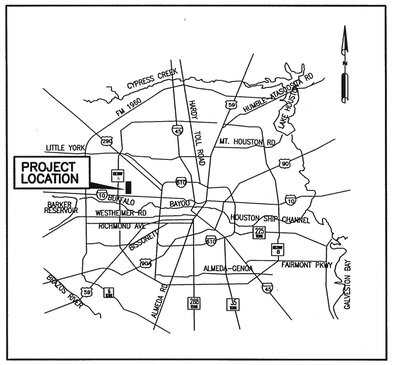
MEMORIAL CITY REDEVELOPMENT AUTHORITY

LUMPKIN ROAD ROADWAY RECONSTRUCTION AND DRAINAGE IMPROVEMENTS

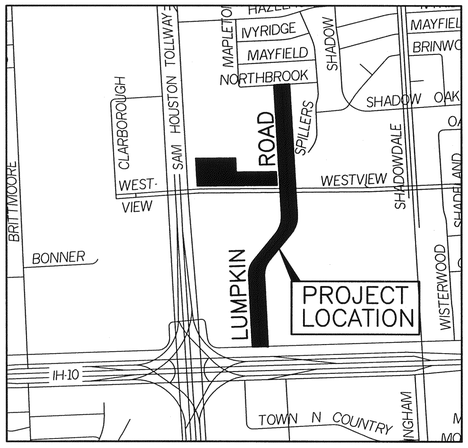
APPROXIMATELY 3,500 L.F. OF STORM SEWER AND ROADWAY RECONSTRUCTION

FROM IH-10 TO NORTHBROOK DRIVE

WBS NO. N-T17000-0012-3



VICINITY MAP
COUNCIL DISTRICT A
NTS



PROJECT LOCATION MAP
KEY MAP 489D & 449Z
GIMS 4958a
NTS

TDLR: EABPRJ4813697

On Behalf of

TAX INCREMENT REINVESTMENT ZONE No. 17

SEPTEMBER 2014

100% SUBMITTAL

NOTIFY CITY OF HOUSTON 48 HOURS BEFORE STARTING CONSTRUCTION

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

SURVEYED BY: KUO & ASSOCIATES
FB NO.: P-5857

STATE OF TEXAS
MUHAMMAD M. ALI P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. F-2614

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	TRAFFIC AND TRANSPORTATION
WASTEWATER	STORM WATER QUALITY
STORM WATER	FACILITIES
STREET & BRIDGE	PARK-FORESTRY DEPT

CITY ENGINEER DATE

DIRECTOR OF PUBLIC WORKS AND ENGINEERING DATE

SHEET NO 1 OF 226

INDEX OF SHEETS

THIS PROJECT CONTAINS A TOTAL OF 226 DRAWINGS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
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LUMPKIN ROAD
N-T17000-0012-3

INDEX OF SHEETS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
NOT TO SCALE
CITY DWG NO.
SHEET: 2 OF 226

pw:\\ladpw.ladco.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\General\2-001-Index Sht-RG.dgn 9/5/2014 2:07:47 PM MJGuthrie

GENERAL CONSTRUCTION NOTES

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS "STANDARD CONSTUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" PUBLISHED BY THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING.
2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION "INFRASTRUCTURE DESIGN MANUAL", PUBLISHED BY THE CITY OF HOUSTON, DEPARTMENT OF PUBLC WORKS AND ENGINEERING. SOILS REPORT WAS PREPARED BY AVILES ENGINEERING CORPORATION, REPORT NO. G153-10 FINAL, DATED FEBRUARY 2013, AND REPORT NO. G153-17 FINAL, DATED JUNE 2014.
3. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE 18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
4. CONTRACTOR SHALL BE REPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES, AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM. WATER LINES, STORM DRAINAGE, AND STREET PAVING" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" REFERENCED ABOVE, AT NO ADDITIONAL COST.
5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING AT 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
6. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIME DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER. ALL CONSTUCTION STORM RUNOFF SHALL COMPLY WITH THE FINAL DRAFT OF STORMWATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES AS PREPARED BY HARRIS COUNTY/HCFCD, AND THE CITY OF HOUSTON, ALL IN COMPLIANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS.
7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS, AND TREES ALONG THE AREA OF EXCAVATION.
8. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS RECORDING AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE CITY ENGINEER.
9. FOR TRENCHLESS CONSTRUCTION, CONTRACTOR SHALL DETERMINE THE LOCATIONS OF BORE PITS IN FIELD SUBJECT TO THE CITY ENGINEER'S APPROVAL.
10. WATER METER COUNTS PER CITY OF HOUSTON CUSTOMER SERVICE ARE PROVIDED. CONTRACTOR TO VERIFY ALL EXISTING WATER SERVICES ARE FOUND AND TRANSFERRED.
11. PRIOR TO THE CONSTRUCTION OF THESE FACILITIES WITHIN OR BY THE MEMORIAL CITY REDEVELOPMENT AUTHORITY (MCRA), MCRA OR ITS ENGINEER WILL GIVE WRITTEN NOTICE TO THE CITY OF HOUSTON'S INTERAGENCY GROUP STATING THE DATE SUCH CONSTRUCTION WILL BE COMMENCED.
12. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE NOR ALL INCLUSIVE. ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF CONSTRUCTION. ANY CONFLICT OR DISCREPANCY DISCOVERED MUST BE IMMEDIATELY BROUGHT TO THE ENGINEER'S ATTENTION.
13. THE CONTRACTOR SHALL NOTIFY THE CITY OF HOUSTON ENGINEERING DEPARTMENT, AND CENTERPOINT ENERGY AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK, NOTIFICATIONS SHALL BE FOLLOWED WITH A LETTER, COPIES OF WHICH SHALL BE SENT TO THE ENGINEER.
14. THE CONTRACTOR, ON BEHALF OF THE OWNER, SHALL OBTAIN ALL PERMITS REQUIRED BY THE CITY OF HOUSTON, PRIOR TO STARTING CONSTRUCTION OF UTILITIES WITHIN THE ROAD RIGHT-OF-WAY.
15. GUIDELINES SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAG MEN, SIGNAGE, STRIPING, AND WARNING DEVICES, ETC. DURING CONSTRUCTION - BOTH DAY AND NIGHT.
16. THE LOADING AND UNLOADING OF ALL PIPE, VALVES, HYDRANTS, MANHOLES, AND OTHER ACCESSORIES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDED PRACTICES AND SHALL AT ALL TIMES BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIAL. THE CONTRACTOR SHALL LOCATE AND PROVIDE THE NECESSARY STORAGE AREAS FOR THE MATERIALS AND EQUIPMENT.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHIPPING AND STORING OF ALL MATERIALS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE SUCH MATERIAL AT THE POINT OF DELIVERY AND TO REJECT ALL DEFECTIVE MATERIAL. ANY DEFECTIVE MATERIAL INCORPORATED INTO THE WORK SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. THERE SHALL BE NO PAYMENT MADE FOR STORED MATERIAL.
18. ALL PIPE AND REINFORCEMENT STEEL SHALL BE KEPT FREE OF DIRT AND OTHER DEBRIS. ANY DAMAGE TO THE COATING OF THE VARIOUS MATERIALS MUST BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
19. ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
20. CONTRACTOR IS TO MAINTAIN A CLEAN PROJECT AREA, FREE FROM WORKMAN TRASH AND REFUSE, AT ALL TIMES.
21. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION. TRENCH SAFETY SHALL BE DONE IN ACCORDANCE WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
22. ALL STATIONS ARE GIVEN WITH RESPECT TO THE BASELINE OF STREET RIGHT-OF-WAY UNLESS OTHERWISE NOTED.
23. SURFACE RESTORATION: AT THE END OF ALL CONSTRUCTION PROJECTS, THE CONTRACTOR SHALL RESTORE THE EXISTING FACILITIES, I.E. THE PROPERTY, TO EQUAL OR BETTER CONDITION THAN EXISTING SITE CONDITIONS PRIOR TO THE CONSTRUCTION. ALL FINISHED GRADES SHALL VARY UNIFORMLY BETWEEN THE FINISHED ELEVATIONS SHOWN.
24. FINAL ACCEPTANCE OF THE UTILITIES WILL NOT BE GIVEN TO THE CONTRACTOR UNTIL THEY ARE INSPECTED AND APPROVED BY TCEQ AND THE CITY OF HOUSTON. FINAL ACCEPTANCE OF THE PAVING WILL NOT BE GIVEN TO THE CONTRACTOR UNTIL IT IS INSPECTED AND APPROVED BY THE CITY OF HOUSTON.
25. PROVIDE MATS OR OTHER MEANS TO PREVENT OVERLOADING OR DAMAGE TO EXISTING ROADWAYS FROM TRACKED EQUIPMENT, TANDEM AXLE TRUCKS OR EQUIPMENT WHICH WILL DAMAGE EXISTING ROADWAY SURFACE.
26. THE CONTRACTOR SHALL REQUEST AND OBTAIN APPROVAL FROM THE ENGINEER FOR THE USE OF WELL POINTS WHEN TRENCH CONDITIONS REQUIRE THEM.

STORM SEWER CONSTRUCTION NOTES:

1. ALL STORM SEWERS SHALL BE REINFORCED CONCRETE PIPE, (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DETAILED DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 (OCT.2002) AS APPLICABLE UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED AND FUTURE CURBS SHALL BE BACK FILLED WITH 1-1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITH IN ONE(1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACK FILLED WITH SUITABLE EARTH MATERIAL.
3. ALL TRENCH BACKFILLS SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FEET INTERVALS ON EACH LIFT, AND MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM D-698/AASHTOT99).
4. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM D443 AND ASTM C877 RESPECTIVELY.
5. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24-INCH AND LARGER R.C.P. (C-76, CLASS III).
6. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES AND INLETS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL PROVIDE 12" MINIMUM CLEARANCE AT STORM SEWER AND WATER LINE CROSSING.
8. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS AND VALVE BOXES TO GRADE.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF HIS WORKS.
10. ALL DITCHES SHALL BE REGRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACK FILLED AND COMPACTED. ALL DISTURBED AREAS SHALL BE REGRADED, SEEDED, AND FERTILIZED.
11. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.
12. ALL STORM SEWER MANHOLES SHALL BE STANDARD CITY OF HOUSTON TYPE "C" MANHOLES UNLESS OTHERWISE NOTED ON PLANS AND MUST INCLUDE THE WORDS "STORM SEWER".
13. ALL INLETS SHALL BE CITY OF HOUSTON TYPE B-B UNLESS OTHERWISE NOTED ON ALL THE PLANS. DEPTH OF INLETS SHALL BE INCREASED BEGINNING AT 2'-6" AND AS NECESSARY TO ACCOMMODATE THE DIAMETER AND ANGLE OF THE EXIT PIPE.

PAVING CONSTRUCTION NOTES:

1. ALL STOP SIGNS (R1-1) SHALL BE 30"X30" DIAMOND GRADE FACES.
2. ALL TEMPORARY AND PERMANENT SIGNAGE MUST COMPLY WITH THE "2011 TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AS CURRENTLY AMENDED.
3. ALL ROAD WIDTHS, CURB RADII, AND CURB ALIGNMENT ARE MEASURED TO THE FACE OF CURB. T.C. INDICATES TOP OF CURB. T.P. INDICATES TOP OF PAVEMENT ELEVATIONS.
4. ALL INTERSECTION CURB RETURN RADII SHALL BE 25 FEET FROM BACK-OF-CURB AND ALL COMMERCIAL DRIVEWAY RADII SHALL BE 10' FROM BACK-OF-CURB UNLESS NOTED OTHERWISE. MINIMUM GRADES SHALL BE 1.00% AND 0.60% RESPECTIVELY.
5. TRANSVERSE EXPANSION JOINTS SHALL BE INSTALLED AT EACH CURB RETURN AND AT A MAXIMUM SPACING OF 80 FEET. LOAD TRANSMISSION DEVICES (3/4" DIA. X 18" LONG DOWELS) SHALL BE SPACED AT 12" C-C.
6. THE MAXIMUM SPACING BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 14 FEET. DEFORMED METAL STRIPS SHALL BE INSTALLED A MAXIMUM ½" BELOW THE FINISHED TOP OF PAVEMENT.
7. WHEN A THICKER PAVEMENT ROADWAY INTERSECTS WITH A THINNER PAVEMENT ROADWAY, THE THICKER PAVEMENT SHALL BE CONSTRUCTED FOR THE ENTIRE INTERSECTION, TO THE ENDS OF ALL CURB RETURNS.
8. THE PAVING CONTRACTOR SHALL PROTECT ALL UTILITIES, SIDEWALKS, PAVEMENT, ETC. AND SHALL REPAIR OR REPLACE AT HIS EXPENSE ANY FACILITIES DAMAGED DURING PAVING OR GRADING OPERATIONS.
9. THE PAVING SUBGRADE SHALL BE STABILIZED TO 8-INCH DEPTH WITH A MIXTURE OF 6% LIME BY DRY WEIGHT. LIME SHALL MEET THE REQUIREMENTS OF ITEM 260 OF THE TXDOT STANDARD SPECIFICATIONS FOR LIME TREATMENT METHOD USING COMMERCIAL LIME SLURRY. USE OF CARBIDE LIME OR BY-PRODUCT LIME IS PROHIBITED. STABILIZED SOILS SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY (+/-3 % OF OPTIMUM MOISTURE) PER ASTM D-698.
10. AREAS TO BE FILLED SHALL BE SCARIFIED AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (±3% OF OPTIMUM MOISTURE) PER ASTM D-698 TO A DEPTH OF 6" PRIOR TO FILL PLACEMENT. FILL MATERIAL SHALL BE PLACED IN MAXIMUM 8" THICK LIFTS (MEASURED LOOSE) AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (±3% OF OPTIMUM MOISTURE) PER ASTM D-698. FILL SHALL BE CLEAN EARTH AND BE FREE FROM TRASH, VEGETATION AND LARGE STONES. TEST REPORTS SHALL BE SUBMITTED PRIOR TO PLACEMENT OF PAVEMENT.
11. NECESSARY TESTING OF SUB GRADE AND PAVEMENT TO PROVE THAT THESE ITEMS MEET REQUIREMENTS SHALL BE DONE BY A COMMERCIAL TESTING LABORATORY ENGAGED BY THE OWNER.
12. WHERE PROPOSED PAVEMENT IS TO MEET EXISTING PAVEMENT, THE EXISTING REBAR OR DOWELS SHALL BE CLEANED AND TIED INTO THE PROPOSED PAVEMENT, USING A MINIMUM OF 30 BAR DIAMETERS LAPS. WHERE PROPOSED CONCRETE ENDS AT A CONSTRUCTION JOINT OR EXPANSION JOINT, THE REBAR SHALL BE EXTENDED A MINIMUM LENGTH OF 30 BAR DIAMETERS, COATED WITH ASPHALT AND WRAPPED WITH BURLAP.
13. ALL CONCRETE PAVEMENT SHALL BE EIGHT INCHES THICK UNLESS OTHERWISE SHOWN. CONCRETE SHALL HAVE A MINIMUM 3500 P.S.I. COMPRESSIVE STRENGTH AT 28 DAYS. REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60.
14. SIDEWALKS SHALL BE BUILT IN ACCORDANCE WITH CITY OF HOUSTON. ALL INTERSECTIONS SHALL BE CONSTRUCTED WITH WHEELCHAIR RAMPS, IN CONFORMANCE WITH THE GOVERNOR'S OFFICE OF TRAFFIC SAFETY MEMORANDUM DATED MAY 6, 1976 (HIGHWAY SAFETY ACT, 1973, SEC 288). AMERICANS WITH DISABILITIES ACT (ADA) AND TEXAS ACCESSIBILITY STANDARDS (TAS) SHALL BE COMPLIED WITH IN ALL SIDEWALK CONSTRUCTION.
15. CONCRETE WASH-OUT AREAS ARE TO BE PROVIDED BY THE CONTRACTOR AT A LOCATION ACCEPTABLE TO THE OWNER. UNDER NO CIRCUMSTANCES IS THE CONTRACTOR TO PERMIT CONCRETE TRUCKS TO WASH AT ANY AREA OTHER THAN THAT DESIGNATED.
16. STREET NAME SIGNS SHALL BE BUILT IN ACCORDANCE WITH CITY OF HOUSTON REQUIREMENTS AND SPECIFICATIONS, AND BEAR STREET NAMES AS PER RECORDED PLAT.
17. A DOUBLE-REFLECTORIZED BLUE TRAFFIC MARKER SHALL BE PLACED 6 INCHES OFFSET FROM THE PAVEMENT CENTERLINE AT ALL FIRE HYDRANT LOCATIONS, BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A MARKER PLACED ON EACH STREET. THERE WILL BE NO SEPARATE PAYMENT FOR THESE MARKERS.
18. SAW CUT EXISTING CURB AT EACH END AND KNOCK OUT CURB FROM BEGINNING TO END OF PROPOSED DRIVEWAY.
19. SAW CUT EXISTING PAVEMENT A MINIMUM OF 12 INCHES AWAY FROM FACE OF CURB (GUTTER LINE) AND BREAK OUT TO EXPOSE EXISTING REINFORCEMENT STEEL.
20. REINFORCING STEEL TO BE ELEVATED A MINIMUM OF 3" ABOVE SUBGRADE. (3" MANUFACTURED CHAIRS ARE REQUIRED WITH MAXIMUM SPACING OF 72 INCHES C/C EACH WAY).

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-15-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

GENERAL CONSTRUCTION NOTES

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: NOT TO SCALE	CITY DWG NO.
SHEET: 3 OF 226	

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STREET AND BRIDGE

1. DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL" REFERENCED AT http://documents.publicworks.houstontx.gov/document-center/cat*view/88-engineering-and-construction /90-design-manuals/364-city-of-houston-infrastructure-design-manual.html.
2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH LAYER SHALL BE 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.
3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURB INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDUMS AND AMENDMENTS THERETO.
6. CONDITION OF ROAD AND/OR RIGHT OF WAY, UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
8. 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 CENTER OF THE EXISTING SLAB WITH "PRO ROC" OR EQUAL.
9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.
10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-1457.
11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND WHERE THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".
13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPT. OF PUBLIC WORKS AND ENGINEERING "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.
14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE DEPARTMENT OF PUBLIC WORKS AND ENGINEERING AT (PHONE)832-394-9098 OR 832-395-4424(FAX) AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF THE NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
15. 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.

TRAFFIC NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TEXAS MUTCD, MOST RECENT EDITION WITH REVISIONS) DURING CONSTRUCTION.
2. NO TRAFFIC LANES ALONG LUMPKIN SHALL BE CLOSED DURING THE HOURS OF 6:00AM TO 9:00AM AND 4:00PM TO 7:00PM MONDAY THRU FRIDAY. NO LANES SHALL BE CLOSED IN RESIDENTIAL AREA FROM 7:00 PM TO 7:00 AM.
3. CONTRACTOR SHALL COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON-WORKING HOURS AND OPEN LANES FOR NORMAL TRAFFIC FLOW.
4. OFF DUTY UNIFORMED POLICE OFFICER(S)/FLAGGER(S) IS/ARE REQUIRED TO DIRECT TRAFFIC WHEN LANES ARE CLOSED.
5. IN THE EVENT THAT NO "TRAFFIC CONTROL PLANS" EXIST AS A PART OF CONTRACT DRAWINGS, CONTRACTOR MAY PREPARE PLANS* AND SUBMIT TO THE PLAN REVIEW SECTION FOR APPROVAL TEN DAYS PRIOR TO IMPLEMENTATION.
6. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF "TRAFFIC CONTROL PLANS" DURING THE CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, HE/SHE SHALL BE RESPONSIBLE FOR PREPARING AND SUBMITTING AN ALTERNATE SET OF PLANS* TO THE PLAN REVIEW SECTION FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION.
7. APPROVED COPIES OF TRAFFIC CONTROL PLANS AND MOBILITY PERMITS SHALL BE MADE AVAILABLE FOR INSPECTION AT THE JOB SITE AT ALL TIMES. CONTRACTORS MUST SECURE MOBILITY PERMITS FROM THE CITY5#32S TRAFFIC MANAGEMENT AND MAINTENANCE BRANCH BEFORE CLOSING A LANE/SIDEWALK. THE REQUEST MUST BE MADE AT LEAST 10 DAYS IN ADVANCE OF THE CLOSURE. NOTE THAT WORKING HOURS MAY BE RESTRICTED OR THE REQUEST MAY BE DENIED. CALL 832-395-3020 FOR AN APPLICATION OR LOGON TO WWW.GIMS.HOUSTONTX.GOV.

* THESE PLANS SHALL BE DRAWN TO SCALE ON REPRODUCIBLE MYLAR AND SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS. PLANS WILL BECOME A PART OF THE CONTRACT DRAWINGS.

STORM WATER QUALITY PRE-CONSTRUCTION INSPECTION REQUIREMENTS

THE PROPERTY OWNER OR THE CONTRACTOR SHALL CONTACT THE HARRIS COUNTY STORM WATER QUALITY PERMITTING SECTION AT 713-956-3000 FOR A PRE-CONSTRUCTION INSPECTION PRIOR TO COMMENCING ANY CLEARING OR CONSTRUCTION ACTIVITIES ON THE SITE.

GENERAL CONSTRUCTION NOTES FOR STORM WATER POLLUTION PREVENTION PLAN:

STORM WATER POLLUTION PLAN (SWPPP) AND STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) COMPLIANCE NOTES:

A. ≤ 1.0 ACRE
- IF AREA IS DISTURBED, (CLEARING AND GRUBBING AND/OR EXCAVATION INVOLVED)
- PROVIDE BMP'S TO PREVENT ANY RUNOFF INTO THE CITY'S MS4
- PROVIDE SWPPP NOTES FOR CONSTRUCTION PLANS
- ANY CONSTRUCTION SITE RUNOFF INTO THE CITY'S MS4 IS A VIOLATION OF THE CITY STORM WATER ORDINANCE

B. ≥ 1.0 <5.0 ACRES
- CONSIDERED SMALL CONSTRUCTION ACTIVITIES
- SUBMIT A CONSTRUCTION SITE NOTICE (CSN) TO THE CITY AND TCEQ
- POST A CONSTRUCTION SITE NOTICES AT THE CONSTRUCTION SITE
- REQUIRED TO DEVELOP A SWP3
- NOT REQUIRED TO SUBMIT A NOI OR NOT
- ANY SUPPORTING CONCRETE OR ASPHALT PLANT IS SEPARATELY AUTHORIZED TO DISCHARGE UNDER AN INDIVIDUAL TPDES PERMIT

C. ≤ 5.0 ACRES AND PART OF LARGER COMMON PLAN OF DEVELOPMENT THAT WILL EQUALLY DISTURB AREA THAT IS EQUAL TO OR GREATER (>) 5.0 ACRES
- CONSIDERED LARGE CONSTRUCTION ACTIVITIES
- CONTRACTOR IS REQUIRED TO SUBMIT AN NOI TO COH AND TCEQ
- SUBMIT A STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR DESIGNED STRUCTURAL AND NONSTRUCTRAL CONTROL FEATURES
- DEVELOP A SWP3 (SWPPP), STORM WATER POLLUTION PREVENTION PLAN TO BE RETAINED ON SITE DURING CONSTRUCTION OF PROJECTS FROM BEGINNING TO END
- SUBMIT A NOT (NOTICE OF TERMINATION) WITHIN 30 DAYS AFTER FINAL STABILIZATION HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE. ALL SILT FENCES OR TEMPORARY EROSION CONTROL FEATURES MUST BE REMOVED OR SCHEDULED FOR REMOVAL AS DEFINED UNDER THE SWP3

D. 5.0 ACRES
SAME AS ABOVE

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 FROM 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

WASTEWATER CONSTRUCTION NOTES

1. RECORD LOCATIONS OF ALL STACKS, SUTVS, ETC. ON "AS BUILT DRAWINGS".
2. MAINTAIN SERVICE TO SEWERS DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROPERLY LOCATING AND/OR REPLACING SANITARY SEWER SERVICE LATERALS AFFECTED BY CONSTRUCTION. CITY DOES NOT WARRANTY LOCATION OR NUMBER OF ANY SANITARY LEADS SHOWN OR NOT SHOWN ON PLANS.
3. USE PIPE MATERIALS AS CALLED OUT ON PLANS.
4. SEE SANITARY SEWER SERVICE RECONNECTION CONSTRUCTION NOTES.
5. USE MANDREL TESTING ONLY AS AN ACCEPTANCE TEST OF SEWER SEGMENTS.
6. DIVERSION PUMPING IS CONSIDERED INCIDENTAL.
7. SUBMIT CCTV INSPECTION OF NEW SANITARY SEWER PER SPEC 02558.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

GENERAL CONSTRUCTION NOTES

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: NOT TO SCALE	CITY DWG NO.
SHEET: 4 OF 226	

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CENTERPOINT ENERGY

1. LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE, LLC. WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713)223-4567,1-800-669-8344, OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

* WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 945-8036 (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)659-3552 OR (713)207-4200.

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

WARNING: OVERHEAD ELECTRICAL LINES

1. 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.

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

***ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

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

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

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

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

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.

6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER ROOSEVELT LEE JR. AT (713)567-4552 OR EMAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILIITES.

METRO

1. THE CONTRACTOR SHALL CONTACT METRO BUS OPERATIONS BY EMAIL AT LEAST SEVEN(7) WORKING DAYS IN ADVANCE WHEN WORK IS SCHEDULED NEAR A BUS STOP. CONTRACTOR MUST EMAIL ALL THREE REPRESENTATIVES LISTED BELOW:
   ZELMA.RIDLEY@RIDEMETRO.ORG
   CARL.TAYLOER@RIDEMETRO.ORG
   SHIRLEY.MITCHELL@RIDEMETRO.ORG

DETAILS

1. CITY OF HOUSTON STANDARD DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATERLINES, STORM DRAINAGE, AND STREET PAVING ARE INCORPORATED IN PLANS BY REFERENCE AS IF COPIED VERBATIM. STANDARD DETAILS ARE AVAILABLE FOR DOWNLOAD AT THE FOLLOWING WEB ADDRESS: http://documents.publicworks.houstontx.gov/document-center/cat*view/88-engineering-and-construction/96-drawings/212-standard-details.html

2. DETAILS INCLUDED IN PLAN SET SUPERSEDE RELATED COH STANDARD DETAILS.

No.	DATE	REVISIONS	APP.

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

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

PRIVATE UTILITY LINES SHOWN

9/25/14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PRIVATE UTILITY NOTES

SHEET 1 OF 1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 5 OF 226	

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LEGEND :

SYMBOL EXISTING PLAN VIEW	DESCRIPTION
●IR	IRON PIPE OR IRON ROD MONUMENTS
	CENTERLINE OF RIGHT-OF-WAY
5+ØØ	SURVEY BASELINE
	EXISTING RIGHT-OF-WAY LINE
	PROPERTY LINE
	CENTERLINE OF DITCH
25'	DIMENSION LINE
	CURB LINE
	EDGE OF ASPHALT PAVEMENT
	SIDEWALK
	SHRUBS
	TREE
BRICK BLDG.	BUILDING
	SLAB
	POST, WOOD OR METAL
95	INDEX CONTOUR
16" WATER	WATER LINE
WV OR BFWV	WATER VALVE (GATE OR BUTTERFLY)
TS & V	TAPPING SLEEVE AND VALVE
FH	FIRE HYDRANT
	WATER METER
8" CPE	CENTERPOINT ENERGY GAS LINE
GM	GAS METER
24" (& SMALLER) SAN SWR	SANITARY SEWER LINE
30" (& LARGER) SAN SWR	
CO MH	SANITARY SEWER LINE, MANHOLE & CLEANOUT
24" (& SMALLER) STM SWR	STORM SEWER LINE
30" (& LARGER) STM SWR	
MH	STORM SEWER LINE AND MANHOLE
	STORM SEWER JUNCTION BOX
"S" INLET "S-S" INLET	CURB INLET
	GRATE INLET
	CONCRETE DRAIN
	CULVERT

SYMBOL EXISTING PLAN VIEW	DESCRIPTION
HL & P CO MH 9 MTD	HOUSTON LIGHTING & POWER CO CONDUIT & MANHOLE
	POWER POLE W/ OVERHEAD LINES
	POWER POLE W/ DOWN GUY
	TRAFFIC LIGHT POLE
	MARKER
	BUSINESS SIGN
	SIGN POST
	FENCE LINE (CHAIN LINK OR OTHER)
	FENCE LINE (BARBED WIRE)
SBC MH 6 MTD	SBC MANHOLE & OVERHEAD & BURIED CABLE
T	TELEPHONE BOX
	STREET LIGHT (CANTILEVERED ON WOODEN POLE
	STREET LIGHT (CANTILEVERED ON ORNAMENTAL POLE

SYMBOL EXISTING PROFILE VIEW	DESCRIPTION
	NORTH OR EAST PROPERTY LINE
	SOUTH OR WEST PROPERTY LINE
	NORTH OR EAST DITCH OR CURB
	SOUTH OR WEST DITCH OR CURB
	CENTER LINE OF PAVEMENT
HL & P MTD	HOUSTON LIGHTING & POWER CO CONDUIT
8" HP CPE GAS	GAS LINE
SBC & MCD	SOUTHWESTERN BELL COMMUNICATION CONDUIT
EXIST. 12" WATER MAIN	WATER LINE
EXIST. 24" SAN SWR	SANITARY SEWER LINE (24" AND SMALLER)
EXIST. 30" SAN SWR	SANITARY SEWER LINE (30" AND LARGER)
EXIST. 24" STM SWR	STORM SEWER LINE (24" AND SMALLER)
EXIST. 30" STM SWR	STORM SEWER LINE (30" AND LARGER)
	HOUSTON LIGHTING & POWER CO MANHOLE
	SOUTHWESTERN BELL TELEPHONE MANHOLE
	SANITARY SEWER MANHOLE & CLEANOUT
	STORM SEWER MANHOLE
Ⓡ	INFORMATION OBTAINED FROM RECORD DRAWINGS. NOT FIELD VERIFIED

SYMBOL PROPOSED PLAN VIEW	DESCRIPTION
B-1	BORING LOCATION
PI	POINT OF INTERSECTION (PI)
PC OR PT	POINT OF CURVE (PC) OR POINT OF TANGENCY (PT)
20" (& SMALLER) WL	WATER LINE
	TAPPING SLEEVE & VALVE
	FIRE HYDRANT
24" (& SMALLER) SAN SWR	SANITARY SEWER LINE
30" (& LARGER) SAN SWR	
	SANITARY SEWER MANHOLE
24" (& SMALLER) STM SWR	STORM SEWER LINE
30" (& LARGER) STM SWR	
	STORM SEWER MANHOLE
"S-S" INLET	CURB INLET
	FACE OF CURB
	PAVEMENT HEADER
5' CONC SIDEWALK	CONCRETE WALK
	MATCH LINE
	FLOW DIRECTION
	PROPOSED RIGHT-OF-WAY LINE
	BRICK PAVERS
	PROPOSED SIGN

SYMBOL PROPOSED PROFILE VIEW	DESCRIPTION
	WATER LINE (20" AND SMALLER)
	SANITARY SEWER LINE (24" AND SMALLER)
	SANITARY SEWER LINE (30" AND LARGER)
	STORM SEWER LINE (24" AND SMALLER)
	STORM SEWER LINE (30" AND LARGER)
	SANITARY SEWER MANHOLE
	STORM SEWER MANHOLE
	STORM SEWER INLET
TOC @ +Ø.3Ø% TOC @ -Ø.3Ø%	TOP OF CURB OR CENTERLINE OF OPEN DITCH PAVING
	DIP WITH RESTRAINED JOINTS

ABBREVIATIONS :

&	AND
@	AT
AVE	AVENUE
℄	BASELINE
BC	BEHIND CURB
CIP	CAST IRON PIPE
℄	CENTERLINE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
COH	CITY OF HOUSTON
CONC	CONCRETE
CONSTR	CONSTRUCTION
CPE	CENTERPOINT ENERGY
DIA	DIAMETER
DR	DRIVE
DWG	DRAWING
E	EAST
EL OR ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
E/R	END OF CURB RETURN
ESM'T	EASEMENT
EXIST	EXISTING
FC	FACE OF CURB
F-F	FACE-TO-FACE
FH	FIRE HYDRANT
FL	FLOWLINE
FT	FEET
GV & B	GATE VALVE AND BOX
HCFCD	HARRIES COUNTY FLOOD CONTROL DISTRICT
HL & P	HOUSTON LIGHTING AND POWER
HMAC	HOT MIXED ASPHALTIC CONCRETE
HPS	HIGH-PRESSURE SODIUM
HWY	HIGHWAY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IP	IRON PIPE
IR	IRON ROD
JT	JOINT
JUNCT	JUNCTION
LF	LINEAR FEET
LN	LANE
LT	LEFT
MAX	MAXIMUM
METRO	METROPOLITAN TRANSIT AUTHORITY
MH	MANHOLE
MIN	MINIMUM
MON	MONUMENT
N	NORTH
NO	NUMBER
NTS	NOT TO SCALE
OCEL	ON CURVE ELEVATION
OFS	OFFSET
OH	OVERHEAD
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PERM	PERMANENT
PI	POINT OF INTERSECTION
PROP	PROPOSED
PT	POINT
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE PIPE
PVI	POINT OF VERTICAL INTERSECTION
PVM'T	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
Ⓡ	RECORD DRAWING
R	RADIUS OF CIRCULAR CURVE
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
REINF	REINFORCED
REMOV	REMOVABLE
ROW	RIGHT OF WAY
RD	ROAD
RRPM	REFLECTIVE REMOVABLE PAVEMENT MARKERS
RT	RIGHT
RJ	RESTRAINED JOINT
RW	RETAINING WALL
S	SOUTH
SAN	SANITARY
SHT	SHEET
ST	STREET
STA	STATION ALONG BASELINE OR CENTERLINE
STM	STORM
SWR	SEWER
SBC	SOUTHWESTERN BELL COMMUNICATION COMPANY
T	TANGENT
TBM	TEMPORARY BENCH MARK
TOC OR TC	TOP OF CURB
TEMP	TEMPORARY
TP	TOP OF PAVEMENT
TS & V	TAPPING SLEEVE AND VALVE
TYP	TYPICAL
UG	UNDERGROUND
VC	VERTICAL CURVE
W	WEST
W/	WITH
WL	WATER LINE
WP	WOOD POLE
WV	WATER VALVE

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
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LICENSED PROFESSIONAL ENGINEER
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LUMPKIN ROAD
N-T17000-0012-3

SYMBOLS AND ABREVIATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO. :	FACILITY
DRAWING SCALE: NOT TO SCALE	CITY DWG NO.
SHEET: 6 OF 226	

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KEYED NOTES

1. PROPOSED CONCRETE PIPE STUB WITH RING GRATE AS SHOWN ON STANDARD DETAIL 02084-05 - STORM SEWER RING GRATE FOR OPEN END OF 18" TO 72" RCP STUBS TO DITCH, AT A MINIMUM OF 0.5 FEET BELOW THE EXISTING DITCH FLOW LINE. REALIGN DITCH AS DIRECTED BY THE CITY ENGINEER.
2. PROPOSED FLEXIBLE BASE AS SHOWN ON STANDARD DETAIL 02741-01 HOT-MIX ASPHALTIC CONCRETE PAVEMENT DETAILS.
3. PROPOSED SAWED JOINT AND EXPOSE 15-INCHES OF REINFORCING STEEL. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. SEE NOTE 9.
4. PROPOSED STANDARD CONCRETE CURB AND GUTTER AS SHOWN ON STANDARD DETAIL 02771-01 - CURB, CURB AND GUTTER AND HEADER DETAILS.
5. DOWEL ON 6-INCH CURB AFTER ASPHALTIC SURFACING IS IN PLACE, OR INTO EXISTING CONCRETE PAVEMENT, AS APPLICABLE.
6. REMOVE EXISTING SIDEWALK.
7. PROPOSED 3/4-INCH BOARD EXPANSION OR PREMOLDED NON-EXTRUDING JOINT BETWEEN SIDEWALK AND CURB.
8. REMOVE A SUFFICIENT LENGTH OF CONCRETE PIPE, AS DETERMINED BY THE ENGINEER, AND CONNECT TO PROPOSED INLET WITH REINFORCED CONCRETE PIPE OF LIKE DIAMETER.
9. 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.
10. THE CONTRACTOR SHALL NOTIFY THE CITY TRAFFIC SIGNAL DIVISION, 10 WORKING DAYS IN ADVANCE FOR RELOCATION OF EXISTING TRAFFIC SIGNAL POLES.
11. ADJUST EXISTING INLET TO FIT NEW GRADE AND ALIGNMENT.
12. DECREASE CURB EXPOSURE FROM 6 INCHES TO 2 INCHES IN 1 FOOT.
13. DECREASE CURB EXPOSURE FROM 6 INCHES TO 2 INCHES IN 4 FOOT.
14. DECREASE CURB EXPOSURE FROM 6 INCHES TO 0 INCHES IN 2 FOOT.
15. PROPOSED REINFORCED CONCRETE MEDIAN/MEDIAN NOSE SHALL BE COLORED BLACK FOR CONCRETE ROADWAYS AND UNCOLORED FOR ASPHALTIC CONCRETE ROADWAYS.
16. RIP-RAP SHALL BE PLACED ON SLOPES AND DITCHES AS DIRECTED BY THE ENGINEER.
17. CONVERT EXISTING INLET OR MANHOLE WITH INLET TOP TO MANHOLE.
18. REMOVE EXISTING CULVERT.
19. REMOVE AND REPLACE PIPE CULVERT AS DIRECTED BY THE ENGINEER.
20. EXISTING STRUCTURE TO BE REMOVED.
21. BREAK INTO BARREL OF MONOLITHIC REINFORCED CONCRETE STORM SEWER. COST TO BE INCLUDED IN THE UNIT PRICE BID FOR STORM SEWER OR LEAD, AS APPLICABLE.
22. REMOVE EXISTING INLET AND LEAD. PLUG AS SHOWN.
23. REMOVE EXISTING CONCRETE PAVEMENT, CONCRETE BASE, AND CEMENT STABILIZED SHELL BASE COURSE WITH OR WITHOUT ASPHALT SURFACING.
24. PROPOSED ASPHALT TRANSITION.
25. REMOVE INLET AND EXTEND LEAD.
26. MEET EXISTING CURB OR CURB AND GUTTER.
27. PROPOSED WHEELCHAIR RAMP, AS SHOWN ON STANDARD DETAIL 02775-02 WHEELCHAIR RAMP DETAILS.
28. ADJUST EXISTING INLET AND MANHOLE FRAME AND COVER TO FIT NEW GRADE.
29. REMOVE CURB OR CURB AND GUTTER FOR GRADE AND ALIGNMENT.
30. ADJUST EXISTING WATER VALVE BOXES TO NEW PAVING GRADE. REPLACE MISSING OR DAMAGED VALVE BOXES AND COVERS.
31. REPLACE TYPE B INLET OR TYPE A INLET.
32. PROPOSED PAVEMENT MARKINGS AS SHOWN ON STANDARD DETAIL 02763-01 - PAVEMENT MARKING DETAILS.
33. PROPOSED WHITE PLASTIC MARKER AS SHOWN ON TRAFFIC AND TRANSPORTATION DRAWING, STANDARD ELONGATED WORD AND ARROW SYMBOL DESIGN DETAILS FOR PAVEMENT MARKINGS.
34. PROPOSED PLASTIC MARKER, AS SHOWN ON TRAFFIC AND TRANSPORTATION DRAWING, STANDARD FOR LEFT TURN CHANNELIZATION.
35. PROPOSED STANDARD CONCRETE PAVING HEADER AS SHOWN ON STANDARD DETAIL 02771-01 - CURB, CURB AND GUTTER AND HEADER DETAILS.
36. REMOVE AND REPLACE DRIVEWAY TO ROW, EXCEPT WHERE NOTED OTHERWISE ON PLANS, AT WIDTHS AS SHOWN ON DETAILS.
37. REPLACE CONCRETE PAVEMENT WITH OR WITHOUT ASPHALT OVERLAY WITH 6 INCH OF CONCRETE PAVEMENT AND 6 INCH CURBS TO THE LIMITS AS SHOWN ON STANDARD DETAIL 02951-02 - STREET CUT PAVEMENT REPLACEMENT - CONCRETE PAVEMENT OVER 5 YEARS IN AGE. (JUNE 2002)
38. REPLACE ASPHALT PAVEMENT OR CONCRETE PAVEMENT WITH ASPHALT OVERLAY TO THE LIMITS AS SHOWN ON STANDARD DETAIL 02951-03 STREET CUT PAVEMENT REPLACEMENT - ASPHALT PAVEMENT FOR PAVEMENT FOR PAVEMENT FOR ALL AGES. (JUNE 2002)
39. REMOVE EXISTING PAVEMENT (ALL TYPES AND THICKNESSES)
40. DRIVEWAY EXTENDS BEYOND ROW AS SHOWN ON THE PLANS AND AS NOTED IN THE DRIVEWAY TABULATION TABLE.
41. TRANSITION PROPOSED SIDEWALK TO EXISTING SIDEWALK LEVEL WITH A MINIMUM SLOPE OF 20:1.
42. EXISTING STRUCTURE/UTILITY TO REMAIN.
43. CAST IN PLACE TOE WALL AS NEEDED FOR GRADING. REFER TO TOE WALL DETAILS SHEET FOR MORE INFORMATION.
44. TIE PROPOSED CONCRETE PAVEMENT TO EXISTING CONCRETE PAVEMENT HEADER. IF EXISTING PAVEMENT DOES NOT HAVE EXISTING EXPOSED REINFORCING STEEL, USE HORIZONTAL DOWELS.
45. SAW CUT EXISTING PAVEMENT.
46. REMOVE AND DISPOSE OF EXISTING MANHOLE.
47. EXISTING POWER POLE TO BE REMOVED. (BY OTHERS; CENTERPOINT ENERGY)
48. REMOVE & RELOCATE EXISTING TRAFFIC SIGN
49. ABANDON STORM SEWER MANHOLE, PLUG AND ABANDON LEAD
50. ADJUST EXISTING MANHOLE FRAME AND COVER TO FIT NEW GRADE AND ALIGNMENT (BY PRIVATE UTILITY COMPANY)
51. RELOCATE AND RECONNECT EXISTING WATER METER.
52. RELOCATE EXISTING ELECTRICAL BOX
53. ADJUST EXISTING GRATE FRAME AND COVER TO FIT NEW GRADE
54. REMOVE AND REPLACE EXISTING LEAD
55. ADJUST EXIST WATER VALVE BOXES/METER BOXES TO NEW GRADE. REPLACE ALL MISSING OR DAMAGED WATER VALVE BOXES/METER BOXES AND COVERS.
56. REMOVE AND DISPOSE VALVE BOXES ON ABANDONED WATER LINES. REMOVE RISER TO BELOW PROPOSED PAVEMENT SUBGRADE.
57. FOLLOW PROCEDURES IN SPEC SECTION 02516-CUT, PLUG AND ABANDONMENT OF WATER LINES.
58. PROPOSED PEDESTRIAN RAMP WITH MAXIMUM 1:15 SLOPE FOR GRADE CHANGE AT DRIVEWAYS AND INTERSECTIONS. SEE STANDARD DETAILS.
59. REMOVE EXISTING GRAVEL PAVEMENT
60. SEE LANDSCAPE/HARDSCAPE DETAILS SHEETS FOR MORE DETAILS.
61. PROPOSED TYPE 1 TXDOT PEDESTRIAN RAMP. SEE STANDARD DETAIL 12-A FOR DETAILS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

KEYED NOTES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
NOT TO SCALE
CITY DWG NO.
SHEET:
7 OF 226

MJGuthrie
8:23:20 AM
9/2/2014
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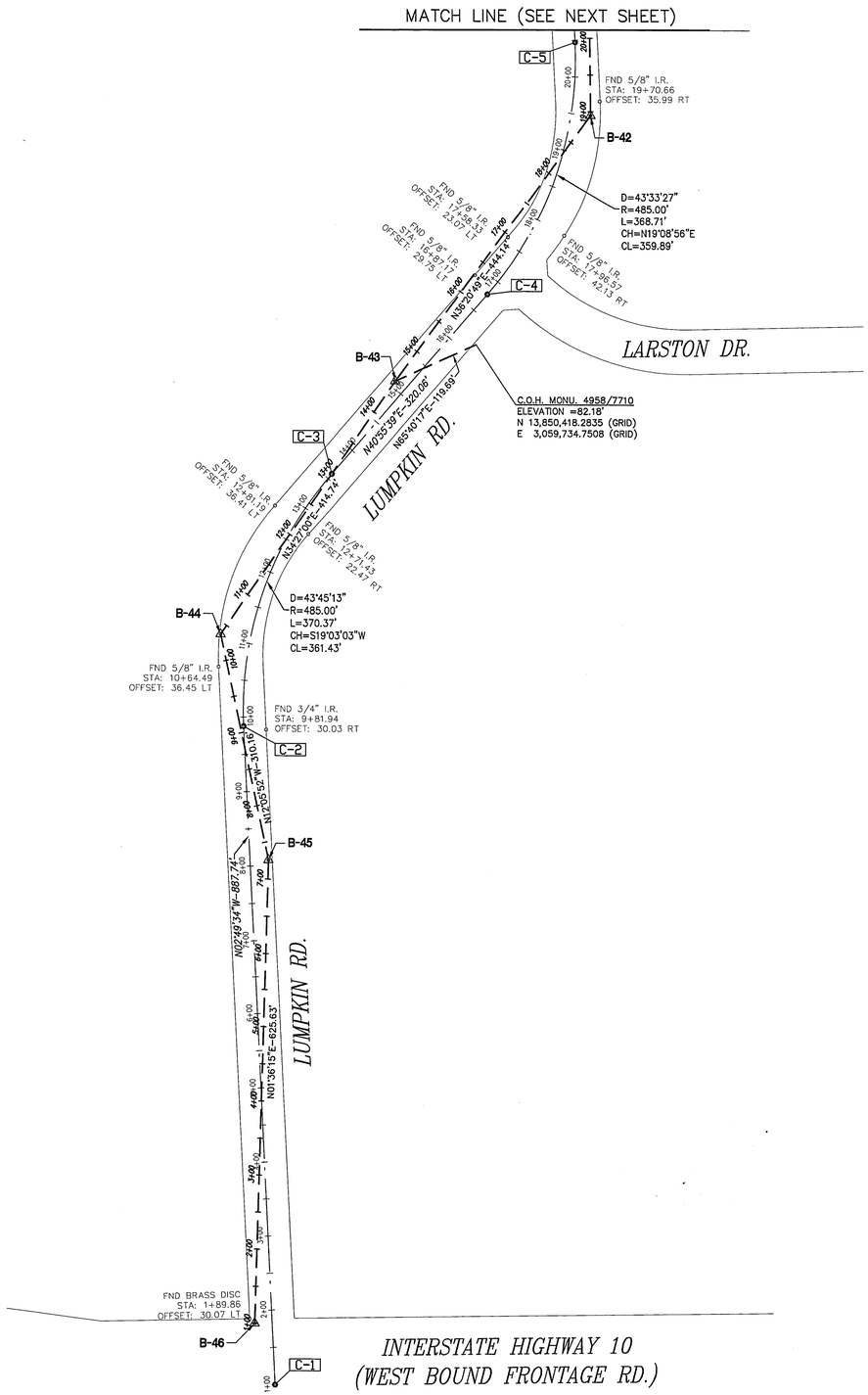

SURVEY BASELINE POINTS DATA (TEMPORARY BENCHMARK)

POINT NO.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	ELEV. (FT.)	S. BL STA.	D. BL STA.	OFFSET (FT.)	DESCRIPTION
B-40	13,853,388.55	3,060,249.01	13,851,587.84	3,059,851.23	86.39	27+57.28	28+08.56	18.18 RT	SET MAG NAIL W/SHNR
B-41	13,852,974.60	3,060,281.65	13,851,173.95	3,059,883.87	85.29	23+42.04	23+93.54	31.79 RT	SET 1/2" I.R. W/CAP
B-42	13,852,527.26	3,060,286.69	13,850,726.67	3,059,888.90	85.18	18+94.67	19+50.97	26.24 RT	SET 1/2" I.R. W/CAP
B-43	13,852,169.53	3,060,023.45	13,850,368.98	3,059,625.70	82.25	14+50.53	15+08.09	17.04 LT	SET "X" CUT
B-44	13,851,827.53	3,059,788.84	13,850,027.03	3,059,391.12	80.32	10+35.79	11+04.75	40.32 LT	SET 1/2" I.R. W/CAP
B-45	13,851,524.26	3,059,853.85	13,849,723.80	3,059,456.12	80.03	7+25.63	8+07.15	24.86 RT	SET 1/2" I.R. W/CAP
B-46	13,850,898.87	3,059,836.33	13,849,098.49	3,059,438.60	78.75	1+00	1+83.38	23.46 LT	SET 5/8" I.R. W/CAP
B-50	13,852,974.20	3,059,529.31	13,851,173.55	3,059,131.63	85.59	8+52.24	--------	--------	SET 1/2" I.R
B-52	13,853,854.62	3,060,197.63	13,852,053.85	3,059,799.85	86.60	32+26.17	32+76.49	11.77 LT	SET 1/2" I.R. W/CAP
B-53	13,854,337.53	3,060,187.45	13,852,536.70	3,059,789.68	85.72	37+09.19	37+59.36	0.22 RT	SET "X" CUT
B-54	13,853,390.06	3,060,439.61	13,851,589.36	3,060,041.81	87.72	2+90.61	3+09.32	7.40 RT	SET MAG NAIL

TEMPORARY BENCHMARKS

T.B.M. B-40
SET MAG NAIL W/SHNR AT EAST SIDE OF LUMPKIN RD. APPROX. 418 FT NORTH OF LUMPKIN RD. AND WESTVIEW DR. INTERSECTION.
D. STA: 28+08.56/18.18' RT
ELEV.=86.39'

T.B.M. B-41
SET 1/2" I.R. W/KUO CAP AT NORTHEAST CORNER OF LUMPKIN RD. AND WESTVIEW DR. INTERSECTION.
D. STA: 23+93.54/31.79' RT
ELEV.=85.29'

T.B.M. B-42
SET 1/2" I.R. W/KUO CAP AT EAST SIDE OF LUMPKIN RD. APPROX. 361 FT SOUTH OF LUMPKIN RD. AND WESTVIEW DR. INTERSECTION.
D. STA: 19+50.97/26.24' RT
ELEV.=85.17'

T.B.M. B-43
SET "X" CUT AT WEST SIDE OF LUMPKIN RD. APPROX. 166 FT SOUTH OF LUMPKIN RD. AND LARSTON DR. INTERSECTION.
D. STA: 15+08.09/17.04' LT
ELEV.=82.25'

T.B.M. B-44
SET 1/2" I.R. W/KUO CAP AT WEST SIDE OF LUMPKIN RD. APPROX. 587 FT SOUTH OF LUMPKIN RD. AND LARSTON DR. INTERSECTION.
D. STA: 11+04.75/40.32' LT
ELEV.=80.32'

T.B.M. B-45
SET 1/2" I.R. W/KUO CAP AT EAST SIDE OF LUMPKIN RD. APPROX. 622 FT NORTH OF LUMPKIN RD. AND INTERSTATE HIGHWAY 10. INTERSECTION.
D. STA: 8+07.15/24.86' RT
ELEV.=80.03'

T.B.M. B-46
SET 5/8" I.R. W/KUO CAP AT NORTHWEST CORNER OF LUMPKIN RD. AND INTERSTATE HIGHWAY 10. INTERSECTION.
D. STA: 1+83.38/23.46' LT
ELEV.=78.75'

T.B.M. B-48
SET "X" CUT AT CENTER LINE OF WESTVIEW DR. APPROX. 175 FT WEST OF LUMPKIN RD. AND WESTVIEW DR. INTERSECTION.
D. STA: 1+17.93/7.33' LT
ELEV.=85.53'

T.B.M. B-50
SET 1/2" I.R LOCATED AT THE SOUTHWEST CORNER OF DETENTION POND AND NORTH SIDE OF WESTVIEW DRIVE.
ELEV.=85.59'

T.B.M. B-52
SET 1/2" I.R. W/KUO CAP AT WEST SIDE OF LUMPKIN RD. APPROX. 466 FT NORTH OF LUMPKIN RD. AND NORTHBROOK DR. INTERSECTION.
D. STA: 32+76.49/11.77 LT
ELEV.=86.60'

T.B.M. B-53
SET "X" CUT AT NORTH SIDE OF LUMPKIN RD. AND NORTHBROOK DR. INTERSECTION.
D. STA: 37+59.36/0.22' RT
ELEV.=85.72'

T.B.M. B-54
SET MAG NAIL LOCATED APPROX. 418' NORTH OF WESTVIEW AND 182' EAST OF LUMPKIN ROAD.
D. STA: 3+09.32/7.40 RT
ELEV.=87.72'

100 0 50 100 200
SCALE: 1" = 100'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z

ELEV.=82.18 FEET NAVD 88 (CORS96) BASED ON GEOID '09.

