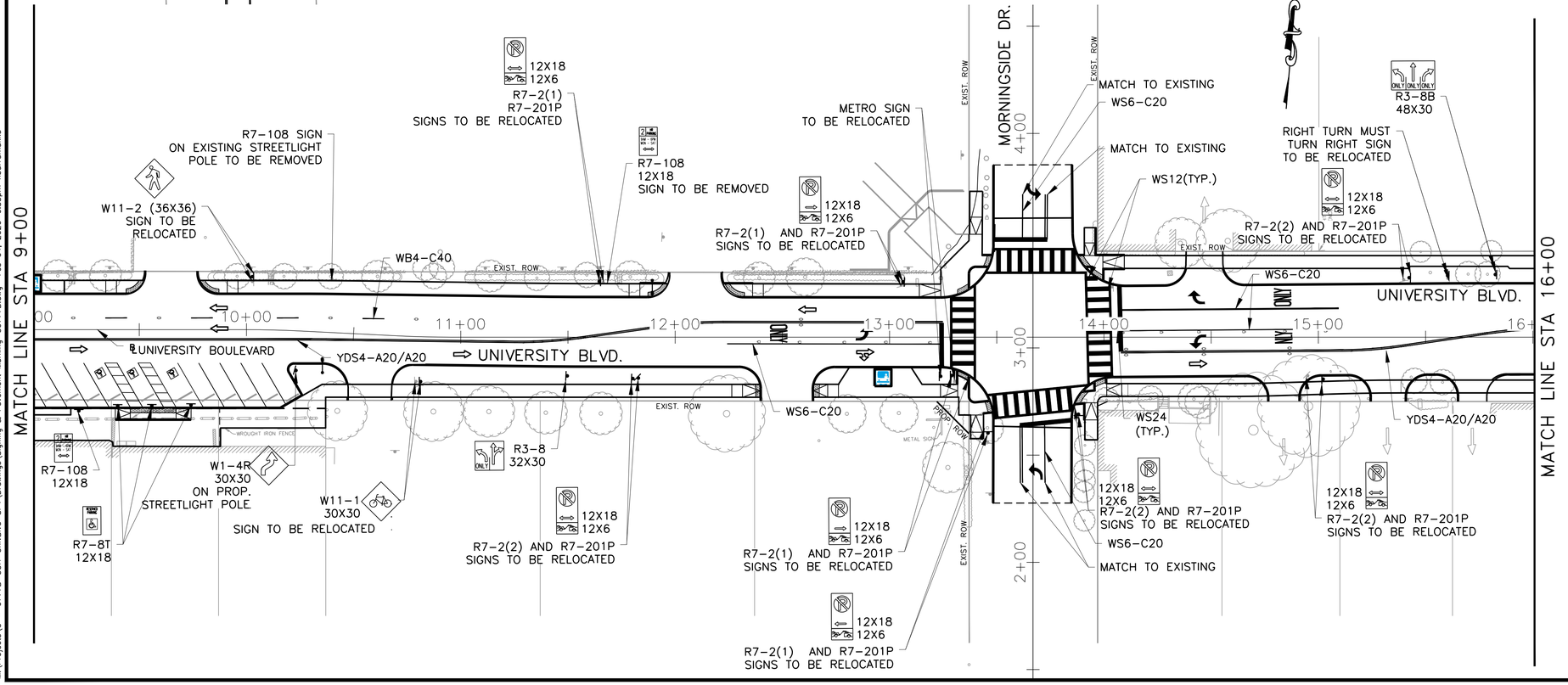

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- BASELINE
- RIGHT-OF-WAY (ROW)
- EXISTING SIGN
- PROPOSED SIGN
- SHARED BIKE LANE
- TRAFFIC FLOW DIRECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SIGNING AND PAVEMENT MARKING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 33 OF 139	

GC Engineering, Inc.
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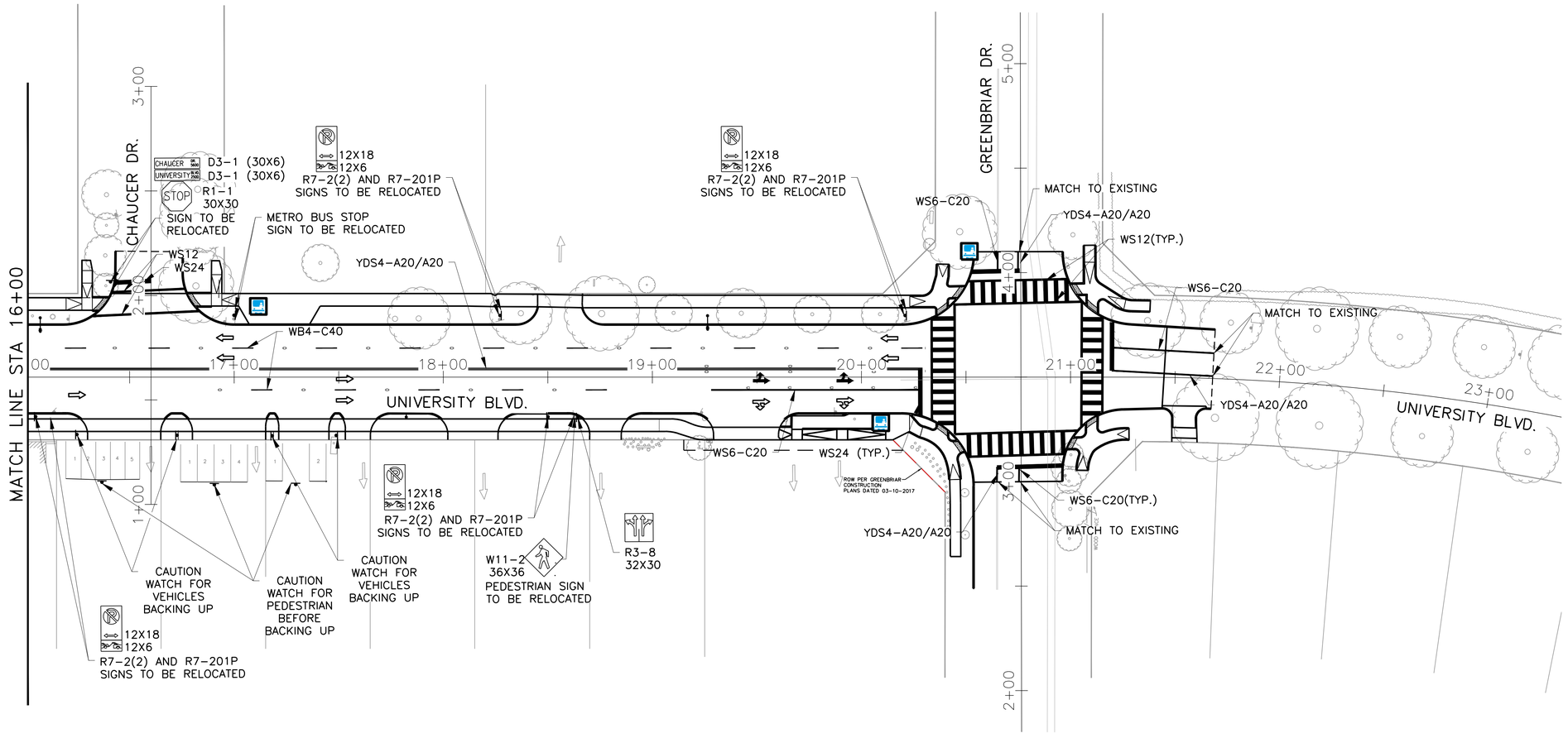

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- BASELINE
- RIGHT-OF-WAY (ROW)
- EXISTING SIGN
- PROPOSED SIGN
- SHARED BIKE LANE
- TRAFFIC FLOW DIRECTION

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SIGNING AND PAVEMENT MARKING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 34 OF 139	

GC Engineering, Inc.
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GENERAL PAVEMENT MARKING NOTES:

1. PRIOR TO START OF CONSTRUCTION, ALL EXISTING PAVEMENT MARKINGS WITHIN THE AREA OF CONSTRUCTION SHALL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING ALL EXISTING PAVEMENT MARKINGS AND LANE CONFIGURATIONS WILL BE DUPLICATED AGAIN. THIS REVIEW CAN BE DONE IN CONJUNCTION WITH SIGN INVENTORY. THE CONTRACTOR IS HELD ACCOUNTABLE FOR EXISTING AND TEMPORARY CONSTRUCTION PAVEMENT MARKINGS THROUGHOUT THE PROJECT AND AT THE PROJECT'S COMPLETION.
2. ALL PAVEMENT MARKINGS SHALL CONFORM TO CITY OF HOUSTON STANDARDS AND SPECIFICATIONS AND GENERAL GUIDELINES OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. THE PERMANENT PAVEMENT MARKINGS MAY BE MODIFIED AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
4. THE DESIGN SPEED FOR THE ROAD IS: 30 THE POSTED SPEED LIMIT IS: 30
5. ALL LANE DIMENSIONS ARE FROM CENTER OF LANE LINE, CENTER OF DOUBLE LANE LINE, FACE OF CURB, OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
6. THE PAVEMENT MARKING DRAWINGS ARE SCHEMATIC ONLY. THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, DETAILS, AND STANDARDS WHEN INSTALLING PAVEMENT MARKINGS AND SYMBOLS.
7. THE FINAL LONGITUDINAL STRIPINGS SHALL BE 60 MIL (0.060") THICK HOT-SPRAYED THERMOPLASTIC PLACED OVER THE TEMPORARY STRIPING WITHIN 14 TO 30 CALENDAR DAYS AFTER COMPLETION OF THE FINAL PAVEMENT SURFACE, OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER. ALL OTHER PAVEMENT MARKINGS SHALL BE APPLIED AT THE SAME TIME. TEMPORARY STRIPING SHALL BE WATER BASED PAINT.
8. ALL FINAL TRANSVERSE MARKINGS SHALL BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. ALL PAVEMENT ARROWS AND LEGENDS SHALL ALSO BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. PREFORMED THERMOPLASTIC APPLICATIONS MAY BE USED IF ONLY APPROVED BY THE CITY TRAFFIC ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT AND INSTALLATION OF PAVEMENT MARKINGS OF FINAL SURFACE COURSE FOLLOWING CONTROL POINTS THAT HAVE BEEN SET NO MORE THAN 50 FEET APART ALONG THE LINES TO BE IMPLEMENTED. IN TANGENT SECTIONS OF A ROAD WHERE THE PAVEMENT MARKING PATTERN DOES NOT CHANGE, CONTROL POINTS CAN BE SET AT 200 FEET SPACING. THE LAYOUT AND INSPECTION OF ALL PAVEMENT MARKINGS SHALL BE APPROVED BY CITY OF HOUSTON REPRESENTATIVE PRIOR TO THE APPLICATION OF MATERIALS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE FINAL SURFACE COURSE IS PLACED SO THAT THE STRIPING IS OFFSET NO MORE THAN ONE FOOT CLEAR OF THE CONSTRUCTION JOINT, UNLESS OTHERWISE DIRECTED BY THE CITY TRAFFIC ENGINEER.
11. ALL RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED SO THAT THE REFLECTIVE FACE OF EACH MARKER IS FACING THE DIRECTION OF TRAFFIC AND IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW. TYPE C PAVEMENT MARKERS SHALL BE INSTALLED SO THAT THE CLEAR FACE OF EACH MARKER IS FACING THE APPROACHING TRAFFIC FLOW AND PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.
12. ALL REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED IN ACCORDANCE TO CITY OF HOUSTON STANDARD SPECIFICATION 02762. APPLYING OVER EXISTING PAVEMENT MARKINGS DOES NOT CONSTITUTE AS APPROVED OBLITERATION METHOD.
13. THE ENGINEER OF RECORD SHALL BE REQUIRED TO PRODUCE AS-BUILT OF PAVEMENT MARKING PLANS WITHIN 30 DAYS AFTER COMPLETION OF PAVEMENT MARKING IMPLEMENTATION.
14. BLUE RPMS MAY BE PLACED ADJACENT TO FIRE HYDRANTS WITH THE APPROVAL OF THE CITY TRAFFIC ENGINEER.
15. FOR ALL CONSTRUCTION, ALL PAVEMENT MARKINGS AND SIGNING SHALL BE INSTALLED AND SHALL BE PAID BY THE PROJECT OWNER/DEVELOPER.
16. FINAL INSPECTION AND ACCEPTANCE OF PAVEMENT MARKINGS SHALL BE PERFORMED BY TRANSPORTATION & DRAINAGE OPERATION REPRESENTATIVE (713-803-3054).

Description and Application of Pavement Marking Lines

Line Series	Color	Description	Width Inches	Typical Applications
WB	White	Broken (10' stripe w/ 30' gap)	4"	- Lane lines between travel lanes in the same direction where changing of lanes is permitted.
WS	White	Solid	4"	- Edge lines to delineate the right edge of the roadway.
			6"	- Left edge of bicycle lane and lane lines between travel lanes in the same direction where changing of lanes is discouraged.
			12"	- Perpendicular crosswalk lines.
			24"	- Stop bars at intersections (signalized and unsignalized). - Hatching at high visibility crosswalks.
			12", 24"	- Diagonal hatching used in gores between same direction of travel lanes.
WG	White	Guide (2' stripe w/6' gap)	6"	- Guide lines through intersections. - Taper lines for turn lanes. - Guide lines for bicycle lanes.
YS	Yellow	Solid	4"	- Edge lines to delineate the left edge of a divided roadway, a one-way road, or ramp.
			12", 24"	- Diagonal hatching used in gores between opposing direction of travel lanes.
YDS	Yellow	Double Solid	4" - (4") - 4" (gap)	- Centerline that separates opposing travel lanes and delineation of median islands.
YDB	Yellow	Double Broken	4" - (4") - 4" (gap)	- Defines the edges of center reversible lanes that are used as TWLTLs during intermittent periods.
YB	Yellow	Broken (10' stripe w/ 30' gap)	4"	- Separates travel lanes in opposite directions where passing is permitted in both directions of travel.
YB (BIKE)	Yellow	Broken (3' stripe w/ 9' gap)	4"	- Separates bicycle travel lanes in opposite directions where passing is permitted in both directions of travel.
YSB	Yellow	Solid & Broken Broken (10' stripe w/ 30' gap)	4" - (4") - 4" (gap)	- Separates travel lanes in opposite directions where passing is permitted in one direction and prohibited in the opposite direction. - Used for edge of two-way left-turn lanes (TWLTL).
BICYCLE GREEN	Green	Solid Colored Pavement	Varies	- Ped/Bike crossing - Vehicle / Bike/ Conflict Area
YIELD LINE	White	Triangle	16" x 24"	- Mid-Block crossing.

Description and Application of Reflective Raised Pavement Markers (RPM)

RRPM Types	Color	COH Spec. Sec. 02764 Equivalent	Description
C	Clear	Type I-C	- Approach face that reflects white light, and the other side does not reflect.
R	Clear & Red	Type II-C-R	- Approach face that reflects white light, and the other side reflects red light.
A	Amber & Amber	Type II-A-A	- Approach face and the other side both reflect amber light.

Line Style Designation : YSB4 - A40/A40

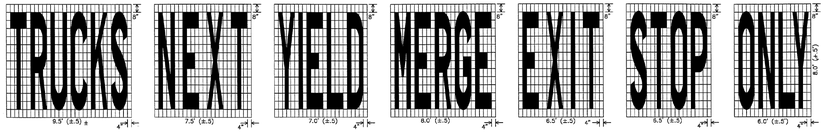
- Color
- Pattern
- Width of stripe
- RPM spacing
- RPM type
- RPM spacing
- RPM Type

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

GENERAL NOTES AND LEGENDS
(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-01

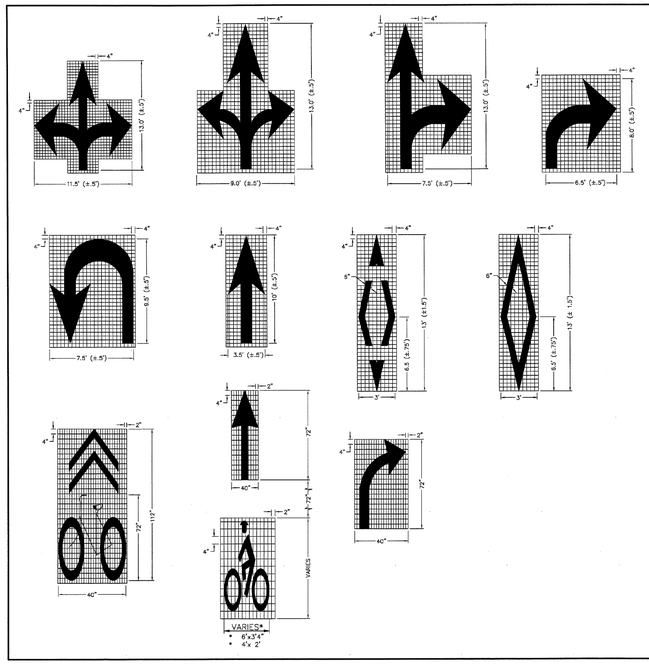


CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD PAVEMENT MARKING - (WORDS)
(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-03



NOTES FOR PAVEMENT MARKINGS "SYMBOLS" AND "ARROWS":

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.
2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS. SPECIAL PERMISSION NEEDED BY CITY TRAFFIC ENGINEER FOR REDUCTION BELOW ONE-THIRD OF STANDARD SIZES.
3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 50 FEET, OR AS INDICATED ON THE PLANS.
4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:

   A. REGULATORY
      STOP
      RIGHT (LEFT) TURN ONLY, SYMBOL ARROWS.

   B. WARNING
      STOP AHEAD
      SIGNAL AHEAD
      SCHOOL
      SCHOOL X-ING
      PED X-ING
      R X R (SEE SHEET 01510-08 DETAILS)
      OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS. SPECIAL PERMISSION NEEDED BY CITY TRAFFIC ENGINEER FOR SPECIAL CONDITIONS.

5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.
6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES (ALL-WAY STOP).
7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
8. SPACING BETWEEN STANDARD SIZE LETTERS SHOULD BE 4 INCHES (MIN). THE WIDTH OF NON-STANDARD SIZE LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES. APPROVAL BY CITY TRAFFIC ENGINEER, SPECIAL PERMISSION NEEDED FOR NON-STANDARD SIZE "LETTER" AND/OR "ARROWS".
9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. SINGLE TURN ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".
10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED IN THE DESIGN PLANS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD PAVEMENT MARKING - (SYMBOLS)
(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-04

GC ENGINEERING, INC.
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PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

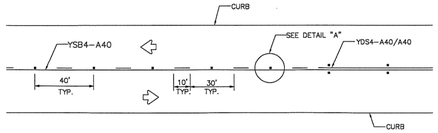
STANDARD DETAILS - PAVEMENT MARKING

SHEET 01 OF 03

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 35 OF 139	

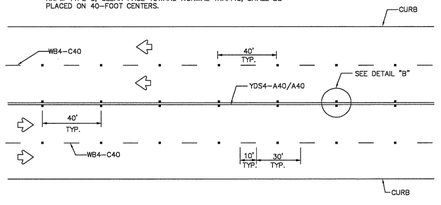
GC Engineering, Inc.
M:\Projects\G - 0777B-COH-UnivBvd-SP1\Drawings\Standard Details-Pavement Marking-G0777B.dwg Feb 04, 2026-6:35pm nburromuku

CENTERLINE & FOR ALL TWO LANE STREETS WITH PASSING ZONE

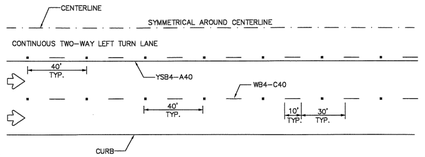


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY STREETS

RRPM TYPE C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.

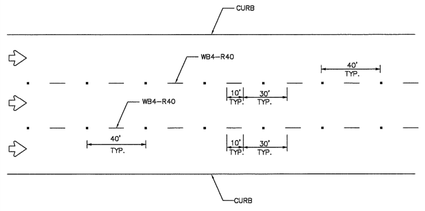


CENTERLINE & LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY MULTILANE STREET

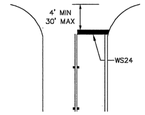
RRPM TYPE R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.



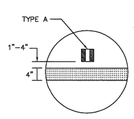
GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF HOUSTON STANDARD SPECIFICATIONS.

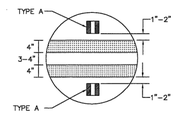
GUIDE FOR PLACEMENT OF STOP LINES & CENTERLINE



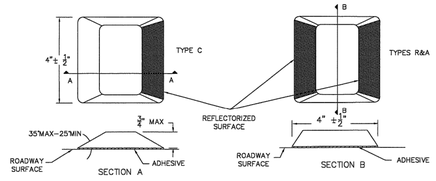
DETAIL "A"



DETAIL "B"



REFLECTIVE RAISED PAVEMENT MARKERS



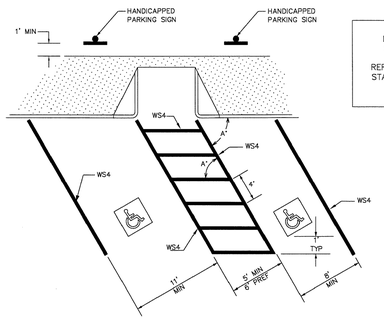
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE
(NOT TO SCALE)

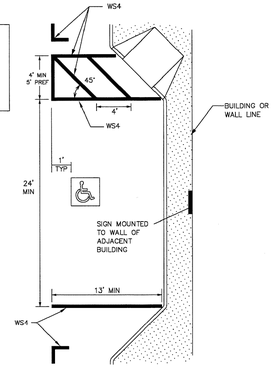
CITY TRAFFIC ENGINEER / CITY ENGINEER — DIRECTOR OF HOUSTON PUBLIC WORKS

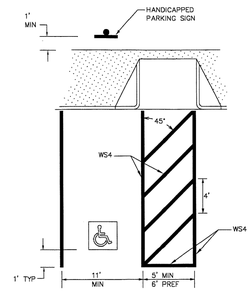
EFF DATE: JUL-01-2018 | DWG NO: 01510-05

TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS



RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS.
REFER TO CITY OF HOUSTON STANDARDS ON WHEELCHAIR RAMP CRITERIA.

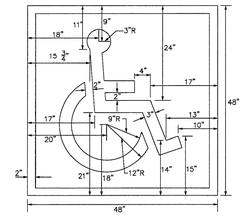




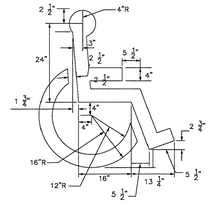
NOTES:

1. ALL PARKING SPACE LIMIT LINES SHALL BE 4", WS4.
2. AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.
3. DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY ± 10%.
4. PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):
   A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
   B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
   C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND
   D) SHALL BE 30"x 30" MINIMUM.
5. WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30"x 30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.
6. ALL SLOPE IN AND AROUND EXPECTED WHEELCHAIR PATH SHALL NOT EXCEED ADA REQUIREMENTS FOR WHEELCHAIR RAMPS.
7. REFER TO CITY OF HOUSTON TRAFFIC SIGN STANDARDS FOR HANDICAPPED PARKING SIGN DETAILS.
8. NOTE THAT ANGLED PARKING ON PUBLIC ROADWAYS REQUIRE CITY COUNCIL APPROVAL BEFORE IMPLEMENTATION.

HANDICAPPED PAVEMENT MARKING SYMBOLS



WITH BACKGROUND
SYMBOL & BORDER: WHITE
BACKGROUND: BLUE



SYMBOL ONLY
SYMBOL: BLUE OR WHITE

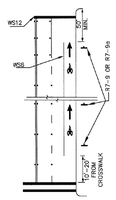
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

PAVEMENT MARKINGS FOR ACCESSIBLE PARKING
(NOT TO SCALE)

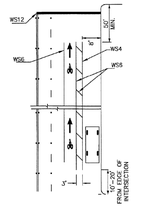
CITY TRAFFIC ENGINEER / CITY ENGINEER — DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-07

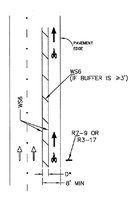
STANDARD BIKE LANES
NO ON-STREET PARKING ALONG BICYCLE LANE



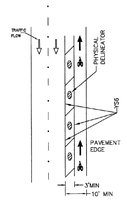
STANDARD BIKE LANES
ON-STREET PARKING ALONG BICYCLE LANE



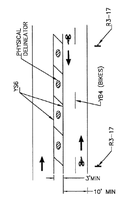
BUFFERED BIKE LANES
*DELINEATOR REQUIRED IF D<2'



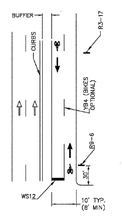
SEPARATED BIKE LANES
ONE-WAY (CONTRA-FLOW)



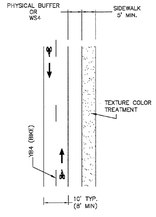
SEPARATED BIKE LANES
TWO-WAY



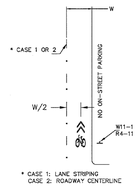
TWO-WAY SIDE PATH



SIDEPATH WITH DEDICATED SIDEWALK

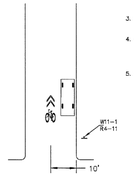


ROADWAY WITH SHARED LANE



- NEIGHBORHOOD BIKEWAY
- COLLECTOR/ THOROUGHFARE
- NO ON-STREET PARKING

ROADWAY WITH SHARED LANE



- NEIGHBORHOOD STREET
- NO CENTER LINE OR LANE MARKING
- ON STREET PARKING

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE ON PLANS.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF HOUSTON STANDARD SPECIFICATIONS.
3. EXACT SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD (TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL) GUIDE FOR THE DEVELOPMENT OF BICYCLES FACILITIES, AASHTO, LATEST EDITION.
5. SHARED LANE MARKING SHALL BE IMPLEMENTED ONLY ON ROADWAY SEGMENT BUT NOT WITHIN THE FUNCTIONAL LIMITS OF AN INTERSECTION.

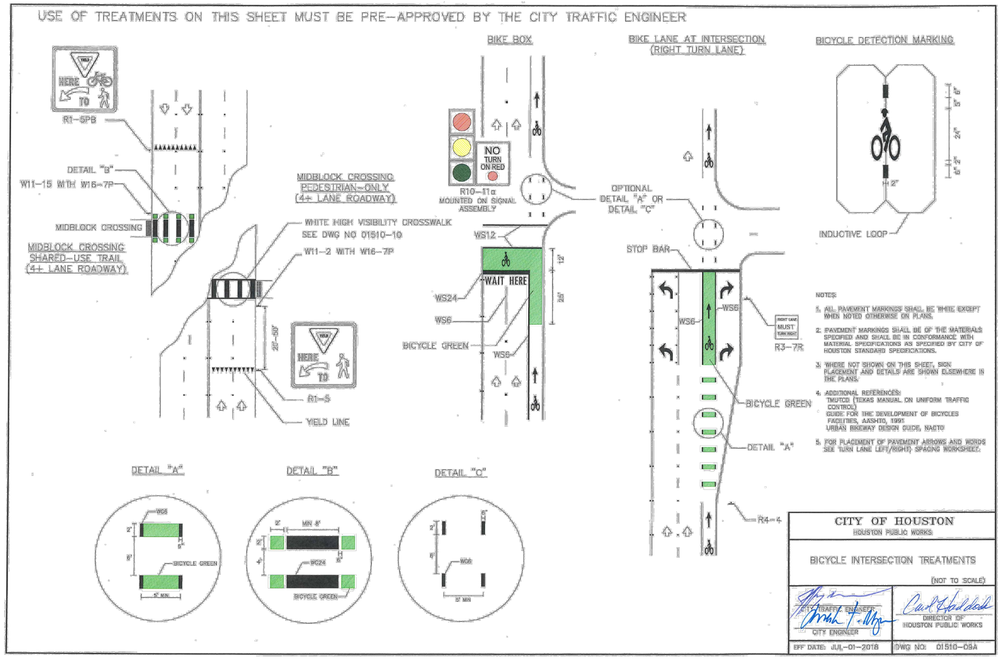
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

BICYCLE LANE PAVEMENT MARKINGS
(NOT TO SCALE)

CITY TRAFFIC ENGINEER / CITY ENGINEER — DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-09

USE OF TREATMENTS ON THIS SHEET MUST BE PRE-APPROVED BY THE CITY TRAFFIC ENGINEER



NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE ON PLANS.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF HOUSTON STANDARD SPECIFICATIONS.
3. WHERE NOT SHOWN ON THIS SHEET, SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD (TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL) GUIDE FOR THE DEVELOPMENT OF BICYCLES FACILITIES, AASHTO, 1999 URBAN BIKEWAY DESIGN GUIDE, NACTO
5. FOR PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE TURN LANE LEFT/RIGHT) SPACING WORKSHEET.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

BICYCLE INTERSECTION TREATMENTS
(NOT TO SCALE)

CITY TRAFFIC ENGINEER / CITY ENGINEER — DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 | DWG NO: 01510-08A

GC ENGINEERING, INC.
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – PAVEMENT MARKING

SHEET 02 OF 03

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 36 OF 139	

GC Engineering, Inc.
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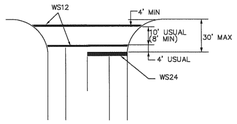
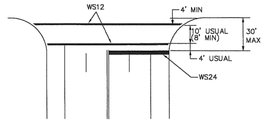
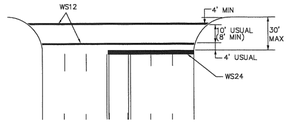
TWO LANES WITH SHOULDERS



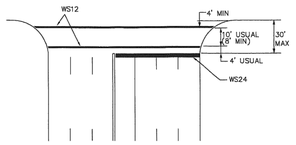
FOUR LANES WITH SHOULDERS



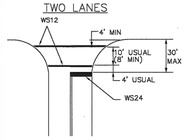
MULTI – LANES



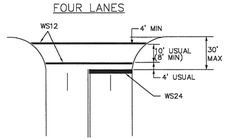
MULTI – LANE WITH MEDIAN



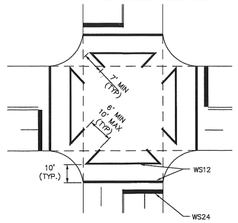
TWO LANES



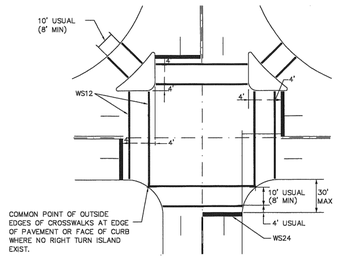
FOUR LANES



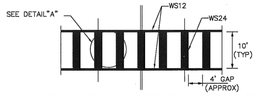
EXCLUSIVE PEDESTRIAN PHASE



INTERSECTION WITH RIGHT – TURN ISLANDS

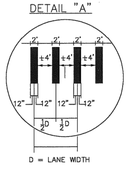


HIGH VISIBILITY CROSSWALK DETAIL



TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED CROSSINGS ON COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.

DETAIL "A"



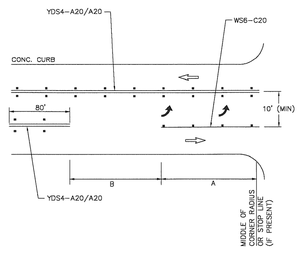
D = LANE WIDTH

NOTES:

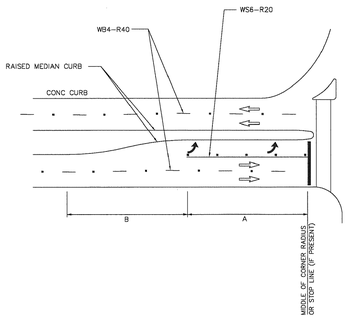
1. CROSSWALKS AND STOP LINES SHALL BE WHITE.
2. "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
TYPICAL CROSSWALK DETAILS (NOT TO SCALE)	
CITY TRAFFIC ENGINEER CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-10

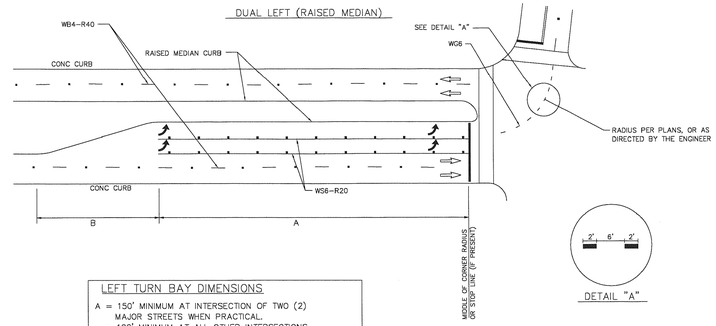
LEFT-TURN LANE



LEFT-TURN LANE (RAISED MEDIAN)



DUAL LEFT (RAISED MEDIAN)



DETAIL "A"

LEFT TURN BAY DIMENSIONS

A = 150' MINIMUM AT INTERSECTION OF TWO (2) MAJOR STREETS WHEN PRACTICAL.
= 100' MINIMUM AT ALL OTHER INTERSECTIONS.

B = 100' MINIMUM ON STRAIGHT ROADWAYS.
*TAPER LENGTH MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT.
*TAPER LENGTH MAY BE LONGER IF CURVE IS TO THE RIGHT.

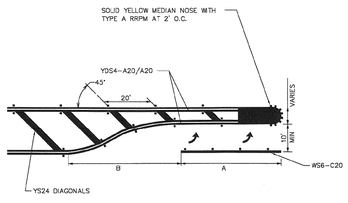
NOTE:
1. DIMENSIONS SHALL BE ADJUSTED AS DETERMINED BY CITY OF HOUSTON TRAFFIC ENGINEER.
2. REFER TO CITY OF HOUSTON DESIGN MANUAL (DWG No. 10.06-07) FOR DETAILS.

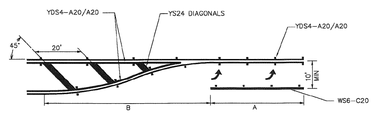
NOTES:

1. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
2. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS.
3. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
4. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
5. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1 (NOT TO SCALE)	
CITY TRAFFIC ENGINEER CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-11

PAINTED MEDIAN LEFT TURN BAY DETAILS





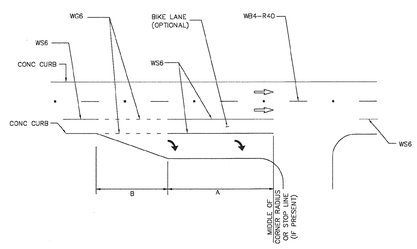
LEFT TURN BAY DIMENSIONS

A = 150' MINIMUM AT INTERSECTION OF TWO (2) MAJOR STREETS WHEN PRACTICAL.
= 100' MINIMUM AT ALL OTHER INTERSECTIONS.

B = 100' MINIMUM ON STRAIGHT ROADWAYS.
*TAPER LENGTH MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT.
*TAPER LENGTH MAY BE LONGER IF CURVE IS TO THE RIGHT.

NOTE:
1. DIMENSIONS SHALL BE ADJUSTED AS DETERMINED BY CITY OF HOUSTON TRAFFIC ENGINEER.
2. REFER TO CITY OF HOUSTON DESIGN MANUAL (DWG No. 10.06-07) FOR DETAILS.

UNSIGNALIZED RIGHT-TURN LANE



NOTES:

1. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
2. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
3. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
4. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2 (NOT TO SCALE)	
CITY TRAFFIC ENGINEER CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-12

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – PAVEMENT MARKING

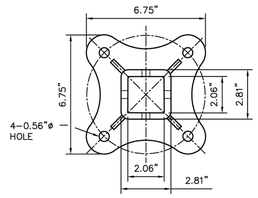
SHEET 03 OF 03

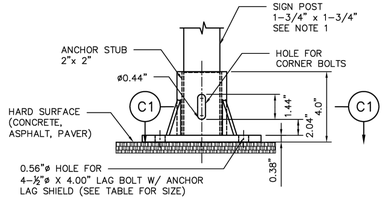
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 37 OF 139	

GC Engineering, Inc.
M:\Projects\G - 0777B-COH-UnivBlvd-SP1\Drawings\Standard Details-Pavement Marking-G0777B.dwg Feb 04, 2026-6:35pm nburromuku

DocuSign Envelope ID: CB71C116-B716-4899-A5EE-0D2F2CC55AF6

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY AND SUITABILITY FOR EACH INSTALLATION. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT DESIGNS OR FOR INCORRECTLY FOR ADDRESS, EQUATION, OR DAMAGES RESULTING FROM ITS USE.





TOP VIEW

SIDE VIEW

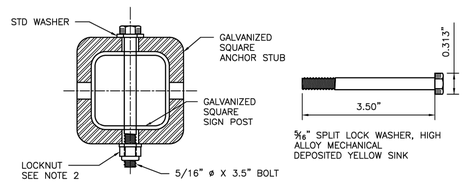
TYPICAL HARD SURFACE INSTALLATION GALVANIZED SIGN BASE

NOTES:

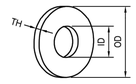
1. REFER TO COH STD DWG 01554–01 FOR SIGN AND POST REQUIREMENTS.
2. REFER TO DETAIL "C5" ON COH STD DWG 01554–01 FOR NUT AND BOLT REQUIREMENTS.

BASE PLATE NOTES:

1. MATERIAL: ASTM A–536 GRADE 65–45–12 DUCTILE IRON
2. HOT DIP GALVANIZE PER ASTM A–153
3. ALL DIMENSIONS ARE IN INCHES



SECTION C1
CORNER BOLT

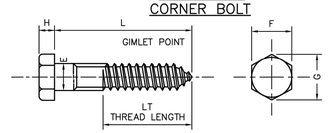


SAE FLAT WASHERS

SIZE	ID			OD			THICKNESS – TH		
	BASIC	TOLERANCE		BASIC	TOLERANCE		BASIC	MAX	MIN
		PLUS	MINUS		PLUS	MINUS			
1/2"	0.531	0.015"	0.005"	1.062"	0.030"	0.007"	0.95"	0.121"	0.74"

DIMENSIONS: ASME B18.21.1, TYPE A PLAIN WASHERS
MATERIAL: CARBON STEEL
FINISH: Fe/Zn 3AT PER ASTM F1941

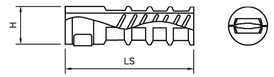
1/2" FLAT WASHERS, LOW CARBON, SAE, ZINC PLATED



DIAMETER	E		F		G		H		L	LT
	BODY DIAMETER		WIDTH ACROSS FLATS		WIDTH ACRSS CORNERS		HEIGHT		LENGTH	THREAD LENGTH
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN		
1/2"	0.515"	0.482"	0.750"	0.725"	0.866"	0.826"	0.364"	0.302"	4.00"	3.84"

MATERIAL:PER A307 GRADE A
COATING: HOT DIP ZINC PER ASTM F2329 OR IN ACCORDANCE WITH CLASS C OF ASTM A153 AND CLASS D FOR ⅜" DIAMETER AND LESS

4" HEX LAG SCREWS, HOT DIPPED GALVANIZED



TH	LS	H	L
LAG THREAD SIZE	LENGTH OF SHIELD	DRILLED HOLE SIZE	BOLT LENGTH REQ
	NOMINAL		
1/2"	3.00"	0.75"	4.00"

ANCHOR LAG SHIELD – ZINC ALLOY

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIGN BASE
HARD SURFACE
MOUNTING DETAILS
(SCALE: NOT TO SCALE)

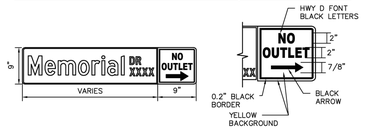
APPROVED BY:

DocuSigned by: Suhail Kanwar — CITY ENGINEER
DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 01554–02

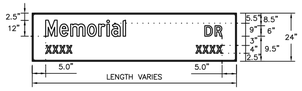
DocuSign Envelope ID: CB71C116-B716-4899-A5EE-0D2F2CC55AF6

POST MOUNTED STREET NAME SIGN W/ NO OUTLET SIGN



D3 – POST MOUNTED STREET NAME SIGN

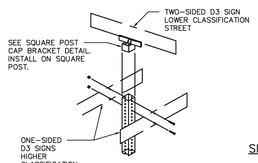
OVERHEAD STREET NAME SIGN DETAIL



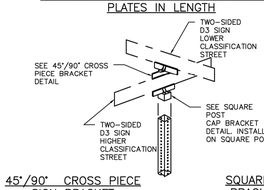
D3 – STREET NAME SIGN

	POST–MOUNTED SIGN	OVERHEAD SIGN
HEIGHT	9"	24"
LENGTH	30" MIN 48" MAX 6" INCREMENTS OF LENGTH	10" MAX 2" INCREMENT OF LENGTH
THICKNESS	0.125"	0.080"
SUBSTREATE	ALLUMINUM ALLOY, 5052–H38 (ASTM B–209)	
SIGN FACE MATERIALS	GREEN FILM OVER DIAMOND GRADE VIP SHEETING	
LEGENDS AND SYMBOLS	HIGHWAY GOTHIC SERIES D (USUAL) HIGHWAY GOTHIC SERIES C OR B FOR MAXIMUM LENGTH SIGN BLACK	
COLOR	LETTERS–WHITE REFLECTIVE BORDER–WHITE REFLECTIVE BACKGROUND–GREEN REFLECTIVE	

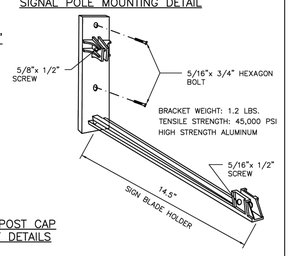
D3 SIGNS GREATER THAN 42" PLATES IN LENGTH



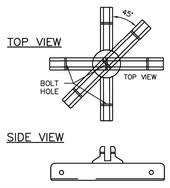
D3 SIGNS LESS THAN OR EQUAL TO 42" PLATES IN LENGTH



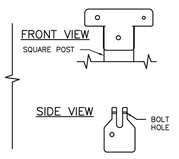
SIGNAL POLE MOUNTING DETAIL



45°/90° CROSS PIECE
SIGN BRACKET



SQUARE POST CAP
BRACKET DETAILS



NOTES:

1. TYPICAL SIGN PLATE SHOULD BE 30" MAX.
2. LONGER SIGN PLATE MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

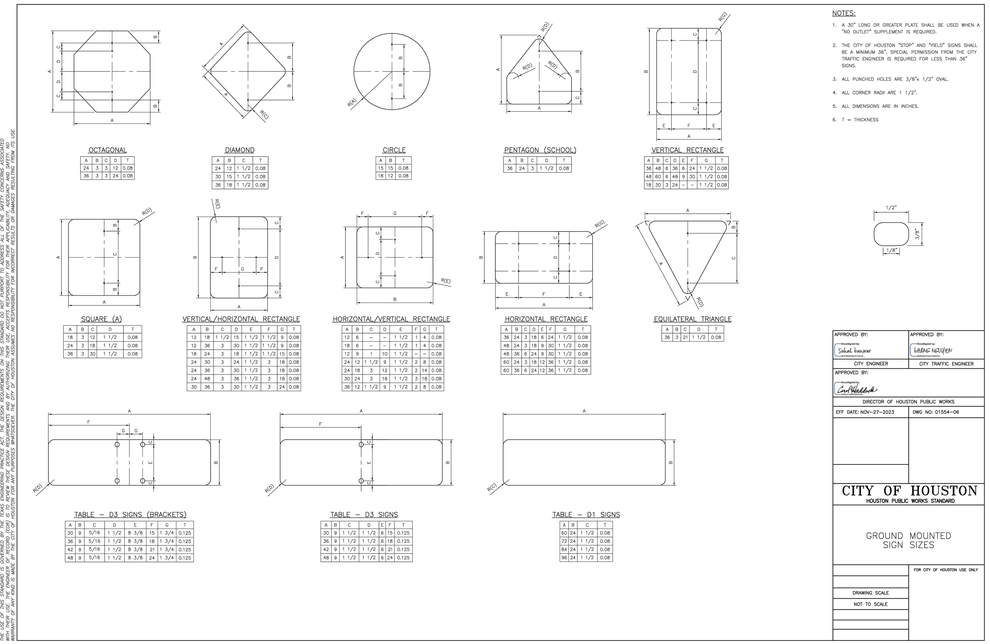
STREET NAME SIGN AND
SIGN MOUNTING
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Suhail Kanwar — CITY ENGINEER
DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 01554–03

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY AND SUITABILITY FOR EACH INSTALLATION. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT DESIGNS OR FOR INCORRECTLY FOR ADDRESS, EQUATION, OR DAMAGES RESULTING FROM ITS USE.



NOTES:

1. A 30" LONG OR GREATER PLATE SHALL BE USED WHEN A "NO OUTLET" SUPPLEMENT IS REQUIRED.
2. THE CITY OF HOUSTON "STOP" AND "YIELD" SIGNS SHALL BE A MINIMUM 36", SPECIAL PROVISION FROM THE CITY TRAFFIC ENGINEER IS REQUIRED FOR LESS THAN 36" SIGNS.
3. ALL PUNCHED HOLES ARE 3/8"x 1/2" OVAL.
4. ALL CORNER RADII ARE 1 1/2".
5. ALL DIMENSIONS ARE IN INCHES.
6. T = THICKNESS

APPROVED BY: Suhail Kanwar — CITY ENGINEER
APPROVED BY: Khang Nguyen — CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock — DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE:NOV–27–2023 | DWG NO: 01554–08

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

GROUND MOUNTED
SIGN SIZES

FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE
NOT TO SCALE

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – TRAFFIC SIGNS

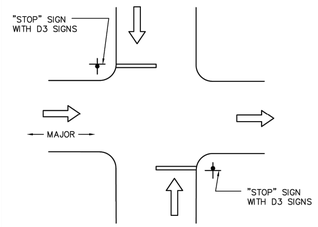
SHEET 01 OF 02

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 38 OF 139	

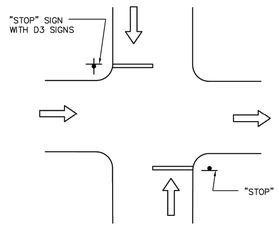
GC Engineering, Inc.
M:\Projects\G – 0777B–COH–UnivBlvd–SP1\Drawings\Standard Details–Traffic Signs–C0778D.dwg Feb 04, 2026–6:36pm nburomuku

DocuSign Envelope ID: CB71C116-B716-4899-A5EE-0D2F2CC55AF6

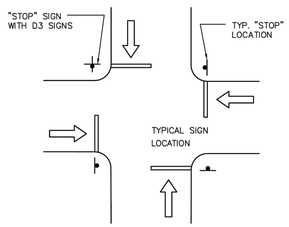
TYPICAL SIGN PLACEMENT



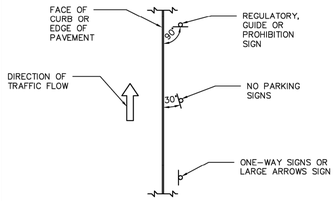
TWO-WAY STOP
AND ONE-WAY OPERATION
ON MAJOR/LOCAL INTERSECTION



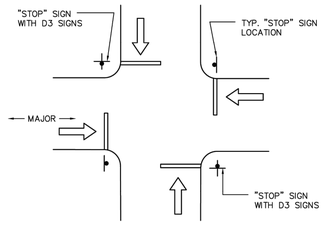
TWO-WAY STOP
AND ONE-WAY OPERATION
ON LOCAL/LOCAL INTERSECTION



FOUR-WAY STOP CONTROL
ON LOCAL/LOCAL INTERSECTION



MAST ARM INSTALLATION
REFER TO TRAFFIC SIGNAL DETAILS
FOR ADDITIONAL INFORMATION.



FOUR-WAY STOP CONTROL
ON MAJOR/LOCAL INTERSECTION

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL SIGN PLACEMENT

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukat Kanwar — CITY ENGINEER
DocuSigned by: HANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 01554-07

DISCLAIMER:
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DocuSign Envelope ID: CB71C116-B716-4899-A5EE-0D2F2CC55AF6

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REGULATORY SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
STOP	R1-1	36x36
YIELD	R1-2	36x36x36
ALL WAY PLAQUE	R1-3P	18x6
YIELD HERE TO PEDESTRIANS	R1-5a	36x48
EXCEPT RIGHT TURN (PLAQUE)	R1-10P(1)	24x18
EXCEPT BUSES (PLAQUE)	R1-10P(2)	24x18
SPEED LIMIT	R2-1	30x36
MINIMUM SPEED LIMIT (PLAQUE)	R2-4P	24x30
NO RIGHT TURNS	R3-1	36x36
NO LEFT TURNS	R3-2	36x36
NO U-TURNS	R3-4	36x36
LEFT/RIGHT TURN ONLY	R3-5	30x36
THRU ONLY	R3-5a	30x36
LEFT TURN/THRU	R3-6	30x36
LEFT/RIGHT LANE MUST TURN LEFT/RIGHT	R3-7	36x36
ADVANCE INTERSECTION LANE CONTROL (VARIES)	R3-8	VARIES×30
TWO-WAY LEFT TURN ONLY (OVERHEAD)	R3-9a	30x36
TWO-WAY LEFT TURN LANE (POST MOUNTED)	R3-9b	24x36
BEGIN	R3-9cP	30x12
END	R3-9dP	30x12
REVERSIBLE LANE CONTROL (SYMBOL)	R3-9e	108x48
REVERSIBLE LANE CONTROL (POST MOUNTED)	R3-9f	36x54
ADVANCE REVERSIBLE LANE CONTROL TRANSITION	R3-9g,9h	108x36
END REVERSIBLE LANE	R3-9i	108x48
BIKE LANE	R3-17	24x18
SLOWER TRAFFIC KEEP RIGHT	R4-3	24x30
BEGIN RIGHT TURN LANE YIELD TO BIKES	R4-4	36x30
KEEP RIGHT	R4-7	24x30
KEEP LEFT	R4-8	24x30
DO NOT DRIVE ON SHOULDER	R4-17	24x30
DO NOT PASS ON SHOULDER	R4-18	24x30
DO NOT ENTER	R5-1	36x36
WRONG WAY	R5-1a	42x30
NO TRUCKS (SYMBOL)	R5-2(1)	24x24
NO THRU TRUCKS (TEXT)	R5-2(2)	24x30
ONE WAY (LONG)	R6-1	54x18
ONE WAY	R6-2	30x36
ROUNDABOUT DIRECTIONAL (2 CHEVRONS)	R6-4	30x24
ROUNDABOUT CIRCULATION (PLAQUE)	R6-5P	30x30
BEGIN ONE WAY	R6-6	30x36
END ONE WAY	R6-7	30x36
PARKING RESTRICTION (ARROW)	R7-2(1)	12x18
PARKING RESTRICTION (TO CORNER)	R7-2(2)	12x18
PARKING RESTRICTION (BUS ZONE)	R7-2(3)	12x18

REGULATORY SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
PARKING RESTRICTION (VALET ZONE)	R7-2(4)	12x18
PARKING RESTRICTION (PEAK PERIOD)	R7-2(5)	12x18
PARKING RESTRICTION (EMERGENCY VEH. ONLY)	R7-2(6)	12x18
PARKING RESTRICTION (TAXI ZONE)	R7-2(7)	12x18
PARKING RESTRICTION (NO STOPPING OR STANDING)	R7-2(8)	12x18
PARKING RESTRICTION (JITNEY STOP)	R7-2(9)	12x18
PARKING RESTRICTION (PED-CAB ZONE)	R7-2(10)	12x18
PARKING RESTRICTION (LIMO ZONE)	R7-2(11)	12x18
PARKING RESTRICTION (COMMERCIAL VEH. ZONE)	R7-2(12)	12x18
PARKING RESTRICTION (FED/CITY AUTHORIZED VEH. ONLY)	R7-2(13)	12x18
PARKING RESTRICTION (U.S. MARSHAL PARKING ONLY)	R7-2(14)	12x18
PARKING RESTRICTION (EMERGENCY)	R7-2(15)	12x18
PARKING TIME LIMIT (VARIES)	R7-108	12x18
HANDICAPPED PARKING	R7-8T	12x18
TOW AWAY ZONE (PLAQUE)	R7-201P	12x6
PARKING METER (COH)	R7-110	12x18
ON TRACKS (PLAQUE)	R8-3eP	24x18
CROSS ONLY AT CROSSWALKS (SYMBOL)	R9-2	12x18
NO PEDESTRIAN CROSSING (SYMBOL)	R9-3	18x18
NO PEDESTRIAN CROSSING	R9-3a	12x18
PEDESTRIAN CROSSING	R9-8	36x18
SIDEWALK CLOSED	R9-9	24x12
SIDEWALK CLOSED-USE OTHER SIDE	R9-10	24x12
SIDEWALK CLOSED CROSS HERE	R9-11a	24x12
PUSH BUTTON FOR PEDESTRIAN CROSSING	R10-3a	9x15
LEFT ON GREEN ARROW ONLY	R10-5	30x36
STOP HERE ON RED	R10-6	24x36
DO NOT BLOCK INTERSECTION	R10-7	24x30
LEFT/RIGHT TURN SIGNAL	R10-10	30x36
NO TURN ON ROAD (TEXT)	R10-11a	36x48
LET TURN YIELD ON GREEN	R10-12	30x36
CROSSWALK, STOP ON RED	R10-23	24x30
KEEP OFF MEDIAN	R11-1	24x30
ROAD CLOSED	R11-2	48x30
ROAD CLOSED LOCAL TRAFFIC ONLY	R11-3a	60x30
BRIDGE OUT LOCAL TRAFFIC ONLY	R11-3b	60x30
ROAD CLOSED TO THRU TRAFFIC	R11-4	60x30
WEIGHT LIMIT XX TONS	R12-1	24x30
AXLE WEIGHT LIMIT XX TONS/LBS	R12-2	24x30
NO TRUCKS OVER XX TONS/LBS EMPTY WEIGHT	R12-3	24x36
WEIGHT LIMIT XX TONS PER AXLE XX TONS GROSS	R12-4	36x24
LOAD ZONED BRIDGE	R12a1	VARIES×36
TRUCK ROUTE	R14-1	24x18
GRADE CROSSING (CROSSBUCK)	R15-1	48x9
NUMBER OF TRACKS (PLAQUE)	R15-2P	27x18

REGULATORY SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
RIGHT ANGLE TURN	CW1-1	36X36
HORIZONTAL CURVE	CW1-2	36X36
REVERSE RIGHT ANGLE TURNS	CW1-3	36X36
REVERSE HORIZONTAL CURVES	CW1-4	36X36
REVERSE CURVE (2 LANES)	CW1-4b	36X36
REVERSE CURVE (MORE THAN 2 LANES)	CW1-4c	36X36
ONE-DIRECTION LARGE ARROW	CW1-6	48X24
UPWARD SLOPING ARROW	CW1-6aT	36X36
CHEVRON	CW1-8	18X24
STOP AHEAD	CW3-1	36X36
SIGNAL AHEAD	CW3-3	36X36
BE PREPARED TO STOP	CW3-4	36X36
ROAD NARROWS	CW5-1	36X36
NARROW BRIDGE	CW5-2	36X36
TWO-WAY TRAFFIC FLOW	CW6-3	36X36
TWO-WAY TRAFFIC	CW6-4	12X18
BUMP	CW8-1	36X36
DIP	CW8-2	36X36
SOFT SHOULDER	CW8-4	36X36
TRUCK CROSSING	CW8-6	36X36
ROUGH ROAD	CW8-8	36X36
UNEVEN LANES	CW8-11	36X36
LEFT LANE ENDS	CW9-1(1)	36X36
RIGHT LANE ENDS	CW9-1(2)	36X36
DOUBLE ARROW	CW12-1	30X30
ADVISORY SPEED (PLAQUE)	CW13-1P	24X24
XX FEET (PLAQUE)	CW16-2P	24X18
AHEAD (PLAQUE)	CW16-3	24X12
ROAD WORK AHEAD	CW20-1	36X36
DETOUR AHEAD	CW20-2	36X36
ROAD CLOSED AHEAD	CW20-3	36X36
ONE LANE ROAD	CW20-4	36X36
LEFT LANE CLOSED	CW20-5(1)	36X36
RIGHT LANE CLOSED	CW20-5(2)	36X36
FLAGGER (SYMBOL)	CW20-7	36X36
NARROW LANES AHEAD	CW20-8T	36X36
SHOULDER WORK AHEAD	CW21-5	36X36
UTILITY WORK AHEAD	CW21-7	36X36
DOUBLE REVERSE CURVE (1 LANE)	CW24-1	36X36
DOUBLE REVERSE CURVE (2 LANE)	CW24-1a	36X36
DOUBLE REVERSE CURVE (3 LANE)	CW24-1b	36X36
END ROAD WORK	G20-2	36X18
DETOUR WITH ARROWS	M4-9	30X24
END DETOUR	M4-8a	24X18
PEDESTRIAN DETOUR	M4-9b	30X24
DETOUR	M4-10	48X18

APPROVED BY: Sukat Kanwar, CITY ENGINEER | APPROVED BY: HANG NGUYEN, CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock, DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: NOV-27-2023 | DWG NO: 01554-08

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL CITY OF HOUSTON SIGNS

SHEET 1 OF 2

FOR CITY OF HOUSTON USE ONLY

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WARNING SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
RIGHT ANGLE TURN CURVE	W1-1	30x30
RIGHT ANGLE TURN WITH SPEED LIMIT	W1-1a	36x36
HORIZONTAL CURVE	W1-2	30x30
HORIZONTAL CURVE WITH SPEED LIMIT	W1-2a	36x36
REVERSE RIGHT ANGLE TURN	W1-3	30x30
REVERSE HORIZONTAL CURVE	W1-4	30x30
WINDING ROAD	W1-5	30x30
ONE DIRECTION LARGE ARROW	W1-6	48x24
TWO DIRECTION LARGE ARROW	W1-7	48x24
CHEVRON ALIGNMENT	W1-8	18x24
HAIRPIN CURVE	W1-11	30x30
TRUCK ROLLOVER	W1-13	36x36
CROSS ROAD	W2-1	30x30
SIDE STREET T-INTERSECTION (SYMBOL)	W2-2	30x30
T- INTERSECTION (SYMBOL)	W2-4	30x30
Y- INTERSECTION (SYMBOL)	W2-5	30x30
ROUNDABOUT (SYMBOL)	W2-6	30x30
STOP AHEAD	W3-1	30x30
SIGNAL AHEAD	W3-3	30x30
REDUCED SPEED LIMIT AHEAD	W3-5	36x36
MERGE	W4-1	36x36
LANE ENDS	W4-2	36x36
ADDED LANE	W4-3	36x36
CROSS TRAFFIC DOES NOT STOP (PLAQUE)	W4-4P	24x12
ROAD NARROWS	W5-1	36x36
NARROW BRIDGE	W5-2	36x36
DIVIDED HIGHWAY	W6-1	36x36
DIVIDED HIGHWAY ENDS	W6-2	36x36
TWO WAY TRAFFIC (SYMBOL)	W6-3	36x36
BUMP	W8-1	30x30
DIP	W8-2	30x30
PAVEMENT ENDS	W8-3	36x36
SOFT SHOULDER	W8-4	36x36
TRUCK CROSSING	W8-6	36x36
LOOSE GRAVEL	W8-7	36x36
ROUGH ROAD	W8-8	36x36
UNEVEN LANES	W8-11	36x36
WATCH FOR ICE ON BRIDGE	W8-13T	36x36
SHOULDER DROP-OFF (SYMBOL)	W8-17	30x30
SHOULDER DROP-OFF (PLAQUE)	W8-17P	24x18

WARNING SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
FLOOD GAUGE	W8-19	12X72
NO SHOULDER	W8-23	36x36
SHOULDER ENDS	W8-25	36x36
LEFT LANE ENDS	W9-1(1)	36x36
RIGHT LANE ENDS	W9-1(2)	36x36
LANE ENDS MERGE LEFT	W9-2(1)	36x36
LANE ENDS MERGE RIGHT	W9-2(2)	36x36
GRADE CROSSING ADVANCE WARNING	W10-1	30 DIA
NO TRAIN HORN	W10-9	36x36
NO TRAIN HORN (PLAQUE)	W10-9P	30x24
BICYCLE	W11-1	30x30
PEDESTRIAN	W11-2	36x36
EMERGENCY VEHICLE	W11-8	30x30
HANDICAPPED	W11-9	30x30
TRUCK	W11-10	30x30
EMERGENCY SIGNAL AHEAD (PLAQUE)	W11-12P	36x30
BICYCLE/PEDESTRIAN	W11-15	30x30
TRAIL CROSSING (PLAQUE)	W11-15P	24x18
DOUBLE ARROW	W12-1	30x30
LOW CLEARANCE WITH ARROWS	W12-2	36x36
LOW CLEARANCE	W12-2a	78x24
LOADED ZONED BRIDGE	W12-3T	36x36
ADVISORY SPEED (PLAQUE)	W13-1P	18x18
NO OUTLET	W14-2	24x24
NO OUTLET WITH ARROW	W14-2a	36x6
SHARE THE ROAD (PLAQUE)	W16-1P	18x24
XX FEET (PLAQUE)	W16-2P	24x18
NEXT XX FEET (PLAQUE)	W16-4P	30x24
SUPPLEMENTAL LEFT ARROW (PLAQUE)	W16-5P(1)	24x18
SUPPLEMENTAL RIGHT ARROW (PLAQUE)	W16-5P(2)	24x18
DIAGONAL ARROW (PLAQUE)	W16-7P	24x12
AHEAD (PLAQUE)	W16-9P	24x12
WHEN FLASHING (PLAQUE)	W16-13P	24x18
ROUNDABOUT (PLAQUE)	W16-17	24x12
SPEED HUMP	W17-1	30x30
TYPE 3 OBJECT MARKER (LEFT)	Ow3-L	12x36
TYPE 3 OBJECT MARKER (RIGHT)	Ow3-R	12x36
TYPE 3 OBJECT MARKER (CENTER)	Ow3-C	12x36
TYPE 4 OBJECT MARKER	Ow4-1	18x18

BICYCLE SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
STOP	W1-1	18x18
STREET NAME	D3-1	VARIES×6
YIELD	W1-2	18x18x18
TO REQUEST GREEN WAIT ON SYMBOL	R10-22	12x18
YIELD TO PEDESTRIAN	R9-6	18x18
NO PARKING BIKE LANE	R7-9	12x18
BIKE ROUTE	D11-1	24x18
BIKE ROUTE TO DOWNTOWN	D11-1c	24x18
BIKE SIGN AUXILARY SIGNS	M4-1, M4-14	12x6
BICYCLE ROUTE ROUTE ARROW SIGNS	M5-1,3, M8-1,2,3,4,5,6,7	12x9
WALK YOUR BIKE (CUSTOM SIGN)	R9-8 Cstm	12x18
YIELD TO PED/BIKE (CUSTOM SIGN)	R1-5P8	36x36
TURNING VEHICLES YIELD TO PED/BIKE (CUSTOM SIGN)	R10-15P8	36x36
STOP FOR PED/BIKE (CUSTOM SIGN)	R1-5P8b	36x36
TURNING VEHICLES STOP FOR PED/BIKE (CUSTOM SIGN)	R10-15P8a	36x36
CROSSWALK STOP ON RED (CUSTOM SIGN)	R10-23 (Cstm)	42x30
PEDESTRIAN CROSSING (CUSTOM SIGN)	W11-2 (HAWK)	48x30
LOOK BOTH WAYS (CUSTOM SIGN)	W4-4P2 (BIKE) W4-4P3 (BIKE)	VARIES
TURN WIDE (CUSTOM SIGN)	R3-8 (BIKE)	30x36
BIKE MERGE AHEAD (CUSTOM SIGN)	W11-1 (MERGE)	36x36