HORIZONTAL DATUM:

ALL HORIZONTAL COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD 83, 1993 ADJUSTMENT.

THE COORDINATES & DISTANCES SHOWN ARE SURFACE UNLESS OTHERWISE NOTED, AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY A SCALE FACTOR OF 0.999870017.

LEGEND:

- B-XX SURVEY CONTROL POINT NUMBER
- C-X DESIGN BASELINE POINT NUMBER
- SURVEY CONTROL POINT
- DESIGN BASELINE POINT
- CITY OF HOUSTON MONUMENT
- D. BL: DESIGN BASELINE
- S. BL: SURVEY BASELINE

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

KUO & associates, Inc.
Consulting Engineers & Surveyors
10700 Richmond Ave., Suite 113, Houston, Texas 77042
Tel: 713-975-9785, Fax: 713-975-0903, www.kuoassociates.com
Texas Firm Registration No. F-4578

STATE OF TEXAS REGISTERED SHAHEEN CHOWDHURY 5858 PROFESSIONAL LAND SURVEYOR

SURVEYED BY:
KUO & ASSOCIATES
FB No. P-5857

Shaheen Chowdhury 07/29/14

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LUMPKIN ROAD

SURVEY CONTROL MAP

SHEET 1 OF 2

WBS NO.
N-T17000-0012-3
DRAWING SCALE
1" = 100'
CITY OF HOUSTON PM
SHEET NO. 8 OF 226

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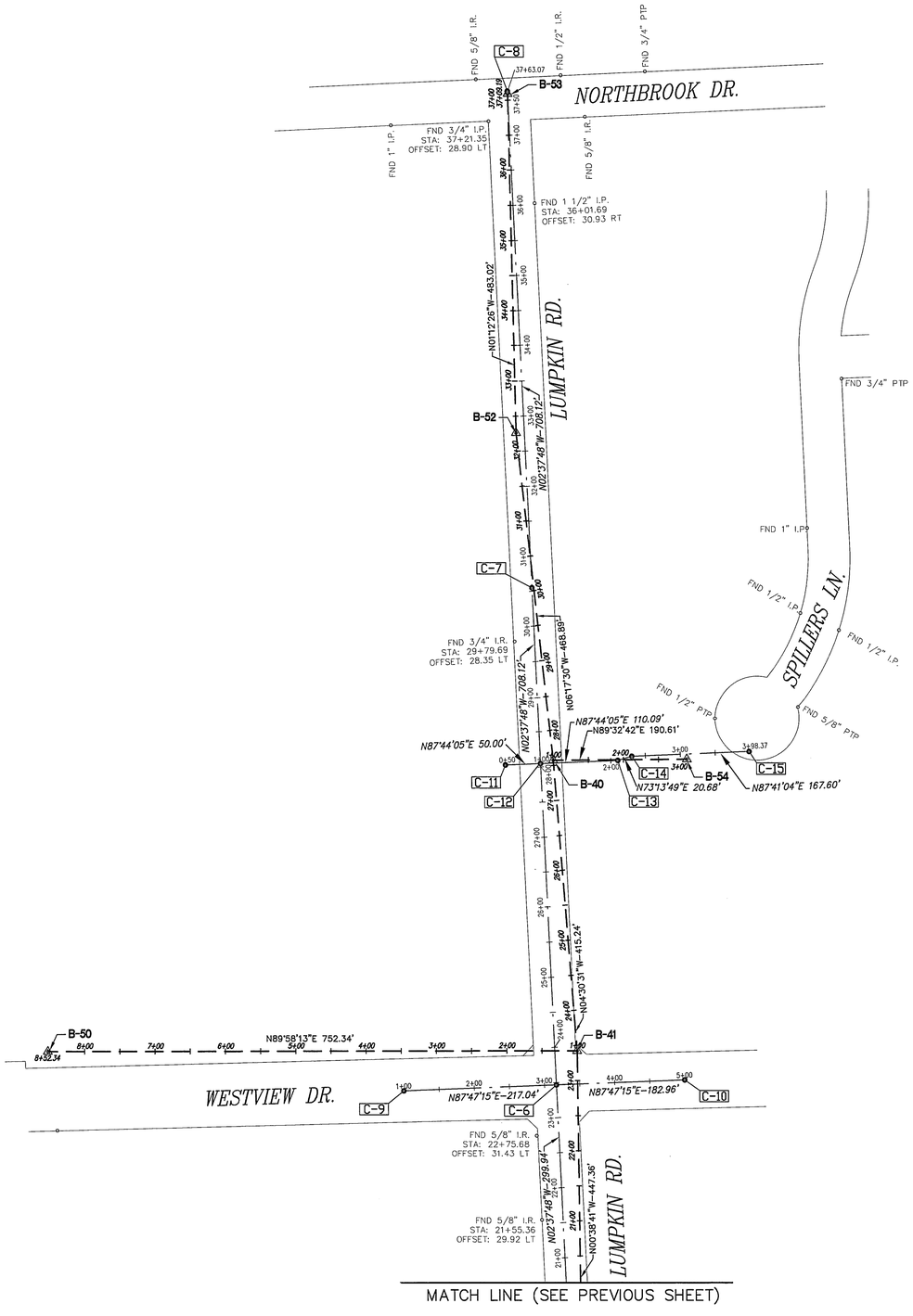
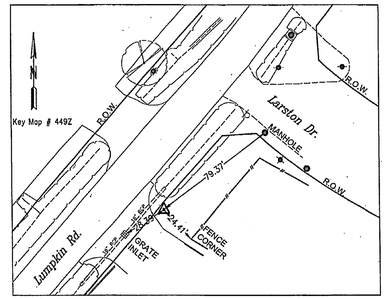


CITY OF HOUSTON

CITY SURVEY MARKER 4958 7710



ON MAP SHEET: 4958 A4

NAD83 (CORS 96 EPOCH 2002.00) Texas S. C. Zone

N= 13,850,418.2835

E= 3,059,734.7508

Lat.= 29°47'19.78717" (N)

Lon.= 95°33'33.06504" (W)

Method For Horizontal GPS

Elevations Adjustment

82.18 FEET (NAVD 88, 2001 Adj) CORS '96

Method For Vert. GPS

Ellipsoid Height= -8.2746 (FT)

General Location: EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION.

Date Set: 6-15-2010 Type of Mark: 4A

Survey Markers Useful As Azimuth From Station

NOTES:

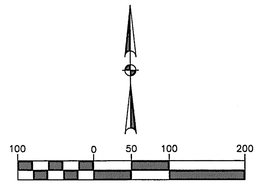
1. Scale Factor (S.F. 0.999870017)
2. Surface= Grid / S.F.

Surveyed By: KUO & ASSOCIATES, INC.
10700 RICHMOND AVE., SUITE 113
HOUSTON, TX. 77042

City of Houston, Harris County, Texas

STATE OF TEXAS REGISTERED SHAHEEN CHOWDHURY 5858 PROFESSIONAL LAND SURVEYOR

Shaheen Chowdhury 8/29/19



SCALE: 1" = 100'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z

ELEV.=82.18 FEET NAVD 88 (CORS96) BASED ON GEOID '09.

HORIZONTAL DATUM:

ALL HORIZONTAL COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD 83, 1993 ADJUSTMENT.

THE COORDINATES & DISTANCES SHOWN ARE SURFACE UNLESS OTHERWISE NOTED, AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY A SCALE FACTOR OF 0.999870017.

LEGEND:

B-XX	SURVEY CONTROL POINT NUMBER
C-X	DESIGN BASELINE POINT NUMBER
⚠	SURVEY CONTROL POINT
•	DESIGN BASELINE POINT
⊛	CITY OF HOUSTON MONUMENT
D. BL:	DESIGN BASELINE ——·——
S. BL:	SURVEY BASELINE — — —

DESIGN BASELINE POINTS DATA

POINT NO.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	D. BL STA.	DESCRIPTION
C-1	13,850,816.74	3,059,863.88	13,849,016.37	3,059,466.14	1+00	SET 1/2" I.R. W/CAP
C-2	13,851,703.40	3,059,820.11	13,849,902.91	3,059,422.38	9+87.74	SET MAG NAIL W/SHNR
C-3	13,852,045.04	3,059,938.08	13,850,244.51	3,059,540.34	13+58.11	SET MAG NAIL W/SHNR
C-4	13,852,286.86	3,060,147.75	13,850,486.30	3,059,749.98	16+78.17	SET MAG NAIL W/SHNR
C-5	13,852,626.84	3,060,265.81	13,850,826.23	3,059,868.02	20+46.88	SET MAG NAIL W/SHNR
C-6	13,852,926.47	3,060,252.04	13,851,125.83	3,059,854.26	23+46.82/3+17.04	SET "X" CUT
C-7	13,853,633.85	3,060,219.55	13,851,833.11	3,059,821.77	30+54.95	SET MAG NAIL W/SHNR
C-8	13,854,341.23	3,060,187.06	13,852,540.40	3,059,789.28	37+63.07	SET "X" CUT
C-9	13,852,918.09	3,060,035.17	13,851,117.45	3,059,637.42	1+00	SET "X" CUT
C-10	13,852,933.53	3,060,434.87	13,851,132.88	3,060,037.06	5+00	SET "X" CUT
C-11	13,853,381.99	3,060,181.07	13,851,581.28	3,059,783.30	0+50	SET 1/2" I.R.
C-12	13,853,383.97	3,060,231.03	13,851,583.26	3,059,833.25	1+00	SET MAG NAIL W/SHNR
C-13	13,853,388.32	3,060,341.03	13,851,587.61	3,059,943.24	2+10.09	SET MAG NAIL W/SHNR
C-14	13,853,394.28	3,060,360.83	13,851,593.58	3,059,963.04	2+30.77	SET MAG NAIL W/SHNR
C-15	13,853,401.06	3,060,528.30	13,851,600.35	3,060,130.48	3+98.37	SET "X" CUT

MEMORIAL CITY REDEVELOPMENT AUTHORITY

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Tel: 713-975-8769, Fax: 713-975-0920, www.kuoassociates.com
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STATE OF TEXAS REGISTERED SHAHEEN CHOWDHURY 5858 PROFESSIONAL LAND SURVEYOR

Shaheen Chowdhury 09/29/19

SURVEYED BY:
KUO & ASSOCIATES
FB No. P-5857

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LUMPKIN ROAD

SURVEY CONTROL MAP

SHEET 2 OF 2

WBS NO.	
N-T17000-0012-3	
DRAWING SCALE	
1" = 100'	
CITY OF HOUSTON PM	
SHEET NO. 9 OF 226	

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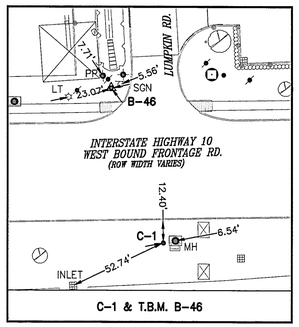
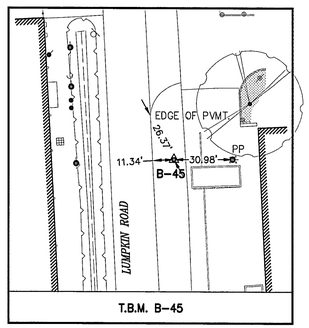


C-1 & T.B.M. B-46



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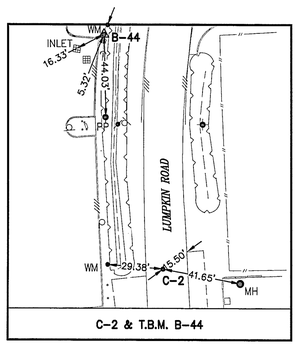

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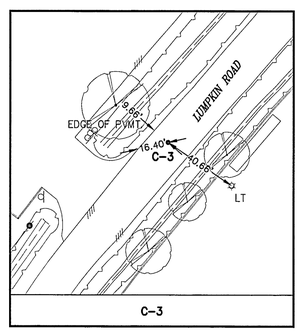

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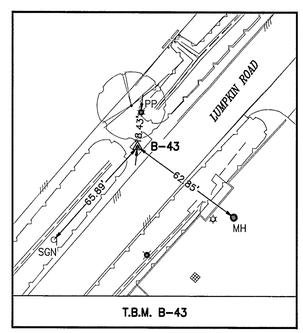

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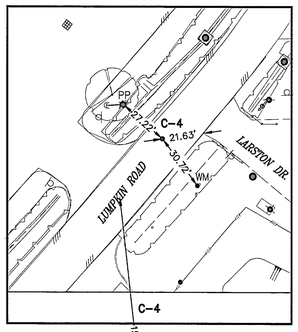

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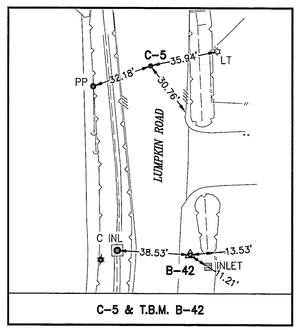
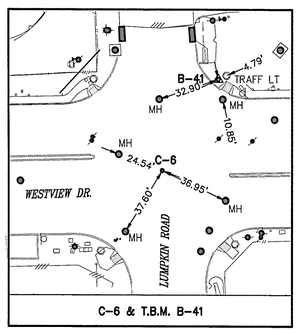


C-5 & T.B.M. B-42



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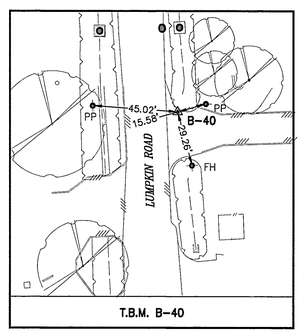

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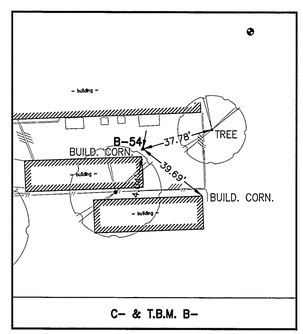
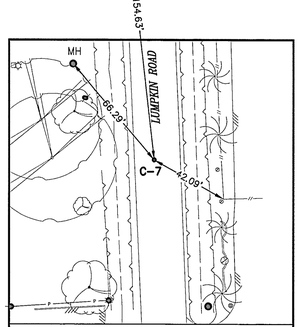


C- & T.B.M. B-



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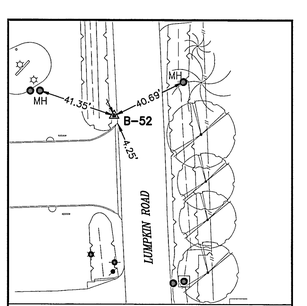

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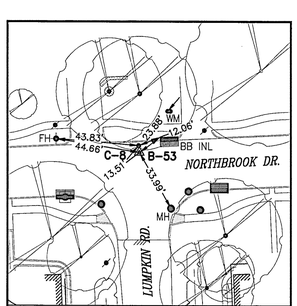

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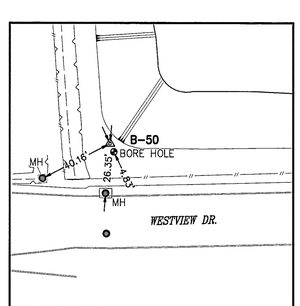
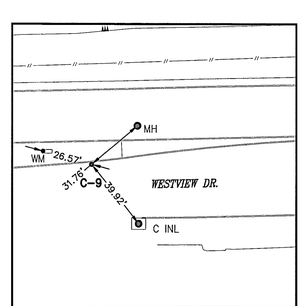


C- & T.B.M. B-



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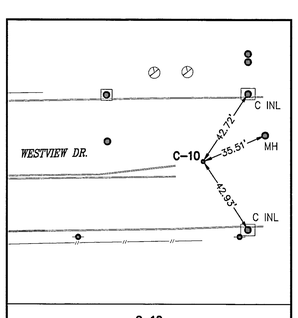

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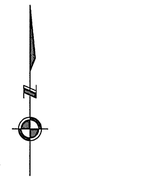


GRAPHIC SCALE

40 0 20 40 80

(IN FEET)
1 inch = 40 ft.

EXIST. TOPOGRAPHIC LEGEND

- MANHOLE
- GRATE INLET
- B/BB INLET
- FIRE HYDRANT
- SIGNAL POLE
- FENCE
- BUSH
- BORE HOLE
- WATER VALVE
- HIGH BANK
- DESIGN BASELINE POINT
- SURVEY CONTROL POINT
- MAIL BOX
- LIGHT
- SIGN
- POWER POLE
- POWER POLE W/LIGHT
- DOWN GUY
- TREE
- PLANTER
- BUILDING
- WATER METER
- HEDGE ROW
- METER POLE
- HL&P MANHOLE

ABBREVIATIONS

F.H. – FIRE HYDRANT
F.C – FENCE CORNER
LT – LIGHT POLE
MB – MAIL BOX
MH.– MANHOLE
PP – POWER POLE
PP/LIGHT – POWER POLE W/LIGHT
WM – WATER METER

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

KUO & associates, Inc.
Consulting Engineers & Surveyors
10700 Richmond Ave., Suite 113, Houston, Texas 77042
Tel: 713-975-9789, Fax: 713-975-0520, www.kuoassociates.com
Texas Firm Registration No. F-45578

SURVEYED BY:
KUO & ASSOCIATES
FB No. P-5857

STATE OF TEXAS REGISTERED SHAHEEN CHOWDHURY 5858 PROFESSIONAL LAND SURVEYOR
Shaheen Chowdhury 07/29/14

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LUMPKIN ROAD

CONTROL POINT SWING TIES

WBS NO.
N-T17000-0012-3
DRAWING SCALE
1" = 40'
CITY OF HOUSTON PM
SHEET NO. 10 OF 226

S:\Proj-2013\13082 (10037 LUMPKIN)\Dwgs\SCM\SCM-13082.dwg March 26 2014

PROPOSED LUMPKIN ALIGNMENT

BL LUMPKIN ROAD

Beginning chain PR-HALN description

Point 510 N 13,850,816.743 E 3,059,863.875 Sta 1+00.00

Course from 510 to PC PR-HALN-1 N 2° 49′ 33.88" W Dist 887.741

Curve PR-HALN-1	Curve Data				
P.I. Station	11+82.48	N	13,851,897.909	E	3,059,810.504
Delta =	43° 45′ 13.00" (RT)				
Degree =	11° 48′ 48.74"				
Tangent =	194.741				
Length =	370.368				
Radius =	485.001				
External =	37.637				
Long Chord =	361.435				
Mid. Ord. =	34.926				
P.C. Station	9+87.74	N	13,851,703.405	E	3,059,820.105
P.T. Station	13+58.11	N	13,852,045.044	E	3,059,938.079
C.C.		N	13,851,727.318	E	3,060,304.516
Back = N	2° 49′ 33.88" W				
Ahead = N	40° 55′ 39.12" E				
Chord Bear = N	19° 03′ 02.62" E				

Course from PT PR-HALN-1 to PC PR-HALN-2 N 40° 55′ 39.12" E Dist 320.060

Curve PR-HALN-2	Curve Data				
P.I. Station	18+71.95	N	13,852,433.268	E	3,060,274.697
Delta =	43° 33′ 27.00" (LT)				
Degree =	11° 48′ 48.74"				
Tangent =	193.778				
Length =	368.708				
Radius =	485.001				
External =	37.278				
Long Chord =	359.893				
Mid. Ord. =	34.618				
P.C. Station	16+78.17	N	13,852,286.861	E	3,060,147.752
P.T. Station	20+46.88	N	13,852,626.842	E	3,060,265.805
C.C.		N	13,852,604.588	E	3,059,781.315
Back = N	40° 55′ 39.12" E				
Ahead = N	2° 37′ 47.88" W				
Chord Bear = N	19° 08′ 55.62" E				

Course from PT PR-HALN-2 to 511 N 2° 37′ 47.88" W Dist 1,716.191

Point 511 N 13,854,341.225 E 3,060,187.057 Sta 37+63.07

Ending chain PR-HALN description

BL WESTVIEW DRIVE

Chain PR-WV-HALN contains:
200 201 202

Beginning chain PR-WV-HALN description

Point 200 N 13,852,916.06 E 3,059,934.93 Sta 0+00.00

Course from 200 to 201 N 88° 08′ 57.284" E Dist 317.28

Point 201 N 13,852,926.31 E 3,060,252.05 Sta 3+17.28

Course from 201 to 202 N 88° 08′ 57.285" E Dist 282.74

Point 202 N 13,852,935.44 E 3,060,534.64 Sta 6+00.02

Ending chain PR-WV-HALN description

BL WESTVIEW BASIN

Beginning chain PR-PD-HALN2 description

Point 1153 N 13,852,988.548 E 3,060,349.295 Sta 0+00.00

Course from 1153 to 1154 S 88° 37′ 36.12" W Dist 414.921

Point 1154 N 13,852,978.604 E 3,059,934.493 Sta 4+14.92

Course from 1154 to 1155 S 88° 37′ 36.12" W Dist 485.081

Point 1155 N 13,852,966.978 E 3,059,449.552 Sta 9+00.00

Ending chain PR-PD-HALN2 description

BL BASIN CHANNEL

Beginning chain CHANNEL description

Point 400 N 13,853,037.904 E 3,060,246.923 Sta 0+00.00

Course from 400 to PC CHANNEL-1 S 87° 47′ 38.21" W Dist 414.026

Curve CHANNEL-1	Curve Data				
P.I. Station	4+17.58	N	13,853,021.810	E	3,059,829.649
Delta =	16° 50′ 35.93" (RT)				
Degree =	238° 22′ 11.37"				
Tangent =	3.559				
Length =	7.066				
Radius =	24.037				
External =	0.262				
Long Chord =	7.041				
Mid. Ord. =	0.259				
P.C. Station	4+14.03	N	13,853,021.967	E	3,059,833.204
P.T. Station	4+21.09	N	13,853,022.689	E	3,059,826.201
C.C.		N	13,853,045.980	E	3,059,832.142
Back = S	87° 28′ 01.76" W				
Ahead = N	75° 41′ 22.31" W				
Chord Bear = N	84° 06′ 40.27" W				

Course from PT CHANNEL-1 to PC CHANNEL-2 N 69° 59′ 49.60" W Dist 235.329

Curve CHANNEL-2	Curve Data				
P.I. Station	6+63.31	N	13,853,105.544	E	3,059,598.594
Delta =	22° 16′ 16.83" (RT)				
Degree =	163° 42′ 08.02"				
Tangent =	6.889				
Length =	13.605				
Radius =	35.000				
External =	0.672				
Long Chord =	13.519				
Mid. Ord. =	0.659				
P.C. Station	6+56.42	N	13,853,103.188	E	3,059,605.068
P.T. Station	6+70.03	N	13,853,110.179	E	3,059,593.496
C.C.		N	13,853,136.076	E	3,059,617.040
Back = N	69° 59′ 49.60" W				
Ahead = N	47° 43′ 32.77" W				
Chord Bear = N	58° 51′ 41.18" W				

Course from PT CHANNEL-2 to 401 N 47° 05′ 39.94" W Dist 187.657

Point 401 N 13,853,237.934 E 3,059,456.042 Sta 8+57.68

Ending chain CHANNEL description

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE: CITY DWG NO.

NOT TO SCALE

SHEET: 11 OF 226

pw:\\adpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\General\11-001-HOR-ALIGN-01.dgn
MJGuthrie
8:23:34 AM
9/2/2014

W156-02-00

5'X5' RCB

9'X6' RCB

6'X9' RCB

2-9'X9' RCB

3-72" RCP

EXIST. TXDOT DETENTION BASIN

2-9'X5' RCB

TO RUMMEL CREEK W156-00-00

3-8'X4' RCB

CLARBOROUGH PL

WESTVIEW DR

8'X5' RCB

7'X5' RCB

WEST SAM HOUSTON TOLLWAY

5'X5' RCB

8'X5' RCB

7'X5' RCB

6'X5' RCB

PIPELINE CORRIDOR

2-10'X10' RCB

HCC

SYSTEM B
9.2 AC

36" RCP

30" RCP

24" RCP

2-5'X9' RCB

2-10'X10' RCB

30" RCP

SYSTEM C
4.9 AC

84" RCP

2-30" RCP

30" RCP RESTRICTOR

7'X5' RCB

12" RCP

15" RCP

18" RCP

15" RCP

84" RCP

42" RCP

36" RCP

30" RCP

24" RCP

2-10'X10' RCB

IH-10 FRONTAGE RD

*SYSTEM E
271.4 AC

7'X6' RCB

EXIST COH DETENTION BASIN

SYSTEM A
119.1 AC

36" RCP

7'X5' RCB

LUMPKIN RD

7'X4' RCB

6'X6' RCB

WESTVIEW DR

*SYSTEM F
30.9 AC

2-RCP

SHADOWDALE DITCH W156-00-00

36" RCP

MAPLETON DR

24" RCP

42" RCP

NORTHBROOK DR

24" RCP

MAYFIELD RD

24" RCP

IVYRIDGE RD

24" RCP

HAZELHURST DR

STEBBINS DR

72" RCP

24" RCP

30" RCP

36" RCP

SPILLERS LN

30" RCP

24" RCP

72" RCP

SHADOW BEND DR

*SYSTEM D
288.6 AC

24" RCP

24" RCP

72" RCP

21" RCP

0 200 400 800

(IN FEET)
1 INCH = 200 FEET

No.	DATE	REVISIONS	APP.

LEGEND

- EXISTING RCB
- EXISTING STORM SEWER
- 2 YR FLOW DIRECTION
- CHANNEL FLOW DIRECTION
- SYSTEM DRAINAGE BOUNDARY
- EXISTING PRIVATE DETENTION BASIN
- EXISTING TXDOT DETENTION BASIN
- EXISTING COH DETENTION BASIN

*EXISTING DRAINAGE SYSTEM IS WITHIN SHADOWDALE DITCH WATERSHED BUT DOES NOT CONTRIBUTE TO LUMPKIN SYSTEMS A, B, AND C. SYSTEM IS MODELED IN THE INFOWORKS 2D ANALYSIS.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING OVERALL DRAINAGE AREA MAP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY:

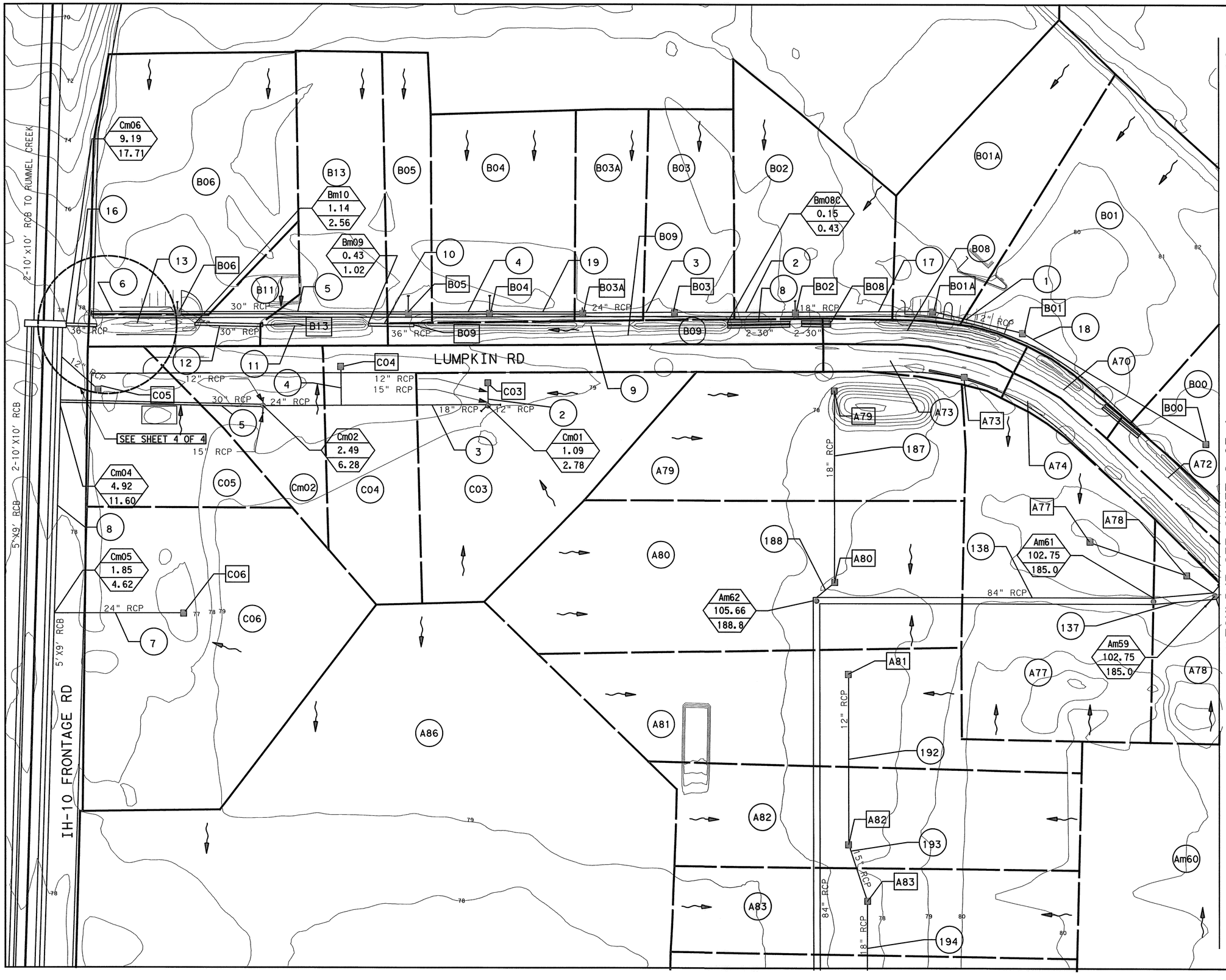
DRAWING SCALE: 1"= 200'

VERT:
HORZ:

CITY DWG NO.

SHEET: 12 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\12-001-PR-EX-OVALL-DRN-AREA-MAP.dgn 10:17:21 AM 9 Sep 2014 MJGuthrie



0 50 100 200
(IN FEET)
1 INCH = 50 FEET

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER / TOTAL CUMULATIVE AREA (AC) / 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- EXISTING RCB
- EXISTING STORM SEWER
- 2 YR FLOW DIRECTION
- INLET
- MANHOLE
- SYSTEM DRAINAGE BOUNDARY
- DRAINAGE AREA

No.	DATE	REVISIONS	APP.

BRIAN R. WHITNEY P.E. 81591 REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING DRAINAGE AREA MAP (1 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY:
DRAWING SCALE: 1"=50'
CITY DWG NO.:
VERT:
HORZ:
SHEET: 13 OF 226

SHEET 2 OF 4

pw:\\ledpw.ledco.int:prod_jectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\13-001-PR-EX-DRN-AREA-MAP (1 OF 4).dgn 10:17:38 AM 9/12/2014 MJGuthrie

MATCHLINE SEE SHEET 1 OF 4

MATCHLINE SEE SHEET 3 OF 4

PRIVATE DET. BASIN

PRIVATE DET. BASIN

WESTVIEW DR

EXIST COH DETENTION POND

LUMPKIN RD

7'x6' RCB

7'x5' RCB

7'x4' RCB

6'x6' RCB

18"RCP

24"RCP

36"RCP

2-30"

2-24"

2-18"

A74 96.25 172.4

Am56 95.71 171.6

A66 90.43 163.9

A60 83.47 150.6

A59 82.98 150.1

Am57D 81.54 149.0

Am45 77.94 142.1

Am44 16.79 36.4

Am43 16.79 36.4

Am41 16.43 36.37

Am42 77.94 142.1

Am38 60.93 107.1

Am57B

B00 129 122 126 124 186 134 184 155 154 153 116 112 183 120 181 117 203 204

A50 A51 A52 A53 A54 A55 A56 A57 A59 A60 A61 A62 A63 A64 A65 A66 A67 A68 A74 A75 A75A A76 A78 A44 A47 A46 A45 A43 A42 A32 F01 F02

Am69 Am60

N

0 50 100 200

(IN FEET)
1 INCH = 50 FEET

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER; TOTAL CUMULATIVE AREA (AC); 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- EXISTING RCB
- EXISTING STORM SEWER
- 2 YR FLOW DIRECTION
- INLET
- MANHOLE
- SYSTEM DRAINAGE BOUNDARY
- DRAINAGE AREA

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING DRAINAGE AREA MAP (2 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=50'
CITY DWG NO.
VERT:
HORZ:
SHEET: 14 OF 226

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MATCHLINE SEE SHEET 2 OF 4

LUMPKIN RD

NORTHBROOK DR

MAYFIELD RD

SPILLERS LN

A47 A42 A43 A41 A33 A32 A36 A34 A35 A38 A37 A30 A29 A31 A39 A40 A19 A18 A17 A14 A13 A20 A12 A11

147 148 146 108 107

Am37 57.51 103.6

Am36 46.78 83.1

Am27 4.29 8.14

Am28 4.29 8.14

Am29 7.25 13.39

Am30 7.25 13.39

Am32 20.97 38.38

Am31 19.23 35.27

Am26 11.98 22.35

Am23 6.68 12.82

Am35 43.07 77.29

Am34 21.55 39.17

Am16 20.23 36.67

Am15 19.74 36.20

Am11 3.89 7.39

Am10 1.97 3.84

36" RCP 30" RCP 24" RCP 7'x4' RCB 6'X3' RCB 42" RCP 60" RCP

N

0 50 100 200

(IN FEET)
1 INCH = 50 FEET

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER / TOTAL CUMULATIVE AREA (AC) / 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- EXISTING RCB
- EXISTING STORM SEWER
- 2 YR FLOW DIRECTION
- INLET
- MANHOLE
- SYSTEM DRAINAGE BOUNDARY
- DRAINAGE AREA

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING DRAINAGE AREA MAP (3 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=50'
CITY DWG NO.
VERT:
HORZ:
SHEET: 15 OF 226

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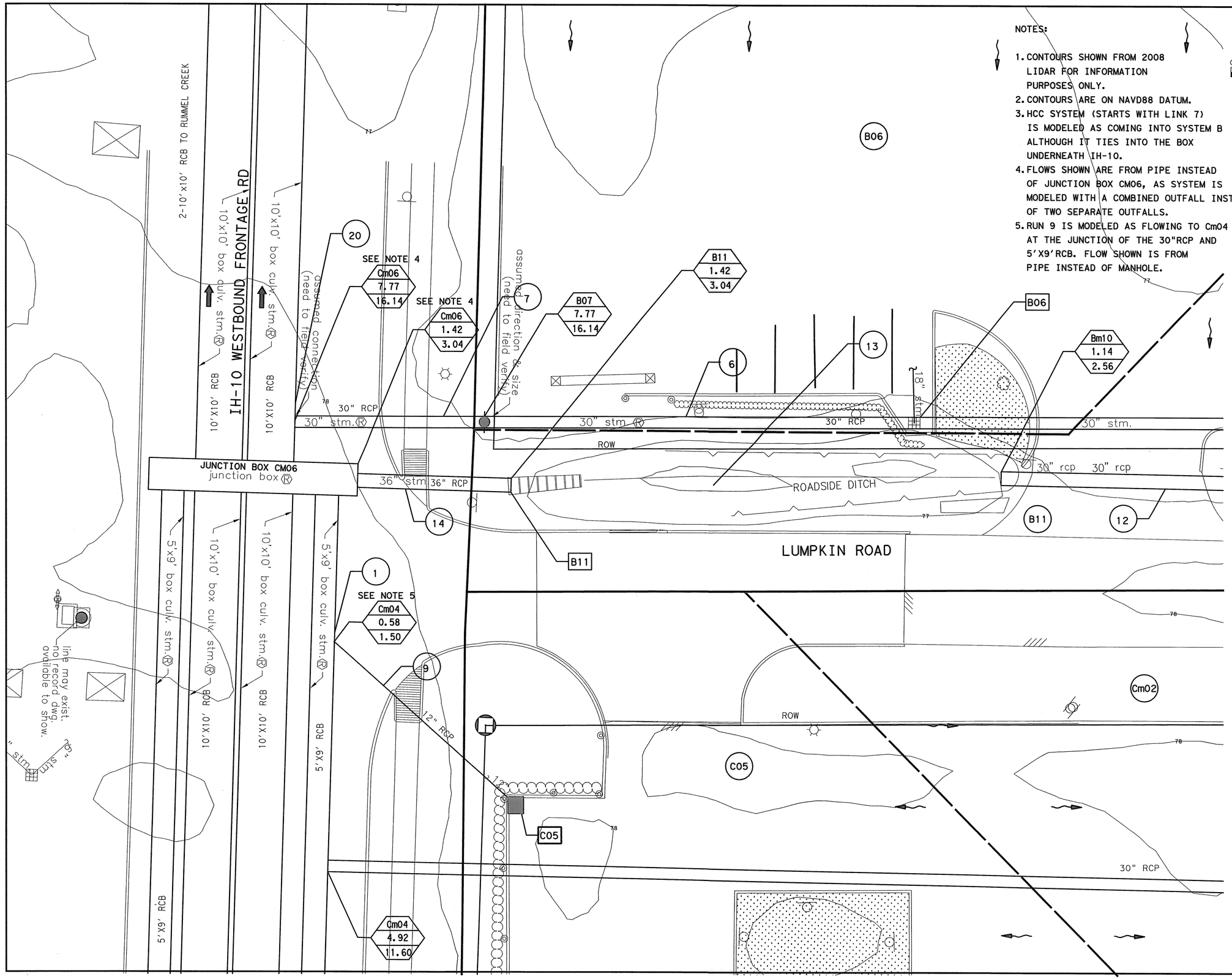

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.
3. HCC SYSTEM (STARTS WITH LINK 7) IS MODELED AS COMING INTO SYSTEM B ALTHOUGH IT TIES INTO THE BOX UNDERNEATH IH-10.
4. FLOWS SHOWN ARE FROM PIPE INSTEAD OF JUNCTION BOX CM06, AS SYSTEM IS MODELED WITH A COMBINED OUTFALL INSTEAD OF TWO SEPARATE OUTFALLS.
5. RUN 9 IS MODELED AS FLOWING TO Cm04 AT THE JUNCTION OF THE 30"RCP AND 5'X9'RCB. FLOW SHOWN IS FROM PIPE INSTEAD OF MANHOLE.

N

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

No.	DATE	REVISIONS	APP.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER / TOTAL CUMULATIVE AREA (AC) / 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- EXISTING RCB
- EXISTING STORM SEWER
- 2 YR FLOW DIRECTION
- INLET
- MANHOLE
- SYSTEM DRAINAGE BOUNDARY
- DRAINAGE AREA

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
EXISTING DRAINAGE AREA MAP (4 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: 1"=10'
VERT:
HORZ:
SHEET: 16 OF 226
CITY DWG NO.