SCHOOL SIGNS		
SIGN	SIGN DESIGNATION	SIZE (IN.)
SCHOOL	S1-1(*YG)	36x36
X-YY TO X-YY AM AND PM (PLAQUE)	S4-1P	24x10
SCHOOL (PLAQUE)	S4-3P(*YG)	24x8
WHEN FLASHING (PLAQUE)	S4-4P	24x10
REDUCED SCHOOL SPEED LIMIT AHEAD	S4-5a(*YG)	30x36
SCHOOL SPEED LIMIT XX WHEN FLASHING	S5-1(*YG)	24x48
END SCHOOL ZONE	S5-2	24x30
END SCHOOL ZONE (PLAQUE)	S5-2p1P	24x10
CELL PHONE USE PROHIBITED	S7-1T	24x18
TURN ARROW (PLAQUE)	SW6-5P(*YG)	24x12
ADVANCE TURN ARROW (PLAQUE)	SW6-6P(*YG)	24x12
DIAGONAL ARROW (PLAQUE)	SW6-7P(*YG)	24x12
AHEAD (PLAQUE)	SW6-9P(*YG)	24x12

FYG- FLUORESCENT YELLOW-GREEN BACKGROUND COLOR

APPROVED BY: Sukat Kanwar, CITY ENGINEER | APPROVED BY: HANG NGUYEN, CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock, DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: NOV-27-2023 | DWG NO: 01554-09

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL CITY OF HOUSTON SIGNS

SHEET 2 OF 2

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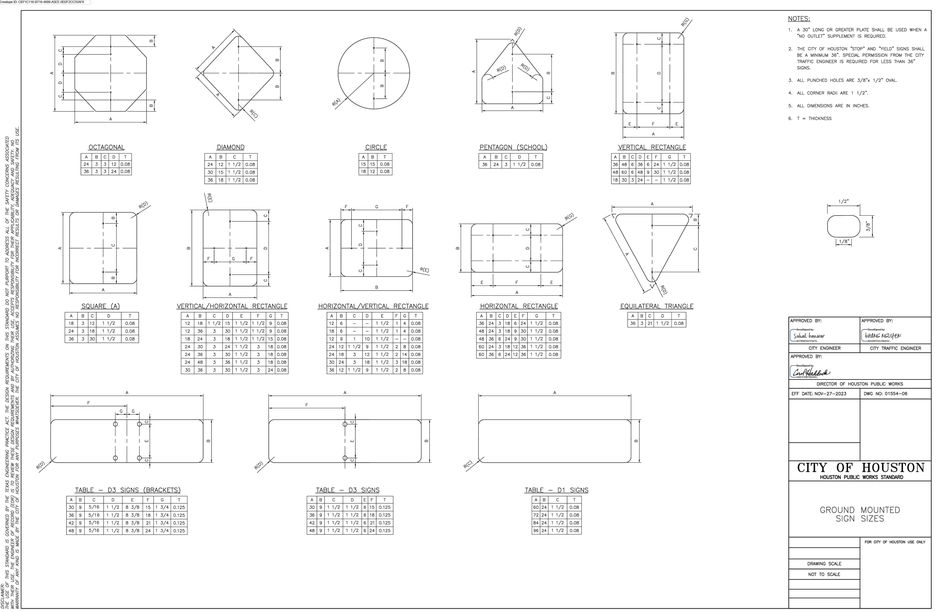

NOTES:

1. A 30" LONG OR GREATER PLATE SHALL BE USED WHEN A "NO OUTLET" SUPPLEMENT IS REQUIRED.
2. THE CITY OF HOUSTON "STOP" AND "YIELD" SIGNS SHALL BE A MINIMUM 36". SPECIAL PERMISSION FROM THE CITY TRAFFIC ENGINEER IS REQUIRED FOR LESS THAN 36" SIGNS.
3. ALL PUNCHED HOLES ARE 3/16"x 1/2" OVAL.
4. ALL CORNER RADII ARE 1 1/2".
5. ALL DIMENSIONS ARE IN INCHES.
6. T = THICKNESS

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW SITE-SPECIFIC CONDITIONS AND BY AUTHORIZING HIS/HER USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ACCURACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – TRAFFIC SIGNS

SHEET 02 OF 02

APPROVED BY: Sukat Kanwar, CITY ENGINEER | APPROVED BY: HANG NGUYEN, CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock, DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: NOV-27-2023 | DWG NO: 01554-06

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

GROUND MOUNTED SIGN SIZES

FOR CITY OF HOUSTON USE ONLY

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WBS NUMBER	N-100006-0001-3
DRAWING SCALE	N/A
CITY OF HOUSTON PM	MICHELLE RANDON, PE
SHEET NO.	39 OF 139

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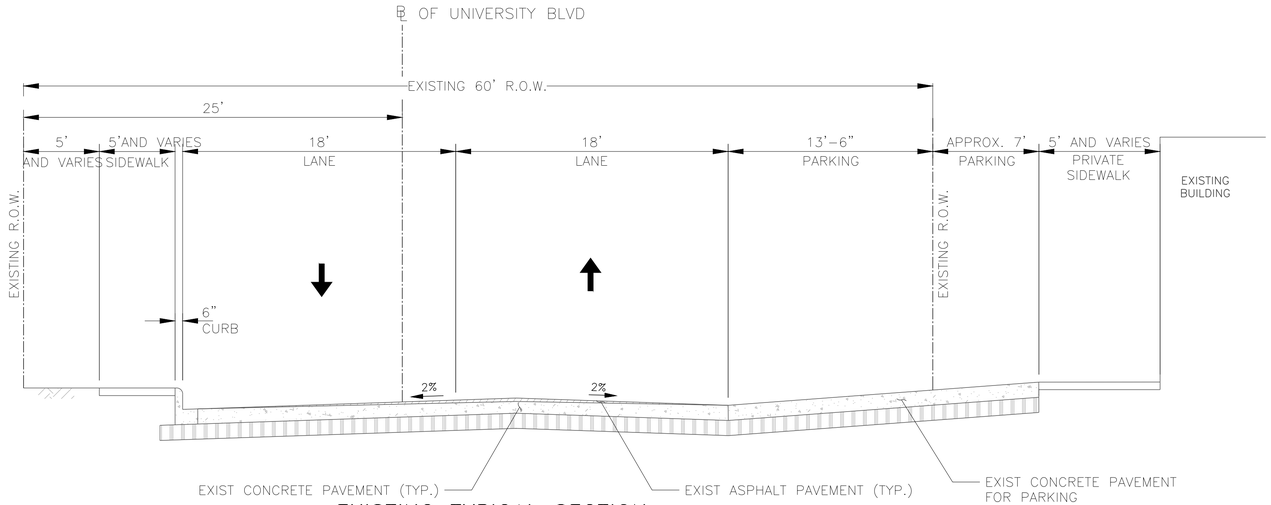
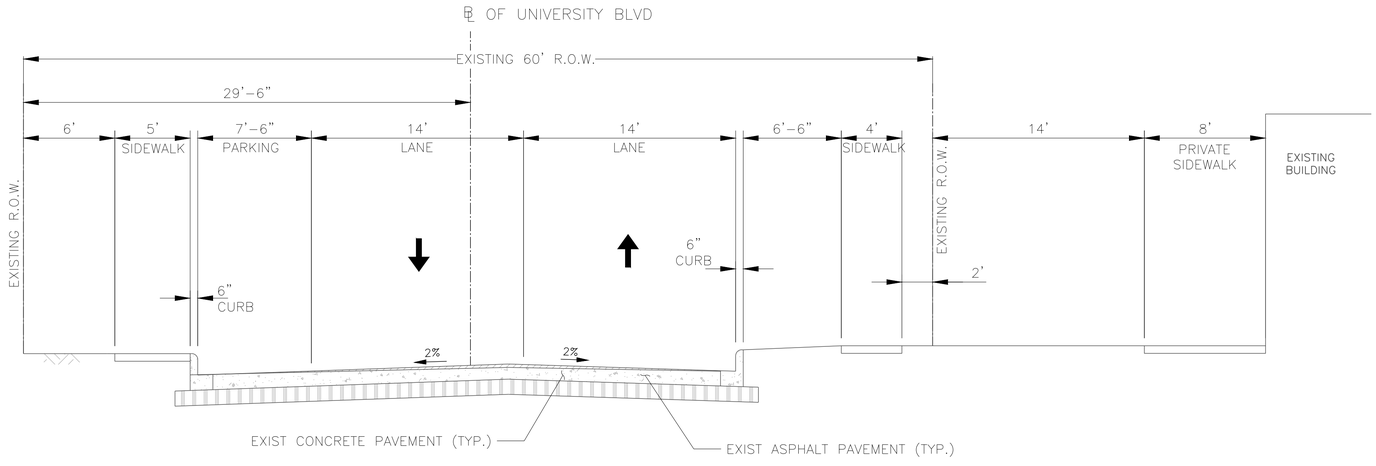


EXISTING TYPICAL SECTION

FROM APPROX. STA 3+00 TO APPROX. STA 10+50

SCALE: 1" = 5'



EXISTING TYPICAL SECTION

FROM APPROX. STA 10+50 TO MORNINGSIDE DRIVE (STA 14+00)

SCALE: 1" = 5'

LEGEND

℄ BASELINE

R.O.W. RIGHT-OF-WAY

TRAVEL LANE

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

EXISTING TYPICAL SECTIONS

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 40 OF 139

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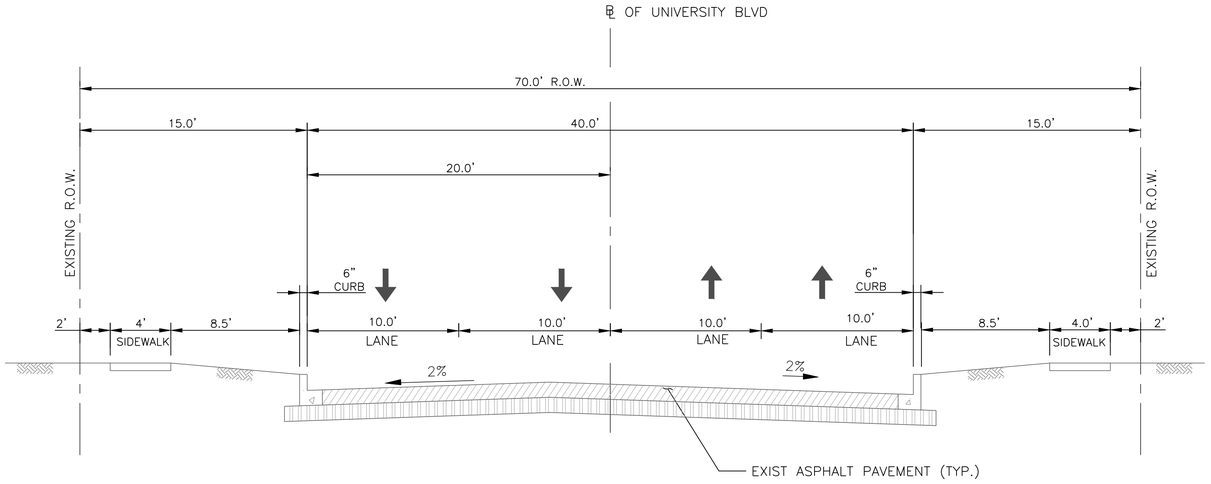

EXISTING TYPICAL SECTION

UNIVERSITY BLVD
FROM MORNINGSIDE DR (STA 13+70) TO GREENBRIAR DR (STA 20+70)
SCALE: 1" = 5'

LEGEND

℄ BASELINE

R.O.W. RIGHT-OF-WAY

TRAVEL LANE

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

EXISTING TYPICAL SECTIONS

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 41 OF 139

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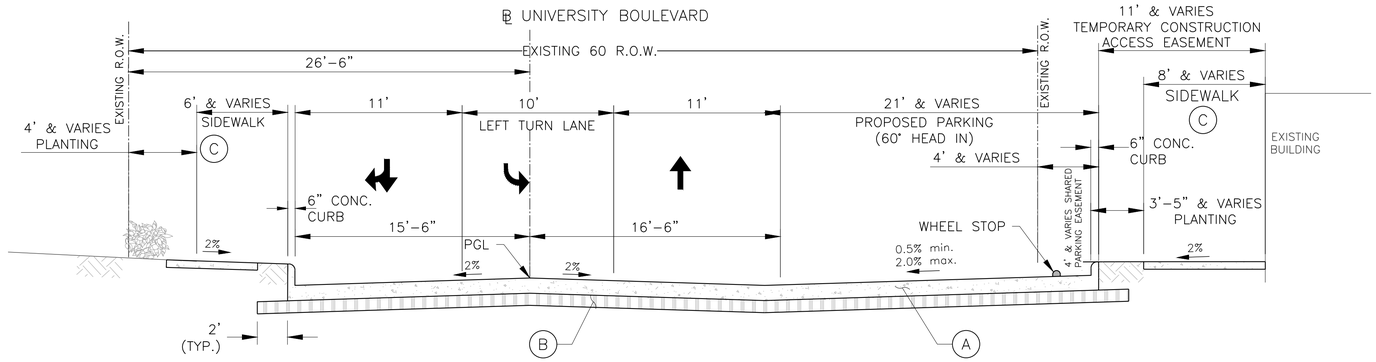
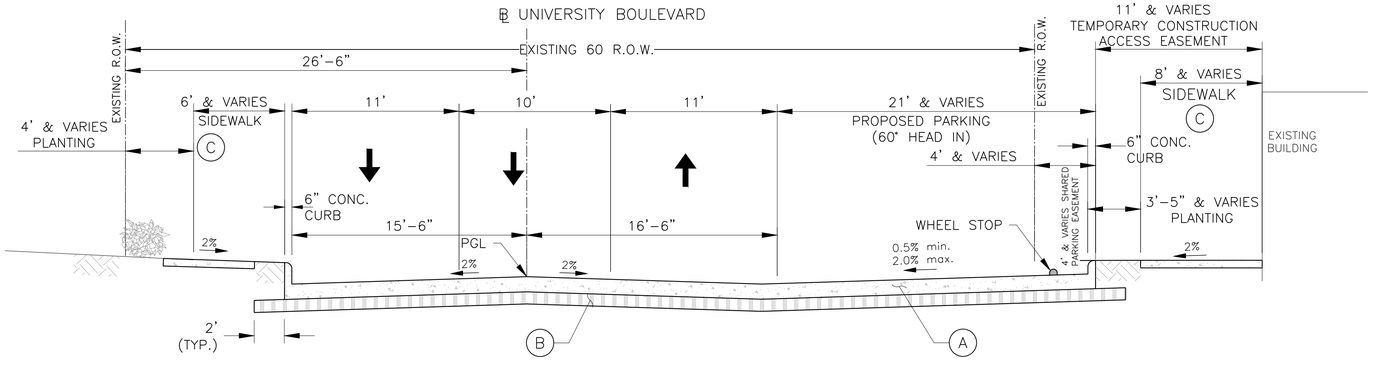


PROPOSED TYPICAL SECTION

FROM KIRBY DRIVE (STA 3+00) TO APPROX. STA 4+60

SCALE: 1" = 5'



PROPOSED TYPICAL SECTION

FROM APPROX. STA 4+60 TO APPROX. STA 10+50

SCALE: 1" = 5'

LEGEND

℄	BASELINE
R.O.W.	RIGHT–OF–WAY
↑	TRAVEL LANE
PGL	PROPOSED GRADE LINE
(A)	11"(TYP.) THICK REINF. CONCRETE PAVEMENT
(B)	8" THICK LIME STABILIZED SUBGRADE (6% LIME)
(C)	4–½" THICK CONCRETE SIDEWALK

NOTES

1. REFER TO GEOTECHNICAL REPORT PREPARED BY KENALL, INC. DATED MAY 17, 2021 FOR PAVEMENT AND SUBGRADE RECOMMENDATIONS.

GC ENGINEERING, INC.
2505 PARK AVE,
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TYPICAL SECTIONS

SHEET 01 OF 04

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
1" = 5'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 42 OF 139	

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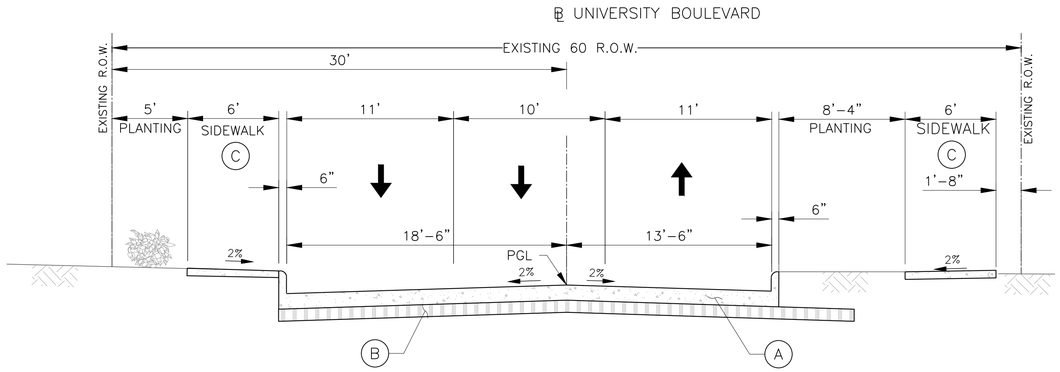
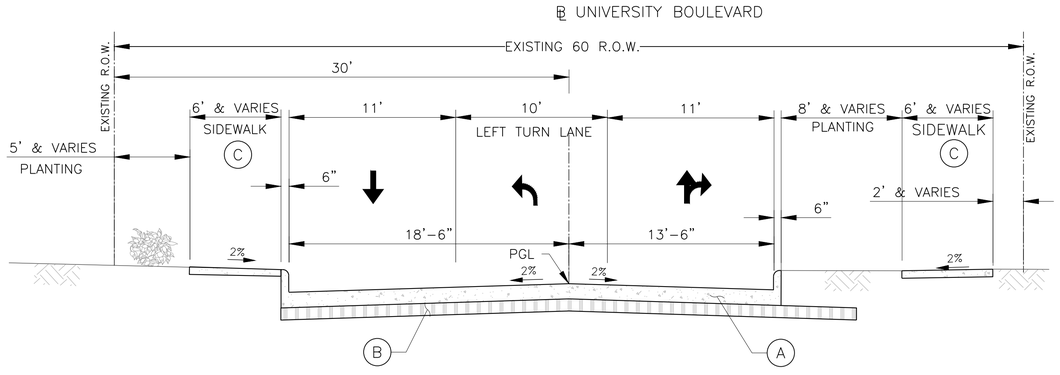


PROPOSED TYPICAL SECTION
FROM APPROX. STA 10+50 TO APPROX. STA 12+00
SCALE: 1" = 5'



PROPOSED TYPICAL SECTION
FROM APPROX. STA 12+00 TO MORNINGSIDE DRIVE (STA 14+00)
SCALE: 1" = 5'

LEGEND

℄	BASELINE
R.O.W.	RIGHT–OF–WAY
↑	TRAVEL LANE
PGL	PROPOSED GRADE LINE
(A)	11"(TYP.) THICK REINF. CONCRETE PAVEMENT
(B)	8" THICK LIME STABILIZED SUBGRADE (6% LIME)
(C)	4–½" THICK CONCRETE SIDEWALK

NOTES

1. REFER TO GEOTECHNICAL REPORT PREPARED BY KENALL, INC. DATED MAY 17, 2021 FOR PAVEMENT AND SUBGRADE RECOMMENDATIONS.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TYPICAL SECTIONS

SHEET 02 OF 04

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
1" = 5'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 43 OF 139	

GC Engineering, Inc.
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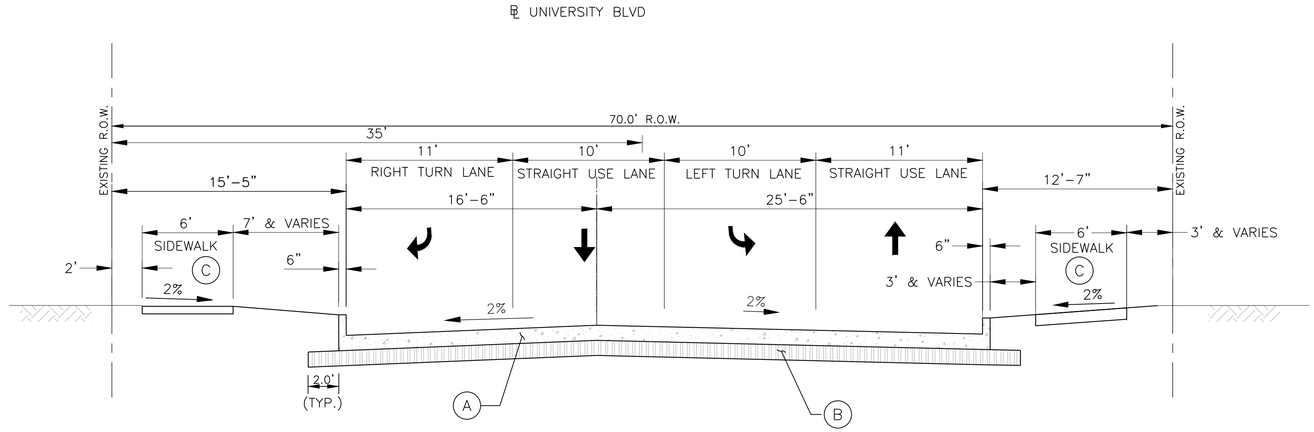


PROPOSED TYPICAL SECTION

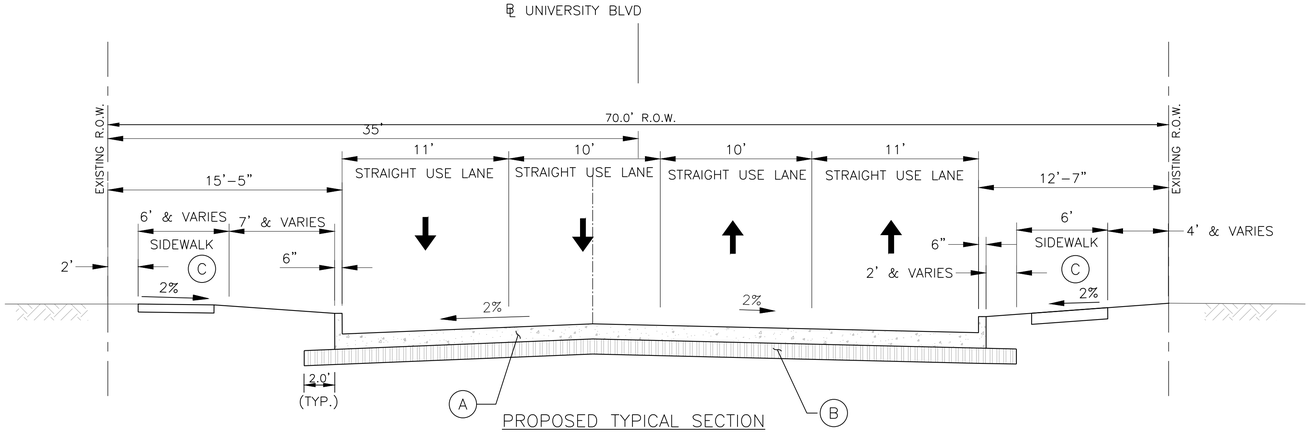
UNIVERSITY BLVD
FROM MORNINGSIDE DR STA 14+00 TO APPROX. 15+00
SCALE: 1" = 5'

LEGEND

℄	BASELINE
R.O.W.	RIGHT-OF-WAY
↑	TRAVEL LANE
PGL	PROPOSED GRADE LINE
(A)	11"(TYP.) THICK REINF. CONCRETE PAVEMENT
(B)	8" THICK LIME STABILIZED SUBGRADE (6% LIME)
(C)	4-½" THICK CONCRETE SIDEWALK

NOTES

1. REFER TO GEOTECHNICAL REPORT PREPARED BY KENALL, INC. DATED MAY 17, 2021 FOR PAVEMENT AND SUBGRADE RECOMMENDATIONS.



PROPOSED TYPICAL SECTION

UNIVERSITY BLVD
APPROX. STA 15+50 TO APPROX. 19+00
SCALE: 1" = 5'

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TYPICAL SECTIONS

SHEET 03 OF 04

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 5'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 44 OF 139	

GC Engineering, Inc.
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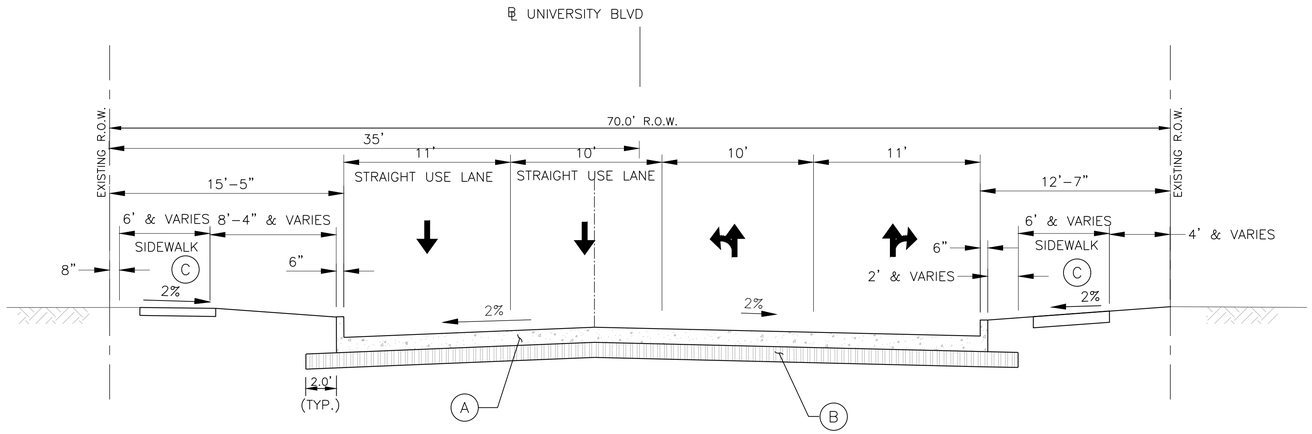

PROPOSED TYPICAL SECTION

UNIVERSITY BLVD
APPROX. 19+00 TO GREENBRIAR DRIVE (STA. 20+00)
SCALE: 1" = 5'

LEGEND

℄	BASELINE
R.O.W.	RIGHT-OF-WAY
↑	TRAVEL LANE
PGL	PROPOSED GRADE LINE
(A)	11"(TYP.) THICK REINF. CONCRETE PAVEMENT
(B)	8" THICK LIME STABILIZED SUBGRADE (6% LIME)
(C)	4-½" THICK CONCRETE SIDEWALK

NOTES

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROPOSED TYPICAL SECTIONS

SHEET 04 OF 04

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 45 OF 139

FOR CITY OF HOUSTON USE ONLY

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KEY NOTES:

THE FOLLOWING NOTES ARE APPLICABLE TO ALL PLAN AND PROFILE SHEETS FOR ROADWAY AND UTILITY IMPROVEMENTS. THE PLAN AND PROFILE SHEETS MAY REFERENCE THE NOTES IN THE PLAN VIEW BY NOTE NUMBER LISTED BELOW.

(1) PROPOSED 11" THICK REINFORCED CONCRETE PAVEMENT WITH 8" THICK LIME STABILIZED SUBGRADE (6% LIME). REFER TO GEOTECHNICAL REPORT PREPARED BY KENALL INC. FOR MORE INFORMATION

(2) PROPOSED 4–½" THICK CONCRETE SIDEWALK WITH THE WIDTH AS SHOWN IN THE PLAN
SEE STREET PAVING AND SIDEWALK DETAIL 02775–01

(3) PROPOSED 6' WIDE 4–½" THICK CONCRETE SIDEWALK
SEE STREET PAVING AND SIDEWALK DETAIL 02775–01

(4) SAWCUT EXISTING DRIVEWAY AT THE ROW, AND MATCH EXISTING DRIVEWAY ELEVATION OR AS DIRECTED BY THE ENGINEER

(5) PROPOSED 6" CONCRETE CURB

(6) PROPOSED WHEELCHAIR RAMP WITH DETECTABLE WARNING PAVERS
SEE STREET PAVING AND SIDEWALK DETAIL 02775–02

(7) PROPOSED PARALLEL RAMP WITH DETECTABLE WARNING PAVERS
SEE STREET PAVING AND SIDEWALK DETAIL 02775–03

(8) PROPOSED STANDARD CONCRETE PAVING HEADER
SEE STREET PAVING AND SIDEWALK DETAIL 02771–01

(9) SAWCUT EXISTING SIDEWALK TO EXPOSE A MINIMUM OF 15" OF STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. WHERE REQUIRED, HORIZONTAL DOWELS SHALL BE #3 BARS, 24" LONG SPACED AT 24" CENTER TO CENTER. IF THERE IS EXISTING LONGITUDINAL JOINT WITHIN 12" OF PROPOSED SAWCUT, CONTRACTOR SHALL ADJUST THE PROPOSED SIDEWALK TO THE LIMITS OF THE EXISTING LONGITUDINAL JOINT. NO SEPARATE PAY FOR ADJUSTMENT OF SIDEWALK.

(10) PROPOSED PERMANENT ASPHALT TRANSITION. 4" HMAC WITH 8" BLACK BASE AND 8" THICK LIME STABILIZED SUBGRADE (6% LIME).

(11) ADJUST EXISTING MANHOLE FRAME AND COVER TO MATCH NEW GRADE AND SAN MANHOLE COVER ALONG TIRE PATHS TO BE SEALED AND FLUSHED.

(12) ADJUST EXISTING WATER VALVE BOXES TO MATCH NEW GRADE. REPLACE MISSING OR DAMAGED VALVE BOXES AND COVERS.

(13) ABANDON EXISTING WATER METER SERVICE AND RELOCATE & RECONNECT WATER METER OUTSIDE PAVEMENT AREAS. INSTALL NEW METER BOX TO MATCH NEW GRADE AND DISPOSE OF EXISTING METER BOX.

(14) REMOVE AND SALVAGE EXISTING FIRE HYDRANT TO BE RETURNED TO CITY'S STOCK YARD.

(15) REMOVE ABANDONED WATER GATE VALVE FROM ABANDONED WATER LINE.

(16) EXISTING FIRE SERVICE CONNECTION TO REMAIN.

(17) PROPOSED 6" SANITARY SEWER SERVICE LEAD AND CLEANOUT
SEE STANDARD CLEANOUT DETAIL ON SERVICE LEAD 02534–05.

(18) PROPOSED TYPE 'C' MANHOLE
SEE STORM SEWER DETAIL 02081–01.

(19) PROPOSED METRO BUS SHELTER.

(20) LIMITS OF PROPOSED 11–INCH THICK REINFORCED HIGH EARLY STRENGTH CONCRETE WITH 8–INCH THICK CEMENT STABILIZED SAND SUBGRADE.

(21) PROPOSED 4'X4' JUNCTION BOX WITH FLAT SLAB
SEE STORM SEWER DETAIL SHEET 125 OF 138.

(22) ADJUST EXISTING SANITARY CLEANOUT TO MATCH NEW GRADE.

APP.	REVISION	DATE	MK.

NOTE:

1. SEE SIGNAGE AND PAVEMENT MARKING, SHEET 33, AND TRAFFIC SIGNAL LAYOUT, SHEETS 27 TO 32D, FOR ADDITIONAL DETAILS.
2. WHERE REQUIRED FOR PAVEMENT CONNECTIONS, 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.
3. 4" 2–WAY REFLECTORIZED BLUE PAVEMENT MARKERS SHALL BE PLACED 6–INCHES OFFSET OF THE CENTERLINE AT ALL FIRE HYDRANT LOCATIONS. FIRE HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.
4. SEE DRIVEWAY SCHEDULE, SHEET 78 OF 139, FOR DRIVEWAY DETAILS.

GC ENGINEERING, INC.
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN AND PROFILE – KEY NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
HORZ: 1"=40' VERT: 1"=4'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 46 OF 139	

GC Engineering, Inc.
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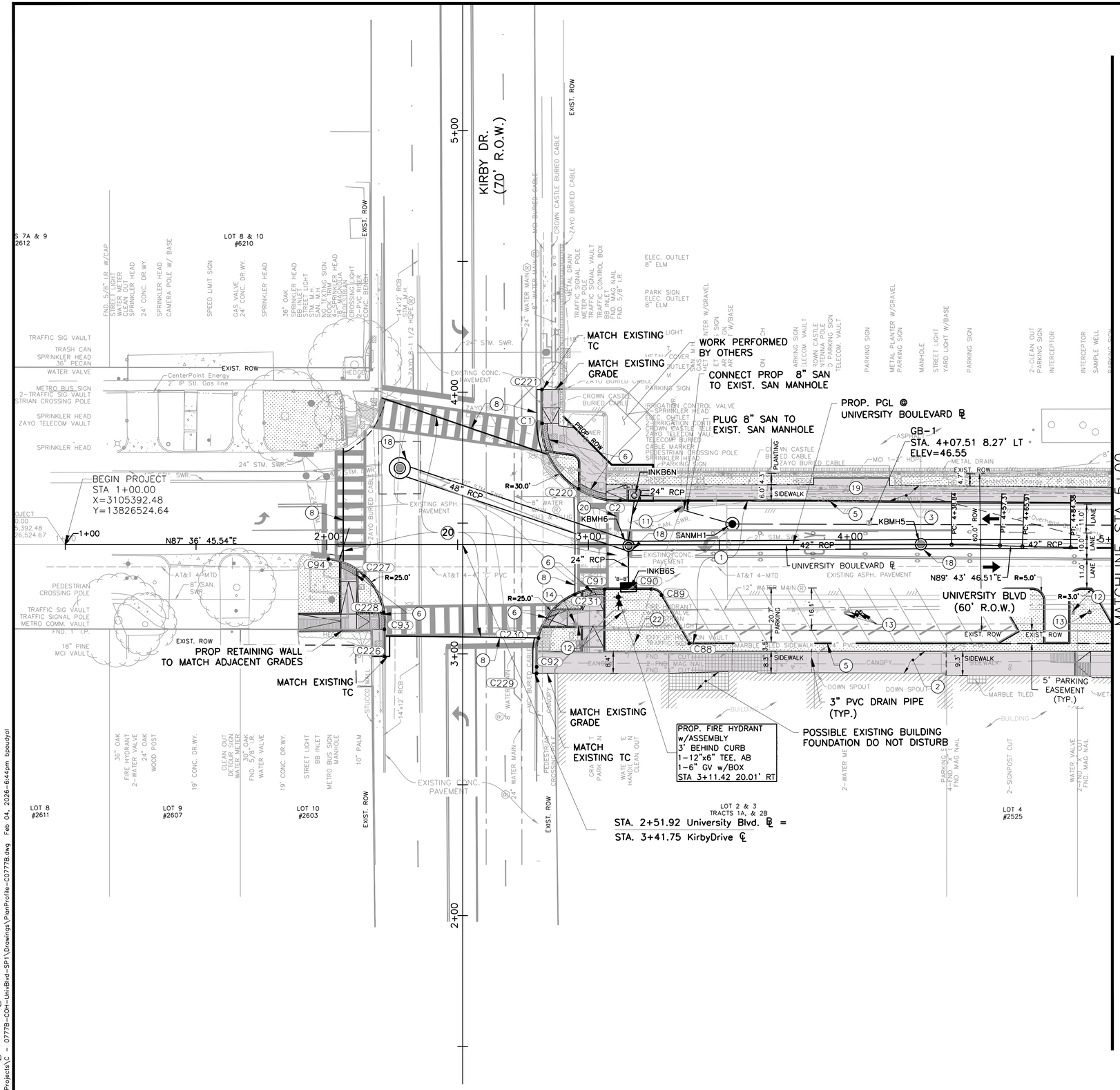

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP ROW
- PROP PAVEMENT EDGE
- TC — TOP OF CURB
- PGL — PROFILE GRADE LINE
- N1/S1 — DRIVEWAY NUMBER
- (C85) — CURB STATION OFFSET
- MH1 — PROP SANITARY MANHOLE
- MHKB5 — PROP STORM MANHOLE
- INKB5NA — PROP TYPE C-INLET
- INKB3N — PROP TYPE BB-INLET
- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION

NOTE:

1. THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON TEXAS SOUTH CENTRAL ZONE NO. 4204, STATE PLANE GRID COORDINATES (NAD83).
2. COORDINATES FOR THE SURVEY BASELINE ARE GRID VALUES, SCALE FACTOR = 0.999884905. ALL DISTANCES SHOWN ARE SURFACE VALUES.
3. REFER TO KEY NOTES AND STATION OFFSET TABLES SHEET FOR ADDITIONAL INFORMATION. ALL STATION OFFSETS ARE BASED ON UNIVERSITY BOULEVARD ALIGNMENT UNLESS OTHERWISE STATED.
4. SEE SHEET 139 OF 139 FOR SIDEWALK CONSTRUCTION DETAILS AT STOREFRONTS ON THE SOUTHSIDE OF UNIVERSITY BOULEVARD.

NO.	DATE	REVISION	APP.

NOTICE:

For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground line can be marked. This signature does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES

DATE:

CenterPoint Energy/Natural Gas utilities shown (gas service lines are not shown).
(This Signature not to be used for conflict verification.)
Signature valid for six months.

DATE:

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
(This signature verifies existing underground facilities - not to be used for conflict verification.)
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DATE:

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Signature valid for one year.

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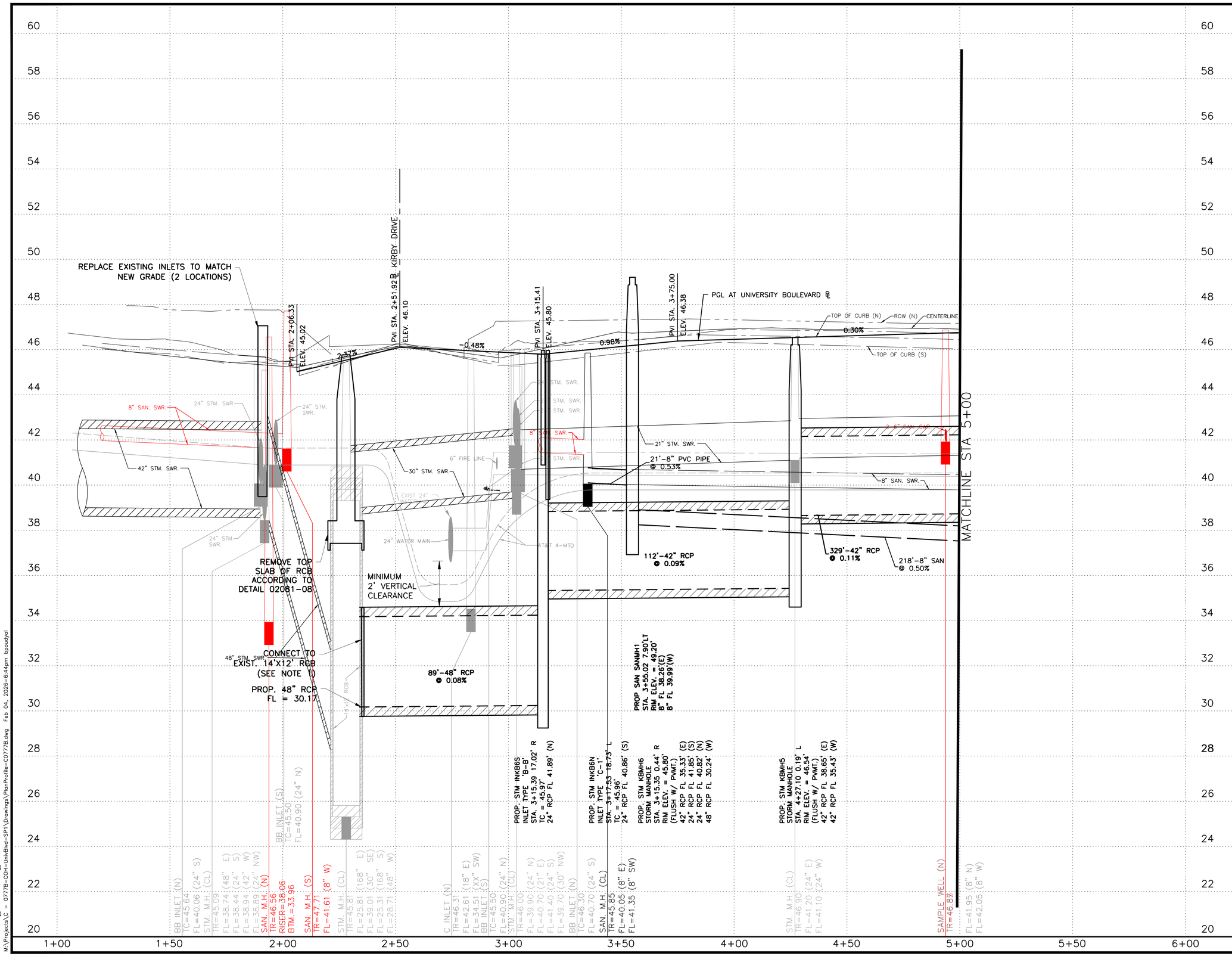
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
UNIVERSITY BOULEVARD
BEGIN TO STA 5+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 47 OF 139	



20 0 10 20 40

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

NOTE:

1. WORK FOR CONNECTING TO EXISTING STORM SEWER IS INCIDENTAL TO RELATED PAY ITEMS.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
UNIVERSITY BOULEVARD
BEGIN TO STA 5+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 48 OF 139	

GC Engineering, Inc.
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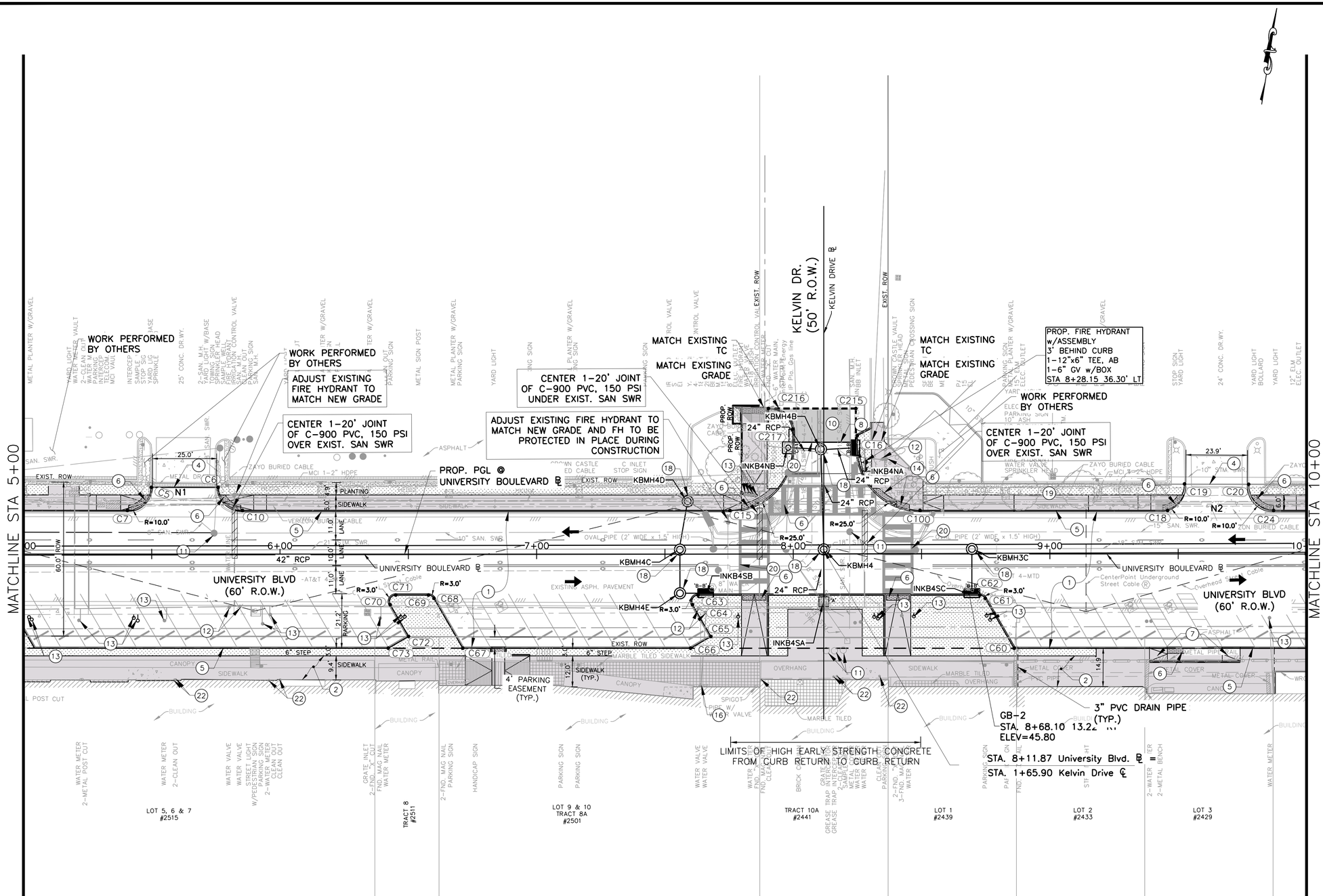

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP ROW
- PROP PAVEMENT EDGE
- TC — TOP OF CURB
- PGL — PROFILE GRADE LINE
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- INKB3N — PROP TYPE BB-INLET
- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION
- PROP PAVEMENT HEADER

NOTE:

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3. REFER TO KEY NOTES AND STATION OFFSET TABLES SHEET FOR ADDITIONAL INFORMATION. ALL STATION OFFSETS ARE BASED ON UNIVERSITY BOULEVARD ALIGNMENT UNLESS OTHERWISE STATED.
4. SEE SHEET 139 OF 139 FOR SIDEWALK CONSTRUCTION DETAILS AT STOREFRONTS ON THE SOUTHSIDE OF UNIVERSITY BOULEVARD.

APP.	REVISION	DATE	MK.

NOTICE:

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
UNIVERSITY BOULEVARD
FROM STA 5+00 TO STA 10+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 49 OF 139	

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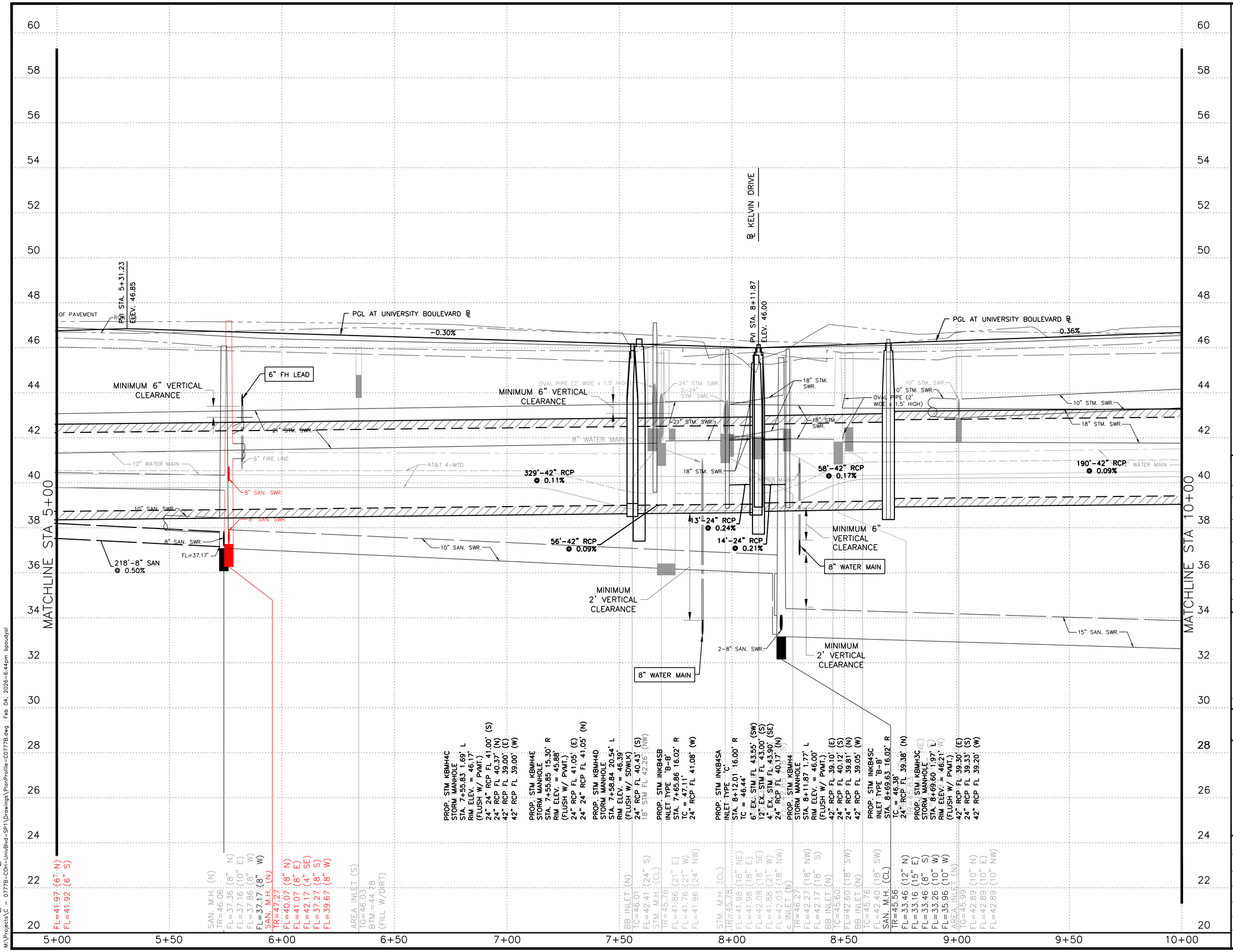

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
UNIVERSITY BOULEVARD
FROM STA 5+00 TO STA 10+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 50 OF 139	

GC Engineering, Inc.
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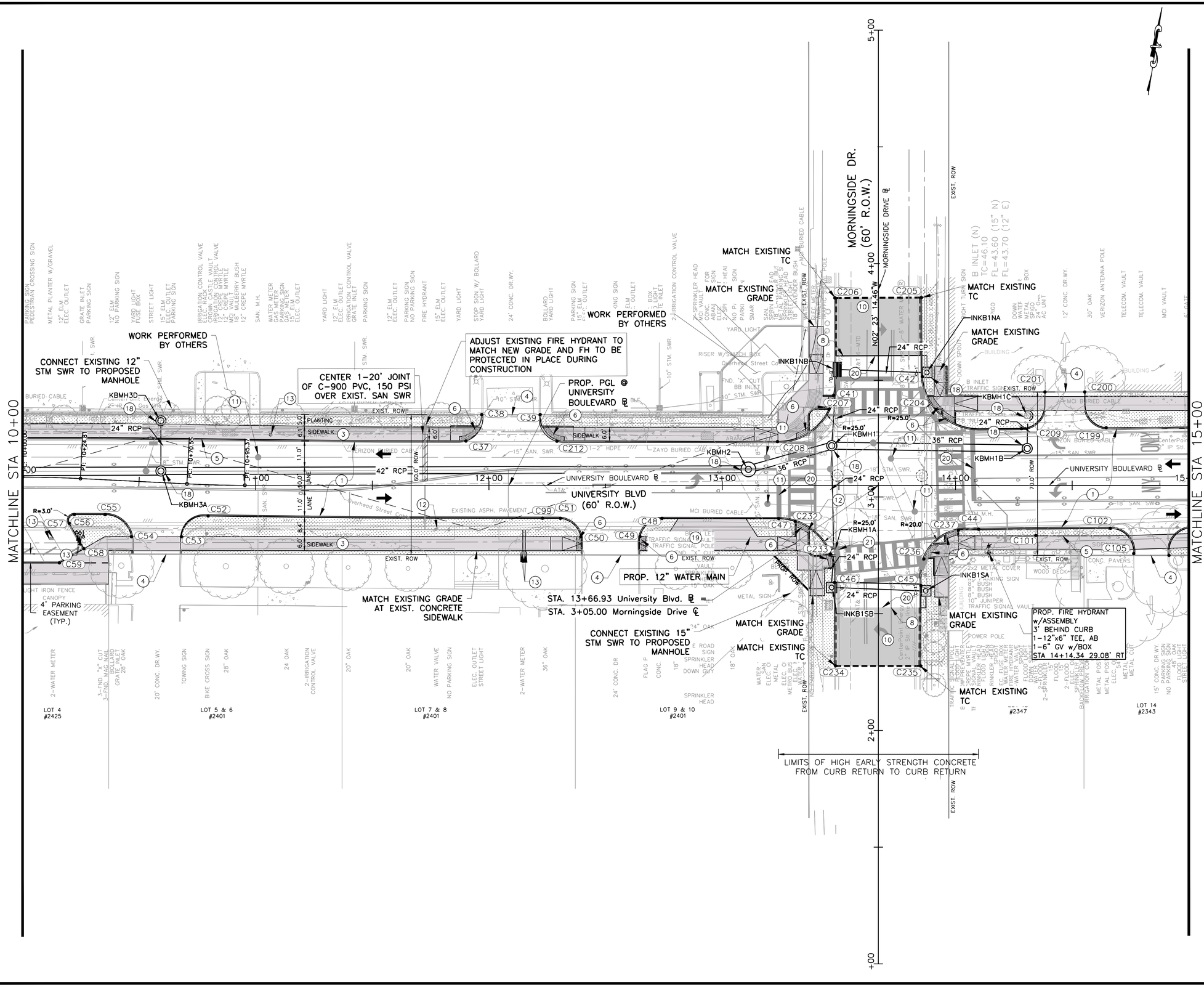

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

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- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION
- PROP PAVEMENT HEADER

NOTE:

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4. SEE SHEET 139 OF 139 FOR SIDEWALK CONSTRUCTION DETAILS AT STOREFRONTS ON THE SOUTHSIDE OF UNIVERSITY BOULEVARD.

NO.	REVISION	DATE	APP.
MK.			

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
UNIVERSITY BOULEVARD
FROM STA 10+00 TO 15+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 51 OF 139	

GC Engineering, Inc.
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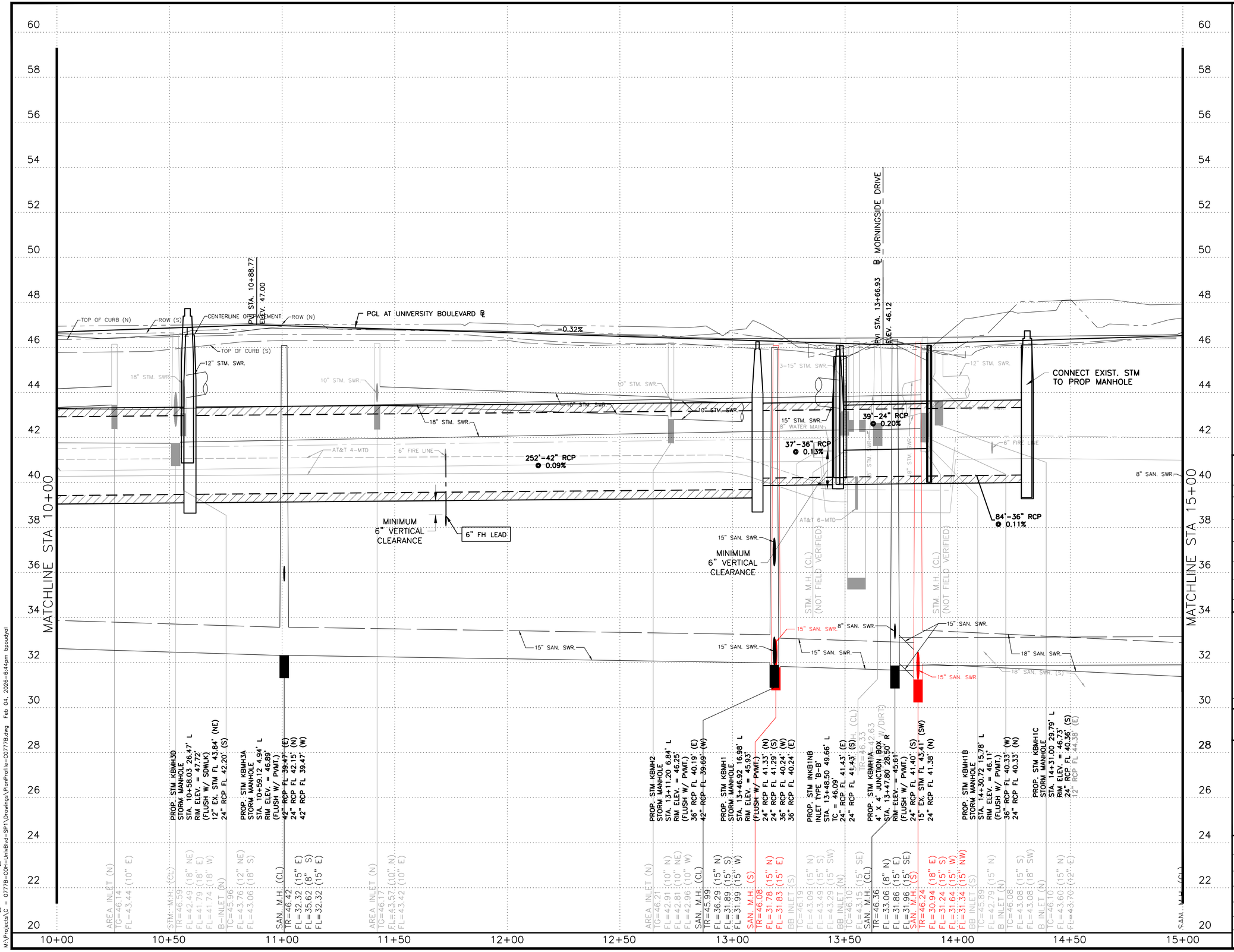

GC Engineering, Inc.
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SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

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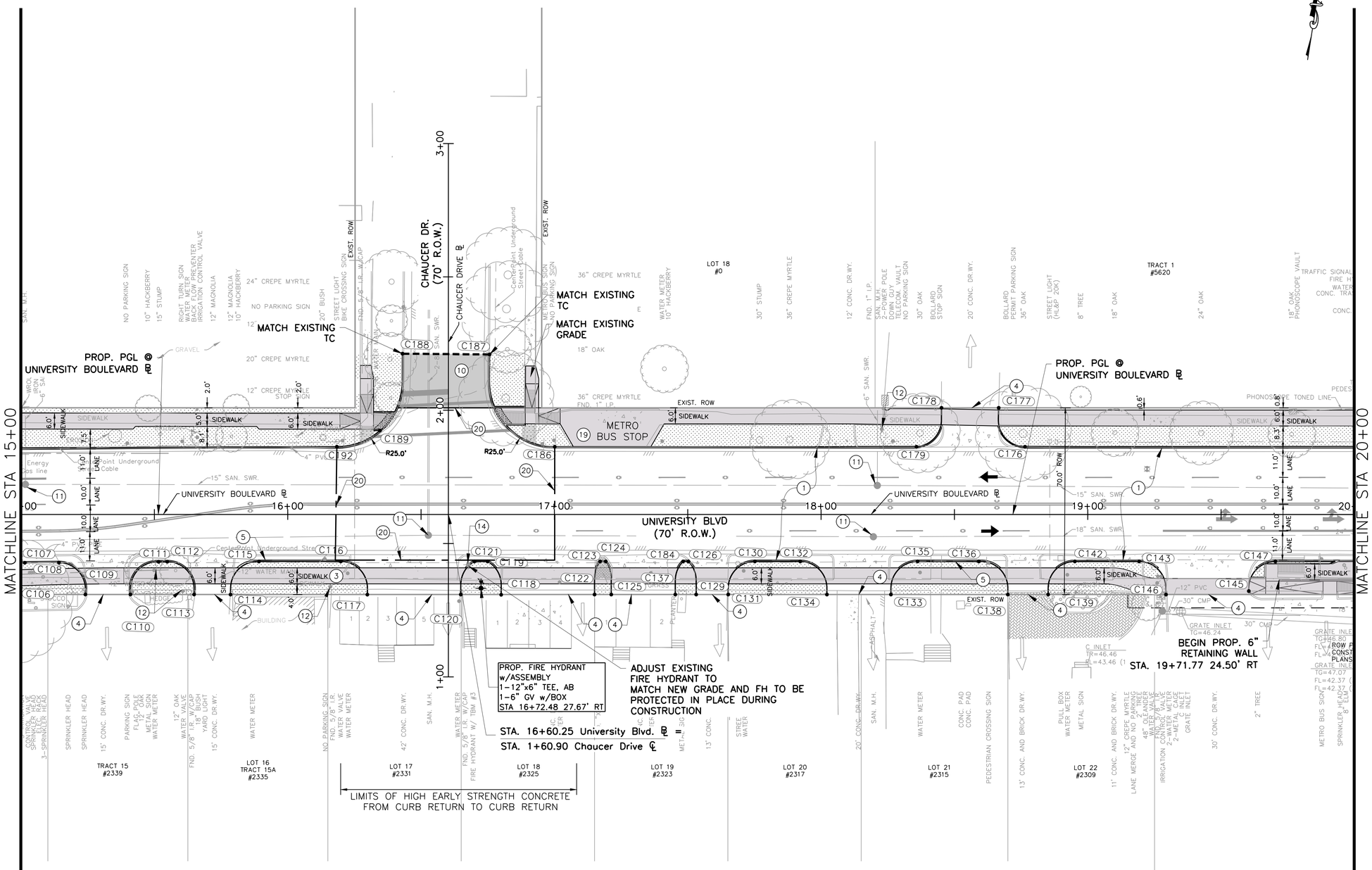
GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
UNIVERSITY BOULEVARD
FROM STA 10+00 TO 15+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 52 OF 139	



20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP ROW
- PROP PAVEMENT EDGE
- TC — TOP OF CURB
- PGL — PROFILE GRADE LINE
- N1/S1 — DRIVEWAY NUMBER
- (C85) — CURB STATION OFFSET
- MH1 — PROP SANITARY MANHOLE
- MHKB5 — PROP STORM MANHOLE
- INKB5NA — PROP TYPE C-INLET
- INKB3N — PROP TYPE BB-INLET
- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION
- PROP PAVEMENT HEADER

NOTE:

1. THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON TEXAS SOUTH CENTRAL ZONE NO. 4204, STATE PLANE GRID COORDINATES (NAD83).
2. COORDINATES FOR THE SURVEY BASELINE ARE GRID VALUES, SCALE FACTOR = 0.999884905. ALL DISTANCES SHOWN ARE SURFACE VALUES.
3. REFER TO KEY NOTES AND STATION OFFSET TABLES SHEET FOR ADDITIONAL INFORMATION. ALL STATION OFFSETS ARE BASED ON UNIVERSITY BOULEVARD ALIGNMENT UNLESS OTHERWISE STATED.
4. SEE SHEET 139 OF 139 FOR SIDEWALK CONSTRUCTION DETAILS AT STOREFRONTS ON THE SOUTHSIDE OF UNIVERSITY BOULEVARD.

NOTICE:
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VERIFICATION OF PRIVATE UTILITY LINES

DATE:

CenterPoint Energy/Natural Gas utilities shown (gas service lines are not shown). (This Signature not to be used for conflict verification.) Signature valid for six months.