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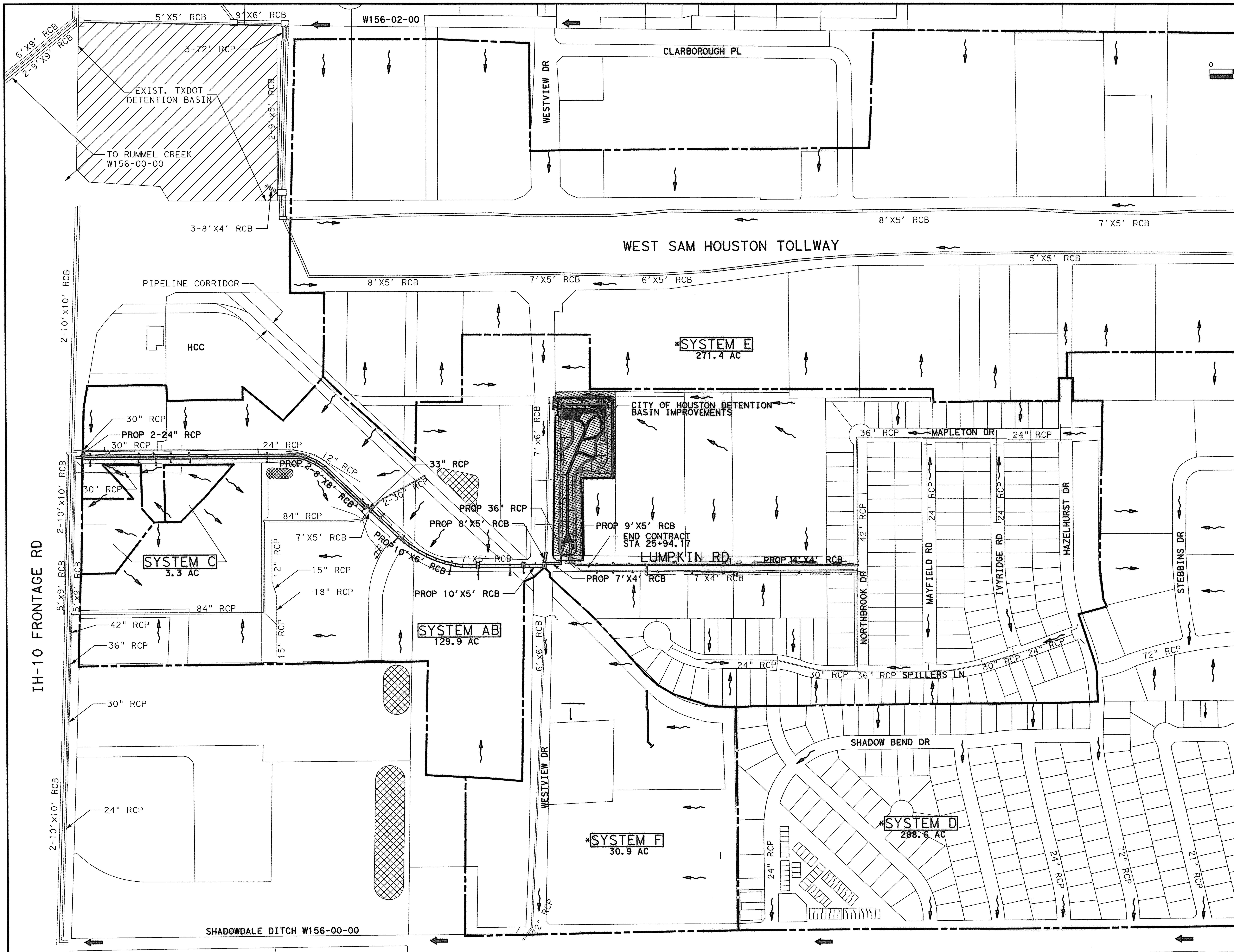


LEGEND

- PROPOSED RCB
- PROPOSED STORM SEWER
- 2 YR FLOW DIRECTION
- CHANNEL FLOW DIRECTION
- SYSTEM DRAINAGE BOUNDARY
- EXISTING PRIVATE DETENTION BASIN
- EXISTING TXDOT DETENTION BASIN
- EXISTING COH DETENTION BASIN

*DRAINAGE SYSTEM IS IN SHADOWDALE DITCH WATERSHED BUT DOES NOT CONTRIBUTE TO LUMPKIN SYSTEMS AB OR C. SYSTEM IS MODELED IN THE INFOWORKS 2D ANALYSIS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

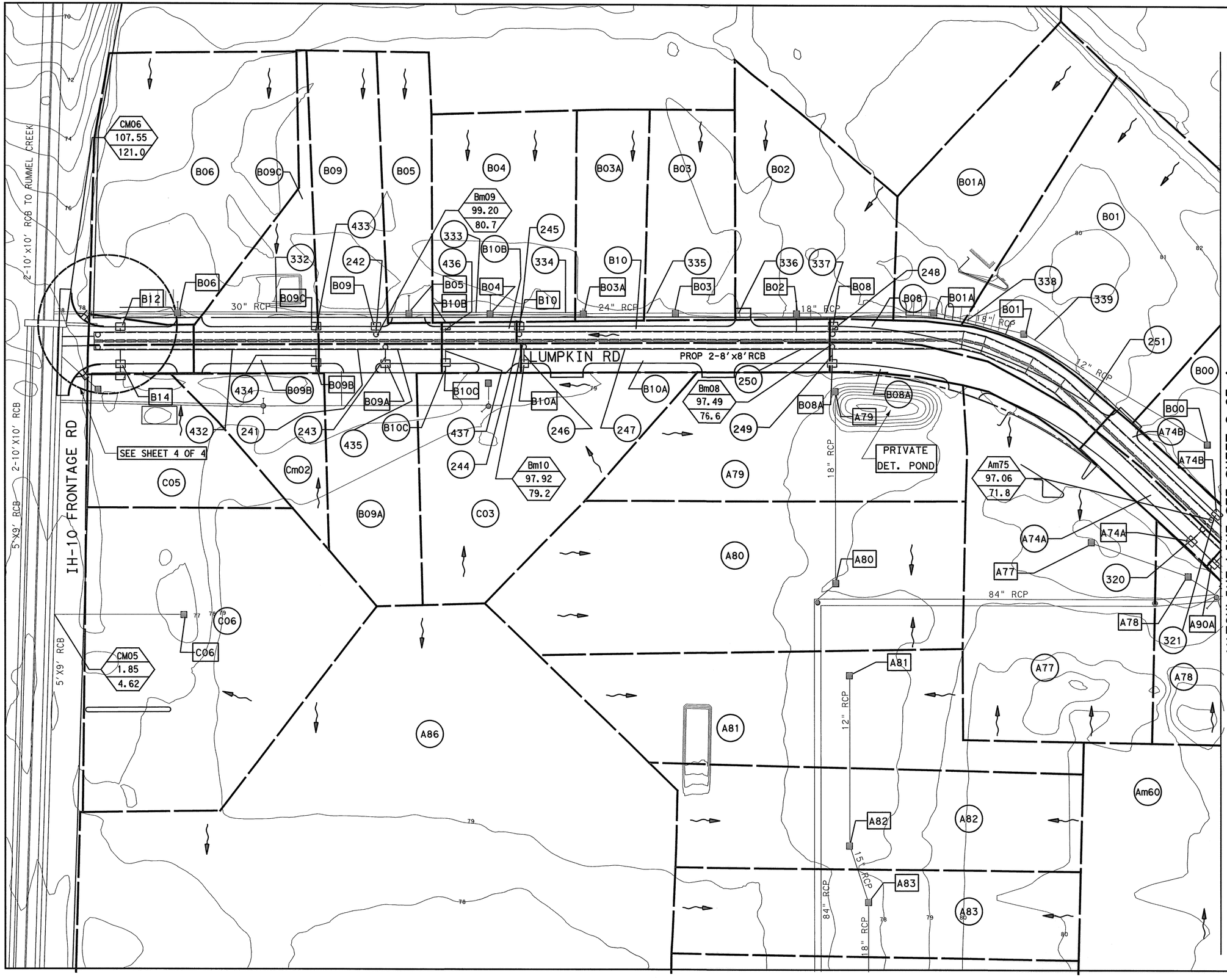
PROPOSED OVERALL DRAINAGE AREA MAP

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=200'
CITY DWG NO.
VERT:
HORZ:
SHEET: 17 OF 226

pw:\\ladpw.lada.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\17-001-PR-OVALL-DRN-AREA-MAP.dgn 9/11/2014 10:18:37 AM MJGuthrie



NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER; TOTAL CUMULATIVE AREA (AC); 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- PROPOSED RCB
- PROPOSED STORM SEWER
- 2 YR FLOW DIRECTION
- PROP INLET
- EXIST INLET
- PROP MANHOLE
- DRAINAGE AREA

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — BRIAN R. WHITNEY P.E. — 81591 — REGISTERED PROFESSIONAL ENGINEER

9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED DRAINAGE AREA MAP (1 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: 1"=50'	CITY DWG NO.
VERT:	
HORZ:	
SHEET: 18 OF 226	

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MATCHLINE LINE SEE SHEET 1 OF 4

MATCHLINE LINE SEE SHEET 3 OF 4

Am90 96.80 71.7 | B00 | 438 | A74B | 253 | A90B | A68 | A54 | 2-30"RCP | PRIVATE DET. POND | A50 | A44 | PROP DET. BASIN | A47

Am56 96.59 71.3 | Am41 16.80 37.35 | A51 | WESTVIEW DR | A52 | Am43 17.30 37.69 | A46 | A46A | A42C

Am68C 0.44 1.00 | 324 | 323 | A67C | 500 | 400 | 257 | A67 | Am67C 1.68 3.65 | Am68B 92.79 120.0 | A67 | A74A | A78 | A67C | A68D | Am67B 91.65 118.1 | Am59C 89.81 117.8 | A59B | Am58 85.87 113.8 | A56 | Am44 17.30 37.69 | A53 | 401 | 402 | Am38B 62.09 67.2 | Am38A 59.11 105.5 | Am48 57.10 101.3 | 302 | 304 | 275 | A46 | A46A | A46B | Am49 55.81 99.2 | 305 | 306 | 271

Am60 | 254 | A67D | A90A | 439 | 256 | 330 | 259 | 263 | 153 | 265 | Am55 80.14 104.8 | 264 | A56 | 166 | 151 | A59B | PROP 10'x6' RCB | LUMPKIN RD | PROP 8'x5' RCB | 7'x6' RCB | PROP 7'x4' RCB | PROP 4'x4' RCB | 7'x4' RCB

PRIVATE DET. POND | 123 | 260 | 261 | A67D | A63C4 | A63 | A59A | A58 | 262 | A57 | 117 | A55 | PROP 10'x5' RCB | 152 | 203 | 149 | 270 | 276 | SEE NOTE 3 | A45 | A45A | 191 | A45B | Am37A 54.76 97.6

Am57D 83.40 111.0 | 181 | Am38 62.09 67.2 | Am46 59.11 105.5 | Am42 79.39 103.6 | 9'x6' RCB | A32

A76 | A63 | A58 | A57 | PRIVATE DET. POND

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.
3. THIS CONTRACT ENDS AT STA 25+94.17. ALL STORM FLOWS ARE BASED ON ULTIMATE IMPROVEMENTS.

0 50 100 200
(IN FEET)
1 INCH = 50 FEET

No.	DATE	REVISIONS	APP.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER; TOTAL CUMULATIVE AREA (AC); 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- PROPOSED RCB
- PROPOSED STORM SEWER
- 2 YR FLOW DIRECTION
- PROP INLET
- EXIST INLET
- PROP MANHOLE
- DRAINAGE AREA

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED DRAINAGE AREA MAP (2 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY:

DRAWING SCALE: 1"=50' | CITY DWG NO.:

VERT:
HORZ:

SHEET: 19 OF 226

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MATCHLINE LINE SEE SHEET 2 OF 4

A47 A42C A42B AM36C A42A A42 A42D A19 A18 A17 A14 A13 A12 A11 A20 A39 A40 A41 A43 A43A A43B A43C A45A A46B A33 A32 A34 A35 A36 A37 A38 A30 A29 A31

Am37 54.76 91.1 | Am94 52.97 89.1 | Am36 49.93 82.7 | Am36B 51.03 85.2 | Am36A 48.18 80.8 | Am47A 48.18 78.8 | Am47 46.77 77.2 | Am92 54.71 91.0 | Am93 53.63 89.5 | Am15 19.67 36.1 | Am11 3.88 7.4 | Am10 1.96 3.8 | Am16 21.27 38.5 | Am35 44.10 72.6 | Am34 21.54 31.9 | Am27 4.29 1.6 | Am28 4.29 1.6 | Am29 7.25 6.7 | Am30 7.25 6.7 | Am32 20.99 31.2 | Am31 19.25 28.2 | Am26 12.00 22.4 | Am23 6.70 12.9

295 421 422 277 187 424 311 314 281 280 274 301 189 294 300 315 296 278 420 103 316 279

NORTHBROOK DR | MAYFIELD RD | LUMPKIN RD | SPILLERS LN

PROP 4'x4' RCB | 7'x4' RCB | 6'X3' RCB | 24" RCP | 30" RCP | 36" RCP | 42" RCP | 60" RCP | FUTURE PROP 48"RCP

0 50 100 200
(IN FEET)
1 INCH = 50 FEET

NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.

No.	DATE	REVISIONS	APP.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER / TOTAL CUMULATIVE AREA (AC) / 2-YR Q (CFS)
- B-- — DRAINAGE AREA
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- PROPOSED STORM SEWER
- 2 YR FLOW DIRECTION
- PROP INLET
- EXIST INLET
- PROP MANHOLE
- DRAINAGE AREA

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED DRAINAGE AREA MAP (3 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY:
DRAWING SCALE: 1"=50'
VERT:
HORZ:
SHEET: 20 OF 226
CITY DWG NO.:

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NOTES:

1. CONTOURS SHOWN FROM 2008 LIDAR FOR INFORMATION PURPOSES ONLY.
2. CONTOURS ARE ON NAVD88 DATUM.
3. FLOWS SHOWN ARE FROM PIPE INSTEAD OF JUNCTION BOX CM06, AS SYSTEM IS MODELED WITH A COMBINED OUTFALL.

N

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

No.	DATE	REVISIONS	APP.

LEGEND

- MH# / AREA / FLOW — MANHOLE NUMBER / TOTAL CUMULATIVE AREA (AC) / 2-YR Q (CFS)
- B-- — DRAINAGE AREA
- B-- — INLET ID
- X — HOUSTORM RUN NO.
- PROPOSED RCB
- PROPOSED STORM SEWER
- 2 YR FLOW DIRECTION
- PROP INLET
- EXIST INLET
- PROP MANHOLE
- DRAINAGE AREA

2-10'x10' RCB TO RUMMEL CREEK

IH-10 FRONTAGE RD

10'X10' RCB

10'x10' box culv. stm.

assumed connection (need to field verify)

assumed direction & size (need to field verify)

SEE NOTE 3

Cm06 / 100.84 / 83.4

Cm06 / 6.71 / 8.8

Bm07 / 6.71 / 8.8

Bm14 / 100.84 / 83.6

Bm11 / 100.84 / 83.6

30" stm.

30" RCP

JUNCTION BOX CM06
junction box

PROP 24"RCP

PROP 24" LEAD

PROP 2-8'X8'RCB

5'x9' box culv. stm.

5'X9' RCB

12" RCP

LUMPKIN RD

ROW

line may exist, no record dwg. available to show.

EXIST. INLET C05 TO REMAIN. PROP. INLET C05 ADDED AT PROP. CURB AT EXIST. DRIVEWAY TO CAPTURE TRAPPED WATER. ALL FLOW ASSUMED TO GO TO PROP. INLET. NO CHANGES TO EXISTING INLET C05 UNDER THIS CONTRACT.

B06 B09C B09A B12 B14 C05 Cm02

13 14 15 317 318 331 430 431 432

9-12-14

BRIAN R. WHITNEY P.E. 81591 LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROPOSED DRAINAGE AREA MAP (4 OF 4)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=10'
CITY DWG NO.
VERT:
HORZ:
SHEET: 21 OF 226

pw:\\ladpw.ladco.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\21-001-PR-DRN-AREA-MAP (4 OF 4).dgn 9/9/2014 10:19:38 AM MJGuthrie

SYSTEM A

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 11/25/2013 3:38:25 PM

PROJECT NAME : Lumpkin-Primary
JOB NUMBER :
PROJECT DESCRIPTION : Updated ID BRW 11-8-2012
PROJECT File: L:¼-10384-001 Read Only -0-Non-Projectwise Data -03-Modelin

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)
A01	0.66	0.60	24.14	24.14	3.47	0.000	1.373
A02	0.68	0.26	22.91	22.91	3.56	0.000	0.629
A03	0.65	2.55	26.79	26.79	3.29	0.000	5.450
A04	0.58	1.81	26.10	26.10	3.33	0.000	3.499
A05	0.59	0.98	24.97	24.97	3.41	0.000	1.971
A06	0.63	0.37	23.39	23.39	3.52	0.000	0.821
A07	0.58	1.37	25.48	25.48	3.37	0.000	2.564
A08	0.57	1.29	25.46	25.46	3.38	0.000	2.482
A09	0.59	0.58	24.08	24.08	3.47	0.000	1.188
A10	0.59	0.75	24.51	24.51	3.44	0.000	1.529
A11	0.58	1.09	25.15	25.15	3.40	0.000	2.143
A12	0.57	0.88	24.79	24.79	3.42	0.000	1.716
A13	0.6	1.05	25.09	25.09	3.40	0.000	2.142
A14	0.58	0.87	24.75	24.75	3.42	0.000	1.728
A15	0.58	1.00	25.01	25.01	3.41	0.000	1.975
A16	0.58	1.20	25.32	25.32	3.38	0.000	2.356
A17	0.62	0.30	23.07	23.07	3.55	0.000	0.659
A18	0.58	1.16	25.26	25.26	3.39	0.000	2.280
A19	0.58	1.69	25.96	25.96	3.34	0.000	3.276
A20	0.59	0.49	23.82	23.82	3.49	0.000	1.009
A21	0.65	0.94	24.89	24.89	3.41	0.000	2.086
A22	0.61	0.19	22.43	22.43	3.59	0.000	0.417
A23	0.58	0.92	24.86	24.86	3.42	0.000	1.823
A24	0.61	0.20	22.54	22.54	3.59	0.000	0.437
A25	0.59	1.17	25.28	25.28	3.39	0.000	2.338
A26	0.57	1.23	25.38	25.38	3.38	0.000	2.370
A27	0.57	1.82	26.12	26.12	3.33	0.000	3.456
A28	0.61	0.21	22.60	22.60	3.58	0.000	0.459
A29	0.59	1.71	25.99	25.99	3.34	0.000	3.370
A30	0.58	1.51	25.75	25.75	3.36	0.000	2.939
A31	0.59	2.08	26.38	26.38	3.31	0.000	4.068
A32	0.58	2.72	26.93	26.93	3.28	0.000	5.174
A33	0.58	1.57	25.83	25.83	3.35	0.000	3.051
A34	0.62	0.45	23.69	23.69	3.50	0.000	0.976
A35	0.6	0.95	24.92	24.92	3.41	0.000	1.945
A36	0.57	1.56	25.81	25.81	3.35	0.000	2.981
A37	0.59	0.86	24.73	24.73	3.43	0.000	1.738
A38	0.59	0.88	24.79	24.79	3.42	0.000	1.776
A39	0.59	0.58	24.09	24.09	3.47	0.000	1.188
A40	0.58	1.29	25.46	25.46	3.38	0.000	2.525
A41	0.72	3.71	27.60	27.60	3.24	0.000	8.648
A42	0.75	8.47	29.57	29.57	3.12	0.000	19.829
A43	0.75	2.26	26.55	26.55	3.30	0.000	5.600
A44	0.68	3.42	27.42	27.42	3.25	0.000	7.555
A45	0.8	0.06	21.15	21.15	3.70	0.000	0.177
A46	0.8	0.16	22.25	22.25	3.61	0.000	0.472
A47	0.74	10.09	30.02	30.02	3.10	0.000	23.117
A48	0.76	1.09	25.15	25.15	3.40	0.000	2.814
A49	0.75	2.44	26.70	26.70	3.29	0.000	6.028
A50	0.8	0.57	24.05	24.05	3.47	0.000	1.584
A51	0.75	2.24	26.53	26.53	3.30	0.000	5.552
A52	0.8	0.16	22.55	22.55	3.61	0.000	0.462
A53	0.8	0.20	22.52	22.52	3.59	0.000	0.574
A54	0.65	3.80	27.65	27.65	3.23	0.000	7.989
A55	0.8	0.06	21.16	21.16	3.70	0.000	0.177
A56	0.8	0.09	21.49	21.49	3.67	0.000	0.264
A57	0.75	3.11	27.23	27.23	3.26	0.000	7.605
A59	0.67	1.44	25.66	25.66	3.36	0.000	3.244
A60	0.66	0.49	23.83	23.83	3.49	0.000	1.128
A61	0.76	0.20	22.53	22.53	3.59	0.000	0.545
A62	0.75	2.58	26.81	26.81	3.29	0.000	6.360
A63	0.75	2.86	27.03	27.03	3.27	0.000	7.021
A64	0.77	0.31	23.15	23.15	3.54	0.000	0.845
A65	0.71	0.29	23.06	23.06	3.55	0.000	0.730
A66	0.66	0.72	24.44	24.44	3.45	0.000	1.637
A67	0.65	0.49	23.83	23.83	3.49	0.000	1.111
A68	0.65	0.58	24.07	24.07	3.47	0.000	1.309
A70	0.8	0.09	21.51	21.51	3.67	0.000	0.264
A72	0.8	0.15	22.13	22.13	3.62	0.000	0.434
A73	0.8	0.15	22.14	22.14	3.62	0.000	0.434
A74	0.79	0.26	22.88	22.88	3.56	0.000	0.731
A75	0.79	0.10	21.62	21.62	3.66	0.000	0.289
A75A	0.8	0.03	20.52	20.52	3.75	0.000	0.090
A76	0.7	2.55	26.79	26.79	3.29	0.000	5.870
A77	0.75	1.35	25.80	25.80	3.35	0.000	3.897
A78	0.75	0.40	23.51	23.51	3.51	0.000	1.394
A79	0.75	1.12	25.21	25.21	3.39	0.000	2.850
A80	0.75	1.79	26.08	26.08	3.33	0.000	4.476
A81	0.75	1.25	25.40	25.40	3.38	0.000	3.168
A82	0.75	1.11	25.19	25.19	3.39	0.000	2.825
A83	0.75	0.95	24.92	24.92	3.41	0.000	2.431
A84	0.75	1.11	25.19	25.19	3.39	0.000	2.825
A85	0.75	1.32	25.50	25.50	3.37	0.000	3.339
A86	0.75	7.61	29.29	29.29	3.14	0.000	17.906
Am57b	0.75	0.34	23.25	23.25	3.53	0.000	0.901
Am60	0.75	2.00	26.30	26.30	3.32	0.000	4.980
Am69	0.8	0.17	22.30	22.30	3.60	0.000	0.490

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes Long (%)	Slopes Trans (%)	Gutter n	Gutter Depr. (ft)	Grate Width (ft)	Type	Pond Width Allowed (ft)
A56	Curb	5.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
A55	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)
A56	Curb	0.264	0.264	0.000	0.000		2.23	5.00	4.75
A55	Curb	0.177	0.177	0.000	0.000		1.86	5.00	4.10

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)
A01	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A02	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A04	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A05	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A06	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A07	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A08	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A09	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A10	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A11	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A12	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A13	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A14	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A15	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A16	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A17	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A18	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A19	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A20	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A21	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A22	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A23	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A24	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A25	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A26	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A27	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A28	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A29	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A30	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A31	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A32	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A33	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A34	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A35	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A36	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A37	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A38	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A39	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A40	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A41	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A42	ArInl	10.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A43	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A44	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A45	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A46	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A47	ArInl	10.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A48	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A49	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A50	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A51	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A52	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A53	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A54	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A57	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A59	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	1.50
A60	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A61	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A62	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A63	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A64	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A65	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A66	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A67	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A68	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A70	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A72	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A73	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A74	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A75	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A75A	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A76	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A77	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A78	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A79	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A80	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A81	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A82	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A83	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A84	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A85	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A86	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	1.50

Sag Inlets Computation Data.

Inlet ID	Inlet Type	Length (ft)	Grate Perim (ft)	Grate Area (sf)	Total Q (cfs)	Inlet Capacity (cfs)	Actual Head (ft)	Ponded Width Left (ft)	Ponded Width Right (ft)
A01	ArInl	5.00	n/a	n/a	1.373	15.022	0.260	n/a	n/a
A02	ArInl	5.00	n/a	n/a	0.629	15.022	0.252	n/a	n/a
A04	ArInl	5.00	n/a	n/a	3.499	15.022	0.318	n/a	n/a
A05	Curb	5.00	n/a	n/a	1.971	15.022	0.272	7.75	7.75
A06	Curb	5.00	n/a	n/a	0.821	15.022	0.254	5.60	5.60
A07	Curb	5.00	n/a	n/a	2.564	15.022	0.286	8.55	8.55
A08	Curb	5.00	n/a	n/a	2.482	15.022	0.284	8.45	8.45
A09	Curb	5.00	n/a	n/a	1.188	15.022	0.258	6.40	6.40
A10	Curb	5.00	n/a	n/a	1.529	15.022	0.265	7.05	7.05
A11	Curb	5.00	n/a	n/a	2.143	15.022	0.275	8.00	8.00
A12	Curb	5.00	n/a	n/a	1.716	15.022	0.266	7.35	7.35
A13	Curb	5.00	n/a	n/a	2.142	15.022	0.275	8.00	8.00
A14	Curb	5.00	n/a	n/a	1.728	15.022	0.267	7.40	7.40
A15	Curb	5.00	n/a	n/a	1.975	15.022	0.272	7.75	7.75
A16	Curb	5.00	n/a	n/a	2.356	15.022	0.281	8.30	8.30
A17	Curb	5.00	n/a	n/a	0.659	15.022	0.252	5.15	5.15
A18	Curb	5.00	n/a	n/a	2.280	15.022	0.279	8.20	8.20

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (1 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ:
SHEET: 22 OF 226

No.	DATE	REVISIONS	APP.

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\22-001-2-YEAR EXISTING HOUSTORM&OUTPUT141 OF 7.dgn 9:50 AM McGuthrie

SYSTEM A (CONTINUED)

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)
A19	Curb	5.00	n/a	n/a	3.276	15.022	0.309	9.40	9.40
A20	Curb	5.00	n/a	n/a	1.009	15.022	0.256	6.05	6.05
A21	ArInl	5.00	n/a	n/a	2.086	15.022	0.274	n/a	n/a
A22	Curb	5.00	n/a	n/a	0.417	15.022	0.251	4.35	4.35
A23	ArInl	5.00	n/a	n/a	1.823	15.022	0.268	n/a	n/a
A24	Curb	5.00	n/a	n/a	0.437	15.022	0.251	4.40	4.40
A25	Curb	5.00	n/a	n/a	2.338	15.022	0.280	8.30	8.30
A26	Curb	5.00	n/a	n/a	2.370	15.022	0.281	8.30	8.30
A27	Curb	5.00	n/a	n/a	3.456	15.022	0.316	9.60	9.60
A28	Curb	5.00	n/a	n/a	0.459	15.022	0.251	4.50	4.50
A29	Curb	5.00	n/a	n/a	3.370	15.022	0.313	9.50	9.50
A30	Curb	5.00	n/a	n/a	2.939	15.022	0.298	9.00	9.00
A31	Curb	5.00	n/a	n/a	4.068	15.022	0.342	10.20	10.20
A32	Curb	5.00	n/a	n/a	5.174	15.022	0.398	11.15	11.15
A33	Curb	5.00	n/a	n/a	3.051	15.022	0.302	9.15	9.15
A34	Curb	5.00	n/a	n/a	0.976	15.022	0.255	5.95	5.95
A35	Curb	5.00	n/a	n/a	1.945	15.022	0.271	7.70	7.70
A36	Curb	5.00	n/a	n/a	2.981	15.022	0.299	9.05	9.05
A37	Curb	5.00	n/a	n/a	1.738	15.022	0.267	7.40	7.40
A38	Curb	5.00	n/a	n/a	1.776	15.022	0.267	7.45	7.45
A39	Curb	5.00	n/a	n/a	1.188	15.022	0.258	6.40	6.40
A40	Curb	5.00	n/a	n/a	2.525	15.022	0.285	8.50	8.50
A41	ArInl	5.00	n/a	n/a	8.648	15.022	0.664	n/a	n/a
A42	ArInl	10.00	n/a	n/a	19.829	30.045	0.794	n/a	n/a
A43	ArInl	5.00	n/a	n/a	5.600	15.022	0.424	n/a	n/a
A44	ArInl	5.00	n/a	n/a	7.555	15.022	0.566	n/a	n/a
A45	Curb	5.00	n/a	n/a	0.177	15.022	0.251	3.15	3.15
A46	Curb	5.00	n/a	n/a	0.462	15.022	0.251	4.50	4.50
A47	ArInl	10.00	n/a	n/a	23.117	30.045	0.990	n/a	n/a
A48	Curb	5.00	n/a	n/a	2.814	15.022	0.294	8.85	8.85
A49	Curb	5.00	n/a	n/a	6.028	15.022	0.451	11.80	11.80
A50	Curb	5.00	n/a	n/a	1.584	15.022	0.264	7.15	7.15
A51	Curb	5.00	n/a	n/a	5.552	15.022	0.421	11.45	11.45
A52	Curb	5.00	n/a	n/a	0.462	15.022	0.251	4.50	4.50
A53	Curb	5.00	n/a	n/a	0.574	15.022	0.252	4.90	4.90
A54	ArInl	5.00	n/a	n/a	7.989	15.022	0.604	n/a	n/a
A57	Grate	n/a	10.00	6.25	7.605	41.140	0.393	12.90	12.90
A59	Curb	5.00	n/a	n/a	3.244	15.022	0.308	9.35	9.35
A60	ArInl	5.00	n/a	n/a	1.128	15.022	0.257	n/a	n/a
A61	Grate	n/a	10.00	6.25	0.545	41.140	0.068	4.80	4.80
A62	ArInl	5.00	n/a	n/a	6.360	15.022	0.474	n/a	n/a
A63	Grate	n/a	10.00	6.25	7.021	41.140	0.373	12.50	12.50
A64	ArInl	5.00	n/a	n/a	0.845	15.022	0.254	n/a	n/a
A65	ArInl	5.00	n/a	n/a	0.730	15.022	0.253	n/a	n/a
A66	ArInl	5.00	n/a	n/a	1.637	15.022	0.265	n/a	n/a
A67	Grate	n/a	10.00	6.25	1.111	41.140	0.109	6.25	6.25
A68	Grate	n/a	10.00	6.25	1.309	41.140	0.122	6.65	6.65
A70	Grate	n/a	10.00	6.25	0.264	41.140	0.042	3.65	3.65
A72	ArInl	5.00	n/a	n/a	0.698	15.022	0.253	n/a	n/a
A73	Grate	n/a	10.00	6.25	0.434	41.140	0.058	4.40	4.40
A74	ArInl	5.00	n/a	n/a	1.165	15.022	0.258	n/a	n/a
A75	Grate	n/a	10.00	6.25	0.289	41.140	0.044	3.80	3.80
A75A	Grate	n/a	10.00	6.25	0.090	41.140	0.020	2.45	2.45
A76	ArInl	5.00	n/a	n/a	5.870	15.022	0.441	n/a	n/a
A77	Grate	n/a	10.00	6.25	3.897	41.140	0.252	10.00	10.00
A78	Grate	n/a	10.00	6.25	1.054	41.140	0.105	6.15	6.15
A79	ArInl	5.00	n/a	n/a	2.850	15.022	0.295	n/a	n/a
A80	Grate	n/a	10.00	6.25	4.476	41.140	0.276	10.55	10.55
A81	Grate	n/a	10.00	6.25	3.168	41.140	0.219	9.25	9.25
A82	Grate	n/a	10.00	6.25	2.825	41.140	0.203	8.90	8.90
A83	Grate	n/a	10.00	6.25	2.431	41.140	0.184	8.40	8.40
A84	Grate	n/a	10.00	6.25	2.825	41.140	0.203	8.90	8.90
A85	Grate	n/a	10.00	6.25	3.339	41.140	0.227	9.45	9.45
A86	Grate	n/a	10.00	6.25	17.906	41.140	0.696	17.75	17.75

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A01	ArInl	0.660	0.60	24.14	3.47		0.00	1.373
A02	ArInl	0.680	0.26	22.91	3.56		0.00	0.629
A03	CrcMh	0.650	2.55	26.79	3.23		0.00	5.450
A04	ArInl	0.580	1.81	26.10	3.33		0.00	3.499
A05	Curb	0.590	0.98	24.97	3.41		0.00	1.971
A06	Curb	0.601	1.35	25.20	3.39		0.00	2.753
A07	Curb	0.580	1.31	25.48	3.37		0.00	2.564
A08	Curb	0.570	1.29	25.46	3.38		0.00	2.482
A09	Curb	0.590	0.58	24.08	3.47		0.00	1.188
A10	Curb	0.590	0.75	24.51	3.44		0.00	1.529
A11	Curb	0.570	1.09	25.15	3.40		0.00	2.143
A12	Curb	0.570	0.88	24.79	3.42		0.00	1.716
A13	Curb	0.600	1.05	25.09	3.40		0.00	2.142
A14	Curb	0.580	0.87	24.75	3.42		0.00	1.728
A15	Curb	0.580	1.00	25.01	3.41		0.00	1.975
A16	Curb	0.580	1.20	25.32	3.38		0.00	2.356
A17	Curb	0.588	1.50	25.42	3.38		0.00	2.979
A18	Curb	0.580	1.16	25.26	3.39		0.00	2.280
A19	Curb	0.580	2.85	25.96	3.34		0.00	5.524
A20	Curb	0.590	0.49	23.82	3.49		0.00	1.009
A21	ArInl	0.650	0.94	24.89	3.41		0.00	2.086
A22	Curb	0.643	1.13	25.13	3.40		0.00	2.470
A23	ArInl	0.580	0.92	24.86	3.42		0.00	1.823
A24	Curb	0.585	1.12	25.05	3.40		0.00	2.231
A25	Curb	0.590	1.17	25.28	3.39		0.00	2.338
A26	Curb	0.570	1.23	25.38	3.38		0.00	2.370
A27	Curb	0.570	1.82	25.72	3.33		0.00	3.456
A28	Curb	0.610	0.21	22.60	3.58		0.00	0.459
A29	Curb	0.590	1.71	25.99	3.34		0.00	3.370
A30	Curb	0.580	1.51	25.75	3.36		0.00	2.939
A31	Curb	0.590	2.08	26.38	3.31		0.00	4.068
A32	Curb	0.580	2.72	26.93	3.28		0.00	5.174
A33	Curb	0.580	1.57	25.83	3.35		0.00	3.051
A34	Curb	0.620	0.45	23.69	3.50		0.00	0.976
A35	Curb	0.606	1.40	24.92	3.41		0.00	2.897
A36	Curb	0.570	1.56	25.81	3.35		0.00	2.981
A37	Curb	0.590	0.86	24.73	3.43		0.00	1.738
A38	Curb	0.590	1.74	24.90	3.41		0.00	3.504
A39	Curb	0.590	0.58	24.09	3.47		0.00	1.188
A40	Curb	0.580	1.29	25.46	3.38		0.00	2.525
A41	ArInl	0.720	3.71	27.60	3.24		0.00	8.648
A42	ArInl	0.750	8.47	29.57	3.12		0.00	19.829
A43	ArInl	0.750	2.26	26.55	3.30		0.00	5.600
A44	ArInl	0.680	3.42	27.42	3.25		0.00	7.555
A45	Curb	0.800	0.06	21.15	3.70		0.00	0.177

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)
A46	Curb	0.632	61.15	36.41	2.78		0.00	107.471
A47	ArInl	0.740	10.09	30.02	3.10		0.00	23.117
A48	Curb	0.742	11.18	30.08	3.09		0.00	25.655
A49	Curb	0.750	2.44	26.70	3.29		0.00	6.028
A50	Curb	0.800	0.57	24.05	3.47		0.00	1.584
A51	Curb	0.750	2.24	26.53	3.30		0.00	5.552
A52	Curb	0.800	0.16	22.25	3.61		0.00	0.462
A53	Curb	0.800	0.20	22.52	3.59		0.00	0.574
A54	ArInl	0.650	3.80	27.65	3.23		0.00	7.989
A55	Curb	0.758	0.40	25.77	3.35		0.00	1.016
A56	Curb	0.658	78.43	36.71	2.77		0.00	142.727
A57	Grate	0.750	3.11	27.23	3.26		0.00	7.605
A59	Curb	0.661	82.98	37.45	2.74		0.00	150.102
A60	ArInl	0.661	83.47	37.64	2.73		0.00	150.551
A61	Grate	0.760	0.20	22.53	3.59		0.00	0.545
A62	ArInl	0.751	2.78	26.81	3.29		0.00	6.860
A63	Grate	0.750	2.86	27.03	3.27		0.00	7.021
A64	ArInl	0.751	5.95	27.50	3.24		0.00	14.503
A65	ArInl	0.749	6.24	27.81	3.22		0.00	15.082
A66	ArInl	0.667	90.43	37.92	2.72		0.00	163.894
A67	Grate	0.650	0.49	23.83	3.49		0.00	1.111
A67C	Junct	0.650	0.49	24.65	3.43		0.00	1.111
A68	Grate	0.650	0.58	24.07	3.47		0.00	1.309
A70	Grate	0.800	0.09	21.51	3.67		0.00	0.264
A72	ArInl	0.800	0.24	36.50	2.78		0.00	0.533
A73	Grate	0.800	0.15	22.14	3.62		0.00	0.434
A74	ArInl	0.668	96.25	38.73	2.68		0.00	172.397
A75	Grate	0.790	0.10	21.62	3.66		0.00	0.289
A75A	Grate	0.792	0.13	22.15	3.62		0.00	0.372
A76	ArInl	0.700	2.55	26.79	3.29		0.00	5.870
A77	Grate	0.750	1.55	25.80	3.35		0.00	3.897
A78	Grate	0.750	1.95	26.19	3.33		0.00	4.866
A79	ArInl	0.750	1.12	25.21	3.39		0.00	2.850
A80	Grate	0.750	2.91	27.37	3.25		0.00	7.097
A81	Grate	0.750	1.25	25.40	3.38		0.00	3.168
A82	Grate	0.750	2.36	26.17	3.33		0.00	5.892
A83	Grate	0.750	3.31	26.39	3.31		0.00	8.227
A84	Grate	0.750	1.11	25.19	3.39		0.00	2.825
A85	Grate	0.750	5.74	26.86	3.28		0.00	14.138
A86	Grate	0.682	119.01	41.54	2.57		0.00	208.971
Am01	CrcMh	0.666	0.86	24.55	3.44		0.00	1.969
Am02	CrcMh	0.628	2.27	27.10	3.27		0.00	10.721
Am03	CrcMh	0.623	6.57	27.75	3.23		0.00	13.210
Am04	CrcMh	0.623	6.57	27.75	3.23		0.00	13.210
Am05	CrcMh	0.623	6.57	27.75	3.23		0.00	13.210
Am06	CrcMh	0.623	6.57	27.75	3.23		0.00	13.210
Am07	CrcMh	0.575	2.60	25.59	3.37		0.00	5.033
Am08	CrcMh	0.580	3.93	27.44	3.25		0.00	7.410
Am09	CrcMh	0.592	10.90	27.90	3.22		0.00	20.515
Am10	CrcMh	0.576	1.97	25.28	3.39		0.00	3.837
Am11	CrcMh	0.583	3.89	27.28	3.26		0.00	7.386
Am12	CrcMh	0.599	15.39	29.06	3.15		0.00	29.051
Am13	CrcMh	0.598	16.89	29.72	3.11		0.00	31.449
Am14	CrcMh	0.598	16.89	29.72	3.11		0.00	31.449
Am15	CrcMh	0.595	19.74	30.32	3.08		0.00	36.199
Am16	CrcMh	0.595	20.23	30.96	3.04		0.00	36.668
Am17	CrcMh	0.650	0.94	25.01	3.41		0.00	2.086
Am18	CrcMh	0.580	0.92	24.94	3.41		0.00	1.823
Am19	CrcMh	0.614	2.25	25.21	3.39		0.00	4.689
Am20	CrcMh	0.580	2.40	25.48	3.37		0.00	4.695
Am21	CrcMh	0.597	4.65	26.57	3.30		0.00	9.161
Am22	CrcMh	0.590	6.68	27.32	3.25		0.00	12.823
Am23	CrcMh	0.590	6.68	27.32	3.25		0.00	12.823
Am24	CrcMh	0.585	3.22	26.13	3.33		0.00	6.278
Am25	CrcMh	0.588	9.90	27.82	3.22		0.00	18.780
Am26	CrcMh	0.589	11.98	28.73	3.17		0.00	22.350
Am27	CrcMh	0.580	4.29	27.05	3.27		0.00	8.141
Am28	CrcMh	0.580	4.29	27.05	3.27		0.00	8.141
Am29	CrcMh	0.583	7.25	28.77	3.17		0.00	13.387
Am30	CrcMh	0.583	7.25	28.77	3.17		0.00	13.387
Am31	CrcMh	0.586	19.23	29.47	3.13		0.00	35.267
Am32	CrcMh	0.587	20.97	29.61	3.12		0.00	38.377
Am33	CrcMh	0.587	20.97	29.61	3.12		0.00	38.377
Am34	CrcMh	0.587	21.55	30.00	3.10		0.00	39.170
Am35	JctBx	0.591	43.07	31.08	3.04		0.00	77.287
Am36	BoxMh	0.601	46.78	32.68	2.96		0.00	83.075
Am37	BoxMh	0.629	57.51	34.55	2.86		0.00	103.579
Am38	CrcMh	0.632	60.93	36.32	2.78		0.00	107.142
Am39	BoxMh	0.743	13.62	30.13	3.09		0.00	31.287
Am40	CrcMh	0.000	0.00	0.00	0.00		0.00	0.000
Am41	BoxMh	0.746	16.43	32.47	2.97		0.00	36.365
Am42	BoxMh	0.657	77.94	36.53	2.77		0.00	142.091
Am43	BoxMh	0.747	16.79	33.79	2.90		0.00	36.398
Am44	BoxMh	0.747	16.79	33.79	2.90		0.00	36.398
Am45	BoxMh	0.657	77.94	36.53	2.77		0.00	142.091
Am45b	CrcMh	0.750	0.34	25.68	3.36		0.00	0.901
Am56	BoxMh	0.667	95.71	38.60	2.69		0.00	171.584
Am57b	CrcMh	0.750	0.34	23.25	3.53		0.00	0.901
Am57bC5	CrcMh	0.750	0.34	25.68	3.36		0.00	0.901
Am57D	JctBx	0.661	81.94	36.78	2.76		0.00	149.015
Am58	CrcMh	0.672	102.75	38.76	2.68		0.00	185.043
Am60	CrcMh	0.722	4.55	26.96	3.28		0.00	10.767
Am61	CrcMh	0.672	102.75	38.76	2.68		0.00	185.043
Am62	CrcMh	0.674	105.66	39.51	2.65		0.00	188.751
Am63	CrcMh	0.678	111.40	40.67	2.61		0.00	196.779
Am63C4	CrcMh	0.750	5.64	27.18	3.26		0.00	13.813
Am64	BoxMh	0.682	119.01	41.54	2.57		0.00	208.971
Am68C	Junct	0.650	1.07	25.29	3.39		0.00	2.355
Am69	CrcMh	0.671	1.24	25.46	3.38		0.00	2.807
Am71C	CrcMh	0.800	0.09	24.35	3.45		0.00	0.264
Am73	CrcMh	0.800	0.15	22.57	3.58		0.00	0.434

No.	DATE	REVISIONS	APP.

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (2 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 23 OF 226

pw:\\ladpw.ladco.int:proJectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\23-001-2-YEAR EXISTING HOUSTORM.dgn 7/14/2014 8:02 AM MJGuthrie

SYSTEM A (CONTINUED)

Conveyance Configuration Data

Run #	Node US	Node DS	I.D. US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n value
1	A15	Am12	81.70	81.13	Cir 1	0.00	2.00	36.4	1.567	0.013
10	Am02	Am03	83.20	82.96	Cir 1	0.00	2.00	131.6	0.182	0.013
100	A24	Am19	82.14	82.02	Cir 1	0.00	2.00	16.2	0.741	0.013
106	Am34	Am35	72.50	72.37	Box 1	6.00	3.00	23.1	0.563	0.015
107	Am35	Am36	72.37	71.07	Box 1	7.00	4.00	540.0	0.242	0.015
108	Am36	Am37	71.06	70.98	Box 1	7.00	4.00	332.3	0.024	0.015
109	Am17	A22	82.35	82.25	Cir 1	0.00	2.00	24.0	0.417	0.013
11	A23	Am18	84.62	84.37	Cir 1	0.00	2.00	22.5	1.111	0.013
110	Am04	Am05	82.82	82.79	Cir 1	0.00	2.00	17.4	0.172	0.013
111	A44	Am38	72.06	71.45	Cir 1	0.00	3.00	52.6	1.160	0.013
112	A45	A46	80.76	80.40	Cir 1	0.00	2.00	41.3	0.872	0.013
114	Am57bC	A55	82.00	80.97	Cir 1	0.00	1.50	28.6	3.604	0.013
116	A56	Am57D	70.57	70.42	Box 1	7.00	5.00	35.1	0.427	0.015
117	A57	Am57D	82.17	70.47	Cir 1	0.00	1.50	44.5	27.251	0.013
118	A16	A17	81.53	81.41	Cir 1	0.00	2.00	23.0	0.522	0.013
119	A17	Am13	81.41	81.38	Cir 1	0.00	2.00	4.9	0.610	0.013
12	A21	Am17	84.62	84.37	Cir 1	0.00	2.00	30.2	0.828	0.013
120	Am63C4	A64	82.30	81.48	Cir 1	0.00	1.50	151.0	0.543	0.013
122	Am56	A74	68.77	68.69	Box 1	7.00	5.00	47.8	0.167	0.015
123	A66	Am56	69.05	68.77	Box 1	7.00	5.00	223.0	0.126	0.015
124	A67	A67C	79.72	79.70	Cir 1	0.00	1.25	55.1	0.036	0.013
125	A67C	Am68C	79.70	78.78	Cir 1	0.00	2.50	126.2	0.729	0.013
126	A68	Am68C	79.34	78.78	Cir 1	0.00	1.00	51.6	1.085	0.013
127	Am68C	Am69	78.78	78.61	Cir 1	0.00	2.50	35.4	0.480	0.013
128	Am69	Am56	78.61	78.29	Cir 1	0.00	2.00	17.0	1.883	0.013
129	A54	Am56	77.04	75.04	Cir 2	0.00	2.50	273.6	0.731	0.013
130	Am14	Am15	80.12	79.40	Cir 1	0.00	2.00	243.1	0.297	0.013
131	A72	Am56	78.61	78.29	Cir 1	0.00	2.00	18.1	1.766	0.013
132	A74	Am59	68.89	68.75	Cir 1	0.00	7.00	22.1	0.633	0.013
133	A13	Am11	82.34	82.20	Cir 1	0.00	2.00	21.1	0.665	0.013
134	Am60	Am59	74.46	74.08	Cir 1	0.00	2.00	122.8	0.309	0.013
135	A77	A78	76.50	76.09	Cir 1	0.00	1.00	116.7	0.351	0.013
136	A78	Am59	76.09	75.90	Cir 1	0.00	1.25	16.3	1.166	0.013
137	Am59	Am61	68.75	68.70	Cir 1	0.00	7.00	54.0	0.093	0.013
138	Am61	Am62	68.70	67.86	Cir 1	0.00	7.00	372.5	0.226	0.013
139	Am30	Am31	78.38	78.09	Cir 1	0.00	2.50	162.9	0.178	0.013
141	A37	A38	80.12	80.08	Cir 1	0.00	2.00	23.7	0.169	0.013
142	A38	Am32	80.08	80.06	Cir 1	0.00	2.00	16.6	0.120	0.013
143	Am31	Am32	77.04	77.02	Cir 1	0.00	5.00	30.0	0.067	0.013
144	Am32	Am33	77.02	76.91	Cir 1	0.00	5.00	191.5	0.057	0.013
145	Am33	Am34	76.91	75.13	Cir 1	0.00	5.00	207.5	0.858	0.013
146	A41	Am36	79.34	79.20	Cir 1	0.00	2.00	8.3	1.679	0.013
147	A42	Am37	79.17	79.03	Cir 1	0.00	2.00	32.0	0.438	0.013
148	A43	Am37	78.86	78.72	Cir 1	0.00	2.00	4.0	3.502	0.013
149	Am38	A46	70.88	70.84	Box 1	7.00	4.00	28.9	0.138	0.015
150	A46	Am42	70.84	70.43	Box 1	7.00	4.00	62.7	0.654	0.015
151	Am42	Am45	70.65	70.60	Box 1	7.00	4.00	49.4	0.101	0.015
152	Am45	A56	70.60	70.57	Box 1	7.00	5.00	44.5	0.067	0.015
153	Am57D	A59	70.42	69.68	Box 1	7.00	5.00	282.2	0.262	0.015
154	A59	A60	69.68	69.36	Box 1	7.00	5.00	88.6	0.361	0.015
155	A60	A66	69.36	69.05	Box 1	7.00	5.00	118.0	0.263	0.015
156	A47	A48	77.31	77.26	Cir 1	0.00	2.00	26.0	0.192	0.013
157	A48	Am39	77.26	77.21	Cir 1	0.00	2.00	24.0	0.208	0.013
158	A49	Am39	79.07	79.02	Cir 1	0.00	2.00	50.0	0.100	0.013
159	Am39	Am41	72.06	71.76	Box 1	7.00	6.00	400.0	0.075	0.015
160	Am41	Am43	71.86	71.77	Box 1	7.00	6.00	200.0	0.045	0.015
161	Am43	Am44	71.77	71.71	Box 1	7.00	6.00	133.0	0.045	0.015
162	A50	Am41	79.05	78.98	Cir 1	0.00	2.00	21.0	0.333	0.013
163	A51	Am41	79.00	78.93	Cir 1	0.00	2.00	47.8	0.146	0.013
164	A52	Am43	79.21	79.17	Cir 1	0.00	2.00	21.0	0.190	0.013
165	A53	Am43	79.16	79.12	Cir 1	0.00	2.00	44.3	0.090	0.013
166	Am44	Am42	71.71	71.67	Cir 1	0.00	2.50	35.6	0.112	0.013
180	A62	Am63C4	82.40	82.30	Cir 1	0.00	1.50	85.2	0.117	0.013
181	A63	Am63C4	82.50	82.30	Cir 1	0.00	1.00	61.3	0.326	0.013
182	A61	A62	82.50	82.40	Cir 1	0.00	1.50	139.6	0.072	0.013
183	A64	A65	81.48	81.43	Cir 1	0.00	2.50	55.1	0.091	0.013
184	A65	A66	81.43	76.44	Cir 1	0.00	2.00	46.3	10.853	0.013
185	A75	A75A	79.29	79.20	Cir 1	0.00	1.50	46.2	0.195	0.013
186	A76	Am60	74.66	74.46	Cir 1	0.00	2.00	45.6	0.439	0.013
187	A79	A80	72.10	72.05	Cir 1	0.00	1.50	209.3	0.024	0.013
188	A80	Am62	72.05	72.00	Cir 1	0.00	2.00	26.0	0.192	0.013
189	Am62	Am63	67.86	67.55	Cir 1	0.00	7.00	377.3	0.082	0.013
190	A85	Am63	74.83	74.75	Cir 1	0.00	2.00	72.2	0.111	0.013
191	A84	A85	74.96	74.83	Cir 1	0.00	1.25	133.1	0.098	0.013
192	A81	A82	75.22	75.03	Cir 1	0.00	1.00	185.2	0.103	0.013
193	A82	A83	75.03	74.96	Cir 1	0.00	1.25	65.3	0.107	0.013
194	A83	A85	74.96	74.83	Cir 1	0.00	1.50	129.7	0.100	0.013
195	A86	Am64	67.25	66.75	Cir 1	0.00	7.00	511.6	0.098	0.013
196	Am63	A86	67.55	67.25	Cir 1	0.00	7.00	309.8	0.097	0.013
199	A70	Am71C	78.35	78.30	Cir 2	0.00	2.50	110.2	0.045	0.013

Conveyance Hydraulic Computations. Tailwater = 73.750 (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*	83.10	83.10	86.65	0.008	0.36	1.97	5.19	3.34	2.0	28.4	0.000
10	85.44	85.14	86.50	0.223	2.00	2.00	3.41	3.41	10.7	9.7	0.000
100*	82.95	82.95	87.79	0.010	0.46	0.93	4.13	3.46	2.2	19.6	0.000
106*	77.97	77.96	85.66	0.048	1.04	3.00	6.26	5.94	39.2	133.8	0.000
107	77.96	76.95	85.23	0.056	1.95	4.00	5.65	2.76	77.3	160.2	0.000
108	76.95	76.74	84.50	0.065	4.00	4.00	2.97	2.97	83.1	50.5	0.000
109	83.00	82.95	86.70	0.008	0.51	0.70	3.30	2.13	2.1	14.7	0.000
11*	86.37	86.37	86.73	0.006	0.37	2.00	4.49	5.41	1.8	23.9	0.000
110	84.73	84.64	87.22	0.338	2.00	2.00	4.20	4.20	13.2	9.4	0.000
111*	76.35	76.34	76.67	0.013	0.66	3.00	6.60	4.47	7.6	72.1	0.000
112*	82.40	82.40	85.16	0.000	0.13	2.00	2.05	0.11	0.2	21.2	0.000
114*	82.62	82.62	84.50	0.007	0.22	1.50	5.71	2.73	0.9	20.0	0.000
116	76.13	76.01	85.57	0.102	2.46	5.00	8.29	4.08	142.7	291.5	0.000
117*	83.24	76.01	84.17	0.520	0.38	1.50	21.83	4.30	7.6	56.1	0.000
118*	82.43	82.43	86.26	0.011	0.51	1.02	3.70	3.50	2.4	16.4	0.000
119*	82.43	82.43	85.94	0.017	0.56	1.05	4.18	3.74	3.0	17.7	0.000
12*	86.37	86.37	86.73	0.008	0.43	2.00	4.21	3.39	2.1	20.7	0.000
120	85.75	83.16	84.30	1.715	1.50	1.50	7.82	7.82	13.8	7.8	0.000
122	74.89	74.88	82.29	0.148	3.98	5.00	6.15	4.90	171.6	182.4	0.000
123	75.19	74.89	81.20	0.135	4.30	5.00	5.45	4.68	163.9	158.0	0.000
124	80.39	80.29	81.02	0.029	0.94	0.94	1.13	1.13	1.1	1.2	0.000
125*	80.29	80.29	81.50	0.001	0.31	1.51	3.25	1.13	1.1	35.7	0.000
126*	80.36	80.29	80.39	0.134	0.41	1.00	4.32	5.54	1.3	3.7	0.000
127*	80.29	80.29	80.71	0.003	0.49	1.68	3.51	3.36	2.4	28.5	0.000
128*	80.29	80.29	80.61	0.015	0.41	2.00	6.13	3.68	2.8	31.2	0.000
129*	77.70	77.54	79.30	0.009	0.57	2.50	4.74	0.81	8.0	70.4	0.000
130*	81.85	80.89	86.52	0.097	1.71	1.79	6.71	6.37	31.4	65.4	0.000
131*	80.29	80.29	81.00	0.001	0.19	2.00	3.65	3.31	0.5	30.2	0.000
132*	74.88	74.86	79.29	0.072	2.81	6.01	11.94	9.25	172.4	510.4	0.000
133*	83.15	83.14	86.33	0.009	0.46	0.94	3.92	3.38	2.1	18.5	0.000
134	75.88	74.86	80.39	0.225	1.42	1.42	4.50	4.50	10.8	12.6	0.000
135	78.63	77.24	78.15	1.187	1.00	1.00	4.96	4.96	3.9	2.1	0.000
136*	77.24	77.15	78.42	0.563	0.77	1.25	6.14	5.18	4.9	7.0	0.000
137	74.86	74.86	78.61	0.083	5.47	6.16	5.74	5.16	185.0	195.2	0.000
138	74.86	74.32	79.21	0.083	3.95	6.46	8.26	4.99	185.0	304.7	0.000
139	80.03	79.45	85.61	0.106	0.98	2.00	2.89	3.89	13.4	17.4	0.000
141	82.12	82.08	85.61	0.006	0.59	2.00	2.27	0.55	1.7	9.3	0.000
142	82.08	82.06	85.25	0.024	0.94	2.00	2.42	1.12	3.5	7.9	0.000
143	79.45	79.39	85.59	0.018	2.58	2.58	3.45	3.45	35.3	67.5	0.000
144	79.39	78.64	85.48	0.022	2.83	2.83	3.35	3.35	38.4	62.7	0.000
145*	78.64	77.97	86.21	0.022	1.35	2.84	8.99	5.33	38.4	242.3	0.000
146*	81.21	81.20	84.90	0.145	0.74	2.00	8.12	5.18	8.6	29.4	0.000
147	81.27	81.03	81.10	0.762	2.00	2.00	6.31	6.31	19.8	15.0	0.000
148*	80.72	80.72	81.10	0.061	0.49	2.00	9.35	4.50	5.6	42.5	0.000
149	76.34	76.33	84.36	0.108	3.02	4.00	5.08	3.83	107.1	121.2	0.000
150*	76.33	76.26	85.17	0.109	1.74	4.00	8.84	7.90	107.5	263.4	0.000
151	76.26	76.17	85.85	0.190	4.00	4.00	5.07	5.07	142.1	103.6	0.000
152	76.17	76.13	85.80	0.102	4.92	5.00	4.12	4.06	142.1	115.8	0.000
153	76.01	75.59	84.00	0.113	3.04	5.00	7.01	4.26	149.0	228.3	0.000
154	75.59	75.37	82.68	0.113	2.71	5.00	7.90	4.30	150.1	268.0	0.000
155	75.37	75.19	82.16	0.114	3.06	5.00	7.04	4.30	150.6	228.6	0.000
156	79.79	79.52	82.81	1.035	2.00	2.00	7.36	7.36	23.1	10.0	0.000
157	79.52	79.21	82.76	1.275	2.00	2.00	8.17	8.17	25.7	10.4	0.000
158	81.04	81.02	83.07	0.070	1.41	2.00	2.55	1.92	6.0	7.2	0.000
159	76.96	76.68	83.14	0.003	1.57	4.92	2.85	0.91	31.3	156.9	0.000
160	76.68	76.60	83.06	0.004	2.06	4.83	2.52	1.08	36.4	121.5	0.000
161	76.60	76.54	84.15	0.004	2.06	4.83	2.52	1.08	36.4	121.7	0.000
162	81.05	80.98	82.05	0.005	0.47	2.00	2.81	0.50	1.6	13.1	0.000
163	80.97	80.93	82.00	0.060	1.16	2.00	2.93	1.77	5.6	8.7	0.000
164	81.21	81.17	84.21	0.000	0.29	2.00	1.61	0.15	0.5	9.9	0.000
165	81.16	81.12	84.16	0.001	0.39	2.00	1.32	0.18	0.6	6.8	0.000
166	76.54	76.26	84.69	0.781	2.50	2.50	7.42	7.42	36.4	13.8	0.000
180	86.11	85.75	84.10	0.423	1.50	1.50	3.88	3.88	6.9	3.6	0.000
181	88.11	85.75	84.50	3.850	1.50	1.50	8.94	8.94	7.0	2.0	0.000
182	86.20	86.11	84.25	0.093	0.45	1.50	1.23	0.31	0.5	2.8	0.000
183	83.16	82.83	83.98	0.124	2.50	2.50	2.95	2.95	14.5	12.4	0.000
184*	82.83	78.44	82.66	0.441	0.61	2.00	18.58	4.80	15.1	74.8	0.000
185*	80.70	80.70	80.79	0.001	0.25	1.50	1.46	1.26	0.3	4.7	0.000
186	76.03	75.88	76.66	0.067	0.87	1.42	4.48	2.45	5.9	15.0	0.000
187	74.50	74.34	78.20	0.073	1.50	1.50	1.61	1.61	2.8	1.6	0.000
188	74.34	74.32	78.16	0.098	2.25	2.50	5.44	2.96	7.1	10.0	0.000
189	74.32	74.31	78.51	0.087	5.91	6.76	5.45	4.96	188.8	183.9	0.000
190	77.03	76.75	78.22	0.387	2.00	2.00	4.50	4.50	14.1	7.6	0.000
191	77.28	77.03	78.31	0.190	1.25	1.25	2.30	2.30	2.8	2.0	0.000
192	79.81	78.36	78.17	0.784	1.00	1.00	4.03	4.03	3.2	1.1	0.000
193	78.36	77.82	77.89	0.825	1.25	1.25	4.80	4.80	5.9	2.1	0.000
194	77.82	77.03	78.24	0.608	1.50	1.50	4.66	4.66	8.2	3.3	0.000
195	74.29	73.75	77.00	0.106	6.13	7.00	5.85	5.43	209.0	200.6	0.000
196	74.31	74.29	78.75	0.094	5.19	7.00	5.88	5.11	196.8	199.6	0.000
199*	80.30	80.30	80.80	0.000	0.21	2.00	0.65	0.05	0.3	17.5	0.000

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (3 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 24 OF 226

No.	DATE	REVISIONS	APP.

pw:\\adpw.ladco.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\24-001-2-YEAR EXISTING HOUSTORM\24-001-2-YEAR EXISTING HOUSTORM.dgn 9/12/2014 9:14 AM McGuthrie

SYSTEM A (CONTINUED)

Conveyance Configuration Data

Run #	Node US	Node DS	I.D. US	I.D. DS	FlowLine Elev. US (ft)	FlowLine Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n value
200	Am71C	A72	78.30	78.30	Dit 1	0.00	1.50	94.5	0.005	0.040
202	Am45b	Am57bC	82.02	82.00	Cir 1	0.00	1.50	22.8	0.088	0.013
203	A55	A56	80.97	80.62	Cir 1	0.00	2.00	35.6	0.983	0.013
204	Am57b	Am45b	82.03	82.02	Cir 2	0.00	1.50	88.5	0.011	0.013
205	A27	Am22	81.42	81.11	Cir 1	0.00	2.00	27.6	1.123	0.013
206	A73	Am73	78.69	78.60	Cir 1	0.00	1.50	43.7	0.206	0.013
207	Am73	A74	78.60	78.29	Dit 1	0.00	1.50	319.2	0.097	0.040
22	Am12	Am13	81.13	80.38	Cir 1	0.00	3.00	233.6	0.321	0.013
230	Am29	Am30	78.73	78.38	Cir 1	0.00	2.50	192.4	0.182	0.013
231	A75A	A74	79.20	79.10	Cir 1	0.00	1.50	78.0	0.128	0.013
29	Am37	Am38	70.98	70.88	Box 1	7.00	4.00	392.9	0.025	0.015
3	A05	A06	84.28	84.25	Cir 1	0.00	2.00	27.3	0.110	0.013
32	Am15	Am16	79.10	77.73	Cir 1	0.00	3.50	283.4	0.483	0.013
33	Am13	Am14	80.38	80.12	Cir 1	0.00	3.00	76.7	0.339	0.013
38	A39	Am34	81.73	81.71	Cir 1	0.00	2.00	18.6	0.107	0.013
39	A40	Am35	81.40	81.31	Cir 1	0.00	2.00	72.3	0.125	0.013
40	A09	Am08	82.78	82.74	Cir 1	0.00	2.00	22.6	0.177	0.013
41	A08	Am07	83.40	83.35	Cir 1	0.00	2.00	14.4	0.347	0.013
43	A06	Am03	84.24	84.22	Cir 1	0.00	2.00	5.6	0.357	0.013
44	A07	Am07	83.40	83.35	Cir 1	0.00	2.00	20.0	0.250	0.013
46	Am05	Am06	82.79	82.75	Cir 1	0.00	2.00	38.0	0.105	0.013
48	Am03	Am04	82.96	82.72	Cir 1	0.00	2.00	111.2	0.216	0.013
49	Am06	Am09	82.75	82.68	Cir 1	0.00	2.00	39.6	0.177	0.013
5	A01	Am01	84.44	84.40	Cir 1	0.00	2.00	42.4	0.094	0.013
50	A10	Am08	82.78	82.74	Cir 1	0.00	2.00	12.9	0.311	0.013
52	A34	A35	80.93	80.89	Cir 1	0.00	2.00	30.2	0.133	0.013
53	A14	Am11	82.34	82.20	Cir 1	0.00	2.00	81.0	0.173	0.013
54	A11	Am10	82.87	82.82	Cir 1	0.00	2.00	21.5	0.232	0.013
55	A12	Am10	82.87	82.82	Cir 1	0.00	2.00	14.8	0.338	0.013
56	Am08	Am09	82.74	82.68	Cir 1	0.00	2.00	28.5	0.211	0.013
57	Am07	Am08	83.35	82.74	Cir 1	0.00	2.00	340.3	0.179	0.013
58	Am09	Am12	81.68	81.13	Cir 1	0.00	3.00	303.1	0.181	0.013
59	A18	A19	80.39	79.91	Cir 1	0.00	2.00	22.2	2.160	0.013
6	A02	Am01	84.44	84.40	Cir 1	0.00	2.00	20.9	0.191	0.013
61	Am10	Am11	82.82	82.20	Cir 1	0.00	2.00	345.1	0.180	0.013
62	A20	Am16	81.82	81.41	Cir 1	0.00	2.00	17.4	2.352	0.013
63	Am11	Am12	81.20	81.13	Cir 1	0.00	2.00	27.7	0.253	0.013
64	A19	Am15	79.91	79.80	Cir 1	0.00	2.00	6.7	1.654	0.013
65	Am27	Am28	80.09	79.86	Cir 1	0.00	2.00	126.4	0.182	0.013
67	Am26	Am31	79.19	79.03	Cir 1	0.00	3.00	66.4	0.241	0.013
68	Am25	Am26	79.68	79.19	Cir 1	0.00	3.00	245.0	0.200	0.013
69	A35	Am29	80.89	80.80	Cir 1	0.00	2.00	46.7	0.193	0.013
7	Am01	Am02	84.40	84.35	Cir 1	0.00	2.00	45.4	0.110	0.013
71	Am24	Am25	80.84	80.77	Cir 1	0.00	2.00	35.4	0.198	0.013
74	A33	Am27	80.13	80.09	Cir 1	0.00	2.00	17.6	0.227	0.013
75	A36	Am29	80.93	80.89	Cir 1	0.00	2.00	14.3	0.281	0.013
76	Am28	Am29	79.86	79.23	Cir 1	0.00	2.00	352.9	0.179	0.013
79	A32	Am27	80.13	80.09	Cir 1	0.00	2.00	22.4	0.179	0.013
8	A03	Am02	84.40	84.35	Cir 1	0.00	2.00	48.1	0.104	0.013
80	A31	Am26	80.22	80.19	Cir 1	0.00	2.00	19.0	0.158	0.013
81	Am23	Am25	79.87	79.68	Cir 1	0.00	3.00	113.0	0.168	0.013
82	A30	Am24	80.85	80.84	Cir 1	0.00	2.00	17.0	0.059	0.013
83	Am22	Am23	80.11	79.87	Cir 1	0.00	3.00	125.4	0.191	0.013
85	A29	Am24	80.87	80.84	Cir 1	0.00	2.00	21.5	0.140	0.013
86	A28	Am22	81.17	81.11	Cir 1	0.00	2.00	16.4	0.366	0.013
87	Am21	Am22	80.82	80.62	Cir 1	0.00	2.50	146.0	0.137	0.013
88	Am20	Am21	81.39	81.32	Cir 1	0.00	2.00	34.5	0.203	0.013
9	A04	Am02	84.38	84.35	Cir 1	0.00	2.00	16.0	0.187	0.013
91	Am19	Am21	82.02	81.42	Cir 1	0.00	2.00	267.8	0.224	0.013
93	A26	Am20	81.42	81.39	Cir 1	0.00	2.00	14.9	0.201	0.013
94	A25	Am20	81.42	81.39	Cir 1	0.00	2.00	25.5	0.118	0.013
95	Am18	A24	82.34	82.14	Cir 1	0.00	2.00	25.0	0.800	0.013
96	A22	Am19	82.25	82.02	Cir 1	0.00	2.00	23.5	0.979	0.013
97	Am16	Am35	73.55	73.41	Cir 1	0.00	3.50	44.1	0.317	0.013

Conveyance Hydraulic Computations. Tailwater = 73.750 (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)
200	80.30	80.29	80.90	0.000	0.47	1.50	0.13	0.02	0.3	3.4	0.000
202	82.63	82.62	84.58	0.007	0.55	0.62	1.53	1.30	0.9	3.1	0.000
203*	82.62	82.62	85.47	0.002	0.29	2.00	3.61	2.80	1.0	22.5	0.000
204	82.65	82.63	84.63	0.002	0.66	0.66	0.61	0.61	0.9	2.2	0.000
205*	81.93	81.50	86.60	0.023	0.51	0.51	5.43	5.43	3.5	24.1	0.000
206	80.19	80.10	80.64	0.002	0.31	1.50	1.68	0.25	0.4	4.8	0.000
207	80.10	79.79	80.50	0.000	0.30	1.50	0.41	0.03	0.4	14.5	0.000
22	83.10	82.43	86.01	0.188	1.97	2.05	3.90	3.65	29.1	38.0	0.000
230	80.37	80.03	85.27	0.106	1.64	1.65	3.92	3.39	13.4	17.6	0.000
231	80.70	80.60	82.34	0.001	0.32	1.50	1.35	0.21	0.4	3.8	0.000
29	76.74	76.34	84.43	0.101	4.00	4.00	3.70	3.70	103.6	52.0	0.000
3	85.18	85.16	86.28	0.008	0.70	0.91	2.01	1.42	2.0	7.5	0.000
32*	80.89	78.04	85.72	0.128	1.79	1.79	7.33	7.33	36.2	70.3	0.000
33	82.43	81.85	86.37	0.220	2.05	2.05	6.12	6.12	31.4	39.0	0.000
38	83.73	83.71	85.13	0.003	0.54	2.00	1.75	0.38	1.2	7.4	0.000
39	83.39	83.31	85.68	0.012	0.77	1.65	2.25	0.80	2.2	8.0	0.000
40	83.99	83.95	86.57	0.003	0.48	1.21	2.06	0.60	1.2	9.5	0.000
41	84.43	84.38	87.22	0.012	0.58	1.03	3.24	1.52	2.5	13.4	0.000
43	85.16	85.14	86.95	0.015	0.61	0.92	3.38	1.94	2.8	13.6	0.000
44	84.42	84.38	86.61	0.013	0.65	1.03	2.91	1.57	2.6	11.4	0.000
46	84.64	84.44	87.52	0.338	2.00	2.00	4.20	4.20	13.2	7.4	0.000
48	85.14	84.73	87.03	0.338	2.00	2.00	4.20	4.20	13.2	8.1	0.000
49	84.44	84.23	86.57	0.338	2.00	2.00	4.20	4.20	13.2	9.6	0.000
5	85.51	85.48	86.44	0.004	0.60	1.08	1.73	0.80	1.4	9.0	0.000
50	83.99	83.95	87.42	0.005	0.47	1.21	2.72	0.77	1.5	12.7	0.000
52	82.92	82.88	86.25	0.002	0.46	1.99	1.76	0.31	1.0	8.3	0.000
53	83.26	83.14	86.33	0.006	0.58	0.94	2.28	1.18	1.7	9.4	0.000
54	83.73	83.70	87.01	0.009	0.60	0.88	2.69	1.61	2.1	11.0	0.000
55	83.74	83.70	87.01	0.006	0.49	0.88	2.89	1.29	1.7	13.2	0.000
56	83.95	83.93	86.53	0.006	0.41	1.25	3.59	3.59	7.4	10.4	0.000
57	84.38	83.95	86.30	0.049	1.23	1.21	3.08	2.53	5.0	9.6	0.000
58	83.57	83.10	87.07	0.094	1.89	1.97	4.38	4.16	20.5	28.5	0.000
59*	80.91	80.89	85.38	0.010	0.35	0.98	6.06	1.49	2.3	33.4	0.000
6	85.52	85.48	86.44	0.001	0.34	1.08	1.76	0.37	0.6	9.9	0.000
61	83.70	83.14	86.16	0.029	0.88	0.94	2.89	2.63	3.8	9.6	0.000
62*	83.41	83.41	84.81	0.002	0.23	2.00	4.89	2.63	1.0	34.8	0.000
63	83.14	83.13	85.87	0.106	1.17	1.97	3.85	2.36	7.4	11.4	0.000
64*	80.89	80.89	84.90	0.059	0.59	1.09	7.12	4.49	5.9	29.2	0.000
65	81.50	81.28	84.96	0.128	1.41	1.42	3.45	3.42	8.1	9.7	0.000
67	81.01	79.45	85.22	0.111	1.82	1.82	4.98	4.98	22.4	32.9	0.000
68	81.41	81.01	86.16	0.079	1.73	1.82	4.45	4.19	18.8	30.0	0.000
69	82.88	82.80	86.21	0.016	0.74	2.00	2.74	0.92	2.9	10.0	0.000
7	85.48	85.44	86.50	0.008	0.70	1.09	2.01	1.13	2.0	7.5	0.000
71	81.98	81.41	85.83	0.076	1.14	1.14	3.38	3.38	6.3	10.1	0.000
74	81.53	81.50	85.45	0.018	0.73	1.41	2.95	1.29	3.1	10.8	0.000
75	82.93	82.89	86.40	0.017	0.68	2.00	3.17	0.95	3.0	12.0	0.000
76	81.28	80.37	85.48	0.128	1.42	1.42	3.42	3.42	8.1	9.6	0.000
79	81.52	81.50	86.02	0.052	1.05	1.41	3.11	2.19	5.2	9.6	0.000
8	85.59	85.44	86.48	0.058	1.29	1.29	2.55	2.55	5.1	7.3	0.000
80	81.12	81.01	85.73	0.032	0.94	0.94	2.79	2.79	4.1	9.0	0.000
81	81.44	81.41	85.88	0.037	1.44	1.73	3.81	3.04	12.8	27.5	0.000
82	81.98	81.98	86.50	0.017	1.05	1.14	1.77	1.59	2.9	5.5	0.000
83	81.50	81.44	86.08	0.037	1.39	1.57	4.00	3.43	12.8	29.3	0.000
85	81.99	81.98	86.50	0.022	0.88	1.14	2.54	1.83	3.4	8.5	0.000
86	81.55	81.50	87.07	0.000	0.25	0.39	2.02	1.06	0.5	13.7	0.000
87	82.32	81.50	86.68	0.049	1.40	1.40	3.23	3.23	9.2	15.2	0.000
88	82.34	82.22	86.15	0.043	0.95	0.95	3.18	3.18	4.7	10.2	0.000
9	85.45	85.44	86.38	0.024	0.83	1.09	2.86	2.01	3.5	9.8	0.000
91	82.95	82.22	87.18	0.043	0.93	0.93	3.30	3.30	4.7	10.8	0.000
93	82.37	82.34	87.07	0.011	0.66	0.95	2.63	1.60	2.4	10.2	0.000
94	82.36	82.34	86.35	0.011	0.75	0.95	2.16	1.58	2.3	7.8	0.000
95*	82.95	82.95	88.34	0.006	0.41	0.81	3.99	3.41	1.8	20.3	0.000
96*	82.95	82.95	87.22	0.012	0.45	0.93	4.69	3.55	2.9	22.5	0.000
97	78.04	77.96	84.96	0.132	2.05	3.50	6.26	3.81	36.7	56.9	0.000

* Supercritical flow.

NOTES:

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3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. TAILWATER FOR 2-YR ANALYSIS, SYSTEM A, IS TOP OF PIPE AT THE 84"RCP OUTFALL INTO THE BOX UNDERNEATH THE IH-10 FRONTAGE ROAD EAST OF LUMPKIN, 73.75.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (4 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 25 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\25-001-2-YEAR EXISTING HOUSTORM.dgn 9/12/2014 8:25 AM MJGuthrie

SYSTEM A (CONTINUED)

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

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

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	3.0	0.0	8	1215.77
Circular	Concrete	2.0	0.0	76	3669.88
Circular	Concrete	3.5	0.0	3	570.61
Circular	Concrete	5.0	0.0	3	429.0
Box	Concrete	5.0	7.0	7	839.15
Box	Concrete	6.0	7.0	3	733.0
Circular	Concrete	2.5	0.0	9	1521.2
Circular	Concrete	1.25	0.0	4	269.84
Circular	Concrete	1.0	0.0	4	414.83
Circular	Concrete	1.5	0.0	12	1155.5
Circular	Concrete	7.0	0.0	6	1647.27
Ditch	Grass	0.0	0.0	2	413.7
Box	Concrete	4.0	7.0	6	1408.23
Box	Concrete	3.0	6.0	1	23.1

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	49
Area Inlet (Type E)		5.0	0.0	0.0	0.0	0.0	18
Box Manhole		0.0	0.0	0.0	0.0	0.0	10
Grate In Sag	Parallel	0.0	0.0	0.0	6.25	10.0	18
Curb In Sag		5.0	0.0	0.0	0.0	0.0	43
Curb On Grade		5.0	0.0	0.0	0.0	0.0	2
Junction Box		0.0	0.0	0.0	0.0	0.0	2
Area Inlet (Type E)		10.0	0.0	0.0	0.0	0.0	2
Conduit Junction		0.0	0.0	0.0	0.0	0.0	2

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= A67C Previous intensity used.
Decreasing conduit size @ downstream Run# 128
Discharge decreased downstream node Id= Am71C Previous intensity used.
Discharge decreased downstream node Id= Am73 Previous intensity used.
Discharge decreased downstream node Id= Am28 Previous intensity used.
Discharge decreased downstream node Id= Am44 Previous intensity used.
Decreasing conduit size @ downstream Run# 166
Discharge decreased downstream node Id= Am18 Previous intensity used.
Discharge decreased downstream node Id= Am17 Previous intensity used.
Discharge decreased downstream node Id= Am45b Previous intensity used.
Discharge decreased downstream node Id= Am30 Previous intensity used.
Decreasing conduit size @ downstream Run# 184
Discharge decreased downstream node Id= Am57bC5 Previous intensity used.
Discharge decreased downstream node Id= Am04 Previous intensity used.
Discharge decreased downstream node Id= Am05 Previous intensity used.
Discharge decreased downstream node Id= Am06 Previous intensity used.
Discharge decreased downstream node Id= Am14 Previous intensity used.
Discharge decreased downstream node Id= Am23 Previous intensity used.
Discharge decreased downstream node Id= Am33 Previous intensity used.
Decreasing conduit size @ downstream Run# 106
Discharge decreased downstream node Id= Am45 Previous intensity used.
Discharge decreased downstream node Id= Am61 Previous intensity used.
Computed right ponded width exceeds allowable width at inlet Id= A63
Computed left ponded width exceeds allowable width at inlet Id= A63
Computed right ponded width exceeds allowable width at inlet Id= A57
Computed left ponded width exceeds allowable width at inlet Id= A57
Computed right ponded width exceeds allowable width at inlet Id= A86
Computed left ponded width exceeds allowable width at inlet Id= A86
Run# 195 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 190
Run# 189 Insufficient capacity.
Run# 190 Insufficient capacity.
Run# 191 Insufficient capacity.
Run# 194 Insufficient capacity.
Run# 193 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A82 Run # 193
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 136
Run# 187 Insufficient capacity.
Run# 192 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A81 Run # 192
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 207
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 231
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 128
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 129
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 131
Run# 123 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 184
Run# 135 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A77 Run # 135
Upstream HGL exceeds critical elevation (Design) at node Id= A65 Run # 184
Run# 183 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 203
Run# 120 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= Am63C4 Run # 120
Run# 152 Insufficient capacity.
Run# 180 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A62 Run # 180
Run# 181 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A63 Run # 181
Upstream HGL exceeds critical elevation (Design) at node Id= A61 Run # 182
Run# 151 Insufficient capacity.
Run# 166 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 112
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 164
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 165
Run# 29 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 147
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 148
Run# 147 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= A42 Run # 147
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 162
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 163
Run# 108 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 146
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 157
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 158
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 39
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 38
Run# 157 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 62
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 142
Run# 156 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 69
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 75
Run# 49 Insufficient capacity.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 11
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 12
Run# 46 Insufficient capacity.
Run# 110 Insufficient capacity.
Run# 48 Insufficient capacity.
Run# 10 Insufficient capacity.

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LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS
(5 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:
26 OF 226

MJGuthrie

SYSTEM B

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update: Nov/01/2007
Run @ 4/4/2014 11:30:03 AM

PROJECT NAME : HCC Stormline
JOB NUMBER :
PROJECT DESCRIPTION :
PROJECT File: L:\130-10384-001*Read Only\9-0-Non-Projectwise*Data\9-03-Modelin

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)
B08	0.8	0.15	22.13	22.13	3.62	0.000	0.434
B09	0.79	0.28	22.99	22.99	3.55	0.000	0.786
B13	0.75	0.71	24.42	24.42	3.45	0.000	1.836
B11	0.75	0.28	22.99	22.99	3.55	0.000	0.746
B01A	0.65	0.85	24.72	24.72	3.43	0.000	1.893
B00	0.65	1.17	25.28	25.28	3.39	0.000	2.576
B03A	0.65	0.40	23.51	23.51	3.51	0.000	0.913
B01	0.75	1.54	26.30	26.30	3.32	0.000	3.834
B02	0.65	0.84	24.70	24.70	3.43	0.000	1.871
B03	0.65	0.50	23.85	23.85	3.49	0.000	1.134
B04	0.65	0.82	24.66	24.66	3.43	0.000	1.828
B05	0.75	0.36	23.35	23.35	3.52	0.000	0.952
B06	0.65	1.29	25.45	25.45	3.38	0.000	2.831

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)
B05	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B06	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B08	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
B09	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
B01A	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B00	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B03A	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B13	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
B11	ArInl	5.00	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
B01	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B02	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B03	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	0.50
B04	Grate	10.00	6.25	0.50	2.08	0.50	2.08	0.014	n/a	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 Width Left (ft)	Ponded Width Right (ft)
B05	Grate	n/a	10.00	6.25	0.952	10.914	0.098	5.77	5.77
B06	Grate	n/a	10.00	6.25	2.831	10.914	0.203	8.65	8.65
B08	ArInl	5.00	n/a	n/a	0.434	15.022	0.251	n/a	n/a
B09	ArInl	5.00	n/a	n/a	1.220	15.022	0.258	n/a	n/a
B01A	Grate	n/a	10.00	6.25	1.893	10.914	0.155	7.45	7.45
B00	Grate	n/a	10.00	6.25	2.576	10.914	0.191	8.37	8.37
B03A	Grate	n/a	10.00	6.25	0.913	10.914	0.096	5.67	5.67
B13	ArInl	5.00	n/a	n/a	2.853	15.022	0.295	n/a	n/a
B11	ArInl	5.00	n/a	n/a	3.310	15.022	0.311	n/a	n/a
B01	Grate	n/a	10.00	6.25	3.834	10.914	0.249	9.71	9.71
B02	Grate	n/a	10.00	6.25	1.871	10.914	0.154	7.40	7.40
B03	Grate	n/a	10.00	6.25	1.134	10.914	0.110	6.15	6.15
B04	Grate	n/a	10.00	6.25	1.828	10.914	0.152	7.36	7.36

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)
B05	Grate	0.679	6.48	29.23	3.14		0.00	13.826
B06	Grate	0.674	7.77	30.30	3.08		0.00	16.144
B07	CrcMh	0.674	7.77	30.30	3.08		0.00	16.144
B08	ArInl	0.800	0.15	22.13	3.62		0.00	0.434
Bm08C	CrcMh	0.800	0.15	23.99	3.48		0.00	0.434
B09	ArInl	0.793	0.43	32.14	2.98		0.00	1.018
Bm12	Junct	0.000	0.00	0.00	0.00		0.00	0.000
B01A	Grate	0.693	3.56	26.58	3.30		0.00	8.148
B00	Grate	0.650	1.17	25.28	3.39		0.00	2.576
B03A	Grate	0.679	5.30	27.94	3.22		0.00	11.579
Bm09	CrcMh	0.793	0.43	32.14	2.98		0.00	1.018
B13	ArInl	0.766	1.14	33.09	2.93		0.00	2.564
Bm10	CrcMh	0.766	1.14	33.09	2.93		0.00	2.564
B11	ArInl	0.763	1.42	35.78	2.81		0.00	3.043
Bm06	Junct	0.000	0.00	0.00	0.00		0.00	0.000
Cm07	JctBx	0.688	9.19	35.94	2.80		0.00	17.713
B01	Grate	0.707	2.71	26.40	3.31		0.00	6.346
B02	Grate	0.685	4.40	27.28	3.26		0.00	9.818
B03	Grate	0.681	4.90	27.55	3.24		0.00	10.822
B04	Grate	0.675	6.12	28.33	3.19		0.00	13.195
Cm06	Junct	0.688	9.19	35.94	2.80		0.00	17.713

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	B01	B01A		77.11	75.24	Cir 1	0.00	1.50	89.0	2.102	0.013
2	B02	B03		74.93	74.46	Cir 1	0.00	2.00	87.3	0.538	0.013
3	B03	B03A		74.46	74.18	Cir 1	0.00	2.00	100.4	0.279	0.013
4	B04	B05		73.94	73.90	Cir 1	0.00	2.50	145.0	0.028	0.013
5	B05	B06		73.90	73.47	Cir 1	0.00	2.50	247.8	0.174	0.013
6	B06	B07		73.47	73.30	Cir 1	0.00	2.50	87.8	0.194	0.013
7	B07	Cm06		73.30	71.33	Cir 1	0.00	2.50	41.0	4.810	0.013
8	B08	Bm08C		75.80	75.75	Cir 2	0.00	2.50	90.0	0.056	0.013
9	Bm08C	B09		75.75	74.35	Dit 1	0.00	2.50	336.2	0.416	0.040
10	B09	Bm09		74.35	74.30	Cir 2	0.00	2.50	51.5	0.097	0.013
11	Bm09	B13		74.30	74.25	Dit 1	0.00	3.00	114.5	0.044	0.004
12	B13	Bm10		74.25	74.00	Cir 2	0.00	2.50	78.0	0.321	0.013
13	Bm10	B11		74.00	73.95	Dit 1	0.00	2.50	87.0	0.057	0.040
14	B11	Cm06		73.95	73.82	Cir 1	0.00	3.00	33.0	0.394	0.013
17	B01A	B02		75.24	74.93	Cir 1	0.00	1.50	193.3	0.160	0.013
18	B00	B01		78.34	77.11	Cir 1	0.00	1.00	246.0	0.500	0.013
19	B03A	B04		74.18	73.94	Cir 1	0.00	2.50	100.6	0.239	0.013
20	Cm06	Cm07		71.33	71.32	Cir 1	0.00	3.90	1.0	1.000	0.013

Conveyance Hydraulic Computations. Tailwater = 71.440 (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*	78.08	77.46	79.89	0.362	0.68	1.50	8.22	3.59	6.3	15.3	0.000
2*	76.20	76.02	78.76	0.187	1.11	1.56	5.51	3.73	9.8	16.7	0.000
3	76.02	76.02	78.56	0.227	1.49	1.84	4.30	3.58	10.8	12.0	0.000
4	75.89	75.61	78.46	0.103	2.50	2.50	2.69	2.69	13.2	6.8	0.000
5	75.61	75.32	78.73	0.113	1.71	1.85	3.87	3.56	13.8	17.2	0.000
6	75.32	74.02	78.47	0.154	1.85	1.85	4.16	4.16	16.1	18.1	0.000
7*	74.02	72.29	79.02	0.154	0.72	0.96	13.88	9.34	16.1	90.3	0.000
8	78.80	78.75	78.30	0.000	0.26	2.50	0.81	0.04	0.4	19.4	0.000
9	78.75	77.35	79.87	0.000	0.21	2.50	0.69	0.01	0.4	104.5	0.000
10	77.35	77.30	76.35	0.000	0.34	2.50	1.27	0.10	1.0	25.7	0.000
11	77.30	77.25	77.30	0.000	0.18	3.00	2.01	0.02	1.0	533.6	0.000
12	77.25	77.00	77.25	0.001	0.40	2.50	2.54	0.26	2.6	46.6	0.000
13	77.00	76.95	77.00	0.000	0.80	2.50	0.54	0.07	2.6	38.8	0.000
14	76.95	76.82	78.50	0.002	0.55	3.00	3.45	0.43	3.0	42.0	0.000
17	77.46	76.20	77.48	0.597	1.50	1.50	4.61	4.61	8.1	4.2	0.000
18	79.18	78.08	80.84	0.518	0.84	0.97	3.65	3.30	2.6	2.5	0.000
19	76.02	75.89	78.50	0.079	1.36	1.95	4.23	2.82	11.6	20.1	0.000
20*	72.29	72.28	76.00	0.017	0.96	0.96	7.79	7.79	17.7	134.8	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

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

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.5	0.0	2	282.3
Circular	Concrete	2.0	0.0	2	187.7
Circular	Concrete	2.5	0.0	8	1061.15
Ditch	Grass	0.0	0.0	2	423.2
Ditch	Grass	0.0	0.0	1	114.5
Circular	Concrete	3.0	0.0	1	33.0
Circular	Concrete	1.0	0.0	1	246.0
Circular	Concrete	3.9	0.0	1	1.0

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)
Grate In Sag	Parallel	0.0	0.0	0.0	6.25	10.0	9
Circular Manhole		0.0	0.0	0.0	0.0	0.0	4
Area Inlet (Type E)		5.0	0.0	0.0	0.0	0.0	4
Conduit Junction		0.0	0.0	0.0	0.0	0.0	3
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
Discharge decreased downstream node Id= Bm08C Previous intensity used.
Discharge decreased downstream node Id= Bm09 Previous intensity used.
Decreasing conduit size @ downstream Run# 12
Discharge decreased downstream node Id= Bm10 Previous intensity used.
Discharge decreased downstream node Id= B07 Previous intensity used.
Tailwater set to uniform depth elevation = 72.28(ft)
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 14
Run# 4 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B09 Run # 10
Run# 17 Insufficient capacity.
Upstream HGL exceeds critical elevation (Design) at node Id= B08 Run # 8
Run# 18 Insufficient capacity.

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. TAILWATER FOR 2-YR ANALYSIS, SYSTEM B, IS TOP OF PIPE AT THE 36"RCP OUTFALL INTO THE JUNCTION BOX AT THE INTERSECTION OF THE IH-10 FRONTAGE ROAD AND LUMPKIN, 71.44.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (6 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ:
SHEET: 27 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\27-001-2-YEAR EXISTING HOUSTORM.dgn 4/4/2014 11:30:48 AM McGuthrie

SYSTEM C

HouStorm (City Of Houston STORM DRAIN DESIGN) Version 2.1, Update:
Nov/01/2007
Run @ 7/16/2014 8:05:34 AM

PROJECT NAME : HCC-Stormline C
JOB NUMBER :
PROJECT DESCRIPTION :

PROJECT File: L:\130-10384-001*Read Only\9-0-Non-Projectwise*Data\9-03-Modelin

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)
C03	0.75	1.09	25.15	25.15	3.40	0.000	2.777
C04	0.76	0.92	24.85	24.85	3.42	0.000	2.389
Cm02	0.76	0.48	23.78	23.78	3.49	0.000	1.274
C06	0.75	1.85	26.15	26.15	3.33	0.000	4.620
C05	0.75	0.58	24.09	24.09	3.47	0.000	1.510

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)
C03	Curb	10.00	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)
C03	Curb	2.777	2.777	0.000	0.000		7.78	10.00	11.45

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)
C04	Grate	3.50	10.00	0.50	2.00	0.50	2.00	0.014	n/a	1.50
C06	Grate	3.50	10.00	0.50	2.00	0.50	2.00	0.014	n/a	1.50
C05	Grate	3.50	10.00	0.50	2.00	0.50	2.00	0.014	n/a	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)
C04	Grate	n/a	3.50	10.00	2.389	19.849	0.366	8.35	8.35
C06	Grate	n/a	3.50	10.00	4.620	19.849	0.568	10.70	10.70
C05	Grate	n/a	3.50	10.00	1.510	19.849	0.269	4.45	8.55

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)
Cm01	CrcMh	0.750	1.09	25.17	3.40		0.00	2.777
Cm02	CrcMh	0.756	2.49	26.00	3.34		0.00	6.283
Cm05	CrcMh	0.750	1.85	26.91	3.28		0.00	4.620
C03	Curb	0.750	1.09	25.15	3.40		0.00	2.777
C04	Grate	0.760	0.92	24.85	3.42		0.00	2.389
C06	Grate	0.750	1.85	26.15	3.33		0.00	4.620
Cm04	CrcMh	0.753	4.92	29.37	3.13		0.00	11.603
C05	Grate	0.750	0.58	24.09	3.47		0.00	1.510
Cm06	BoxMh	0.753	4.92	29.37	3.13		0.00	11.603

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
2	C03	Cm01	74.52	74.47	Cir 1	0.00	1.25	5.5	0.909	0.013
3	Cm01	Cm02	74.47	72.27	Cir 1	0.00	2.00	237.0	0.928	0.013
4	C04	Cm02	73.65	72.27	Cir 1	0.00	2.00	94.0	1.468	0.013
5	Cm02	Cm04	71.77	71.70	Cir 1	0.00	2.50	203.0	0.034	0.013
7	C06	Cm05	70.20	70.00	Cir 1	0.00	2.00	130.0	0.154	0.013
8	Cm05	Cm04	67.09	66.96	Box 1	5.00	9.00	222.0	0.059	0.015
9	C05	Cm04	75.35	75.00	Cir 1	0.00	1.00	23.5	1.490	0.013
1	Cm04	Cm06	66.96	66.95	Box 1	5.00	9.00	1.0	1.000	0.015

Conveyance Hydraulic Computations. Tailwater = 72.670 (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)
2*	75.11	75.05	78.95	0.183	0.59	0.59	4.89	4.89	2.8	6.2	0.000
3*	75.05	73.09	78.97	0.015	0.48	0.82	4.76	2.29	2.8	21.9	0.000
4*	74.19	73.09	76.87	0.011	0.40	0.82	5.36	1.97	2.4	27.5	0.000
5	73.09	72.67	77.75	0.023	1.72	1.72	1.75	1.75	6.3	7.6	0.000
7	72.95	72.80	76.50	0.041	1.02	2.00	2.86	1.47	4.6	8.9	0.000
8	72.80	72.67	78.00	0.000	0.62	5.71	1.50	0.16	4.6	148.0	0.000
9*	76.04	76.00	77.60	0.178	0.41	1.00	5.03	3.65	1.5	4.4	0.000
1*	72.67	72.67	76.70	0.000	0.45	5.72	5.19	4.21	11.6	611.7	0.000

* Supercritical flow.