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MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
UNIVERSITY BOULEVARD
FROM STA 15+00 TO STA 20+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 53 OF 139	

GC Engineering, Inc.
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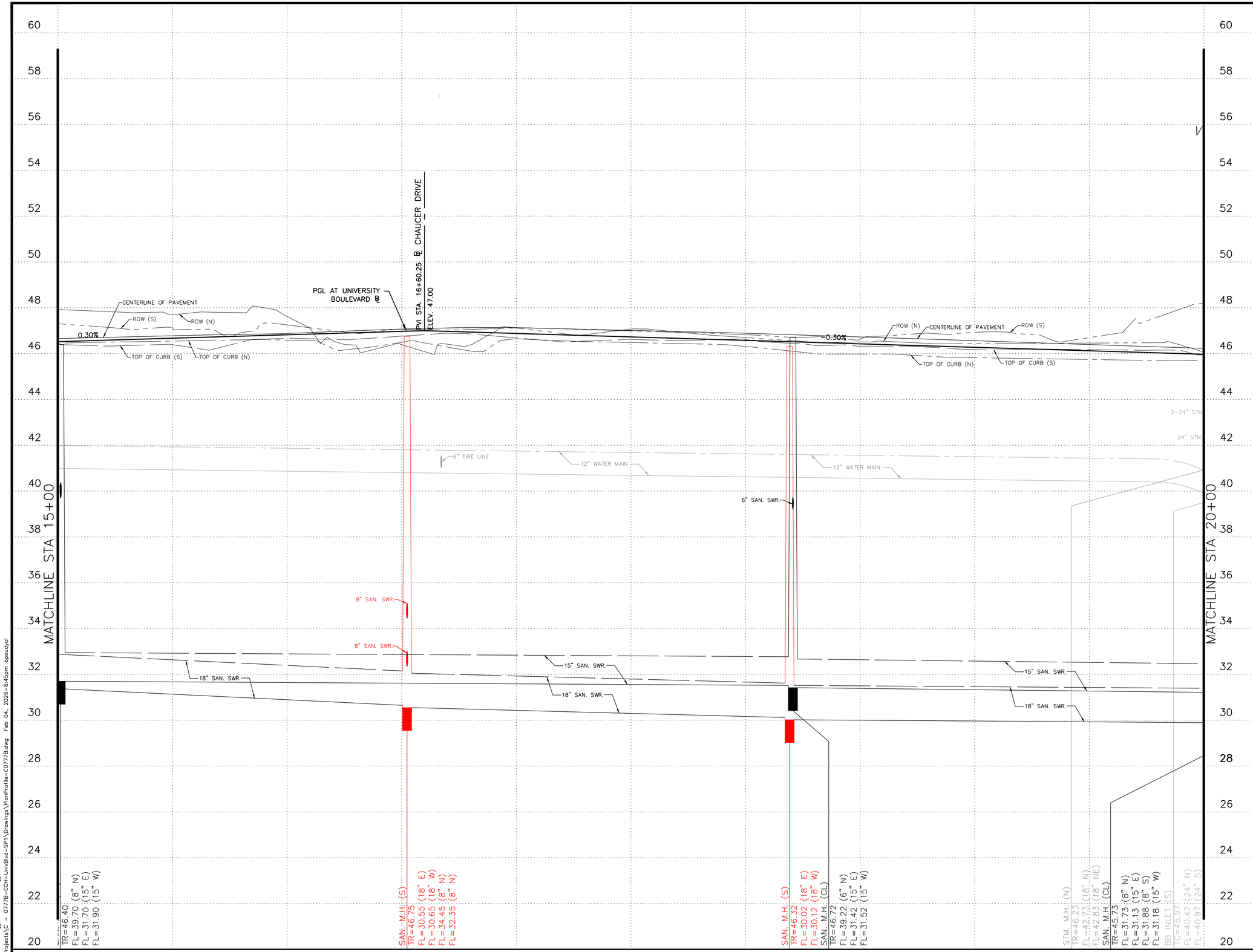

20 0 10 20 40

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
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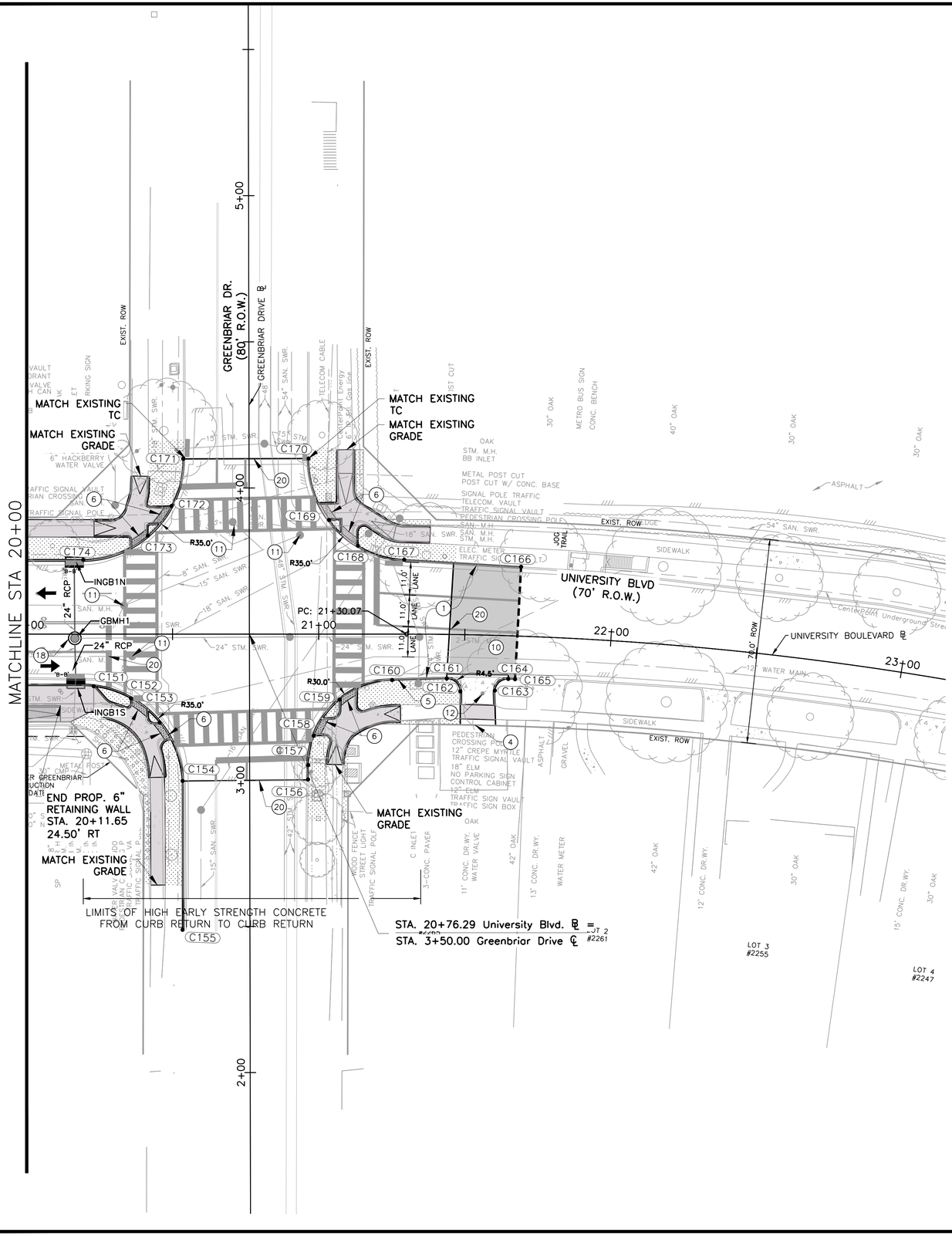
UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
UNIVERSITY BOULEVARD
FROM STA 15+00 TO STA 20+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 54 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0778-COH-UnivBlvd-SP1\Drawings\PlanProfile-C0778.dwg Feb 04, 2026 - 6:45pm bpoudyal



20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

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- PGL — PROFILE GRADE LINE
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- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION
- PROP PAVEMENT HEADER

NOTE:

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
UNIVERSITY BOULEVARD
FROM STA 20+00 TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 55 OF 139	

GC Engineering, Inc.
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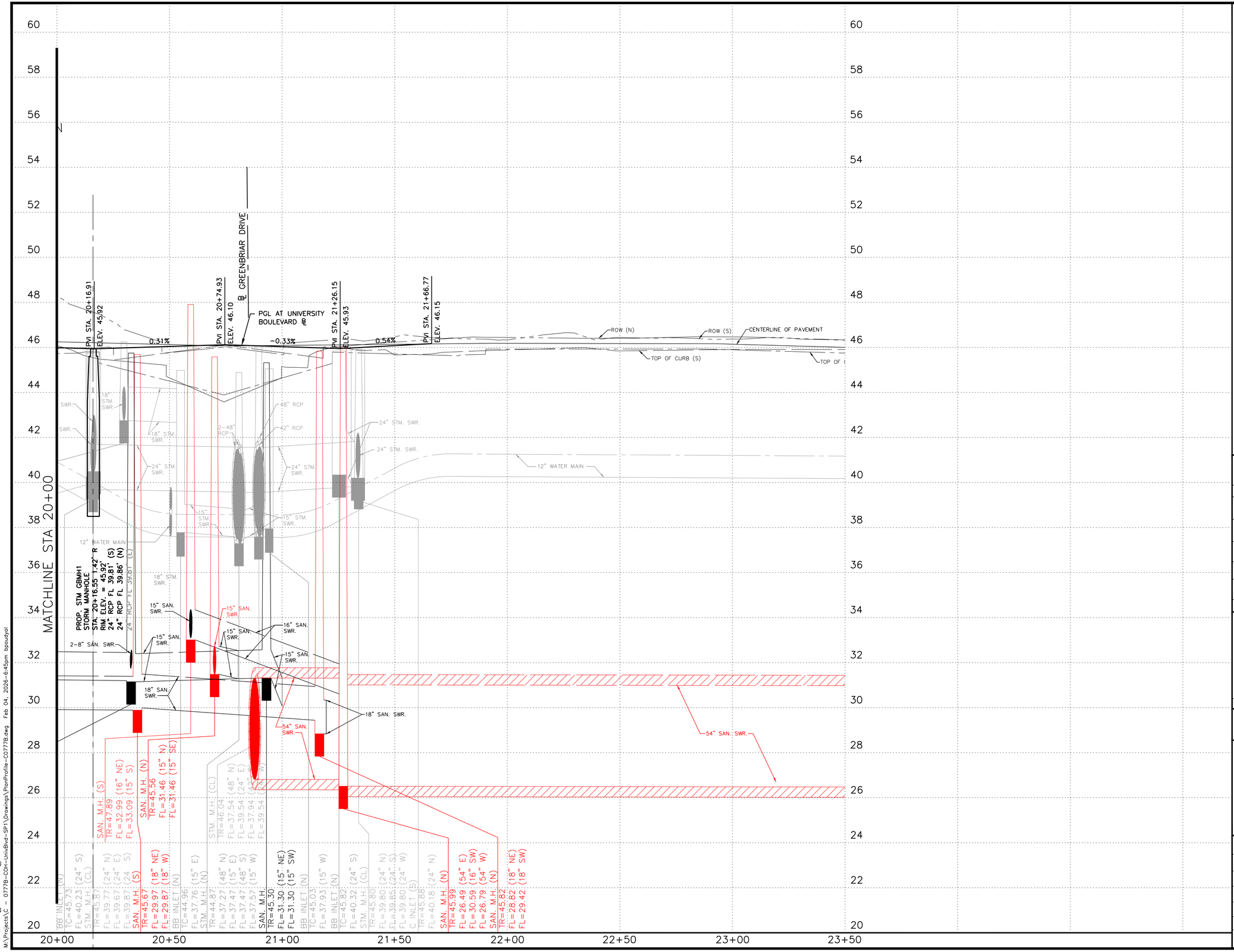

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
UNIVERSITY BOULEVARD
FROM STA 20+00 TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 56 OF 139	

GC Engineering, Inc.
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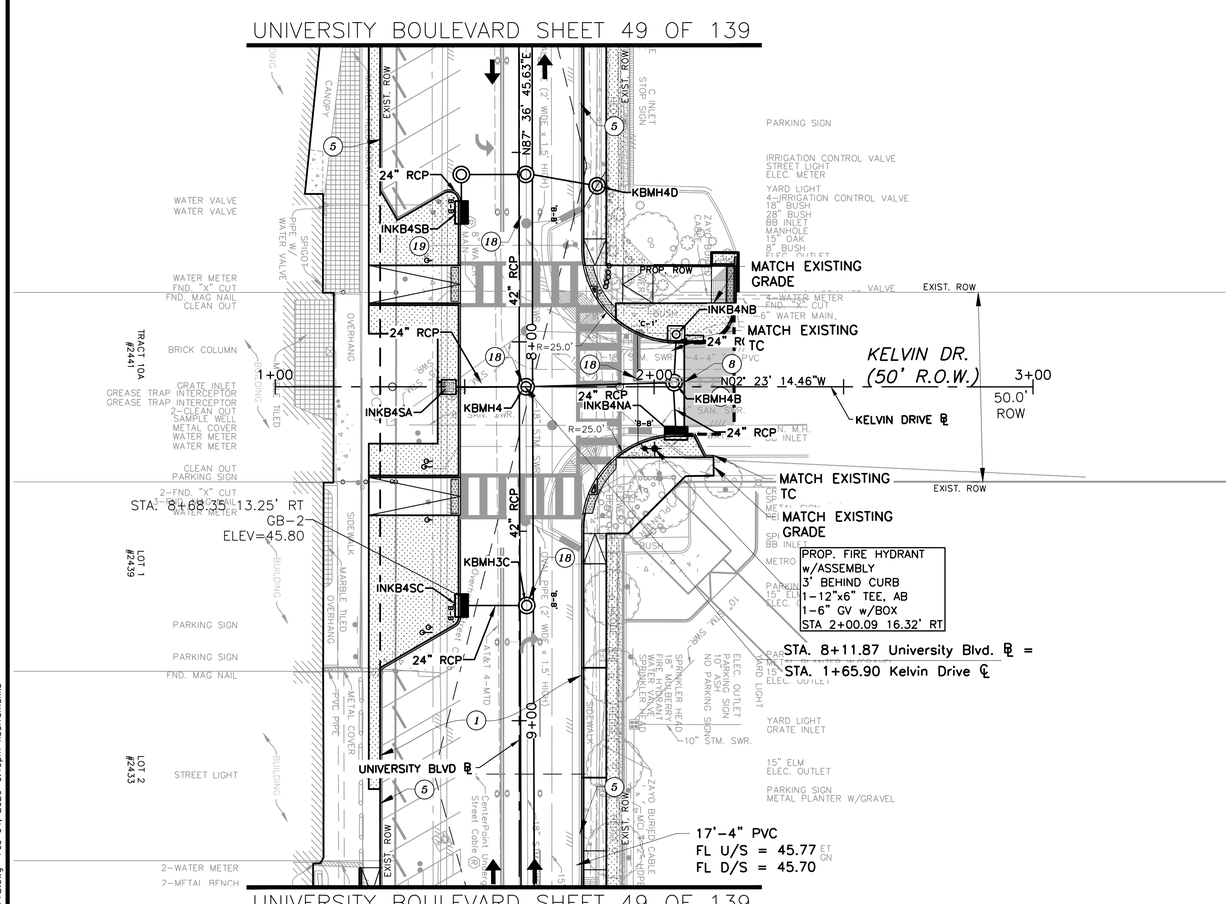
UNIVERSITY BOULEVARD SHEET 49 OF 139



UNIVERSITY BOULEVARD SHEET 49 OF 139

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP PAVEMENT EDGE
- TC TOP OF CURB
- PGL PROFILE GRADE LINE
- N1/S1 DRIVEWAY NUMBER CURB STATION OFFSET
- MH1 PROP SANITARY MANHOLE
- MHKB5 PROP STORM MANHOLE
- INKB5NA PROP TYPE C-INLET
- INKB3N PROP TYPE BB-INLET
- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION

NOTE:

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2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
KELVIN DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 57 OF 139	

GC Engineering, Inc.
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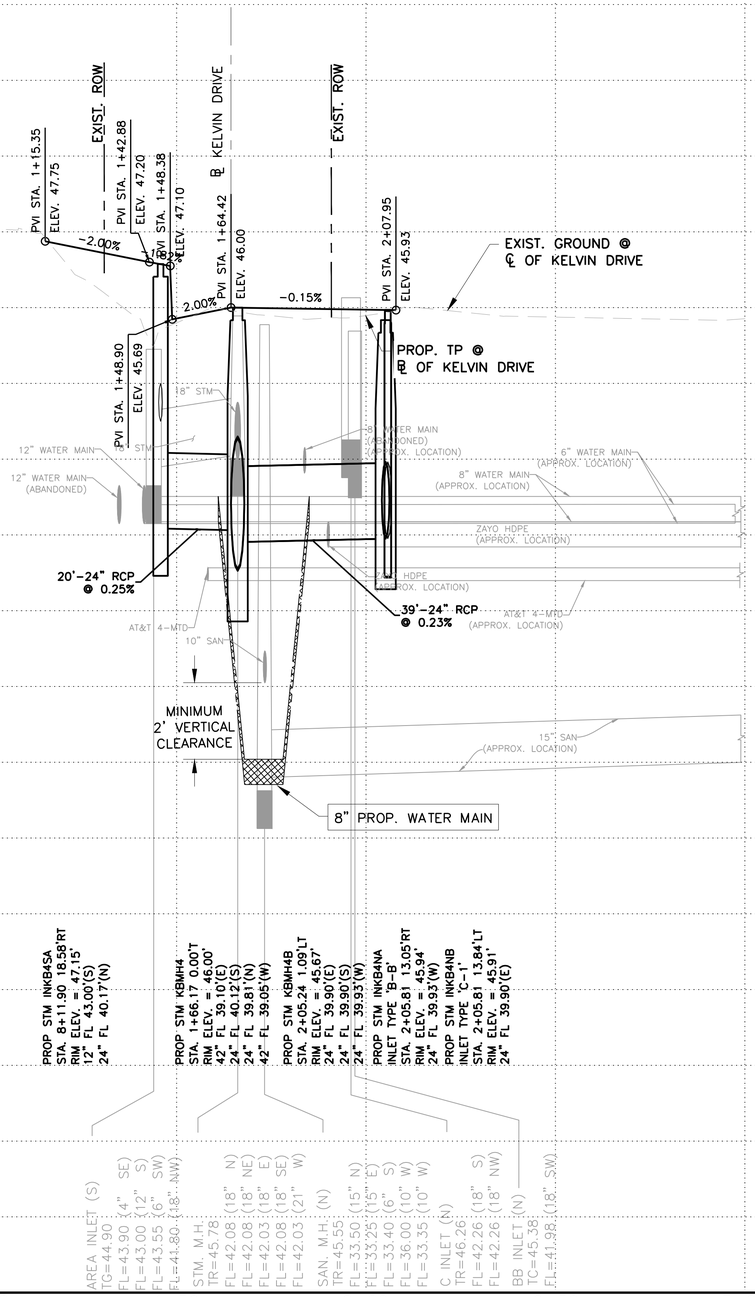

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
KELVIN DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 58 OF 139	

GC Engineering, Inc.
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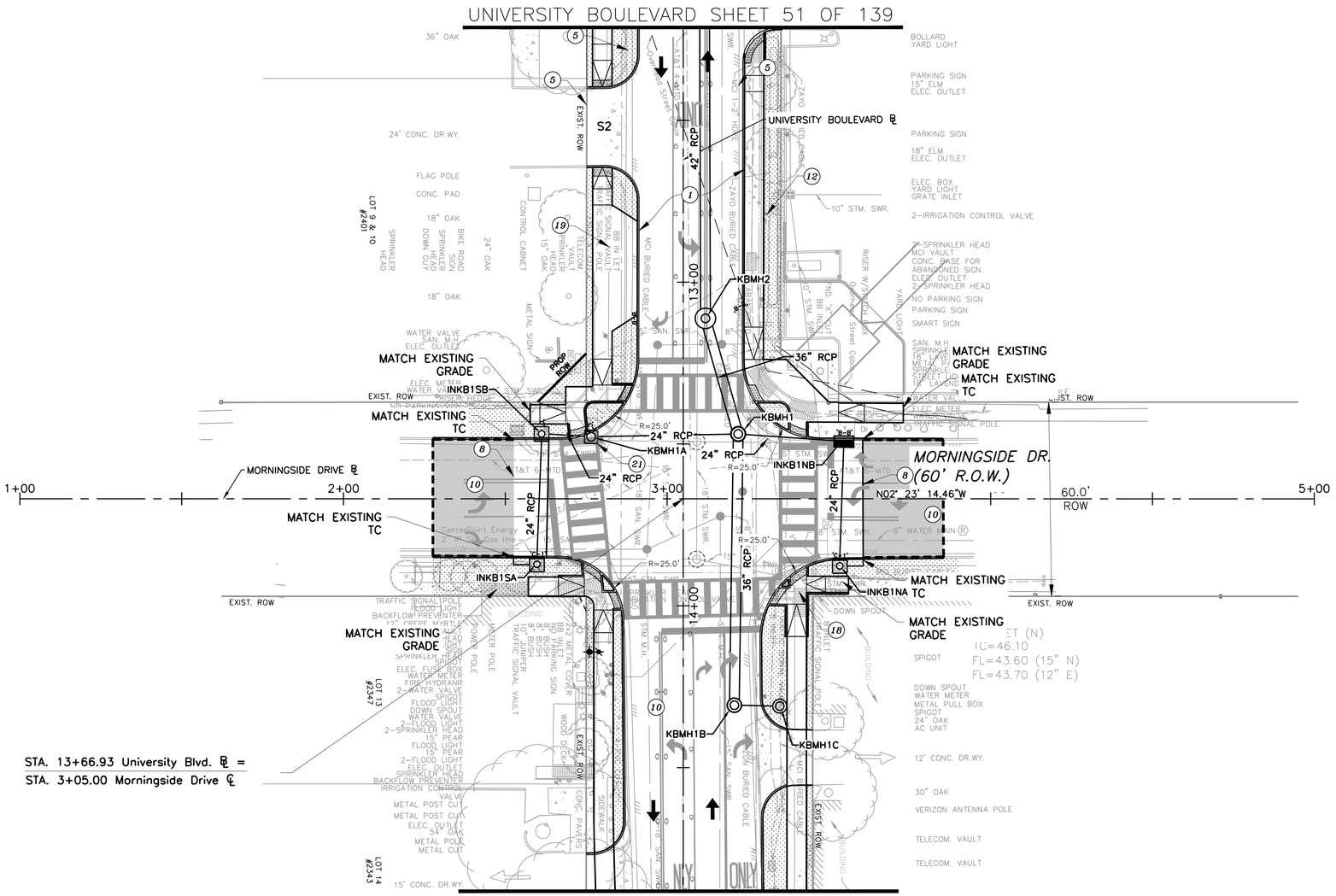

UNIVERSITY BOULEVARD SHEET 51 OF 139

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP PAVEMENT EDGE
- TC TOP OF CURB
- PGL PROFILE GRADE LINE
- N1/S1 DRIVEWAY NUMBER / CURB STATION OFFSET
- MH1 PROP SANITARY MANHOLE
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- BOREHOLE LOCATION
- LANDSCAPED AREA
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NOTE:

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APP.	DATE	MK.	REVISION

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
MORNINGSIDE DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 59 OF 139	

GC Engineering, Inc.
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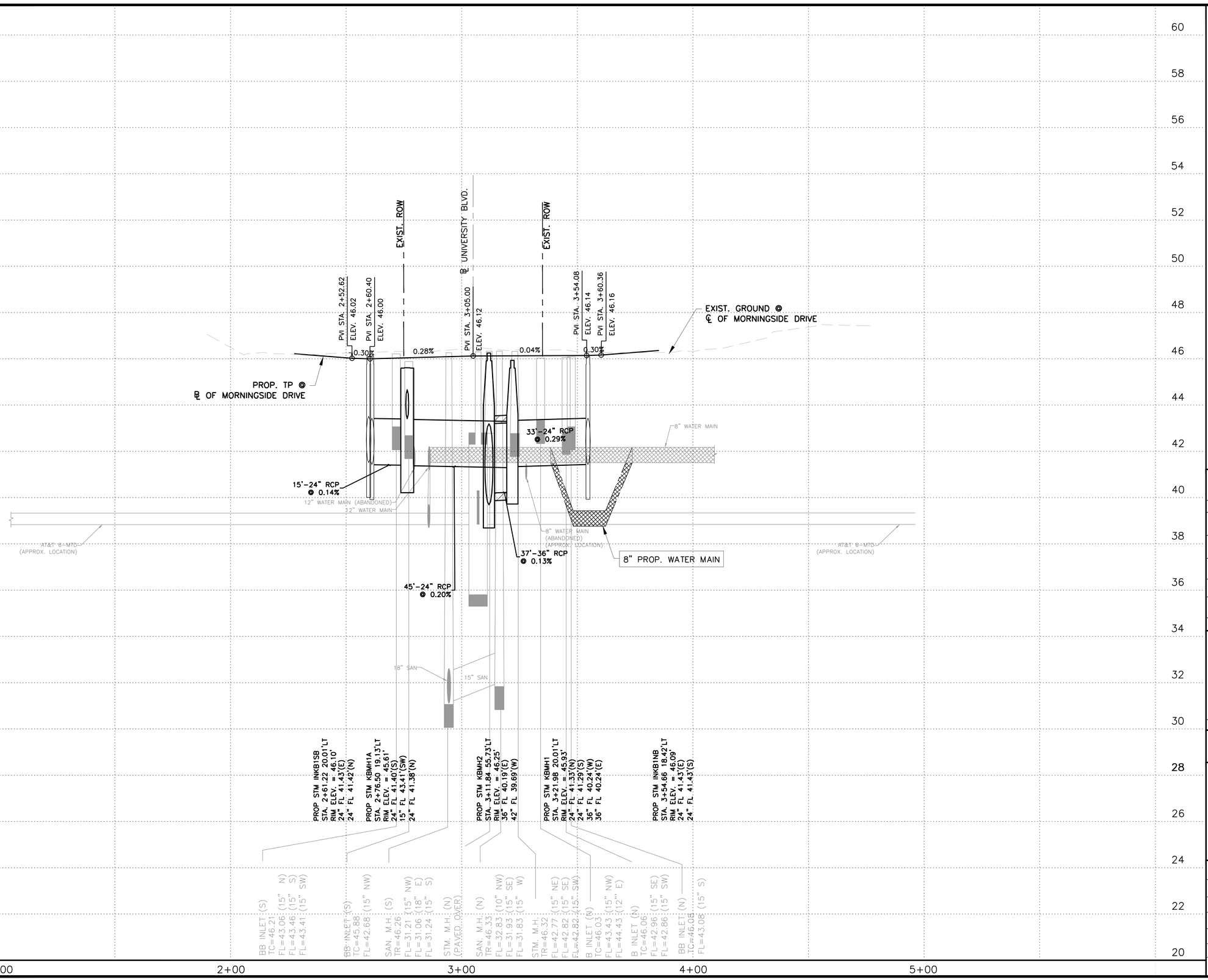

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UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
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PROFILE
MORNINGSIDE DRIVE
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CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 60 OF 139	

GC Engineering, Inc.
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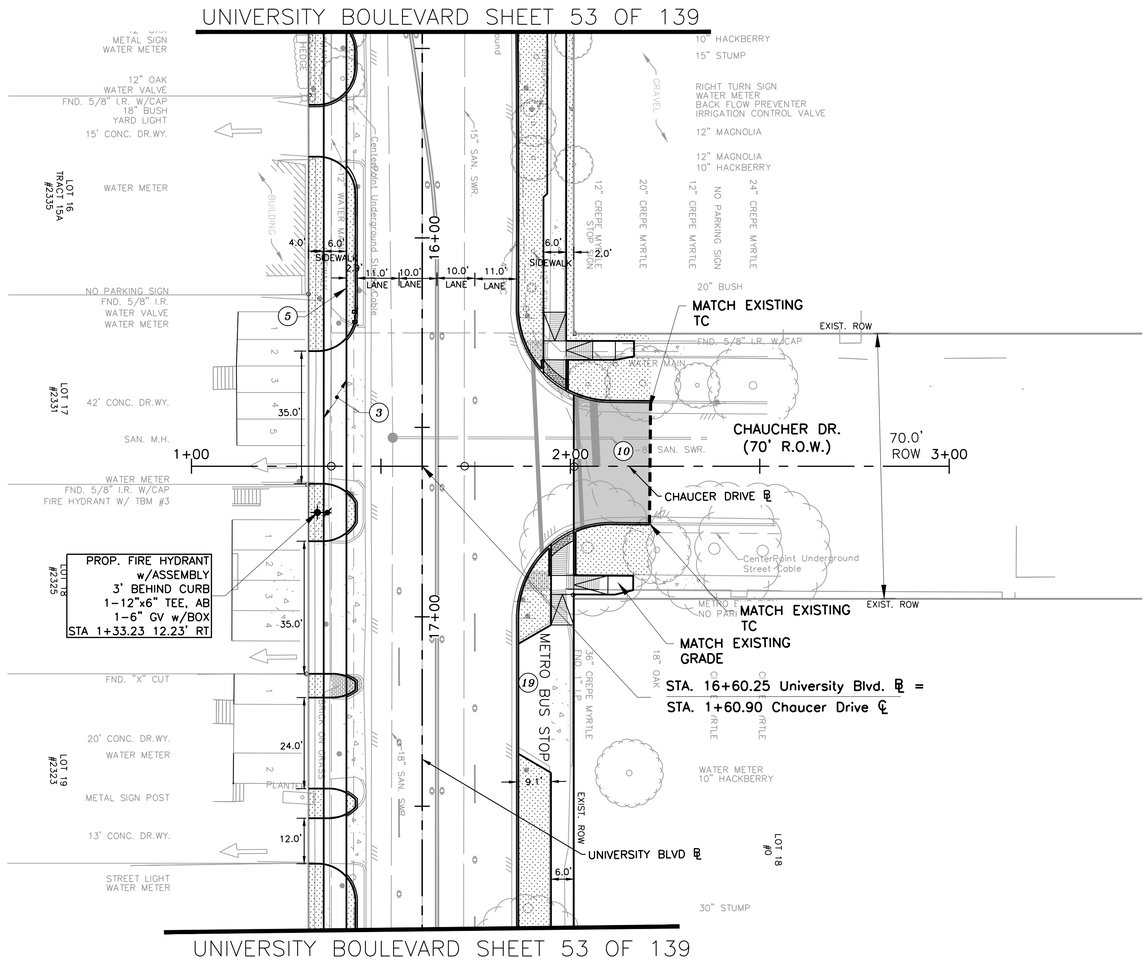

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SCALE: 1"=20' (22x34)

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SURVEYED BY: WESTERN GROUP

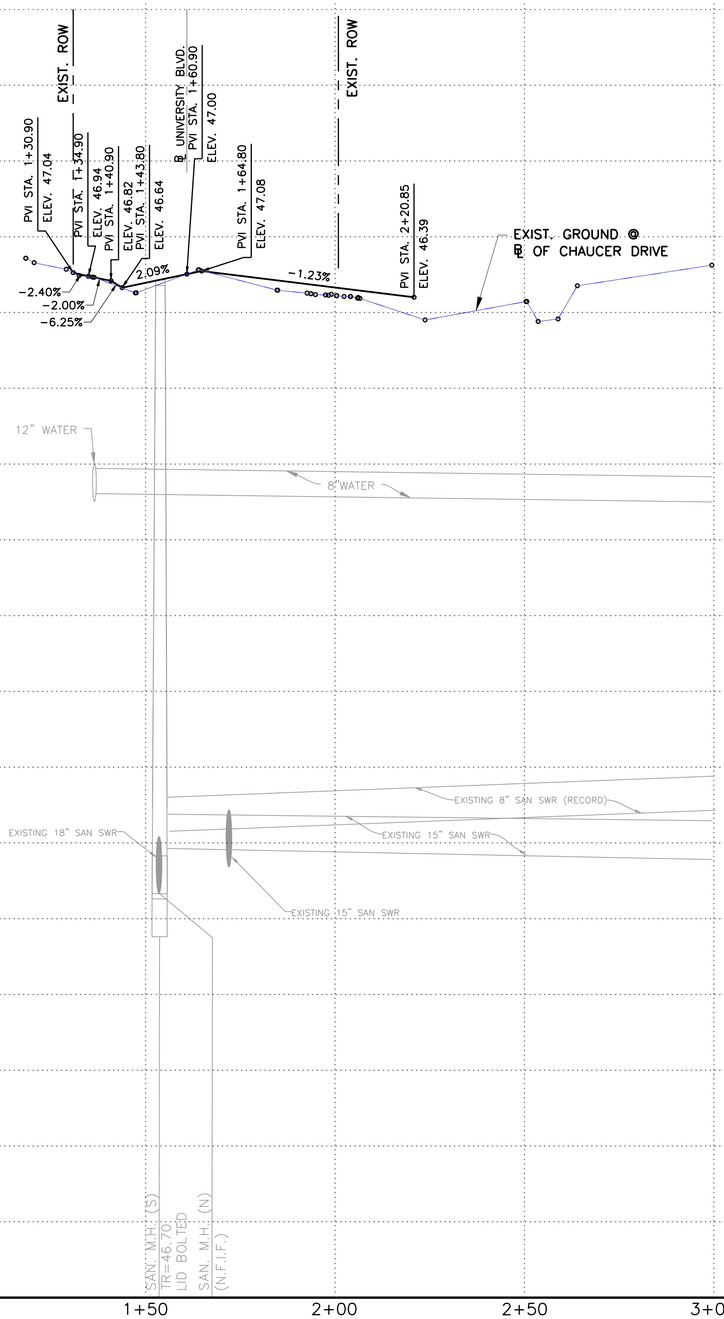
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
CHAUCER DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=20' VERT: 1"=2'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 61 OF 139	

GC Engineering, Inc.
M:\Projects\C - 07778-COH-UnivBlvd-SP1\Drawings\PlanProfile-CrossStreets-C07778.dwg Feb 04, 2026 - 6:41pm nburram.uku



20 0 10 20 40

SCALE: 1"=20' (H) (22x34)
1"=2' (V) (22X34)

MK.	DATE	REVISION	APP.

NOTICE:
For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground line can be marked. This signature does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES

DATE:

CenterPoint Energy/Natural Gas utilities shown (gas service lines are not shown).
(This Signature not to be used for conflict verification.)
Signature valid for six months.

DATE:

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY.
(This signature verifies existing underground facilities – not to be used for conflict verification.)
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DATE:

Approved for AT&T Texas/SWBT underground conduit facilities only.
Signature valid for one year.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PROFILE
CHAUCER DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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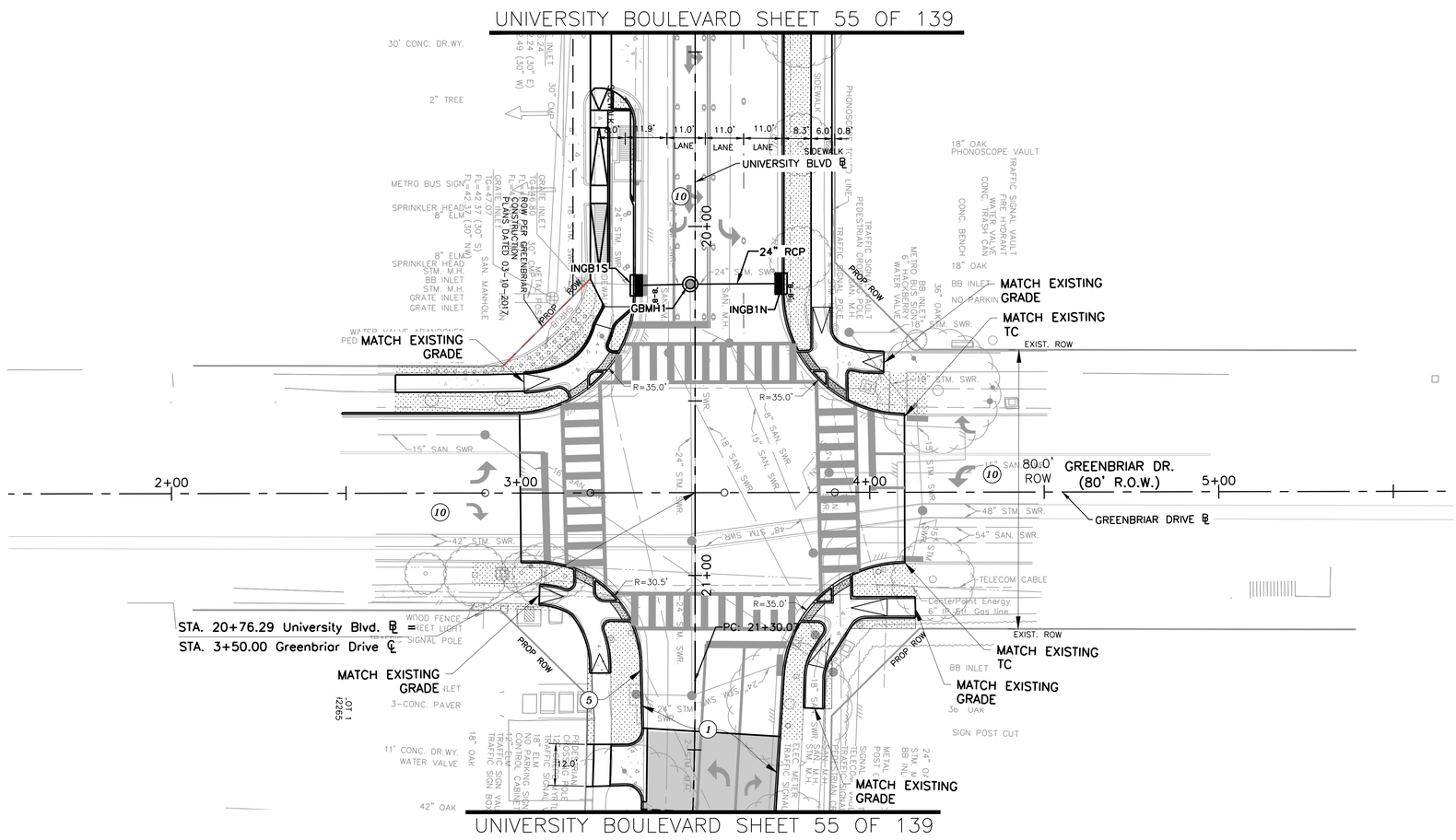

20 0 10 20 40

SCALE: 1"=20' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP PAVEMENT EDGE
- TC TOP OF CURB
- PGL PROFILE GRADE LINE
- N1/S1 DRIVEWAY NUMBER / CURB STATION OFFSET
- MH1 PROP SANITARY MANHOLE
- MHKB5 PROP STORM MANHOLE
- INKB5NA PROP TYPE C-INLET
- INKB3N PROP TYPE BB-INLET
- BOREHOLE LOCATION
- LANDSCAPED AREA
- HMAC PAVING
- TRAVEL DIRECTION

NOTE:

1. THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON TEXAS SOUTH CENTRAL ZONE NO. 4204, STATE PLANE GRID COORDINATES (NAD83).
2. COORDINATES FOR THE SURVEY BASELINE ARE GRID VALUES, SCALE FACTOR = 0.99984905. ALL DISTANCES SHOWN ARE SURFACE VALUES.
3. REFER TO KEY NOTES AND STATION OFFSET TABLES SHEET FOR ADDITIONAL INFORMATION. ALL STATION OFFSETS ARE BASED ON UNIVERSITY BOULEVARD ALIGNMENT UNLESS OTHERWISE STATED.

MK.	DATE	REVISION	APP.

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UNIVERSITY BOULEVARD SP-1
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FROM KIRBY DRIVE TO GREENBRIAR DRIVE

PLAN
GREENBRIAR DRIVE
FROM BEGIN TO END

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
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HORZ: 1"=20' VERT: 1"=2'	
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MICHELLE RANDON, PE	
SHEET NO. 63 OF 139	

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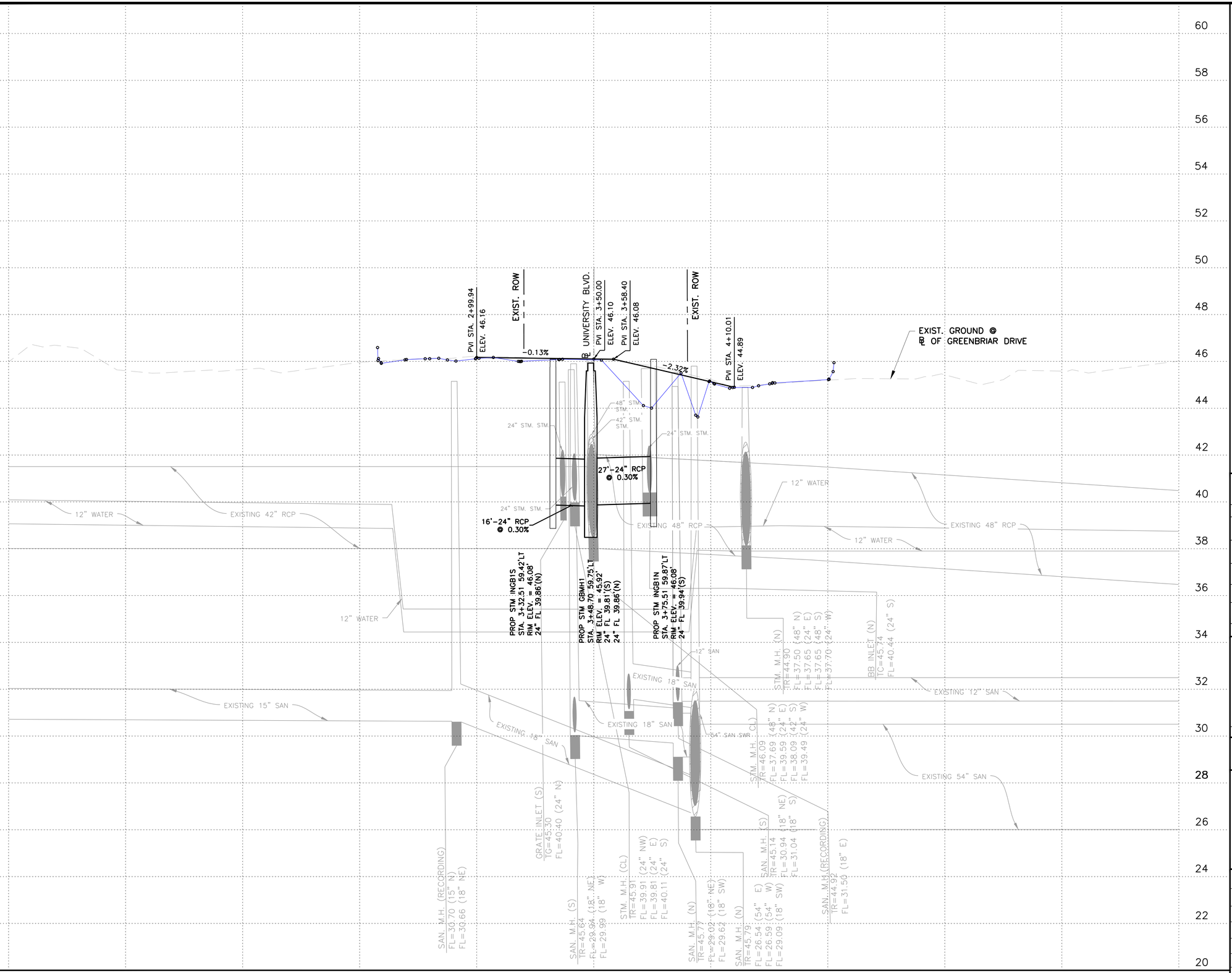

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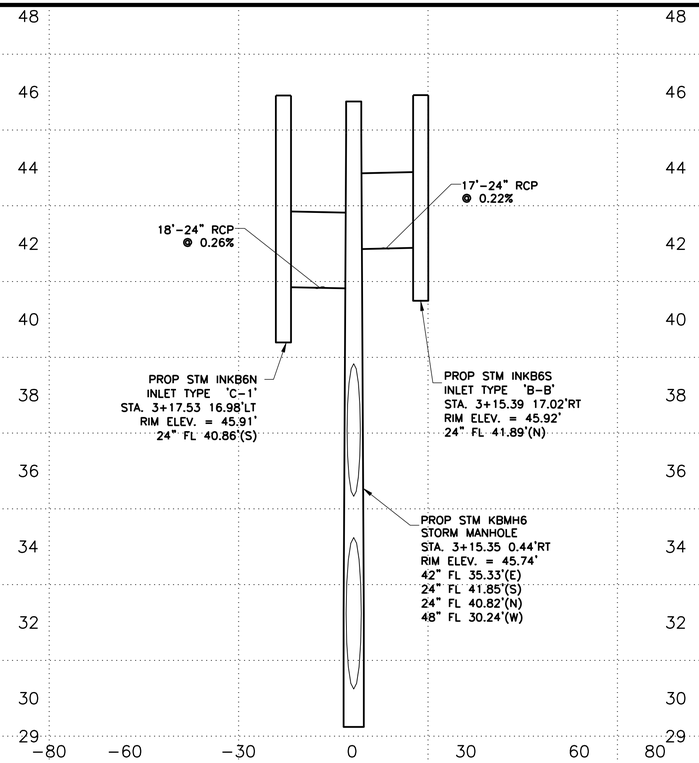

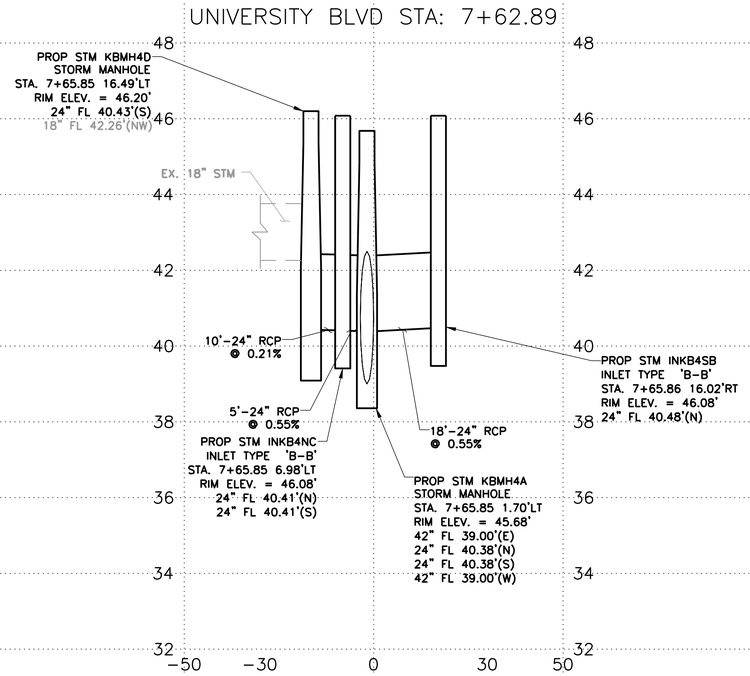

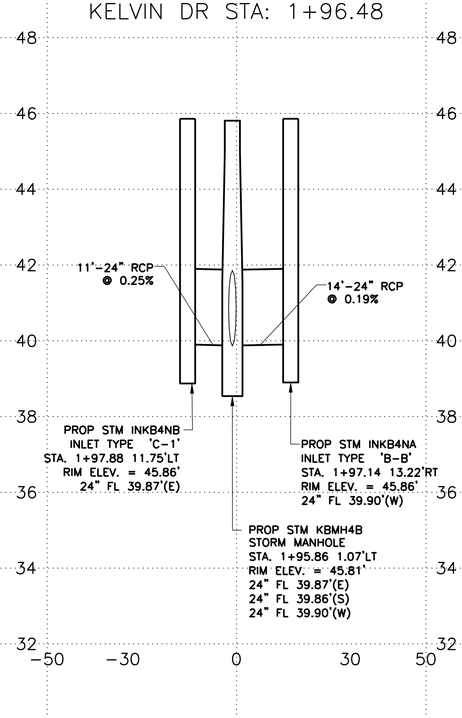

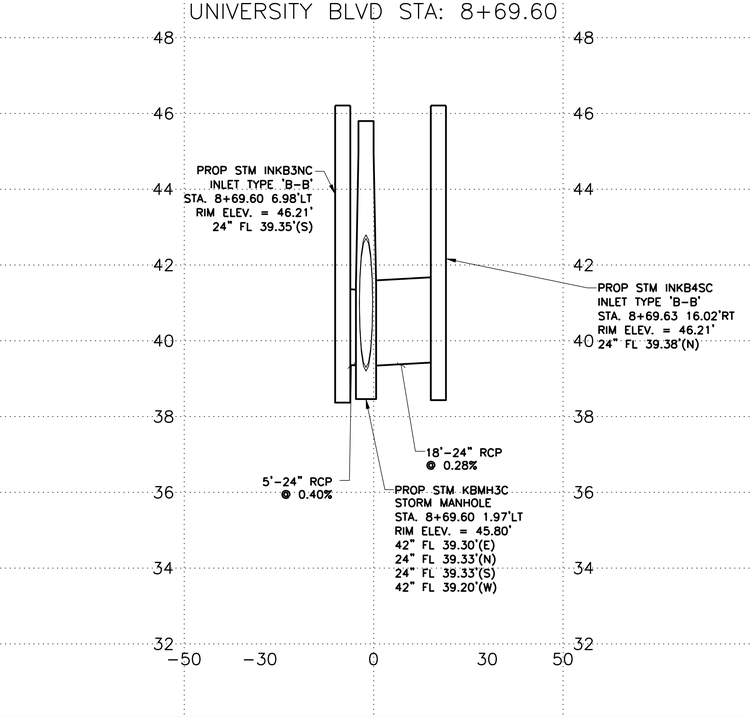

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A. MAHENDRA RODRIGO
TBPE NO: 87523
03/27/2024

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STORM SEWER LATERALS

SHEET 01 OF 03

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
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CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 65 OF 135

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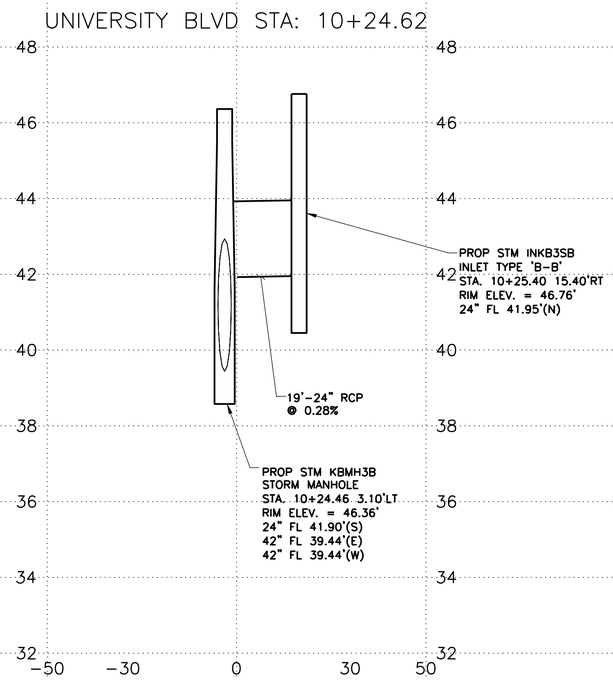

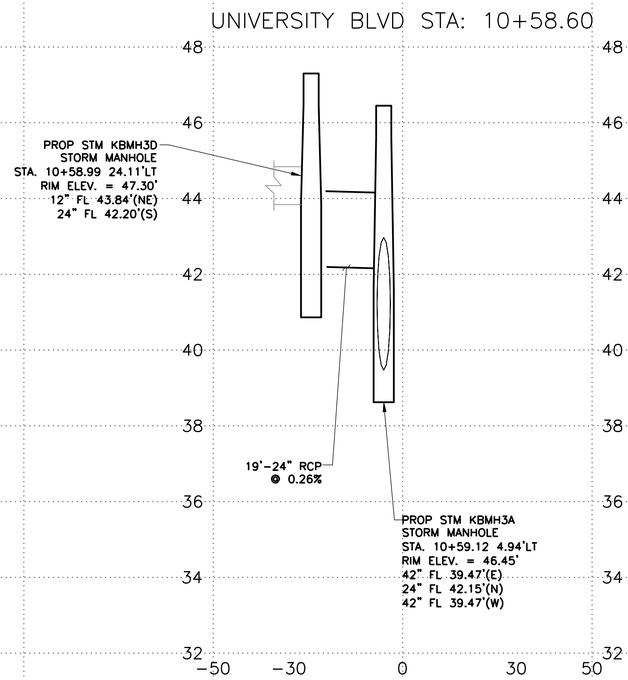

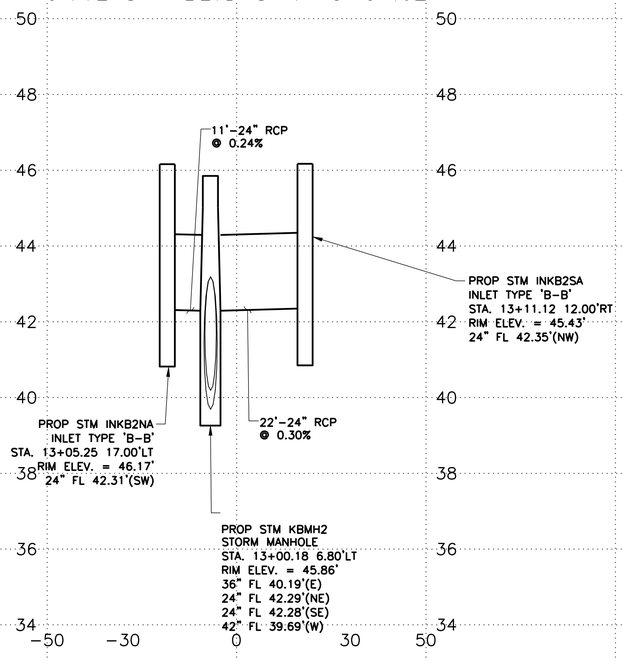

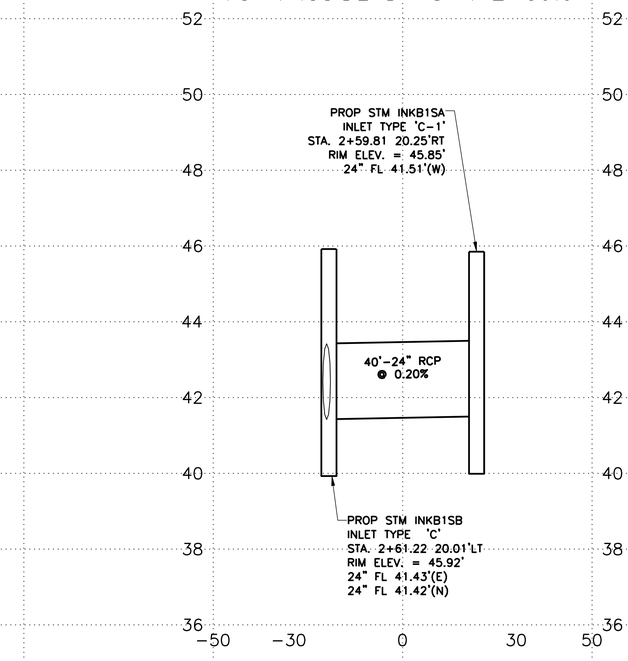

20 0 10 20 40

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UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STORM SEWER LATERALS

SHEET 02 OF 03

WBS NUMBER
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CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 66 OF 135

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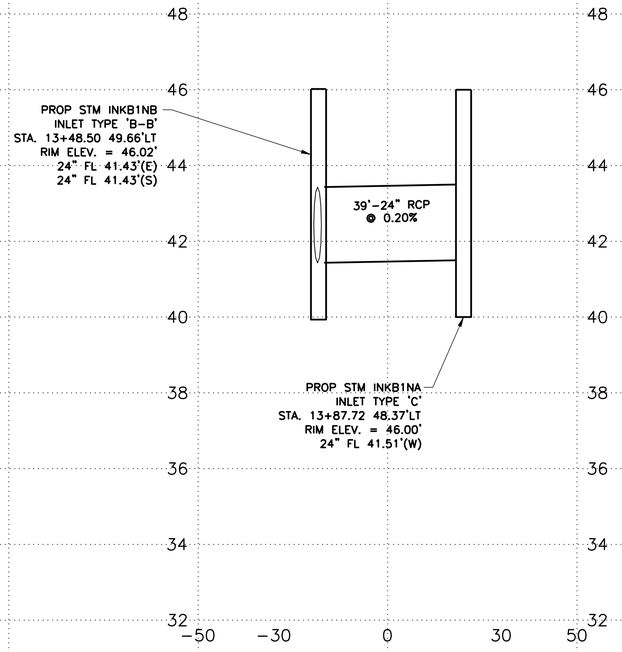
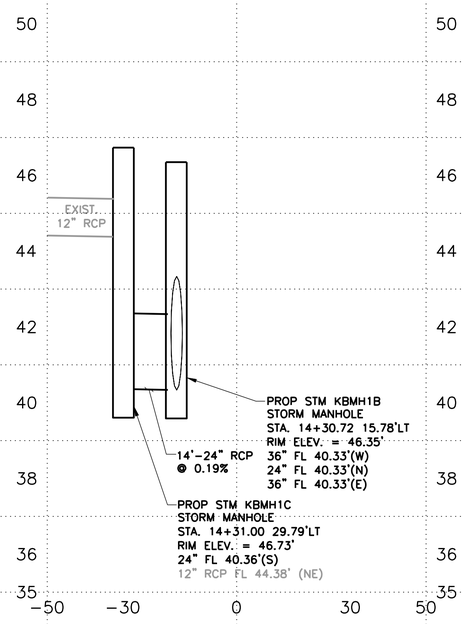
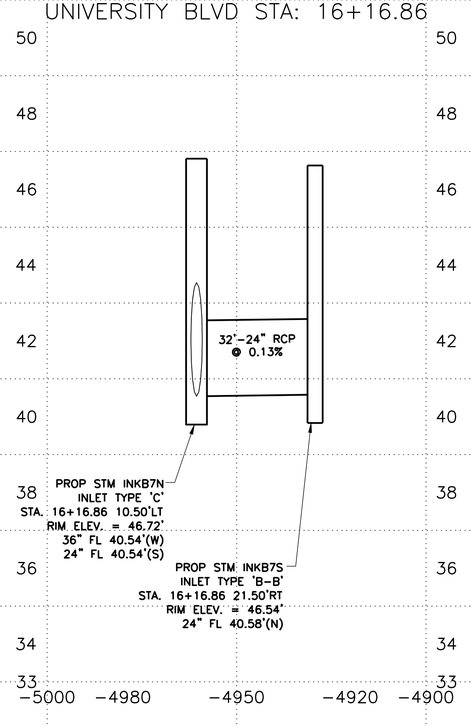
MORNINGSIDE DR STA: 3+43.62



UNIVERSITY BLVD STA: 14+30.72



UNIVERSITY BLVD STA: 16+16.86



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PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STORM SEWER LATERALS

SHEET 03 OF 03

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SHEET NO. 67 OF 135

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CURB STATION OFFSET		
ID	STA OFFSET	REF. ALIGNMENT
C1	STA 2+82.28 46.39' LT	UNIVERSITY BLVD.
C2	STA 3+12.11 16.98' LT	UNIVERSITY BLVD.
C3	STA 12+82.36 424.01' LT	UNIVERSITY BLVD.
C5	STA 5+49.85 25.96' LT	UNIVERSITY BLVD.
C6	STA 5+75.88 25.98' LT	UNIVERSITY BLVD.
C7	STA 5+40.52 16.98' LT	UNIVERSITY BLVD.
C10	STA 5+85.36 16.98' LT	UNIVERSITY BLVD.
C15	STA 7+75.32 16.96' LT	UNIVERSITY BLVD.
C16	STA 8+24.91 46.17' LT	UNIVERSITY BLVD.
C18	STA 9+45.87 16.98' LT	UNIVERSITY BLVD.
C19	STA 9+52.47 27.32' LT	UNIVERSITY BLVD.
C20	STA 9+77.43 27.16' LT	UNIVERSITY BLVD.
C24	STA 9+87.15 16.98' LT	UNIVERSITY BLVD.
C25	STA 13+06.83 471.63' LT	UNIVERSITY BLVD.
C26	STA 13+37.90 438.12' LT	UNIVERSITY BLVD.
C27	STA 13+24.52 468.97' LT	UNIVERSITY BLVD.
C28	STA 13+06.19 435.91' LT	UNIVERSITY BLVD.
C29	STA 13+72.05 414.92' LT	UNIVERSITY BLVD.
C30	STA 13+10.67 384.97' LT	UNIVERSITY BLVD.
C31	STA 13+20.88 443.19' LT	UNIVERSITY BLVD.
C32	STA 13+44.55 411.98' LT	UNIVERSITY BLVD.
C33	STA 13+34.72 381.22' LT	UNIVERSITY BLVD.
C34	STA 13+50.46 465.21' LT	UNIVERSITY BLVD.
C35	STA 12+85.60 439.92' LT	UNIVERSITY BLVD.
C36	STA 13+06.20 460.07' LT	UNIVERSITY BLVD.
C37	STA 11+90.13 18.96' LT	UNIVERSITY BLVD.
C38	STA 11+96.92 30.28' LT	UNIVERSITY BLVD.
C39	STA 12+21.97 30.31' LT	UNIVERSITY BLVD.
C40	STA 12+80.49 418.61' LT	UNIVERSITY BLVD.
C41	STA 13+47.75 38.57' LT	UNIVERSITY BLVD.
C42	STA 13+85.74 46.56' LT	UNIVERSITY BLVD.
C44	STA 14+09.88 18.81' RT	UNIVERSITY BLVD.
C45	STA 13+85.17 42.97' RT	UNIVERSITY BLVD.
C46	STA 13+48.16 41.61' RT	UNIVERSITY BLVD.
C47	STA 13+24.20 14.25' RT	UNIVERSITY BLVD.
C48	STA 12+74.18 14.18' RT	UNIVERSITY BLVD.
C49	STA 12+64.73 21.96' RT	UNIVERSITY BLVD.
C50	STA 12+39.44 22.02' RT	UNIVERSITY BLVD.
C51	STA 12+30.60 14.15' RT	UNIVERSITY BLVD.
C52	STA 10+80.04 13.35' RT	UNIVERSITY BLVD.
C53	STA 10+69.29 22.70' RT	UNIVERSITY BLVD.
C54	STA 10+47.89 23.76' RT	UNIVERSITY BLVD.
C55	STA 10+36.17 14.86' RT	UNIVERSITY BLVD.
C56	STA 10+22.89 15.51' RT	UNIVERSITY BLVD.
C57	STA 10+20.81 19.35' RT	UNIVERSITY BLVD.
C58	STA 10+27.79 29.94' RT	UNIVERSITY BLVD.
C59	STA 10+17.05 36.45' RT	UNIVERSITY BLVD.
C60	STA 8+86.05 36.72' RT	UNIVERSITY BLVD.
C61	STA 8+74.82 17.27' RT	UNIVERSITY BLVD.
C62	STA 8+72.65 16.02' RT	UNIVERSITY BLVD.