SUMMARY OF STORM DRAIN STRUCTURE QUANTITIES

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

LINKS:

Type of Convey Structure	Material	Rise (ft)	Span (ft)	Number of Links of this type	Quantity (ft)
Circular	Concrete	1.25	0.0	1	5.5
Circular	Concrete	2.0	0.0	3	461.0
Circular	Concrete	2.5	0.0	1	203.0
Box	Concrete	9.0	5.0	2	223.0
Circular	Concrete	1.0	0.0	1	23.5

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	4
Curb On Grade		10.0	0.0	0.0	0.0	0.0	1
Grate In Sag	Parallel	0.0	0.0	0.0	10.0	3.5	3
Box Manhole		0.0	0.0	0.0	0.0	0.0	1

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= Cm01 Previous intensity used.
Discharge decreased downstream node Id= Cm05 Previous intensity used.
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 9

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. TAILWATER FOR 2-YR ANALYSIS, SYSTEM C, IS EQUIVALENT TO THE TOP OF EXISTING 2-10'X10'RCB UNDERNEATH THE IH-10 WESTBOUND FRONTAGE ROAD, 72.67'.

6. "OUT" IS A DUMMY NODE REPRESENTING THE OUTFALL IN THE 5'X9'RCB UNDERNEATH THE IH-10 WESTBOUND FRONTAGE ROAD 1-FT DOWNSTREAM OF CM04.

7. WHERE SURVEY WAS NOT AVAILABLE, ELEVATIONS WERE APPROXIMATED FROM CITY GIMS OR TXDOT DATA.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, EXISTING CONDITIONS (7 OF 7)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 28 OF 226

M.J.Guthrie
pw:\\ladpw.ladco.int:pro_jectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\28-001-2-YEAR EXISTING HOUSTORM.dgn 7/16/2014 8:00 AM

SYSTEM AB

HouStorm (City Of Houston STORM DRAIN DESIGN)   Version 2.1, Update: Nov/01/2007
Run @ 9/3/2014 1:41:33 PM

PROJECT NAME : Lumpkin-Primary
JOB NUMBER :
PROJECT DESCRIPTION : Updated ID
PROJECT File: L:\130-10384-001*Read Only\9-0-Non-Projectwise*Data\9-03-Modelin

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)
A01	0.66	0.60	24.14	24.14	3.47	0.000	1.373
A02	0.68	0.26	22.89	22.89	3.56	0.000	0.629
A03	0.65	2.55	26.79	26.79	3.29	0.000	5.450
A04	0.58	1.80	26.09	26.09	3.33	0.000	3.480
A05	0.59	0.98	24.96	24.96	3.41	0.000	1.971
A06	0.63	0.36	23.35	23.35	3.52	0.000	0.799
A07	0.58	1.30	25.47	25.47	3.37	0.000	2.544
A08	0.57	1.28	25.44	25.44	3.38	0.000	2.463
A09	0.59	0.57	24.06	24.06	3.47	0.000	1.168
A10	0.59	0.75	24.51	24.51	3.44	0.000	1.523
A11	0.58	1.08	25.14	25.14	3.40	0.000	2.128
A12	0.57	0.88	24.78	24.78	3.42	0.000	1.717
A13	0.6	1.05	25.09	25.09	3.40	0.000	2.142
A14	0.58	0.87	24.76	24.76	3.42	0.000	1.727
A15	0.58	1.00	25.00	25.00	3.41	0.000	1.976
A16	0.58	1.20	25.33	25.33	3.38	0.000	2.356
A17	0.62	0.29	23.04	23.04	3.55	0.000	0.638
A18	0.58	1.16	25.26	25.26	3.39	0.000	2.280
A19	0.58	1.69	25.97	25.97	3.34	0.000	3.275
A20	0.59	1.60	25.86	25.86	3.35	0.000	3.161
A21	0.65	0.94	24.89	24.89	3.41	0.000	2.086
A22	0.61	0.19	22.46	22.46	3.59	0.000	0.416
A23	0.58	0.92	24.85	24.85	3.42	0.000	1.823
A24	0.61	0.21	22.60	22.60	3.58	0.000	0.459
A25	0.59	1.17	25.28	25.28	3.39	0.000	2.338
A26	0.57	1.23	25.37	25.37	3.38	0.000	2.371
A27	0.57	1.82	26.11	26.11	3.33	0.000	3.457
A28	0.61	0.22	22.66	22.66	3.58	0.000	0.480
A29	0.59	1.71	25.99	25.99	3.34	0.000	3.370
A30	0.58	1.51	25.75	25.75	3.36	0.000	2.939
A31	0.59	2.08	26.38	26.38	3.31	0.000	4.068
A32	0.58	2.72	26.93	26.93	3.28	0.000	5.174
A33	0.58	1.57	25.83	25.83	3.35	0.000	3.051
A34	0.62	0.45	23.69	23.69	3.50	0.000	0.976
A35	0.6	0.95	24.91	24.91	3.41	0.000	1.945
A36	0.57	1.56	25.81	25.81	3.35	0.000	2.980
A37	0.59	0.86	24.74	24.74	3.42	0.000	1.738
A38	0.59	0.88	24.78	24.78	3.42	0.000	1.777
A39	0.59	0.55	24.00	24.00	3.48	0.000	1.128
A40	0.58	1.29	25.46	25.46	3.38	0.000	2.526
A41	0.72	1.55	25.80	25.80	3.35	0.000	3.741
A42	0.8	1.12	25.20	25.20	3.39	0.000	3.040
A42A	0.65	0.79	24.59	24.59	3.44	0.000	1.764
A42B	0.65	1.22	25.36	25.36	3.38	0.000	2.682
A42C	0.65	1.08	25.14	25.14	3.40	0.000	2.385
A42D	0.4	1.27	25.43	25.43	3.38	0.000	1.716
A43	0.45	0.96	24.93	24.93	3.41	0.000	1.474
A43A	0.5	0.05	20.90	20.90	3.72	0.000	0.093
A43B	0.65	0.66	24.29	24.29	3.46	0.000	1.483
A43C	0.8	0.72	24.44	24.44	3.45	0.000	1.985
A44	0.68	2.98	27.12	27.12	3.27	0.000	6.621
A45	0.8	0.94	24.84	24.84	3.42	0.000	2.570
A45A	0.65	0.48	23.18	23.18	3.54	0.000	1.104
A45B	0.7	0.70	24.39	24.39	3.45	0.000	1.690
A46	0.8	1.07	25.12	25.12	3.40	0.000	2.909
A46A	0.7	0.81	24.45	24.45	3.44	0.000	1.953
A46B	0.6	0.35	23.31	23.31	3.53	0.000	0.741
A47	0.74	10.05	30.01	30.01	3.10	0.000	23.030
A48	0.76	1.09	25.15	25.15	3.40	0.000	2.813
A49	0.75	2.44	26.70	26.70	3.29	0.000	6.028
A50	0.8	0.98	24.96	24.96	3.41	0.000	2.673
A51	0.75	2.24	26.53	26.53	3.31	0.000	5.553
A52	0.8	0.30	23.09	23.09	3.54	0.000	0.851
A53	0.8	0.20	22.53	22.53	3.59	0.000	0.574
A54	0.65	3.80	27.65	27.65	3.23	0.000	7.989
A55	0.8	0.10	21.67	21.67	3.65	0.000	0.292
A56	0.8	0.65	24.27	24.27	3.46	0.000	1.798
A57	0.75	3.26	27.31	27.31	3.26	0.000	7.959
A58	0.65	2.47	26.73	26.73	3.29	0.000	5.286
A59A	0.8	0.13	21.98	21.98	3.63	0.000	0.377
A59B	0.65	0.05	20.90	20.90	3.72	0.000	0.121
A63	0.75	0.90	24.82	24.82	3.42	0.000	2.308
A63C4	0.4	2.86	27.03	27.03	3.27	0.000	3.744
A67	0.65	1.68	25.96	25.96	3.34	0.000	3.650
A67C	0.8	0.10	21.67	21.67	3.65	0.000	0.292
A67D	0.65	0.60	24.14	24.14	3.47	0.000	1.352
A68	0.65	0.44	23.65	23.65	3.50	0.000	1.002
A68D	0.8	0.16	22.42	22.42	3.59	0.000	0.460
A74A	0.8	0.13	21.98	21.98	3.63	0.000	0.377
A74B	0.8	0.13	21.98	21.98	3.63	0.000	0.377
A76	0.7	2.55	26.79	26.79	3.29	0.000	5.869
A77	0.75	1.55	25.80	25.80	3.35	0.000	3.897
A78	0.75	0.41	23.55	23.55	3.51	0.000	1.079
A79	0.75	1.12	25.20	25.20	3.39	0.000	2.850
A80	0.75	1.79	26.08	26.08	3.33	0.000	4.476
A81	0.75	1.25	25.40	25.40	3.38	0.000	3.168
A82	0.75	1.11	25.19	25.19	3.39	0.000	2.825
A83	0.75	0.95	24.91	24.91	3.41	0.000	2.432
A84	0.75	1.11	25.19	25.19	3.39	0.000	2.825
A85	0.75	1.33	25.52	25.52	3.37	0.000	3.363
A86	0.75	7.60	29.29	29.29	3.14	0.000	17.882
A90A	0.9	0.15	22.16	22.16	3.62	0.000	0.488
A90B	0.9	0.06	21.09	21.09	3.70	0.000	0.200
Am36C	0.8	1.10	25.17	25.17	3.40	0.000	2.988
Am36E	0.8	0.14	22.07	22.07	3.62	0.000	0.406
Am60	0.75	2.01	26.31	26.31	3.32	0.000	5.004
B00	0.65	1.17	25.28	25.28	3.39	0.000	2.576
B01	0.65	1.54	25.79	25.79	3.35	0.000	3.357
B01A	0.65	0.85	24.72	24.72	3.43	0.000	1.893
B02	0.7	0.84	24.70	24.70	3.43	0.000	2.015
B03	0.8	0.51	23.88	23.88	3.49	0.000	1.422
B03A	0.8	0.40	23.51	23.51	3.51	0.000	1.124
B04	0.8	0.82	24.66	24.66	3.43	0.000	2.250
B05	0.8	0.36	23.35	23.35	3.52	0.000	1.015
B06	0.8	0.22	22.66	22.66	3.58	0.000	0.629
B08	0.8	0.22	22.66	22.66	3.58	0.000	0.629
B08A	0.8	0.21	22.60	22.60	3.58	0.000	0.602
B08C	0.8	0.17	22.32	22.32	3.60	0.000	0.490
B09	0.8	0.54	23.97	23.97	3.48	0.000	1.503
B09A	0.8	0.64	24.24	24.24	3.46	0.000	1.771
B09C	0.9	0.40	23.51	23.51	3.51	0.000	1.265
B09D	0.9	0.10	21.67	21.67	3.65	0.000	0.329
B10	0.8	0.19	22.46	22.46	3.59	0.000	0.546
B10A	0.8	0.24	22.78	22.78	3.57	0.000	0.685
B10B	0.9	0.04	20.67	20.67	3.74	0.000	0.135
B10C	0.9	0.06	21.09	21.09	3.70	0.000	0.200
B12	0.8	0.08	21.41	21.41	3.68	0.000	0.235
B14	0.8	0.53	23.94	23.94	3.48	0.000	1.476
C05	0.8	0.53	23.94	23.94	3.48	0.000	1.476

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)
A42B	Curb	8.00	0.40	2.00	0.014	0.33	n/a	n/a	12.00
A42C	Curb	8.00	0.40	2.00	0.014	0.33	n/a	n/a	12.00
A43A	Curb	5.00	0.40	2.00	0.014	0.33	n/a	n/a	12.00
A43B	Curb	8.00	0.40	2.00	0.014	0.33	n/a	n/a	12.00
A43C	Curb	8.00	0.40	2.00	0.014	0.33	n/a	n/a	12.00
A45A	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A45B	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A46A	Curb	8.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A46B	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
A59A	Curb	5.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
A59B	Curb	5.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00
A67C	Curb	5.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
A67D	Curb	8.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
A68D	Curb	5.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
A90A	Curb	5.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
A90B	Curb	5.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00
B09C	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B09D	Curb	5.00	0.30	2.00	0.014	0.33	n/a	n/a	12.00
B10	Curb	5.00	0.42	2.00	0.014	0.33	n/a	n/a	12.00
B10A	Curb	5.00	0.42	2.00	0.014	0.33	n/a	n/a	12.00
B10B	Curb	5.00	0.42	2.00	0.014	0.33	n/a	n/a	12.00
B10C	Curb	5.00	0.42	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)
A42B	Curb	2.682	2.682	0.000	0.000	A42A	7.27	8.00	11.80
A42C	Curb	2.385	2.385	0.000	0.000	A42B	6.79	8.00	11.30
A43A	Curb	0.093	0.093	0.000	0.000	A43B	1.30	5.00	3.35
A43B	Curb	1.483	1.483	0.000	0.000	A43C	5.15	8.00	9.45
A43C	Curb	1.985	1.985	0.000	0.000	A43	6.10	8.00	10.55
A45A	Curb	1.109	1.109	0.000	0.000	A45	4.10	5.00	8.95
A45B	Curb	1.690	1.685	0.000	0.005	A45A	5.21	5.00	10.45
A46A	Curb	1.953	1.953	0.000	0.000	A46	5.67	8.00	11.05
A46B	Curb	0.741	0.741	0.000	0.000	A46A	3.28	5.00	7.65
A59A	Curb	0.377	0.377	0.000	0.000	A67D	2.90	5.00	5.10
A59B	Curb	0.121	0.121	0.000	0.000	A68D	1.56	5.00	3.55
A67C	Curb	0.292	0.292	0.000	0.000	A74B	2.56	5.00	4.60
A67D	Curb	1.352	1.352	0.000	0.000	A74A	5.57	8.00	8.20
A68D	Curb	0.460	0.460	0.000	0.000	A67C	3.18	5.00	5.45
A90A	Curb	0.488	0.488	0.000	0.000	A74A	3.28	5.00	5.60
A90B	Curb	0.200	0.200	0.000	0.000	A74B	2.15	5.00	4.00
B09C	Curb	1.265	1.265	0.000	0.000	B09	4.41	5.00	9.40
B09D	Curb	0.329	0.329	0.000	0.000	B09A	2.16	5.00	5.65
B10	Curb	0.546	0.546	0.000	0.000	B10B	3.04	5.00	6.45
B10A	Curb	0.685	0.685	0.000	0.000	B10C	3.42	5.00	7.00
B10B	Curb	0.135	0.135	0.000	0.000	B09	1.56	5.00	3.80
B10C	Curb	0.200	0.200	0.000	0.000	B09A	1.86	5.00	4.40

NOTES:

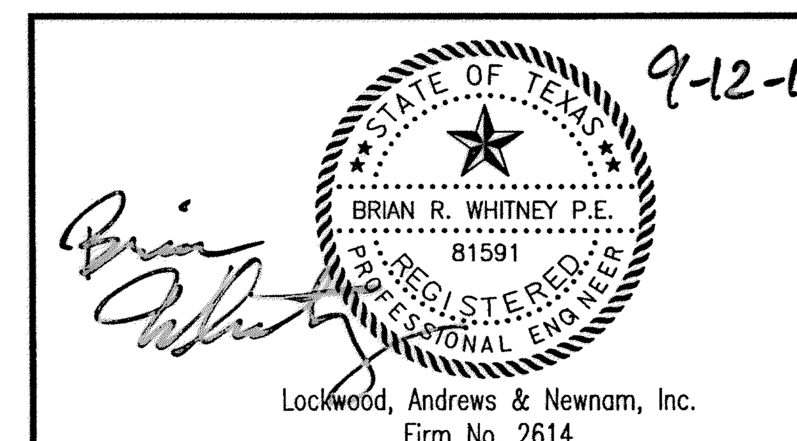
1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

No.	DATE	REVISIONS	APP.



MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, PROPOSED CONDITIONS (1 OF 5)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:   FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ:
SHEET: 29 OF 226

pw:\\ladpw.lado.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\29-001-2-YEAR PROPOSED HOUSTORM OUTPUT (1 OF 5).dgn 9/12/2014 1:13 AM MJGuthrie

SYSTEM AB (CONTINUED)

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim (ft)	Grate Area (sf)	Left-Slope Longi (%)	Left-Slope Transv (%)	Right-Slope Longi (%)	Right-Slope Transv (%)	n	Gutter DeprW (ft)	Head Allowed (ft)
A20	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
A39	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
A40	Curb	5.00	0.00	0.50	2.00	0.50	2.00	0.014	1.50	0.50
A41	Curb	5.00	0.00	0.30	2.00	0.67	2.00	0.014	1.50	0.50
A42	Curb	5.00	0.00	0.67	2.00	0.30	2.00	0.014	1.50	0.50
A42A	Curb	5.00	0.00	0.55	2.00	0.40	2.00	0.014	1.50	0.50
A42D	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	0.50
A43	ArInl	17.32	n/a	0.40	2.00	0.55	2.00	0.014	n/a	0.50
A45	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
A46	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
A54	ArInl	17.32	n/a	0.50	2.00	0.50	2.00	0.014	n/a	1.50
A55	Curb	5.00	0.00	0.56	2.00	1.60	2.00	0.014	1.50	0.50
A56	Curb	5.00	0.00	0.10	2.00	0.40	2.00	0.014	1.50	0.50
A57	ArInl	17.32	n/a	2.50	2.00	2.50	2.00	0.014	n/a	1.50
A58	Grate	10.00	6.25	3.30	2.00	3.30	2.00	0.014	n/a	0.50
A63	Grate	10.00	6.25	1.00	2.00	1.00	2.00	0.014	n/a	0.50
A63C4	Grate	10.00	6.25	3.30	2.00	3.30	2.00	0.014	n/a	0.50
A67	Grate	10.00	6.25	0.50	2.00	0.50	2.00	0.014	n/a	0.50
A74A	Curb	5.00	0.00	0.30	2.00	0.70	2.00	0.014	1.50	0.50
A74B	Curb	5.00	0.00	0.70	2.00	0.30	2.00	0.014	1.50	0.50
B08	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B08A	Curb	5.00	0.00	0.30	2.00	0.30	2.00	0.014	1.50	0.50
B09	Curb	5.00	0.00	0.42	2.00	0.30	2.00	0.014	1.50	0.50
B09A	Curb	5.00	0.00	0.30	2.00	0.42	2.00	0.014	1.50	0.50
B12	Curb	5.00	0.00	0.30	2.00	1.00	2.00	0.014	1.50	0.50
B14	Curb	5.00	0.00	1.00	2.00	0.30	2.00	0.014	1.50	0.50
C05	Grate	10.00	6.25	0.20	2.00	0.20	2.00	0.014	n/a	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)
A20	Curb	5.00	n/a	n/a	3.161	6.261	0.317	9.25	9.25
A39	Curb	5.00	n/a	n/a	1.128	6.261	0.160	6.30	6.30
A40	Curb	5.00	n/a	n/a	2.526	6.261	0.273	8.50	8.50
A41	Curb	5.00	n/a	n/a	3.741	6.261	0.355	10.85	9.35
A42	Curb	5.00	n/a	n/a	3.040	6.261	0.309	8.65	10.05
A42A	Curb	5.00	n/a	n/a	1.764	6.261	0.215	7.40	7.65
A42D	Grate	n/a	10.00	6.25	1.716	10.914	0.146	9.00	4.70
A43	ArInl	17.32	n/a	n/a	1.474	16.280	0.101	n/a	n/a
A45	Curb	5.00	n/a	n/a	2.570	6.261	0.276	8.70	10.10
A46	Curb	5.00	n/a	n/a	2.909	6.261	0.300	9.10	10.60
A54	ArInl	17.32	n/a	n/a	7.989	93.087	0.507	n/a	n/a
A55	Curb	5.00	n/a	n/a	0.292	6.261	0.065	4.20	2.50
A56	Curb	5.00	n/a	n/a	1.798	6.261	0.218	7.20	9.35
A57	ArInl	17.32	n/a	n/a	7.959	93.087	0.507	n/a	n/a
A58	Grate	n/a	10.00	6.25	5.286	10.914	0.308	7.90	7.90
A63	Grate	n/a	10.00	6.25	2.308	10.914	0.177	7.25	7.25
A63C4	Grate	n/a	10.00	6.25	3.744	10.914	0.245	7.40	6.35
A67	Grate	n/a	10.00	6.25	3.650	10.914	0.241	9.80	9.80
A74A	Curb	5.00	n/a	n/a	0.377	6.261	0.077	4.25	4.20
A74B	Curb	5.00	n/a	n/a	0.377	6.261	0.077	3.75	4.75
B08	Curb	5.00	n/a	n/a	0.629	6.261	0.108	6.80	3.55
B08A	Curb	5.00	n/a	n/a	0.602	6.261	0.105	3.50	6.70
B09	Curb	5.00	n/a	n/a	1.503	6.261	0.193	4.60	9.40
B09A	Curb	5.00	n/a	n/a	1.771	6.261	0.215	8.20	7.70
B12	Curb	5.00	n/a	n/a	0.235	6.261	0.056	4.35	2.55
B14	Curb	5.00	n/a	n/a	1.476	6.261	0.191	5.05	7.65
C05	Grate	n/a	10.00	6.25	1.476	10.914	0.132	5.85	9.85

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A01	CrcMh	0.660	0.60	24.14	3.47		0.00	1.373
A02	CrcMh	0.680	0.26	22.89	3.56		0.00	0.629
A03	CrcMh	0.650	2.55	26.79	3.29		0.00	5.450
A04	CrcMh	0.580	1.80	26.09	3.33		0.00	3.480
A05	CrcMh	0.590	0.98	24.96	3.41		0.00	1.971
A06	CrcMh	0.601	1.34	25.19	3.39		0.00	2.732
A07	CrcMh	0.580	1.30	25.47	3.37		0.00	2.544
A08	CrcMh	0.570	1.28	25.44	3.38		0.00	2.463
A09	CrcMh	0.590	0.57	24.06	3.47		0.00	1.168
A10	CrcMh	0.590	0.75	24.51	3.44		0.00	1.523
A11	CrcMh	0.580	1.08	25.14	3.40		0.00	2.128
A12	CrcMh	0.570	0.88	24.78	3.42		0.00	1.717
A13	CrcMh	0.600	1.05	25.09	3.40		0.00	2.142
A14	CrcMh	0.580	0.87	24.76	3.42		0.00	1.727
A15	CrcMh	0.580	1.00	25.00	3.41		0.00	1.976
A16	CrcMh	0.580	1.20	25.33	3.38		0.00	2.356
A17	CrcMh	0.588	1.49	25.43	3.38		0.00	2.958
A18	CrcMh	0.580	1.16	25.26	3.39		0.00	2.280
A19	CrcMh	0.580	2.85	25.97	3.34		0.00	5.524
A20	Curb	0.590	1.60	25.86	3.35		0.00	3.161
A21	CrcMh	0.650	0.94	24.89	3.41		0.00	2.086
A22	CrcMh	0.643	1.13	25.13	3.40		0.00	2.470
A23	CrcMh	0.580	0.92	24.85	3.42		0.00	1.823
A24	CrcMh	0.586	1.13	25.04	3.40		0.00	2.252
A25	CrcMh	0.590	1.17	25.28	3.39		0.00	2.338
A26	CrcMh	0.570	1.23	25.37	3.38		0.00	2.371
A27	CrcMh	0.570	1.82	26.11	3.33		0.00	3.457

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)	
A28	CrcMh	0.610	0.22	22.66	3.58		0.00	0.480	
A29	CrcMh	0.590	1.71	25.99	3.34		0.00	3.370	
A30	CrcMh	0.580	1.51	25.75	3.36		0.00	2.939	
A31	CrcMh	0.590	2.08	26.38	3.31		0.00	4.068	
A32	CrcMh	0.580	2.72	26.93	3.28		0.00	5.174	
A33	CrcMh	0.580	1.57	25.83	3.35		0.00	3.051	
A34	CrcMh	0.620	0.45	23.69	3.50		0.00	0.976	
A35	CrcMh	0.606	1.40	24.91	3.41		0.00	2.898	
A36	CrcMh	0.570	1.56	25.81	3.35		0.00	2.980	
A37	CrcMh	0.590	0.86	24.74	3.42		0.00	1.738	
A38	CrcMh	0.590	1.74	24.91	3.41		0.00	3.503	
A39	Curb	0.590	0.55	24.00	3.48		0.00	1.128	
A40	Curb	0.580	1.29	25.46	3.38		0.00	2.526	
A41	Curb	0.720	1.55	25.80	3.35		0.00	3.741	
A42	Curb	0.800	1.12	25.20	3.39		0.00	3.040	
A42A	Curb	0.650	0.79	24.59	3.44		0.00	1.764	
A42B	Curb	0.650	1.22	25.36	3.38		0.00	2.682	
A42C	Curb	0.650	1.08	25.14	3.40		0.00	2.385	
A42D	Grate	0.440	1.41	25.43	3.38		0.00	2.094	
A43	ArInl	0.450	0.96	24.93	3.41		0.00	1.474	
A43A	Curb	0.500	0.05	20.90	3.72		0.00	0.093	
A43B	Curb	0.650	0.66	24.29	3.46		0.00	1.483	
A43C	Curb	0.800	0.72	24.44	3.45		0.00	1.985	
A44	CrcMh	0.680	2.98	27.12	3.27		65.68	72.301	SEE NOTE 5
A45	Curb	0.800	0.94	24.84	3.42		0.00	2.570	
A45A	Curb	0.650	0.48	23.18	3.54		0.00	1.104	
A45B	Curb	0.700	0.70	24.39	3.45		0.00	1.690	
A46	Curb	0.800	1.07	25.12	3.40		0.00	2.909	
A46A	Curb	0.700	0.81	24.45	3.44		0.00	1.953	
A46B	Curb	0.600	0.35	23.31	3.53		0.00	0.741	
A47	CrcMh	0.740	10.05	30.01	3.10		0.00	23.030	
A48	CrcMh	0.742	11.14	30.07	3.09		0.00	25.568	
A49	CrcMh	0.750	2.44	26.70	3.29		0.00	6.028	
A50	CrcMh	0.800	0.98	24.96	3.41		0.00	2.673	
A51	CrcMh	0.750	2.24	26.53	3.31		0.00	5.553	
A52	CrcMh	0.800	0.30	23.09	3.54		0.00	0.851	
A53	CrcMh	0.800	0.20	22.53	3.59		0.00	0.574	
A54	ArInl	0.650	3.80	27.65	3.23		0.00	7.989	
A55	Curb	0.800	0.10	21.67	3.65		0.00	0.292	
A56	Curb	0.800	0.65	24.27	3.46		0.00	1.798	
A57	ArInl	0.750	3.26	27.31	3.26		0.00	7.959	
A58	Grate	0.650	2.47	26.73	3.29		0.00	5.286	
A59A	Curb	0.494	3.89	27.07	3.27		0.00	6.289	
A59B	Curb	0.650	0.05	20.90	3.72		0.00	0.121	
A63	Grate	0.750	0.90	24.82	3.42		0.00	2.308	
A63C4	Grate	0.484	3.76	27.03	3.27		0.00	5.954	
A67	Grate	0.650	1.68	25.96	3.34		0.00	3.650	
A67C	Curb	0.678	0.54	23.94	3.48		0.00	1.274	
A67D	Curb	0.650	0.60	24.14	3.47		0.00	1.352	
A68	CrcMh	0.650	0.44	23.65	3.50		0.00	1.002	
A68D	Curb	0.663	1.84	26.16	3.33		0.00	4.061	
A74A	Curb	0.800	0.13	21.98	3.63		0.00	0.377	
A74B	Curb	0.800	0.13	21.98	3.63		0.00	0.377	
A90A	Curb	0.900	0.15	22.16	3.62		0.00	0.488	
A90B	Curb	0.900	0.06	21.09	3.70		0.00	0.200	
Am01	CrcMh	0.666	0.86	24.55	3.44		0.00	1.969	
Am02	CrcMh	0.628	5.21	27.11	3.27		0.00	10.701	
Am03	CrcMh	0.623	6.55	27.75	3.23		0.00	13.170	
Am04	CrcMh	0.623	6.55	27.75	3.23		0.00	13.170	
Am05	CrcMh	0.623	6.55	27.75	3.23		0.00	13.170	
Am06	CrcMh	0.623	6.55	27.75	3.23		0.00	13.170	
Am07	CrcMh	0.575	2.58	25.59	3.37		0.00	4.995	
Am08	CrcMh	0.580	3.90	27.43	3.25		0.00	7.349	
Am09	CrcMh	0.607	10.45	27.91	3.22		0.00	20.413	
Am10	CrcMh	0.576	1.96	25.27	3.39		0.00	3.822	
Am11	CrcMh	0.583	3.88	27.27	3.26		0.00	7.372	
Am12	CrcMh	0.599	15.33	29.06	3.15		0.00	28.935	
Am13	CrcMh	0.598	16.82	29.72	3.11		0.00	31.314	
Am14	CrcMh	0.598	16.82	29.72	3.11		0.00	31.314	
Am15	CrcMh	0.595	19.67	30.33	3.08		0.00	36.066	
Am16	CrcMh	0.595	21.27	30.97	3.04		0.00	38.529	
Am17	CrcMh	0.650	0.94	25.01	3.41		0.00	2.086	
Am18	CrcMh	0.580	0.92	24.94	3.41		0.00	1.823	
Am19	CrcMh	0.614	2.26	25.22	3.39		0.00	4.710	
Am20	CrcMh	0.580	2.40	25.48	3.37		0.00	4.695	
Am21	CrcMh	0.597	4.66	26.57	3.30		0.00	9.181	
Am22	CrcMh	0.590	6.70	27.32	3.26		0.00	12.863	
Am23	CrcMh	0.590	6.70	27.32	3.26		0.00	12.863	
Am24	CrcMh	0.585	3.22	26.13	3.33		0.00	6.277	
Am25	CrcMh	0.588	9.92	27.81	3.22		0.00	18.820	
Am26	CrcMh	0.589	12.00	28.73	3.17		0.00	22.391	
Am27	CrcMh	0.580	4.29	27.05	3.27		-6.51	1.632	SEE NOTE 5
Am28	CrcMh	0.580	4.29	27.05	3.27		-6.51	1.632	
Am29	CrcMh	0.583	7.25	29.63	3.12		-6.51	6.667	
Am30	CrcMh	0.583	7.25	29.63	3.12		-6.51	6.667	
Am31	CrcMh	0.586	19.25	30.46	3.07		-6.51	28.172	
Am32	CrcMh	0.587	20.99	30.61	3.06		-6.51	31.222	
Am33	CrcMh	0.587	20.99	30.61	3.06		-6.51	31.222	
Am34	CrcMh	0.587	21.54	31.02	3.04		-6.51	31.938	
Am35	JctBx	0.591	44.10	31.09	3.04		-6.51	72.615	
Am36	EoxMh	0.593	49.93	32.93	2.94		-4.51	82.674	
Am36A	CrcMh	0.595	48.18	32.27	2.98		-4.51	80.846	
Am36B	EoxMh	0.598	51.03	32.98	2.94		-4.51	85.177	
Am36C	CrcMh	0.800	1.10	25.17	3.40		0.00	2.988	
Am36D	CrcMh	0.000	0.00	0.00	0.00		1.00	1.000	
Am36E	CrcMh	0.800	0.14	22.07	3.62		0.00	0.406	

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. ADDITIONAL FLOWS ARE INPUT DIVERSIONS FROM SPILLERS LANE TO LUMPKIN ROAD(AM27 TO AM37A), FROM LUMPKIN INTO THE WESTVIEW BASIN (AM38A TO A44), FROM LUMPKIN TO THE 7'x5'RCB(AM56), FROM THE 24"RCP HCC SYSTEM TO LUMPKIN ROAD TO MATCH 2D RESULTS AND/OR BALANCE HGL IN A LOOPED SYSTEM (B01 TO BM13 & B02 TO BM08), AND FROM THE EXIST 5'X9' RCB AT IH-10 FRONTAGE ROAD WEST (CM04 TO CM06).

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, PROPOSED CONDITIONS (2 OF 5)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 30 OF 226

No.	DATE	REVISIONS	APP.

pw:\\ladpw.laddo.intl:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\30-001-2-YEAR PROPOSED HOUSTORM&OUTFALL 2 OF 5.dgn 9:12:28 AM MJGuthrie

SYSTEM AB (CONTINUED)

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)	
Am37	BoxMh	0.603	54.76	33.92	2.89		-4.51	91.089	SEE NOTE 7
Am37A	JctBx	0.603	54.76	33.92	2.89		2.00	97.599	
Am38	JctBx	0.616	62.09	34.84	2.85		-41.79	67.232	
Am38A	JctBx	0.613	59.11	34.72	2.86		2.00	105.452	
Am38B	CrcMh	0.616	62.09	34.84	2.85		-41.79	67.232	
Am38C	CrcMh	0.616	62.09	34.84	2.85		-41.79	67.232	
Am39	BoxMh	0.743	13.58	30.12	3.09		0.00	31.201	
Am40	BoxMh	0.743	13.58	30.12	3.09		0.00	31.201	
Am41	BoxMh	0.748	16.80	32.32	2.97		0.00	37.349	
Am42	JctBx	0.645	79.39	35.08	2.84		-41.79	103.604	
Am42E	CrcMh	0.000	0.00	0.00	0.00		0.00	0.000	
Am43	BoxMh	0.749	17.30	33.63	2.91		0.00	37.689	
Am44	JctBx	0.749	17.30	33.63	2.91		0.00	37.689	
Am45	BoxMh	0.645	79.39	35.08	2.84		-41.79	103.604	
Am46	BoxMh	0.613	59.11	34.72	2.86		2.00	105.452	
Am47	BoxMh	0.600	46.77	32.13	2.98		-6.51	77.193	
Am47A	BoxMh	0.595	48.18	32.27	2.98		-6.51	78.846	
Am48	BoxMh	0.606	57.10	34.43	2.87		2.00	101.324	
Am49	BoxMh	0.604	55.81	34.18	2.88		2.00	99.204	
Am55	BoxMh	0.646	80.14	35.31	2.83		-41.79	104.761	
Am56	JctBx	0.645	96.59	38.42	2.69		-96.46	71.295	SEE NOTE 7
Am57D	BoxMh	0.650	83.40	35.61	2.82		-41.79	110.951	
Am58	BoxMh	0.650	85.87	36.28	2.79		-41.79	113.799	
Am59C	BoxMh	0.644	89.81	36.86	2.76		-41.79	117.790	
Am67B	BoxMh	0.644	91.65	38.06	2.71		-41.79	118.142	
Am67C	CrcMh	0.650	1.68	26.15	3.33		0.00	3.650	
Am67D	BoxMh	0.644	92.25	38.14	2.71		-41.79	118.998	
Am68B	BoxMh	0.644	92.79	38.14	2.71		-41.79	119.989	
Am68C	CrcMh	0.650	0.44	23.87	3.49		0.00	1.002	
Am75	BoxMh	0.645	97.06	38.65	2.69		-96.46	71.775	
Am90	BoxMh	0.645	96.80	38.47	2.69		-96.46	71.668	
Am92	BoxMh	0.603	54.71	33.92	2.89		-4.51	91.017	
Am93	BoxMh	0.602	53.63	33.62	2.91		-4.51	89.460	
Am94	BoxMh	0.602	52.97	33.08	2.94		-4.51	89.050	
Am94B	BoxMh	0.593	49.93	32.93	2.94		-4.51	82.674	
B00	CrcMh	0.650	1.17	25.28	3.39		0.00	2.576	SEE NOTE 7
B01	CrcMh	0.650	2.71	26.40	3.31		-1.68	4.161	
B01A	CrcMh	0.650	3.56	26.61	3.30		-1.68	5.961	
B02	CrcMh	0.660	4.40	27.56	3.24		-5.54	3.868	
B03	CrcMh	0.674	4.91	27.90	3.22		-5.54	5.121	
B03A	CrcMh	0.684	5.31	28.36	3.19		-5.54	6.052	
B04	CrcMh	0.699	6.13	28.82	3.16		-5.54	8.027	
B05	CrcMh	0.705	6.49	30.30	3.08		-5.54	8.555	
B06	CrcMh	0.708	6.71	31.49	3.02		-5.54	8.794	
B08	Curb	0.800	0.22	22.66	3.58		0.00	0.629	
B08A	Curb	0.800	0.21	22.60	3.58		0.00	0.602	
B09	Curb	0.800	0.54	23.97	3.48		0.00	1.503	
B09A	Curb	0.800	0.64	24.24	3.46		0.00	1.771	
B09C	Curb	0.900	0.40	23.51	3.51		0.00	1.265	
B09D	Curb	0.900	0.10	21.67	3.65		0.00	0.329	
B10	Curb	0.800	0.19	22.46	3.59		0.00	0.546	
B10A	Curb	0.800	0.24	22.78	3.57		0.00	0.685	
B10B	Curb	0.900	0.04	20.67	3.74		0.00	0.135	
B10C	Curb	0.900	0.06	21.09	3.70		0.00	0.200	
B12	Curb	0.800	0.08	21.41	3.68		0.00	0.235	
B14	Curb	0.800	1.06	24.00	3.48		0.00	2.949	
Bm04	CrcMh	0.000	0.00	0.00	0.00		0.00	0.000	
Bm07	CrcMh	0.708	6.71	31.49	3.02		-5.54	8.794	SEE NOTE 7
Bm08	BoxMh	0.646	97.49	38.65	2.69		-92.60	76.558	
Bm09	BoxMh	0.649	99.20	39.11	2.67		-90.93	80.726	
Bm10	BoxMh	0.647	97.92	38.65	2.69		-90.93	79.157	
Bm11	BoxMh	0.652	100.84	39.50	2.65		-90.93	83.356	
Bm13	BoxMh	0.646	97.49	38.65	2.69		-90.93	78.233	
Bm14	Junct	0.652	100.84	39.50	2.65		-90.93	83.356	
Bm20	Junct	0.650	99.70	39.50	2.65		-90.93	80.938	
Bm21	Junct	0.647	98.02	38.65	2.69		-90.93	79.399	
C05	Grate	0.800	0.53	23.94	3.48		0.00	1.476	
Cm06	Junct	0.655	107.55	39.66	2.64		-65.46	120.957	
OUT	JctBx	0.655	107.55	39.66	2.64		-65.46	120.957	

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	A15	Am12	81.70	81.13	Cir 1	0.00	2.00	36.4	1.567	0.013	
10	Am02	Am03	83.20	82.96	Cir 1	0.00	2.00	131.6	0.182	0.013	
100	A24	Am19	82.14	82.02	Cir 1	0.00	2.00	16.2	0.741	0.013	
106	Am34	Am35	72.50	72.37	Box 1	6.00	3.00	23.1	0.563	0.015	
108	Am36	Am94B	71.18	71.16	Box 1	11.0	4.00	20.0	0.100	0.015	
109	Am17	A22	82.35	82.25	Cir 1	0.00	2.00	24.0	0.417	0.013	
11	A23	Am18	84.62	84.37	Cir 1	0.00	2.00	22.5	1.111	0.013	SEE NOTE 6
110	Am04	Am05	82.82	82.79	Cir 1	0.00	2.00	17.4	0.172	0.013	
111	A44	Am38C	66.26	66.25	Cir 1	0.00	4.44	1.0	1.000	0.013	SEE NOTE 8
117	A57	Am57D	79.89	79.27	Cir 1	0.00	2.00	41.0	1.512	0.013	
118	A16	A17	81.53	81.41	Cir 1	0.00	2.00	23.0	0.522	0.013	
119	A17	Am13	81.41	81.38	Cir 1	0.00	2.00	4.9	0.610	0.013	
12	A21	Am17	84.62	84.37	Cir 1	0.00	2.00	30.2	0.828	0.013	
123	Am59C	Am67B	65.26	65.15	Box 1	10.0	6.00	249.0	0.046	0.015	
126	A68	Am68C	79.34	78.78	Cir 1	0.00	1.00	51.6	1.085	0.013	
129	A54	Am56	77.04	74.50	Cir 2	0.00	2.50	273.6	0.928	0.013	
13	B12	Bm14	69.99	69.60	Cir 1	0.00	2.00	5.0	7.824	0.013	
130	Am14	Am15	80.12	79.10	Cir 1	0.00	3.50	243.1	0.420	0.013	
133	A13	Am11	82.34	82.20	Cir 1	0.00	2.00	21.1	0.665	0.013	

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	
139	Am30	Am31	78.38	78.09	Cir 1	0.00	2.50	162.9	0.178	0.013	
14	B14	Bm14	70.09	69.91	Cir 1	0.00	2.00	13.0	1.385	0.013	
141	A37	A37	80.12	80.08	Cir 1	0.00	2.00	23.7	0.169	0.013	
142	A38	Am32	80.08	80.06	Cir 1	0.00	2.00	16.6	0.120	0.013	
143	Am31	Am32	77.04	77.02	Cir 1	0.00	5.00	30.0	0.067	0.013	
144	Am32	Am33	77.02	76.91	Cir 1	0.00	5.00	191.5	0.057	0.013	
145	Am33	Am34	76.91	75.13	Cir 1	0.00	5.00	207.5	0.858	0.013	
149	Am38	Am42	65.87	65.82	Box 1	7.00	4.00	60.0	0.083	0.013	
15	Bm11	Cm06	64.40	64.39	Cir 2	0.00	3.90	34.5	0.029	0.013	SEE NOTE 6
150	Am40	Am41	72.03	71.86	Box 1	7.00	6.00	330.0	0.052	0.015	
151	Am42	Am45	65.47	65.45	Box 1	10.0	5.00	55.0	0.036	0.015	
152	Am45	Am55	65.45	65.42	Box 1	10.0	6.00	50.0	0.060	0.015	
153	Am57D	Am58	65.39	65.32	Box 1	10.0	6.00	140.0	0.050	0.015	
156	A47	A48	77.31	77.26	Cir 1	0.00	2.00	26.0	0.192	0.013	
157	A48	Am39	77.26	77.21	Cir 1	0.00	2.00	24.0	0.208	0.013	
158	A49	Am39	79.07	79.02	Cir 1	0.00	2.00	50.0	0.100	0.013	
159	Am39	Am40	72.06	72.03	Box 1	7.00	6.00	70.0	0.043	0.015	
160	Am41	Am43	71.86	71.77	Box 1	7.00	6.00	200.0	0.045	0.015	
161	Am43	Am44	71.77	71.71	Box 1	7.00	6.00	133.0	0.045	0.015	
162	A50	Am41	79.05	78.98	Cir 1	0.00	2.00	21.0	0.333	0.013	
163	A51	Am41	79.00	78.93	Cir 1	0.00	2.00	47.8	0.146	0.013	
164	A52	Am43	79.21	79.17	Cir 1	0.00	2.00	21.0	0.190	0.013	
165	A53	Am43	79.16	79.12	Cir 1	0.00	2.00	44.3	0.090	0.013	
166	Am44	Am42	69.00	68.50	Box 1	8.00	5.00	42.0	1.191	0.015	
181	A63	A63C4	82.50	82.30	Cir 1	0.00	1.00	61.3	0.326	0.013	
187	Am36A	Am36	71.43	71.18	Box 1	11.0	4.00	175.0	0.143	0.015	
188	Am36D	Am36A	79.50	79.00	Cir 1	0.00	2.00	12.0	4.170	0.015	
189	A42C	Am92	79.96	79.64	Cir 1	0.00	2.00	6.0	5.341	0.013	
191	A45A	Am48	79.83	79.75	Cir 1	0.00	2.00	6.0	1.333	0.013	
203	A55	Am55	79.93	79.35	Cir 1	0.00	2.00	29.0	2.000	0.013	
205	A27	Am22	81.42	81.11	Cir 1	0.00	2.00	27.6	1.123	0.013	
22	Am12	Am13	81.13	80.38	Cir 1	0.00	3.00	233.6	0.321	0.013	
230	Am29	Am30	78.73	78.38	Cir 1	0.00	2.50	192.4	0.182	0.013	
241	Bm09	Bm20	64.55	64.51	Box 2	8.00	8.00	65.0	0.062	0.015	
242	B09	Bm09	70.27	70.11	Cir 1	0.00	2.00	4.0	4.003	0.013	
243	B09A	Bm09	70.38	70.03	Cir 1	0.00	2.00	14.0	2.501	0.013	
244	Bm10	Bm21	64.63	64.59	Box 2	8.00	8.00	80.0	0.050	0.015	
245	B10	Bm10	70.26	70.07	Cir 1	0.00	2.00	4.0	4.755	0.013	
246	B10A	Bm10	70.45	70.11	Cir 1	0.00	2.00	14.0	2.429	0.013	
247	Bm13	Bm10	64.78	64.63	Box 2	8.00	8.00	300.0	0.050	0.015	
248	B08	Bm08	75.03	74.91	Cir 1	0.00	2.00	6.0	2.000	0.013	
249	B08A	Bm08	75.03	74.71	Cir 1	0.00	2.00	16.0	2.000	0.013	
250	Bm08	Bm13	64.80	64.77	Box 2	8.00	8.00	40.0	0.075	0.015	
251	Am75	Bm08	65.03	64.80	Box 2	8.00	8.00	476.0	0.048	0.015	
252	Am90	Am75	65.04	65.03	Box 2	8.00	8.00	25.0	0.040	0.015	
253	Am56	Am90	65.05	65.04	Cir 1	0.00	3.90	19.0	0.053	0.013	SEE NOTE 6
254	Am68B	Am56	65.10	65.05	Box 1	10.0	6.00	53.0	0.038	0.015	
256	Am67B	Am67D	65.15	65.14	Box 1	10.0	6.00	15.0	0.033	0.015	
257	Am67C	A68D	77.00	76.75	Cir 1	0.00	2.00	7.0	3.574	0.013	
258	A67	Am67C	79.72	79.43	Cir 1	0.00	1.25	50.0	0.580	0.013	
259	A59B	Am59C	78.67	78.35	Cir 1	0.00	2.00	14.0	2.286	0.013	
260	A59A	Am59C	78.99	78.35	Cir 1	0.00	2.00	25.0	2.561	0.013	
261	A63C4	A59A	79.19	78.99	Cir 1	0.00	2.00	16.0	1.250	0.013	
262	A58	Am58	79.70	78.96	Cir 1	0.00	2.00	37.0	2.000	0.013	
263	Am58	Am59C	65.32	65.26	Box 1	10.0	6.00	120.0	0.050	0.015	
264	A56	Am55	79.93	79.85	Cir 1	0.00	2.00	6.0	1.333	0.013	
265	Am55	Am57D	65.42	65.39	Box 1	10.0	6.00	60.0	0.050	0.015	
270	Am46	Am38A	70.37	70.00	Box 1	11.0	4.00	126.0	0.294	0.015	
271	Am37A	Am49	70.66	70.54	Box 1	11.0	4.00	76.0	0.158	0.015	
272	Am37	Am37A	70.79	70.66	Box 1	11.0	4.00	48.0	0.271	0.015	
274	Am35	Am47	71.90	71.57	Box 1	11.0	4.00	257.0	0.128	0.015	
275	A46	Am46	79.61	79.53	Cir 1	0.00	2.00	6.0	1.333	0.013	
276	A45	Am46	79.61	79.57	Cir 1	0.00	2.00	6.0	0.667	0.013	
277	A42A	Am36	78.80	78.60	Cir 1	0.00	2.00	5.0	4.003	0.013	
278	A43	Am36	78.80	78.74	Cir 1	0.00	2.00	6.0	1.000	0.013	
279	A41	Am47	78.99	78.91	Cir 1	0.00	2.00	2.0	4.003	0.013	
280	A42	Am47	79.03	78.69	Cir 1	0.00	2.00	4.0	8.531	0.013	
281	Am47	Am47A	71.57	71.53	Box 1	11.0	4.00	33.0	0.121	0.015	
294	Am93	Am92	70.91	70.81	Box 1	11.0	4.00	80.0	0.125	0.015	
295	A42B	Am94	79.02	78.80	Cir 1	0.00	2.00	7.0	3.144	0.013	
296	A43B	Am93	79.63	79.57	Cir 1	0.00	2.00	6.0	1.000	0.013	
3	A05	A06	84.28	84.25	Cir 1	0.00	2.00	27.3	0.110	0.013	
300	Am94	Am93	71.10	70.91	Box 1	11.0	4.00	143.0	0.133	0.015	
301	Am92	Am37	70.81	70.79	Box 1	11.0	4.00	71.0	0.028	0.015	
302	A46A	Am48	79.83	79.75	Cir 1	0.00	2.00	6.0	1.333	0.013	
304	Am48	Am46	70.44	70.37	Box 1	11.0	4.00	72.0	0.097	0.015	
305	A46B	Am49	80.04	79.98	Cir 1	0.00	2.00	6.0	1.000	0.013	
306	Am49	Am48	70.54	70.44	Box 1	11.0	4.00	71.0	0.141	0.015	
311	Am47A	Am36A	71.53	71.43	Box 1	11.0	4.00	63.2	0.158	0.015	
314	A42D	Am47A	79.38	78.78	Cir 1	0.00	2.00	30.0	2.000	0.013	
315	A43A	Am37	79.30	79.20	Cir 1	0.00	2.00	6.0	1.667	0.013	
316	A43C	Am94	78.87	78.80	Cir 1	0.00	2.00	6.0	1.167	0.013	
317	C05	B14	71.66	71.62	Cir 1	0.00	2.00	10.0	0.400	0.013	
318	Bm14	Bm11	64.41	64.40	Box 2	8.00	8.00	24.0	0.042	0.015	
32	Am15	Am16	79.10	77.73	Cir 1	0.00	3.50	283.4	0.483	0.013	
320	A74A	Am75	75.52	75.20	Cir 1	0.00	2.00	16.0	2.000	0.013	
321	A74B	Am75	75.52	75.20	Cir 1	0.00	2.00	6.0	5.341	0.013	
323	Am68C	A67C	76.53	76.32	Cir 1	0.00	2.00	16.0	1.313	0.013	
324	A67C	Am68B	76.32	76.11	Cir 1	0.00	2.00	6.0	3.502	0.013	
33	Am13	Am14	80.38	80.12	Cir 1	0.00	3.00	76.7	0.339	0.013	
330	A67D	Am67D	77.11	76.61	Cir 1	0.00	2.00	28.0	1.786	0.013	
331	B06	Bm07	73.47	73.06	Cir 1	0.00	2.50	85.0	0.482	0.013	
332	B05	B06	73.90	73.47	Cir 1	0.00	2.50	247.8	0.174	0.013	
333	B04	B05	73.94	73.90	Cir 1	0.00	2.50	145.0	0.028	0.013	
334	B03A	B04	74.18	73.94	Cir 1	0.00	2.50	100.6	0.239	0.013	
335	B03	B03A	74.46	74.18	Cir 1	0.00	2.00	100.4	0.279	0.013	

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. TAILWATER FOR 2-YR ANALYSIS, SYSTEM AB, IS EQUIVALENT TO THE EXISTING TOP OF BOX OF THE EXISTING 5'X9'RCB UNDERNEATH THE IH-10 WESTBOUND FRONTAGE ROAD, 72.67'.

6. THE 2-24" RCP OUTFALL, RUN 15, 33" RESTRICTOR, RUN 253, AND 36" POND OUTFALL, RUNS 110, 401 AND 402, WERE MODELED WITH EQUIVALENT PIPE SIZES TO MATCH HEAD LOSS OF ACTUAL PIPES IN SYSTEM AB.

7. ADDITIONAL FLOWS ARE INPUT DIVERSIONS FROM SPILLERS LANE TO LUMPKIN ROAD(AM27 TO AM37A), FROM LUMPKIN INTO THE WESTVIEW BASIN (AM38A TO A44), FROM LUMPKIN TO THE 7'x5'RCB(AM56), FROM THE 24"RCP HCC SYSTEM TO LUMPKIN ROAD TO MATCH 2D RESULTS AND/OR BALANCE HGL IN A LOOPED SYSTEM (B01 TO BM13 & B02 TO BM08), AND FROM THE EXIST 5'X9' RCB AT IH-10 FRONTAGE ROAD WEST (CM04 TO CM06).

8. RUN 111 REPRESENTS IMPACT OF DETENTION BASIN. PEAK FLOW EXITS AT NODE AM38C (REDUCED BY -109.47CFS). THEN 60% OF PEAK FLOW (65.68CFS) RE-ENTERS AT A44, WHICH REPRESENTS THE THE 36"RCP OUTFALL OF THE BASIN.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, PROPOSED CONDITIONS
(3 OF 5)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:

SHEET:
31 OF 226

No.	DATE	REVISIONS	APP.

SYSTEM AB (CONTINUED)

Conveyance Configuration Data

Run #	Node US	I.D. DS	FlowLine Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n*value	
336	B02	B03	74.93	74.46	Cir 1	0.00	2.00	87.3	0.538	0.013	
337	B01A	B02	75.24	74.93	Cir 1	0.00	1.50	193.3	0.160	0.013	
338	B01	B01A	77.11	75.24	Cir 1	0.00	1.50	89.0	2.102	0.013	
339	B00	B01	78.34	77.11	Cir 1	0.00	1.00	246.0	0.500	0.013	
350	A45B	Am49	80.08	80.02	Cir 1	0.00	2.00	6.0	1.000	0.013	
38	A39	Am34	81.73	81.71	Cir 1	0.00	2.00	18.6	0.107	0.013	
39	A40	Am35	81.40	81.31	Cir 1	0.00	2.00	72.3	0.125	0.013	
40	A09	Am08	82.78	82.74	Cir 1	0.00	2.00	22.6	0.177	0.013	
400	Am67D	Am68B	65.14	65.07	Box 1	10.0	6.00	116.0	0.060	0.015	
401	Am38B	Am38	66.14	66.12	Cir 1	0.00	4.44	13.0	0.154	0.013	SEE NOTE 6
402	Am38C	Am38B	66.25	66.14	Cir 1	0.00	4.44	70.0	0.157	0.013	
404	Am38A	Am38C	66.60	66.50	Box 1	9.00	5.00	43.0	0.233	0.015	
41	A08	Am07	83.40	83.35	Cir 1	0.00	2.00	14.4	0.347	0.013	
420	Am94B	Am36B	71.16	71.15	Box 1	11.0	4.00	12.5	0.080	0.015	
421	Am36B	Am94	71.15	71.10	Box 1	11.0	4.00	28.0	0.179	0.015	
422	Am36C	Am36B	79.30	78.80	Cir 1	0.00	2.00	26.0	1.923	0.013	
424	Am36E	A42D	83.99	83.27	Cir 1	0.00	0.67	38.4	1.875	0.013	
43	A06	Am03	84.24	84.22	Cir 1	0.00	2.00	5.6	0.357	0.013	
430	Bm07	Cm06	73.06	70.63	Cir 1	0.00	2.50	85.0	2.860	0.013	
431	Cm06	OUT	63.68	63.67	Box 1	5.00	9.00	1.0	1.000	0.013	
432	Bm20	Bm14	64.51	64.41	Box 2	8.00	8.00	211.0	0.047	0.015	
433	B09C	Bm20	70.20	70.00	Cir 1	0.00	2.00	5.0	4.003	0.013	
434	B09D	Bm20	70.50	70.00	Cir 1	0.00	2.00	16.0	3.127	0.013	
435	Bm21	Bm09	64.59	64.55	Box 2	8.00	8.00	75.0	0.053	0.015	
436	B10B	Bm21	70.20	70.00	Cir 1	0.00	2.00	5.0	4.003	0.013	
437	B10C	Bm21	70.50	70.00	Cir 1	0.00	2.00	16.0	3.127	0.013	
438	A90B	Am90	75.71	75.53	Cir 1	0.00	2.00	6.0	3.001	0.013	
439	A90A	Am90	75.71	75.21	Cir 1	0.00	2.00	16.0	3.127	0.013	
44	A07	Am07	83.40	83.35	Cir 1	0.00	2.00	20.0	0.250	0.013	
46	Am05	Am06	82.79	82.75	Cir 1	0.00	2.00	38.0	0.105	0.013	
48	Am03	Am04	82.96	82.82	Cir 1	0.00	2.00	111.2	0.126	0.013	
49	Am06	Am09	82.75	82.68	Cir 1	0.00	2.00	39.6	0.177	0.013	
5	A01	Am01	84.44	84.40	Cir 1	0.00	2.00	42.4	0.094	0.013	
50	A10	Am08	82.78	82.74	Cir 1	0.00	2.00	12.9	0.311	0.013	
500	A68D	Am67B	76.75	76.50	Cir 1	0.00	2.00	7.0	3.574	0.013	
52	A34	A35	80.93	80.89	Cir 1	0.00	2.00	30.2	0.133	0.013	
53	A14	Am11	82.34	82.20	Cir 1	0.00	2.00	81.0	0.173	0.013	
54	A11	Am10	82.87	82.82	Cir 1	0.00	2.00	21.5	0.232	0.013	
55	A12	Am10	82.87	82.82	Cir 1	0.00	2.00	14.8	0.338	0.013	
56	Am08	Am09	82.74	82.68	Cir 1	0.00	2.00	28.5	0.211	0.013	
57	Am07	Am08	83.35	82.74	Cir 1	0.00	2.00	340.3	0.179	0.013	
58	Am09	Am12	81.68	81.13	Cir 1	0.00	3.00	303.1	0.181	0.013	
59	A18	A19	80.39	79.91	Cir 1	0.00	2.00	22.2	2.160	0.013	
6	A02	Am01	84.44	84.40	Cir 1	0.00	2.00	20.9	0.191	0.013	
61	Am10	Am11	82.82	82.20	Cir 1	0.00	2.00	345.1	0.180	0.013	
62	A20	Am16	81.82	81.41	Cir 1	0.00	2.00	17.4	2.352	0.013	
63	Am11	Am12	81.20	81.13	Cir 1	0.00	2.00	27.7	0.253	0.013	
64	A19	Am15	79.91	79.80	Cir 1	0.00	2.00	6.7	1.654	0.013	
65	Am27	Am28	80.09	79.86	Cir 1	0.00	2.00	126.4	0.182	0.013	
67	Am26	Am31	79.19	79.03	Cir 1	0.00	3.00	66.4	0.241	0.013	
68	Am25	Am26	79.68	79.19	Cir 1	0.00	3.00	245.0	0.200	0.013	
69	A35	Am29	80.89	80.80	Cir 1	0.00	2.00	46.7	0.193	0.013	
7	Am01	Am02	84.40	84.35	Cir 1	0.00	2.00	45.4	0.110	0.013	
71	Am24	Am25	80.84	80.77	Cir 1	0.00	2.00	35.4	0.198	0.013	
74	A33	Am27	80.13	80.09	Cir 1	0.00	2.00	17.6	0.227	0.013	
75	A36	Am29	80.93	80.89	Cir 1	0.00	2.00	14.3	0.281	0.013	
76	Am28	Am29	79.86	79.23	Cir 1	0.00	2.00	352.9	0.179	0.013	
79	A32	Am27	80.13	80.09	Cir 1	0.00	2.00	22.4	0.179	0.013	
8	A03	Am02	84.40	84.35	Cir 1	0.00	2.00	48.1	0.104	0.013	
80	A31	Am26	80.22	80.19	Cir 1	0.00	2.00	19.0	0.158	0.013	
81	Am23	Am25	79.87	79.68	Cir 1	0.00	3.00	113.0	0.168	0.013	
82	A30	Am24	80.85	80.84	Cir 1	0.00	2.00	17.0	0.059	0.013	
83	Am22	Am23	80.11	79.87	Cir 1	0.00	3.00	125.4	0.191	0.013	
85	A29	Am24	80.87	80.84	Cir 1	0.00	2.00	21.5	0.140	0.013	
86	A28	Am22	81.17	81.11	Cir 1	0.00	2.00	16.4	0.366	0.013	
87	Am21	Am22	80.82	80.62	Cir 1	0.00	2.50	146.0	0.137	0.013	
88	Am20	Am21	81.39	81.32	Cir 1	0.00	2.00	34.5	0.203	0.013	
9	A04	Am02	84.38	84.35	Cir 1	0.00	2.00	16.0	0.187	0.013	
91	Am19	Am21	82.02	81.42	Cir 1	0.00	2.00	267.8	0.224	0.013	
93	A26	Am20	81.42	81.39	Cir 1	0.00	2.00	14.9	0.201	0.013	
94	A25	Am20	81.42	81.39	Cir 1	0.00	2.00	25.5	0.118	0.013	
95	Am18	A24	82.34	82.14	Cir 1	0.00	2.00	25.0	0.800	0.013	
96	A22	Am19	82.25	82.02	Cir 1	0.00	2.00	23.5	0.979	0.013	
97	Am16	Am35	73.55	73.41	Cir 1	0.00	3.50	44.1	0.317	0.013	

Conveyance Hydraulic Computations. Tailwater = 72.670 (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*	83.10	83.10	86.65	0.008	0.36	1.97	5.19	3.35	2.0	28.4	0.000	
10	85.43	85.14	86.50	0.222	2.00	2.00	3.41	3.41	10.7	9.7	0.000	
100*	82.95	82.95	87.79	0.010	0.46	0.93	4.14	3.46	2.3	19.6	0.000	
106*	75.52	75.51	85.66	0.032	0.91	3.00	5.85	5.55	31.9	133.8	0.000	
108	74.86	74.84	83.45	0.022	1.91	3.68	3.94	2.04	82.7	177.9	0.000	
109	83.00	82.95	86.70	0.008	0.51	0.70	3.30	2.13	2.1	14.7	0.000	
11*	86.37	86.37	86.73	0.006	0.37	2.00	4.49	3.41	1.8	23.9	0.000	SEE NOTE 6
110	84.73	84.64	87.22	0.336	2.00	2.00	4.19	4.19	13.2	9.4	0.000	
111*	73.73	73.73	76.67	0.144	1.90	4.44	11.43	8.08	72.3	190.5	0.000	SEE NOTE 7
117*	81.32	81.27	83.76	0.123	0.73	2.00	7.64	5.04	8.0	27.9	0.000	
118*	82.43	82.42	86.26	0.011	0.51	1.01	3.70	3.49	2.4	16.4	0.000	
119*	82.42	82.42	85.94	0.017	0.55	1.04	4.17	3.73	3.0	17.7	0.000	
12*	86.37	86.37	86.73	0.008	0.43	2.00	4.21	3.39	2.1	20.7	0.000	
123	73.53	73.45	83.77	0.017	3.42	6.00	3.44	1.96	117.8	194.2	0.000	

Conveyance Hydraulic Computations. Tailwater = 72.670 (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)	
126*	79.82	79.78	80.39	0.078	0.35	1.00	4.01	3.26	1.0	3.7	0.000	
129*	77.70	77.00	79.30	0.009	0.54	2.50	5.16	0.81	8.0	79.4	0.000	
13*	72.71	72.71	78.15	0.000	0.09	2.00	4.79	1.80	0.2	63.5	0.000	
130*	81.91	81.59	86.52	0.096	1.71	2.49	6.71	4.28	31.3	65.4	0.000	
133*	83.14	83.14	86.33	0.009	0.46	0.94	3.92	3.38	2.1	18.5	0.000	
139	79.46	79.22	85.61	0.026	1.08	1.13	3.30	3.09	6.7	17.4	0.000	
14*	72.72	72.71	78.15	0.017	0.45	2.00	5.58	3.73	2.9	26.7	0.000	
141	82.12	82.08	85.61	0.006	0.59	2.00	2.27	0.55	1.7	9.3	0.000	
142	82.08	82.06	85.25	0.024	0.94	2.00	2.42	1.12	3.5	7.9	0.000	
143	79.22	79.17	85.59	0.012	2.27	2.27	3.26	3.26	28.2	67.5	0.000	
144	79.17	78.12	85.48	0.014	2.50	2.50	3.18	3.18	31.2	62.7	0.000	
145*	78.12	75.52	86.21	0.014	1.21	1.21	8.47	8.47	31.2	242.3	0.000	
149	73.70	73.67	85.14	0.032	2.33	4.00	4.13	2.40	67.2	108.5	0.000	
15	72.70	72.67	78.73	0.096	3.90	3.90	3.49	3.49	83.4	45.9	0.000	SEE NOTE 6
150	74.02	73.97	83.21	0.003	1.78	2.11	2.50	2.11	31.2	130.0	0.000	
151	73.67	73.66	85.18	0.022	3.44	5.00	3.01	2.07	103.6	132.8	0.000	
152	73.66	73.64	85.80	0.013	2.86	6.00	3.62	1.73	103.6	221.4	0.000	
153	73.62	73.57	85.02	0.015	3.19	6.00	3.48	1.85	111.0	202.1	0.000	
156	79.78	79.51	82.81	1.028	2.00	2.00	7.33	7.33	23.0	10.0	0.000	
157	79.51	79.21	82.76	1.267	2.00	2.00	8.14	8.14	25.6	10.4	0.000	
158	81.04	81.02	83.07	0.070	1.41	2.00	2.55	1.92	6.0	7.2	0.000	
159	74.02	74.02	83.14	0.003	1.90	1.99	2.35	2.24	31.2	118.6	0.000	
160	73.97	73.81	83.06	0.004	2.11	2.11	2.53	2.53	37.3	121.5	0.000	
161	73.81	73.67	83.30	0.004	2.11	2.11	2.55	2.55	37.7	121.7	0.000	
162	81.05	80.98	82.05	0.014	0.61	2.00	3.26	0.85	2.7	13.1	0.000	
163	80.97	80.93	82.00	0.060	1.16	2.00	2.93	1.77	5.6	8.7	0.000	
164	81.21	81.17	84.21	0.001	0.40	2.00	1.93	0.27	0.9	9.9	0.000	
165	81.16	81.12	84.16	0.001	0.39	2.00	1.32	0.18	0.6	6.8	0.000	
166*	73.67	73.67	84.87	0.005	0.65	5.00	7.30	5.33	37.7	576.2	0.000	
181	83.56	83.30	84.50	0.416	1.00	1.00	2.94	2.94	2.3	2.0	0.000	
187	75.08	74.86	83.94	0.021	1.66	3.68	4.42	2.00	80.8	212.7	0.000	
188*	81.00	81.00	84.45	0.003	0.22	2.00	5.40	2.61	1.0	40.2	0.000	
189*	81.64	81.64	84.46	0.011	0.29	2.00	8.44	3.51	2.4	52.5	0.000	
191*	81.75	81.75	84.33	0.002	0.28	2.00	4.12	2.85	1.1	26.2	0.000	
203*	81.35	81.35	84.43	0.000	0.14	2.00	3.18	2.57	0.3	32.1	0.000	
205*	81.93	81.50	86.60	0.023	0.51	0.51	5.43	5.43	3.5	24.1	0.000	
22	83.10	82.42	86.01	0.187	1.97	2.04	5.89	5.65	28.9	38.0	0.000	
230	79.80	79.46	85.27	0.026	1.07	1.08	3.33	3.30	6.7	17.6	0.000	
241	72.85	72.81	78.16	0.002	1.78	8.00	2.83	0.63	80.7	499.3	0.000	
242*	72.85	72.85	77.81	0.004	0.25	2.00	6.64	3.09	1.5	45.5	0.000	
243*	72.85	72.85	77.78	0.006	0.30	2.00	5.92	3.20	1.8	35.9	0.000	
244	72.93	72.89	78.77	0.002	1.89	8.00	2.62	0.62	79.2	450.1	0.000	
245*	72.93	72.93	78.49	0.001	0.15	2.00	5.20	1.34	0.5	49.5	0.000	
246*	72.93	72.93	78.41	0.001	0.19	2.00	4.41	2.35	0.7	35.4	0.000	
247	73.07	72.93	80.69	0.002	1.88	8.00	2.61	0.61	78.2	450.1	0.000	
248*	76.91	76.91	79.53	0.001	0.19	2.00	4.01	2.49	0.6	32.1	0.000	
249*	76.71	76.71	79.53	0.001	0.19	2.00	3.96	2.33	0.6	32.1	0.000	
250	73.10	73.07	79.92	0.001	1.61	8.00	2.97	0.60	76.6	551.3	0.000	
251	73.33	73.10	80.42	0.001	1.78	8.00	2.52	0.56	71.8	442.5	0.000	
252	73.34	73.33	80.62	0.001	1.91	8.00	2.35	0.56	71.7	402.6	0.000	
253	73.39	73.34	80.57	0.280	3.90	3.90	5.97	5.97	71.3	30.9	0.000	SEE NOTE 6
254	73.40	73.39	80.96	0.018	3.75	6.00	3.20	2.00	120.0	175.6	0.000	
256	73.45	73.45	81.86	0.017	3.84	6.00	3.07	1.97	118.1	165.0	0.000	
257*	78.50	78.50	81.41	0.026	0.39	1.75	8.31	3.96	3.6	42.9	0.000	
258	80.81	80.68	81.02	0.317	0.80	1.25	4.39	2.97	3.6	4.9	0.000	
259*	80.35	80.35	83.49	0.000	0.09	2.00	2.55	0.08	0.1	34.4	0.000	
260*	80.37	80.35	83.49	0.077	0.56	2.00	8.64	4.67	6.3	36.4	0.000	
261*	80.38	80.37	85.00	0.069	0.66	1.38	6.58	4.59	6.0	25.4	0.000	
262*	80.98	80.96	84.90	0.054	0.55	2.00	7.53	4.42	5.3	32.1	0.000	
263	73.57	73.53	84.48	0.016	3.28	6.00	3.47	1.90	113.8	202.1	0.000	
264*	81.85	81.85	84.43	0.006	0.36	2.00	4.76	3.26	1.8	26.2	0.000	
265	73.64	73.62	84.65	0.013	3.09	6.00	3.39	1.75	104.8	202.1	0.000	
270	74.16	73.82	84.26	0.035	1.57	3.82	6.12	2.51	105.5	304.9	0.000	
271	74.40	74.30	84.89	0.030	1.83	3.76	4.85	2.36	97.6	223.6	0.000	
272	74.53	74.40	84.88	0.026	1.46	3.74	5.67	2.21	91.1	292.8	0.000	
274	75.51	75.21	86.20	0.017	1.61	3.64	4.10	1.81	72.6	201.6	0.000	
275*	81.53	81.53	84.11	0.016	0.45	2.00	5.49	3.71	2.9	26.2	0.000	
276*	81.57	81.57	84.11	0.013	0.50	2.00	4.14	3.60	2.6	18.6	0.000	
277*	80.60	80.60	83.30	0.006	0.27	2.00	6.97	3.26	1.8	45.5	0.000	
278*	80.74	80.74	83.30	0.004	0.35	2.00	4.06	3.08	1.5	22.7	0.000	
279*	80.91	80.91	83.53	0.027	0.39	2.00	8.71	3.99	3.7	45.5	0.000	
280*	80.69	80.69	83.53	0.018	0.29	2.00	10.69	3.76	3.0	66.4	0.000	
281	75.21	75.17	83.66	0.019	1.70	3.64	4.12	1.93	77.2	195.9	0.000	
294	74.62	74.53	84.13	0.025	1.86	3.72	4.37	2.18	89.5	198.9	0.000	
295*	80.80	80.80	83.53	0.014	0.35	2.00	7.25	3.60	2.7	40.3	0.000	
296*	81.57	81.57	84.13	0.004	0.35	2.00	4.07	3.16	1.5	22.7	0.000	
3	85.17	85.15	86.28	0.008	0.70	0.90	2.01	1.43	2.0	7.5	0.000	
300	74.79	74.62	83.66	0.025	1.82	3.71	4.45	2.18	89.0	205.1	0.000	
301	74.53	74.53	84.59	0.026	3.13	3.74	2.65	2.21	91.0	94.4	0.000	
302*	81.75	81.75	84.33	0.007	0.37	2.00	4.88	3.25	2.0	26.2	0.000	
304	74.21	74.16	84.46	0.032	2.20	3.79	4.18	2.43	101.3	175.4	0.000	
305*	81.98	81.98	84.58	0.001	0.25	2.00	3.31	2.65	0.7	22.7	0.000	
306	74.30	74.21	84.71	0.031	1.92	3.77	4.69	2.39	99.2	211.2	0.000	
311	75.17	75.08	83.69	0.020	1.59	3.65	4.52	1.96	78.8	223.9	0.000	
314*	80.78	80.78	86.03	0.008	0.35	2.00	5.75	3.38	2.1	32.1	0.000	
315*	81.20	81.20	84.76	0.000	0.08	2.00	2.11	0.06	0.1	29.3	0.000	
316*	80.80	80.80	83.53	0.008	0.39	2.00	4.68	3.32	2.0	24.5	0.000	
317	72.75	72.72	77.47	0.004	0.43	1.10	2.94	0.84	1.5	14.4	0.000	
318	72.71	72.70	78.65	0.002	2.09	8.00	2.49	0.65	83.4	410.9	0.000	
32*	81.59	81.23	85.72	0.127	1.78	3.50	7.32	6.93	36.1	70.3	0.000	
320*	77.20	77.20	80.02	0.000	0.15	2.00	3.44	2.26	0.4	32.1	0.000	
321*	77.20	77.20	80.02	0.000	0.12	2.00	4.84	2.26	0.4	52.5	0.000	
323*	78.11	78.11	81.60	0.002	0.27	1.79	3.98	2.61	1.0	26.0	0.000	
324*	78.11	78.11	81.59	0.003	0.24	2.00	6.03	3.03	1.3	42.5	0.000	
33	82.42	81.91	86.37	0.219	2.04	2.04	6.11	6.11	31.3	39.0	0.000	
330*	78.61	78.61	81.62	0.004	0.29	2.00	4.85	3.02	1.4	30.4	0.000	

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. TAILWATER FOR 2-YR ANALYSIS, SYSTEM AB, IS EQUIVALENT TO THE EXISTING TOP OF BOX OF THE EXISTING 5'X9'RCB UNDERNEATH THE IH-10 WESTBOUND FRONTAGE ROAD, 72.67'.

6. THE 2-24" RCP OUTFALL, RUN 15, 33" RESTRICTOR, RUN 253, AND 36" POND OUTFALL, RUNS 110, 401 AND 402, WERE MODELED WITH EQUIVALENT PIPE SIZES TO MATCH HEAD LOSS OF 2D MODELED PIPES IN SYSTEM AB.

7. RUN 111 REPRESENTS IMPACT OF DETENTION BASIN. PEAK FLOW EXITS AT NODE AM38C (REDUCED BY -109.47CFS). THEN 60% OF PEAK FLOW (65.68CFS) RE-ENTERS AT A44, WHICH REPRESENTS THE THE 36"RCP OUTFALL OF THE BASIN.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, PROPOSED CONDITIONS (4 OF 5)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 32 OF 226

pw:\\ladpw.ladco.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\32-001-2-YEAR PROPOSED HOUSTORM&OUTFALL4 OF 5.dgn 9:49 AM MJGuthrie

SYSTEM AB (CONTINUED)

Conveyance Hydraulic Computations. Tailwater = 72.670 (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)
331*	74.42	74.05	78.47	0.046	0.95	0.99	5.11	4.87	8.8	28.6	0.000
332	75.15	74.42	78.73	0.043	1.25	1.25	3.49	3.49	8.6	17.2	0.000
333	75.41	75.15	78.46	0.038	2.50	2.50	1.64	1.64	8.0	6.8	0.000
334	75.59	75.41	78.50	0.022	0.94	1.47	3.57	2.02	6.1	20.1	0.000
335	75.78	75.59	78.56	0.051	0.91	1.41	3.66	2.17	5.1	12.0	0.000
336*	75.80	75.78	78.76	0.029	0.66	1.32	4.31	4.03	3.9	16.7	0.000
337	76.88	75.80	77.48	0.319	1.50	1.50	3.37	3.37	6.0	4.2	0.000
338*	77.89	76.88	79.89	0.156	0.54	1.50	7.34	2.35	4.2	15.3	0.000
339	79.18	77.89	80.84	0.518	0.84	0.84	3.65	3.65	2.6	2.5	0.000
350*	82.02	82.02	84.58	0.006	0.37	2.00	4.23	3.18	1.7	22.7	0.000
38	83.73	83.71	85.13	0.002	0.53	2.00	1.70	0.36	1.1	7.4	0.000
39	83.39	83.31	85.68	0.012	0.77	2.00	2.25	0.80	2.5	8.0	0.000
40	83.98	83.95	86.57	0.003	0.47	1.21	2.06	0.59	1.2	9.5	0.000
400	73.45	73.40	81.87	0.017	3.14	6.00	3.79	1.98	119.0	222.0	0.000
401	73.71	73.70	85.47	0.124	3.30	4.44	5.46	4.34	67.2	74.7	0.000
402	73.73	73.71	84.50	0.124	3.28	4.44	5.49	4.34	67.2	75.5	0.000
404	73.82	73.73	84.78	0.030	1.98	5.00	5.91	2.34	105.5	295.0	0.000
41	84.42	84.38	87.22	0.012	0.58	1.03	3.24	1.52	2.5	13.4	0.000
420	74.84	74.83	83.45	0.022	2.05	3.68	3.67	2.04	82.7	159.2	0.000
421	74.83	74.79	83.54	0.023	1.60	3.69	4.83	2.10	85.2	237.8	0.000
422*	80.80	80.80	85.38	0.017	0.42	2.00	6.30	3.75	3.0	31.5	0.000
424*	84.30	83.94	86.30	0.109	0.22	0.67	3.92	1.15	0.4	1.7	0.000
43	85.15	85.14	86.95	0.014	0.61	0.92	3.37	1.94	2.7	13.6	0.000
430*	74.05	72.67	79.10	0.046	0.60	2.04	9.68	2.05	8.8	69.7	0.000
431*	72.67	72.67	78.50	0.029	1.98	9.00	12.22	9.20	121.0	705.8	0.000
432	72.81	72.71	75.37	0.002	1.97	8.00	2.57	0.63	80.9	438.2	0.000
433*	72.81	72.81	78.01	0.003	0.23	2.00	6.31	2.95	1.3	45.5	0.000
434*	72.81	72.81	78.01	0.000	0.13	2.00	3.85	1.76	0.3	40.2	0.000
435	72.89	72.85	78.41	0.002	1.84	8.00	2.69	0.62	79.4	464.9	0.000
436*	72.89	72.89	78.05	0.000	0.08	2.00	3.20	0.09	0.1	45.5	0.000
437*	72.89	72.89	78.05	0.000	0.10	2.00	3.31	1.34	0.2	40.2	0.000
438*	77.53	77.53	80.21	0.000	0.10	2.00	3.26	1.34	0.2	39.4	0.000
439*	77.21	77.21	80.21	0.000	0.16	2.00	4.34	2.26	0.5	40.2	0.000
44	84.42	84.38	86.61	0.013	0.64	1.03	2.91	1.57	2.5	11.4	0.000
46	84.64	84.44	87.52	0.336	2.00	2.00	4.19	4.19	13.2	7.4	0.000
48	85.14	84.73	87.03	0.336	2.00	2.00	4.19	4.19	13.2	8.1	0.000
49	84.44	83.56	86.97	0.336	2.00	2.00	4.19	4.19	13.2	9.6	0.000
5	85.51	85.47	86.44	0.004	0.60	1.07	1.73	0.80	1.4	7.0	0.000
50	83.98	83.95	87.42	0.004	0.47	1.21	2.71	0.77	1.5	12.7	0.000
500*	78.50	78.50	81.71	0.032	0.42	2.00	8.57	4.09	4.1	42.9	0.000
52	82.92	82.88	86.25	0.002	0.46	1.99	1.76	0.31	1.0	8.3	0.000
53	83.25	83.14	86.33	0.006	0.58	0.94	2.28	1.19	1.7	9.4	0.000
54	83.74	83.70	87.01	0.009	0.60	0.88	2.69	1.60	2.1	11.0	0.000
55	83.74	83.70	87.01	0.006	0.49	0.88	2.89	1.29	1.7	13.2	0.000
56	83.95	83.56	86.53	0.105	1.24	1.24	3.58	3.58	7.3	10.4	0.000
57	84.38	83.95	86.30	0.048	1.03	1.21	3.08	2.52	5.0	9.6	0.000
58	83.56	83.10	87.07	0.093	1.88	1.97	4.38	4.16	20.4	28.5	0.000
59*	81.60	81.59	85.38	0.010	0.35	1.68	6.06	3.47	2.3	33.4	0.000
6	85.51	85.47	86.44	0.001	0.34	1.07	1.76	0.37	0.6	9.9	0.000
61	83.70	83.14	86.16	0.028	0.88	0.94	2.88	2.64	3.8	9.6	0.000
62*	83.41	83.41	84.81	0.019	0.41	2.00	6.87	3.80	3.2	34.8	0.000
63	83.14	83.10	85.87	0.105	1.17	1.97	3.85	2.36	7.4	11.4	0.000
64*	81.59	81.59	84.90	0.059	0.59	1.79	7.13	4.48	5.5	29.2	0.000
65	80.65	80.42	84.96	0.005	0.56	0.56	2.28	2.27	1.6	9.7	0.000
67	81.01	79.22	85.22	0.112	1.82	1.82	4.98	4.98	22.4	32.9	0.000
68	81.41	81.01	86.16	0.079	1.73	1.82	4.46	4.19	18.8	30.0	0.000
69	82.88	82.80	86.21	0.016	0.74	2.00	2.74	0.92	2.9	10.0	0.000
7	85.47	85.43	86.50	0.008	0.70	1.08	2.01	1.14	2.0	7.5	0.000
71	81.98	81.41	85.83	0.076	1.14	1.14	3.38	3.38	6.3	10.1	0.000
74	80.86	80.65	85.45	0.018	0.73	0.73	2.95	2.95	3.1	10.8	0.000
75	82.93	82.89	86.40	0.017	0.68	2.00	3.17	0.95	3.0	12.0	0.000
76	80.42	79.80	85.48	0.005	0.56	0.57	2.27	2.21	1.6	9.6	0.000
79	81.12	80.65	86.02	0.052	1.05	1.05	3.11	3.11	5.2	9.6	0.000
8	85.59	85.43	86.48	0.058	1.29	1.29	2.55	2.55	5.5	7.3	0.000
80	81.12	81.01	85.73	0.032	0.95	0.95	2.78	2.78	4.1	9.0	0.000
81	81.44	81.41	85.88	0.037	1.45	1.73	3.81	3.05	12.9	27.5	0.000
82	81.98	81.98	86.50	0.017	1.05	1.14	1.77	1.59	2.9	5.5	0.000
83	81.50	81.44	86.08	0.037	1.39	1.57	4.00	3.44	12.9	29.3	0.000
85	81.99	81.98	86.50	0.022	0.88	1.14	2.54	1.83	3.4	8.5	0.000
86	81.55	81.50	87.07	0.000	0.26	0.39	2.04	1.09	0.5	13.7	0.000
87	82.22	81.50	86.68	0.050	1.40	1.40	3.24	3.24	9.2	15.2	0.000
88	82.34	82.22	86.15	0.043	0.95	0.95	3.18	3.18	4.7	10.2	0.000
9	85.45	85.43	86.38	0.023	0.82	1.08	2.85	2.01	3.5	9.8	0.000
91	82.95	82.22	87.18	0.043	0.93	0.93	3.30	3.30	4.7	10.8	0.000
93	82.37	82.34	87.07	0.011	0.66	0.95	2.63	1.60	2.4	10.2	0.000
94	82.36	82.34	86.35	0.011	0.75	0.95	2.16	1.58	2.3	7.8	0.000
95*	82.95	82.95	88.34	0.006	0.41	0.81	3.99	3.41	1.8	20.3	0.000
96*	82.95	82.95	87.22	0.012	0.45	0.93	4.69	3.55	2.5	22.5	0.000
97	75.67	75.51	84.96	0.145	2.12	2.12	6.34	6.34	38.5	56.9	0.000

SEE NOTE 6

* 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	113	3944.35
Box	Concrete	8.0	8.0	9	2592.0
Circular	Concrete	1.25	0.0	1	50.0
Circular	Concrete	3.9	0.0	2	88.0
Box	Concrete	6.0	10.0	8	803.0
Box	Concrete	4.0	11.0	15	1275.65
Circular	Concrete	1.0	0.0	3	358.93
Circular	Concrete	2.5	0.0	9	1711.9
Circular	Concrete	3.0	0.0	7	1163.17
Circular	Concrete	3.5	0.0	3	570.61
Box	Concrete	4.0	7.0	1	60.0
Box	Concrete	5.0	10.0	1	55.0
Box	Concrete	3.0	6.0	1	23.1
Circular	Concrete	1.5	0.0	2	282.3
Box	Concrete	6.0	7.0	4	733.0
Circular	Concrete	4.44	0.0	3	84.0
Circular	Concrete	5.0	0.0	3	429.0
Circular	Concrete	0.67	0.0	1	38.4
Box	Concrete	9.0	5.0	1	1.0
Box	Concrete	5.0	9.0	1	43.0
Box	Concrete	5.0	8.0	1	42.0

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	100
Curb On Grade		5.0	0.0	0.0	0.0	0.0	16
Junction Box		0.0	0.0	0.0	0.0	0.0	8
Box Manhole		0.0	0.0	0.0	0.0	0.0	31
Curb In Sag		5.0	0.0	0.0	0.0	0.0	18
Grate In Sag	Parallel	0.0	0.0	0.0	6.25	10.0	6
Curb On Grade		8.0	0.0	0.0	0.0	0.0	6
Conduit Junction		0.0	0.0	0.0	0.0	0.0	4
Area Inlet (Type E)		17.32	0.0	0.0	0.0	0.0	3

END

NORMAL TERMINATION OF HOUSTORM.

Warning Messages for current project:

Runoff Frequency of: 2 Years
Discharge decreased downstream node Id= Am67C Previous intensity used.
Discharge decreased downstream node Id= Am68C Previous intensity used.
Discharge decreased downstream node Id= Am28 Previous intensity used.
Discharge decreased downstream node Id= Am40 Previous intensity used.
Discharge decreased downstream node Id= Am18 Previous intensity used.
Discharge decreased downstream node Id= Am17 Previous intensity used.
Discharge decreased downstream node Id= Am30 Previous intensity used.
Discharge decreased downstream node Id= Am44 Previous intensity used.
Decreasing conduit size @ downstream Run# 166
Discharge decreased downstream node Id= Am04 Previous intensity used.
Discharge decreased downstream node Id= Am05 Previous intensity used.
Discharge decreased downstream node Id= Am06 Previous intensity used.
Discharge decreased downstream node Id= Am14 Previous intensity used.
Discharge decreased downstream node Id= Am23 Previous intensity used.
Discharge decreased downstream node Id= Am33 Previous intensity used.
Decreasing conduit size @ downstream Run# 106
Discharge decreased downstream node Id= Am36A Previous intensity used.
Discharge decreased downstream node Id= Am94B Previous intensity used.
Discharge decreased downstream node Id= Bm07 Previous intensity used.
Discharge decreased downstream node Id= Am37 Previous intensity used.
Discharge decreased downstream node Id= Am37A Previous intensity used.
Discharge decreased downstream node Id= Am38A Previous intensity used.
Decreasing conduit size @ downstream Run# 402
Discharge decreased downstream node Id= Am38B Previous intensity used.
Discharge decreased downstream node Id= Am38 Previous intensity used.
Decreasing conduit size @ downstream Run# 149
Discharge decreased downstream node Id= Am45 Previous intensity used.
Discharge decreased downstream node Id= Am68B Previous intensity used.
Decreasing conduit size @ downstream Run# 253
Discharge decreased downstream node Id= Bm08 Previous intensity used.
Discharge decreased downstream node Id= Bm13 Previous intensity used.
Discharge decreased downstream node Id= Bm10 Previous intensity used.
Discharge decreased downstream node Id= Bm21 Previous intensity used.
Discharge decreased downstream node Id= Bm14 Previous intensity used.
Discharge decreased downstream node Id= Bm11 Previous intensity used.
Decreasing conduit size @ downstream Run# 15
Capacity of grade inlet exceeded at inlet Id= A45B ACCEPTABLE AS IT IS AN ON-GRADE INLET
Run# 15 Insufficient capacity. PROPOSED RESTRICTOR
Run# 333 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
Run# 337 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
Run# 339 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 249
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 248
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 320
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 321
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 438
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 439
Run# 253 Insufficient capacity. PROPOSED RESTRICTOR
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 129
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 324
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 330
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 500
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 259
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 260
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 126
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 262
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 258
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 117
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 181
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 203
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 264
Run# 181 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 164
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 165
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 275
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 276
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 162
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 163
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 302
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 191
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 305
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 350
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 157
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 158
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 315
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 189
Run# 157 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 296
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 295
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 316
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 422
Run# 156 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 277
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 278
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 188
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 314
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 280
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 279
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 424
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 39
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 32
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 62
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 38
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 142
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 69
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 75
Run# 49 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
Run# 46 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 11
HGL elevation below invert. Downstream HGL set to soffit elevation at Run# 12
Run# 110 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
Run# 48 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS
Run# 10 Insufficient capacity. EXIST-OUTSIDE PROJECT LIMITS

NOTES:

1. SEE PAVEMENT AND STORM SEWER SHEETS FOR MORE INFORMATION.

2. ALL STORM SEWER LENGTHS ARE BASED ON CENTER OF STRUCTURE (HYDRAULIC LENGTH) EXCEPT AT BOX CULVERT LATERALS WHERE INSIDE EDGE OF BOX CULVERT OR JUNCTION BOX IS LIMIT OF PIPE.

3. COST FOR CONNECTION TO EXISTING STORM SEWERS WILL BE SUBSIDIARY TO STRUCTURE.

4. VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. ENGINEER OF RECORD HAS REVIEWED ALL THE WARNING MESSAGES AND THEY ARE ACCEPTABLE WITHIN THE COH GUIDELINES.

6. THE 2-24" RCP OUTFALL, RUN 15, 33" RESTRICTOR, RUN 253, AND 36" POND OUTFALL, RUNS 110, 401 AND 402, WERE MODELED WITH EQUIVALENT PIPE SIZES TO MATCH HEAD LOSS OF 2D MODELED PIPES IN SYSTEM AB.

No.	DATE	REVISIONS	APP.