CURB STATION OFFSET		
ID	STA OFFSET	REF. ALIGNMENT
C63	STA 7+62.90 16.02' RT	UNIVERSITY BLVD.
C64	STA 7+60.73 19.77' RT	UNIVERSITY BLVD.
C65	STA 7+67.88 32.15' RT	UNIVERSITY BLVD.
C66	STA 7+59.97 36.72' RT	UNIVERSITY BLVD.
C67	STA 6+71.21 36.72' RT	UNIVERSITY BLVD.
C68	STA 6+59.98 17.27' RT	UNIVERSITY BLVD.
C69	STA 6+57.82 16.02' RT	UNIVERSITY BLVD.
C70	STA 6+45.10 16.02' RT	UNIVERSITY BLVD.
C71	STA 6+42.94 19.77' RT	UNIVERSITY BLVD.
C72	STA 6+50.09 32.15' RT	UNIVERSITY BLVD.
C73	STA 6+42.18 36.72' RT	UNIVERSITY BLVD.
C88	STA 3+38.56 37.72' RT	UNIVERSITY BLVD.
C89	STA 3+27.91 19.27' RT	UNIVERSITY BLVD.
C90	STA 3+24.01 17.02' RT	UNIVERSITY BLVD.
C91	STA 3+06.25 17.02' RT	UNIVERSITY BLVD.
C92	STA 2+80.20 46.69' RT	UNIVERSITY BLVD.
C93	STA 2+22.01 32.37' RT	UNIVERSITY BLVD.
C94	STA 2+00.57 5.55' RT	UNIVERSITY BLVD.
C99	STA 12+22.96 14.09' RT	UNIVERSITY BLVD.
C100	STA 8+49.42 16.98' LT	UNIVERSITY BLVD.
C101	STA 14+34.40 21.50' RT	UNIVERSITY BLVD.
C102	STA 14+66.32 18.38' RT	UNIVERSITY BLVD.
C103	STA 15+87.12 551.69' LT	UNIVERSITY BLVD.
C104	STA 13+41.30 392.56' LT	UNIVERSITY BLVD.
C105	STA 14+76.37 29.23' RT	UNIVERSITY BLVD.
C106	STA 14+91.48 30.00' RT	UNIVERSITY BLVD.
C107	STA 15+01.39 18.11' RT	UNIVERSITY BLVD.
C108	STA 15+14.21 18.05' RT	UNIVERSITY BLVD.
C109	STA 15+24.12 30.00' RT	UNIVERSITY BLVD.
C110	STA 15+41.02 30.00' RT	UNIVERSITY BLVD.
C111	STA 15+51.57 17.73' RT	UNIVERSITY BLVD.
C112	STA 15+54.81 17.71' RT	UNIVERSITY BLVD.
C113	STA 15+64.89 30.00' RT	UNIVERSITY BLVD.
C114	STA 15+78.55 30.03' RT	UNIVERSITY BLVD.
C115	STA 15+89.22 17.63' RT	UNIVERSITY BLVD.
C116	STA 16+19.88 17.60' RT	UNIVERSITY BLVD.
C117	STA 16+29.85 30.03' RT	UNIVERSITY BLVD.
C118	STA 16+80.03 30.09' RT	UNIVERSITY BLVD.
C119	STA 16+74.95 17.60' RT	UNIVERSITY BLVD.
C120	STA 16+64.88 30.00' RT	UNIVERSITY BLVD.
C121	STA 16+69.98 17.60' RT	UNIVERSITY BLVD.
C122	STA 17+15.05 30.00' RT	UNIVERSITY BLVD.
C123	STA 17+17.13 17.60' RT	UNIVERSITY BLVD.
C124	STA 17+19.24 17.60' RT	UNIVERSITY BLVD.
C125	STA 17+21.32 30.00' RT	UNIVERSITY BLVD.
C126	STA 17+50.25 17.60' RT	UNIVERSITY BLVD.
C129	STA 17+53.17 30.00' RT	UNIVERSITY BLVD.
C130	STA 17+75.17 17.60' RT	UNIVERSITY BLVD.
C131	STA 17+65.17 30.00' RT	UNIVERSITY BLVD.
C132	STA 17+92.19 17.60' RT	UNIVERSITY BLVD.

CURB STATION OFFSET		
ID	STA OFFSET	REF. ALIGNMENT
C133	STA 18+26.19 30.00' RT	UNIVERSITY BLVD.
C134	STA 18+02.19 30.00' RT	UNIVERSITY BLVD.
C135	STA 18+36.19 17.60' RT	UNIVERSITY BLVD.
C136	STA 18+59.13 17.60' RT	UNIVERSITY BLVD.
C137	STA 17+45.33 30.00' RT	UNIVERSITY BLVD.
C138	STA 18+70.02 30.00' RT	UNIVERSITY BLVD.
C139	STA 18+85.14 30.00' RT	UNIVERSITY BLVD.
C140	STA 13+70.54 437.72' LT	UNIVERSITY BLVD.
C142	STA 18+95.14 17.60' RT	UNIVERSITY BLVD.
C143	STA 19+19.27 17.60' RT	UNIVERSITY BLVD.
C144	STA 13+37.67 450.54' LT	UNIVERSITY BLVD.
C145	STA 19+60.39 28.72' RT	UNIVERSITY BLVD.
C146	STA 19+29.34 30.01' RT	UNIVERSITY BLVD.
C147	STA 19+70.37 17.60' RT	UNIVERSITY BLVD.
C148	STA 13+39.61 472.06' LT	UNIVERSITY BLVD.
C151	STA 20+23.01 17.84' RT	UNIVERSITY BLVD.
C152	STA 20+35.72 21.98' RT	UNIVERSITY BLVD.
C153	STA 20+45.59 30.23' RT	UNIVERSITY BLVD.
C154	STA 20+53.41 50.24' RT	UNIVERSITY BLVD.
C155	STA 20+53.42 101.14' RT	UNIVERSITY BLVD.
C156	STA 20+96.36 49.74' RT	UNIVERSITY BLVD.
C157	STA 20+96.40 44.79' RT	UNIVERSITY BLVD.
C158	STA 20+98.30 34.76' RT	UNIVERSITY BLVD.
C159	STA 21+07.17 22.40' RT	UNIVERSITY BLVD.
C160	STA 21+25.11 15.71' RT	UNIVERSITY BLVD.
C161	STA 21+44.00 15.12' RT	UNIVERSITY BLVD.
C162	STA 21+48.76 19.45' RT	UNIVERSITY BLVD.
C163	STA 21+60.81 18.88' RT	UNIVERSITY BLVD.
C164	STA 21+65.33 14.77' RT	UNIVERSITY BLVD.
C165	STA 21+67.69 14.79' RT	UNIVERSITY BLVD.
C166	STA 21+68.43 23.71' LT	UNIVERSITY BLVD.
C167	STA 21+29.27 25.45' LT	UNIVERSITY BLVD.
C168	STA 21+13.42 30.23' LT	UNIVERSITY BLVD.
C169	STA 21+03.54 39.04' LT	UNIVERSITY BLVD.
C170	STA 20+96.51 60.06' LT	UNIVERSITY BLVD.
C171	STA 20+53.63 59.96' LT	UNIVERSITY BLVD.
C172	STA 20+49.65 43.84' LT	UNIVERSITY BLVD.
C173	STA 20+41.56 33.70' LT	UNIVERSITY BLVD.
C174	STA 20+19.44 25.40' LT	UNIVERSITY BLVD.
C175	STA 13+19.52 455.24' LT	UNIVERSITY BLVD.
C176	STA 18+76.47 25.40' LT	UNIVERSITY BLVD.
C177	STA 18+66.61 40.00' LT	UNIVERSITY BLVD.
C178	STA 18+45.14 40.00' LT	UNIVERSITY BLVD.
C179	STA 18+35.74 25.40' LT	UNIVERSITY BLVD.
C180	STA 13+59.22 453.29' LT	UNIVERSITY BLVD.
C181	STA 13+61.93 420.74' LT	UNIVERSITY BLVD.
C182	STA 13+29.64 412.66' LT	UNIVERSITY BLVD.
C183	STA 13+14.29 393.42' LT	UNIVERSITY BLVD.
C184	STA 17+48.25 17.60' RT	UNIVERSITY BLVD.
C185	STA 13+59.92 404.21' LT	UNIVERSITY BLVD.

CURB STATION OFFSET		
ID	STA OFFSET	REF. ALIGNMENT
C186	STA 17+00.11 25.40' LT	UNIVERSITY BLVD.
C187	STA 16+75.69 60.01' LT	UNIVERSITY BLVD.
C188	STA 16+43.02 60.30' LT	UNIVERSITY BLVD.
C189	STA 16+34.61 31.50' LT	UNIVERSITY BLVD.
C190	STA 12+92.45 451.48' LT	UNIVERSITY BLVD.
C191	STA 13+04.81 426.41' LT	UNIVERSITY BLVD.
C192	STA 16+18.43 25.40' LT	UNIVERSITY BLVD.
C193	STA 13+31.06 387.25' LT	UNIVERSITY BLVD.
C194	STA 13+00.60 392.51' LT	UNIVERSITY BLVD.
C195	STA 13+15.02 420.24' LT	UNIVERSITY BLVD.
C196	STA 13+40.43 420.95' LT	UNIVERSITY BLVD.
C197	STA 13+49.79 440.46' LT	UNIVERSITY BLVD.
C198	STA 13+09.87 445.50' LT	UNIVERSITY BLVD.
C199	STA 14+64.55 24.66' LT	UNIVERSITY BLVD.
C200	STA 14+55.38 39.99' LT	UNIVERSITY BLVD.
C201	STA 14+38.33 40.00' LT	UNIVERSITY BLVD.
C204	STA 13+91.72 32.56' LT	UNIVERSITY BLVD.
C205	STA 13+85.34 80.44' LT	UNIVERSITY BLVD.
C206	STA 13+48.26 80.28' LT	UNIVERSITY BLVD.
C207	STA 13+45.75 32.57' LT	UNIVERSITY BLVD.
C208	STA 13+23.67 18.75' LT	UNIVERSITY BLVD.
C209	STA 14+28.30 24.33' LT	UNIVERSITY BLVD.
C210	STA 13+54.60 391.19' LT	UNIVERSITY BLVD.
C211	STA 13+29.02 402.70' LT	UNIVERSITY BLVD.
C212	STA 12+29.13 18.90' LT	UNIVERSITY BLVD.
C215	STA 8+24.38 56.69' LT	UNIVERSITY BLVD.
C216	STA 7+90.32 56.69' LT	UNIVERSITY BLVD.
C217	STA 7+99.72 48.64' LT	UNIVERSITY BLVD.
C220	STA 2+96.25 21.40' LT	UNIVERSITY BLVD.
C221	STA 2+82.23 59.27' LT	UNIVERSITY BLVD.
C226	STA 2+22.00 42.70' RT	UNIVERSITY BLVD.
C227	STA 2+14.20 11.98' RT	UNIVERSITY BLVD.
C228	STA 2+21.68 25.87' RT	UNIVERSITY BLVD.
C229	STA 2+80.18 49.15' RT	UNIVERSITY BLVD.
C230	STA 2+80.94 35.71' RT	UNIVERSITY BLVD.
C231	STA 2+94.80 19.08' RT	UNIVERSITY BLVD.
C232	STA 13+31.28 15.46' RT	UNIVERSITY BLVD.
C233	STA 13+46.35 29.48' RT	UNIVERSITY BLVD.
C234	STA 13+48.59 77.36' RT	UNIVERSITY BLVD.
C235	STA 13+85.07 77.38' RT	UNIVERSITY BLVD.
C236	STA 13+86.41 31.54' RT	UNIVERSITY BLVD.
C237	STA 14+01.23 19.16' RT	UNIVERSITY BLVD.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STATION OFFSET TABLES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=40' VERT: 1"=4'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 68 OF 139	

GC Engineering, Inc.
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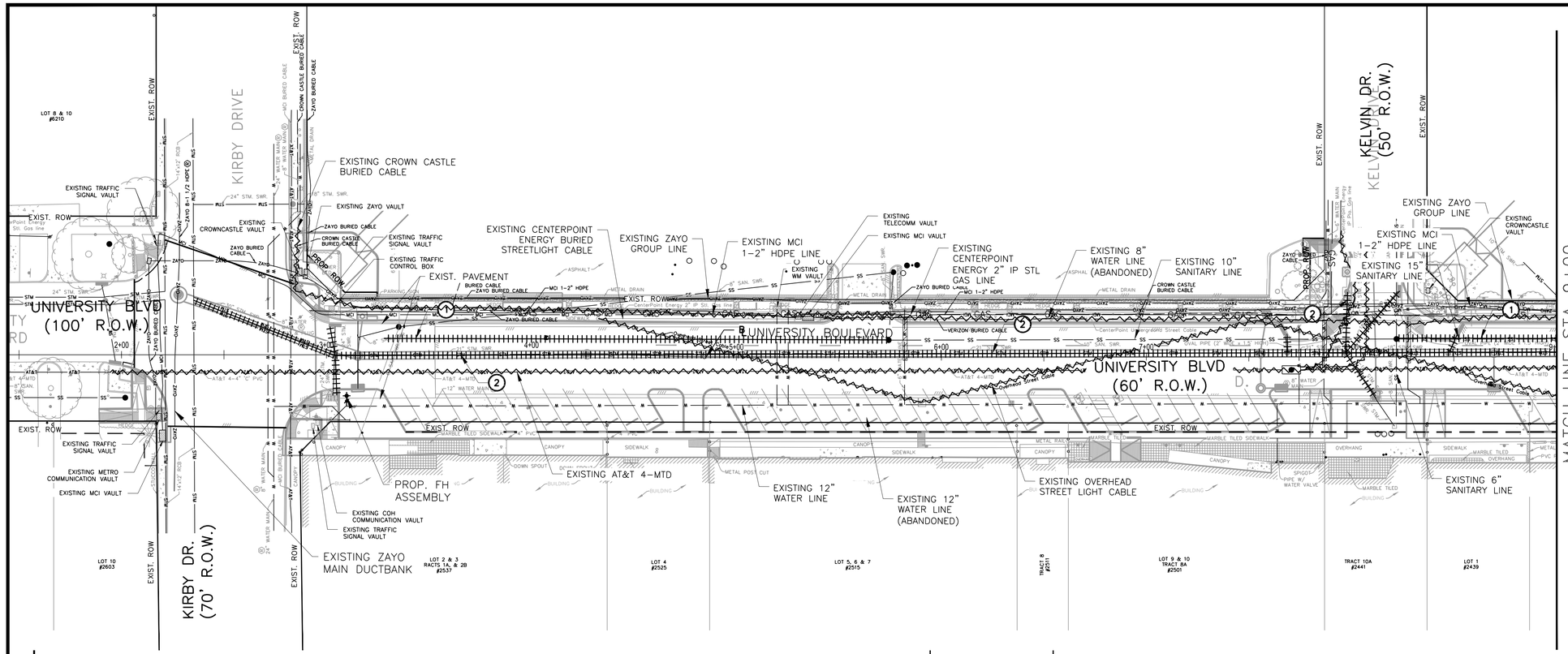

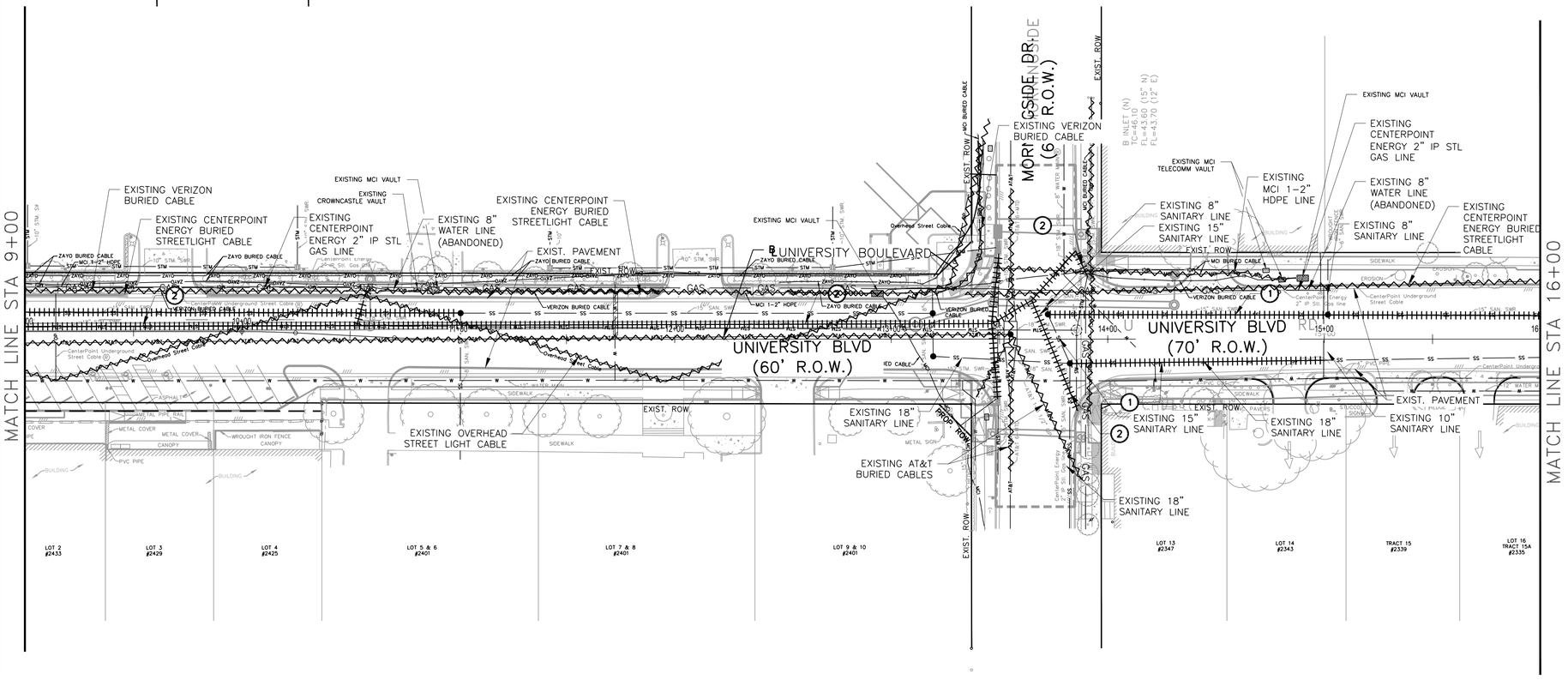

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- UTLITIES TO BE REMOVED OR RELOCATED BY OTHERS
- UTLITIES TO BE REMOVED AND/OR RELOCATED BY CONTRACTOR
- RIGHT-OF-WAY (ROW)
- OP — OVERHEAD POWER LINE
- OT — OVERHEAD TELEPHONE CABLE
- BURRIED CENTERPOINT UNDERGROUND CABLE
- AT&T — BURIED AT&T CABLE
- MCI — BURIED MCI CABLE
- ZAYO — BURIED ZAYO CABLE
- GAS — BURIED GAS LINE
- W — BURIED WATER LINE
- STM — BURIED STORM LINE
- SS — BURIED SANITARY LINE
- P — PHONESCOPE TONED LINE
- BURIED VERIZON LINE
- BURIED CROWN CASTLE CABLE

1. REMOVE SANITARY SEWER LINE INCLUDING MANHOLES
2. REMOVE STORM SEWER LINE INCLUDING INLETS AND MANHOLES

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE;
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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TBPE Registration No. F-7889
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

UTILITY LAYOUT

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 69 OF 139	

GC Engineering, Inc.
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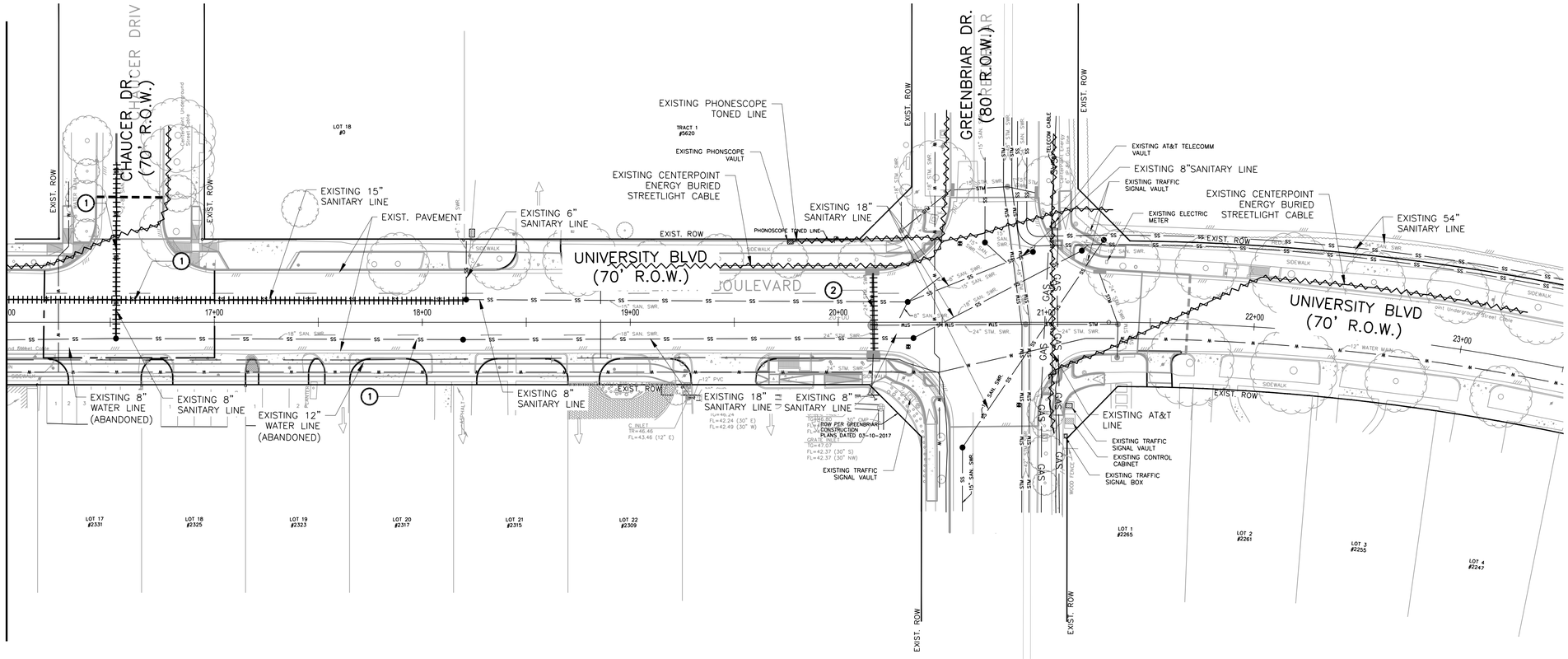

30 0 15 30 60

SCALE: 1" = 30'-0"

LEGEND

- UTLITIES TO BE REMOVED OR RELOCATED BY OTHERS
- UTLITIES TO BE REMOVED AND/OR RELOCATED BY CONTRACTOR
- RIGHT-OF-WAY (ROW)
- OP — OVERHEAD POWER LINE
- OT — OVERHEAD TELEPHONE CABLE
- BURRIED CENTERPOINT UNDERGROUND CABLE
- AT&T — BURIED AT&T CABLE
- MCI — BURIED MCI CABLE
- ZAYO — BURIED ZAYO CABLE
- GAS — BURIED GAS LINE
- W — BURIED WATER LINE
- STM — BURIED STORM LINE
- SS — BURIED SANITARY LINE
- P — PHONESCOPE TONED LINE
- BURIED VERIZON LINE
- BURIED CROWN CASTLE CABLE

(1) REMOVE SANITARY SEWER LINE INCLUDING MANHOLES

(2) REMOVE STORM SEWER LINE INCLUDING INLETS AND MANHOLES

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

UTILITY LAYOUT

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 30'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 70 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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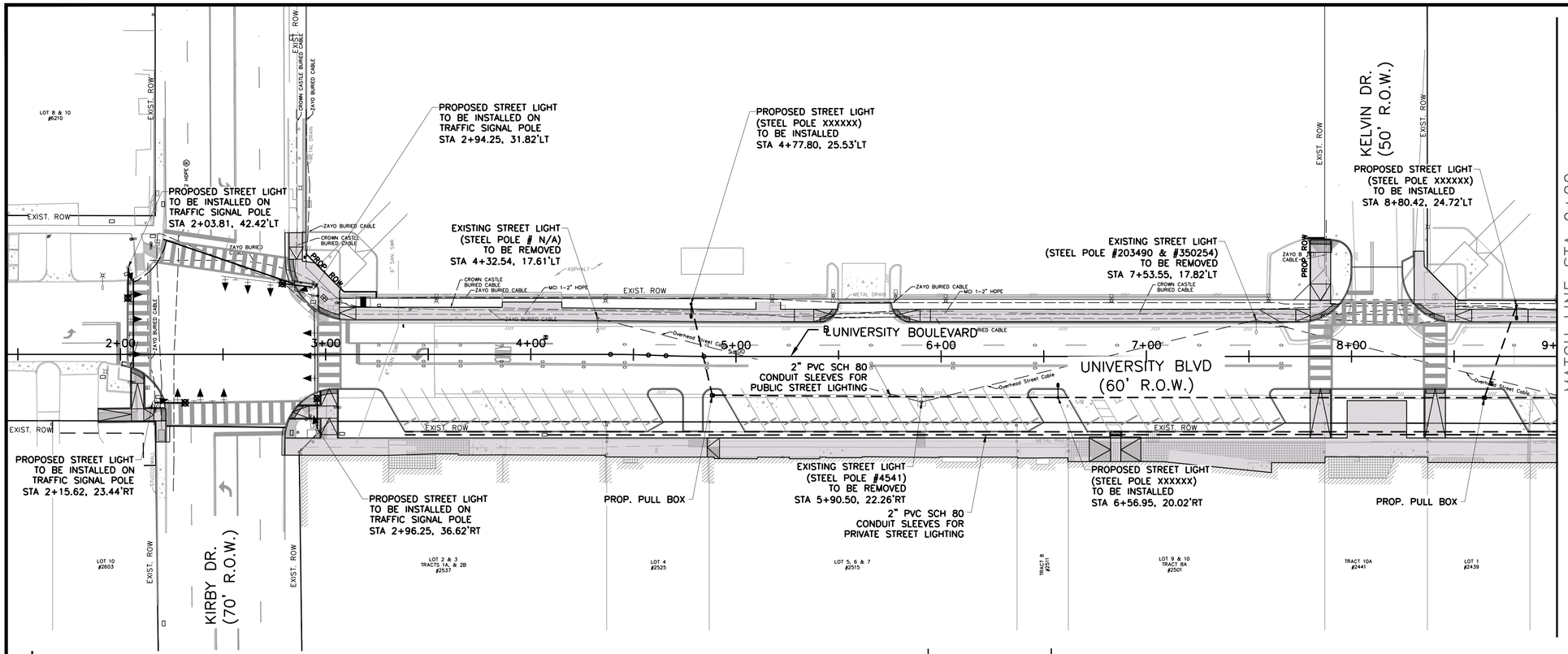

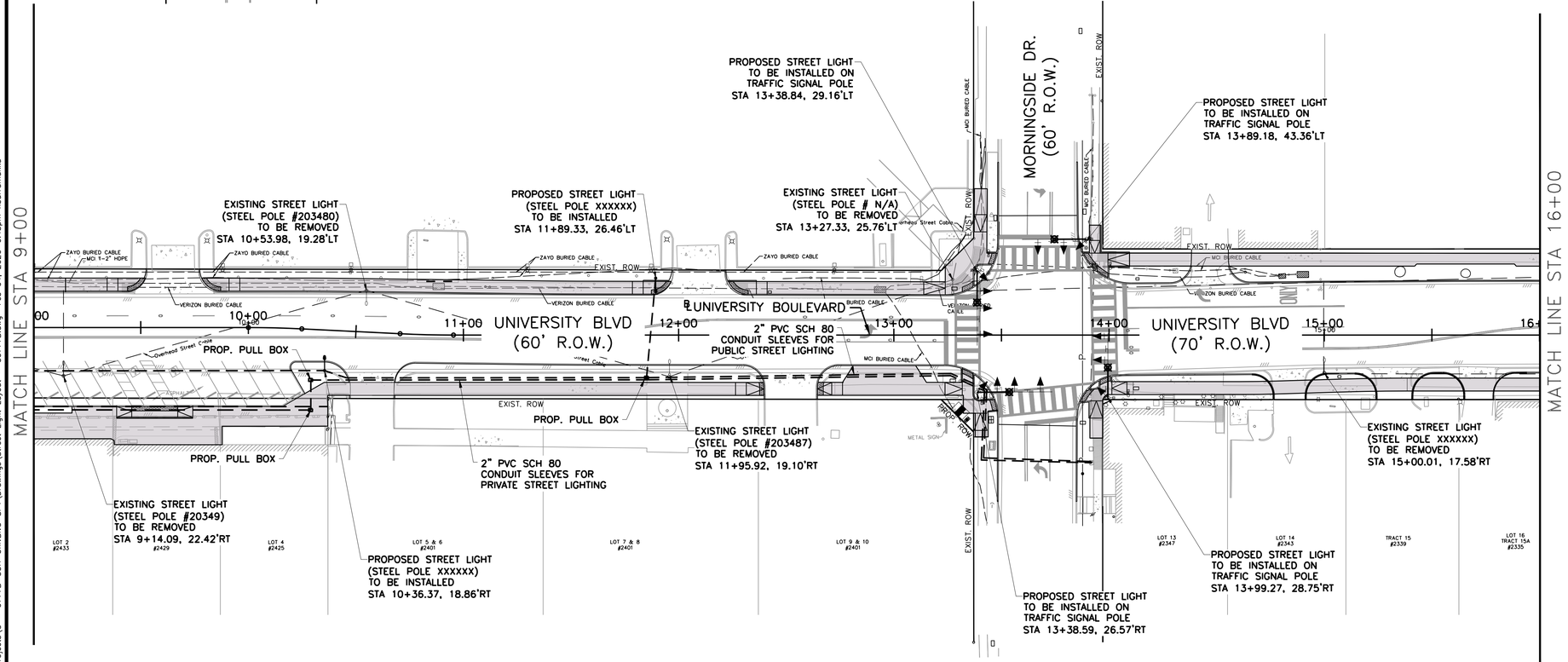

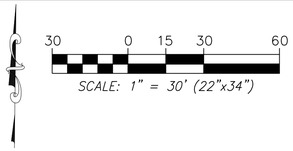

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309 LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP ROW
- PROP PAVEMENT BACK OF CURB
- PROP 2" PVC SCH 80 CONDUIT (SUBJECT TO CHANGE W/ CPE DESIGN)
- EXIST STREETLIGHT CONDUIT
- EXIST STREETLIGHT
- PROP STREETLIGHT

NOTE:

1. THIS SHEET INCLUDES A PRELIMINARY CUSTOM STREETLIGHT LAYOUT. THIS LAYOUT IS SUBJECT TO CHANGE PENDING CENTERPOINT ENERGY (CPE) DESIGN.
2. CONTRACTOR TO ENSURE THAT THE PRIVATE STREETLIGHT CONDUITS ARE NOT IN CONFLICT WITH PROPOSED STORM SEWER GUTTER PIPES.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STREET LIGHTING PLAN

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 30'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 71 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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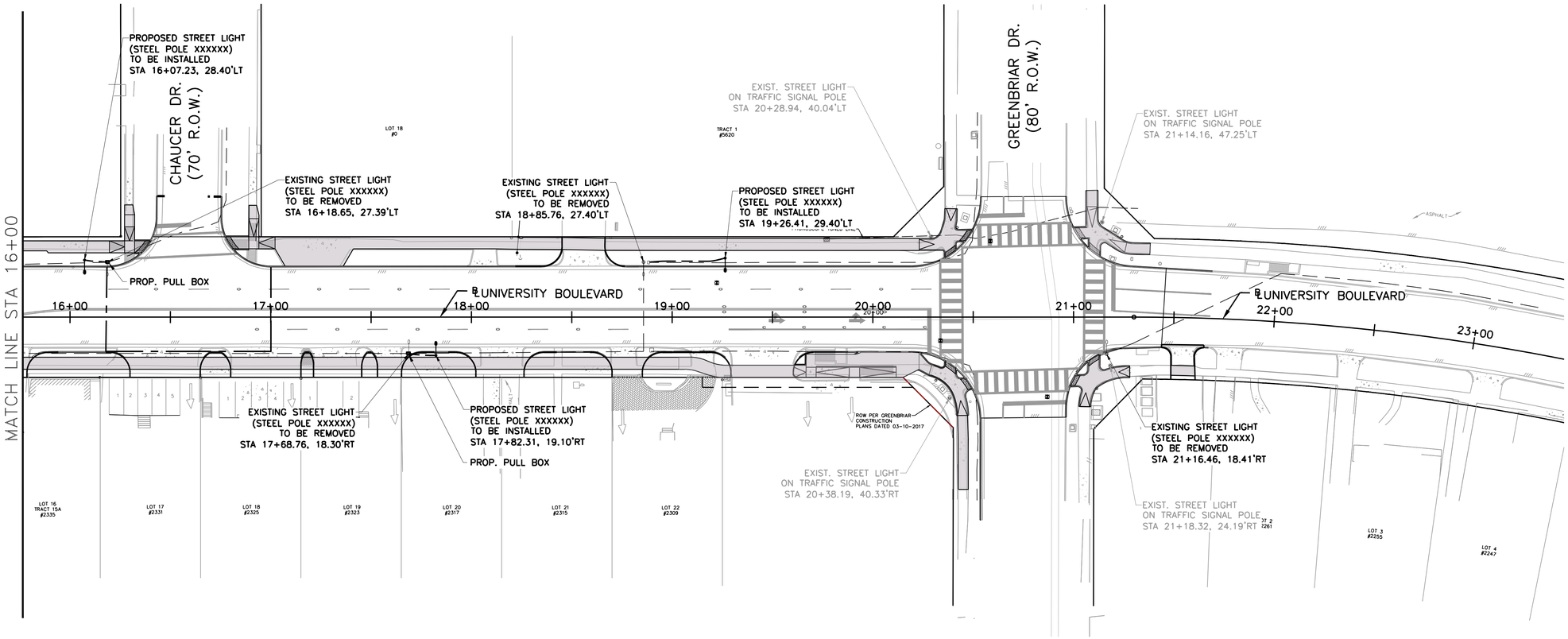

30 0 15 30 60

SCALE: 1" = 30' (22"x34")

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309 LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

- EXIST ROW
- PROP ROW
- PROP PAVEMENT BACK OF CURB
- PROP 2" PVC SCH 80 CONDUIT (SUBJECT TO CHANGE W/ CPE DESIGN)
- EXIST STREETLIGHT CONDUIT
- EXIST STREETLIGHT
- PROP STREETLIGHT

NOTE:

1. THIS SHEET INCLUDES A PRELIMINARY CUSTOM STREETLIGHT LAYOUT. THIS LAYOUT IS SUBJECT TO CHANGE PENDING CENTERPOINT ENERGY (CPE) DESIGN.
2. CONTRACTOR TO ENSURE THAT THE PRIVATE STREETLIGHT CONDUITS ARE NOT IN CONFLICT WITH PROPOSED STORM SEWER GUTTER PIPES.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STREET LIGHTING PLAN

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 30'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 72 OF 139

FOR CITY OF HOUSTON USE ONLY

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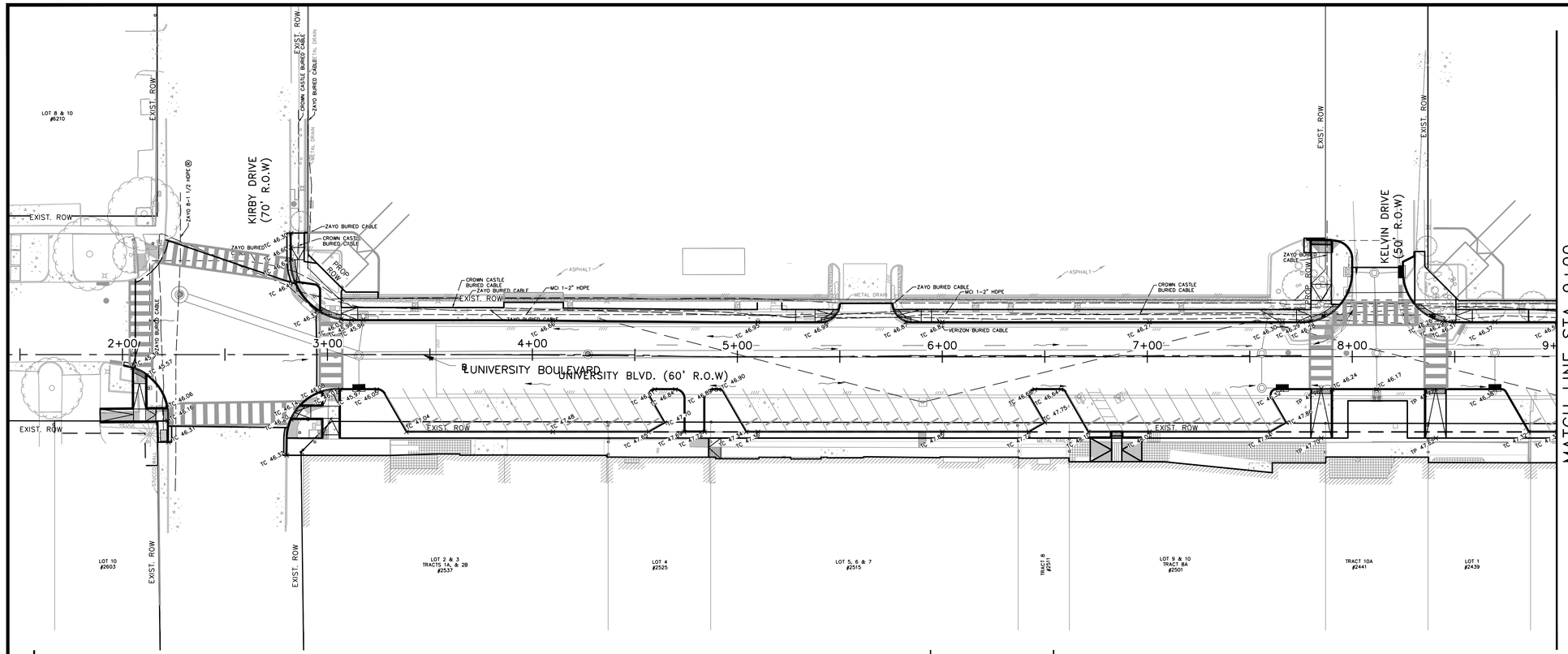

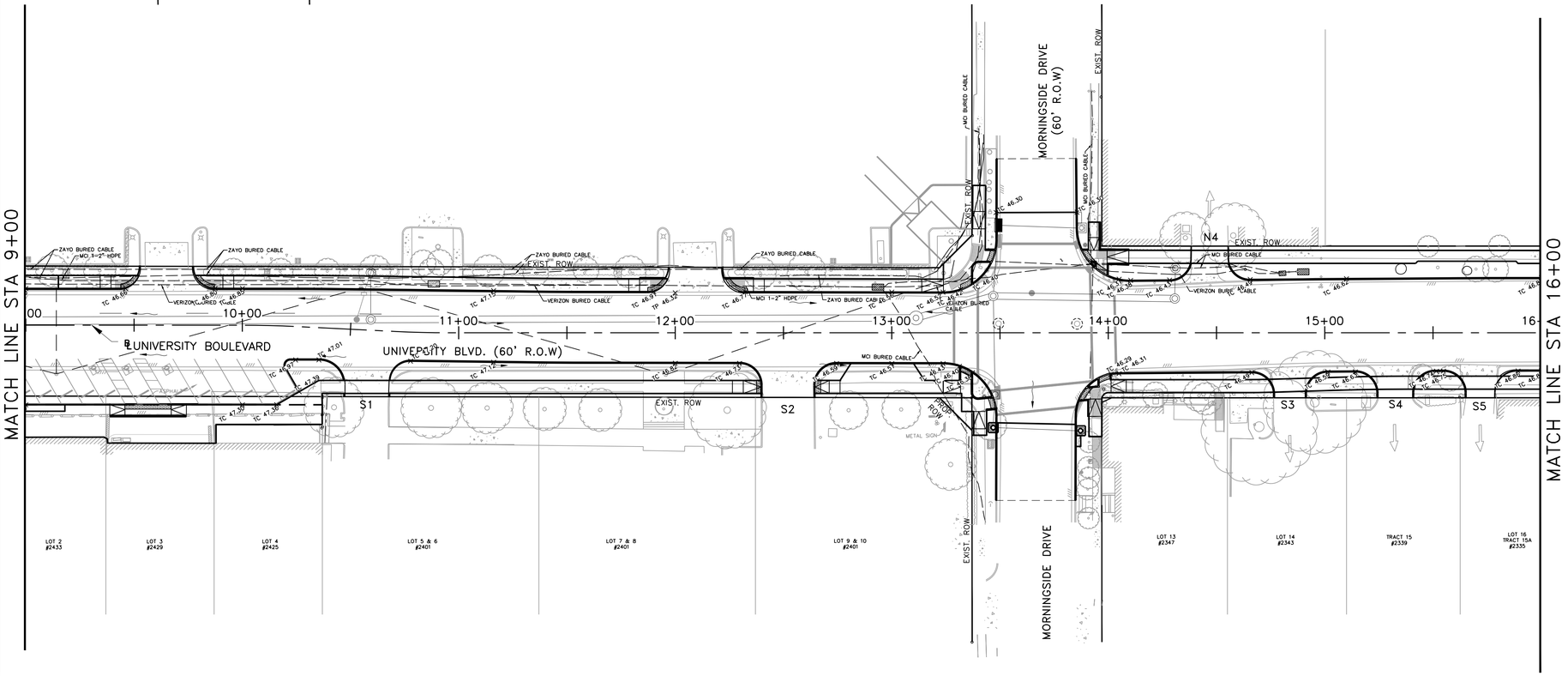

30 0 15 30 60

SCALE: 1"=30' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309 LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

———	EXIST ROW
— — —	PROP PAVEMENT EDGE
TC	TOP OF CURB
TP	TOP OF PAVEMENT
	PROPOSED TOP OF CURB ELEVATION
	PROPOSED TOP OF PAVEMENT ELEVATION
X 47.44	EXISTING ELEVATION

NOTE:

1. CONTRACTOR SHALL MATCH EXISTING GRADE AT ALL LIMITS OF WORK, LEAVE NO SHARP OR UNEVEN EDGES.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

GRADING PLAN

SHEET 01 OF 02

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
1" = 30'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 73 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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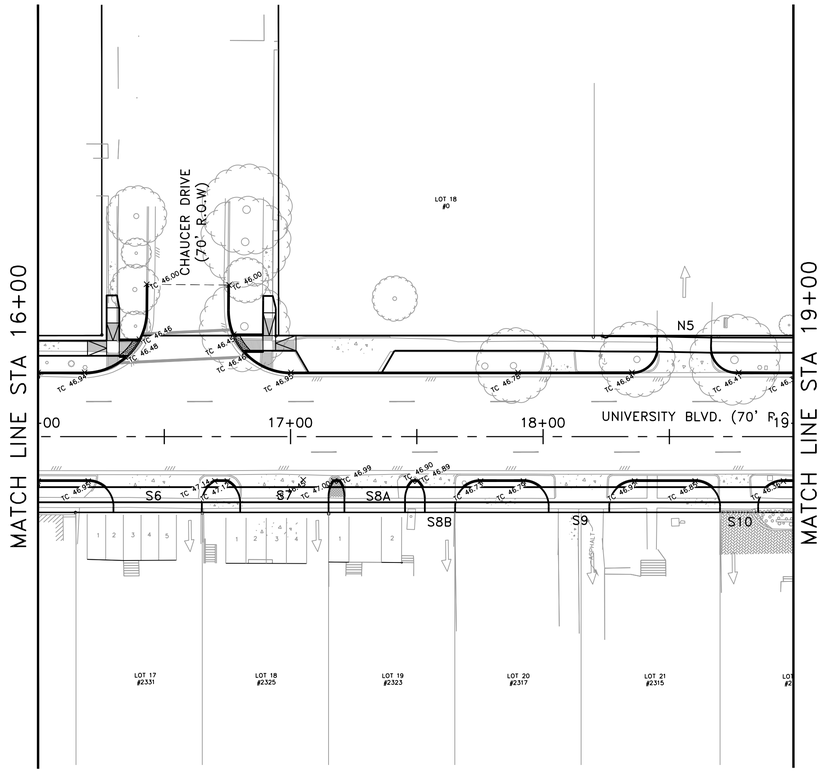

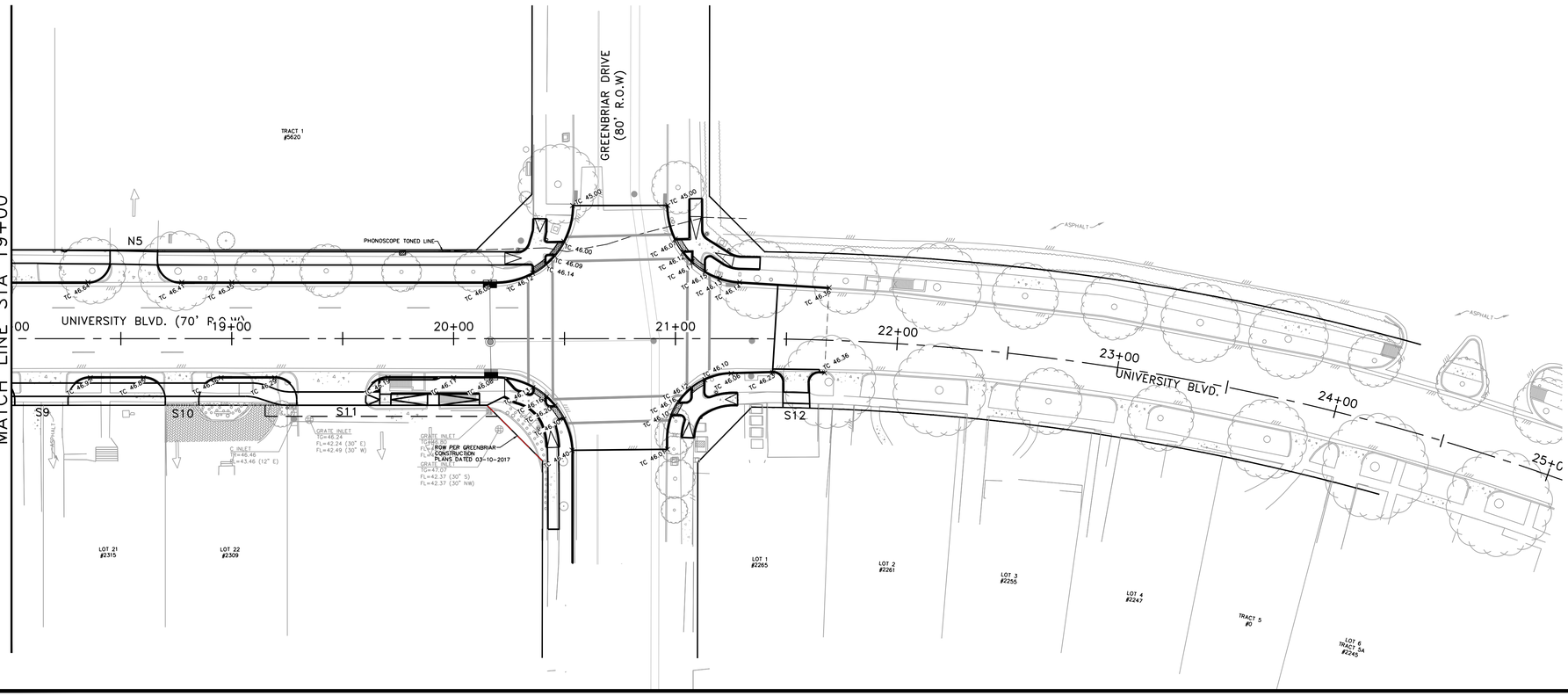

30 0 15 30 60

SCALE: 1"=30' (22x34)

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309 LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND:

———	EXIST ROW
— — —	PROP PAVEMENT EDGE
TC	TOP OF CURB
TP	TOP OF PAVEMENT
TC 46.00	PROPOSED TOP OF CURB ELEVATION
TP 46.00	PROPOSED TOP OF PAVEMENT ELEVATION
X 47.44	EXISTING ELEVATION

NOTE:

1. CONTRACTOR SHALL MATCH EXISTING GRADE AT ALL LIMITS OF WORK, LEAVE NO SHARP OR UNEVEN EDGES.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

GRADING PLAN

SHEET 02 OF 02

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 30'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 74 OF 139	

GC Engineering, Inc.
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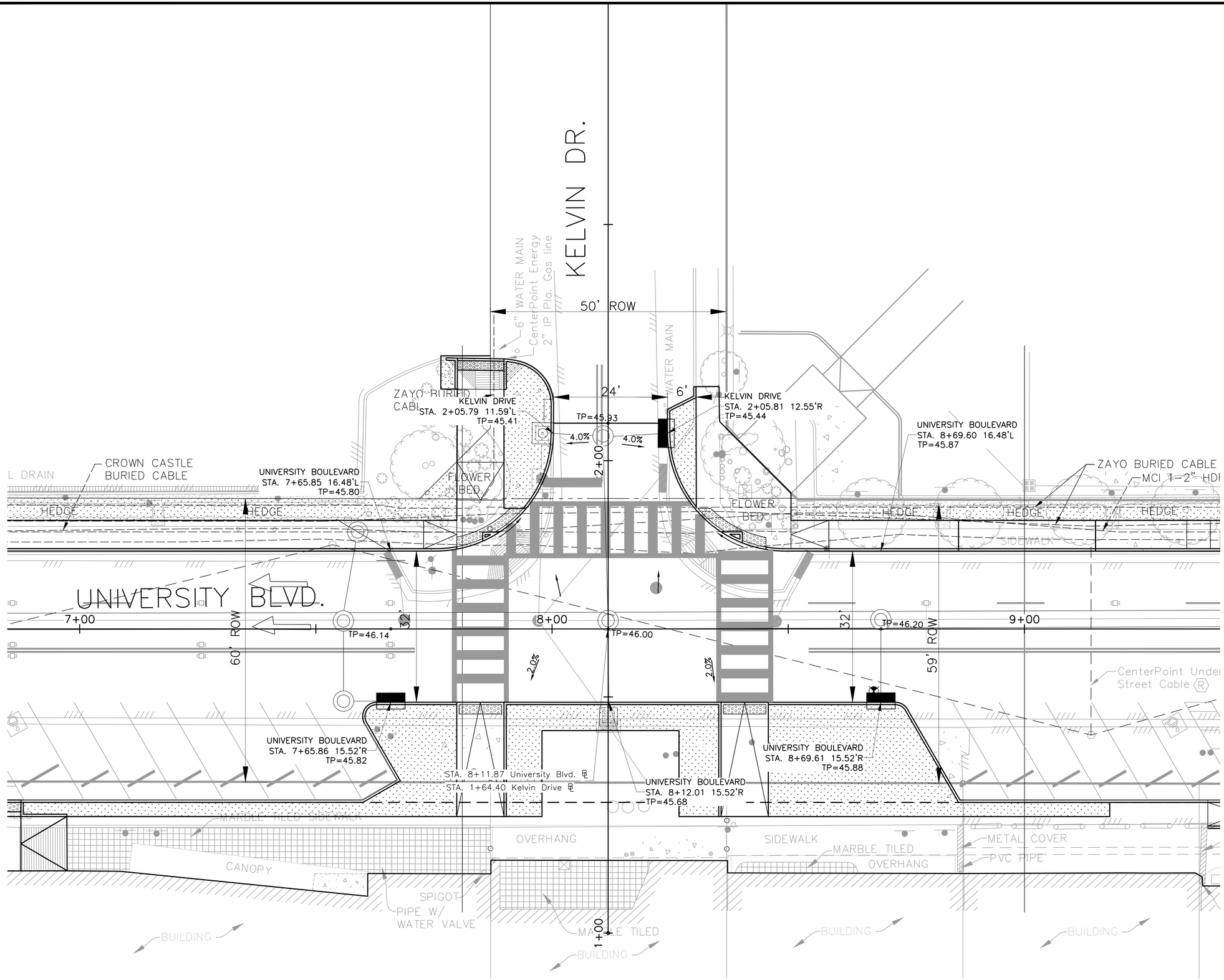

10 0 5 10 20

SCALE: 1" = 10'-0"

LEGEND

TP	TOP OF PAVEMENT
HP	HIGH POINT
℄	CENTER LINE
PVMT	PAVEMENT
℄	BASELINE

NOTE

1. SEE PLAN & PROFILE SHEETS FOR ROAD PROFILE INFORMATION.
2. SEE TRAFFIC SIGNAL PLANS FOR SIGNAL POLE LOCATIONS.
3. ALL STATION & OFFSET LABELS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

INTERSECTION PLAN – UNIVERSITY BLVD AT KELVIN DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 10'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 75 OF 139	

GC Engineering, Inc.
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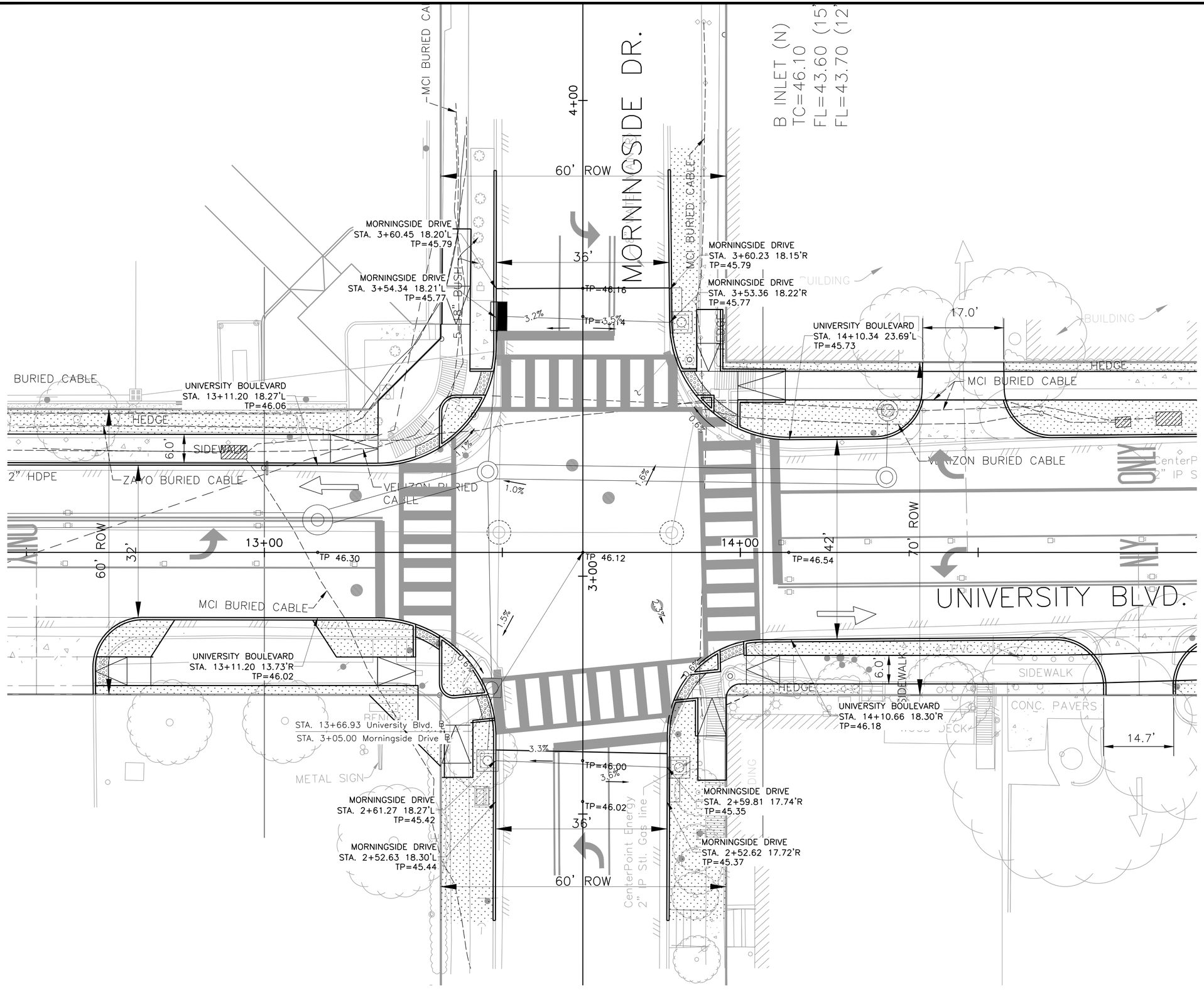

10 0 5 10 20

SCALE: 1" = 10'-0"

LEGEND

TP	TOP OF PAVEMENT
HP	HIGH POINT
℄	CENTER LINE
PVMT	PAVEMENT
℄	BASELINE

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MK.	DATE	REVISION	APP.