9-12-14

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

2-YEAR HOUSTORM OUTPUT, PROPOSED CONDITIONS (5 OF 5)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 33 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-01-Drawings\4-01-Production\4-01-Drawings\33-001-2-YEAR PROPOSED HOUSTORM.dgn 8/28/2015 5:19:59 PM MJGuthrie

STORM SYSTEM AB 100-YEAR INFOWORKS 2D MODEL HYDRAULIC DATA

NODE ID	EXIST WSE (FT)	PROP. 100-YR WSE (FT)	DIFF. (FT)	ALLOW. MPE (FT)	DS FLOW (CFS)	NOTES
Am02	88.28	88.21	-0.07	87.85	17.76	HAZELHURST AND MAPLETON
Am07	87.49	87.44	-0.05	87.30	11.50	IVYRIDGE
Am09	87.49	87.46	-0.03	87.55	36.88	IVYRIDGE AND MAPLETON
Am10	86.93	86.83	-0.10	87.23	10.11	MAYFIELD
Am12	86.93	86.69	-0.24	87.30	59.20	MAYFIELD AND MAPLETON
Am14	86.60	85.45	-1.15	86.60	66.56	NORTHBROOK AND MAPLETON
Am15	86.45	85.70	-0.75	86.35	65.94	NORTHBROOK
Am16	86.44	84.51	-1.93	86.20	80.64	NORTHBROOK AND LUMPKIN
Am19	87.49	87.49	0.00	87.95	14.08	NORTHBROOK AND SPILLERS
Am20	87.13	86.97	-0.16	87.40	13.17	IVYRIDGE AND SPILLERS
Am21	87.13	86.95	-0.18	87.40	14.06	IVYRIDGE AND SPILLERS
Am22	86.97	86.76	-0.21	87.40	25.53	SPILLERS
Am24	86.71	86.42	-0.29	86.80	20.30	SPILLERS AND MAYFIELD
Am25	86.70	86.41	-0.29	87.35	38.60	SPILLERS AND MAYFIELD
Am26	86.53	85.86	-0.67	86.60	58.17	SPILLERS
Am27	87.01	86.39	-0.62	86.10	-14.73	SPILLERS CUL-DE-SAC
Am28	87.01	86.39	-0.62	86.40	-14.73	SPILLERS
Am29	87.01	86.67	-0.34	86.71	17.50	SPILLERS AND BRINWOOD
Am30	86.64	86.46	-0.18	86.80	16.52	SPILLERS
Am31	86.49	85.90	-0.59	86.94	83.69	SPILLERS AND NORTHBROOK
Am33	86.47	84.54	-1.93	86.30	96.42	NORTHBROOK
Am34	86.44	85.38	-1.06	86.00	94.99	NORTHBROOK AND LUMPKIN
Am35	86.44	83.26	-3.18	86.60	185.02	NORTHBROOK AND LUMPKIN
Am36	84.22	84.35	0.13	84.93	225.32	LUMPKIN - SEE NOTE 6
Am37	84.20	82.46	-1.74	85.12	223.96	LUMPKIN
Am37A	84.49	82.46	-2.03	85.00	275.59	LUMPKIN
Am38	84.04	82.79	-1.25	84.40	80.63	LUMPKIN
A44	81.23	84.10	2.87	86.00	71.77	WESTVIEW BASIN - SEE NOTE 6
Am39	84.04	83.94	-0.10	83.15	56.92	WESTVIEW
Am40	84.04	83.94	-0.10	83.28	56.81	WESTVIEW
Am41	84.02	83.93	-0.09	83.70	56.73	WESTVIEW
Am42	81.67	80.72	-0.95	86.86	111.36	WESTVIEW AND LUMPKIN
Am43	84.10	84.06	-0.04	84.70	71.77	WESTVIEW
Am44	82.74	80.72	-2.02	85.60	72.96	WESTVIEW

NODE ID	EXIST WSE (FT)	PROP. 100-YR WSE (FT)	DIFF. (FT)	ALLOW. MPE (FT)	DS FLOW (CFS)	NOTES
Am45	84.91	80.69	-4.22	86.00	111.36	LUMPKIN
Am46	84.74	84.18	-0.56	84.69	274.82	LUMPKIN
Am47	85.59	84.60	-0.99	84.68	184.84	LUMPKIN
Am47A	86.16	84.57	-1.59	84.68	225.22	LUMPKIN
Am48	84.74	84.21	-0.53	85.40	275.54	LUMPKIN
Am49	84.74	84.21	-0.53	85.70	224.22	LUMPKIN
Am55	85.11	80.67	-4.44	85.60	111.34	LUMPKIN
Am56	81.00	81.00	0.00	82.90	129.84	LUMPKIN
Am57D	85.04	80.65	-4.39	84.50	111.55	LUMPKIN
Am58	85.09	84.35	-0.74	84.80	115.89	LUMPKIN
Am59	79.14	78.91	-0.23	80.11	41.40	84"RCP
Am59C	83.08	83.02	-0.06	84.20	111.39	LUMPKIN
Am61	79.59	75.94	-3.65	79.40	69.95	84"RCP
Am62	79.01	78.76	-0.25	79.66	70.32	84"RCP
Am63	78.97	75.74	-3.23	79.66	86.62	84"RCP
Am67B	82.08	80.52	-1.56	82.40	126.36	LUMPKIN
Am67C	82.08	80.52	-1.56	83.55	2.80	LUMPKIN
Am68B	81.04	80.82	-0.22	82.30	127.81	LUMPKIN
Am68C	81.04	80.82	-0.22	82.00	5.13	LUMPKIN
Am74	79.14	78.71	-0.43	82.90	41.36	84"RCP
Am75	79.65	78.61	-1.04	80.80	44.60	LUMPKIN
A86	77.89	77.60	-0.29	77.30	107.50	84"RCP
Am90	80.48	80.56	0.08	80.80	44.59	LUMPKIN
Am92	84.48	84.55	0.07	85.60	77.53	LUMPKIN
Am93	83.55	84.50	0.95	84.93	147.04	LUMPKIN
Am94	83.95	84.50	0.55	84.93	77.88	LUMPKIN
Bm08	79.36	80.20	0.84	80.58	45.88	LUMPKIN
Bm09	77.44	78.15	0.71	78.35	45.68	LUMPKIN
Bm10	78.56	78.63	0.07	79.15	44.87	LUMPKIN
Bm14	77.48	78.16	0.68	78.70	45.64	LUMPKIN
OUT	74.55	71.34	-3.21	79.20	45.74	PROPOSED OUTFALL SYSTEM AB AT LUMPKIN
Am64	76.75	75.29	-1.46	80.20	132.73	EXISTING OUTFALL SYSTEM A, 84"
Cm06	74.55	74.52	-0.03	78.00	45.75	EXISTING OUTFALL SYSTEM B

NOTES:

1. THE TAILWATER USED FOR THE 100-YR ANALYSIS WAS 2-FT ABOVE THE TOP OF BOX (2-10'x10' CULVERTS DOWNSTREAM OF LUMPKIN ROAD). ACTUAL TAILWATERS FROM THE TXDOT IH-10 STUDY WERE REVIEWED, HOWEVER THE RELATIVELY HIGH ELEVATIONS WERE NOT REASONABLE TO EVALUATE HYDRAULICS VS. COH CRITERIA. THEREFORE THE OPTIONAL TAILWATER OF 2-FT ABOVE THE PIPE SOFFIT WAS USED AS PER COH "CONSIDERATIONS FOR CIP PROJECTS" GUIDELINES, NOVEMBER 2009.
2. HYDRAULIC DATA FROM INFOWORKS SD 2D MODEL
3. ALLOWABLE MPE BASED ON THE MINIMUM OF THE LOWEST ROW ELEVATION OR MAXIMUM PONDING DEPTHS AS PER CITY IDM 2013.
4. DRAINAGE SYSTEMS C, D, E, AND F SHOWN ON THE OVERALL DRAINAGE AREA MAPS DO NOT DRAIN DIRECTLY TO LUMPKIN SYSTEM HOWEVER WERE MODELED TO EVALUATE OVERLAND STORM FLOWS IN THE REGION. DATA FOR THESE IS NOT INCLUDED IN THIS TABLE FOR CLARITY.
5. SEE "LUMPKIN ROAD DRAINAGE IMPACT STUDY" MAY 2014 FOR A DISCUSSION OF THE HYDROLOGIC AND HYDRAULIC ANALYSIS.
6. PROPOSED WATER LEVEL INCREASE, BUT STILL BELOW ALLOWABLE MPE.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

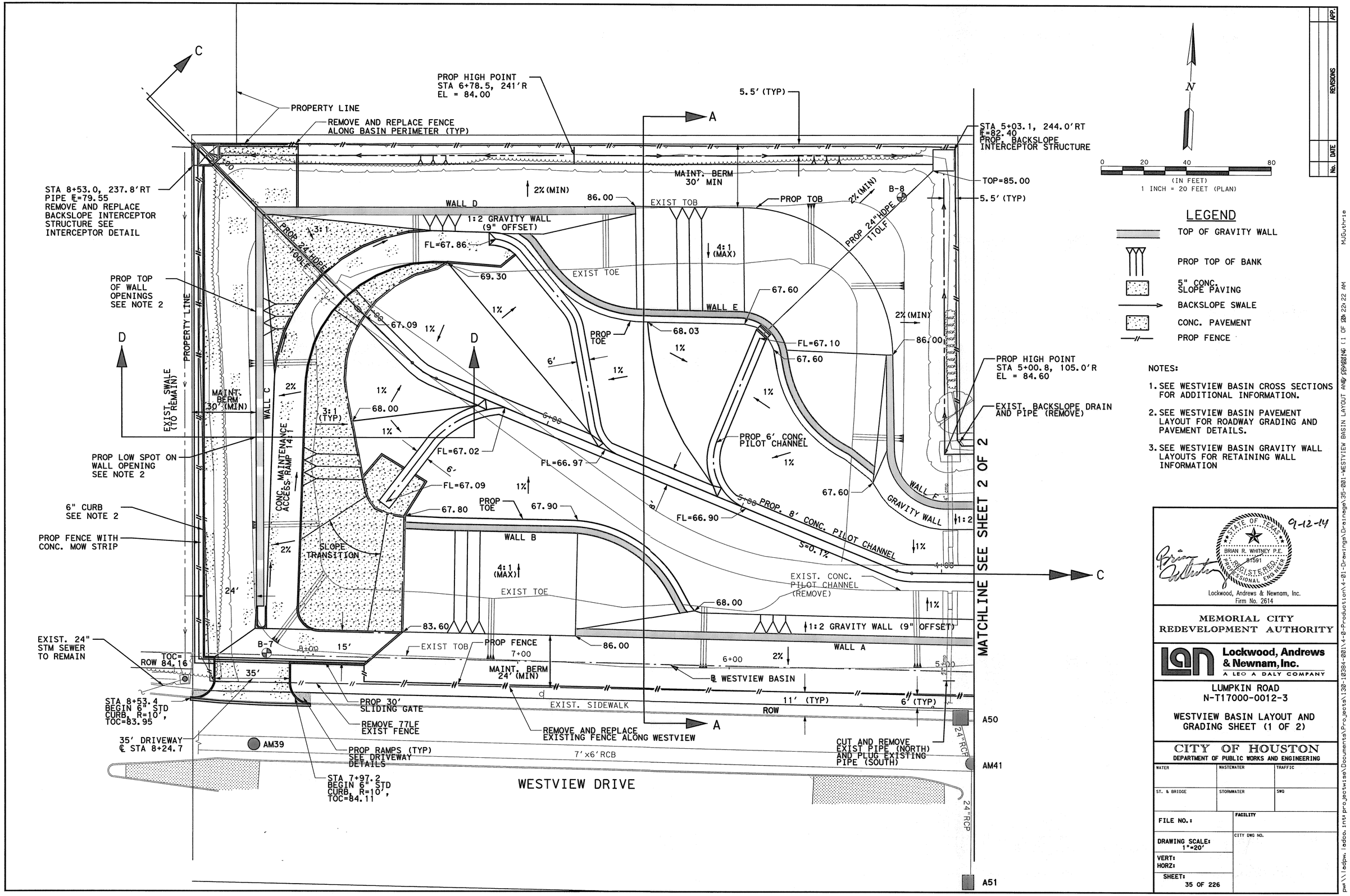
100-YEAR DRAINAGE CALCULATION SHEET

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 34 OF 226

DRAINAGE CALCULATION SHEET 10:22:11 AM MJGuthrie
pw:\\ladpw.ladoo.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\34-001-100-YEAR DRAINAGE



NOTES:

1. SEE WESTVIEW BASIN CROSS SECTIONS FOR ADDITIONAL INFORMATION.
2. SEE WESTVIEW BASIN PAVEMENT LAYOUT FOR ROADWAY GRADING AND PAVEMENT DETAILS.
3. SEE WESTVIEW BASIN GRAVITY WALL LAYOUTS FOR RETAINING WALL INFORMATION

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

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MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN LAYOUT AND GRADING SHEET (1 OF 2)

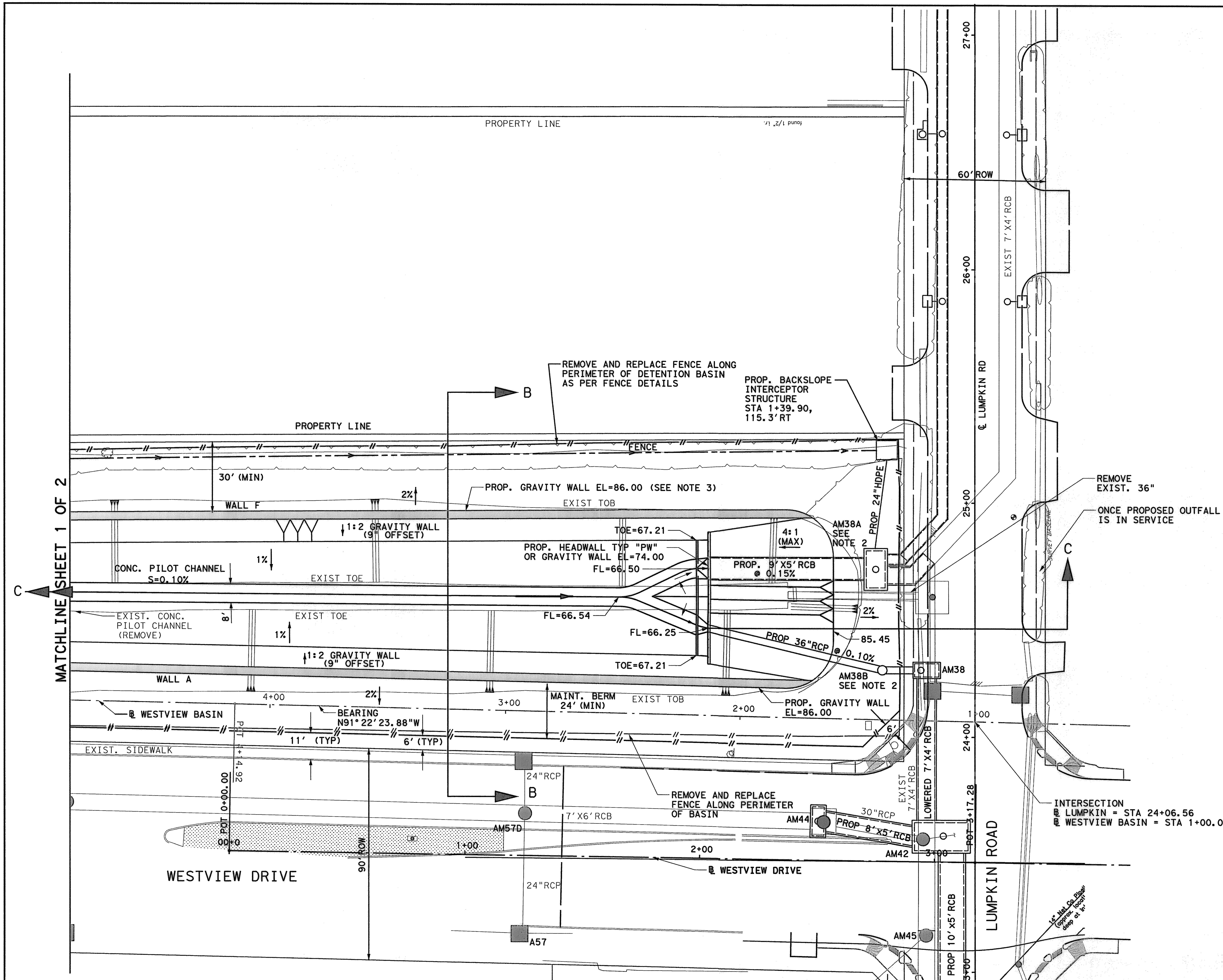
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=20'
CITY DWG NO.
VERT:
HORZ:
SHEET: 35 OF 226

SHEET 2 OF 2

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\35-001-WESTVIEW BASIN LAYOUT AND GRADING (1 OF 2).dgn 12/8/2014 10:22:22 AM MJGuthrie


PROPERTY LINE
MATCHLINE SHEET 1 OF 2
REMOVE AND REPLACE FENCE ALONG PERIMETER OF DETENTION BASIN AS PER FENCE DETAILS
PROP. BACKSLOPE INTERCEPTOR STRUCTURE STA 1+39.90, 115.3'RT
FENCE
30' (MIN)
WALL F
2%
PROP. GRAVITY WALL EL=86.00 (SEE NOTE 3)
EXIST TOB
1:2 GRAVITY WALL (9" OFFSET)
TOE=67.21
4:1 (MAX)
AM38A SEE NOTE 2
PROP 24"HDPE
PROP. HEADWALL TYP "PW" OR GRAVITY WALL EL=74.00
FL=66.50
PROP. 9'X5' RCB @ 0.15%
CONC. PILOT CHANNEL S=0.10%
EXIST TOE
1%
EXIST. CONC. PILOT CHANNEL (REMOVE)
8'
FL=66.54
FL=66.25
PROP 36"RCP @ 0.10%
85.45
AM38
AM38B SEE NOTE 2
WALL A
MAINT. BERM 24' (MIN)
4+00
3+00
2+00
1+00
℄ WESTVIEW BASIN
BEARING N91°22'23.88"W
11' (TYP)
6' (TYP)
PROP. GRAVITY WALL EL=86.00
EXIST. SIDEWALK
POT 1+14.92
POT 0+00.00
00+0
24"RCP
7'X6'RCB
AM57D
A57
90'ROW
WESTVIEW DRIVE
℄ WESTVIEW DRIVE
REMOVE AND REPLACE FENCE ALONG PERIMETER OF BASIN
AM44
30"RCP
PROP 8'x5'RCB
AM42
AM45
EXIST 7'X4'RCB
LOWERED 7'X4'RCB
POT 3+17.28
PROP 10'x5'RCB
LUMPKIN ROAD
℄ LUMPKIN RD
27+00
26+00
25+00
24+00
23+00
60'ROW
EXIST 7'X4'RCB
REMOVE EXIST. 36" ONCE PROPOSED OUTFALL IS IN SERVICE
INTERSECTION
℄ LUMPKIN = STA 24+06.56
℄ WESTVIEW BASIN = STA 1+00.02
B
C
N
0 20 40 80
(IN FEET)
1 INCH = 20 FEET (PLAN)

LEGEND

- TOP OF GRAVITY WALL
- PROP TOP OF BANK
- 5" CONC. SLOPE PAVING
- BACKSLOPE SWALE
- CONC. PAVEMENT
- PROP FENCE

NOTES:

1. SEE WESTVIEW BASIN CROSS SECTIONS FOR ADDITIONAL INFORMATION.
2. SEE LUMPKIN ROAD PLAN AND PROFILE SHEETS FOR PROFILE INFORMATION.
3. SEE WESTVIEW BASIN GRAVITY WALL LAYOUTS, AND DETAILS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER

9-12-14

Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc. — A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

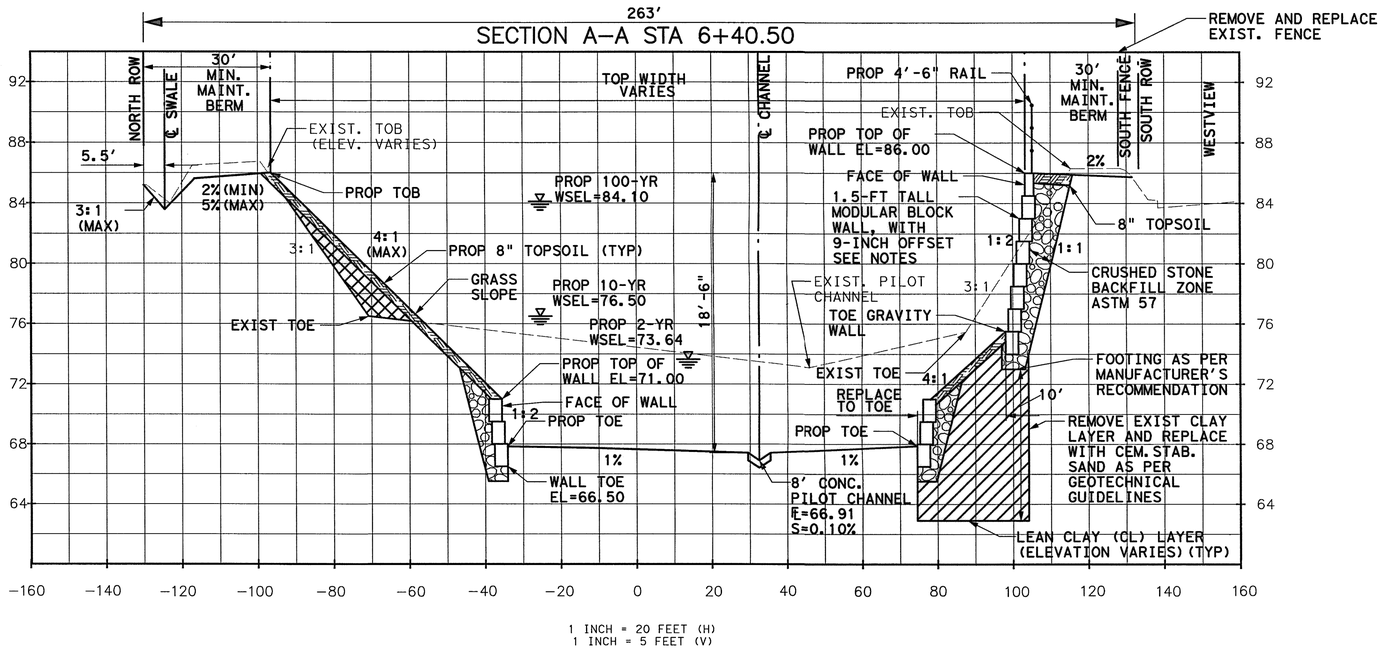
WESTVIEW BASIN LAYOUT AND GRADING SHEET (2 OF 2)

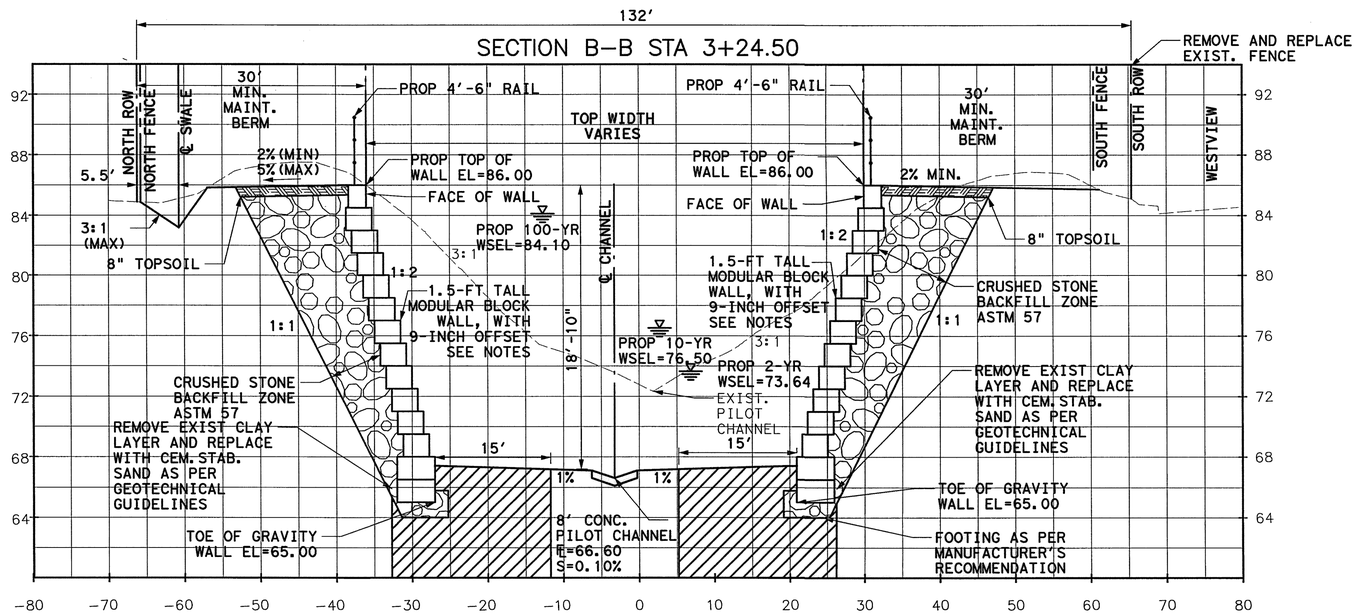
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: 1"=20' | CITY DWG NO.
VERT:
HORZ:
SHEET: 36 OF 226

pw:\\ladpw.lando.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\36-001-WESTVIEW BASIN LAYOUT AND GRADING (2 OF 2).dgn MJGuthrie





LEGEND

- SELECT FILL
- CEMENT STABILIZED SAND BASE
- CRUSHED STONE BACKFILL
- TOPSOIL

NOTES:

1. GRAVITY WALL DIMENSIONS BASED ON USING AN 18" THICK BLOCK WITH A 9" OFFSET PER EACH LAYER. WALLS TALLER THAN 12-FEET REQUIRE A 60-INCH DEEP BOTTOM BLOCK.
2. CONTRACTOR SHALL SUBMIT WALL BLOCK LAYOUT AND CALCULATIONS SIGNED AND SEALED BY A PE FOR APPROVAL PRIOR TO CONSTRUCTION.
3. SEE WESTVIEW BASIN DETAILS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN
CROSS SECTIONS
(1 OF 2)

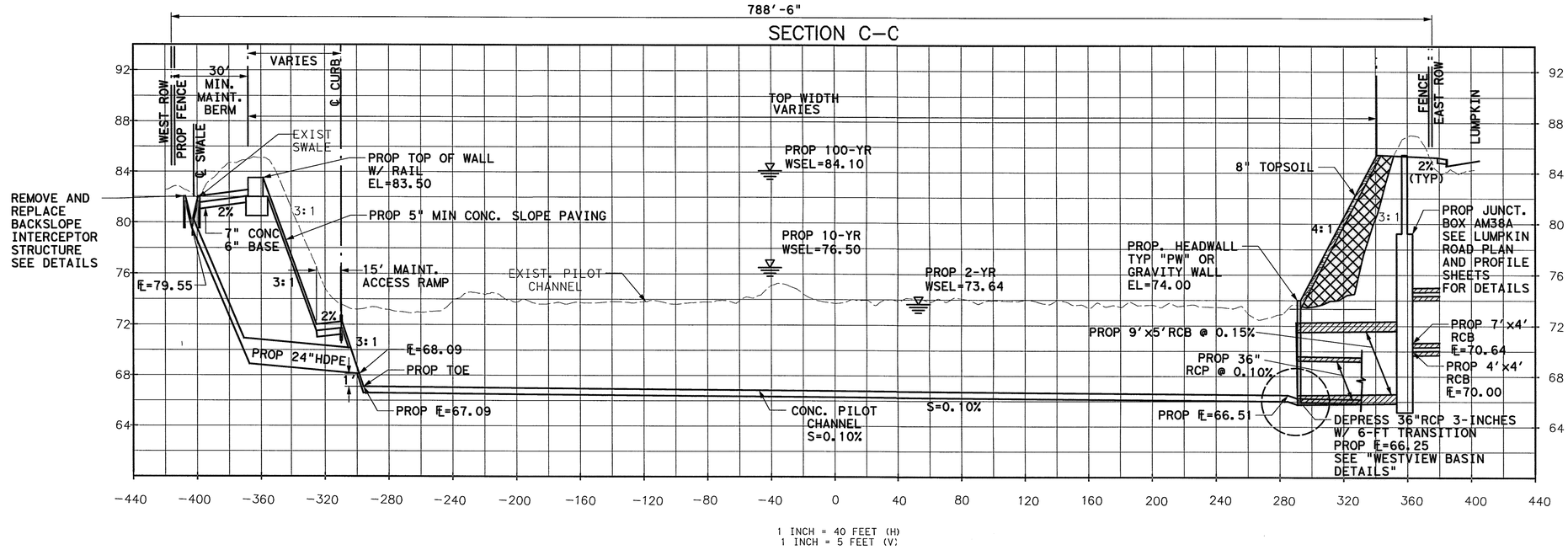
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 37 OF 226

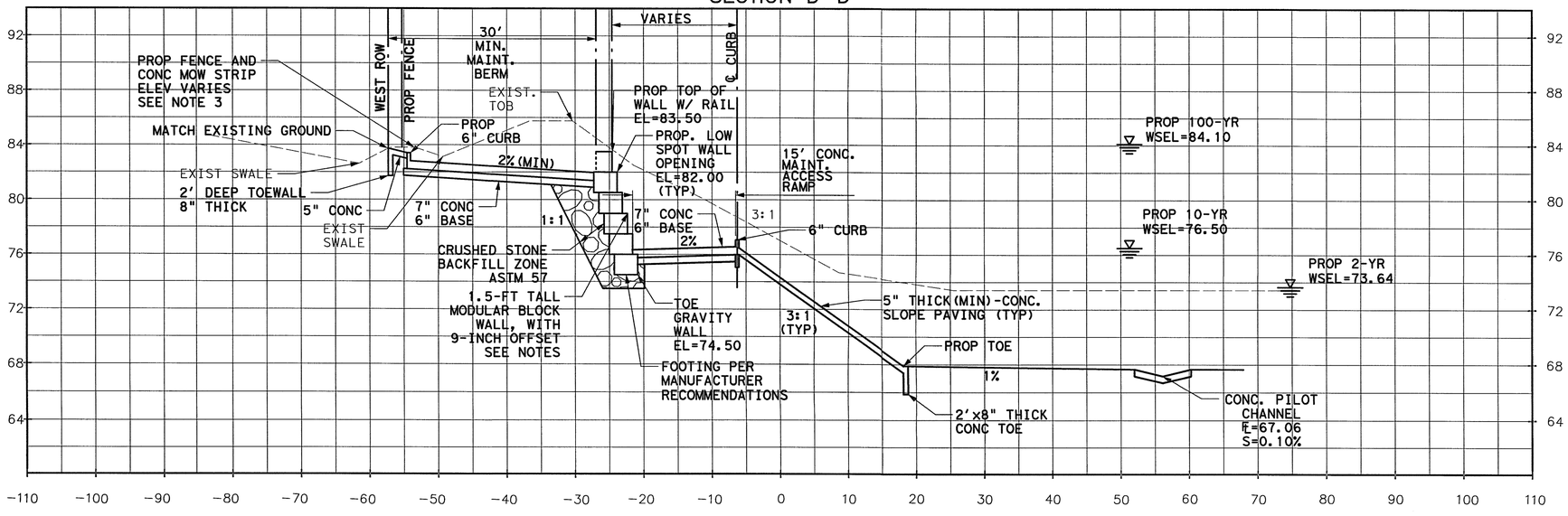
pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-6-Production\4-01-Drawings\Drainage\37-001-WESTVIEW BASIN CROSS SECTIONS.dgn 14 of 21 12:31:21 PM MJGuthrie

SECTION C–C



1 INCH = 40 FEET (H)
1 INCH = 5 FEET (V)

SECTION D–D



1 INCH = 10 FEET (H)
1 INCH = 5 FEET (V)

LEGEND

- SELECT FILL
- CRUSHED STONE BACKFILL
- TOPSOIL

NOTES:

1. GRAVITY WALL DIMENSIONS BASED ON USING AN 18" THICK BLOCK WITH A 9" OFFSET PER EACH LAYER. WALLS TALLER THAN 12-FEET REQUIRE A 60-INCH DEEP BOTTOM BLOCK.
2. CONTRACTOR SHALL SUBMIT WALL BLOCK LAYOUT AND CALCULATIONS SIGNED AND SEALED BY A PE FOR APPROVAL PRIOR TO CONSTRUCTION.
3. SEE WESTVIEW BASIN DETAILS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN
CROSS SECTIONS
(2 OF 2)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ:	
SHEET: 38 OF 226	

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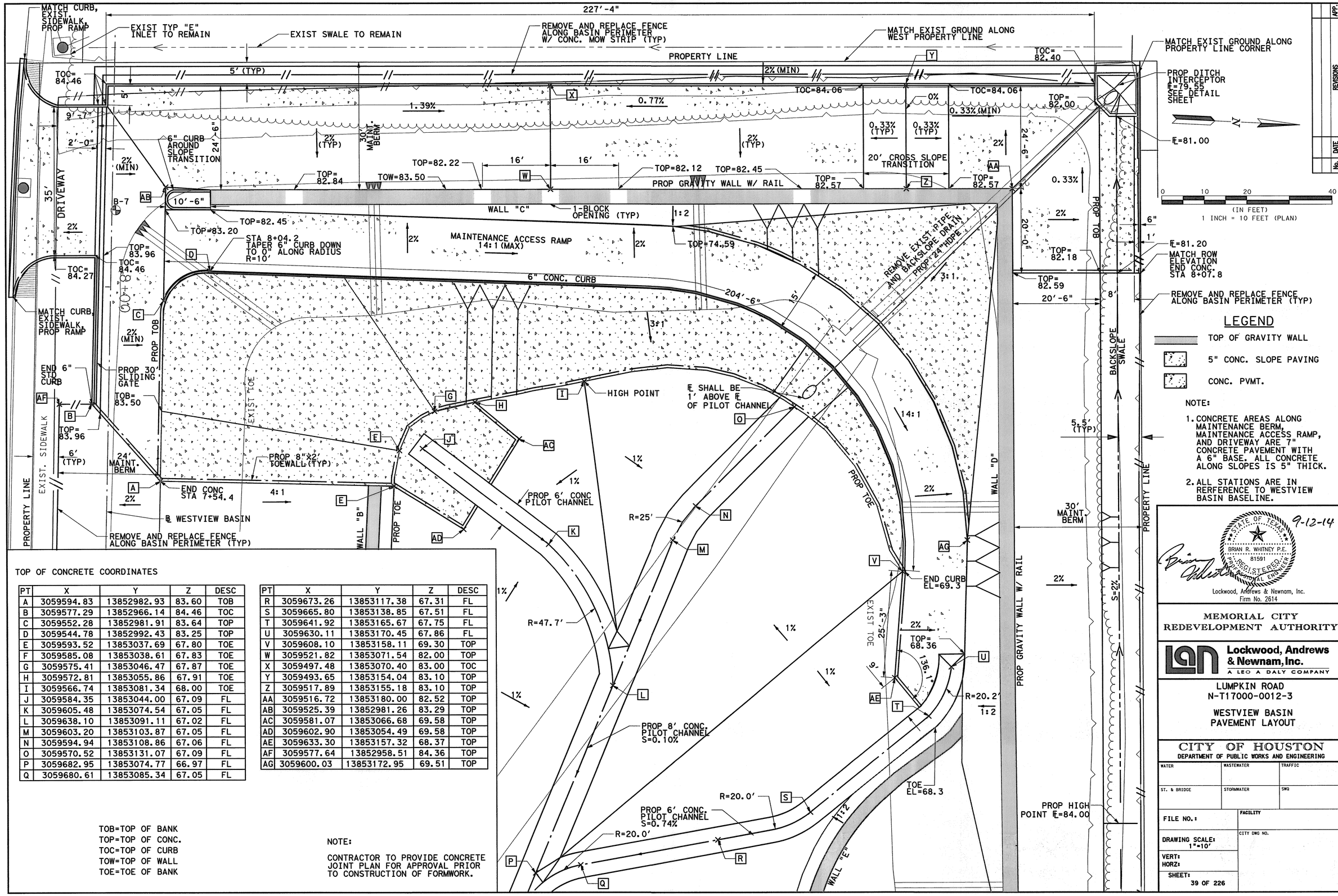

TOP OF CONCRETE COORDINATES

PT	X	Y	Z	DESC
A	3059594.83	13852982.93	83.60	TOB
B	3059577.29	13852966.14	84.46	TOC
C	3059552.28	13852981.91	83.64	TOP
D	3059544.78	13852992.43	83.25	TOP
E	3059593.52	13853037.69	67.80	TOE
F	3059585.08	13853038.61	67.83	TOE
G	3059575.41	13853046.47	67.87	TOE
H	3059572.81	13853055.86	67.91	TOE
I	3059566.74	13853081.34	68.00	TOE
J	3059584.35	13853044.00	67.09	FL
K	3059605.48	13853074.54	67.05	FL
L	3059638.10	13853091.11	67.02	FL
M	3059603.20	13853103.87	67.05	FL
N	3059594.94	13853108.86	67.06	FL
O	3059570.52	13853131.07	67.09	FL
P	3059682.95	13853074.77	66.97	FL
Q	3059680.61	13853085.34	67.05	FL

PT	X	Y	Z	DESC
R	3059673.26	13853117.38	67.31	FL
S	3059665.80	13853138.85	67.51	FL
T	3059641.92	13853165.67	67.75	FL
U	3059630.11	13853170.45	67.86	FL
V	3059608.10	13853158.11	69.30	TOP
W	3059521.82	13853071.54	82.00	TOP
X	3059497.48	13853070.40	83.00	TOC
Y	3059493.65	13853154.04	83.10	TOP
Z	3059517.89	13853155.18	83.10	TOP
AA	3059516.72	13853180.00	82.52	TOP
AB	3059525.39	13852981.26	83.29	TOP
AC	3059581.07	13853066.68	69.58	TOP
AD	3059602.90	13853054.49	69.58	TOP
AE	3059633.30	13853157.32	68.37	TOP
AF	3059577.64	13852958.51	84.36	TOP
AG	3059600.03	13853172.95	69.51	TOP

TOB=TOP OF BANK
TOP=TOP OF CONC.
TOC=TOP OF CURB
TOW=TOP OF WALL
TOE=TOE OF BANK

NOTE:

CONTRACTOR TO PROVIDE CONCRETE JOINT PLAN FOR APPROVAL PRIOR TO CONSTRUCTION OF FORMWORK.

LEGEND

- TOP OF GRAVITY WALL
- 5" CONC. SLOPE PAVING
- CONC. PVMT.

NOTE:

1. CONCRETE AREAS ALONG MAINTENANCE BERM, MAINTENANCE ACCESS RAMP, AND DRIVEWAY ARE 7" CONCRETE PAVEMENT WITH A 6" BASE. ALL CONCRETE ALONG SLOPES IS 5" THICK.
2. ALL STATIONS ARE IN RERFERENCE TO WESTVIEW BASIN BASELINE.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN
PAVEMENT LAYOUT

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=10'
CITY DWG NO.
VERT:
HORZ:
SHEET: 39 OF 226

No.	DATE	REVISIONS	APP.

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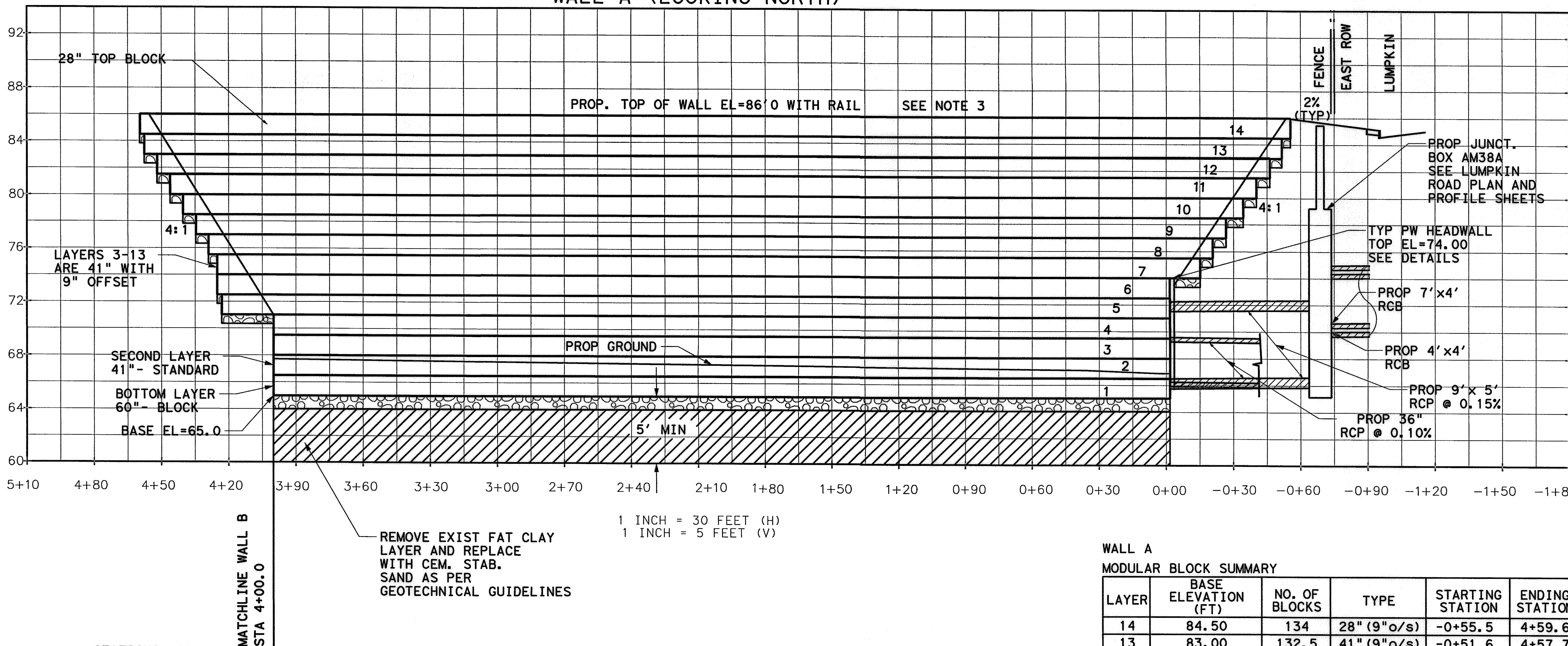
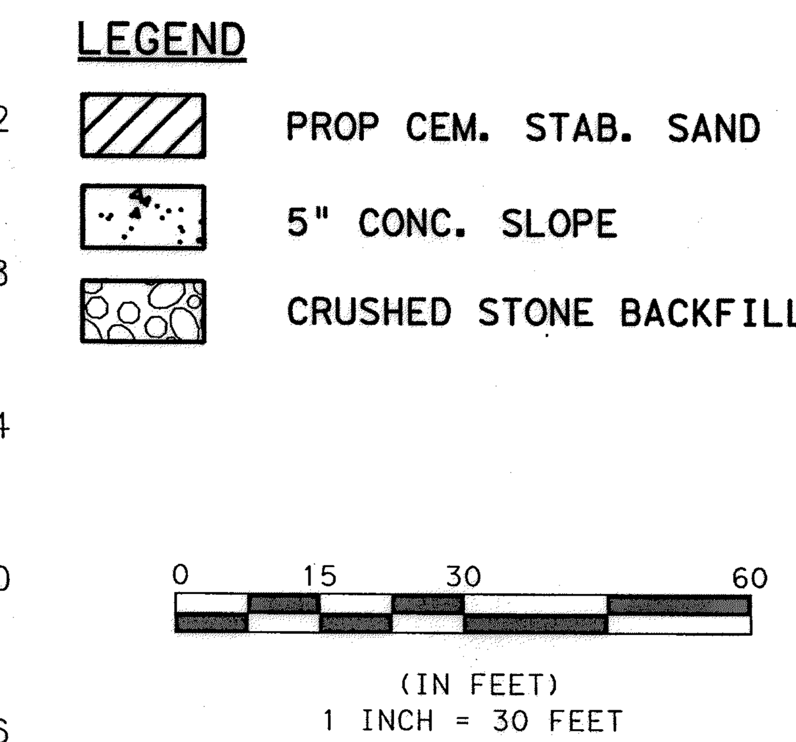
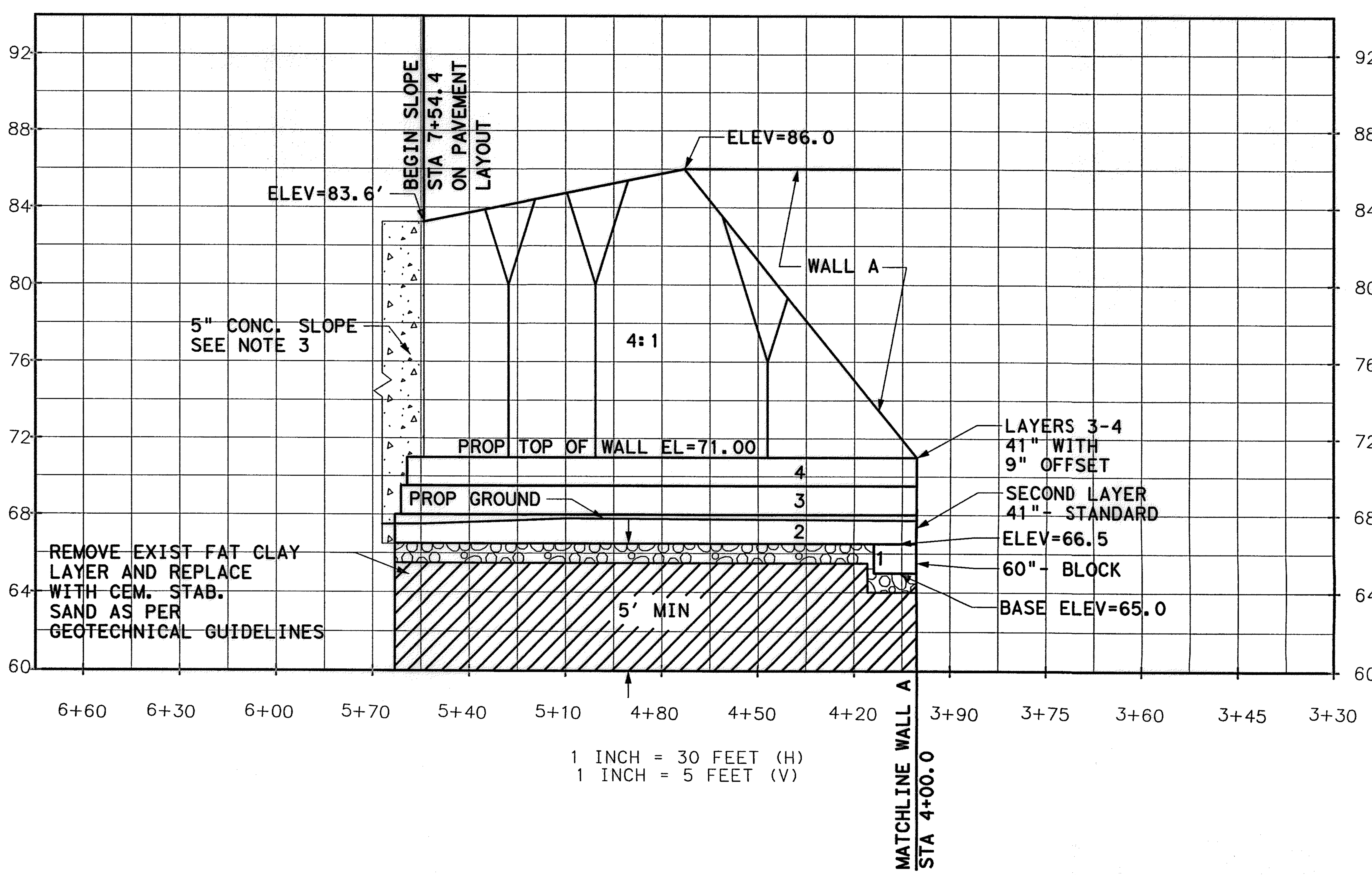
WALL A (LOOKING NORTH)





WALL B (LOOKING NORTH)



WALL A
MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
14	84.50	134	28"(9"o/s)	-0+55.5	4+59.6	515.1
13	83.00	132.5	41"(9"o/s)	-0+51.6	4+57.7	509.3
12	81.50	129.5	41"(9"o/s)	-0+46.3	4+51.5	497.8
11	80.00	126	41"(9"o/s)	-0+40.2	4+44.1	484.3
10	78.50	123.5	41"(9"o/s)	-0+34.3	4+40.4	474.7
9	77.00	120	41"(9"o/s)	-0+26.6	4+34.7	461.3
8	75.50	117	41"(9"o/s)	-0+20.7	4+29.0	449.7
7	74.00	114.5	41"(9"o/s)	-0+15.1	4+25.0	440.1
6	72.50	111	41"(9"o/s)	-0+1.6	4+25.1	426.7
5	71.00	110.5	41"(9"o/s)	-0+1.6	4+23.1	424.7
4	69.50	104.5	41"(9"o/s)	-0+1.6	4+00.1	401.7
3	68.00	104.5	41"(9"o/s)	-0+1.6	4+00.1	401.7
2	66.50	104.5	41"(std)	-0+1.6	4+00.1	401.7
1	65.00	104.5	60"(std)	-0+1.6	4+00.1	401.7

WALL B
MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
4	69.50	42.5	41"(9"o/s)	4+00.0	5+63.4	163.4
3	68.00	42	41"(9"o/s)	4+00.0	5+61.4	161.4
2	66.50	41.5	41"(std)	4+00.0	5+59.5	159.5
1	65.00	3.5	60"(std)	4+00.0	4+13.5	13.5

NOTES:

1. GRAVITY WALL DIMENSIONS BASED ON USING AN 18" THICK BLOCK WITH A 9" OFFSET PER EACH LAYER. WALLS TALLER THAN 12-FEET REQUIRE A 60-INCH DEEP BOTTOM BLOCK. SEE CROSS SECTIONS.
2. CONTRACTOR SHALL SUBMIT SEALED WALL BLOCK DESIGN CALCULATIONS, LAYOUTS, AND SECTIONS FOR REVIEW APPROVAL PRIOR TO CONSTRUCTION.
3. SEE WESTVIEW BASIN DETAILS

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN
GRAVITY WALL
LAYOUT (1 OF 3)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:
40 OF 226

No. | DATE | REVISIONS | APP.