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UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

INTERSECTION PLAN – UNIVERSITY BLVD AT MORNINGSIDE DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 10'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 76 OF 139	

GC Engineering, Inc.
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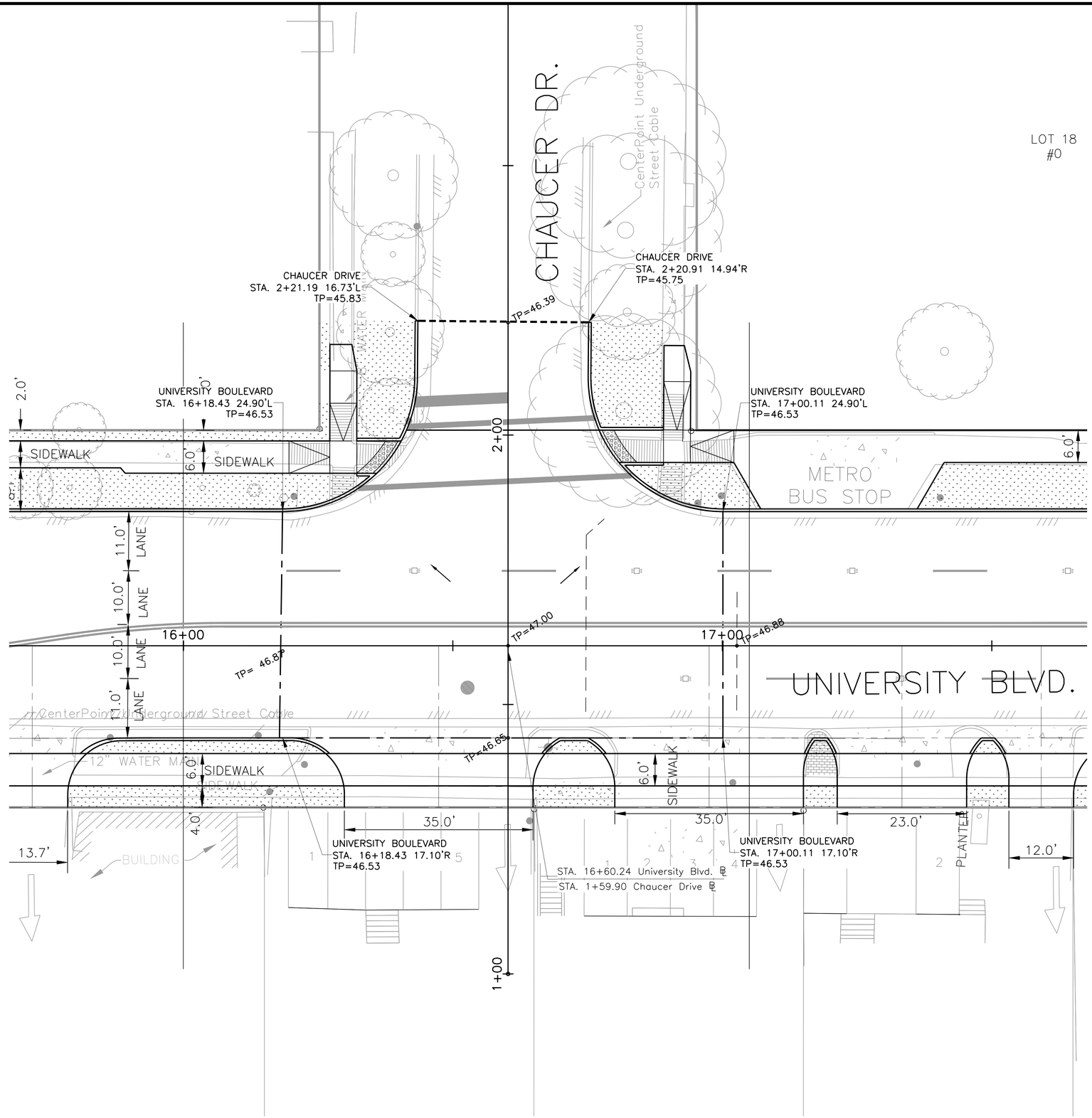


10 0 5 10 20

SCALE: 1" = 10'-0"

LEGEND

TP	TOP OF PAVEMENT
HP	HIGH POINT
℄	CENTER LINE
PVMT	PAVEMENT
℄	BASELINE

NOTE

1. SEE PLAN & PROFILE SHEETS FOR ROAD PROFILE INFORMATION.
2. SEE TRAFFIC SIGNAL PLANS FOR SIGNAL POLE LOCATIONS.
3. ALL STATION & OFFSET LABELS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

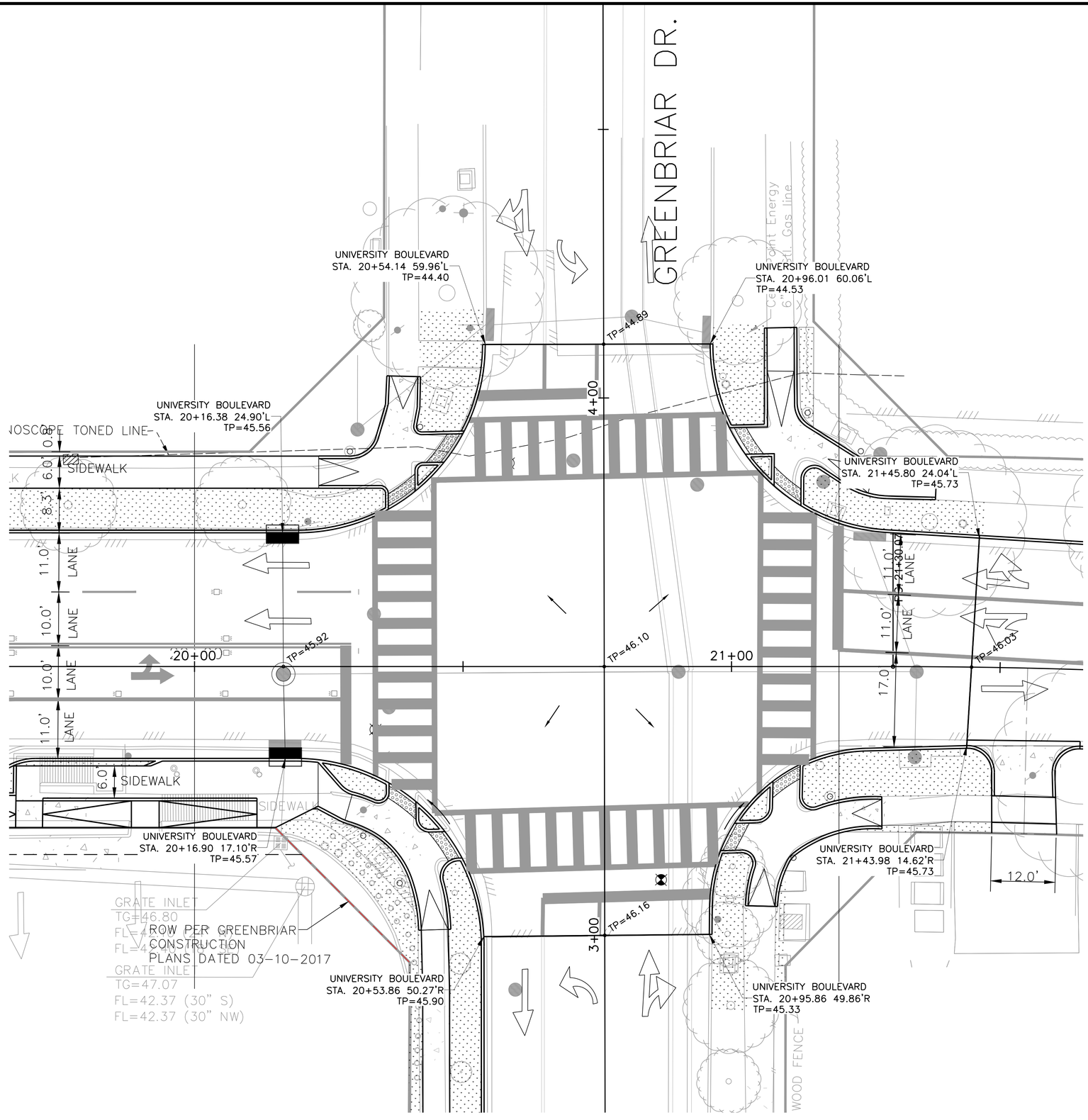
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

INTERSECTION PLAN – UNIVERSITY BLVD AT CHAUCER DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 10'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 77 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Intersection Plans - C0777B.dwg Feb 04, 2026 - 6:44pm rburramukku



10 0 5 10 20

SCALE: 1" = 10'-0"

LEGEND

TP	TOP OF PAVEMENT
HP	HIGH POINT
℄	CENTER LINE
PVMT	PAVEMENT
℄	BASELINE

NOTE

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

INTERSECTION PLAN – UNIVERSITY BLVD AT GREENBRIAR DR

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
1" = 10'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 77A OF 139	

GC Engineering, Inc.
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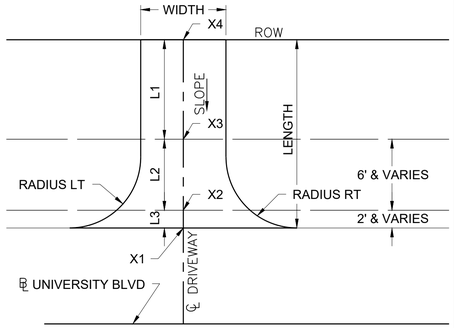
SUMMARY OF DRIVEWAYS

ROADWAY P&P SHEET NO.	DRIVEWAY NO.	DRIVEWAY CENTERLINE STATION	OFFSET	STREET NAME	ELEV AT PT X1	ELEV AT PT X2	ELEV AT PT X3	ELEV AT PT X4	LENGTH L1	LENGTH L2	LENGTH L3	SLOPE	TOTAL LENGTH
			LT/RT		FT	FT	FT	FT	FT	FT	FT	%	FT
49 of 135	N1	5+62.87	LT	UNIVERSITY BLVD	46.29	46.33	46.47	46.75	4.91	7.00	0.5	3.67%	12.41
49 of 135	N2	9+65.59	LT	UNIVERSITY BLVD	46.48	46.51	46.63	46.50	4.20	6.00	0.5	0.22%	10.7
51 of 135	N3	12+10.22	LT	UNIVERSITY BLVD	46.03	46.06	46.18	46.60	5.30	6.00	0.50	4.83%	11.8
51 of 135	N4	14+47.04	LT	UNIVERSITY BLVD	46.40	46.96	47.08	48.24	1.94	6.00	8.00	2.57%	15.94
53 of 135	N5	18+56.40	LT	UNIVERSITY BLVD	46.08	46.68	46.80	46.57	0.80	6.00	8.52	3.18%	15.32
51 of 135	S1	10+59.70	RT	UNIVERSITY BLVD	46.14	46.82	46.94	46.80	1.48	6.00	9.68	3.83%	17.16
51 of 135	S2	12+51.53	RT	UNIVERSITY BLVD	46.21	46.80	46.92	46.55	1.81	6.00	8.35	2.08%	16.16
51 of 135	S3	14+83.75	RT	UNIVERSITY BLVD	46.29	46.53	46.65	47.16	2.80	6.00	3.43	7.12%	12.23
53 of 135	S4	15+32.95	RT	UNIVERSITY BLVD	46.14	46.33	46.45	47.06	4.00	6.00	2.64	7.26%	12.64
53 of 135	S5	15+72.36	RT	UNIVERSITY BLVD	46.56	46.76	46.88	46.89	4.00	6.00	2.82	2.54%	12.82
53 of 135	S6	16+47.91	RT	UNIVERSITY BLVD	46.65	46.86	46.98	47.00	4.00	6.00	2.89	2.69%	12.89
53 of 135	S7	16.98.90	RT	UNIVERSITY BLVD	46.54	46.75	46.87	47.08	4.00	6.00	2.89	4.16%	12.89
53 of 135	S8 A	17+33.92	RT	UNIVERSITY BLVD	46.44	46.64	46.76	46.97	4.00	6.00	2.89	4.15%	12.89
53 of 135	S8 B	17+59.17	RT	UNIVERSITY BLVD	46.46	46.66	46.78	46.91	4.00	6.00	2.9	3.48%	12.9
53 of 135	S9	18+14.19	RT	UNIVERSITY BLVD	45.88	46.08	46.20	46.68	4.00	6.00	2.9	6.22%	12.9
53 of 135	S10	18+77.64	RT	UNIVERSITY BLVD	46.44	46.64	46.76	46.88	4.00	6.00	2.9	3.43%	12.9
53 of 135	S11	19+45.37	RT	UNIVERSITY BLVD	45.81	46.02	46.14	46.52	4.00	6.00	2.89	5.48%	12.89
55 of 135	S13	21+55.17	RT	UNIVERSITY BLVD	45.35	46.01	46.11	46.42	1.96	5.00	9.35	6.55%	16.31



APP.	REVISION	DATE	MK.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

DRIVEWAY SCHEDULE

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 78 OF 139	

GC Engineering, Inc.
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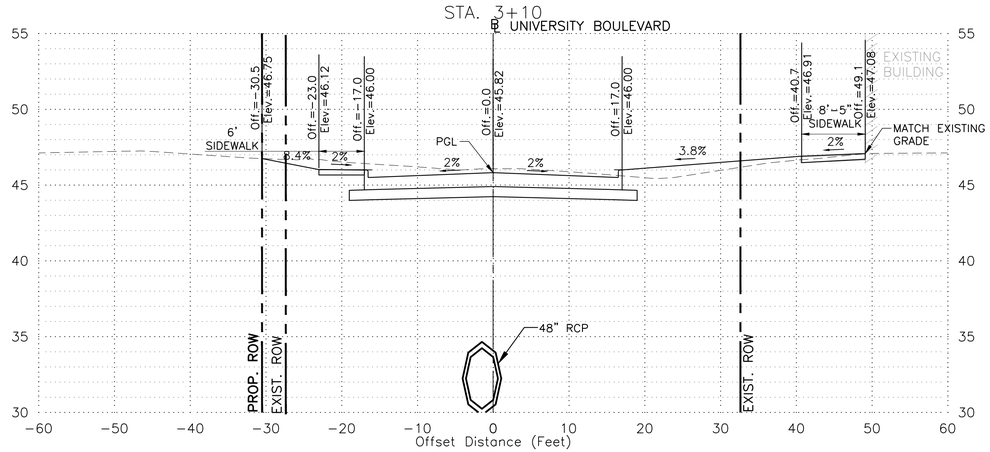

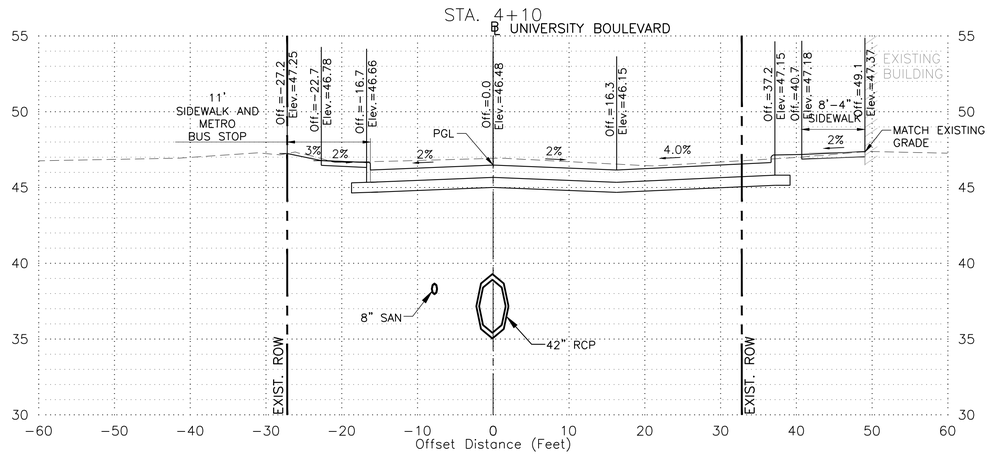

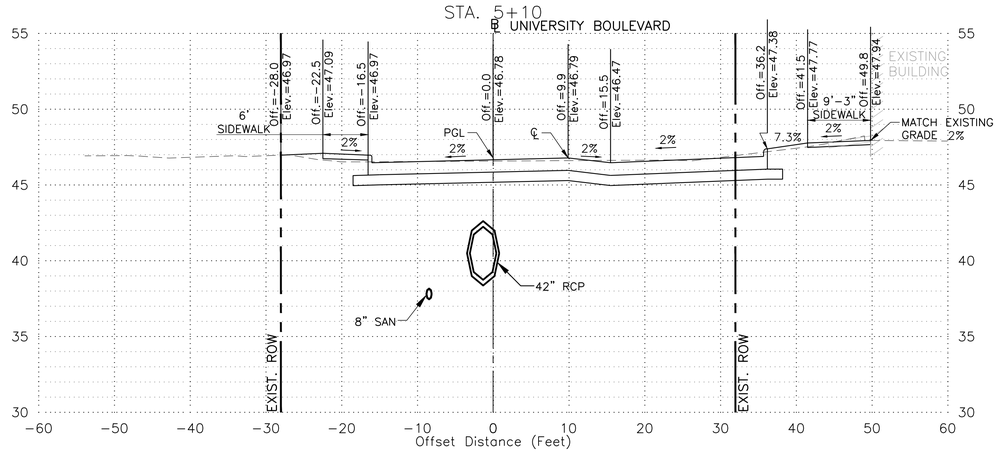

10 0 5 10 20
5 0 5 10

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE
EXISTING GROUND
PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

CROSS SECTIONS
STA 3+12 TO 5+00

SHEET 01 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 79 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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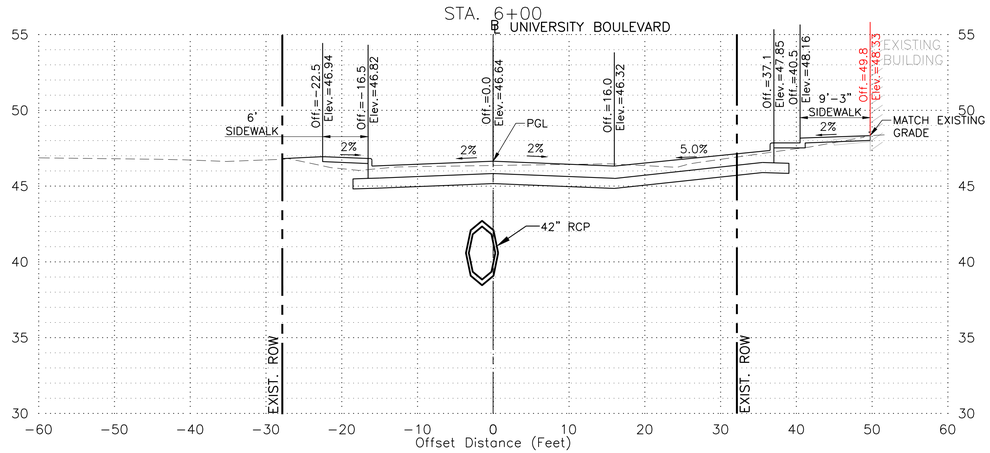

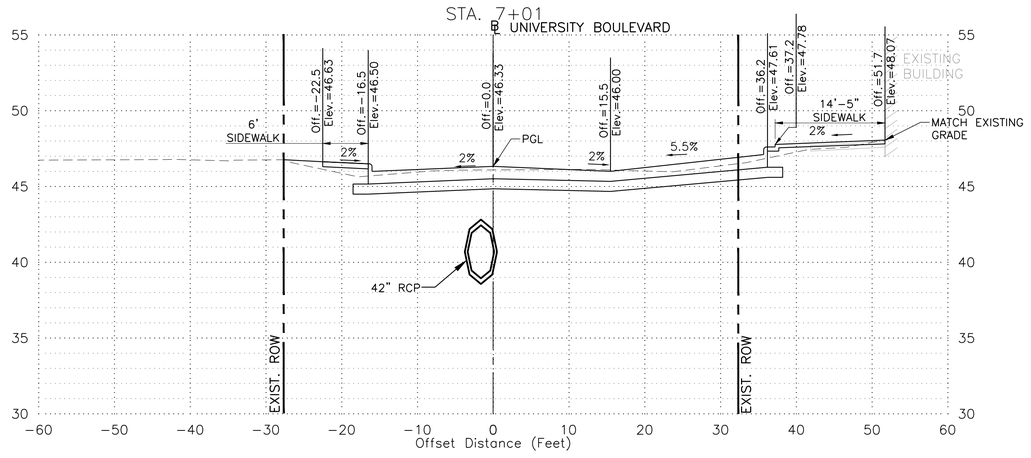

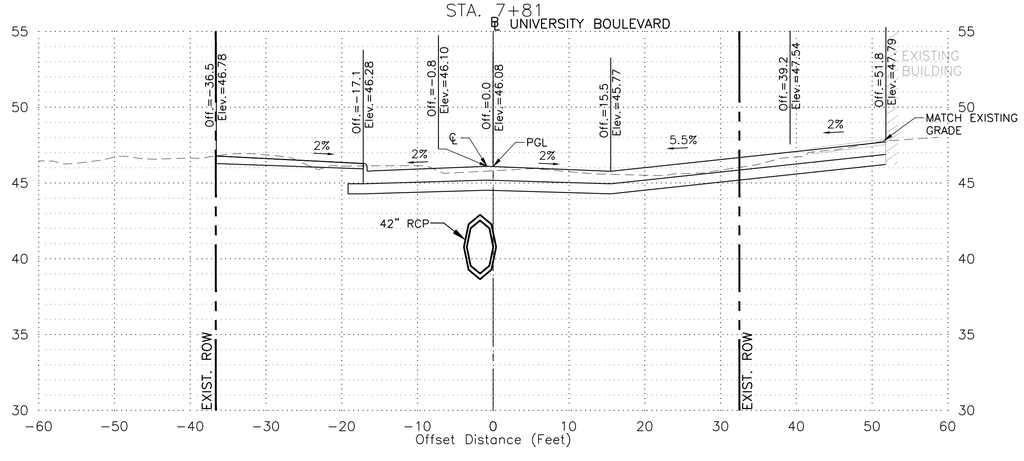

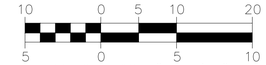

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE
EXISTING GROUND
PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

CROSS SECTIONS
STA 6+00 TO 7+81

SHEET 02 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 80 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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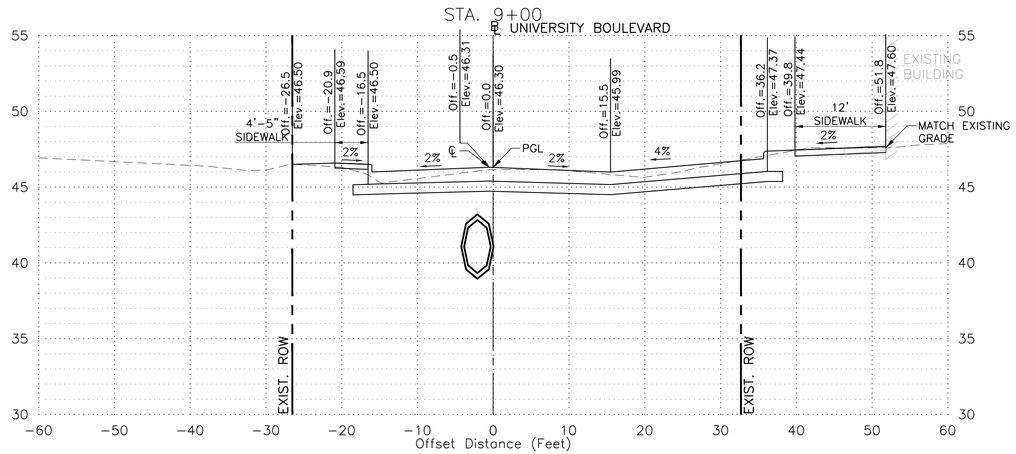

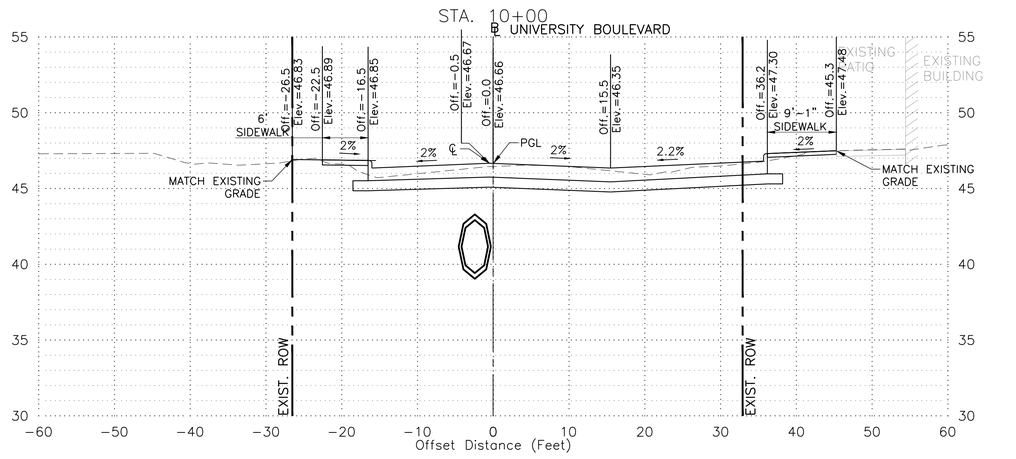

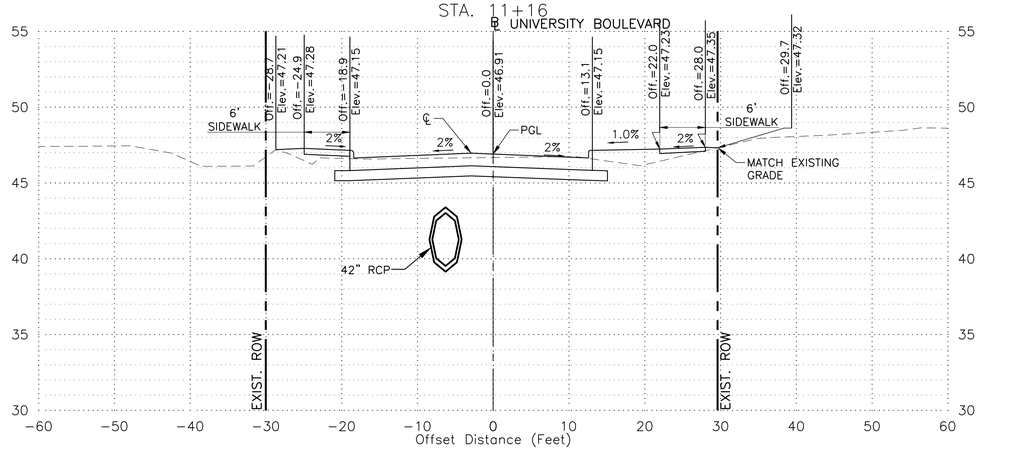

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5 0 5 10

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE
EXISTING GROUND
PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

CROSS SECTIONS
STA 9+00 TO 11+16

SHEET 03 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 81 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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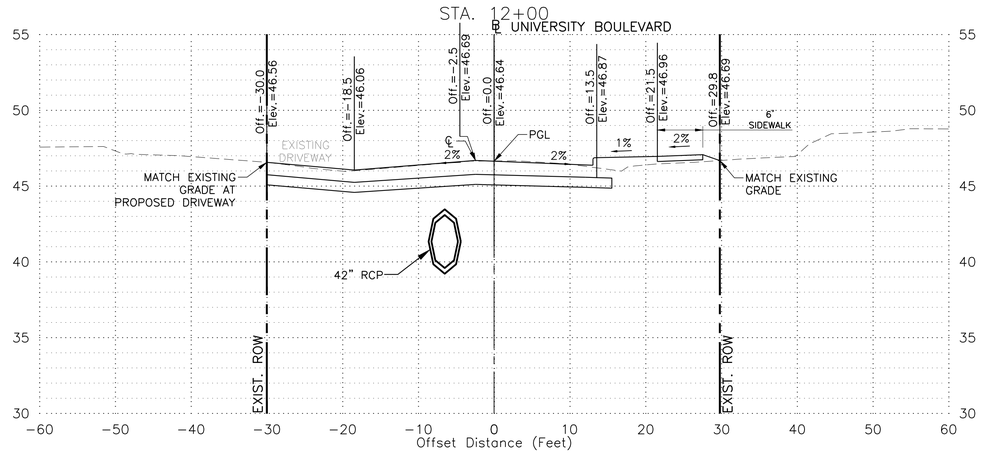

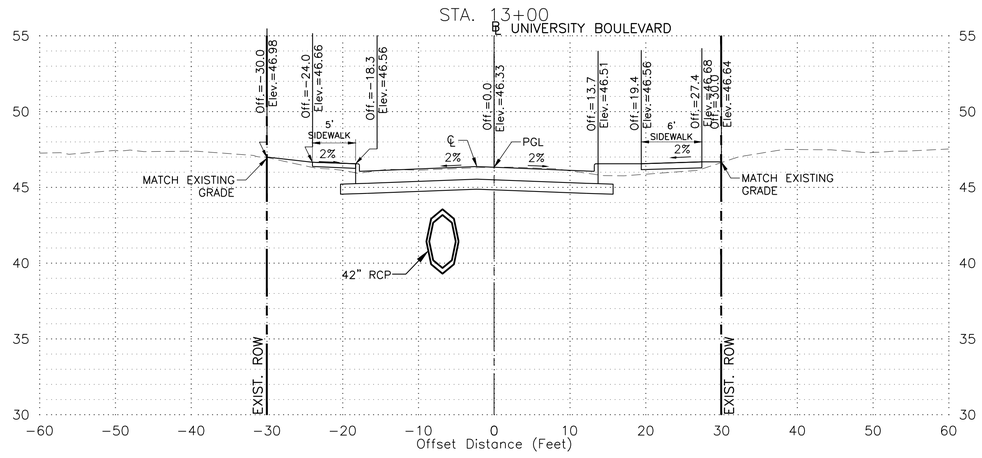

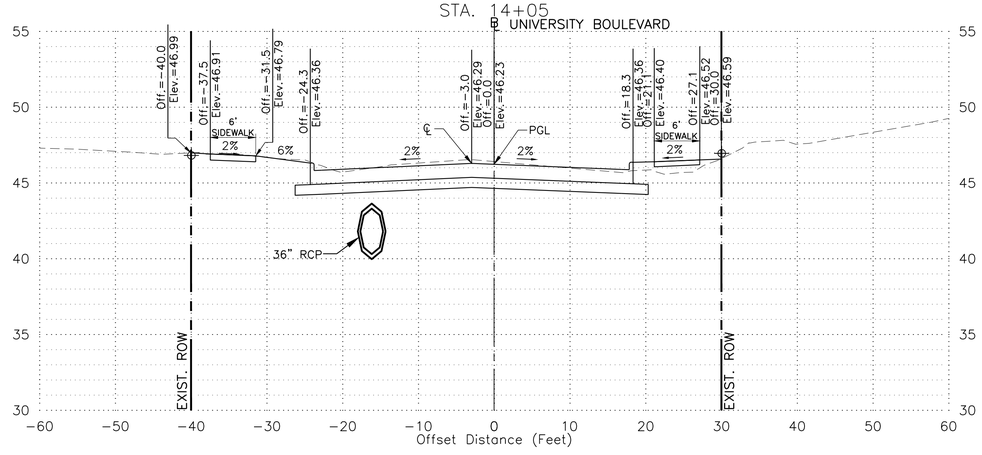

10 0 5 10 20
5 0 5 10

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE
- - - - EXISTING GROUND
——— PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

CROSS SECTIONS
STA 12+00 TO 14+03

SHEET 03 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 82 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
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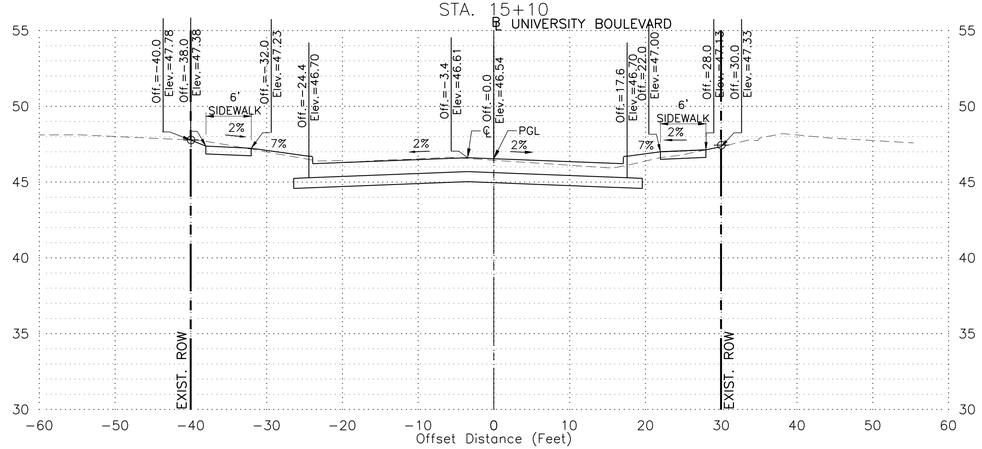

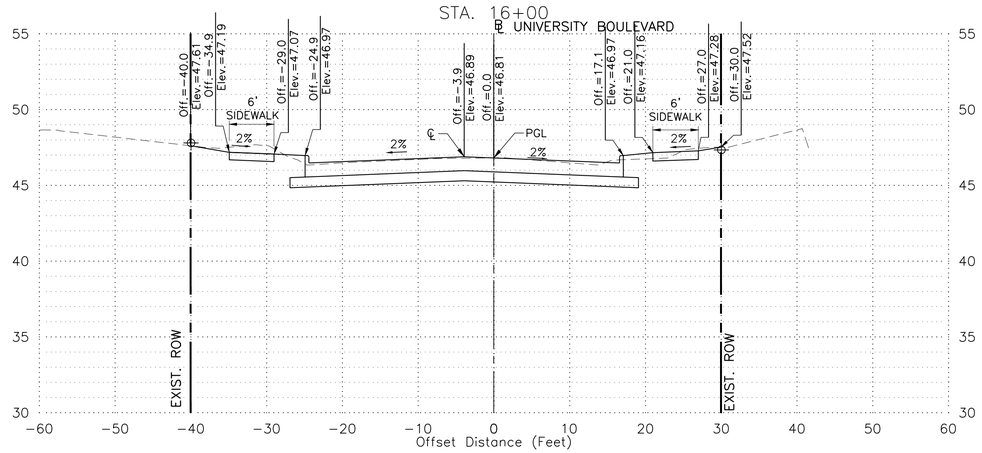

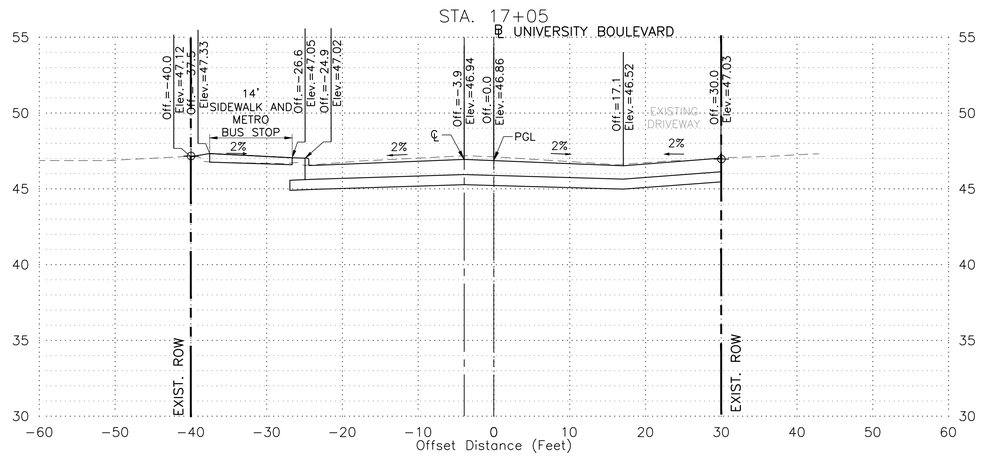

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5 0 5 10

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄	BASELINE
- - - -	EXISTING GROUND
———	PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

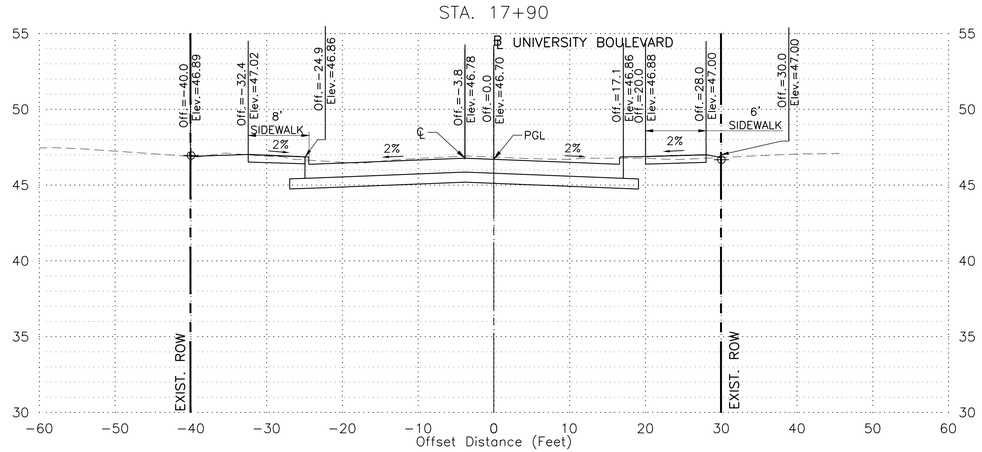
UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

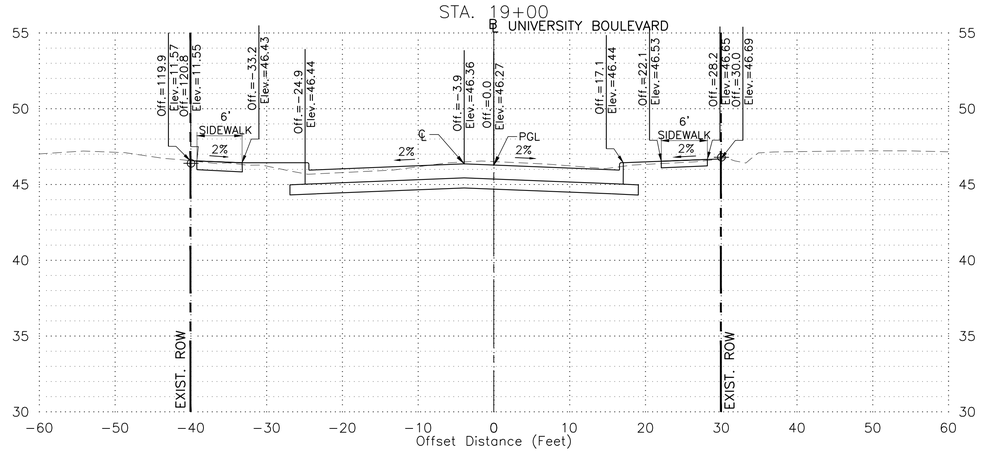
CROSS SECTIONS
STA 15+00 TO 17+00

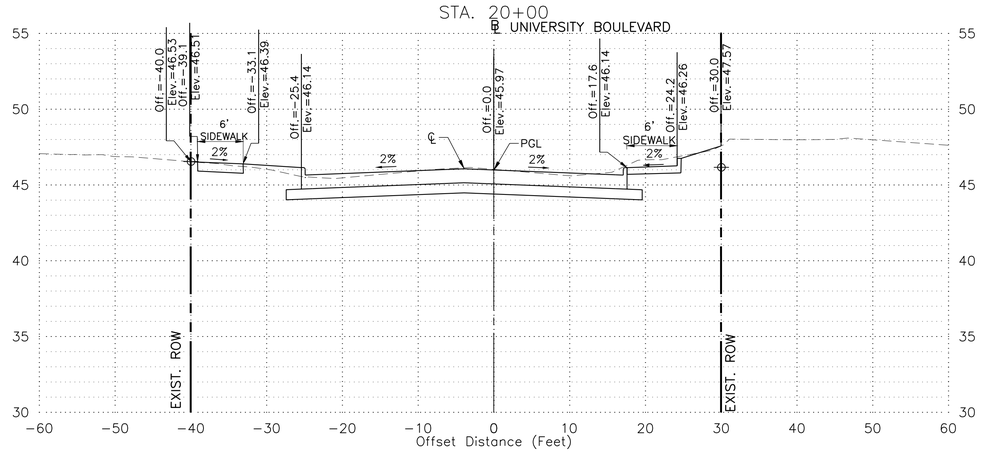
SHEET 05 OF 07

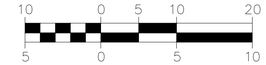
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
HORZ: 1"=10' VERT: 1"=5'	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 83 OF 139	

GC Engineering, Inc.
M:\Projects\C - 07778-COH-UnivBlvd-SP1\Drawings\Roadway CrossSections - C07778.dwg Feb 04, 2026 - 6:46pm nburramukku









SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE
EXISTING GROUND
PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

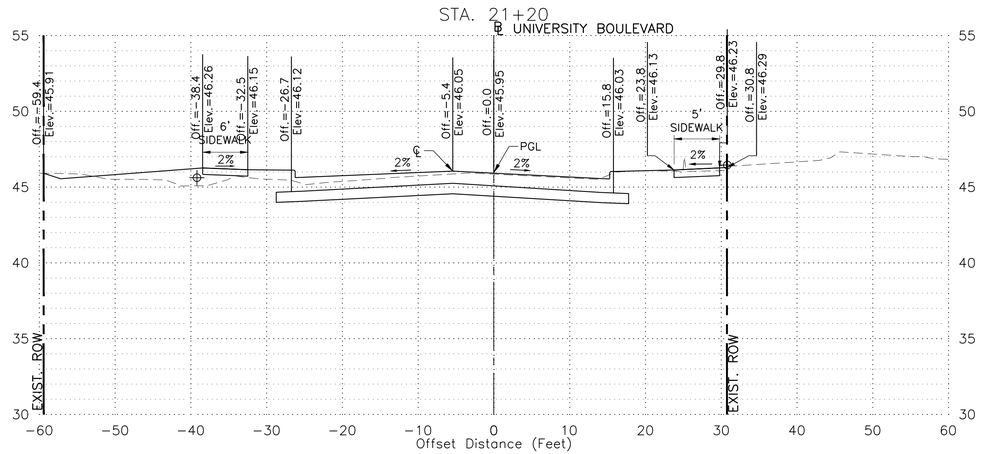
CROSS SECTIONS
STA 18+00 TO 20+00

SHEET 06 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 84 OF 139

FOR CITY OF HOUSTON USE ONLY

GC Engineering, Inc.
M:\Projects\G - 0777B-COH-UnivBvd-SP1\Drawings\Roadway CrossSections - C0777B.dwg Feb 04, 2026 - 6:46pm rburramukku



10 0 5 10 20

5 0 5 10

SCALE: HORZ: 1" = 10'-0"
VERT: 1" = 5'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER 5355-7309
LOCATED AT THE SOUTHEAST CORNER OF LANIER DRIVE AND UNIVERSITY BOULEVARD.
ELEV.=43.77' (NAVD 1988, 2001 ADJ., GEOID 2012A)

LEGEND

℄ BASELINE

EXISTING GROUND

PROPOSED SECTION

MK.	DATE	REVISION	APP.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

CROSS SECTIONS
STA 21+00 TO 21+50

SHEET 07 OF 07

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
HORZ: 1"=10' VERT: 1"=5'
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 85 OF 139

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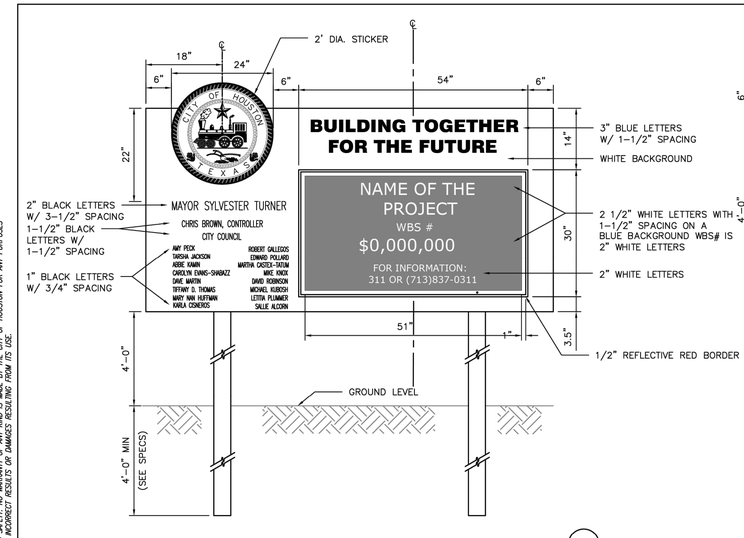


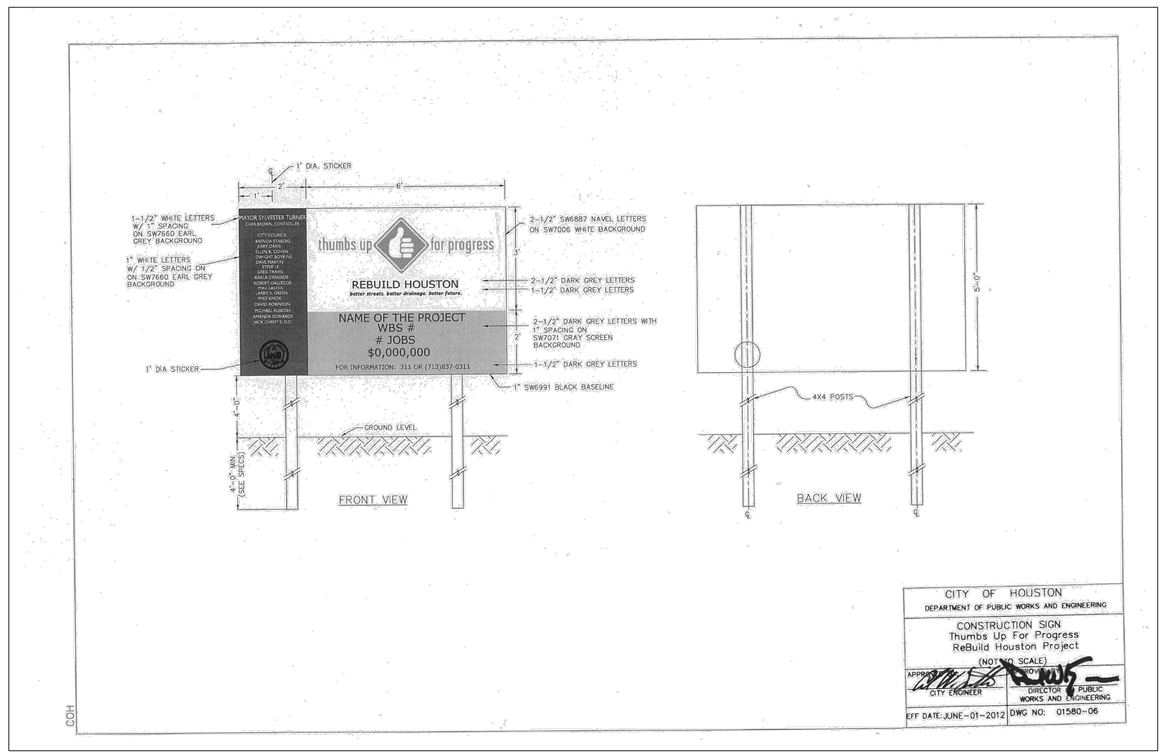
CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CONSTRUCTION SIGN

(SCALE: NOT TO SCALE)

APPROVED BY:

CITY ENGINEER	DIRECTOR OF HPW
DocuSigned by: Sulad Kunwar	DocuSigned by: Carl Haddock
EFF DATE: NOV-27-2023	DWG NO: 01580-01



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONSTRUCTION SIGN
Thumbs Up For Progress
ReBuild Houston Project

(NOT TO SCALE)

CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUNE-01-2012	DWG NO: 01580-06

COH

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
CONSTRUCTION SIGNS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 115 OF 139	

GC Engineering, Inc.
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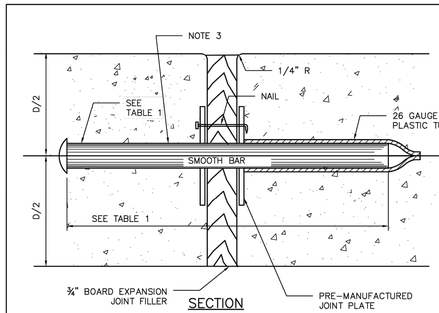
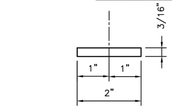


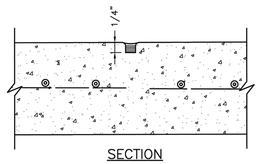
SECTION

DOWEL TYPE EXPANSION JOINT



PLAN VIEW

JOINT PLATE



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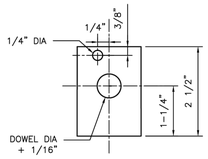
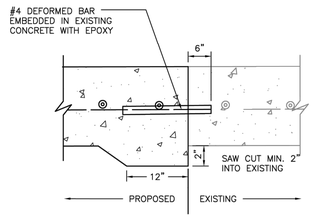
CONTROL JOINT



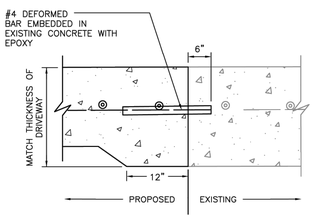
ELEVATION VIEW

JOINT PLATE



SECTION

SIDEWALK TO EXISTING SIDEWALK



SECTION

SIDEWALK TO EXISTING DRIVEWAY

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 3 FEET MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5 FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN A 2 INCH MINIMUM COVER.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sulaf Tanwar — CITY ENGINEER

DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER

DocuSigned by: Carl Haldeck — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02752-02

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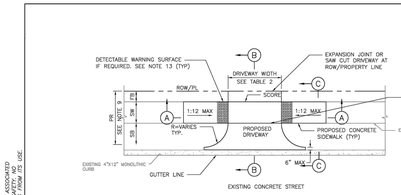
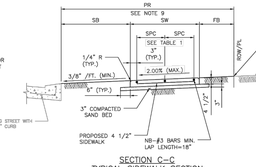


PLAN VIEW

DRIVEWAY

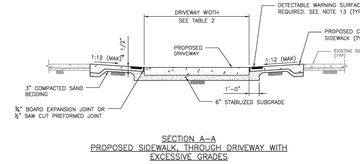


SECTION C–C

TYPICAL SIDEWALK SECTION

NOTES:

1. REPAIR, RECONSTRUCTION OR REPLACEMENT OF SIDEWALKS SHALL MEET PERMITTING REQUIREMENTS OF CODE OF ORDINANCES SECTION 40-552.
2. FOR REPAIR, RECONSTRUCTION, OR REPLACEMENT OF EXISTING SIDEWALKS:
   - 2.1. EXISTING SIDEWALKS LESS THAN OR EQUAL TO 20 FEET IN TOTAL LENGTH:
     - 2.1.1. THE PROPOSED SIDEWALK WIDTH WILL BE ALLOWED TO MATCH THE EXISTING SIDEWALK.
   - 2.2. EXISTING SIDEWALKS GREATER THAN 20 FEET IN TOTAL LENGTH:
     - 2.2.1. THE SIDEWALK WIDTH FOR THE ENTIRE PROPERTY WIDTH SHALL BE IMPROVED TO MEET WIDTH REQUIREMENTS ACCORDING TO THE LATEST INFRASTRUCTURE DESIGN MANUAL.
   - 2.3. 20 FOOT TOTAL LENGTH IS DEFINED AS:
     - 2.3.1. UP TO 10 FEET ON BOTH SIDES OF THE DRIVEWAY; OR
     - 2.3.2. UP TO 20 FEET WHEN SIDEWALK AFFECTED IS LOCATED ONLY ON ONE SIDE OF THE DRIVEWAY.
3. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE SIDEWALK WIDTH (SW) ACCORDING TO IDM REQUIREMENTS, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
4. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY OR DUPLEXES.
5. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE HAVING NOT LESS THAN 6 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
6. THE OUTER DOWEL BARS ARE TO BE LOCATED 12" FROM END OF PROPOSED EDGE OF DRIVEWAY RETURN. EXTEND DOWEL 3" INCHES INTO PROPOSED DRIVEWAY AND BEND REMAINING BAR TO EXTEND TO RADIUS RETURN BOTH SIDES.
7. TROWEL GROOVE SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE SEALANT.
8. ALL JOINTS ALONG THE SIDEWALK SHALL BE CONSTRUCTED ACCORDING TO DRAWING 02752-02 AND SPECIFICATION 02752.
9. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.
10. CEMENT STABILIZED SAND 1.5 SACKS OF CEMENT PER TON OF DRY SAND.
11. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE IN TOTAL COMPLIANCE WITH THE LATEST UNIFORM FEDERAL ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
12. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
13. DETECTABLE WARNING SURFACES:
   - 13.1. SIDEWALK SHALL HAVE A DETECTABLE WARNING SURFACE WHERE:
     - 13.1.1. SIDEWALK INTERSECTS TYPE C DRIVEWAYS (COMMERCIAL DRIVEWAYS) THAT ARE STOP, YIELD OR TRAFFIC SIGNAL CONTROLLED; OR
     - 13.1.2. SIDEWALK SLOPE IS GREATER THAN 1:20 AND INTERSECTS A TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)
   - 13.2. DETECTABLE WARNING SURFACES ARE OPTIONAL WHERE SIDEWALKS INTERSECT TYPE A DRIVEWAYS (SINGLE FAMILY RESIDENTIAL HOUSES OR DUPLEXES) OR TYPE B DRIVEWAYS (SHARED ACCESS/SHARED DRIVEWAYS).
   - 13.3. REFER TO STANDARD DETAILS 02775-06 TO 02775-07 FOR DETECTABLE WARNING SURFACE STANDARDS.



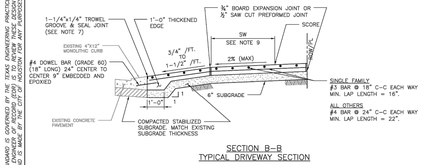
SECTION A–A

PROPOSED SIDEWALK, THROUGH DRIVEWAY WITH EXCESSIVE GRADES

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 & 7 THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
f_c' = 3,500 PSI AND f_y = 60,000 PSI
REFER TO CONTRACT DRAWINGS FOR SIDEWALKS WIDER THAN 6 FEET.

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL				TRANSVERSE STEEL #3 BARS SPACING (IN)
		#3 BARS				
		NO. OF BARS "NB"	SPACING "SPC" (IN)	END BAR SPACING (IN)		
4.5	5	3	27	3		48
4.5	6	4	22	3		48



SECTION B–B

TYPICAL DRIVEWAY SECTION

TABLE 2

DRIVEWAY DESIGN CRITERIA (1)(2)

TRAFFIC TYPE	TYPE A DRIVEWAY (FOR SINGLE FAMILY RESIDENTIAL HOUSES OR DUPLEXES)				TYPE B DRIVEWAY (SHARED ACCESS/SHARED DRIVEWAY)				TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)			
	WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
ONE-WAY	10	12	4	10	12(3)	16(3)	4(3)	10(3)	15	20	10	20
TWO-WAY	10(3)	24(3)	4	10	18(3)	24	4	10	24	35	10	20

(1) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLE 15.2.07.C.1.F FOR DRIVEWAYS THAT REQUIRE A VEHICLE SWEPT PATH ANALYSIS.
(2) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLES 15.2.07.C.1.G.(1) AND 15.2.07.C.1.G.(2) FOR TYPE 1 PAE AND TYPE 2 PAE REQUIREMENTS.
(3) THE MINIMUM WIDTH FOR JOINT ACCESS DRIVEWAY IS 12 FT.
(4) REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES FOR DRIVEWAY WIDTHS FOR NARROW LOTS.
(5) ONLY MURS AND COURTYARD STYLE DEVELOPMENTS ON CORNER LOTS CAN HAVE ONE-WAY DRIVEWAYS.
(6) REFER TO CHAPTER 42, SECTION 42-146 OF THE CODE OF ORDINANCES FOR EXCEPTIONS TO THE MINIMUM DRIVEWAY WIDTH FOR SHARED DRIVEWAYS.

SINGLE FAMILY
#3 BAR @ 18" C–C EACH WAY
MIN. LAP LENGTH = 16".

ALL OTHERS
#4 BAR @ 24" C–C EACH WAY
MIN. LAP LENGTH = 22".

APPROVED BY:

DocuSigned by: Sulaf Tanwar — CITY ENGINEER

DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER

DocuSigned by: Carl Haldeck — DIRECTOR OF PUBLIC WORKS

EFF DATE: NOV-27-2023 | DWG NO: 02754-01A

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DRIVEWAY DETAIL WITH 4"x12" CURB FOR LOCAL RESIDENTIAL STREETS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

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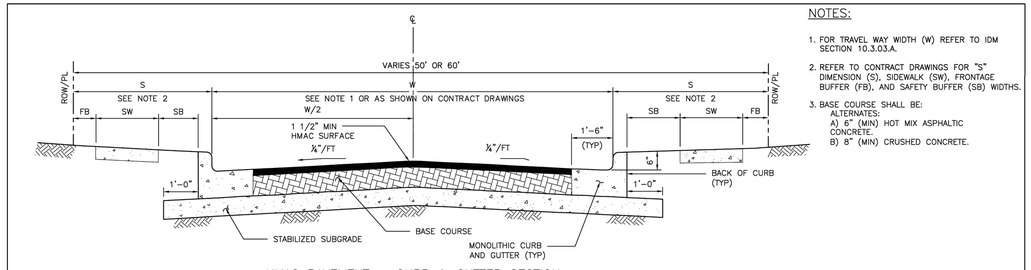
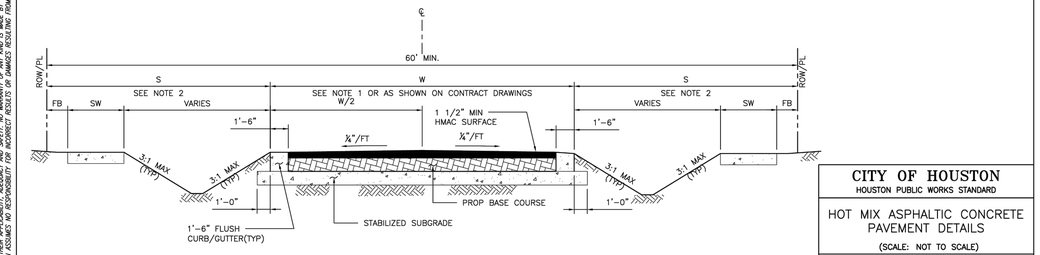


HMAC PAVEMENT – CURB & GUTTER SECTION

(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)



HMAC PAVEMENT – DITCH SECTION

(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

HOT MIX ASPHALTIC CONCRETE PAVEMENT DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sulaf Tanwar — CITY ENGINEER

DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER

DocuSigned by: Carl Haldeck — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02741-01

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 01 OF 08

WBS NUMBER
N-100006-0001-3
DRAWING SCALE
N/A
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 116 OF 139

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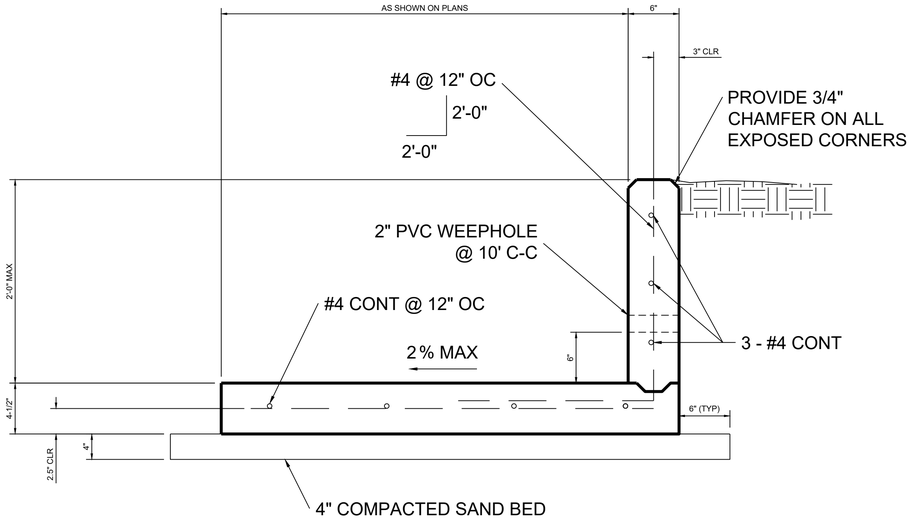
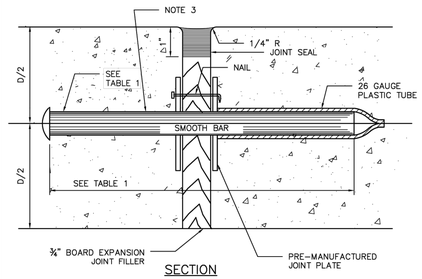


TYPICAL RETAINING WALL DETAIL

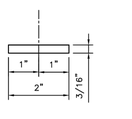
SCALE: N.T.S.

DocuSign Envelope ID: 9B122261-CF05-457B-9A65-2650F40B66D5



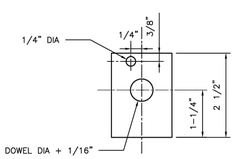
SECTION

DOWEL TYPE EXPANSION JOINT



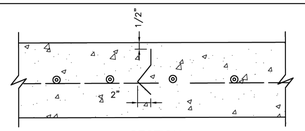
PLAN VIEW

JOINT PLATE



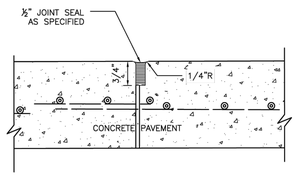
ELEVATION VIEW

JOINT PLATE



SECTION

DEFORMED METAL STRIP



SECTION

CONSTRUCTION JOINT SEAL

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

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS. UNITS TO BE SPACED 12" CENTER ON CENTER.
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.

CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS (SCALE: NOT TO SCALE)	
APPROVED BY:	
DocuSigned by: Sukal Kaswar CITY ENGINEER	DocuSigned by: Carl Haddock DIRECTOR OF HPW
DocuSigned by: LHANG NGUYEN CITY TRAFFIC ENGINEER	
EFF DATE: NOV-27-2023	DWG NO: 02752-01

DISCLAIMER:
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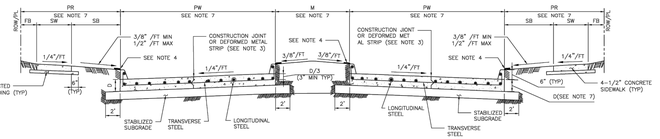
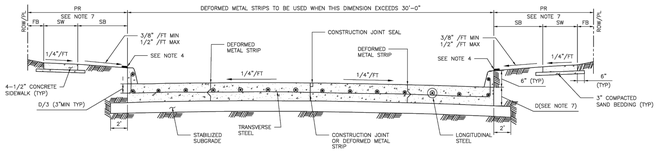


TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TABLE 1

REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH: MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'-0"
MAXIMUM EXPANSION JOINT SPACING = 80'-0"
fc' = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

PAVEMENT THICKNESS "D" (IN)	PAVEMENT WIDTH "PW" (FT)	LONGITUDINAL STEEL									TRAVERSE STEEL		
		#4 BARS			#5 BARS			#6 BARS			#4 BARS	#5 BARS	#6 BARS
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	SPACING (IN)	SPACING (IN)	SPACING (IN)
6	28	17	20.50	4.00	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4.00	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3.00	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3.00	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3.00	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3.00	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3.0	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4.0	–	–	–	36	36	–
8	35	27	16.00	2.00	18	24.25	4.0	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3.0	–	–	–	30	36	–
8	44	24	15.75	4.00	22	24.75	4.0	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3.0	–	–	–	30	36	–
9	25	22	14.00	3.00	14	22.50	4.0	–	–	–	36	36	–
9	34	31	13.50	2.00	19	22.25	3.5	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.5	–	–	–	30	36	–
9	36	32	13.75	3.00	21	21.25	3.5	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3.0	–	–	–	24	36	–
9	45	39	14.00	4.00	26	21.25	4.5	–	–	–	24	36	–
10	25	24	12.75	3.50	17	18.25	4.0	–	–	–	36	36	36
10	34	33	12.50	4.00	21	20.00	4.0	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4.0	–	–	–	30	36	36
10	36	35	12.50	3.50	24	18.50	3.0	–	–	–	30	36	36
10	44	44	12.00	4.00	29	18.50	4.5	–	–	–	24	36	36
10	45	44	12.50	3.00	29	19.00	3.0	–	–	–	24	36	36
11	25	27	11.25	3.00	17	18.25	4.0	12	26.75	3	36	36	36
11	34	36	11.50	2.75	24	17.50	2.5	17	25.00	4	24	36	36
11	35	37	11.50	3.00	24	18.00	3.0	17	25.75	4	24	36	36
11	36	40	11.00	2.00	25	17.75	3.0	17	26.50	4	24	36	36
11	44	48	11.125	2.50	30	18.00	3.0	21	26.00	4	24	36	36
11	45	49	11.125	3.00	31	17.75	4.0	22	25.50	3	24	36	36
12	25	–	–	–	19	16.25	4.0	13	24.50	3	36	36	36
12	34	–	–	–	26	16.00	4.0	18	23.50	4	24	36	36
12	35	–	–	–	26	16.50	4.0	19	23.00	3	24	36	36
12	36	–	–	–	27	16.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	16.25	4.0	24	22.50	5	24	30	36
12	45	–	–	–	35	15.75	3.0	25	22.25	3	24	30	36

MINIMUM LAP LENGTH (L):
A. # 4 BARS ; L = 22 INCHES
B. # 5 BARS ; L = 27 INCHES
C. # 6 BARS ; L = 32 INCHES

NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".
2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.
3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.
4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.
5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.
6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE SIDEWALK WIDTH (SW) ACCORDING TO IDM REQUIREMENTS, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
7. REFER TO CONTRACT DRAWINGS FOR PAVEMENT WIDTH (PW) AND PAVEMENT THICKNESS (D), MEDIAN (M), PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

APPROVED BY:	APPROVED BY:
Sukal Kaswar	LHANG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO. 02751-01

CITY OF HOUSTON

HOUSTON PUBLIC WORKS STANDARD

CONCRETE PAVEMENT DETAILS

	FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE	
NOT TO SCALE	

GC ENGINEERING, INC.
2505 PARK AVE.
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 02 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 117 OF 139	

GC Engineering, Inc.
M:\Projects\G - 0777B-COH-UnivBlvd-SP1\Drawings\Standard Details-Street Paving & Sidewalks-G0777B.dwg Feb 04, 2026-6:46pm rburramuku

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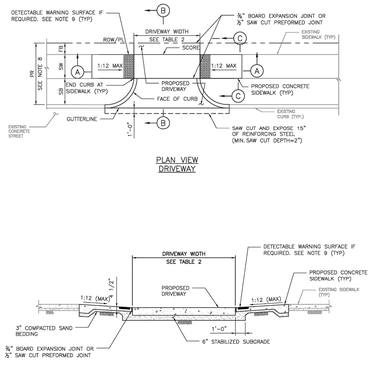
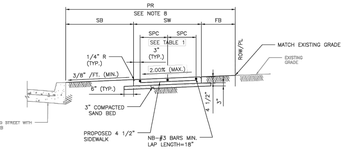


PLAN VIEW
DRIVEWAY



SECTION C–C
TYPICAL SIDEWALK SECTION

SECTION A–A
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE WITH EXISTING SIDEWALK

NOTES:

1. REPAIR, RECONSTRUCTION OR REPLACEMENT OF SIDEWALKS SHALL MEET PERMITTING REQUIREMENTS OF CODE OF ORDINANCES SECTION 40-502.
2. FOR REPAIR, RECONSTRUCTION, OR REPLACEMENT OF EXISTING SIDEWALKS:
   - 2.1. EXISTING SIDEWALKS LESS THAN OR EQUAL TO 20 FEET IN TOTAL LENGTH:
     - 2.1.1. THE PROPOSED SIDEWALK WIDTH WILL BE ALLOWED TO MATCH THE EXISTING SIDEWALK.
   - 2.2. EXISTING SIDEWALKS GREATER THAN 20 FEET IN TOTAL LENGTH:
     - 2.2.1. THE SIDEWALK WIDTH FOR THE ENTIRE PROPERTY WIDTH SHALL BE RECONSTRUCTED TO MEET THE REQUIREMENTS ACCORDING TO THE LATEST INFRASTRUCTURE DESIGN MANUAL.
   - 2.3. 20 FOOT TOTAL LENGTH IS DEFINED AS:
     - 2.3.1. UP TO 10 FEET ON BOTH SIDES OF THE DRIVEWAY; OR
     - 2.3.2. UP TO 20 FEET WHEN SIDEWALK AFFECTED IS LOCATED ONLY ON ONE SIDE OF THE DRIVEWAY.
3. ALL JOINTS ALONG THE SIDEWALK SHALL BE CONSTRUCTED ACCORDING TO DRAWING 02752-02 AND SPECIFICATION 02752.
4. DRIVEWAYS SHALL BE MINIMUM 6" THICK FOR SINGLE FAMILY AND DUPLEXES. DRIVEWAYS SHALL BE MINIMUM 7" THICK FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)
5. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH STANDARD CEMENT CONCRETE AND MIXED IN 7.5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
6. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON ACCESSIBILITY STANDARDS (HAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
7. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
8. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.
9. DETECTABLE WARNING SURFACES:
   - 9.1. SIDEWALK SHALL HAVE A DETECTABLE WARNING SURFACE WHERE:
     - 9.1.1. SIDEWALK INTERSECTS TYPE C DRIVEWAYS (COMMERCIAL DRIVEWAYS) THAT ARE STOP, YIELD, OR TRAFFIC SIGNAL CONTROLLED; OR
     - 9.1.2. SIDEWALK SLOPE IS GREATER THAN 5% AND INTERSECTS TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)
   - 9.2. DETECTABLE WARNING SURFACES ARE OPTIONAL WHERE SIDEWALKS INTERSECT TYPE A DRIVEWAYS (SINGLE FAMILY RESIDENTIAL ADJACENT OR DUPLEXES) OR TYPE B DRIVEWAYS (SHARED ACCESS/SHARED DRIVEWAYS).
   - 9.3. REFER TO STANDARD DETAILS 02775-06 TO 02775-07 FOR DETECTABLE WARNING SURFACE STANDARDS.

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
f'_c = 3,000 PSI, f_y = 60,000 PSI
REFER TO CONTRACT DRAWINGS FOR SIDEWALKS WIDER THAN 6 FEET.

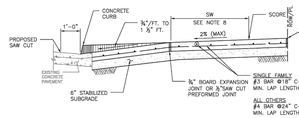
SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL			TRANSVERSE STEEL #3 BARS SPACING (IN)
		#3 BARS			
		NO. OF BARS "NB"	SPACING "SPC" (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48

TABLE 2

DRIVEWAY DESIGN CRITERIA (1)(2)

TRAFFIC TYPE	TYPE A DRIVEWAY (FOR SINGLE FAMILY RESIDENTIAL HOUSES OR DUPLEXES)				TYPE B DRIVEWAY (SHARED ACCESS/SHARED DRIVEWAY)				TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)			
	WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
ONE-WAY	10	12	4	10	12(3)	16(3)	4(4)	10(6)	15	20	10	20
TWO-WAY	10(3)	24(5)	4	10	16(3)	24	4	10	24	35	10	20

(1) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLE 15.2.07.C.1.f FOR DRIVEWAYS THAT REQUIRE A VEHICLE SWEPT PATH ANALYSIS.
(2) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLES 15.2.07.C.1.c(1) AND 15.2.07.C.1.c(2) FOR TYPE 1 PAE AND TYPE 2 PAE REQUIREMENTS.
(3) THE MINIMUM WIDTH FOR JOINT ACCESS DRIVEWAY IS 12 FT.
(4) REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES FOR DRIVEWAY WIDTHS FOR NARROW LOTS.
(5) ONLY MURS AND COURTYARD STYLE DEVELOPMENTS ON CORNER LOTS CAN HAVE ONE-WAY DRIVEWAYS.
(6) REFER TO CHAPTER 42, SECTION 42-146 OF THE CODE OF ORDINANCES FOR EXCEPTIONS TO THE MINIMUM DRIVEWAY WIDTH FOR SHARED DRIVEWAYS.



SECTION B–B
TYPICAL DRIVEWAY SECTION

APPROVED BY:	APPROVED BY:
Sukat kanwar	HANG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Hubbuch	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02754-01B

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DRIVEWAY DETAIL WITH 6" CURBED STREETS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE

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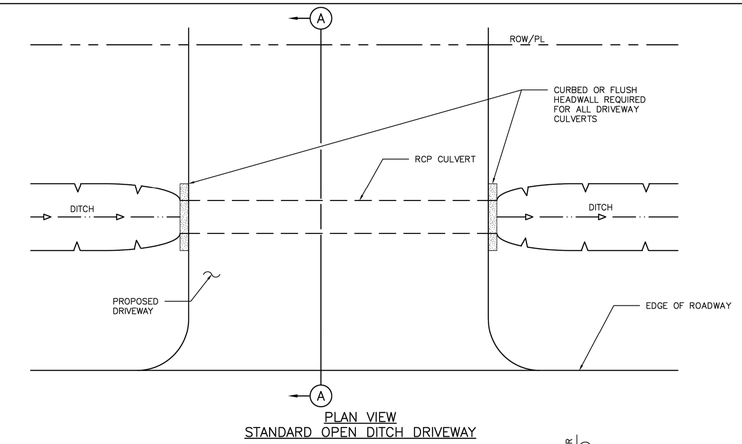
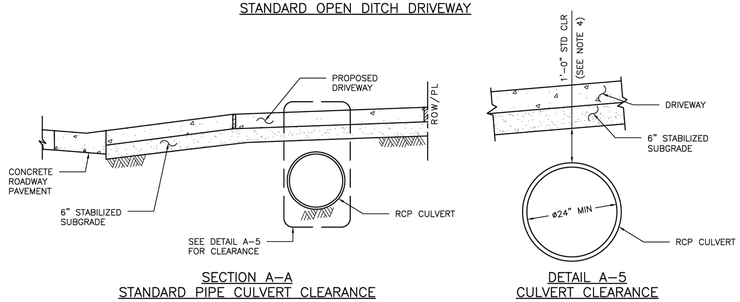


PLAN VIEW
STANDARD OPEN DITCH DRIVEWAY

NOTES:

1. PIPE CULVERTS SHALL CONFORM TO CHAPTER 9 DESIGN REQUIREMENTS OF THE INFRASTRUCTURE DESIGN MANUAL AND MATERIAL REQUIREMENTS OF STANDARD CONSTRUCTION SPECIFICATION SECTION 02631.
2. RCP CULVERT SIZE WILL BE APPROVED BY CITY ENGINEER WITH 24" DIAMETER MINIMUM.
3. DRIVEWAY MATERIAL WITHIN THE RIGHT OF WAY SHALL BE CONCRETE OR ASPHALT.
4. WHERE STANDARD 1'-0" CLEARANCE IS NOT FEASIBLE, MINIMUM CLEARANCE OF 6" IS ALLOWED WHEN APPROVED BY THE OFFICE OF THE CITY ENGINEER (OCE).
5. DITCH FLOW LINE DIRECTION DEPICTED IS SHOWN AS AN EXAMPLE AND MAY NOT MATCH SITE SPECIFIC CONDITIONS. REFER TO CONTRACT DRAWINGS FOR FLOW LINE DIRECTION AND ELEVATIONS.



SECTION A–A
STANDARD PIPE CULVERT CLEARANCE

DETAIL A–5
CULVERT CLEARANCE

DISCLAIMER:
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DRIVEWAYS WITH CULVERTS ON OPEN DITCH TYPE STREETS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukat kanwar	DocuSigned by: Carl Hubbuch
CITY ENGINEER	DIRECTOR OF HPW
DocuSigned by: HANG NGUYEN	
CITY TRAFFIC ENGINEER	

EFF DATE: NOV-27-2023 | DWG NO: 02754-02

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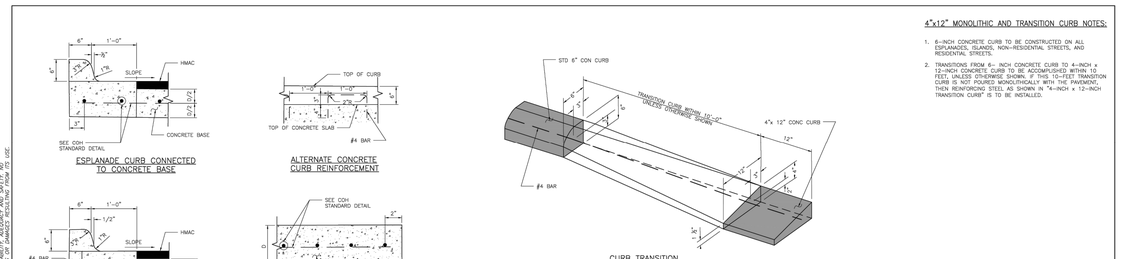


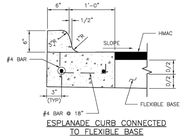
ESPLANADE CURB CONNECTED TO CONCRETE BASE

ALTERNATE CONCRETE CURB REINFORCEMENT

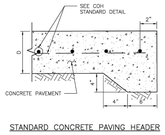
CURB TRANSITION
(SEE NOTES)

4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

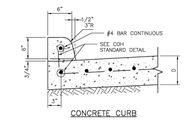
1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS, NON-RESIDENTIAL STREETS, AND RESIDENTIAL STREETS.
2. TRANSITIONS FROM 6- INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FEET TRANSITION CURB IS NOT POURED MONOLITHICALLY 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

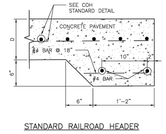


STANDARD CONCRETE PAVING HEADER

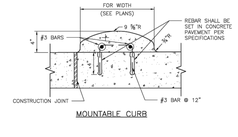


CONCRETE CURB

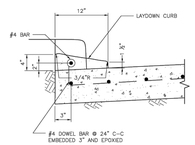
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE
#4 BAR @ 18x10" LONG, DOWLED AND SET IN EPOXY GROUT.
SET #4 DOWEL BARS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



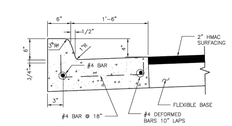
STANDARD RAILROAD HEADER



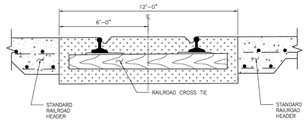
MOUNTABLE CURB



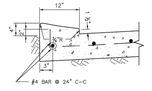
4-INCH x 12-INCH TRANSITION CURB
(SEE NOTES)



MONOLITHIC CURB AND GUTTER



STANDARD RAILROAD CROSSING – SINGLE TRACK



4-INCH x 12-INCH MONOLITHIC CURB
(SEE NOTES)

APPROVED BY:	APPROVED BY:
Sukat kanwar	HANG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Hubbuch	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02771-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB, CURB AND GUTTER AND HEADER DETAILS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
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DISCLAIMER:
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GC ENGINEERING, INC.
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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 03 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 118 OF 139	

GC Engineering, Inc.
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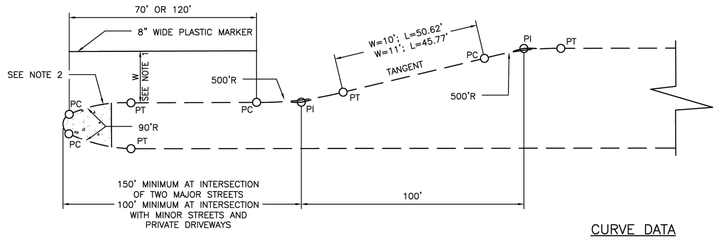


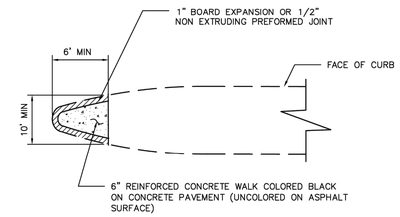
DETAIL OF LEFT TURN LANE

CURVE DATA

W=10' R=500' Δ = 5°42'38.14" L = 49.83' T=24.94'	W=11' R=500' Δ = 6°16'38.27" L = 54.78' T=27.42'

NOTES:

1. 10 FT FOR 80 FT ROW; 11 FT FOR 100 FT ROW.
2. FOR MEDIANS WITH BULLET NOSE CONFIGURATION, PAINT CURB WITH YELLOW REFLECTORIZED PAINT AROUND THE ESPLANADE NOSE TO THE PT OF THE 90 FT R. FOR MEDIANS WITHOUT BULLET NOSE CONFIGURATION, PAINT CURB FROM PC TO PT AND 30 FT BACK OF PC/PT.



ESPLANADE NOSE

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

ESPLANADE NOSE AND LEFT TURN DETAILS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Suhail Tanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

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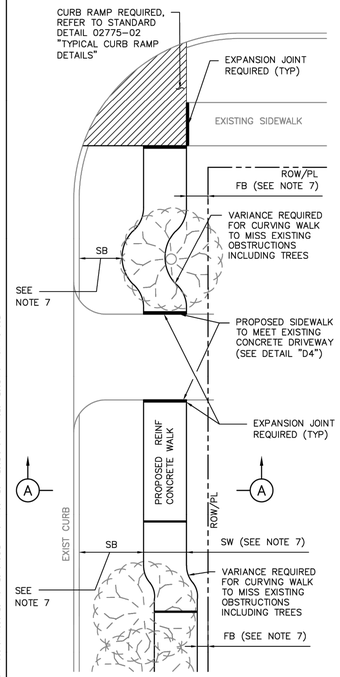
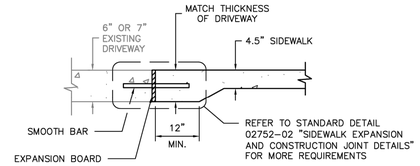


PLAN VIEW

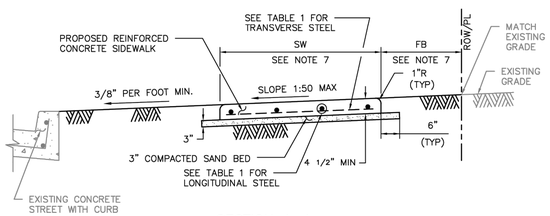


DETAIL D4
DRIVEWAY/SIDEWALK HEADER

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
fc' = 3,500 PSI AND fy = 60,000 PSI
REFER TO CONTRACT DRAWINGS FOR SIDEWALKS WIDER THAN 6 FEET.

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL #3 BARS			TRANSVERSE STEEL #3 BARS SPACING (IN)
		NO. OF BARS	SPACING (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48



SECTION A–A

NOTES:

1. 6X6 – W2.9XW2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL GIVEN IN TABLE 1.
2. REINFORCED CONCRETE SIDEWALKS THRU DRIVEWAYS OPENINGS SHALL BE EITHER 6" THICK OR 7" THICK AS SPECIFIED ON 6" STABILIZED SUBGRADE. FOR THE REINFORCING STEEL REQUIREMENTS, SEE CITY OF HOUSTON STANDARD DETAILS 02754-01A, 02754-01B, 02754-03, AND 02754-04.
3. MAXIMUM SPACING FOR EXPANSION JOINTS SHALL BE 40 FEET.
4. CONTRACTOR SHALL CONSTRUCT SIDEWALK IN A MANNER NOT TO BLOCK THE NATURAL DRAINAGE FROM ADJACENT PROPERTY.
5. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
6. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON UNLESS NOTED OTHERWISE.
7. REFER TO CONTRACT DRAWINGS FOR SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL SIDEWALK LAYOUT AND DETAILS FOR STREETS WITH CURBS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Suhail Tanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS STREET PAVING AND SIDEWALK

SHEET 04 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 119 OF 139	

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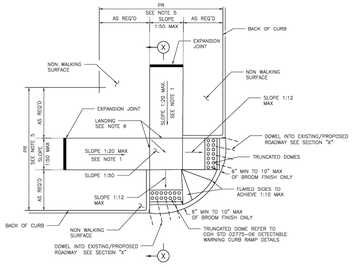
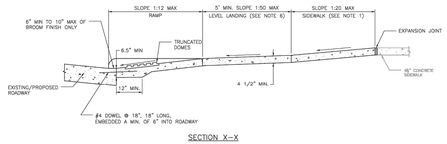
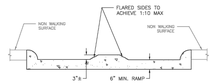


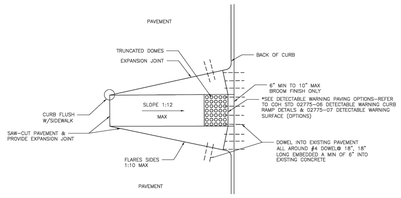
STREETS WITH NON- WALKING SURFACE BEHIND CURB
SEE NOTE-2



SECTION X–X



ELEVATION
LOOKING UP RAMP



CURB RAMP CONSTRUCTION FOR EXISTING PAVEMENT

NOTES:

1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE.
2. BROOM FINISH IS MEASURED FROM FACE OF CURB.
3. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TAS ACCESSIBILITY STANDARDS AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
4. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON UNLESS NOTED OTHERWISE.
5. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR) WIDTH.
6. MINIMUM 5'x5' LANDING PAD ACCORDING TO ADA REQUIREMENTS. WHEN THE APPROACHING SIDEWALK IS WIDER THAN 5', THE LANDING PAD AND RAMP WIDTH MUST MATCH THE SIDEWALK WIDTH.
7. FOR STREETS WITH WALKABLE SURFACES IMMEDIATELY BEHIND THE CURB A FLARE IS REQUIRED ON BOTH SIDES OF THE RAMP.

APPROVED BY:	APPROVED BY:
Sukul Kanwar	Hằng Nguyễn
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Hahlbeck	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02775-02

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL CURB RAMP DETAILS

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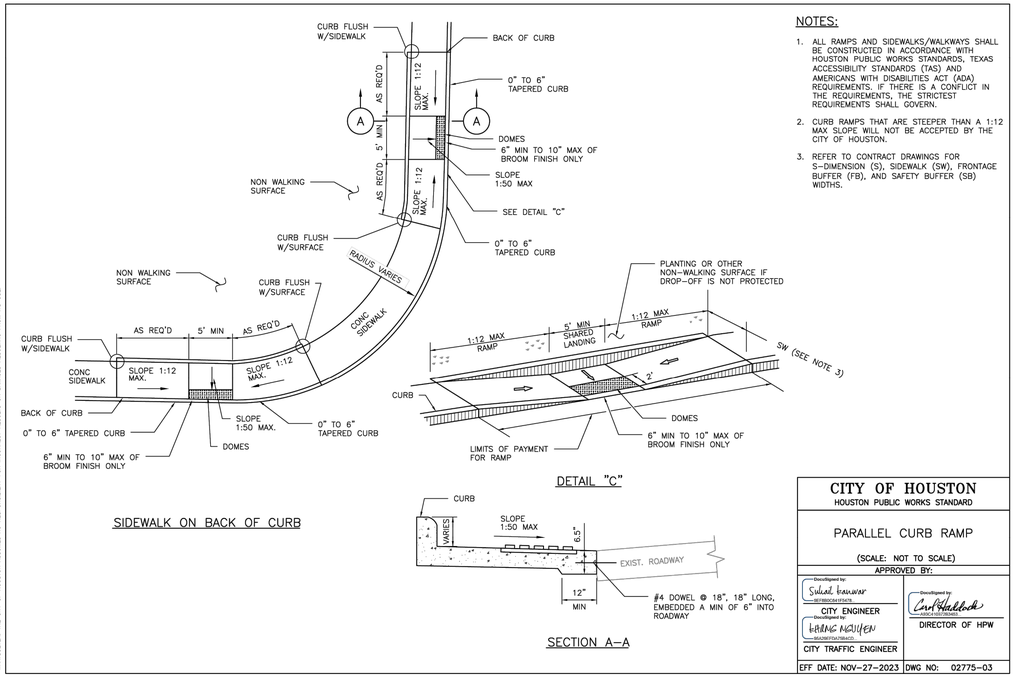

SIDEWALK ON BACK OF CURB

DETAIL "C"

SECTION A–A

NOTES:

1. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
2. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
3. REFER TO CONTRACT DRAWINGS FOR S–DIMENSION (S), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PARALLEL CURB RAMP

(SCALE: NOT TO SCALE)

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DocuSigned by: Sukul Kanwar — CITY ENGINEER	DocuSigned by: Carl Hahlbeck — DIRECTOR OF HPW
DocuSigned by: Hằng Nguyễn — CITY TRAFFIC ENGINEER	
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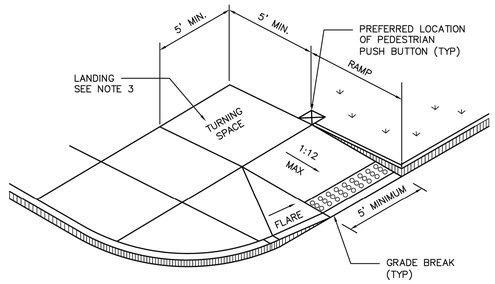

NOTES:

1. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
2. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
3. MINIMUM 5'x5' LANDING PAD ACCORDING TO ADA REQUIREMENTS. WHEN THE APPROACHING SIDEWALK IS WIDER THAN 5', THE LANDING PAD AND RAMP WIDTH MUST MATCH THE SIDEWALK WIDTH.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PERPENDICULAR CURB RAMP

(SCALE: NOT TO SCALE)

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2505 PARK AVE,
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
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STANDARD DETAILS
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SHEET 05 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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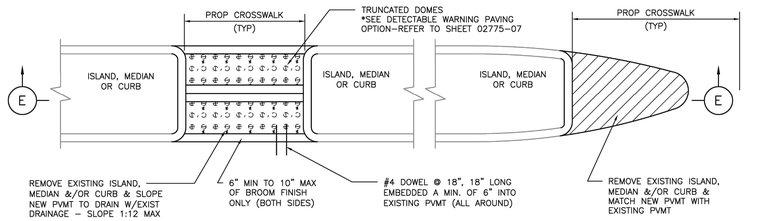

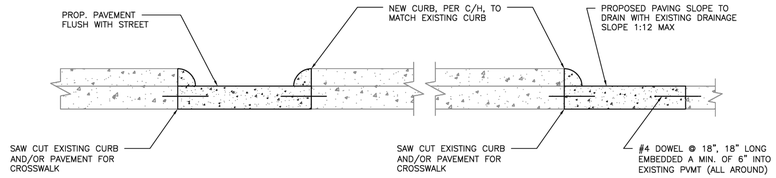

SECTION E–E
FOR ISLAND, MEDIAN, OR CURB MODIFICATIONS FOR CROSSWALKS

NOTES:

1. SEE COH STANDARD DETAIL FOR PAVEMENT MARKING DETAILS.
2. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
3. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB MODIFICATION FOR CURB RAMPS & CROSSWALKS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

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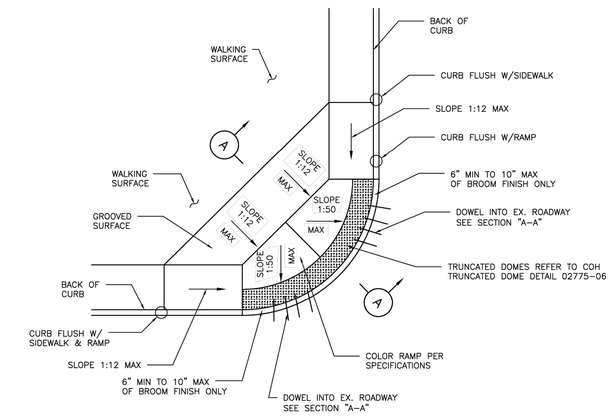
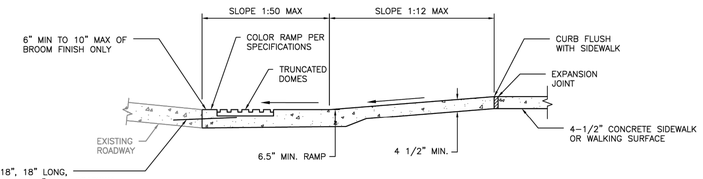


PLAN



SECTION A–A

NOTES:

1. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
2. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
3. THIS STANDARD DETAIL SHALL BE USED ONLY IF THE ROADWAY GEOMETRIC DOESN'T ALLOW STANDARD DETAILS 02775–02, 02775–03, AND 02775–09 TO BE USED.
4. THIS STANDARD DETAIL SHALL NOT BE USED IN LIEU OF STANDARD DETAILS 02775–02, 02775–03, AND 02775–09 UNLESS APPROVED BY THE CITY.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

COMMERCIAL & HIGH DENSITY CONDITIONS CURB RAMP DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

EFF DATE: NOV–27–2023 | DWG NO: 02775–05

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORING THEM FOR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

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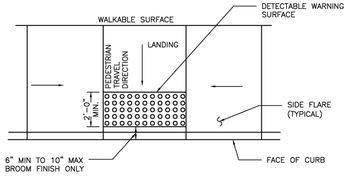
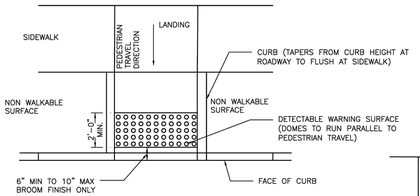
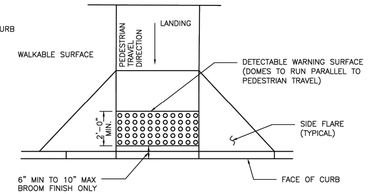


TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE





TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN

GENERAL NOTES FOR DETECTABLE WARNINGS:

1. DETECTABLE WARNING SURFACES MUST BE FULLY ADA COMPLIANT.
2. ALL NEW CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES. THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACE, INCLUDING SIDE FLARES. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
3. DETECTABLE WARNING SURFACES MUST MAINTAIN A SLIP RESISTANCE WITH FA–VALUE OF EQUAL TO OR GREATER THAN 0.8.
4. DETECTABLE WARNING SURFACES MUST MAINTAIN A WATER ABSORPTION RATE OF LESS THAN 1%. DETECTABLE WARNING SHALL NOT ALLOW WATER TO ACCUMULATE.
5. DETECTABLE WARNINGS INSTALLED INTO FRESH CONCRETE SHALL BE WITHOUT VOIDS AND UTILIZING AN ACCEPTABLE ANCHORING SYSTEM.
6. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
7. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
8. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6" MIN TO 10" MAX FROM THE DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.
9. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
10. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DETECTABLE WARNING CURB RAMP DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

EFF DATE: NOV–27–2023 | DWG NO: 02775–06

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORING THEM FOR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

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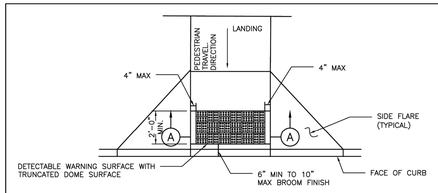
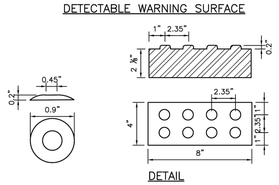


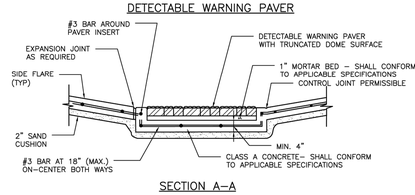
PLAN VIEW

DETECTABLE WARNING SURFACE

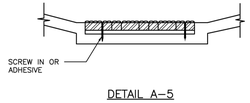


DETAIL

DETECTABLE WARNING PAVER



SECTION A–A
PAVER



DETAIL A–5

NOTES:

GENERAL NOTES

1. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
2. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.

PAVERS

1. FURNISH DETECTABLE WARNING SURFACE 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 POWER UNITS USING A POWER SAW.

POLYMER CONCRETE

1. DETECTABLE WARNING TILES SHALL BE MADE OF POLYMER CONCRETE MATERIALS.
2. DETECTABLE WARNING TILES SHALL BE INSTALLED INTO FRESH CONCRETE (CAST–IN–PLACE) UTILIZING AN ANCHORING SYSTEM.
3. DETECTABLE WARNING TILES SHALL BE OF TERRACOTTA (BRICK–RED) COLOR AND COLORED THROUGHOUT TO GUARANTEE THE ADA REQUIRED COLOR CONTRAST.
4. DETECTABLE WARNING TILES SHALL MEET OR EXCEED THE FOLLOWING ASTM–BASED "STANDARDS" FOR CONCRETE MATERIALS.
   A. COMPRESSION STRENGTH > 12,500 PSI PER ASTM C 39–04
   B. WATER ABSORPTION < 0.25% PER ASTM C 97–09

PADS

1. FURNISH REQUIREMENTS OF ADAAG (MARCH 2003).
2. OTHER MATERIALS MAY BE USED IF APPROVED BY THE CITY ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DETECTABLE WARNING SURFACE (OPTIONS)

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

EFF DATE: NOV–27–2023 | DWG NO: 02775–07

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 06 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 121 OF 139	

GC Engineering, Inc.
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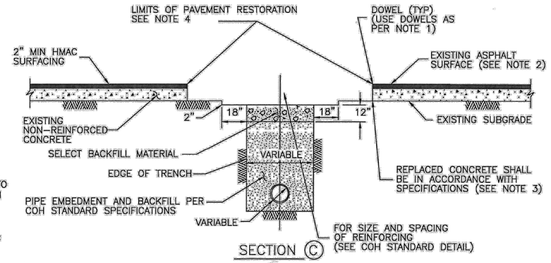
02902–02

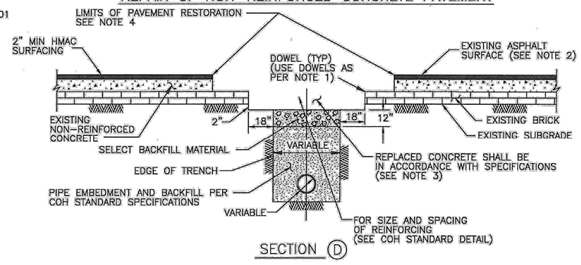


SECTION (C)

NOTE:

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

REPAIR OF NON–REINFORCED CONCRETE PAVEMENT

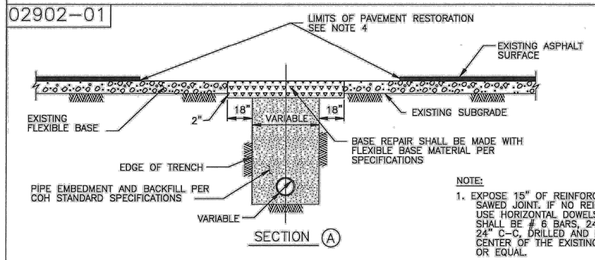


SECTION (D)

REPAIR OF NON–REINFORCED CONCRETE PAVEMENT WITH BRICK

PAVEMENT REPAIR DETAILS FOR STREET CUTS – NON REINFORCED CONCRETE AND BRICK PAVEMENT
NTS

02902–01

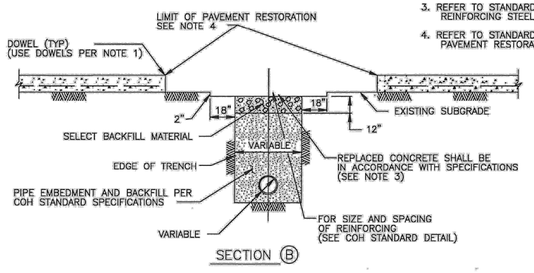


SECTION (A)

REPAIR OF FLEXIBLE BASE 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 ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH 2" MIN HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751–01 FOR REINFORCING STEEL REQUIREMENTS
4. REFER TO STANDARD DETAIL 02951–01 FOR PAVEMENT RESTORATION LIMITS.



SECTION (B)

REPAIR OF REINFORCED CONCRETE PAVEMENT

PAVEMENT REPAIR DETAILS FOR STREET CUTS
NTS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET PAVING AND SIDEWALK
02775–08 THROUGH 02902–02

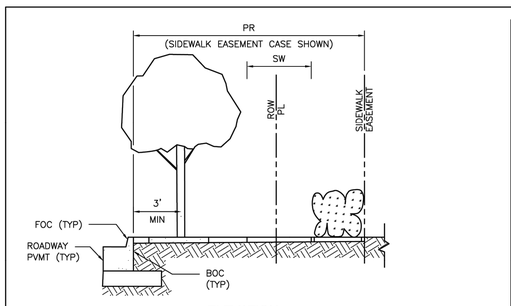
APPROVED BY:	APPROVED BY:
CITY ENGINEER	DEPUTY DIRECTOR

APPROVED BY:
DIRECTOR OF HOUSTON PUBLIC WORKS

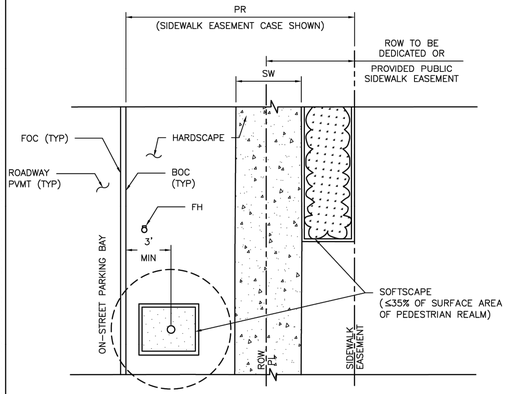
EFFECTIVE DATE: JUL–01–2020
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

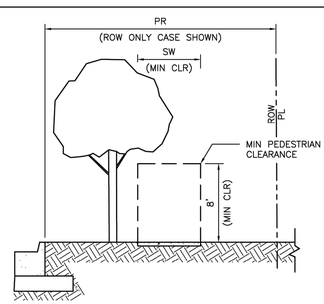
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE USER'S ATTENTION IS DIRECTED TO THE FACT THAT THESE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL SAFETY REQUIREMENTS OR HAZARDS THAT MAY BE ASSOCIATED WITH THE USE OF THIS STANDARD. IT IS THE RESPONSIBILITY OF THE USER OF THIS STANDARD TO ESTABLISH APPROPRIATE SAFETY AND HEALTH PRACTICES AND DETERMINE THE APPLICABILITY OF REGULATORY LIMITATIONS PRIOR TO USE. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR THE USE OF THIS STANDARD, AND MAKES NO WARRANTY OF ANY KIND, IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSE WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



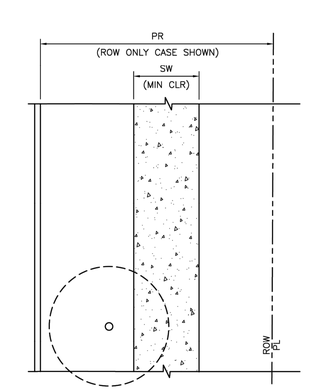
ELEVATION



PLAN
PEDESTRIAN REALM PERFORMANCE STANDARD



ELEVATION



PLAN
SIDEWALK & CLEAR PEDESTRIAN ZONE
MANDATORY MINIMUM REQUIREMENT

NOTES

1. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), AND SIDEWALK (SW) WIDTHS.
2. THE MINIMUM UNOBSTRUCTED VERTICAL CLEARANCE OF A SIDEWALK IS EIGHT (8) FEET AS MEASURED VERTICALLY FROM THE SURFACE OF THE SIDEWALK. FOR VERTICAL CLEARANCE TO IMPROVEMENTS CONSTRUCTED OVER A SIDEWALK WITHIN THE PEDESTRIAN REALM, REFER TO THE CONTRACT DRAWINGS.
3. FOR PEDESTRIAN REALM DESIGN BACKGROUND, REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES, ARTICLE IV – ENHANCED PEDESTRIAN REALM STANDARDS AND THE USERS' GUIDE FOR WALKABLE PLACES AND TRANSIT–ORIENTED DEVELOPMENT.
4. FOR ADDITIONAL PLANTING REQUIREMENTS, REFER TO CHAPTER 33 OF THE CODE OF ORDINANCES, SECTION 129 – GENERAL PLANTING STANDARDS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIDEWALK AND CLEAR ZONE
TRANSIT CORRIDOR STREET

(SCALE: NOT TO SCALE)

APPROVED BY:

Docusigned by: Sukut Kanwar — 0B5788BDC61E4A3... CITY ENGINEER	Docusigned by: Carl Haddock — 5E2CF0B7D6D4E9... DIRECTOR OF HPW
Docusigned by: HANG NGUYEN — 5BA2B6F03A4784C... CITY TRAFFIC ENGINEER	

EFF DATE: NOV–27–2023 | DWG NO: 02775–08

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 07 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 122 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBlvd-SP1\Drawings\Standard Details-Street Paving & Sidewalks-C0777B.dwg Feb 04, 2026-6:47pm nburramuku

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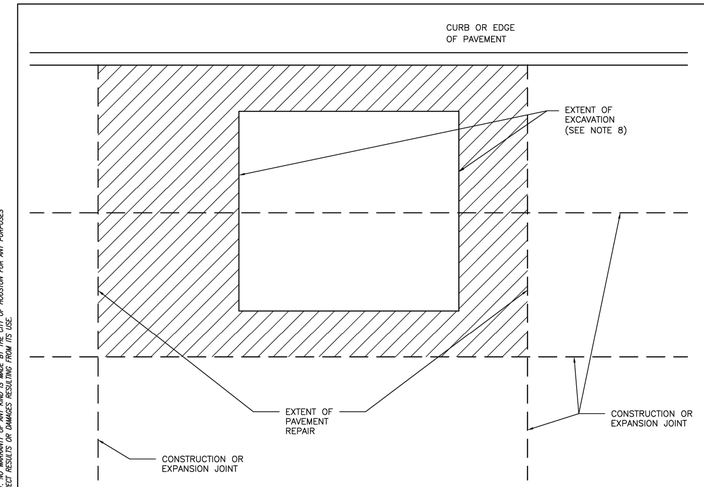

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. REPLACE ENTIRE PANEL WIDTH AND LENGTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL WITHIN EXISTING PAVEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02951–PAVEMENT REPAIR AND RESTORATION) IF EXISTING REINFORCING IS BROKEN OFF.
4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
5. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
6. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
7. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764–RAISED PAVEMENT MARKERS AND 02767–THERMOPLASTIC PAVEMENT MARKINGS.
8. EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02951–04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX–BASE PAVEMENT & CONCRETE PAVEMENT).

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR CONCRETE PAVEMENT REPLACEMENT/RESTORATION AGE OF PAVEMENT ≤ 5YRS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukut Kanwar — CITY ENGINEER	DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER	
EFF DATE: NOV–27–2023	DWG NO: 02951–01

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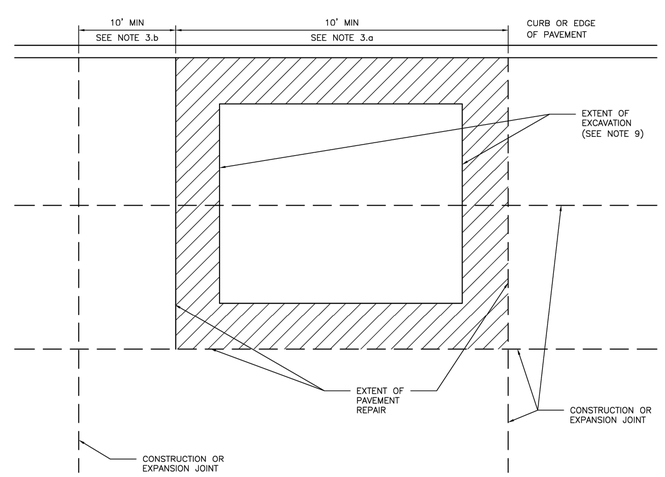

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. WIDTH:
   REPLACE PANEL WIDTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. LENGTH:
   a. MINIMUM LENGTH OF PAVEMENT REPAIR ALONG TRAVEL WAY IS 10' FROM THE NEAREST JOINT.
   b. IF EXTENT OF PAVEMENT REPAIR IS LESS THAN 10' FROM EXISTING CONSTRUCTION OR EXPANSION JOINT, EXTEND PAVEMENT REPAIR TO EXISTING JOINT.
4. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF PANEL REPLACEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02951–PAVEMENT REPAIR AND RESTORATION) IF REINFORCING IS BROKEN OFF OR DOES NOT EXIST.
5. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
6. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
7. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
8. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764–RAISED PAVEMENT MARKERS AND 02767–THERMOPLASTIC PAVEMENT MARKINGS.
9. EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02951–04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX–BASE PAVEMENT & CONCRETE PAVEMENT).

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR CONCRETE PAVEMENT REPLACEMENT/RESTORATION AGE OF PAVEMENT > 5YRS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukut Kanwar — CITY ENGINEER	DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER	
EFF DATE: NOV–27–2023	DWG NO: 02951–02

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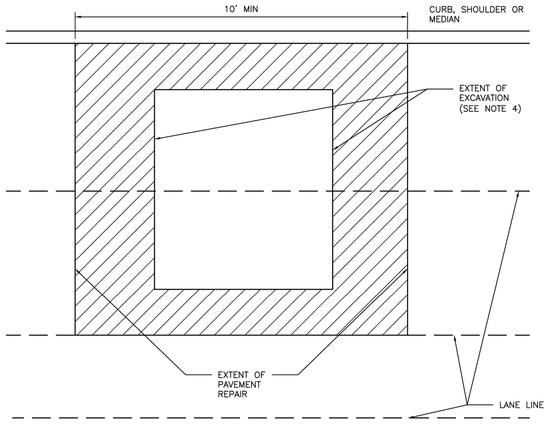

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. FLEXIBLE BASE: REPLACE BASE TO SAME THICKNESS PLUS TWO INCHES (2") FOR EXTENT OF EXCAVATION. USE APPROVED BASE MATERIAL TYPE.*
3. SURFACE COURSE:
   3.1. WIDTH:
   SURFACE MILL AND OVERLAY FULL WIDTH OF LANE(S) TO NEAREST LANE DIVIDER BEYOND EDGE OF EXCAVATION.
   3.2. LENGTH:
   MINIMUM LENGTH OF SURFACE MILL ALONG TRAVEL WAY IS 10'.
   3.3. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764–RAISED PAVEMENT MARKERS AND 02767–THERMOPLASTIC PAVEMENT MARKINGS.
4. EXTENT OF EXCAVATION INCLUDES 18" OVER CUT AS SHOWN ON STANDARD DETAIL 02951–04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX–BASE PAVEMENT AND CONCRETE PAVEMENT).
5. ADDITIONAL REQUIREMENTS FOR ASPHALT OVERLAY ON CONCRETE PAVEMENT:
   5.1. REPLACE CONCRETE FOR EXTENT OF EXCAVATION. REPLACE TO SAME THICKNESS PLUS TWO INCHES (2").
   5.2. WIDTH:
   5.2.1. IF EXCAVATION EXTENDS MORE THAN HALF OF A LANE, REPLACE ENTIRE LANE OF CONCRETE. OTHERWISE USE STANDARD DETAIL 02951–04 THROUGH 05.
   5.3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF CONCRETE REPLACEMENT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS PER CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02951–PAVEMENT REPAIR AND RESTORATION.
   5.4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
   5.5. MAINTAIN CONCRETE EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE APPROVED BY CITY ENGINEER.

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR ASPHALT PAVEMENT REPLACEMENT/RESTORATION FOR PAVEMENT OF ALL AGES
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukut Kanwar — CITY ENGINEER	DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER	
EFF DATE: NOV–27–2023	DWG NO: 02951–03

GC ENGINEERING, INC.
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS
STREET PAVING AND SIDEWALK

SHEET 08 OF 08

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 123 OF 139	

GC Engineering, Inc.
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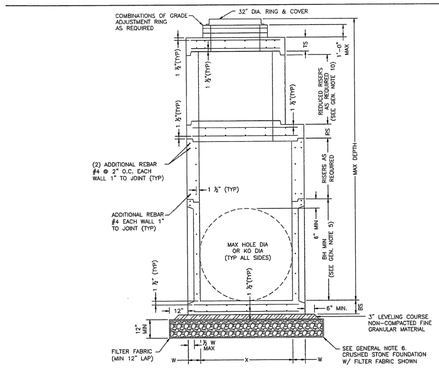
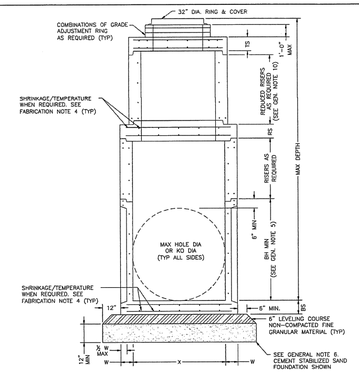


ELEVATION A–A
FLAT SLAB TOP WITH SHIP LOOSE RING & COVER OPTION



ELEVATION B–B
FLAT SLAB TOP WITH SHIP LOOSE RING & COVER OPTION

FABRICATION NOTES:

1. PROVIDE CLASS "H" CONCRETE IN ACCORDANCE WITH TEXAS DEPARTMENT OF TRANSPORTATION ITEM 421 AND HAVING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL OR EQUIVALENT AREA OF WWR. PROVIDE CIRCUMFERENTIAL REINFORCING STEEL IN VERTICAL WALLS OF RISER AND CONE IN ACCORDANCE WITH ASTM C478.
3. PROVIDE MINIMUM CONCRETE CLEAR COVER OF 1 ½" TO REINFORCING STEEL AT INTERIOR OR EXTERIOR WALLS.
4. SLABS WITH A THICKNESS OF 8" OR GREATER REQUIRE SHRINKAGE AND TEMPERATURE REINFORCING STEEL. PROVIDE STEEL AREA = 0.11 IN²/FT EACH WAY.
5. MANUFACTURE BASE AND RISERS TO NEAREST 3" INCREMENT.
6. DESIGN TONGUE AND GROOVE JOINTS FOR FULL CLOSURE ON BOTH SHOULDERS. MINIMUM SPIGOT DEPTH IS ¾".
7. PROVIDE LIFTING DEVICES IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.
8. PROVIDE CAST IRON SOLID COVER, UNLESS NOTED OTHERWISE ELSEWHERE IN THE PLANS.
9. MAXIMUM SPACING OF REINFORCEMENT IS 8".
10. AT MANUFACTURER'S OPTION, PROVIDE CAST OR CORED HOLES OR THIN WALL PANEL (KO) TO THE MAXIMUM DIA SHOWN FOR EACH. WHEN NO PENETRATION IS REQUIRED, IT IS ACCEPTABLE TO PROVIDE A WALL WITH NO SECTIONAL REDUCTION.
11. THREE DIFFERENT OPTIONS FOR CAPPING THE MANHOLE RISER NEAR THE FINISHED GRADE ARE ALLOWED. CONES CAN BE USED WHEN COVER IS SUFFICIENT TO ALLOW FOR PROPER PLACEMENT. FLAT LIDS ARE TO BE USED WHERE COVER IS LIMITED. REFER TO 02082-12 FOR OPTIONS.
12. BASES AND RISERS MAY HAVE CAST, CUT OR THIN WALL PANEL (KO) THAT ARE ROUND AND DO NOT EXTEND INTO THE FLOOR, INTO WALLS, OR WITHIN 6" OF THE JOINT ABOVE OR BELOW.

INSTALLATION NOTES:

1. IF REQUIRED ELSEWHERE, INVERTS (BENCHING) TO BE PROVIDED BY CONTRACTOR. CONCRETE OR MORTAR USED FOR INVERT IS SUBSIDIARY TO MANHOLE. REFER TO CITY OF HOUSTON SPECIFICATION SECTION 02082 FOR INVERT (BENCHING) REQUIREMENTS.
2. SEAL TONGUE AND GROOVE JOINTS PERFORMED ON BULK MASTIC IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS. TONGUE AND GROOVE JOINTS MAY BE GROUTED NO MORE THAN 1" BETWEEN EACH SECTION, OR 36 THE JOINT DEPTH, WHICHEVER IS GREATER.
3. DO NOT GROUT RUBBER GASKET JOINTS WITHOUT MANUFACTURER'S RECOMMENDATION.
4. FOR RIGID PIPE, CUT HOLE IN THIN WALL PANEL (KO) 4" MAX, 2" MIN LARGER THAN PIPE OD.
5. FOR FLEXIBLE PIPE, CONSULT BOOT/SEAL MANUFACTURER'S SPECIFICATION FOR PLACEMENT TOLERANCE AND HOLE SIZE. CENTER PIPE IN HOLE AND INSTALL BOOT/SEAL PER MANUFACTURER'S SPECIFICATION.
6. INITIAL INSTALLATION OF GRADE ADJUSTMENT RINGS IS LIMITED TO 1'–0" MAX AS SHOWN.
7. GRADE ADJUSTMENT RINGS MAY BE INCREASED TO 1'–6" MAX WHEN FUTURE CONSTRUCTION AFFECTS FINAL GRADE OF STRUCTURE. MAKE ADJUSTMENTS GREATER THAN 1'–6" WITH ADDITIONAL RISERS. ADJUSTMENTS MAY BE MADE UP TO THE MAX DEPTH OF 25'–0". STRUCTURE MUST BE EVALUATED IF MAX DEPTH WILL BE EXCEEDED.

GENERAL NOTES:

1. SEE TABLE 1 FOR MINIMUM DESIGN REQUIREMENTS. CONCENTRIC RISER WITH RESPECT TO BASE (ALTERNATIVE CONFIGURATION) FALLS OUTSIDE THE SCOPE OF REQUIREMENTS. THE ENGINEER OF RECORD IS RESPONSIBLE FOR DESIGN FOR SAFETY AND ADEQUACY OF MANHOLE IF THE ALTERNATIVE CONFIGURATION IS USED.
2. DESIGNED ACCORDING TO ASTM C478 AND/OR ASTM C913.
3. PAYMENT FOR PRECAST MANHOLE PER SECTION 02082 "PRECAST CONCRETE MANHOLES."
4. PRECAST BASE CONSISTS OF BASE SLAB, BASE UNIT, RISERS (AS REQUIRED), REDUCING SLAB (AS REQUIRED), AND REDUCED RISERS (AS REQUIRED).
5. MIN HEIGHT SHOWN FOR STOCK BASE UNITS. USE STOCK BASE UNITS WHENEVER PRACTICAL. SMALLER HEIGHT BASE UNITS CAN BE USED IN SPECIAL INSTALLATION CIRCUMSTANCES, WHEN NOTED ELSEWHERE IN THE PLANS. ABSOLUTE MINIMUM HEIGHT OF BASE UNITS IS 2'–6".
6. FOUNDATION/SUBGRADE TO BE DESIGNED BY ENGINEER AND MEET MINIMUM REQUIREMENTS ACCORDING TO SECTION 02082.
7. BASE, RISERS, AND REDUCING SLAB TO BE PRECAST CONCRETE, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.
8. ECCENTRIC REDUCED RISER WITH RESPECT TO BASE IS THE PREFERRED MANHOLE CONFIGURATION. CONCENTRIC REDUCED RISER WITH RESPECT TO BASE MANHOLE CONFIGURATION IS AN ALTERNATIVE DESIGN THAT WILL BE ACCEPTED BASED ON THE NEEDS OF THE CITY OF HOUSTON.
9. MANHOLE SIZE SHALL CONSIDER ENGINEERING ECONOMY. THIS DETAIL IS NOT APPLICABLE TO BOX MANHOLES LARGER THAN 8–FOOT BY 8–FOOT.
10. REFER TO STORM SEWER TYPE 'C' PRECAST ROUND MANHOLE DETAIL (02082-12) FOR REDUCED RISER DESIGN REQUIREMENTS.

PLAN VIEW A
COVER NOT SHOWN

PLAN VIEW B
COVER NOT SHOWN

ECCENTRIC MANHOLE
(PREFERRED CONFIGURATION)

CONCENTRIC MANHOLE
(ALTERNATE CONFIGURATION)

ANGLE OF ENTRY IS LESS THAN OR EQUAL TO 7° — ANGLE OF ENTRY IS GREATER THAN 7°

PIPE CONNECTION DETAIL

CONNECT PIPES WITHIN 7° OF NORMAL TO PRECAST BASE WALL. IF NECESSARY, USE PIPE ELBOW OR CURVED APPROACH ALIGNMENT TO STAY WITHIN THIS LIMIT.

TABLE 1
PRECAST BOX MANHOLE (PBM) MINIMUM REQUIREMENTS FOR 24 IN. TO 78 IN. INTERNAL DIA STORM SEWER PIPES

	SIZE	BASE SLAB THICKNESS	BASE UNIT OR RISER THICKNESS	REDUCED RISER DIA	REDUCING SLAB THICKNESS	TOP SLAB THICKNESS	MAX DEPTH TO TOP OF BASE SLAB	MIN HEIGHT (SEE GEN NOTE 5)	MAX HOLE DIA (SEE FAB NOTE 11)	MAX KO DIA (SEE FAB NOTE 11)
	X & Y	ES	R	D	RS	TS	MAX DEPTH	BY MIN	MAX HOLE DIA	KO DIA
	FT	IN	IN	FT–IN	IN	IN	FT	FT	IN	IN
PBM	3X3	6	6	N/A	N/A	9	25	3.50	36	36
	4X4	6	6	N/A	N/A	9	25	4.50	48	48
	5X5	6	6	N/A	N/A	9	25	5.50	36/60	36/60
	4X3	6	5.5	48 IN.	9	9	25	4.50	48/60	48/60
	5X5	6	6	48 IN.	9	9	25	5.50	60	60
	5X8	6	8	48 IN.	9	9	25	5.50	60/72	60/72
	6X8	9	8	48 IN.	9	9	25	6.50	72	72
	6X8	9	10	48 IN.	12	9	25	6.50	84	90

TABLE 1 NOTES:
1. (*) ROUND MANHOLES ARE PREFERRED FOR THESE SIZES.
2. (^) UNLESS OTHERWISE INDICATED.
3. TABLE IS VALID FOR UP TO 25 FT OF INSTALLATION DEPTH.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STORM SEWER PRECAST BOX MANHOLE (NOT TO SCALE)	
APPROVED BY: Suhail Kanoo CITY ENGINEER	APPROVED BY: Carol Haddock DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL–01–2021	DWG NO: 02082–13

02081–05

COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019

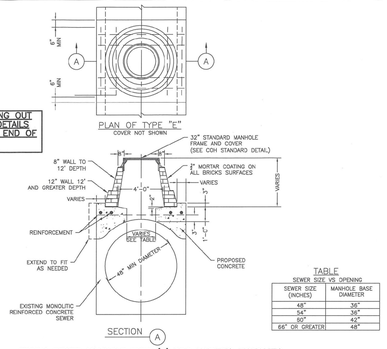
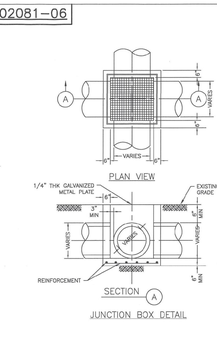


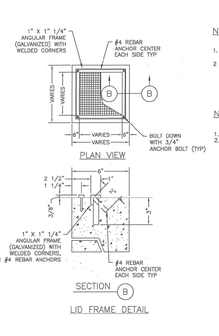
TABLE
SEWER SIZE VS OPENING

SEWER SIZE (INCHES)	MANHOLE BASE DIAMETER
48"	36"
54"	38"
60"	42"
66" OR GREATER	48"

STORM SEWER MANHOLE TYPE "E" FOR EXISTING MONOLITIC REINFORCED CONCRETE 48" DIAMETER AND GREATER
NTS

02081–06



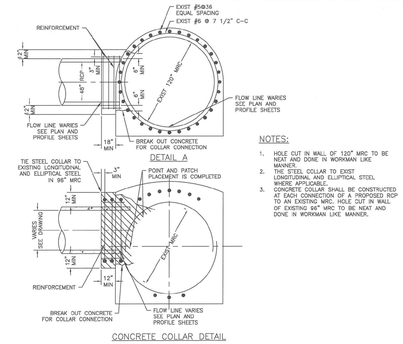


NOTES:
1. DETAIL TO BE USED WHERE STORM SEWER SIZE IS 24" DIA OR LESS.
2. FOR SEWER GREATER 24" DIA USE TYPE "C" MANHOLE.

NOTES TO SPECIFIER:
1. WALL TO BE 8" CONCRETE.
2. NOT TO BE USED IN STREET. FOR AREA BETWEEN CURB AND PROPERTY LINE ONLY.

STORM SEWER
JUNCTION BOX WITH LID OR GRATE TOP FOR MAXIMUM OF 24" DIAMETER STORM SEWE4RS
NTS

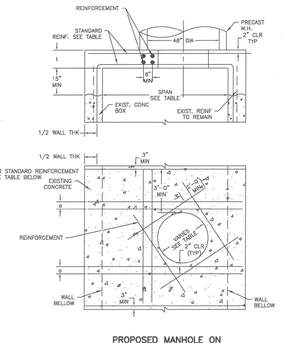
02081–07



NOTES:
1. HOLE CUT IN WALL OF 120" MRC TO BE NEAT AND DONE IN WORKMAN LIKE MANNER.
2. THE STEEL COLLAR TO EXIST ELLIPTICAL STEEL IS ELLIPTICAL STEEL WHERE APPLICABLE.
3. CONCRETE COLLAR SHALL BE CONSTRUCTED AT EACH CONNECTION OF A PROPOSED POP TO AN EXISTING MRC. HOLE CUT IN WALL OF EXISTING 98" MRC TO BE NEAT AND DONE IN WORKMAN LIKE MANNER.

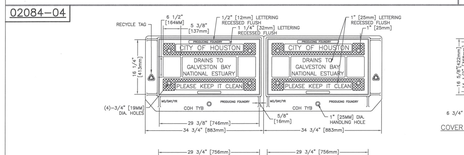
LATERAL CONNECTION TO EXISTING MONOLITHIC REINFORCED CONCRETE STORM SEWER
NTS

02081–08



FIRM INFORMATION	ENGINEER'S SEAL
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STORM SEWER 02081–05 THROUGH 08	
APPROVED BY: CITY ENGINEER	APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR	
EFFECTIVE DATE: JUL–01–2019 FOR CITY OF HOUSTON USE ONLY	
SHEET NO.	

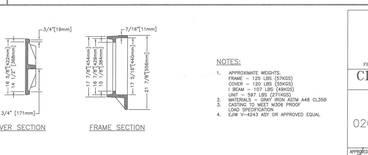
02084–02



NOTES:
1. APPROXIMATE WEIGHTS:
   FRAME = 170 LBS (77KGS)
   COVER = 270 LBS (123KGS)
   UNIT = 440 LBS (200KGS)
2. MATERIALS = GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET MOOR PROOF LOAD SPECIFICATION
4. EJIW V-1420 ADT OR APPROVED EQUAL

STORM SEWER MANHOLE FRAME AND COVER
NTS

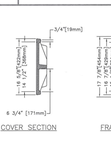
02084–03



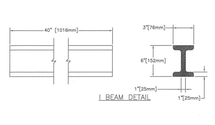
NOTES:
1. APPROXIMATE WEIGHTS:
   FRAME = 125 LBS (57KGS)
   COVER = 120 LBS (55KGS)
   UNIT = 229 LBS (104KGS)
2. MATERIALS = GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET MOOR PROOF LOAD SPECIFICATION
4. EJIW V-4243 ADT OR APPROVED EQUAL

STORM SEWER TYPE "B" INLET ASSEMBLY
NTS

02084–04



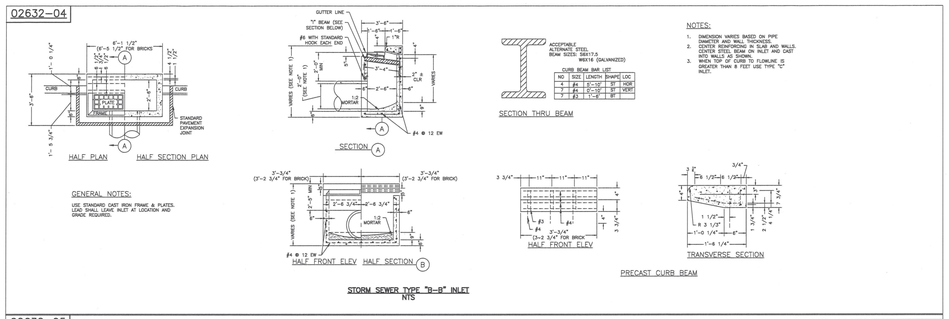
NOTES:
1. APPROXIMATE WEIGHTS:
   FRAME = 125 LBS (57KGS)
   COVER = 120 LBS (55KGS)
   I BEAM = 107 LBS (49KGS)
   UNIT = 597 LBS (271KGS)
2. MATERIALS = GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET MOOR PROOF LOAD SPECIFICATION
4. EJIW V-4243 ADT OR APPROVED EQUAL



STORM SEWER TYPE "BB" INLET DOUBLE ASSEMBLY
NTS

FIRM INFORMATION	ENGINEER'S SEAL
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STORM SEWER 02084–02 THROUGH 04	
APPROVED BY: CITY ENGINEER	APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR	
EFFECTIVE DATE: JUL–01–2019 FOR CITY OF HOUSTON USE ONLY	
SHEET NO.	

02632–04

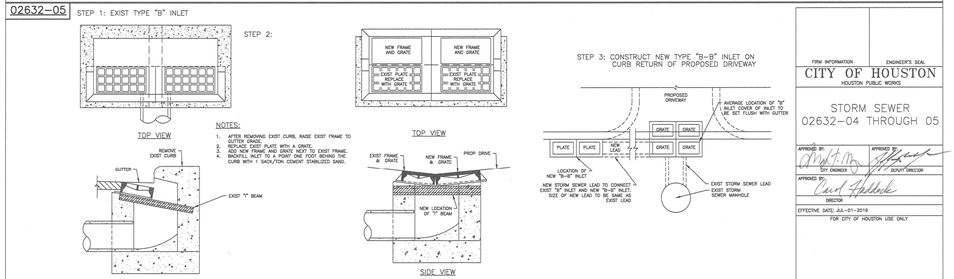


NOTES:
1. DIMENSION VARIES BASED ON PIPE DIAMETER AND WALL THICKNESS.
2. CENTER REINFORCING IN SLAB AND WALLS. CENTER STEEL BEAM ON INLET AND CAST IN CONCRETE WALLS.
3. WHEN TOP OF CURB TO FLOWLINE IS GREATER THAN 8 FEET USE TYPE "C" INLET.

GENERAL NOTES:
USE STANDARD CAST IRON FRAME & PLATES. LOAD SHALL LOAD INLET AT LOCATION AND GRADE REQUIRED.

STORM SEWER TYPE "B–B" INLET
NTS

02632–05



NOTES:
1. AFTER REMOVING EXIST CURB, RAISE EXIST FRAME TO NEW GRADE.
2. REPLACE EXIST PLATE WITH A GRATE.
3. ADD NEW FRAME AND GRATE NEXT TO EXIST FRAME.
4. ADD NEW CURB AND GUTTER. BACKFILL BEHIND CURB WITH 1 SACK/TON CEMENT STABILIZED SAND.

STORM SEWER TYPE "B" INLET RELOCATION
NTS

FIRM INFORMATION	ENGINEER'S SEAL
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STORM SEWER 02632–04 THROUGH 05	
APPROVED BY: CITY ENGINEER	APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR	
EFFECTIVE DATE: JUL–01–2019 FOR CITY OF HOUSTON USE ONLY	
SHEET NO.	

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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – STORM SEWER

SHEET 01 OF 03

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 124 OF 139	

GC Engineering, Inc.
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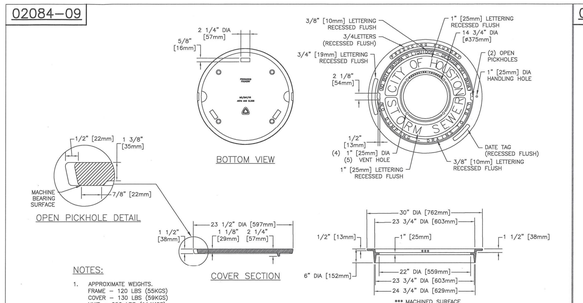
02084–09

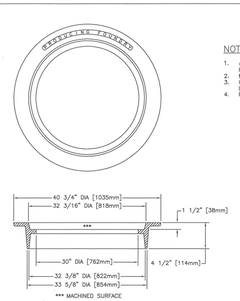


NOTES:

1. APPROXIMATE WEIGHTS:
   FRAME – 120 LBS (55KGS)
   COVER – 130 LBS (59KGS)
   UNIT – 250 LBS (114KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V–1814 A5Y OR APPROVED EQUAL

STORM SEWER TYPE "C–1, C–2, C–2A" AND "H–2" INLET FRAME AND COVER
NTS

02084–10

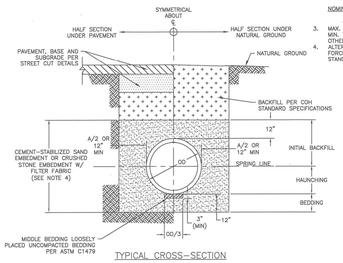


NOTES:

1. APPROXIMATE WEIGHTS:
   FRAME – 190 LBS (86KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET MODE PROOF LOAD SPECIFICATION
4. EJIW V–1816 A5Y OR APPROVED EQUAL

32" INVERTED MANHOLE FRAME
NTS

02317–03



TYPICAL CROSS–SECTION

NOTES:

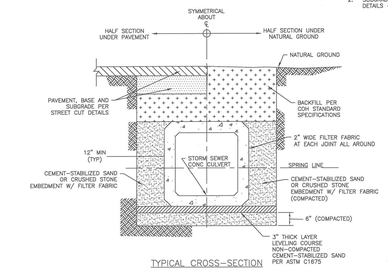
1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN. TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

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.

SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317–05



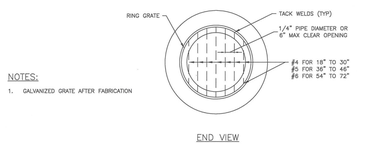
TYPICAL CROSS–SECTION

NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. SUBGRADE AND PAVEMENT FOR STREET CUT DETAILS – 02951.

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02084–11

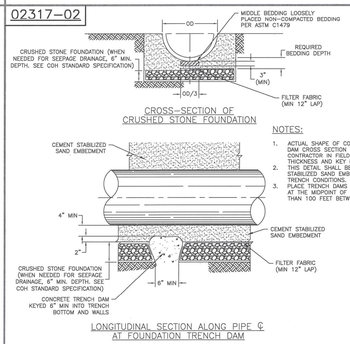


NOTES:

1. GALVANIZED GRATE AFTER FABRICATION

STORM SEWER
RING GRATE FOR OPEN END OF 18" TO 72" RCP STUBS TO DITCH
NTS

02317–02



NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY ENGINEER BASED ON SOIL CONDITIONS, THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND 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.

SANITARY OR STORM SEWER CRUSHED STONE FOUNDATION FOR WET STABLE TRENCH
NTS

FIRM INFORMATION | ENGINEER'S SEAL

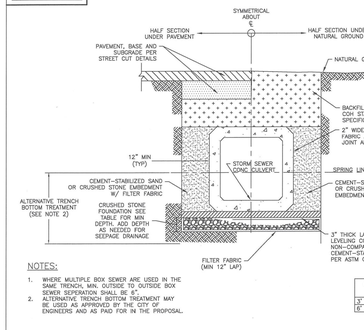
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02084–09 THROUGH 11
AND 02317–02

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL–01–2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

02317–06



NOTES:

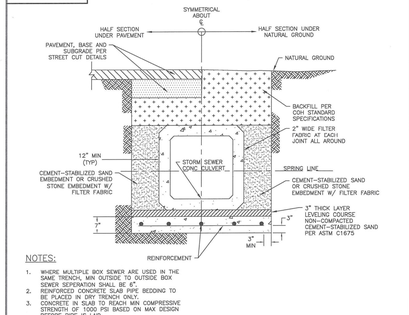
1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. ALTERNATIVE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY OF ENGINEERS AND AS PAID FOR IN THE PROPOSAL.

TABLE

CULVERT SIZE (FT)	FOUNDATION DEPTH(INCHES)
3' X 2' TO 6' X 6'	12
6' X 6' AND LARGER	18

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR WET STABLE TRENCH
NTS

02317–07



NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. REINFORCED CONCRETE SLAB PIPE BEDDING TO BE PLACED IN DRY TRENCH ONLY.
3. CONCRETE IN SLAB TO REACH MIN COMPRESSIVE STRENGTH OF 1000 PSI BASED ON MAX DESIGN BEFORE PIPE IS LAID.
4. PRECAST SEAL SLAB MAYBE USED AS APPROVED BY CITY ENGINEER.

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL WITH SEAL SLAB
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02317–03 THROUGH 07

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL–01–2019
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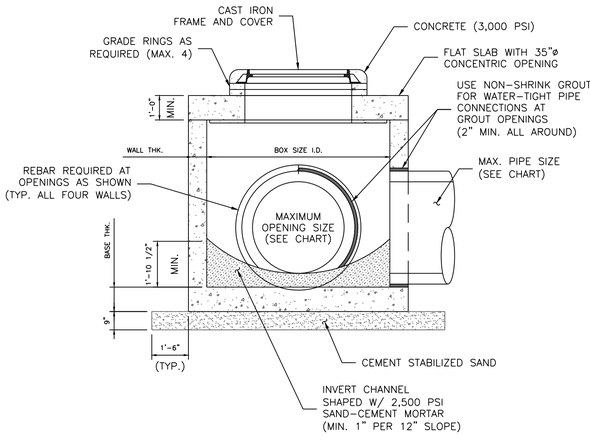
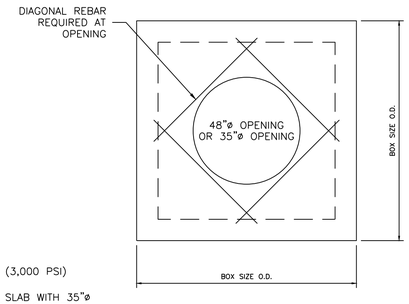
SHEET NO.

BOX SIZE I.D.	MAX. OPENING SIZE	FLAT SLAB THK.	MIN. WALL THK.	MIN. BASE THK.
4'X4'	48"	8"	6"	6"
5'X5'	60"	10"	6"	8"
6'X6'	72"	10"	8"	8"
7'X7'	84"	10"	8"	8"
8'X8'	96"	10"	8"	8"

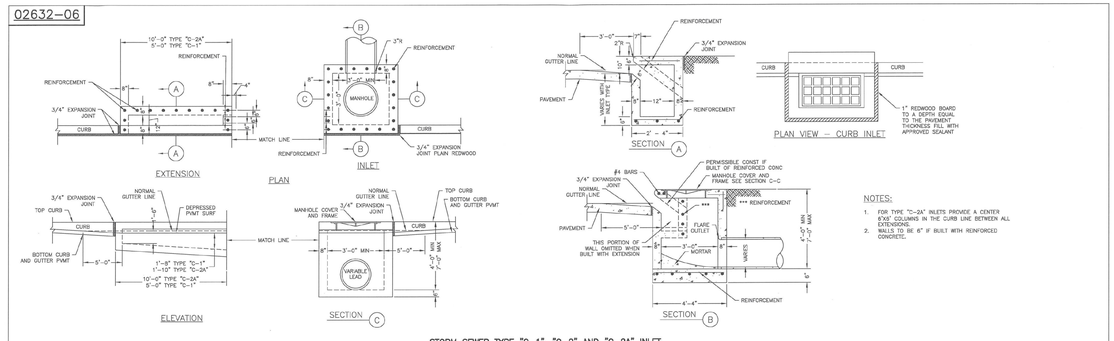


JUNCTION BOX/MANHOLE WITH FLAT SLAB
SCALE: NTS



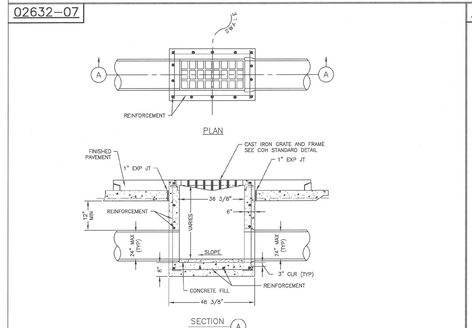
PLAN VIEW
FLAT SLAB WITH OPENING
SCALE: NTS

02632–06



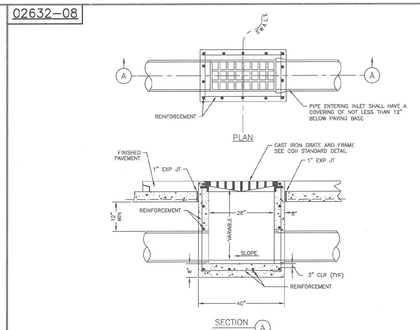
STORM SEWER TYPE "C–1", "C–2" AND "C–2A" INLET
NTS

02632–07



STORM SEWER TYPE "D" INLET
NTS

02632–08



STORM SEWER TYPE "D–1" INLET
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02632–06 THROUGH 08

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL–01–2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GC ENGINEERING, INC.
2505 PARK AVE,
PEARLAND, TEXAS 77581
Phone: (281) 412-7008
FAX: (281) 412-4623
TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – STORM SEWER

SHEET 02 OF 03

WBS NUMBER
N–100006–0001–3
DRAWING SCALE
N/A
CITY OF HOUSTON PM
MICHELLE RANDON, PE
SHEET NO. 125 OF 139

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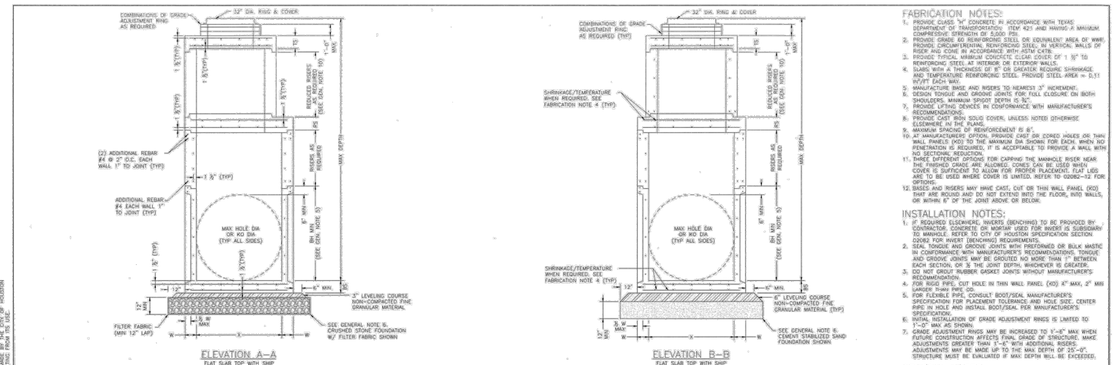
GC Engineering, Inc.
M:\Projects\C – 0778–COH–UnivBlvd–SP1\Drawings\Standard Details–Storm Sewer–C0778D.dwg Feb 04, 2026–6:47pm nburamukku



ELEVATION A–A
FLAT SLAB TOP WITH SMIP LOOSE RING & COVER OPTION

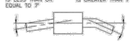
ELEVATION B–B
FLAT SLAB TOP WITH SMIP LOOSE RING & COVER OPTION

PLAN VIEW A
COVER NOT SHOWN

PLAN VIEW B
COVER NOT SHOWN

ECCENTRIC MANHOLE
(PREFERRED CONFIGURATION)

CONCENTRIC MANHOLE
(ALTERNATE CONFIGURATION)



PIPE CONNECTION DETAIL

CONNECT PIPES WITHIN 3" OF NORMAL TO PRECAST BASE, WHERE NECESSARY, USE PIPE SLEEVE OR CURVED APPROACH ALIGNMENT TO STAY WITHIN THIS LIMIT.

TABLE 1

PRECAST BOX MANHOLE (PBM) MINIMUM REQUIREMENTS FOR 24 IN. TO 78 IN. INTERNAL DIA STORM SEWER PIPES:

	SIZE	BASE SLAB THICKNESS	BASE UNIT OR RISER THICKNESS	REDUCED RISER DIA.	REDUCING SLAB THICKNESS	TOP SLAB THICKNESS	MAX DEPTH TO TOP OF BASE SLAB	MIN HEIGHT (SEE GEN NOTE 5)	MAX HOLE DIA (SEE FAB NOTE 11)	MAX KO DIA (SEE FAB NOTE 11)
	X' & "	IN.	IN.	IN.	IN.	IN.	MAX DEPTH	BY MIN	MAX HOLE DIA	KO DIA
	FT	IN.	IN.	FT	IN.	IN.	FT	IN.	FT	FT
PBM	2X2'	6	6	N/A	N/A	9	25	5.50	36	36
	4X4'	6	6	N/A	N/A	9	25	5.50	48	48
	5X5'	6	6	N/A	N/A	9	25	5.50	36/60	36/60
	4X5'	6	6	48 IN.	9	9	25	4.50	48/60	48/60
	5X5'	6	6	48 IN.	9	9	25	5.50	60	60
	5X6	9	8	48 IN.	9	9	25	5.50	60/72	60/72
	6X6	9	8	48 IN.	9	9	25	6.50	72	72
	8X8	9	10	48 IN.	12	9	25	8.50	96	96

TABLE 1 NOTES:
1. (*) ROUND MANHOLES ARE PREFERRED FOR THESE SIZES.
2. (^) UNLESS OTHERWISE INDICATED.
3. TABLE IS VALID FOR UP TO 25 FT OF INSTALLATION DEPTH.

FABRICATION NOTES:

1. PROVIDE CLASS "H" CONCRETE AT ACCORDANCE WITH TEXAS DEPARTMENT OF TRANSPORTATION, ITEM 421 AND MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL OR EQUIVALENT AREA OF WWF, PROVIDE CIRCUMFERENTIAL REINFORCING STEEL IN VERTICAL WALLS OF RISERS AND BARREL SECTIONS ACCORDING TO ASTM C478.
3. MINIMUM TOTAL AREA OF CONCRETE CLEAR COVER OF 1 ½" TO REINFORCING STEEL AT INTERIOR OR EXTERIOR WALLS.
4. SLABS WITH A THICKNESS OF 8" OR GREATER REQUIRE SHRINKAGE AND TEMPERATURE REINFORCING STEEL. PROVIDE STEEL AREA = 0.11 IN²/FT EACH WAY.
5. MANUFACTURE BASE AND RISERS TO NEAREST 3" INCREMENT.
6. DESIGN TONGUE AND GROOVE JOINTS FOR FULL CLOSURE ON BOTH INSIDE AND OUTSIDE WITH JOINT DEPTH OF ½".
7. PROVIDE LIFTING DEVICES IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.
8. PROVIDE CAST IRON SOLID COVER, UNLESS NOTED OTHERWISE ELSEWHERE IN THE PLANS.
9. MAXIMUM SPACING OF REINFORCEMENT IS 6".
10. AT MANUFACTURERS OPTION, KNOCKOUTS MAY BE CONES MADED ON THIN WALLED RISERS AND BASE UNITS WITH MINIMUM DIA SHOWN FOR EACH. WHEN NO PENETRATION IS REQUIRED, IT IS ACCEPTABLE TO PROVIDE A WALL WITH NO SECTIONAL REDUCTION.
11. THREE DIFFERENT OPTIONS FOR CAPPING THE MANHOLE RISER NEAR THE FINISHED GRADE ARE ALLOWED. CONES CAN BE USED WHEN THERE IS SUFFICIENT DO ALLOW FOR PROPER PLACEMENT. FLAT LIDS ARE TO BE USED WHERE COVER IS LIMITED. REFER TO 02082–12 FOR OPTIONS.
12. BASES AND RISERS MAY HAVE CAST, CUT OR THIN WALL PANEL HOLE THAT ARE ROUND AND DO NOT EXTEND INTO THE FLOOR, INTO WALLS, OR WITHIN 6" OF THE JOINT ABOVE OR BELOW.

INSTALLATION NOTES:

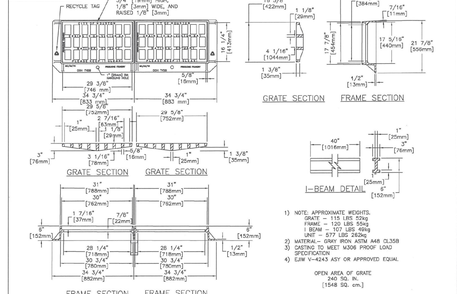
1. IF REQUIRED ELSEWHERE, INVERTS (BENCHING) TO BE PROVIDED BY CONTRACTOR. CONCRETE OR MORTAR USED FOR INVERT IS SUBORDINATE TO MANHOLE. REFER TO CITY OF HOUSTON SPECIFICATION SECTION 02602 FOR CONCRETE MANHOLE INVERTS.
2. SEAL TONGUE AND GROOVE JOINTS WITH PREFORMED OR BULK MASTIC IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS. TONGUE AND GROOVE JOINTS MAY BE GROUTED NO MORE THAN 1" BETWEEN EACH SECTION, OR ¾ THE JOINT DEPTH, WHICHEVER IS GREATER.
3. DO NOT GROUT RUBBER GASKET JOINTS WITHOUT MANUFACTURER'S RECOMMENDATION.
4. FOR RIGID PIPE, CUT HOLE IN THIN WALL PANEL (KO) 6" MAX, 2" MIN LARGER THAN OD.
5. FOR FLEXIBLE PIPE, CONSULT BOOT/SEAL MANUFACTURER'S SPECIFICATION FOR PLACEMENT TOLERANCE AND HOLE SIZE. CENTER PIPE IN HOLE AND INSTALL BOOT/SEAL PER MANUFACTURER'S SPECIFICATION.
6. INITIAL INSTALLATION OF GRADE ADJUSTMENT RINGS IS LIMITED TO 1'–0" MAX AS SHOWN.
7. GRADE ADJUSTMENT RINGS MAY BE INCREASED TO 1'–6" MAX WHEN CONCRETE RINGS ARE USED. CONTRACTOR IS CAUTIONED THAT MAKE ADJUSTMENTS GREATER THAN 1'–6" WITH ADDITIONAL RISERS. ADJUSTMENTS MAY BE MADE UP TO THE MAX DEPTH OF 25'–0", STRUCTURE MUST BE EVALUATED IF MAX DEPTH WILL BE EXCEEDED.

GENERAL NOTES:

1. SEE TABLE 1 FOR MINIMUM DESIGN REQUIREMENTS. CONCENTRIC RISER WITH RESPECT TO BASE (ALTERNATIVE CONFIGURATION) FALLS OUTSIDE THE SCOPE OF REQUIREMENTS PROVIDED. ENGINEER OF RECORD SHALL PERFORM CALCULATIONS TO VERIFY THE ADEQUACY OF MANHOLE IF NOT ALTERNATIVE CONFIGURATION USED.
2. DESIGNED ACCORDING TO ASTM C478 AND/OR ASTM C913.
3. PAYMENT FOR PRECAST MANHOLE PER SECTION 02602 PRECAST CONCRETE MANHOLES.
4. PRECAST BASE CONSISTS OF BASE SLAB, BASE UNIT, RISERS (AS REQUIRED), REDUCING SLAB (AS REQUIRED), AND REDUCED RISERS (AS REQUIRED).
5. MIN HEIGHT SHOWN FOR STOCK BASE UNITS. USE STOCK BASE UNITS WHERE POSSIBLE. MIN HEIGHT OF BASE UNITS IS 4'–0" UNLESS DUE TO SPECIAL INSTALLATION CIRCUMSTANCES, WHEN NOTED ELSEWHERE IN THE PLANS. ABSOLUTE MINIMUM HEIGHT OF BASE UNITS IS 2'–4".
6. FOUNDATION/SUBGRADE TO BE DESIGNED BY ENGINEER AND MEET MINIMUM REQUIREMENTS ACCORDING TO SECTION 02082.
7. ALL STORM WATER MANHOLES ARE TO BE PRECAST CONCRETE, UNLESS EXCEPTIONS NOTED ELSEWHERE IN THE PLANS.
8. ECCENTRIC MANHOLE WITH RESPECT TO BASE IS THE PREFERRED MANHOLE CONFIGURATION. CONCENTRIC REDUCED RISER WITH RESPECT TO BASE MANHOLE CONFIGURATION IS AN ALTERNATIVE DESIGN THAT WILL BE ACCEPTED BASED ON THE NEEDS OF THE CITY OF HOUSTON.
9. MANHOLE SIZE SHALL CONSIDER ENGINEERING ECONOMY. THIS DENIAL IS NOT APPLICABLE TO BOX MANHOLES LARGER THAN 8–FOOT BY 8–FOOT.
10. REFER TO STORM SEWER TYPE 'C' PRECAST ROUND MANHOLE DETAIL (02082–12) FOR REDUCED RISER DESIGN REQUIREMENTS.

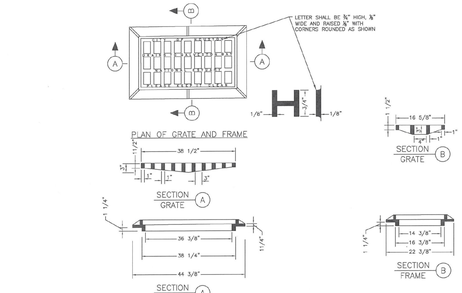
CITY OF HOUSTON	
HOUSTON PUBLIC WORKS	
STORM SEWER PRECAST BOX MANHOLE	
(NOT TO SCALE)	
APPROVED BY: Suhail Kanuri, CITY ENGINEER	APPROVED BY: Carl Haddock, DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL–01–2021	DWG NO: 02082–13

02084–05



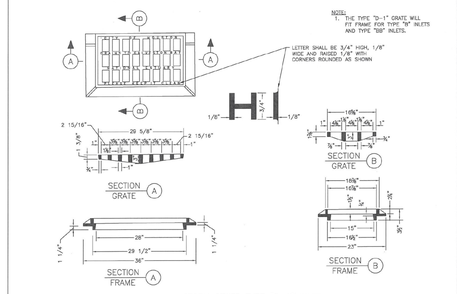
STORM SEWER TYPE D–B INLET DOUBLE ASSEMBLY
NTS

02084–06



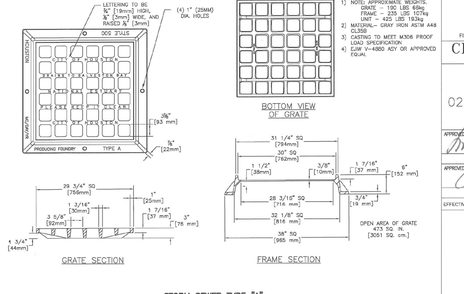
STORM SEWER TYPE "D" INLET GRATE AND FRAME
NTS

02084–07



STORM SEWER TYPE "D–1" INLET GRATE AND FRAME
NTS

02084–08

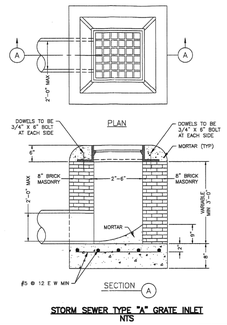


STORM SEWER TYPE "A" INLET GRATE AND FRAME
NTS

FIRM INFORMATION	ENGINEER'S SEAL
CITY OF HOUSTON	
HOUSTON PUBLIC WORKS	
STORM SEWER 02084–05 THROUGH 08	
APPROVED BY: CITY ENGINEER	APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR	
EFFECTIVE DATE: JUL–01–2019	
FOR CITY OF HOUSTON USE ONLY	
	SHEET NO.

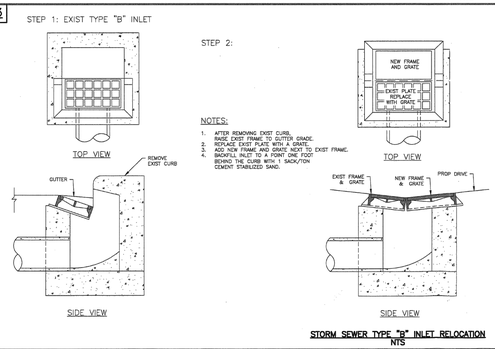
02632–01

COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019



STORM SEWER TYPE "A" GRATE INLET
NTS

02632–03



STORM SEWER TYPE "B" INLET RELOCATION
NTS

FIRM INFORMATION	ENGINEER'S SEAL
CITY OF HOUSTON	
HOUSTON PUBLIC WORKS	
STORM SEWER 02632–01 AND 03	
APPROVED BY: CITY ENGINEER	APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING	
EFFECTIVE DATE: JUL–01–2019	
FOR CITY OF HOUSTON USE ONLY	
	SHEET NO. XX OF XX

GC ENGINEERING, INC.
2505 PARK AVE,
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – STORM SEWER

SHEET 03 OF 03

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 126 OF 139	

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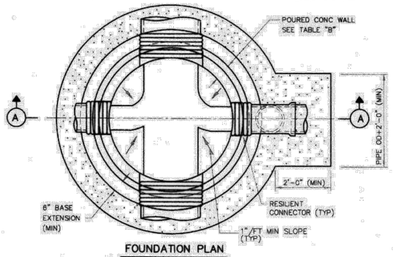
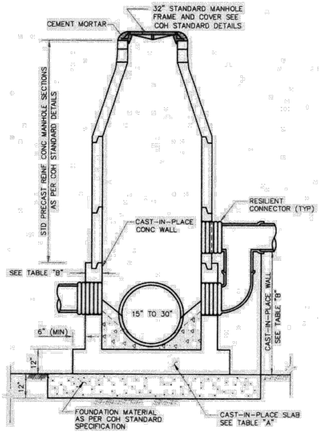


FOUNDATION PLAN



ELEVATION (A)

NOTES:

1. SEAT MANHOLE FRAME IN SEALANT PER COH STANDARD SPECIFICATION.
2. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
3. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.

NOTES ON USE OF STANDARD DETAIL

TABLE "A"

BASE SLAB REINFORCING AND THICKNESS

MH INSIDE DIA (FT)	DEPTH TO INV (FT)	BASE THICKNESS	REINFORCING (E W, T & B)
8	≤ 20	1'-0"	# 6 @ 10"
	≤ 25	1'-2"	# 6 @ 8"
	≤ 30	1'-4"	# 6 @ 7"
	≤ 40	1'-6"	# 6 @ 6"
	≤ 50	1'-8"	# 6 @ 5"
	≤ 60	1'-10"	# 6 @ 6"
6	≤ 15	1'-0"	# 5 @ 8"
	≤ 20	1'-0"	# 5 @ 6"
	≤ 25	1'-2"	# 5 @ 7"
	≤ 30	1'-2"	# 6 @ 8"
	≤ 40	1'-2"	# 6 @ 6"
	≤ 50	1'-4"	# 6 @ 8"
	≤ 60	1'-4"	# 6 @ 7"
5	≤ 15	1'-0"	# 5 @ 8"
	≤ 20	1'-0"	# 5 @ 7"
	≤ 25	1'-0"	# 5 @ 6"
	≤ 30	1'-0"	# 6 @ 10"
	≤ 40	1'-2"	# 6 @ 10"
	≤ 50	1'-2"	# 6 @ 8"
	≤ 60	1'-2"	# 6 @ 8"
4	≤ 20	1'-0"	# 5 @ 8"
	≤ 25	1'-0"	# 5 @ 8"
	≤ 30	1'-0"	# 5 @ 7"
	≤ 40	1'-0"	# 6 @ 10"

TABLE "B"

WALL REINFORCING AND THICKNESS

MH INSIDE DIA (FT)	DEPTH TO PIPE TO INV (FT)	MAXIMUM CAST-IN-PLACE WALL HEIGHT	WALL THICKNESS	REINFORCING AT EACH FACE VERTICAL	REINFORCING AT EACH FACE HORIZONTAL
8	≤ 20	8'-0"	0'-10"	# 6 @ 12"	# 6 @ 12"
	≤ 25	9'-6"	0'-10"	# 6 @ 10"	
	≤ 30	7'-0"	0'-10"	# 6 @ 8"	
	≤ 40	8'-0"	1'-0"	# 6 @ 8"	
	≤ 50	9'-0"	1'-2"	# 6 @ 8"	
	≤ 60	10'-0"	1'-4"	# 6 @ 6"	
6	≤ 15	5'-0"	0'-8"	# 5 @ 12"	# 5 @ 12"
	≤ 20	5'-8"	0'-8"	# 5 @ 8"	
	≤ 25	6'-0"	0'-9"	# 5 @ 8"	
	≤ 30	6'-0"	0'-9"	# 5 @ 6"	# 5 @ 8"
	≤ 40	7'-0"	0'-10"	# 5 @ 8"	
	≤ 50	7'-0"	1'-0"	# 6 @ 8"	
	≤ 60	8'-0"	1'-2"	# 6 @ 7"	
5	≤ 15	5'-0"	0'-8"	# 5 @ 8"	# 4 @ 12"
	≤ 20	5'-4"	0'-8"	# 5 @ 7"	
	≤ 25	5'-8"	0'-10"	# 5 @ 6"	
	≤ 30	8'-0"	0'-10"	# 6 @ 10"	# 5 @ 12"
	≤ 40	8'-4"	0'-10"	# 6 @ 10"	
	≤ 50	6'-8"	1'-0"	# 6 @ 8"	
	≤ 60	7'-0"	1'-0"	# 6 @ 8"	
4	≤ 20	4'-8"	0'-8"	# 5 @ 12"	# 4 @ 12"
	≤ 25	5'-0"	0'-8"	# 5 @ 10"	
	≤ 30	5'-8"	0'-10"	# 6 @ 12"	
	≤ 40	6'-0"	0'-10"	# 6 @ 12"	

NOTE TO SPECIFIER:

1. TABLES "A" AND "B" WILL BE USED TO DESIGN THE CAST-IN-PLACE BASE AND WALL FOR VARIOUS MANHOLE DIAMETER AND DEPTH.

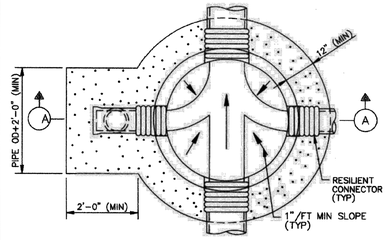
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER
PRECAST CONCRETE MANHOLE
WITH CAST-IN-PLACE BASE
(NOT TO SCALE)

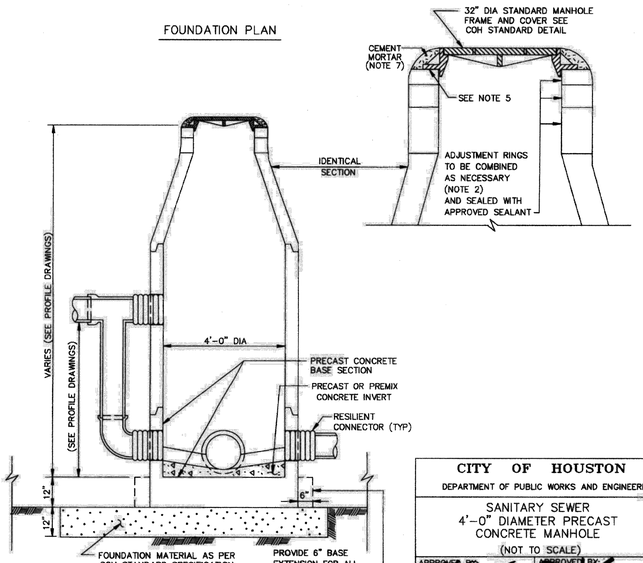
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02082-08

NOTES:

1. DEPTH OF MANHOLE DETERMINES SECTIONS REQUIRED.
2. PRECAST CONCRETE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-0".
3. MANHOLE WALL THICKNESS FOR DEPTH EXCEEDING 12'-0" SHALL BE DETERMINED TO MEET LOADING CONDITIONS. MIN THICKNESS 5".
4. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.
5. SEAT MANHOLE FRAME IN SEALANT PER COH STANDARD SPECIFICATION.
6. ECCENTRIC PRECAST CONCRETE MANHOLE MAY BE USED.
7. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
8. MIN REINFORCING IN THE PRECAST CONCRETE BASE SHALL BE # 5 @ 8 EW.



FOUNDATION PLAN



SECTION (A)

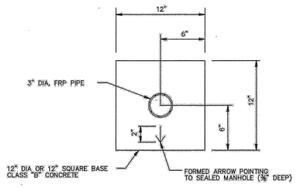
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER
4'-0" DIAMETER PRECAST
CONCRETE MANHOLE
(NOT TO SCALE)

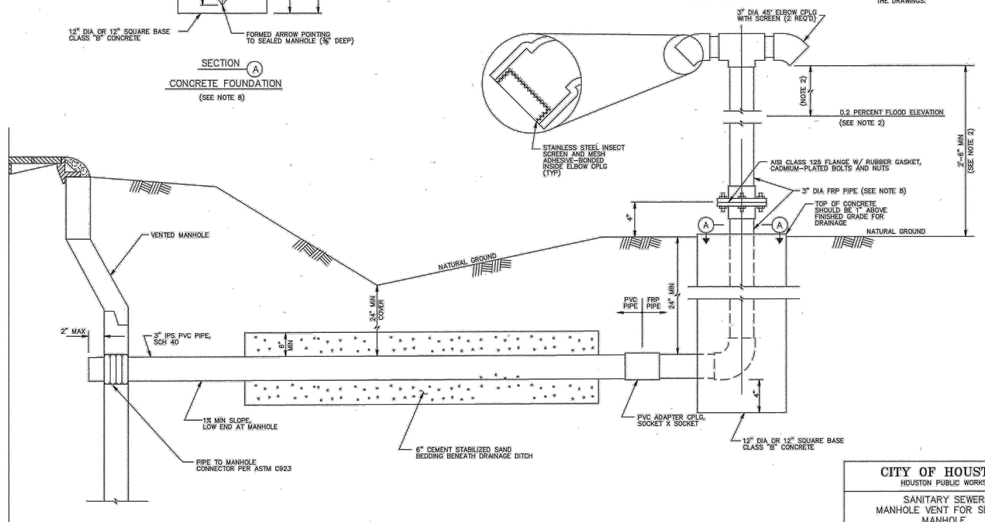
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02082-02

NOTES:

1. INSTALL AT LOCATION AND BASED ON 0.2 PERCENT FLOOD ELEVATION SHOWN ON PLAN AND PROFILE DWGS.
2. MINIMUM VENT HEIGHT ELEVATION IS TO BE 2'-6" ABOVE THE NATURAL GROUND OR AS REQUIRED BY CHAPTER 19, SECTION 19-33 OF THE CITY OF HOUSTON CODE OF ORDINANCES, WHICHEVER IS HIGHER.
3. WHEN FLOODPROOFED VENTS ARE SPECIFIED BY THE EOR, REFER TO THE CONTRACT DOCUMENTS FOR CONSTRUCTION REQUIREMENTS.
4. DRAIN TO VENTED (ADJACENT) MH AT MIN 1% SLOPE. CONNECT TO MANHOLE WITH SPECIFIED CONNECTOR.
5. WHEN VENT CROSSES DRAINAGE DITCH, PROVIDE CEMENT STABILIZED SAND BEDDING
6. THE VENT IS TO BE INSTALLED WITHIN THE RIGHT OF WAY.
7. SEE COH STANDARD SPECIFICATIONS FOR PROTECTIVE COATING REQUIREMENTS FOR EXPOSED FRP PIPE.
8. THIS STANDARD DETAIL SETS THE MINIMUM REQUIREMENTS FOR THE MANHOLE VENT'S CONCRETE FOUNDATION AND VENT PIPE SIZE. THE EOR IS RESPONSIBLE FOR THE ADEQUACY AND DESIGN OF THE CONCRETE FOUNDATION AND VENT PIPE SIZE AND SHALL PROVIDE CONSTRUCTION DETAILS IN THE DRAWINGS.



SECTION (A)
CONCRETE FOUNDATION
(SEE NOTE 8)



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

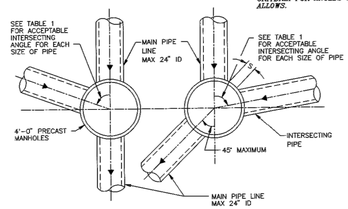
SANITARY SEWER
MANHOLE VENT FOR SEALED
MANHOLE
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 02082-06

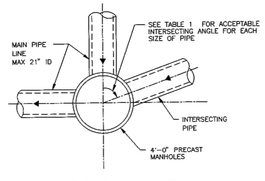
NOTES ON USE OF STANDARD DETAIL 02082-02

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 "S" OF 15.5" 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 RCP. THE DESIGN 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 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
CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
4'-0" DIAMETER PRECAST
CONCRETE MANHOLE NOTES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02082N-02

GC ENGINEERING, INC.
2505 PARK AVE,
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WASTEWATER

SHEET 01 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 127 OF 139	

GC Engineering, Inc.
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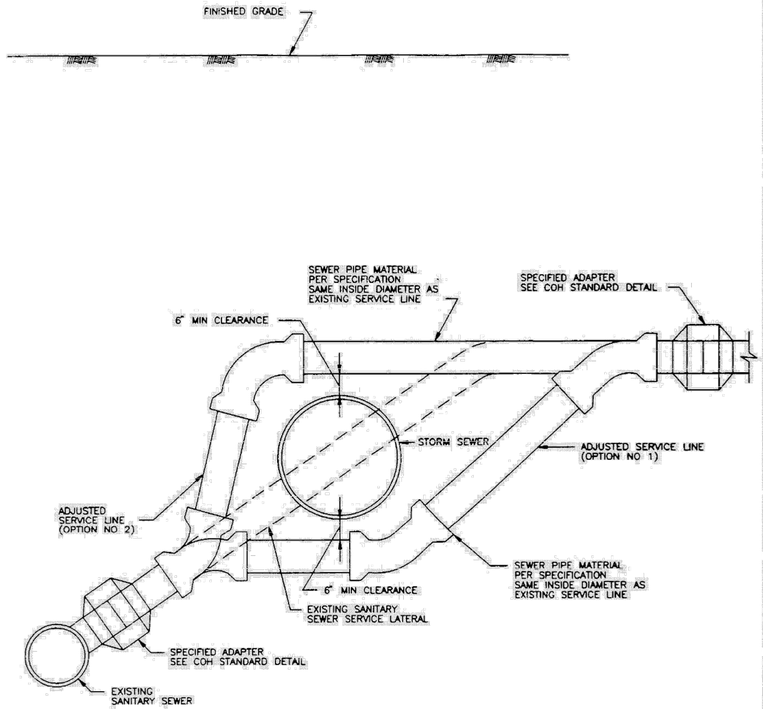
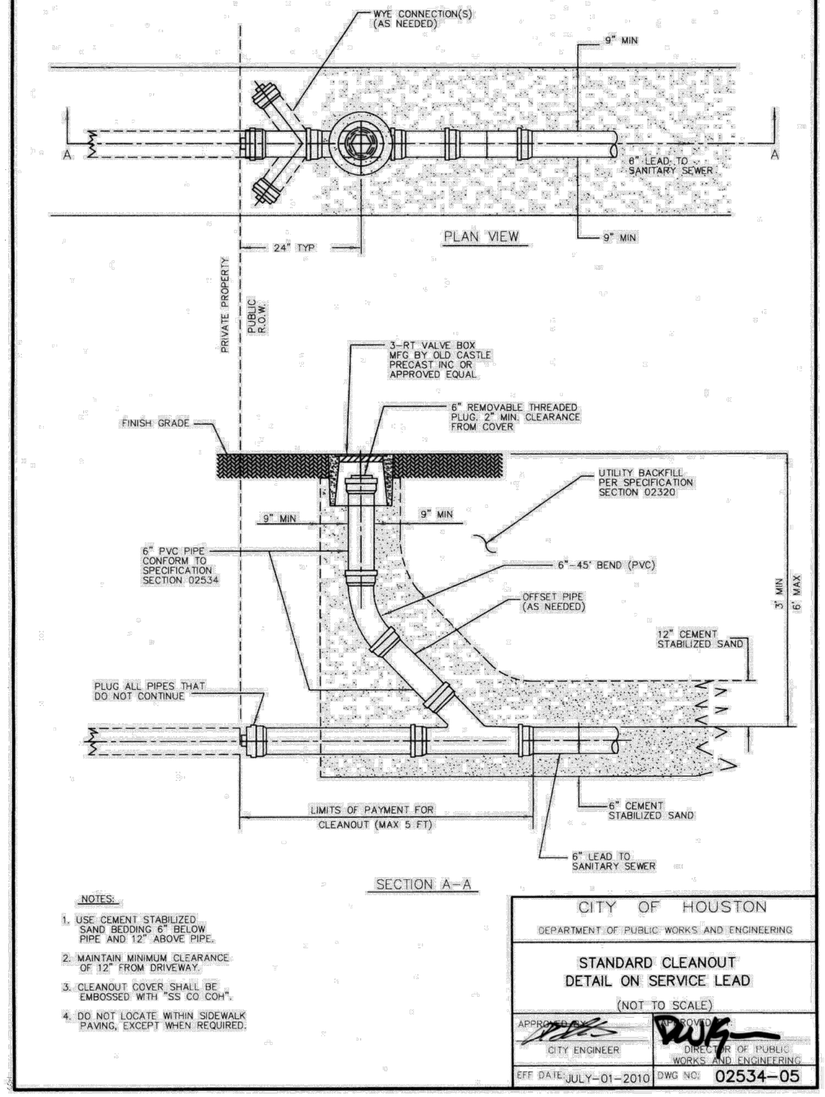


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
SERVICE LINE RECONNECTION
FOR STORM SEWER CONFLICTS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02534-03



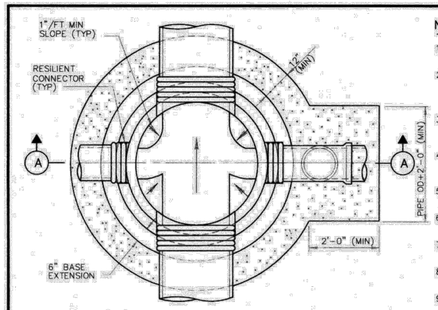
NOTES:

1. USE CEMENT STABILIZED SAND BEDDING 6" BELOW PIPE AND 12" ABOVE PIPE.
2. MAINTAIN MINIMUM CLEARANCE OF 12" FROM DRIVEWAY.
3. CLEANOUT COVER SHALL BE EMBOSSED WITH "SS CO COH".
4. DO NOT LOCATE WITHIN SIDEWALK PAVING, EXCEPT WHEN REQUIRED.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

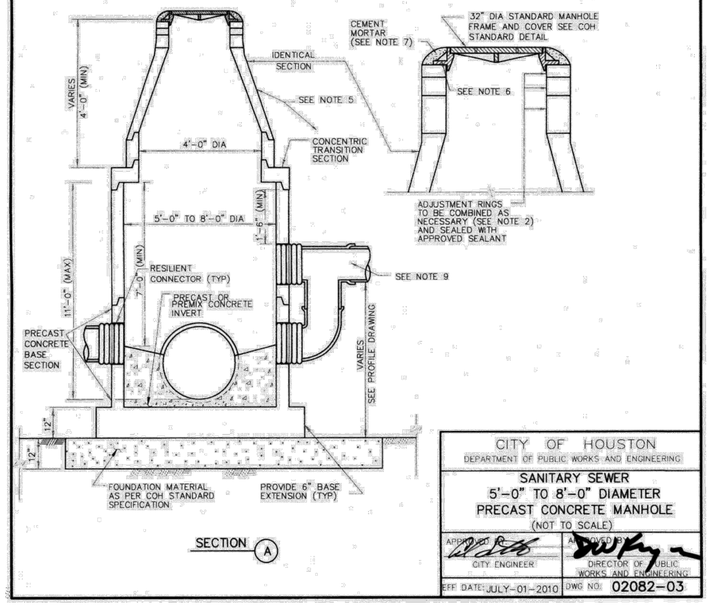
STANDARD CLEANOUT
DETAIL ON SERVICE LEAD
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02534-05



NOTES:

1. DEPTH OF MANHOLE DETERMINES SECTIONS REQUIRED.
2. PRECAST CONCRETE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12", THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-6".
3. MANHOLE WALL THICKNESS FOR DEPTH EXCEEDING 12'-0" SHALL BE DETERMINED TO MEET LOADING CONDITIONS, MIN THICKNESS 5".
4. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.
5. ALTERNATE ECCENTRIC CONE AND/OR TRANSITION SECTION MAY BE USED.
6. SEAT MANHOLE FRAME IN SEALANT PER COH STANDARD SPECIFICATION.
7. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
8. MIN REINFORCING IN THE PRECAST CONCRETE BASE SHALL BE # 5 @ 8 EW.
9. WHERE DIMENSIONAL RESTRICTIONS DICTATE, THE MANHOLE BASE HEIGHT SHALL BE ADJUSTED TO HAVE THE UPPER INLET PIPE OF THE DROP ENTER INTO THE 4'-0" DIAMETER RISER SECTION.



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER
5'-0" TO 8'-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: 02082-03

GC ENGINEERING, INC.
2505 PARK AVE,
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS - WASTEWATER

SHEET 02 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 128 OF 139	

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NOTES:

1.) MATERIAL SHALL MEET OR EXCEED MINIMUM REQUIREMENTS OF ASTM A36 CARBON STEEL.

2.) TOP AND BOTTOM RINGS SHALL HAVE A CONTINOUS WELD.

3.) ALL "M5" STYLE RISERS ARE FOR HEIGHT ADJUSTMENTS EQUAL TO OR LESS THAN THE THICKNESS OF THE MANHOLE COVER.

4.) EACH RISER IS CUSTOM FABRICATED FROM MEASUREMENTS PROVIDED WITH EACH ORDER. REQUIRED MEASUREMENTS INCLUDE THE FOLLOWING:
A. EXIST. MANHOLE COVER DIAMETER - TOP & BOTTOM
B. EXISTING MANHOLE COVER THICKNESS
C. REQUIRED HEIGHT OF ADJUSTMENT

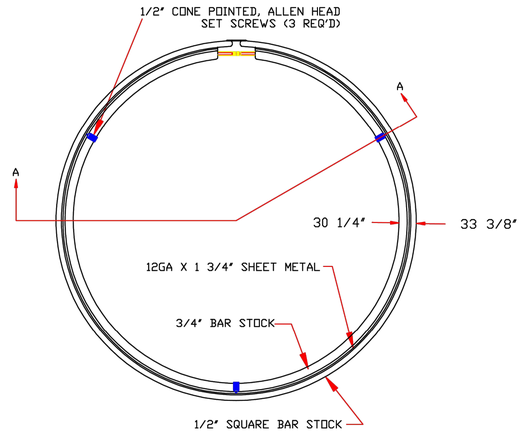
5.) MINIMUM RECOMMENDED HEIGHT OF ADJUSTMENT FOR REPAVING PROJECTS IS 1".

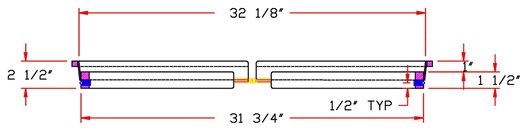
6.) HEIGHT ADJUSTMENTS ARE AVAILABLE IN 1/4" INCREMENTS.

7.) DURING INSTALLATION CHECK FOR FULL BEARING OF LOWER FRAME SECTION ON EXISTING CASTING.

8.) DIMENSIONS MAY VARY TO MEET EXISTING FIELD CONDITIONS. ANY CHANGE IN DIMENSIONS SHALL BE APPROVED BY THE OWNER.

9.) AFTER FABRICATION, RISERS ARE COATED WITH EITHER A WATER BASED BITUMINOUS ASPHALT EMULSION PAINT OR BASF E-COAT W/ CHARCOAL BLACK TOPCOAT.





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

STEEL ADJUSTING RISER

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: XX-XX-XX	DWG. NO: 02084-02A

NOTES:

1.) MATERIAL SHALL MEET OR EXCEED MINIMUM REQUIREMENTS OF ASTM A36 CARBON STEEL.

2.) TOP AND BOTTOM RINGS SHALL HAVE A CONTINOUS WELD.

3.) ALL "M5" STYLE RISERS ARE FOR HEIGHT ADJUSTMENTS EQUAL TO OR LESS THAN THE THICKNESS OF THE MANHOLE COVER.

4.) EACH RISER IS CUSTOM FABRICATED FROM MEASUREMENTS PROVIDED WITH EACH ORDER. REQUIRED MEASUREMENTS INCLUDE THE FOLLOWING:
A. EXIST. MANHOLE COVER DIAMETER - TOP & BOTTOM
B. EXISTING MANHOLE COVER THICKNESS
C. REQUIRED HEIGHT OF ADJUSTMENT

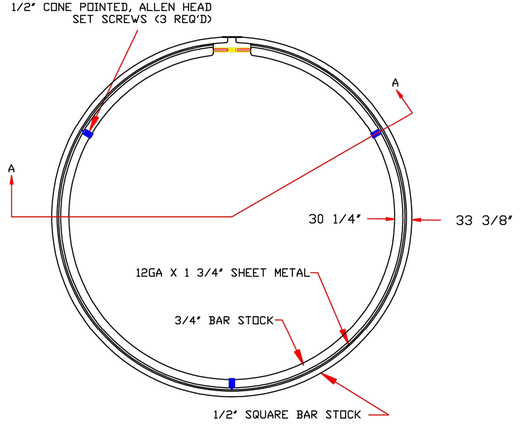
5.) MINIMUM RECOMMENDED HEIGHT OF ADJUSTMENT FOR REPAVING PROJECTS IS 1".

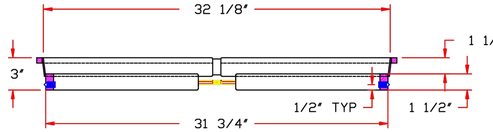
6.) HEIGHT ADJUSTMENTS ARE AVAILABLE IN 1/4" INCREMENTS.

7.) DURING INSTALLATION CHECK FOR FULL BEARING OF LOWER FRAME SECTION ON EXISTING CASTING.

8.) DIMENSIONS MAY VARY TO MEET EXISTING FIELD CONDITIONS. ANY CHANGE IN DIMENSIONS SHALL BE APPROVED BY THE OWNER.

9.) AFTER FABRICATION, RISERS ARE COATED WITH EITHER A WATER BASED BITUMINOUS ASPHALT EMULSION PAINT OR BASF E-COAT W/ CHARCOAL BLACK TOPCOAT.



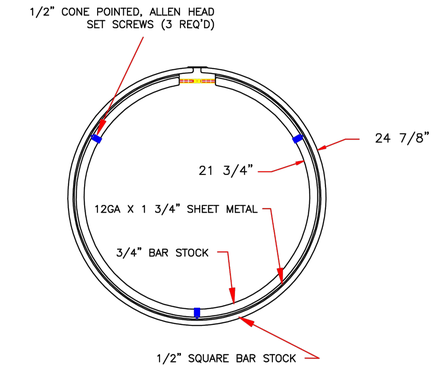


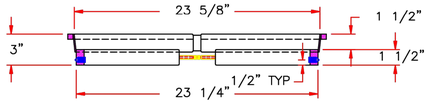
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

STEEL ADJUSTING RISER

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: XX-XX-XX	DWG. NO: 02084-02B





NOTES:

1.) MATERIAL SHALL MEET OR EXCEED MINIMUM REQUIREMENTS OF ASTM A36 CARBON STEEL.

2.) TOP AND BOTTOM RINGS SHALL HAVE A CONTINOUS WELD.

3.) ALL "M5" STYLE RISERS ARE FOR HEIGHT ADJUSTMENTS EQUAL TO OR LESS THAN THE THICKNESS OF THE MANHOLE COVER.

4.) EACH RISER IS CUSTOM FABRICATED FROM MEASUREMENTS PROVIDED WITH EACH ORDER. REQUIRED MEASUREMENTS INCLUDE THE FOLLOWING:
A. EXIST. MANHOLE COVER DIAMETER - TOP & BOTTOM
B. EXISTING MANHOLE COVER THICKNESS
C. REQUIRED HEIGHT OF ADJUSTMENT

5.) MINIMUM RECOMMENDED HEIGHT OF ADJUSTMENT FOR REPAVING PROJECTS IS 1".

6.) HEIGHT ADJUSTMENTS ARE AVAILABLE IN 1/4" INCREMENTS.

7.) DURING INSTALLATION CHECK FOR FULL BEARING OF LOWER FRAME SECTION ON EXISTING CASTING.

8.) DIMENSIONS MAY VARY TO MEET EXISTING FIELD CONDITIONS. ANY CHANGE IN DIMENSIONS SHALL BE APPROVED BY THE OWNER.

9.) AFTER FABRICATION, RISERS ARE COATED WITH EITHER A WATER BASED BITUMINOUS ASPHALT EMULSION PAINT OR BASF E-COAT W/ CHARCOAL BLACK TOPCOAT.

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

STEEL ADJUSTING RISER

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: XX-XX-XX	DWG. NO: 02084-09A

GC ENGINEERING, INC.
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TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WASTEWATER

SHEET 03 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 129 OF 139	

GC Engineering, Inc.
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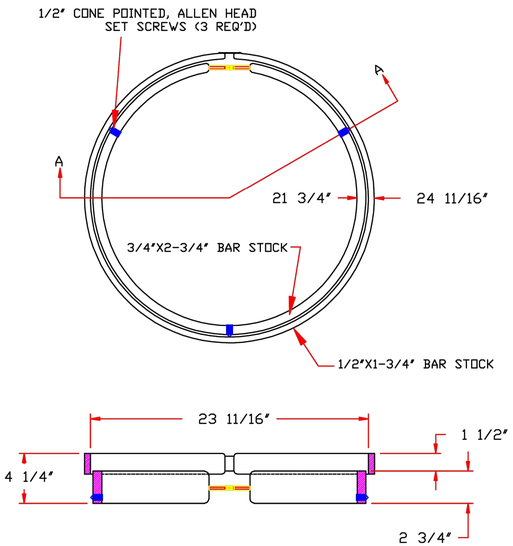


NOTES:

1.) MATERIAL SHALL MEET OR EXCEED MINIMUM REQUIREMENTS OF ASTM A36 CARBON STEEL.

2.) TOP AND BOTTOM RINGS SHALL HAVE A CONTINOUS WELD.

3.) ALL "M2" STYLE RISERS HAVE A MINIMUM HEIGHT OF ADJUSTMENT EQUAL TO THE MANHOLE COVER THICKNESS PLUS 1/4".

4.) EACH RISER IS CUSTOM FABRICATED FROM MEASUREMENTS PROVIDED WITH EACH ORDER. REQUIRED MEASUREMENTS INCLUDE THE FOLLOWING:
A. EXIST. MANHOLE COVER DIAMETER - TOP & BOTTOM
B. EXISTING MANHOLE COVER THICKNESS
C. REQUIRED HEIGHT OF ADJUSTMENT

5.) MINIMUM RECOMMENDED HEIGHT OF ADJUSTMENT FOR REPAVING PROJECTS IS 1".

6.) HEIGHT ADJUSTMENTS ARE AVAILABLE IN 1/4" INCREMENTS.

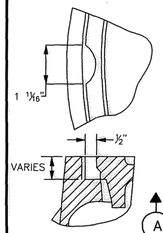
7.) DURING INSTALLATION CHECK FOR FULL BEARING OF LOWER FRAME SECTION ON EXISTING CASTING.

8.) DIMENSIONS MAY VARY TO MEET EXISTING FIELD CONDITIONS. ANY CHANGE IN DIMENSIONS SHALL BE APPROVED BY THE OWNER.

9.) AFTER FABRICATION, RISERS ARE COATED WITH EITHER A WATER BASED BITUMINOUS ASPHALT EMULSION PAINT OR BASF E-COAT W/ CHARCOAL BLACK TOPCOAT.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP	
STEEL ADJUSTING RISER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: XX-XX-XX	DWG. NO: 02084-09B

TYPE 1
OPEN PICK HOLE



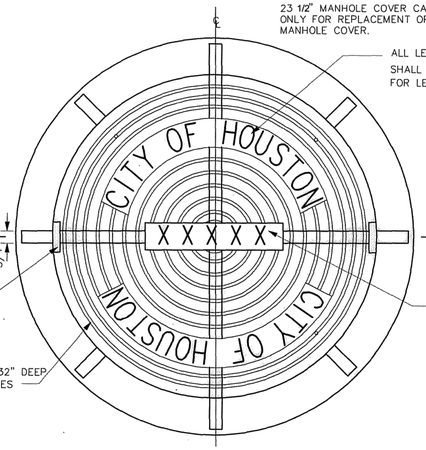
OTHER OPEN PICK HOLES ARE STANDARD ON CERTAIN COVERS.

1/2" x 2 1/2" RECESS (SEE SECTION OF COVER THRU RECESS)

GROOVES 3/16" DIA X 3/32" DEEP APPROX 3/4" TO 1" SPACES

NOTE:
23 1/2" MANHOLE COVER CAN BE USED ONLY FOR REPLACEMENT OF EXISTING MANHOLE COVER.

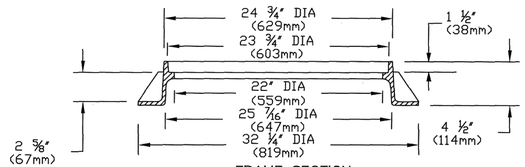
ALL LETTERS SHALL BE 2" HIGH AND SHALL BE RAISED 1/8" LINE WIDTH FOR LETTERS SHALL BE 1/4" WIDE.



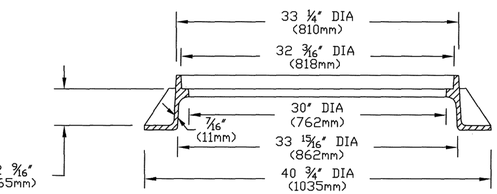
WORD "SANITARY OR WATER"

PLAN

23 1/2" MANHOLE COVER WITH FRAME



FRAME SECTION



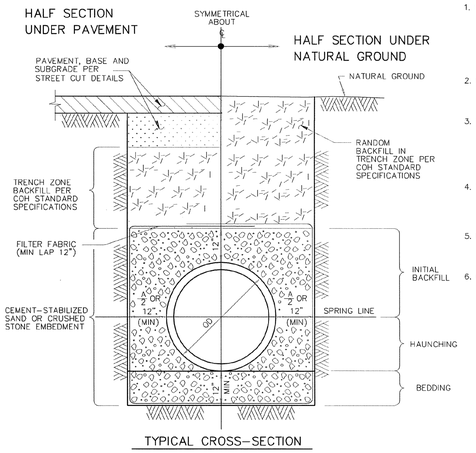
SECTION (A)
32" MANHOLE COVER WITH FRAME

1) NOTE: APPROXIMATE WEIGHTS.
FRAME- 170 LBS 77 kg
COVER- 270 LBS 123 kg
UNIT- 440 LBS 200 kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) MODEL V-14240 ASY OR APPROVED EQUAL

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
SANITARY SEWER AND WATER MANHOLE FRAME AND COVER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2016	DWG NO: 02090-01

HALF SECTION UNDER PAVEMENT

HALF SECTION UNDER NATURAL GROUND



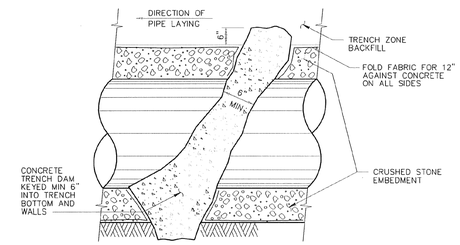
TYPICAL CROSS-SECTION

NOTES:

1. 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"

2. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
3. TRENCH DAM MAY BE FORMED OR UNFORMED.ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
4. TRENCH DAM SHALL BE PLACED AT LEAST 5 FT AWAY FROM ANY PIPELINE STRUCTURE.SEE SPECIFICATIONS FOR OTHER REQUIREMENTS.
5. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.
6. CEMENT-STABILIZED SAND IS PREFERRED FOR EMBEDMENT, BUT CRUSHED STONE MAY BE USED ONLY WHEN SPECIFIED ON THE PLANS.



LONGITUDINAL SECTION ALONG PIPE ℄
AT EMBEDMENT TRENCH DAM

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
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: JUL-01-2016	DWG NO: 02317-01

GC ENGINEERING, INC.
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PEARLAND, TEXAS 77581
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS - WASTEWATER

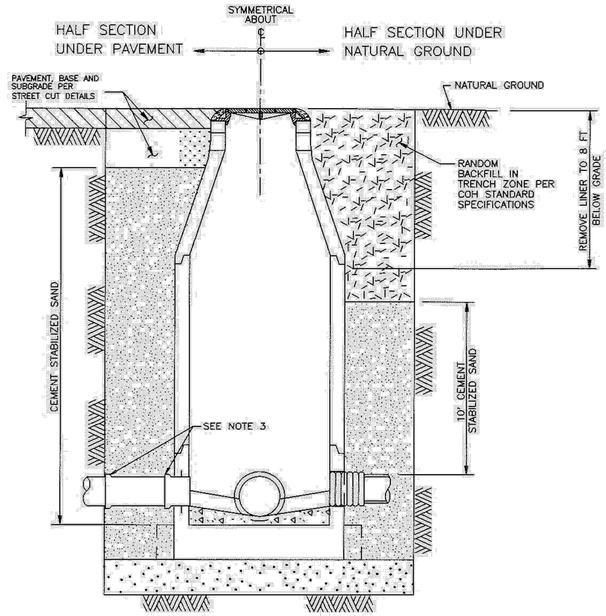
SHEET 04 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 130 OF 139	

GC Engineering, Inc.
M:\Projects\C - 0777B-COH-UnivBvd-SP1\Drawings\Standard Details-Wastewater-C0777B.dwg Feb 04, 2026 - 6:48pm nburrama\ku

NOTES:

1. GROUTING OF MANHOLE STRUCTURE ANNULAR SPACE WILL BE PERMITTED IN CASES WHERE INSUFFICIENT WORK SPACE EXISTS FOR PLACEMENT AND COMPACTATION OF CEMENT STABILIZED SAND, PER COH STANDARD SPECIFICATION FOR TUNNEL GROUT.
2. THIS DETAIL ALSO APPLIES TO BACKFILL OF SHAFTS WITHOUT STRUCTURES.
3. ARRANGE PIPE JOINTS AS SHOWN WHEN USING RIGID CONNECTION TO CAST IN PLACE MANHOLE BASE.

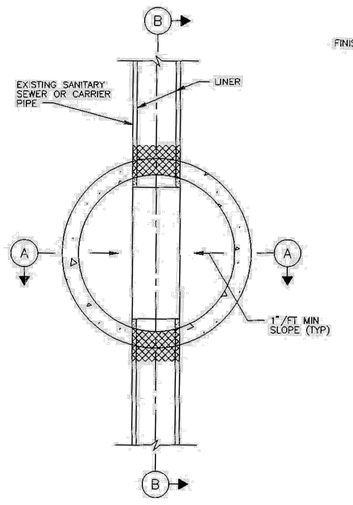


TYPICAL CROSS – SECTION

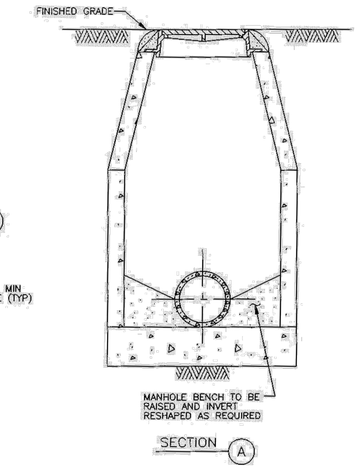
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER BACKFILL OF SHAFTS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02317-08

NOTES:

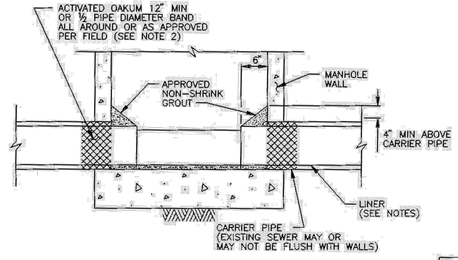
1. ANNULAR SPACE SHALL BE FILLED WITH NON-SHRINK GROUT, MINIMUM 12-INCH OR ONE HALF PIPE DIAMETER OR AS APPROVED BY ENGINEER.



PLAN



SECTION (A)

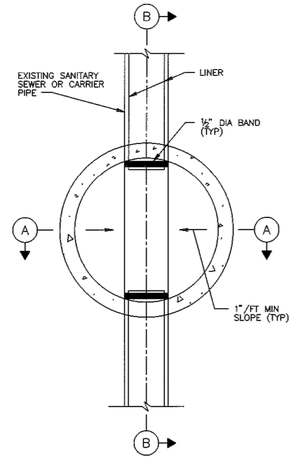


SECTION (B)

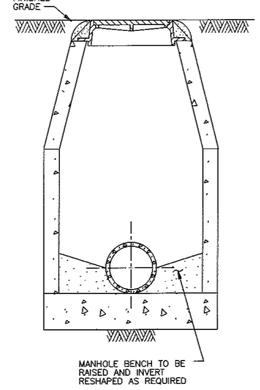
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SEALING OF SLIPLINING AT MANHOLE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-01

NOTES:

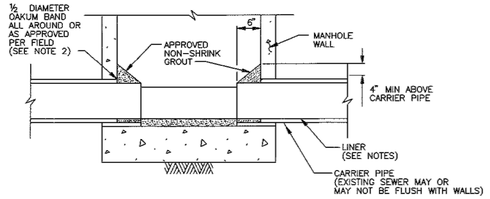
1. ALL LINER SHALL TIGHTLY FIT INSIDE THE EXISTING PIPE. ANNULAR SPACE, IF ANY, SHALL BE FILLED WITH NON-SHRINK GROUT, MINIMUM 12-INCH OR ONE-HALF PIPE DIAMETER.



PLAN



SECTION (A)



SECTION (B)

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SEALING OF CURED-IN-PLACE LINER AT MANHOLE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-02

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TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

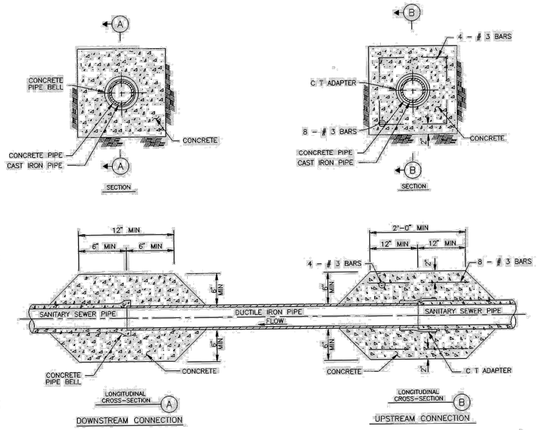
STANDARD DETAILS – WASTEWATER

SHEET 05 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 131 OF 139	

GC Engineering, Inc.
M:\Projects\C - 07778-COH-UnivBlvd-SP1\Drawings\Standard Details-Wastewater-C07778.dwg Feb 04, 2026- 6:48pm nburroughs

NOTE:
1. THE CONTRACTOR SHALL CENTER A MINIMUM OF 18 FOOT JOINT OF DUCTILE IRON PIPE OR C900 PVC PIPE ACROSS THE CENTER OF THE PROPOSED STORM SEWER.

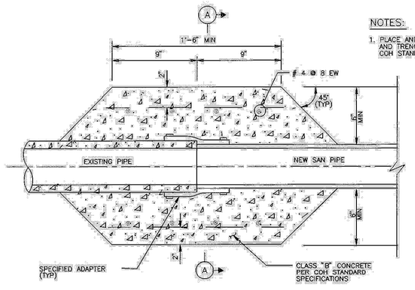


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

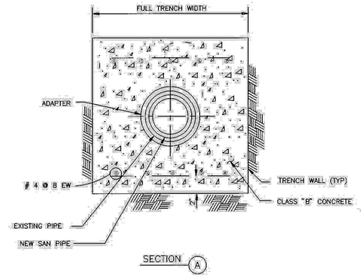
SANITARY SEWER
DUCTILE IRON PIPE
STORM SEWER CROSSING
(NOT TO SCALE)

APPROVED BY CITY ENGINEER	APPROVED BY DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-03

NOTES:
1. PLACE AND COMPACT EMBEDMENT AND TRENCH ZONE BACKFILL PER COH STANDARD SPECIFICATIONS.



LONGITUDINAL SECTION

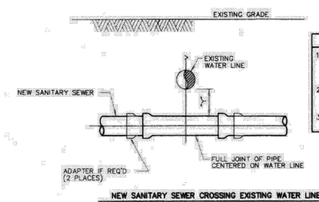


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
PIPE TRANSITION FOR 36" SEWER AND SMALLER
(NOT TO SCALE)

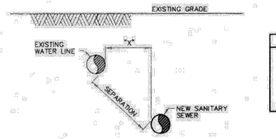
APPROVED BY CITY ENGINEER	APPROVED BY DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-04

NOTES:
1. SANITARY SEWER MUST BE BELOW WATER LINE WHEREVER POSSIBLE. WHEN WATERLINE IS BELOW THE SANITARY SEWER PROVIDE MINIMUM 2 FT SEPARATION, AND INSTALL PIPE IN ACCORDANCE TO CHAPTER 7, TABLE 7.3 OF COH DESIGN MANUAL.
2. WHEN PRESSURE-RATED PIPE IS REQUIRED, PROVIDE PIPE WITH MINIMUM 150 psi PRESSURE RATING.
3. ADAPTERS MUST BE FACTORY MOLDED OR FABRICATED, WITH RING STIFFNES AT LEAST EQUAL TO THE ADJOINING SANITARY SEWER PIPE, AND USING RESILIENT GASKET OR SEAL MATERIAL. FLEXIBLE RUBBER "BOOT" TYPE ADAPTERS WILL NOT BE ACCEPTED.
4. INSTALL FORCE MAINS SAME AS FOR GRAVITY SEWER, USING SPECIFIED PRESSURE PIPE.
5. "Y" MUST ALWAYS BE GREATER THAN OR EQUAL TO 1 FT FOR PRESSURE RATED SS AND 2 FT FOR NON-PRESSURE RATED SS.
6. "X" MUST BE GREATER THAN OR EQUAL TO 4 FT.
7. ALTERNATIVES MAY BE SHOWN ON THE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS.
8. SEPARATION REQUIREMENTS SHOWN HERE DO NOT APPLY TO SERVICE CONNECTIONS – REFER TO PLUMBING CODE FOR APPLICABLE REQUIREMENTS.



INSTALLATION REQUIREMENTS
1. IF "Y" IS GREATER THAN 1' AND "Y" IS LESS THAN 2', USE MINIMUM 18 FT JOINT OF PRESSURE-RATED PIPE PER COH STANDARD DRAWING.
2. IF "Y" IS GREATER THAN 2' AND "Y" IS LESS THAN 9', USE GRAVITY SEWER PIPE IN CEMENT-STABILIZED SAND EMBEDMENT.
3. IF "Y" IS GREATER THAN 9', USE STANDARD EMBEDMENT AND NORMAL JOINT SPACING.

NEW SANITARY SEWER CROSSING EXISTING WATER LINE



INSTALLATION REQUIREMENTS
1. IF SEPARATION IS LESS THAN 9', USE PRESSURE-RATED PIPE. MH TO MH, "X" MUST BE AT LEAST 4 FT. VERTICAL SEPARATION MUST BE AT LEAST 2 FT.
2. IF SEPARATION IS 9' OR GREATER, USE STANDARD PIPE AND EMBEDMENT.

NEW SANITARY SEWER PARALLEL TO EXISTING WATER LINE

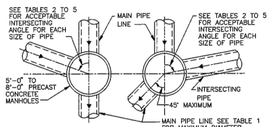
INSTALLING SANITARY SEWERS CROSSING OR PARALLEL TO WATER LINES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

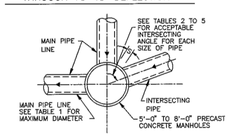
SANITARY SEWER
INSTALLING SANITARY SEWERS
CROSSING OR PARALLEL TO WATER LINES
(NOT TO SCALE)

APPROVED BY CITY ENGINEER	APPROVED BY DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02531-05

NOTES ON USE OF STANDARD DETAIL 02082-03



FOR MAIN PIPES FROM STRAIGHT THROUGH TO 45° DEFLECTION



FOR MAIN PIPE WITH 45° TO 90° DEFLECTION

TABLE 1
MAXIMUM MAIN PIPE DIAMETER (I.D) IN INCHES

MANHOLE DIAMETER (FT)	STRAIGHT THROUGH TO 45° DEFLECTION	WITH 90° DEFLECTION	TABLE TO BE USED
5	36	27	2
6	42	33	3
7	48	36	4
8	60	42	5

TABLE 2
MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR 5'-0" DIA MANHOLE

INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES										
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"
8	49	50	54	58	61	66	69	73	77	82	86
10		53	57	61	64	68	71	76	79	84	88
12			61	65	68	72	75	80	83	88	–
15				68	71	75	79	83	87	–	–
18					75	79	82	87	90	–	–
21						83	86	90	–	–	–
24							90	–	–	–	–
27								–	–	–	–
30									–	–	–
33										–	–
36											–

TABLE 3
MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR 6'-0" DIA MANHOLE

INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES										
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"
8	40	42	45	49	51	54	57	61	63	67	70	78
10		44	47	50	53	56	59	62	65	69	72	79
12			50	54	56	60	62	66	68	72	75	83
15				57	59	62	65	69	71	75	78	85
18					62	65	68	71	74	78	81	88
21						68	71	74	77	81	84	–
24							74	77	80	84	87	–
27								83	85	89	–	–
30									–	–	–	–
33										–	–	–
36											–	–
42												–

TABLE 4
MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR 7'-0" DIA MANHOLE

INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES											
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"	48"
8	35	36	39	42	44	47	49	52	54	57	59	65	71
10		38	40	43	45	48	50	53	55	59	61	67	73
12			43	46	48	51	53	56	58	61	64	70	76
15				48	50	53	55	58	61	64	66	72	78
18					56	58	61	63	66	69	74	74	81
21					58	60	63	66	69	71	77	83	
24						63	66	68	71	74	79	86	
27							70	72	76	78	84	90	
30								78	81	83	89	–	
33									86	88	–	–	
36										–	–	–	
42											–	–	
48												–	

TABLE 5
MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR 8'-0" DIA MANHOLE

INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES													
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"	48"	54"	60"
8	30	32	34	36	38	41	43	45	47	50	52	56	61	67	74
10		33	35	38	40	42	44	46	48	51	53	58	63	68	77
12			38	40	42	44	46	49	51	53	55	60	65	71	79
15				42	44	47	48	51	53	56	58	62	67	73	81
18					46	49	51	53	55	58	66	64	70	75	83
21						51	53	55	57	60	62	67	72	77	85
24							55	57	59	62	64	69	74	79	89
27								61	63	66	68	73	78	83	–
30									67	70	72	77	82	87	–
33										74	76	81	86	–	–
36											81	86	–	–	–
42												–	–	–	–
48													–	–	–
54														–	–
60															–

* NOT APPLICABLE (INTERSECTING PIPE GREATER THAN MAIN PIPE)

NOTES TO SPECIFIER:
1. "–" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.
2. TABLES 2 TO 5 ARE BASED ON A MIN SEPARATION DISTANCE "Z" OF 15.5" 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 TABLES 2 TO 5 ARE BASED ON RCP. THE DESIGN ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLES ALLOW.
4. LIMITATIONS TO BASE HEIGHT ARE BASED ON RESISTING BUOYANT UPLIFT FORCES BASED ON WATER AT GROUND SURFACE AND A SAFETY FACTOR OF 1.20.
5. A SPECIAL DESIGN IS REQUIRED IF MANHOLE ID IS GREATER THAN 8 FT.

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

SANITARY SEWER
5'-0" TO 8'-0" DIAMETER
PRECAST CONCRETE MANHOLE NOTES
(NOT TO SCALE)

APPROVED BY CITY ENGINEER	APPROVED BY DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02082N-03

GC ENGINEERING, INC.
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WASTEWATER

SHEET 06 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 132 OF 139	

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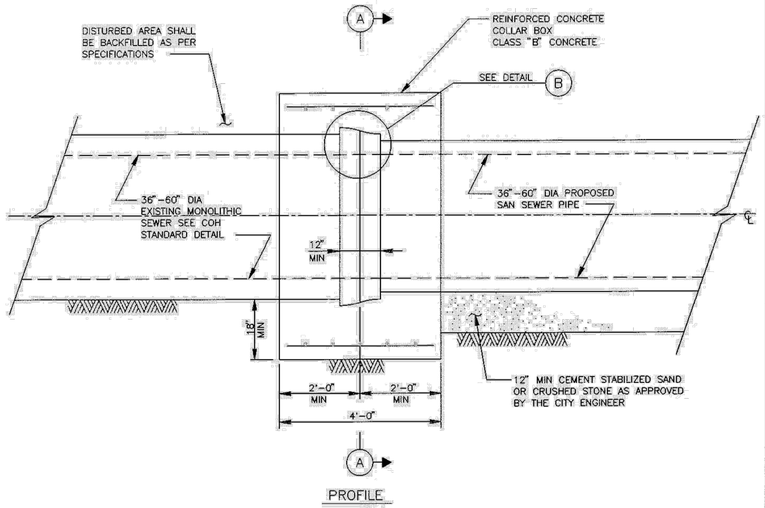
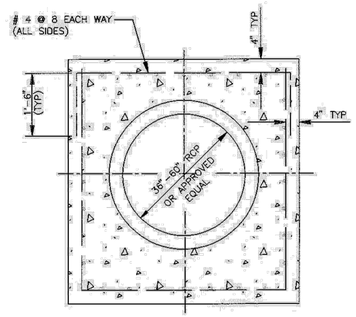
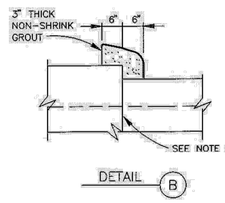


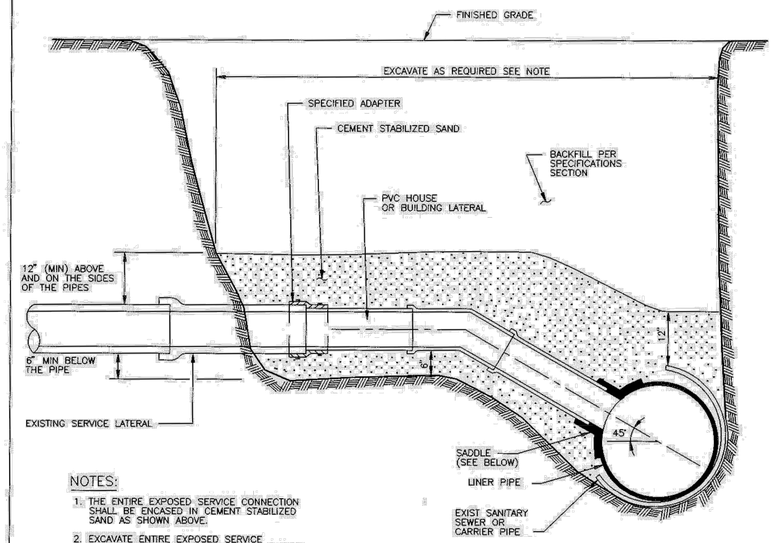




NOTES:

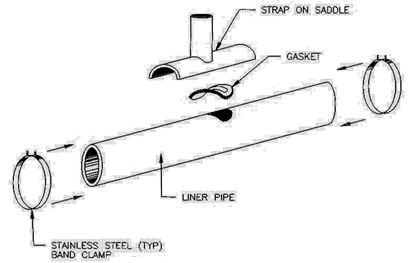
1. EXISTING MRC OR RCP SHALL BE SAW CUT AT LOCATION APPROVED BY THE CITY ENGINEER (SMOOTH END).
2. PIPE EDGES SHALL TOUCH EACH OTHER. ALL GAPS IN JOINT SHALL BE FILLED WITH QUICK SETTING NON SHRINK GROUT SEE SPECIFICATION.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER CONCRETE COLLAR DETAIL FOR CONNECTING EXISTING MONOLITHIC SEWERS TO PIPE SEWERS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-07



NOTES:

1. THE ENTIRE EXPOSED SERVICE CONNECTION SHALL BE ENCASED IN CEMENT STABILIZED SAND AS SHOWN ABOVE.
2. EXCAVATE ENTIRE EXPOSED SERVICE CONNECTION SHALL BE ENCASED IN CEMENT STABILIZED SAND AS SHOWN ABOVE.

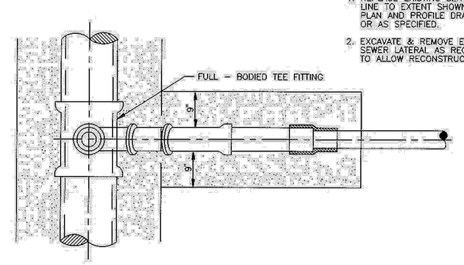


LATERAL STRAP-ON SADDLE

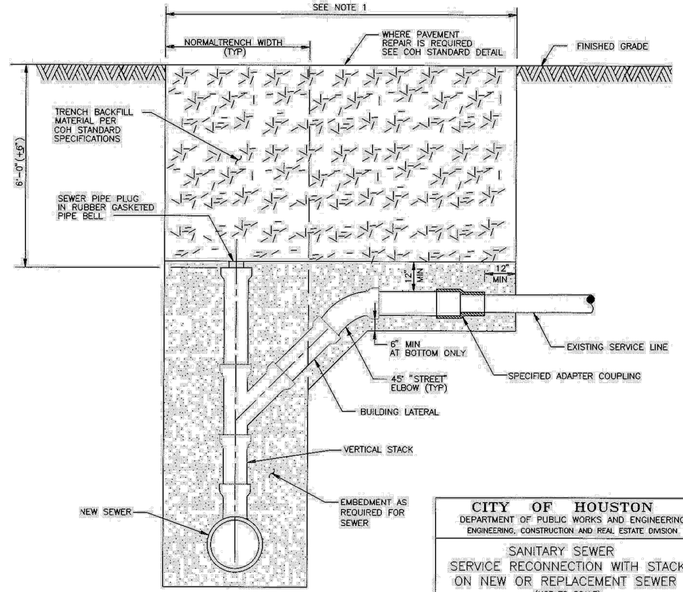
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SERVICE RECONNECTION FOR LINER PIPE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02534-01

NOTES:

1. REPLACE EXISTING SERVICE LINE TO EXTENT SHOWN ON PLAN AND PROFILE DRAWINGS, OR AS SPECIFIED.
2. EXCAVATE & REMOVE EXISTING SEWER LATERAL AS REQUIRED TO ALLOW RECONSTRUCTION.



PLAN



CROSS-SECTION OF SEWER AT SERVICE CONNECTION

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SERVICE RECONNECTION WITH STACK ON NEW OR REPLACEMENT SEWER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02534-02

GC ENGINEERING, INC.
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TBPE Registration No. F-7889

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS - WASTEWATER

SHEET 07 OF 07

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 133 OF 139	

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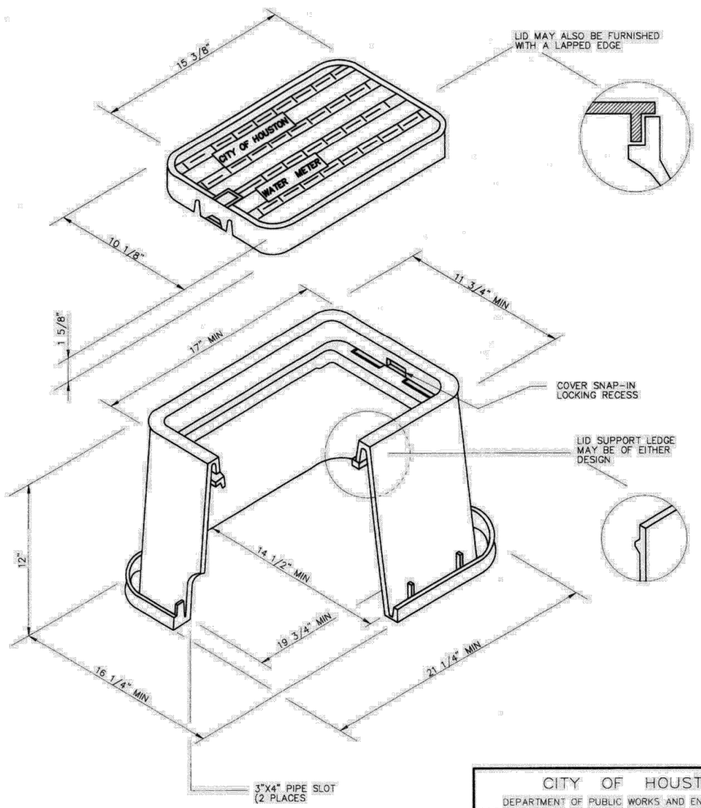
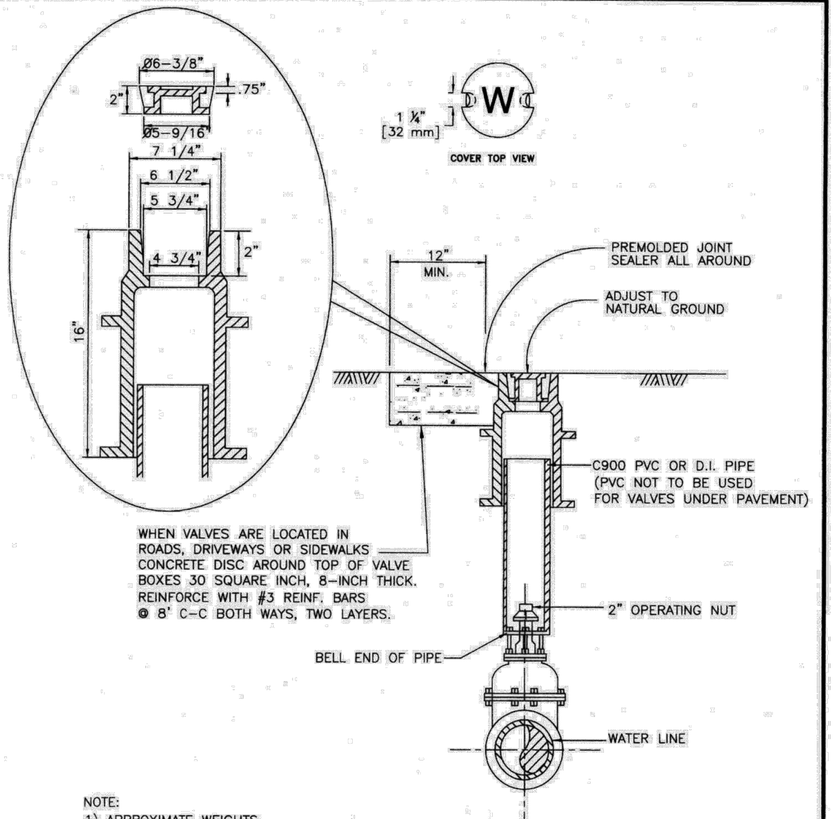


NOTE

1. LID MUST BE ABLE TO ACCEPT THE CITY'S AMR TRANSMITTING ENDPOINT.

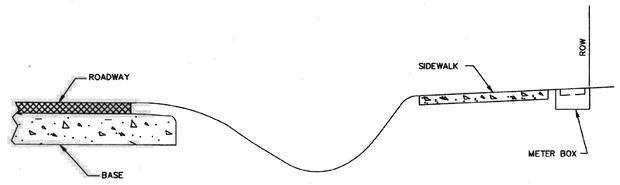
CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
STANDARD PLASTIC METER BOX FOR 5/8" AND 1" METERS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02085-01



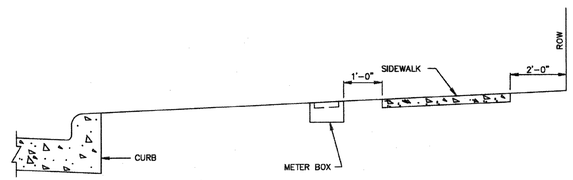
NOTE:

1) APPROXIMATE WEIGHTS
   FRAME – 46 LBS
   COVER – 10 LBS
2) MATERIAL – GRAY IRON ASTM A48 CL35B

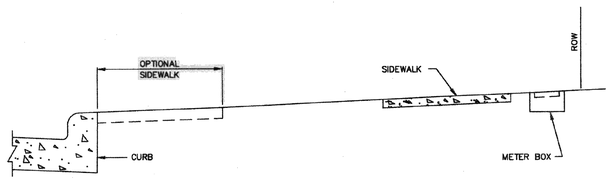
CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
VALVE BOX DETAIL (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY 01, 2010	DWG. NO: 02085-03



OPEN DITCH STREET



CURB STREET



CURB STREET

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
LOCATION OF WATER METER BOX FOR 2" DIAMETER AND LESS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02085-02

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TBPE Registration No. F-7889
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WATER

SHEET 01 OF 05

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 134 OF 139	

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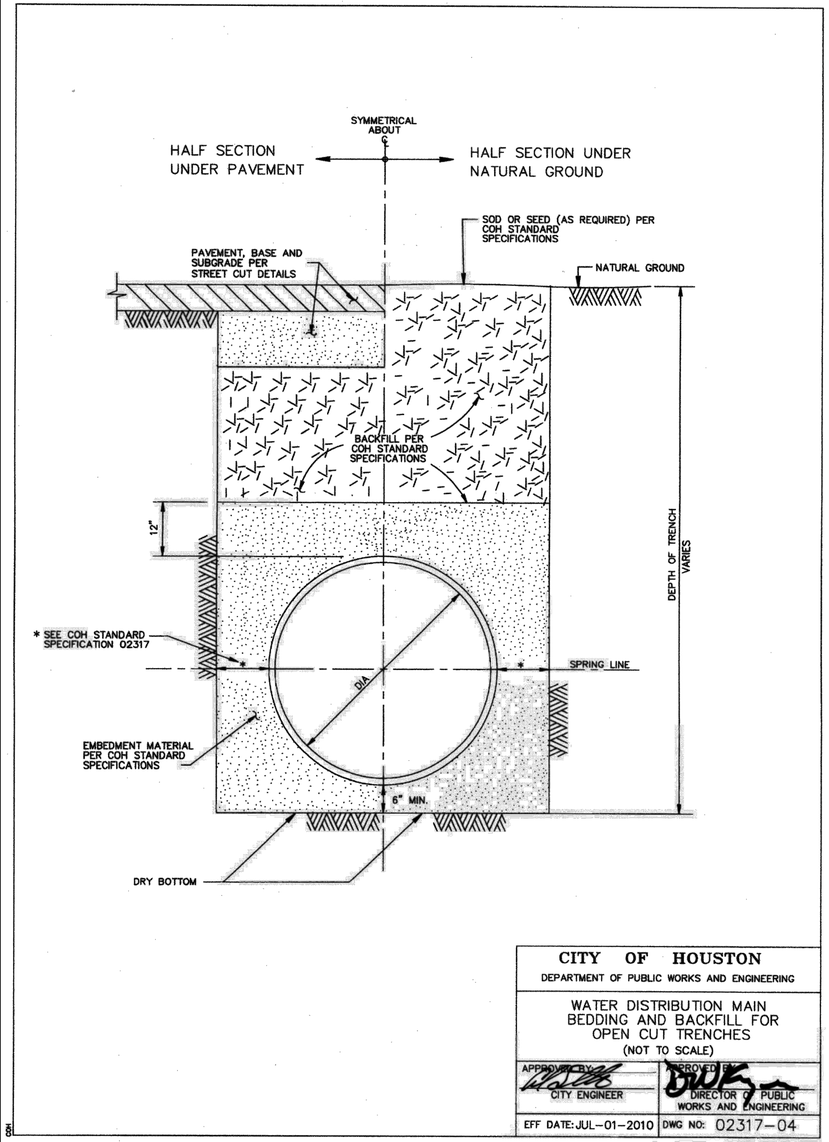
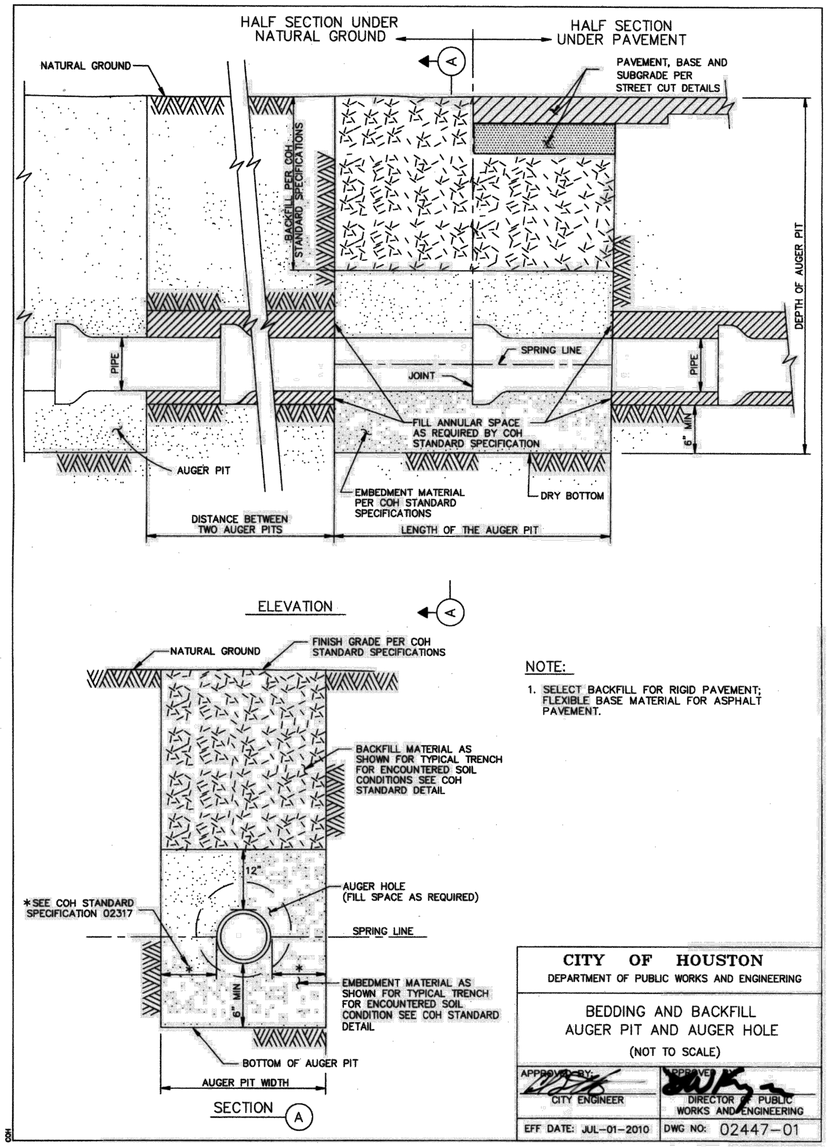


CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
WATER DISTRIBUTION MAIN BEDDING AND BACKFILL FOR OPEN CUT TRENCHES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02317-04



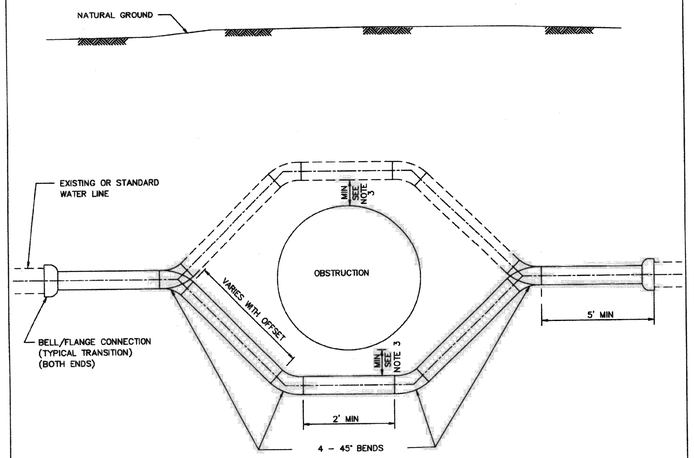
NOTE:

1. SELECT BACKFILL FOR RIGID PAVEMENT; FLEXIBLE BASE MATERIAL FOR ASPHALT PAVEMENT.

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
BEDDING AND BACKFILL AUGER PIT AND AUGER HOLE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02447-01

NOTE:

1. MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH WATER LINE STANDARD SPECIFICATIONS.
2. RESTRAIN EXISTING PIPING BEYOND STEEL SECTION AS REQUIRED TO PREVENT MOVEMENT.
3. AS PER DESIGN GUIDELINE.



PIPE OFFSET ALTERNATES

1. DUCTILE IRON PIPE PRESSURE 250 PSI WITH APPROVED RESTRAINED JOINTS.
2. PVC PIPE WITH INTEGRAL RESTRAINED JOINT SYSTEM, OR DUCTILE – IRON RESTRINED JOINT FITTINGS, EPOXY LINED AND COATED. USE 250 PSI AWWA C900 DR 14 FOR PVC RESTRAINED JOINTS.
3. PVC NOT ALLOWED FOR GREATER THAN 20 FT OF COVER OR FOR DIAMETER LARGER THAN 20 IN.
4. USE ONLY DUCTILE IRON AND PVC PRODUCTS LISTED ON OCE DIVISION APPROVED PRODUCTS LIST AND IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS.

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02511-01

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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WATER

SHEET 02 OF 05

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 135 OF 139	

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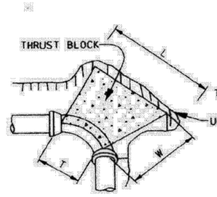
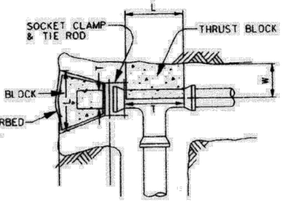
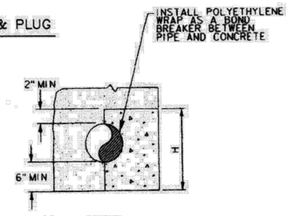


90° BEND

(45° BENDS SIMILAR)



TEE & PLUG



PIPE
CROSS SECTION

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	1.73
SILT	1500	1.41
SANDY SILT	3000	1.00
SAND	4000	0.87
SANDY CLAY	6000	0.71
HARD CLAY	9000	0.58

NOTES:

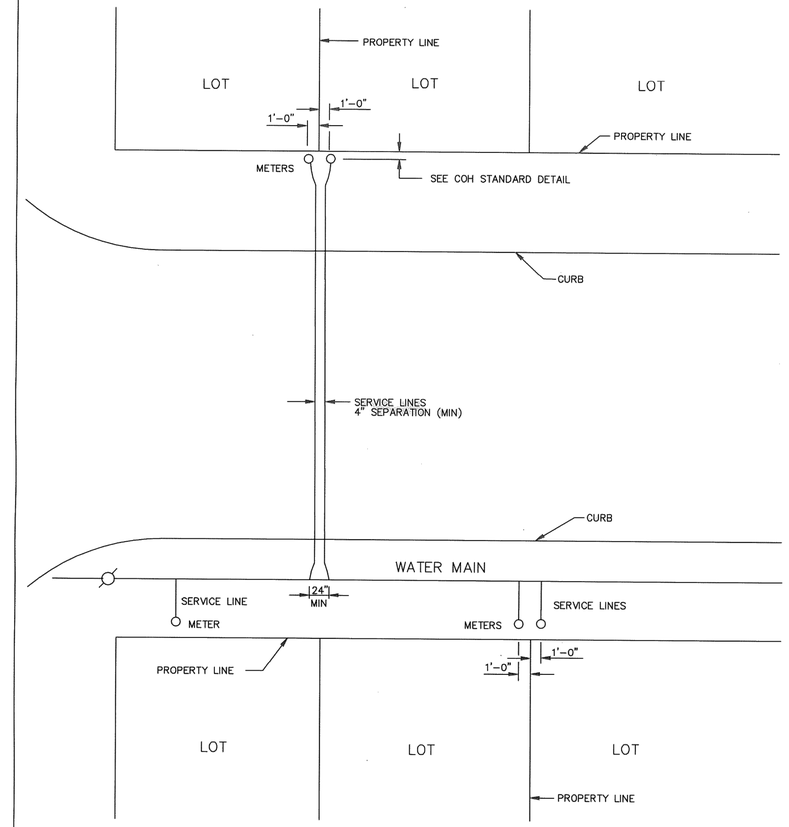
1. DEPTH "W" MAY BE GREATER THAN SPECIFIED TO ALLOW WORKING SPACE.
2. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.
3. PROVIDE CONCRETE IN ACCORDANCE 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)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY–01–2010 | DWG NO: 02511–02



GENERAL NOTES:

1. TWO SERVICE LINES MAY BE INSTALLED IN SAME TRENCH PROVIDING 4" CLEARANCE IS MAINTAINED.
2. ONE METER PER SERVICE LINE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

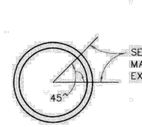
TYPICAL 3/4" THROUGH 2"
SERVICE ARRANGEMENTS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL–01–2016 | DWG NO: 02512–01

PIPE TAPPING SCHEDULE				
WATER MAIN TYPE AND DIAMETER	SERVICE SIZE			
	3/4"	1"	1 1/2"	2"
4" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
4" ASBESTOS (EXISTING) CEMENT	WBSS	WBSS	DSS, WBSS	DSS, WBSS
4" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" ASBESTOS (EXISTING) CEMENT	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
6" AND 8" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" CAST IRON OR DUCTILE IRON	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" ASBESTOS (EXISTING) CEMENT	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
12" PVC (AWWA C900)	DSS, WBSS	DSS, WBSS	DSS, WBSS	DSS, WBSS
16" AND UP CAST IRON OR DUCTILE IRON	DWBSS	DWBSS	DWBSS	DWBSS
16" AND UP ASBESTOS (EXISTING) CEMENT	DWBSS	DWBSS	DWBSS	DWBSS
16" AND UP PVC (AWWA C900)	DWBSS	DWBSS	DWBSS	DWBSS

DSS – DUAL STRAP SADDLES
WBSS – WIDE BAND STRAP SADDLES
DWBSS – DUAL WIDE BAND STRAP SADDLES



SERVICE TAPS TO BE MADE IN THIS ZONE EXCEPT FOR PVC FASTTAP

BLOW–OFF & CHLORINATION TAPS ARE MADE IN VERTICAL POSITION.

WIDE BAND SINGLE SADDLE OR DUAL SADDLES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SERVICE TAPS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL–01–2010 | DWG NO: 02512–02

GC ENGINEERING, INC.
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TBPE Registration No. F-7889

SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP–1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WATER

SHEET 03 OF 05

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N–100006–0001–3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 136 OF 139	

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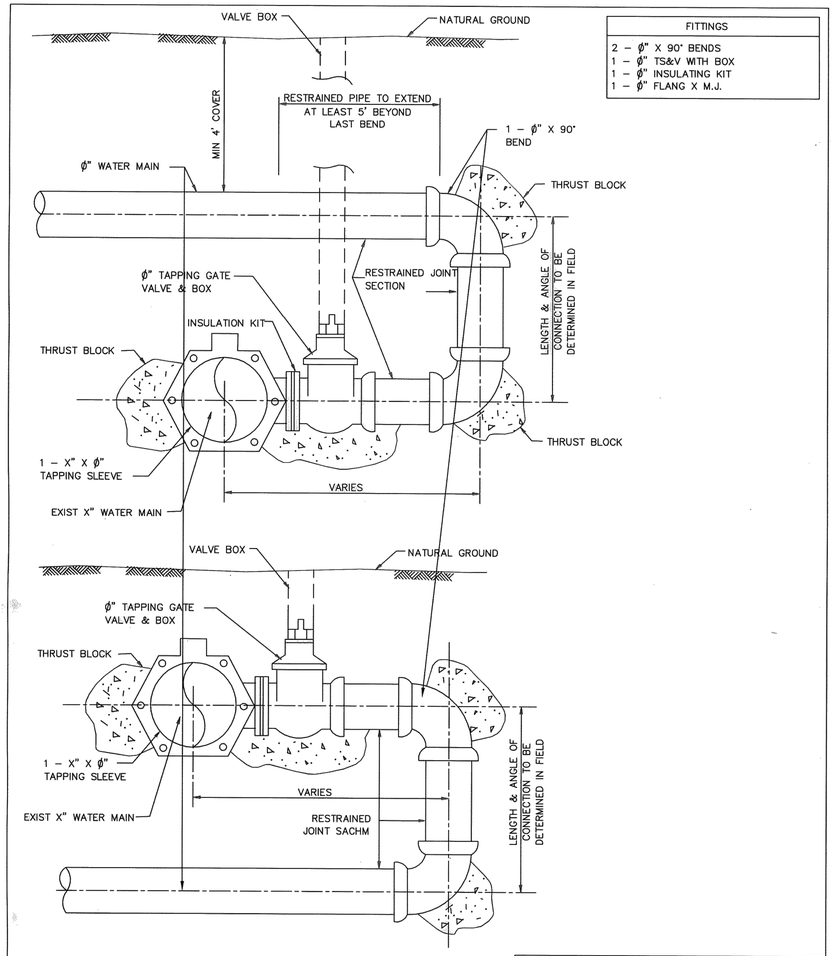


FITTINGS
2 – ϕ" X 90° BENDS
1 – ϕ" TS&V WITH BOX
1 – ϕ" INSULATING KIT
1 – ϕ" FLANG X M.J.

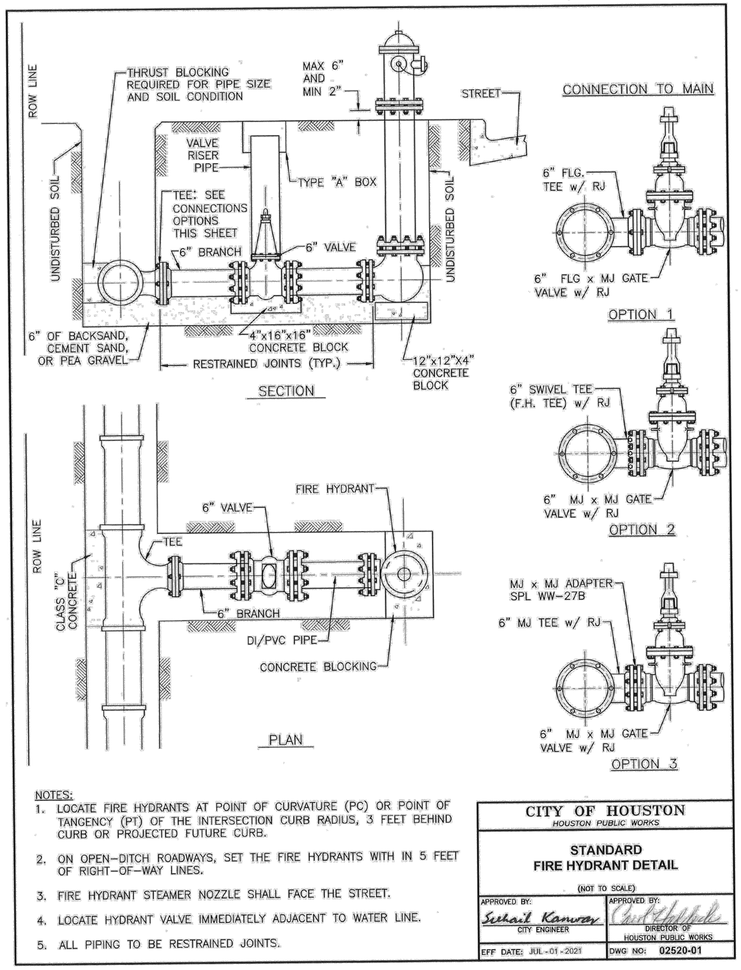
GENERAL NOTES:

1. X" AND ϕ" DENOTE RUN AND BRANCH LINE SIZES RESPECTIVELY.
2. 90° BENDS ARE TO BE ROLLED TO PROVIDE CLEARANCE FOR VALVE BOX.
3. WATER MAIN ASSEMBLY FOR BACK TAP SAME FOR PROPOSED WATER MAIN UNDER EXISTING MAIN.
4. PROVIDE RESTRAINED JOINT PIPE AS SHOWN.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

BACK TAP
ON EXISTING LINE
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2016	DWG NO: 02512-03



NOTES:

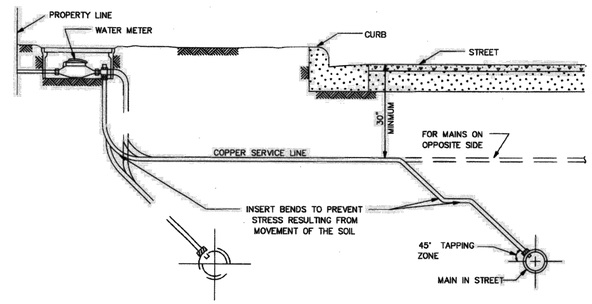
1. LOCATE FIRE HYDRANTS AT POINT OF CURVATURE (PC) OR POINT OF TANGENCY (PT) OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITH IN 5 FEET OF RIGHT-OF-WAY LINES.
3. FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET.
4. LOCATE HYDRANT VALVE IMMEDIATELY ADJACENT TO WATER LINE.
5. ALL PIPING TO BE RESTRAINED JOINTS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

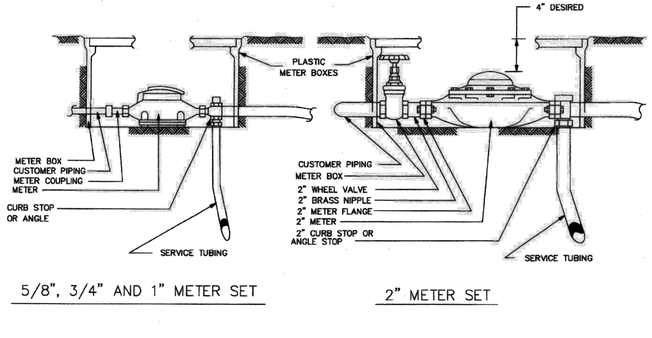
STANDARD FIRE HYDRANT DETAIL
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
Serhat Kamuran	
CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 02520-01

NOTES:
1 1/2" METER SET IS SAME AS 2" EXCEPT WHEEL VALVE IS NOT REQUIRED.



TYPICAL SECTION SERVICE LINE



5/8", 3/4" AND 1" METER SET

2" METER SET

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL METER SETTINGS
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02526-01

GC ENGINEERING, INC.
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TBPE Registration No. F-7889
SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WATER

SHEET 04 OF 05

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 137 OF 139	

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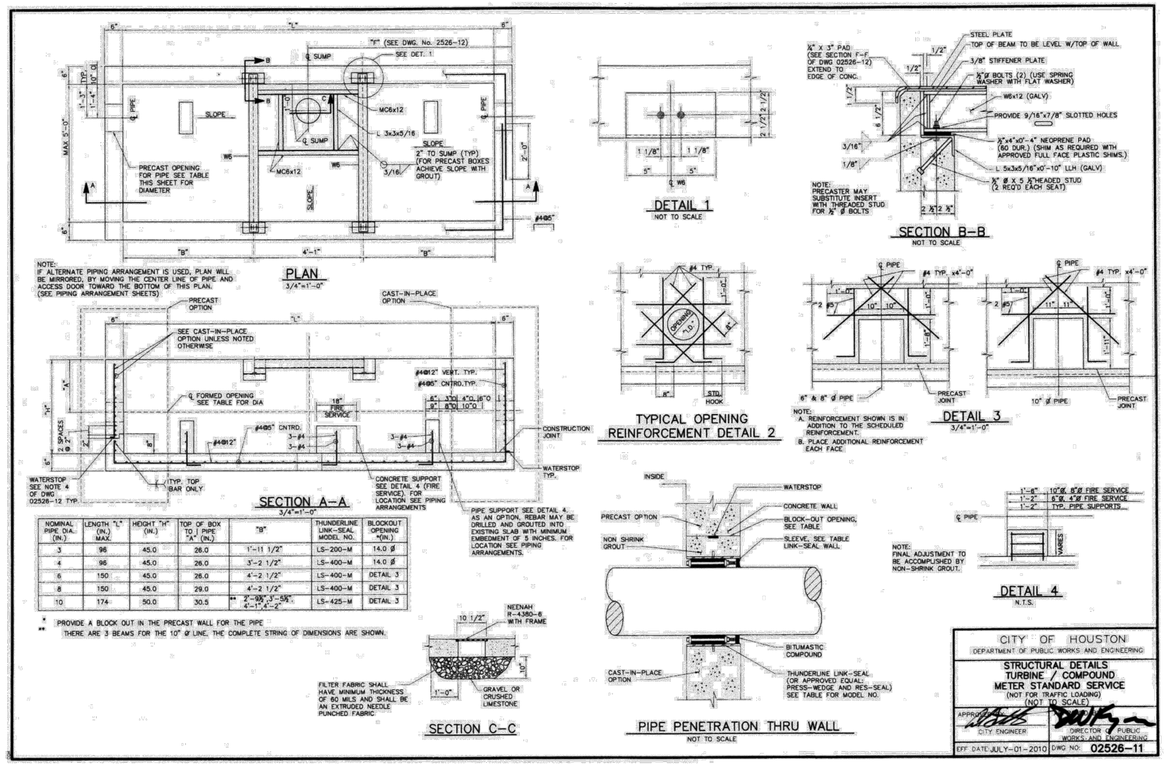
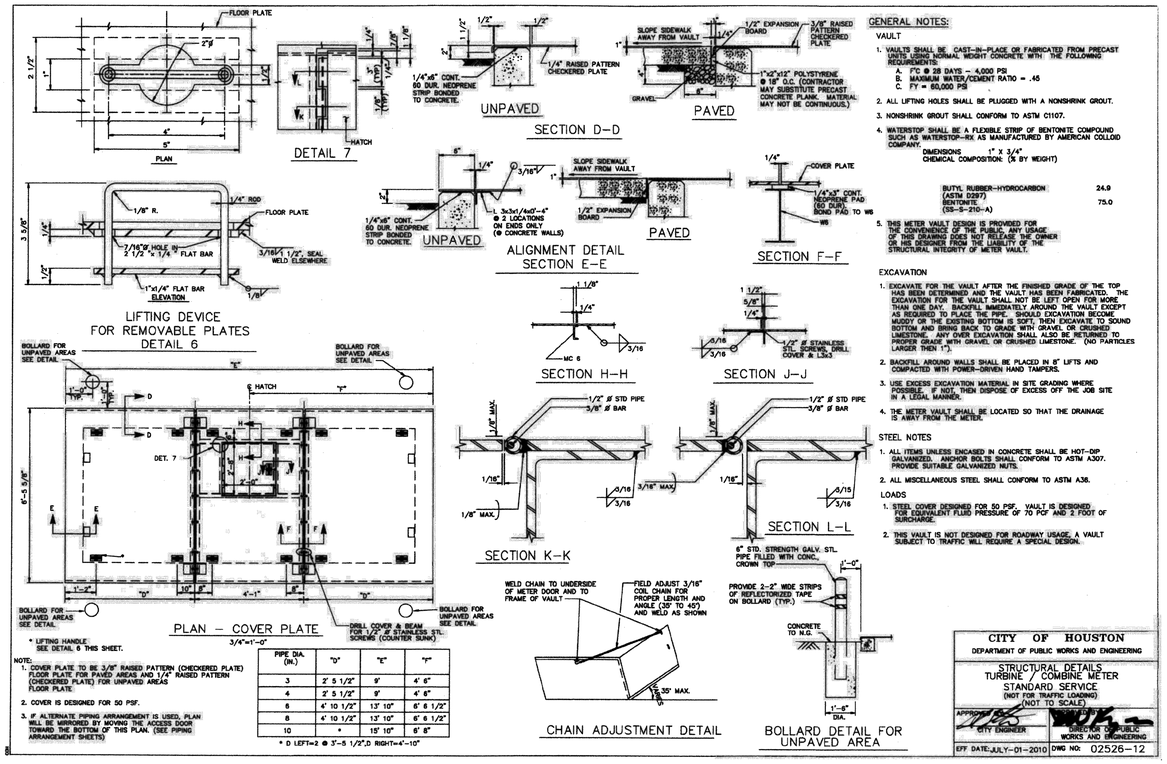


NOMINAL PIPE DIA. (IN.)	LENGTH "L" (IN.) MAX.	HEIGHT "H" (IN.)	TOP OF BOX TO ⌀ PIPE "A" (IN.)	"B"	THUNDERLINE LINK-SEAL MODEL NO.	BLOCKOUT OPENING (IN.)
3	96	45.0	26.0	1'-11 1/2"	LS-200-M	14.0 ⌀
4	96	45.0	26.0	3'-2 1/2"	LS-400-M	14.0 ⌀
6	150	45.0	26.0	4'-2 1/2"	LS-400-M	DETAIL 3
8	150	45.0	29.0	4'-2 1/2"	LS-400-M	DETAIL 3
10	174	50.0	30.5	** 2'-10⅜" 3'-5⅜", 4'-1" 4'-2"	LS-625-M	DETAIL 3

* PROVIDE A BLOCK OUT IN THE PRECAST WALL FOR THE PIPE
** THERE ARE 3 BEAMS FOR THE 10" ⌀ LINE. THE COMPLETE STRING OF DIMENSIONS ARE SHOWN.



PIPE DIA. (IN.)	"D"	"E"	"F"
3	2' 5 1/2"	9"	4' 6"
4	2' 5 1/2"	9"	4' 6"
6	4' 10 1/2"	13" 10"	6' 6 1/2"
8	4' 10 1/2"	13" 10"	6' 6 1/2"
10	*	15" 10"	6' 8"

* D LEFT=2 @ 3'-5 1/2",D RIGHT=4'-10"

NOTE:
1. COVER PLATE TO BE 3/8" RAISED PATTERN (CHECKERED PLATE) FLOOR PLATE FOR PAVED AREAS AND 1/4" RAISED PATTERN (CHECKERED PLATE) FOR UNPAVED AREAS FLOOR PLATE.
2. COVER IS DESIGNED FOR 50 PSF.
3. IF ALTERNATE PIPING ARRANGEMENT IS USED, PLAN WILL BE MIRRORED BY MOVING THE ACCESS DOOR TOWARD THE BOTTOM OF THIS PLAN. (SEE PIPING ARRANGEMENT SHEETS)

GENERAL NOTES:

VAULT

1. VAULTS SHALL BE CAST-IN-PLACE OR FABRICATED FROM PRECAST UNITS USING NORMAL WEIGHT CONCRETE WITH THE FOLLOWING REQUIREMENTS:
   A. F'C @ 28 DAYS – 4,000 PSI
   B. MAXIMUM WATER/CEMENT RATIO = .45
   C. FY = 60,000 PSI
2. ALL LIFTING HOLES SHALL BE PLUGGED WITH A NONSHRINK GROUT.
3. NONSHRINK GROUT SHALL CONFORM TO ASTM C1107.
4. WATERSTOP SHALL BE A FLEXIBLE STRIP OF BENTONITE COMPOUND SUCH AS WATERSTOP-RX AS MANUFACTURED BY AMERICAN COLLOID COMPANY.

DIMENSIONS 1" X 3/4" CHEMICAL COMPOSITION: (% BY WEIGHT)	
BUTYL RUBBER–HYDROCARBON (ASTM D297)	24.0
BENTONITE (SS-S-210-A)	75.0

5. THIS METER VAULT DESIGN IS PROVIDED FOR THE CONVENIENCE OF THE PUBLIC. ANY USAGE OF THIS DRAWING DOES NOT RELEASE THE OWNER OR HIS DESIGNER FROM THE LIABILITY OF THE STRUCTURAL INTEGRITY OF METER VAULT.

EXCAVATION

1. EXCAVATE FOR THE VAULT AFTER THE FINISHED GRADE OF THE TOP HAS BEEN DETERMINED AND THE VAULT HAS BEEN FABRICATED. THE EXCAVATION FOR THE VAULT SHALL NOT BE LEFT OPEN FOR MORE THAN ONE DAY. BACKFILL IMMEDIATELY AROUND THE VAULT EXCEPT AS REQUIRED TO PLACE THE PIPE. SHOULD EXCAVATION BECOME MUDDY OR THE EXISTING BOTTOM IS SOFT, THEN EXCAVATE TO SOUND BOTTOM AND BRING BACK TO GRADE WITH GRAVEL OR CRUSHED LIMESTONE. ANY OVER EXCAVATION SHALL ALSO BE RETURNED TO PROPER GRADE WITH GRAVEL OR CRUSHED LIMESTONE. (NO PARTICLES LARGER THEN 1").
2. BACKFILL AROUND WALLS SHALL BE PLACED IN 8" LIFTS AND COMPACTED WITH POWER-DRIVEN HAND TAMPERS.
3. USE EXCESS EXCAVATION MATERIAL IN SITE GRADING WHERE POSSIBLE. IF NOT, THEN DISPOSE OF EXCESS OFF THE JOB SITE IN A LEGAL MANNER.
4. THE METER VAULT SHALL BE LOCATED SO THAT THE DRAINAGE IS AWAY FROM THE METER.

STEEL NOTES

1. ALL ITEMS UNLESS ENCASED IN CONCRETE SHALL BE HOT-DIP GALVANIZED. ANCHOR BOLTS SHALL CONFORM TO ASTM A307. PROVIDE SUITABLE GALVANIZED NUTS.
2. ALL MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36.

LOADS

1. STEEL COVER DESIGNED FOR 50 PSF. VAULT IS DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 70 PCF AND 2 FOOT OF SURCHARGE.
2. THIS VAULT IS NOT DESIGNED FOR ROADWAY USAGE. A VAULT SUBJECT TO TRAFFIC WILL REQUIRE A SPECIAL DESIGN.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
STRUCTURAL DETAILS
TURBINE / COMBINE METER STANDARD SERVICE
(NOT FOR TRAFFIC LOADING)
(NOT TO SCALE)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY-01-2010
DWG NO: 02526-12

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

STANDARD DETAILS – WATER

SHEET 05 OF 05

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 138 OF 139	

GC Engineering, Inc.
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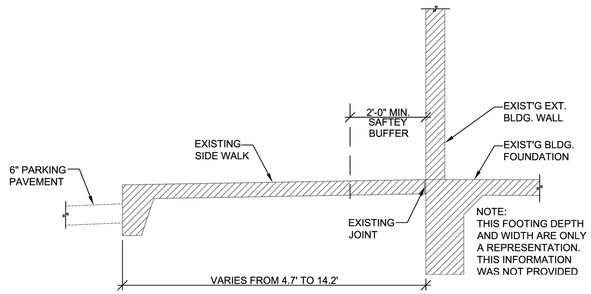


1 EXSIT'G SIDEWALK SECTION
SCALE: 1/2"=1'-0"

REVIEW ONLY

NOT FOR REGULATORY APPROVAL, PERMITTING OR CONSTRUCTION

DON R. WIJERATNE, P.E.
TEXAS NO. 102708

University Blvd. Paving and Drainage Improvements
Kirby Dr. to Morningside Dr.
Houston, Texas 78214

ALVETTI ASSOCIATES F-4928

GC Engineering, Inc.
2505 Park Avenue
Pearland, Texas 77581

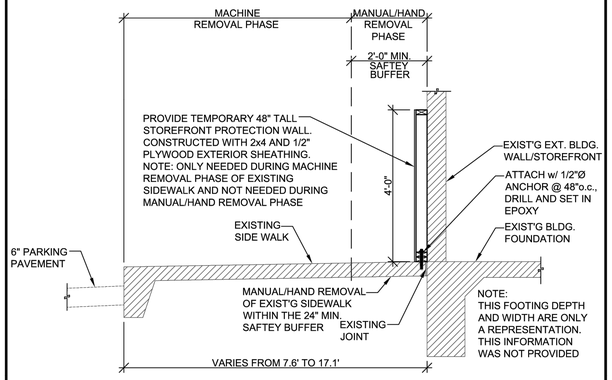
EXISTING SIDEWALK SECTION

SCALE: 1/2" = 1'-0"
DATE: 10-14-2021
PROJ. NO.: 21008

S-1

STOREFRONT PROTECTION WALL NOTE:
PROTECTION WALL TO BE BUILT AT ALL LOCATIONS ALONG STOREFRONT, EXCEPT AT ACCESS DOOR LOCATIONS.

GENERAL NOTE:
1. PROVIDE 48HR. NOTICE TO E.O.R. BEFORE REMOVAL OF SIDEWALKS.
2. ANY CONDITIONS DURING REMOVAL OF SIDEWALKS THAT APPEAR TO AFFECT THE BUILDING SHOULD BE REPORTED TO THE E.O.R. IMMEDIATELY.



2 EXIST'G SIDEWALK REMOVAL SECTION
SCALE: 1/2"=1'-0"

REVIEW ONLY

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Kirby Dr. to Morningside Dr.
Houston, Texas 78214

ALVETTI ASSOCIATES F-4928

GC Engineering, Inc.
2505 Park Avenue
Pearland, Texas 77581

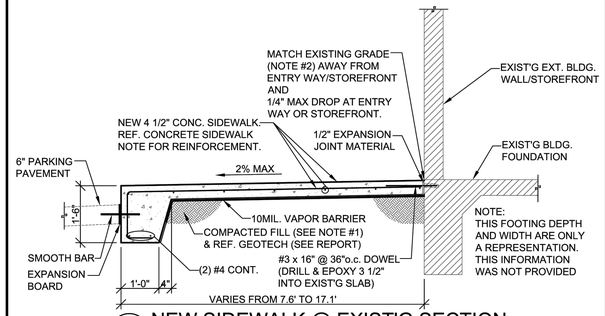
REMOVAL SIDEWALK SECTION

SCALE: 1/2" = 1'-0"
DATE: 10-14-2021
PROJ. NO.: 21008

S-2

CONCRETE SIDEWALK NOTES:
4 1/2" THICK CONCRETE SIDEWALK REINFORCE WITH #4 @ 22"o.c. (LONGITUDNAL STEEL) AND #3 @ 48"o.c. (TRANSVERSE STEEL)
f'c = 3,500 P.S.I. fy = 60,00 P.S.I.
EXPANSION JOINT SPACING = 40 FT.
CONTROL JOINTS = 6 FT.
REF. DETAIL 5,6 & 7/S-5 FOR TYPICAL CONSTRUCTION JOINTS, EXPANSION AND CONTROL JOINTS

NOTES:
1. DO NOT UNDER CUT EXISTING FOOTING WHEN REMOVING AND REPLACING COMPACTED FILL.
2. PROVIDE CURB AT LOCATIONS AWAY FROM ENTRY WAY WHERE TOP OF SIDEWALK IS UNABLE TO MATCH EXISTING.



3 NEW SIDEWALK @ EXIST'G SECTION
SCALE: 1/2"=1'-0"

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University Blvd. Paving and Drainage Improvements
Kirby Dr. to Morningside Dr.
Houston, Texas 78214

ALVETTI ASSOCIATES F-4928

GC Engineering, Inc.
2505 Park Avenue
Pearland, Texas 77581

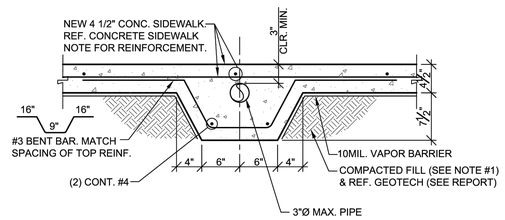
NEW SIDEWALK SECTION

SCALE: 1/2" = 1'-0"
DATE: 10-14-2021
PROJ. NO.: 21008

S-3

CONCRETE SIDEWALK NOTES:
4 1/2" THICK CONCRETE SIDEWALK REINFORCE WITH #4 @ 22"o.c. (LONGITUDNAL STEEL) AND #3 @ 48"o.c. (TRANSVERSE STEEL)
f'c = 3,500 P.S.I. fy = 60,00 P.S.I.

NOTE:
1. DO NOT UNDER CUT EXISTING FOOTING WHEN REMOVING AND REPLACING COMPACTED FILL.



4 PIPE @ NEW SIDEWALK SECTION
SCALE: 1"=1'-0"

REVIEW ONLY

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Kirby Dr. to Morningside Dr.
Houston, Texas 78214

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GC Engineering, Inc.
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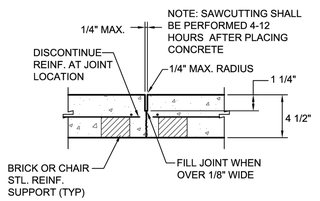
Pearland, Texas 77581

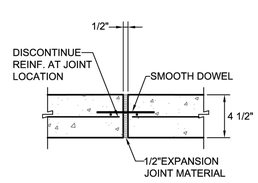
PIPE-THRU SIDEWALK SECTION

SCALE: 1/2" = 1'-0"
DATE: 10-14-2021
PROJ. NO.: 21008

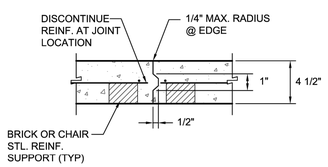
S-4



SAWED JOINT
5 CONTROL JOINTS
NOT T O SCALE



6 EXPANSION JOINTS
NOT T O SCALE



PREFORMED METAL KEYWAY
7 CONSTRUCTION JOINT
NOT T O SCALE

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Kirby Dr. to Morningside Dr.
Houston, Texas 78214

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TYPICAL JOINT DETAILS

SCALE: 1/2" = 1'-0"
DATE: 10-14-2021
PROJ. NO.: 21008

S-5

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SURVEYED BY: WESTERN GROUP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

UNIVERSITY BOULEVARD SP-1
PAVING AND DRAINAGE
FROM KIRBY DRIVE TO GREENBRIAR DRIVE

SIDEWALK CONSTRUCTION AT STOREFRONT DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
N-100006-0001-3	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
MICHELLE RANDON, PE	
SHEET NO. 139 OF 139	

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