MJGuthrie

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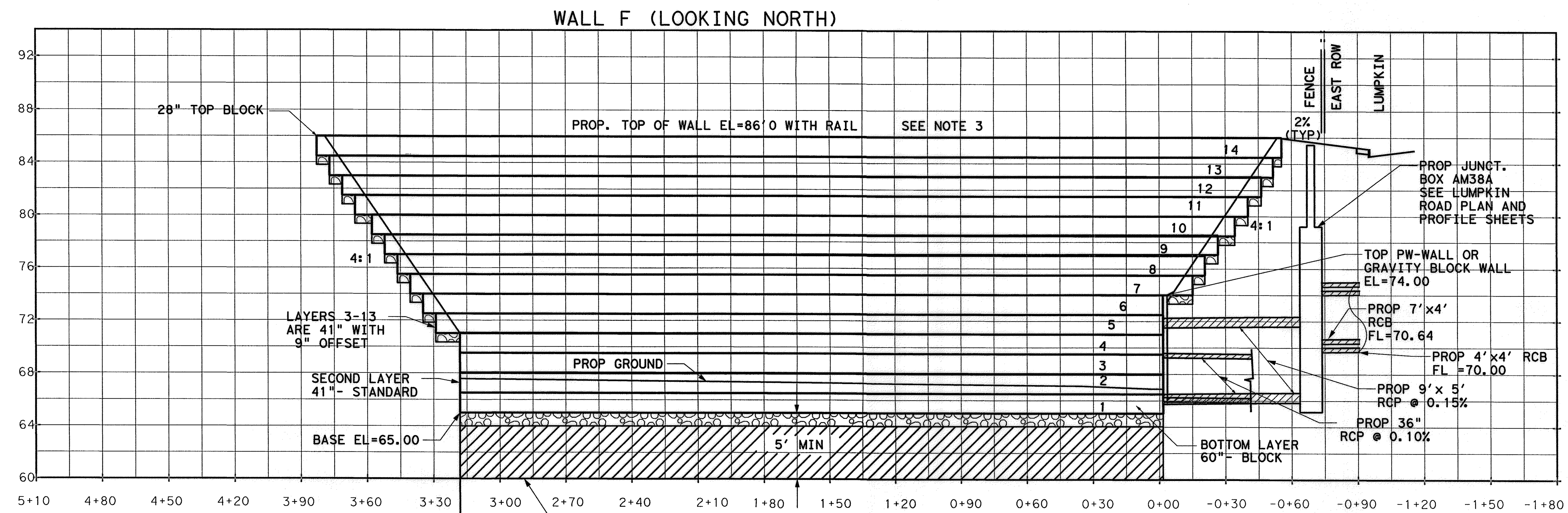
WALL F (LOOKING NORTH)



LEGEND

PROP CEM. STAB. SAND

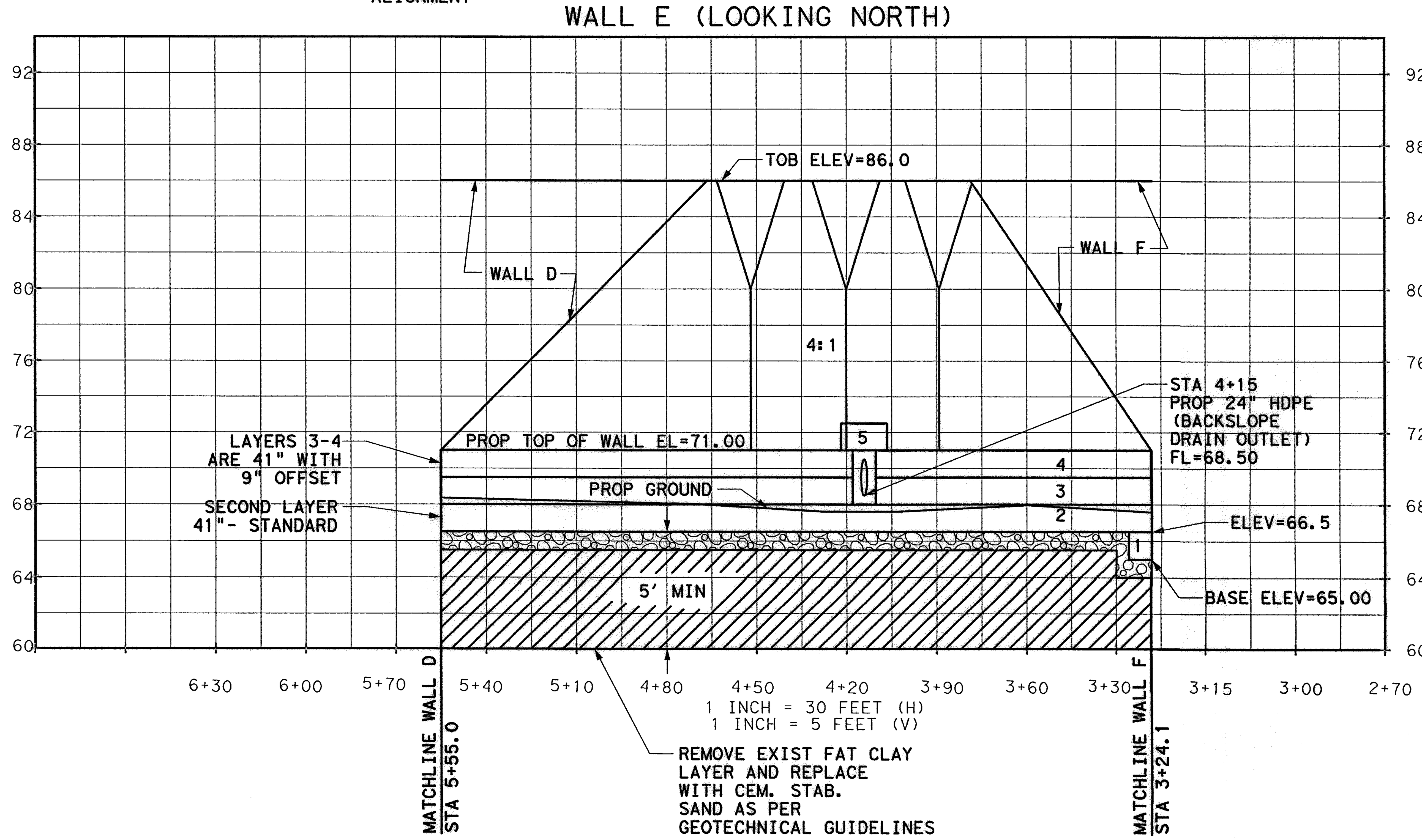
CRUSHED STONE BACKFILL

0 15 30 60
(IN FEET)
1 INCH = 30 FEET

WALL F
MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
14	84.50	114	28"(9"o/s)	-0+55.5	3+82.7	438.2
13	83.00	111.5	41"(9"o/s)	-0+51.6	3+77.0	428.6
12	81.50	108.5	41"(9"o/s)	-0+46.3	3+70.7	417.0
11	80.00	105.5	41"(9"o/s)	-0+40.2	3+65.3	405.5
10	78.50	102	41"(9"o/s)	-0+34.3	3+57.8	392.1
9	77.00	98.5	41"(9"o/s)	-0+26.6	3+52.0	378.6
8	75.50	95.5	41"(9"o/s)	-0+20.7	3+46.4	367.1
7	74.00	93	41"(9"o/s)	-0+15.1	3+40.4	355.5
6	72.50	87.5	41"(9"o/s)	-0+1.6	3+34.7	336.3
5	71.00	86	41"(9"o/s)	-0+1.6	3+29.0	330.6
4	69.50	85	41"(9"o/s)	-0+1.6	3+25.1	326.7
3	68.00	85	41"(9"o/s)	-0+1.6	3+25.1	326.7
2	66.50	85	41"(std)	-0+1.6	3+25.1	326.7
1	65.00	85	60"(std)	-0+1.6	3+25.1	326.7

WALL E (LOOKING NORTH)



WALL E
MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
5	71.00	4	41"(9"o/s)	4+07.0	4+22.4	15.4
4	69.50	60.5	41"(9"o/s)	3+24.1	5+56.6	232.5
3	68.00	60.5	41"(9"o/s)	3+24.1	5+56.6	232.5
2	66.50	60.5	41"(std)	3+24.1	5+56.6	232.5
1	65.00	2	60"(std)	3+24.1	3+31.8	7.7

NOTES:

1. GRAVITY WALL DIMENSIONS BASED ON USING AN 18" THICK BLOCK WITH A 9" OFFSET PER EACH LAYER. WALLS TALLER THAN 12-FEET REQUIRE A 60-INCH DEEP BOTTOM BLOCK. SEE CROSS SECTIONS.
2. CONTRACTOR SHALL SUBMIT SEALED WALL BLOCK DESIGN CALCULATIONS, LAYOUTS, AND SECTIONS FOR REVIEW APPROVAL PRIOR TO CONSTRUCTION.
3. SEE WESTVIEW BASIN DETAILS

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
WESTVIEW BASIN
GRAVITY WALL
LAYOUT (2 OF 3)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 41 OF 226

REVISIONS
No. | DATE | APP.

MJGuthrie

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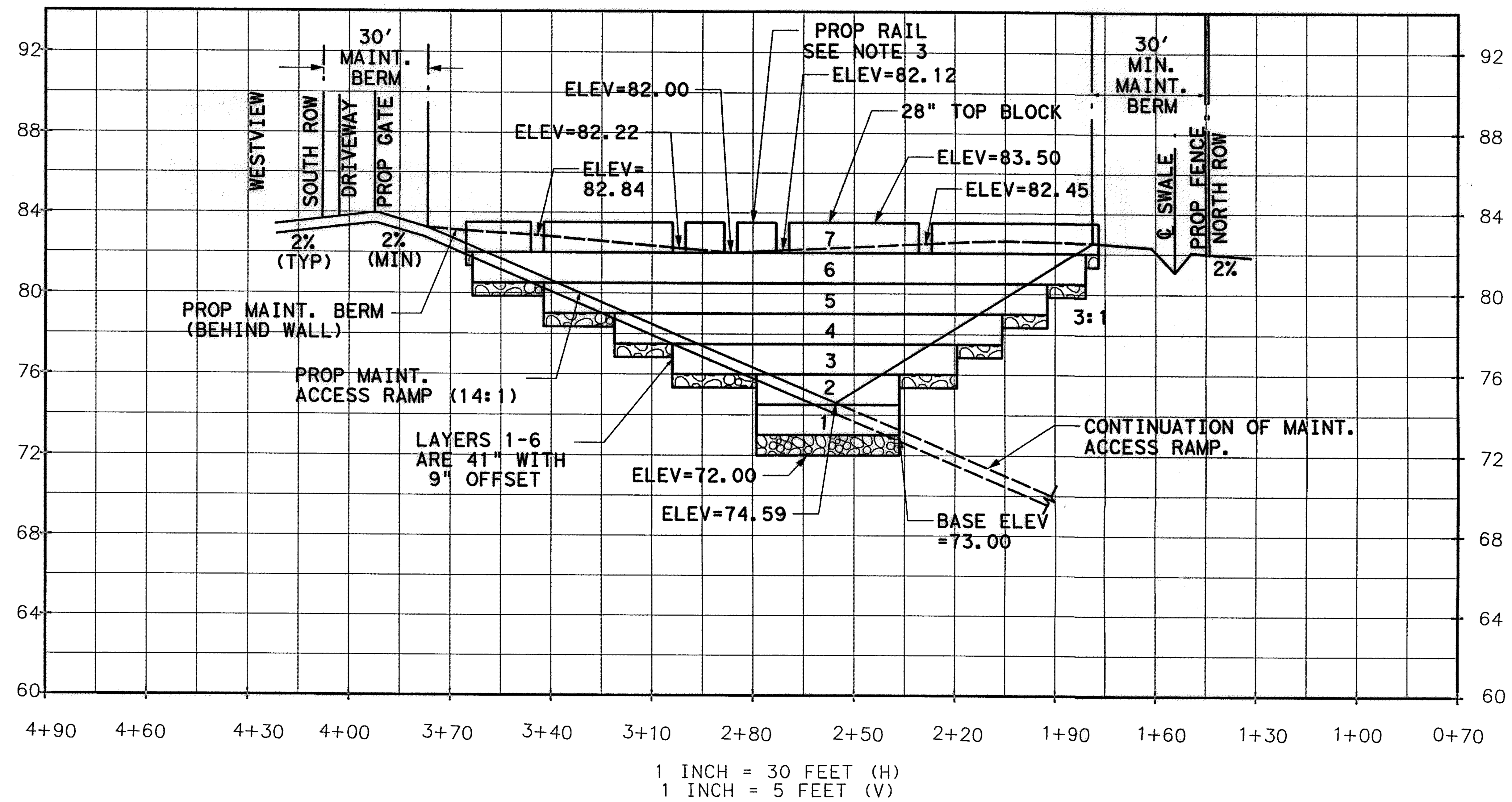
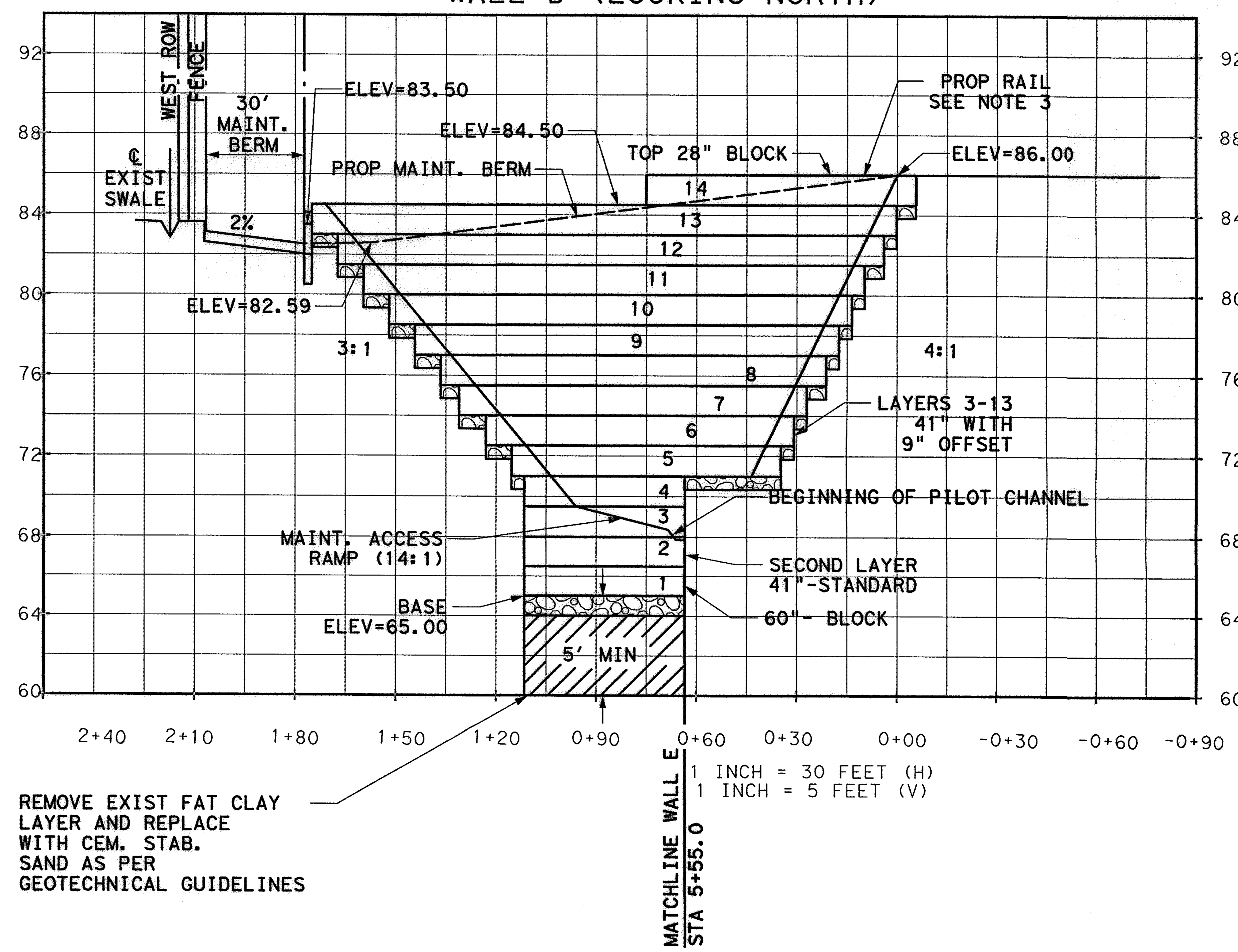
WALL C (LOOKING WEST)



1 INCH = 30 FEET (H)
1 INCH = 5 FEET (V)

WALL D (LOOKING NORTH)



1 INCH = 30 FEET (H)
1 INCH = 5 FEET (V)

REMOVE EXIST FAT CLAY LAYER AND REPLACE WITH CEM. STAB. SAND AS PER GEOTECHNICAL GUIDELINES

LEGEND

CRUSHED STONE BACKFILL

PROP CEM. STAB. SAND

0 15 30 60
(IN FEET)
1 INCH = 30 FEET

WALL C MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
7	82.00	49	28"(9"o/s)	1+77.0	3+65.3	188.3
6	80.50	47.5	41"(9"o/s)	1+80.8	3+63.4	182.6
5	79.00	39	41"(9"o/s)	1+92.3	3+42.2	149.9
4	77.50	30	41"(9"o/s)	2+05.8	3+21.1	115.3
3	76.00	22	41"(9"o/s)	2+19.2	3+03.8	84.6
2	74.50	11	41"(9"o/s)	2+36.5	2+78.8	42.3
1	73.00	11	41"(9"o/s)	2+36.5	2+78.8	42.3

WALL D MODULAR BLOCK SUMMARY

LAYER	BASE ELEVATION (FT)	NO. OF BLOCKS	TYPE	STARTING STATION	ENDING STATION	LENGTH (FT)
14	84.50	21	28"(9"o/s)	-0+5.7	0+75.1	80.7
13	83.00	45.5	41"(9"o/s)	0+0.1	1+75.0	174.9
12	81.50	42.5	41"(9"o/s)	0+4.0	1+67.3	163.4
11	80.00	39	41"(9"o/s)	0+9.7	1+59.6	149.9
10	78.50	36	41"(9"o/s)	0+13.6	1+51.9	138.4
9	77.00	33	41"(9"o/s)	0+17.4	1+44.2	126.8
8	75.50	30	41"(9"o/s)	0+21.2	1+36.6	115.3
7	74.00	27	41"(9"o/s)	0+27.0	1+30.8	103.8
6	72.50	24	41"(9"o/s)	0+30.9	1+23.1	92.3
5	71.00	21	41"(9"o/s)	0+34.7	1+15.4	80.7
4	69.50	12.5	41"(9"o/s)	0+63.4	1+11.4	48.0
3	68.00	12.5	41"(9"o/s)	0+63.4	1+11.4	48.0
2	66.50	12.5	41"(std)	0+63.4	1+11.4	48.0
1	65.00	12.5	60"(std)	0+63.4	1+11.4	48.0

NOTES:

1. GRAVITY WALL DIMENSIONS BASED ON USING AN 18" THICK BLOCK WITH A 9" OFFSET PER EACH LAYER. WALLS TALLER THAN 12-FEET REQUIRE A 60-INCH DEEP BOTTOM BLOCK. SEE CROSS SECTIONS.
2. CONTRACTOR SHALL SUBMIT SEALED WALL BLOCK DESIGN CALCULATIONS, LAYOUTS, AND SECTIONS FOR REVIEW APPROVAL PRIOR TO CONSTRUCTION.
3. SEE WESTVIEW BASIN DETAILS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

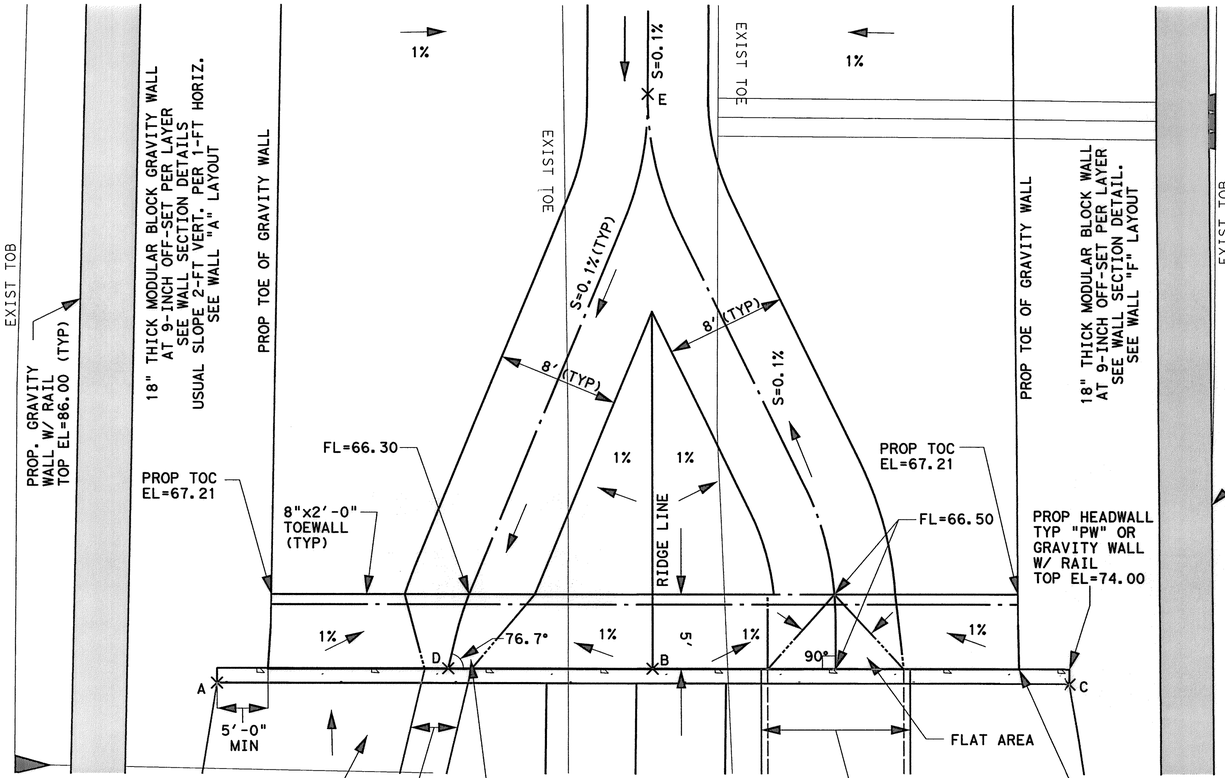
LUMPKIN ROAD
N-T17000-0012-3

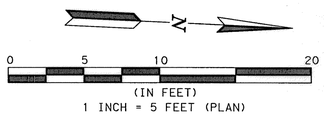
WESTVIEW BASIN
GRAVITY WALL
LAYOUT (3 OF 3)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:





COORDINATE TABLE

PT	X	Y	Z
A	3060135.56	13853005.41	TOW 74.00
B	3060133.02	13853061.74	TOC 67.08 TOW 74.00
C	3060133.29	13853034.06	TOW 74.00
D	3060133.90	13853020.59	℄ 66.25
E	3060095.20	13853032.06	℄ 66.40
F	3060109.64	13853032.98	℄ 66.90

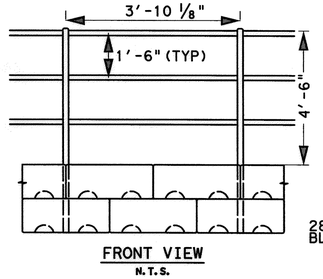
NOTES:

1. CONTRACTOR TO PROVIDE FOR GRAVITY WALL AND ALL CONCRETE AREAS FOR APPROVAL PRIOR TO CONSTRUCTION.
2. COORDINATES AND ELEVATIONS SHOWN ARE APPROXIMATE AND SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF DIFFERENCES.
3. SEE WESTVIEW BASIN LAYOUT AND GRADING (2 OF 2) FOR ADDITIONAL INFORMATION.
4. ALL MODULAR BLOCK LAYOUTS ESTIMATED BASED ON REDI-ROCK BLOCK DIMENSIONS.

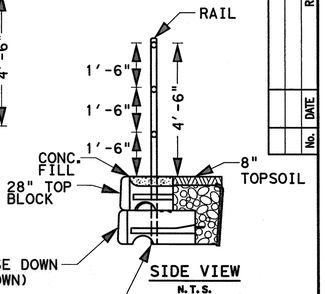
NOTES:

1. THE PEDESTRIAN RAIL ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
   - A. POST: 1½ DIA (1.9" O.D) EXTRA STRONG PIPE AT 3'-10 ⅛" MAXIMUM SPACING.
   - B. TOP AND INTERMEDIATE RAILS: 1½" DIA. (1.9" O.D.) STANDARD PIPE AT 1'-6" SPACING.
   - C. ALL WELDED STEEL SHALL BE GROUND SMOOTH. COMPLETED RAILING SHALL BE HOT-DIP GALVANIZED.
   - D. PROVIDE 1'-0" "RETURNS" AT ENDS OF PEDESTRIAN RAILING (TYP).

TYPICAL RAIL INSTALLATION

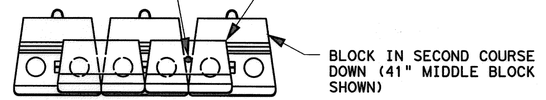


FRONT VIEW
N.T.S.

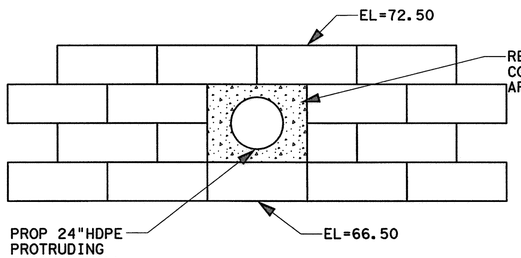


SIDE VIEW
N.T.S.

CORE THROUGH TOP BLOCK AND GROUT POSTS IN V-SHAPED OPENING BETWEEN BLOCKS IN SECOND COURSE DOWN. SPACE IN MULTIPLES OF 46-1/8" INCREMENTS. MUST HAVE 2 ADJACENT BLOCKS IN SECOND LEVEL DOWN TO RESIST OVERTURNING FORCES, AND SHALL HAVE A MINIMUM OF THREE POST (2 SEGMENTS) OF RAILING.



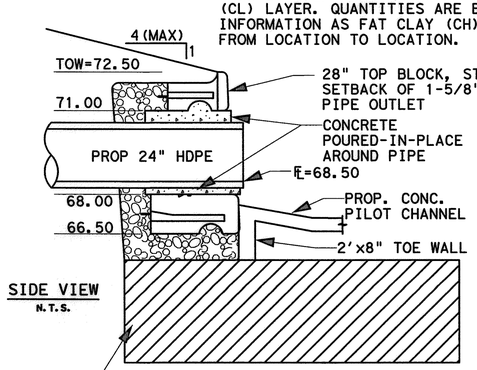
TOP VIEW
N.T.S.



FRONT VIEW
N.T.S.

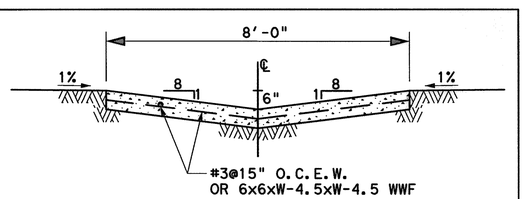
NOTES:

1. STABILIZED MATERIAL UNDER THE PROPOSED WALLS MUST MEET DENSITY AND COMPACTION STANDARDS AS OUTLINED IN THE GEOTECHNICAL REPORT. CEMENT STABILIZED SAND ON USING LIME STABILIZATION TO REPLACE OF THE EXISTING POOR FAT CLAY (CH) SOIL, THE USE OF CEMENT STABILIZED SAND IS INTENDED TO REPLACE THIS UNACCEPTABLE MATERIAL DOWN TO THE STABLE CLAY (CL) LAYER. QUANTITIES ARE BASED ON AVAILABE SOIL. INFORMATION AS FAT CLAY (CH) LAYER THICKNESS MAY VARY FROM LOCATION TO LOCATION.

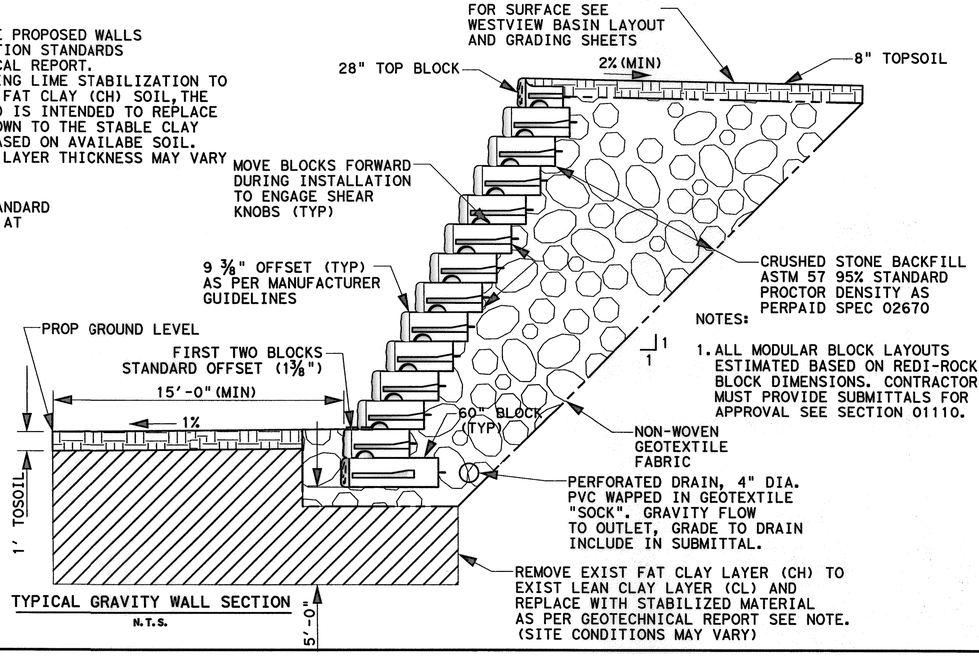


SIDE VIEW
N.T.S.

BACKSLOPE DRAIN OUTFALL
N.T.S.



PILOT CHANNEL CROSS SECTION
N.T.S.



TYPICAL GRAVITY WALL SECTION
N.T.S.

NOTES:

1. ALL MODULAR BLOCK LAYOUTS ESTIMATED BASED ON REDI-ROCK BLOCK DIMENSIONS. CONTRACTOR MUST PROVIDE SUBMITTALS FOR APPROVAL SEE SECTION 01110.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WESTVIEW BASIN DETAILS

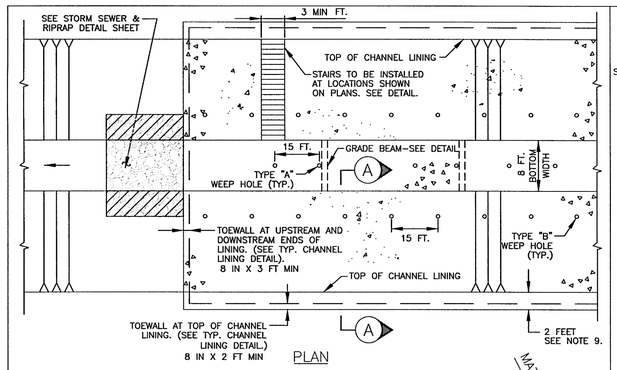
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

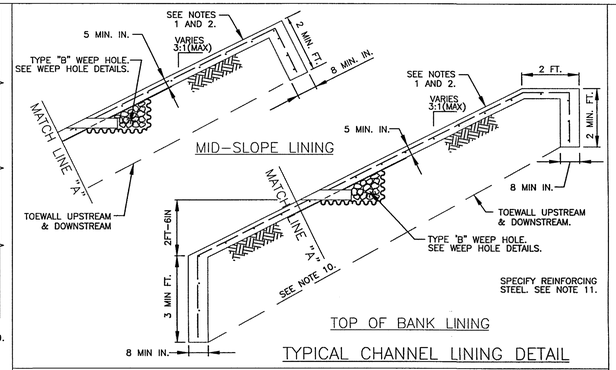
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

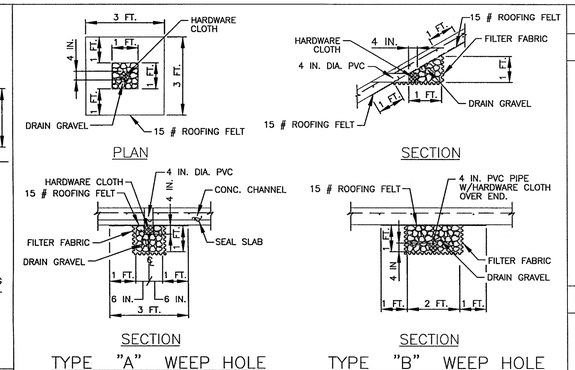
FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 43 OF 226

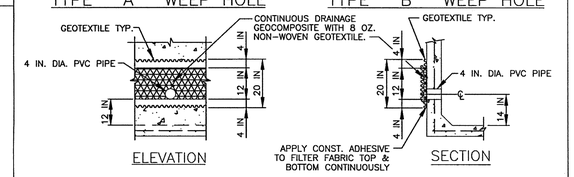
No.	DATE	REVISIONS	APP.

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\43-001-WESTVIEW BASIN DETAILS.dgn 11/2014 10:23:50 AM MJGuthrie









WEEP HOLE NOTES:

1. MATERIALS:
   a. PIPE: 4 INCH DIA. SCH. 40 PVC
   b. DRAIN GRAVEL:

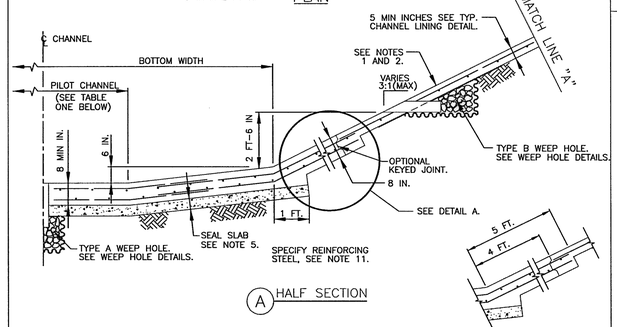
SIEVE SIZE	% FINER
1 IN	100
3/4 IN	70 - 100
3/8 IN	20 - 90
NO. 4	0 - 60
NO. 8	0

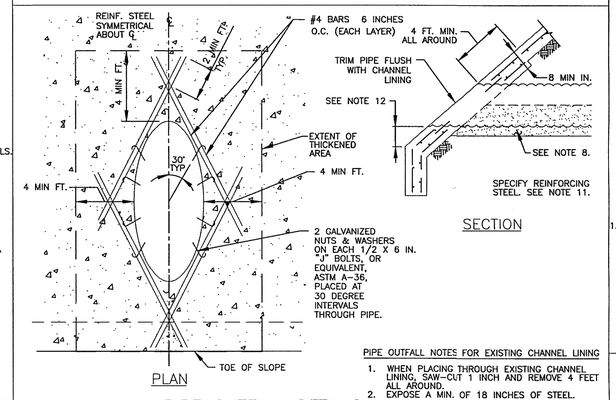
   c. HARDWARE CLOTH: MIN. OPEN 1/8 IN, MAX. OPEN 1/4 IN
   d. FILTER FABRIC: NON-WOVEN GEOTEXTILE

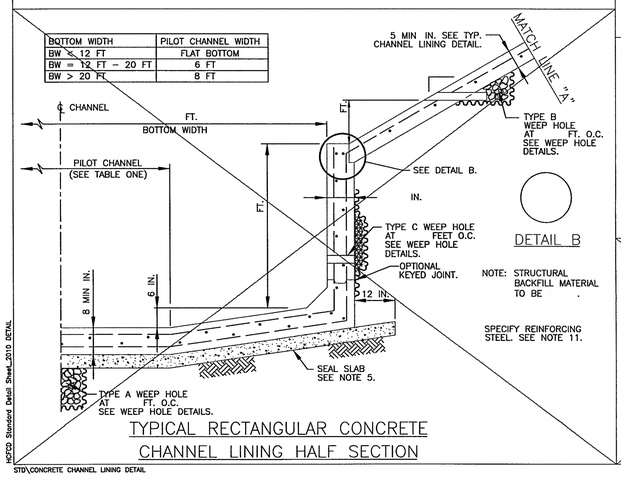
MIN. AOS	SIEVE NO. 100 MIN
MAX. AOS	SIEVE NO. 70 MAX
WEIGHT	OZ/SY 6 OZ. MIN

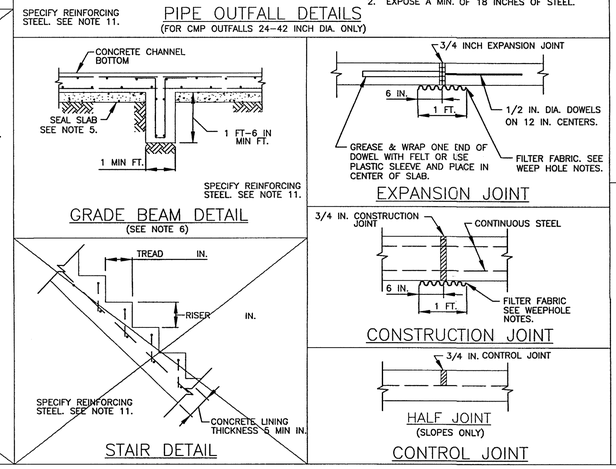
2. CUT WEEP HOLE PIPE FLUSH WITH CONCRETE SURFACE.
3. TYPE "A" AND "C" WEEP HOLES FOR TYPICAL RECTANGULAR CONCRETE CHANNEL LINING. TO BE STAGGERED.

WEEP HOLE DETAILS









CONCRETE CHANNEL LINING DETAILS NOTES:

1. STRUCTURAL CONCRETE FOR CONCRETE CHANNEL LINING AND NONSTRUCTURAL CONCRETE FOR SEAL SLAB SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 03310-CONCRETE.
2. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 03310-CONCRETE.
3. EXCAVATION AND BACKFILL FOR CONCRETE CHANNEL LINING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02316-STRUCTURAL EXCAVATING AND BACKFILLING.
4. RIPRAP SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02378-RIPRAP AND GRANULAR FILL.
5. A NON-REINFORCED 4 INCH MINIMUM NONSTRUCTURAL CONCRETE SEAL SLAB WILL BE REQUIRED BENEATH THE BOTTOM OF CONCRETE CHANNELS.
6. STRUCTURAL CONCRETE GRADE BEAMS SHALL BE INSTALLED TRANSVERSLEY AT 20 FOOT MAX. CENTERS ON CONCRETE LINED CHANNELS WITH BOTTOM WIDTHS EQUAL TO OR GREATER THAN 20 FEET.
7. JOINTS:
   A. PLACE CONSTRUCTION AND/OR EXPANSION JOINT IN CONCRETE LOW-FLOW AND TRAPEZOIDAL BOTTOM SECTIONS AT 20 FOOT MIN., 60 FOOT MAX. SPACING CONTINUOUSLY THROUGH CHANNEL LINING.
   B. PLACE CONTROL JOINT ON SLOPES AT 20 FOOT SPACING.
8. CEMENT STABILIZED SAND SHALL BE PROVIDED AND PLACED IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02321-CEMENT STABILIZED SAND.
9. DELETE 2 FT FLAT EDGE WHEN LINING IS BELOW TOP OF BANK. SEE MID-SLOPE LINING DETAIL.
10. UPSTREAM AND DOWNSTREAM TOE WALL 3 FOOT MIN. DEPTH AT BOTTOM OF SLOPE AND 8 INCHES THIICK.
11. #4 AT 12 INCH O.C. MINIMUM OR EQUIVALENT WELDED WIRE FABRIC.
12. VARIES BASED ON SIDE SLOPE. MINIMUM 1 FOOT VERTICAL AT TOE OF SLOPE.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD WHEN COMPLETED BY OTHERS. AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE §137.33 (b) AND (c) OF THE TEXAS STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS.

HCFCD Standard Detail Sheet_2010 DETAIL

STD\CONCRETE CHANNEL LINING DETAIL

No.	DATE	REVISIONS	APP.

REV	DESCRIPTION	DATE	APPR

N-T17000-0012-3

LUMPKIN ROAD

CONCRETE CHANNEL LINING DETAILS

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

9900 Northwest Freeway
Houston, Texas 77092

DATE: 12-21-2010
SCALE: NTS

SHEET NUMBER

OF

9-12-14

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CONCRETE CHANNEL LINING DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=20'

SHEET:
44 OF 226

M.Guthrie
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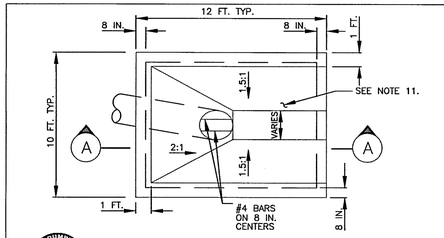
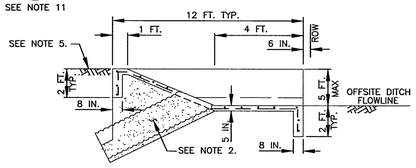
pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-0014-0-Production\4-01-Drawings\Standards\Concrete Channel Lining Details.dgn



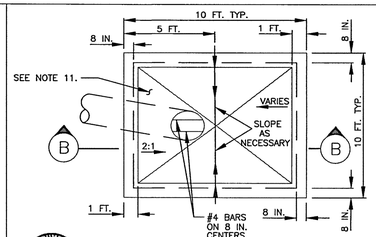
PLAN

SEE NOTE 11



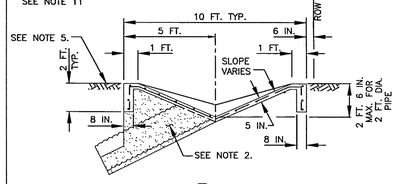
A SECTION

TYPICAL OFFSITE DITCH INTERCEPTOR STRUCTURE
(42 INCH MAX.)



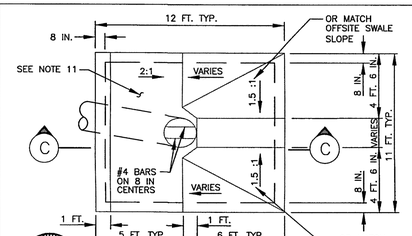
PLAN

SEE NOTE 11



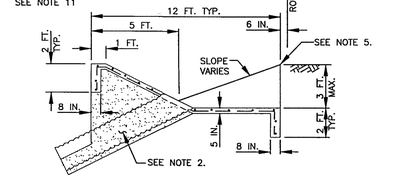
B SECTION

TYPICAL BACKSLOPE INTERCEPTOR STRUCTURE
(24 INCH & 30 INCH ONLY)



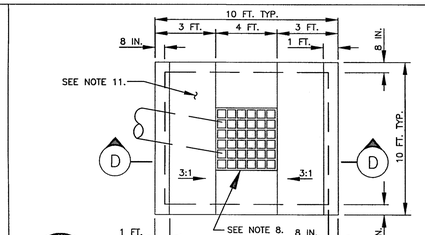
PLAN

SEE NOTE 11



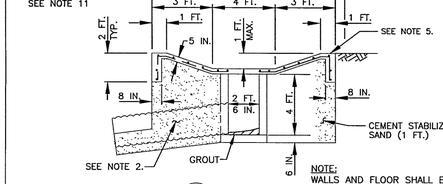
C SECTION

COMBINATION BACKSLOPE & OFFSITE DITCH INTERCEPTOR STRUCTURE
(42 INCH MAX.)



PLAN

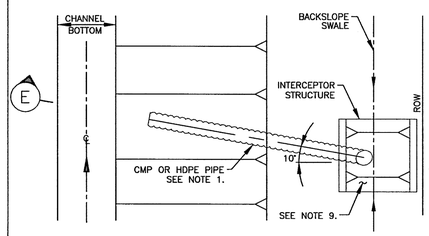
SEE NOTE 11



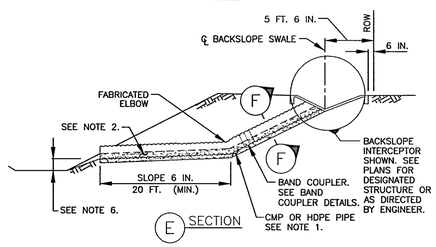
D SECTION

URBAN BACKSLOPE INTERCEPTOR STRUCTURE
(24 INCH ONLY)

NOTE:
WALLS AND FLOOR SHALL BE 6 IN. REINFORCED STRUCTURAL CONCRETE OR WALLS MAY BE 8 IN. CONCRETE BRICK CONSTRUCTION



PLAN

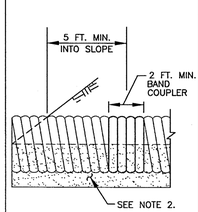


E SECTION

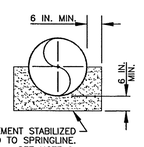
TYPICAL INTERCEPTOR OUTFALL STRUCTURE LAYOUT

PIPE OUT FALL IN CHANNELS

BOTTOM WIDTH	PIPE OUTLET INVERT
6 FEET ≤ BW ≤ 20 FT	1 FOOT ABOVE FLOWLINE
20 FEET < BW ≤ 60 FT	AT TOE OF SLOPE
BW > 60 FT	AT TOE OF SLOPE

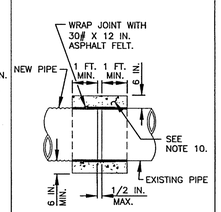


CMP BAND COUPLER DETAIL

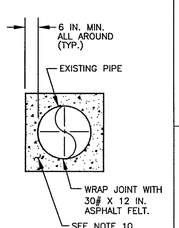


F SECTION

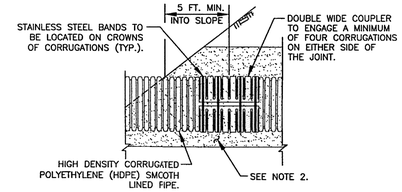
BEDDING CMP DETAIL



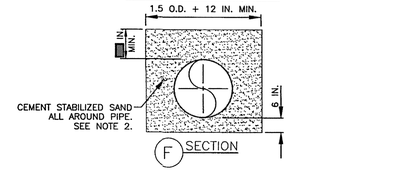
CONCRETE COLLAR DETAIL



BEDDING CONCRETE PIPE DETAIL



HDPE PIPE BAND COUPLER DETAIL



F SECTION

BEDDING HDPE PIPE DETAIL

CORRUGATED GALVANIZED STEEL PIPE (TYPE I)

PIPE DIA. (in.)	MIN.FILL* (in.)	2-2/3" X 1/2" CORRUGATION SHEET THICKNESS gage	(in.)	(mm)	3" X 1" & 5" X 1" CORRUGATION MIN.FILL* (in.)	SHEET THICKNESS gage	(in.)	(mm)
24	12	16	.064	1.63	–	–	–	–
30	12	16	.064	1.63	–	–	–	–
36	12	16	.064	1.63	–	–	–	–
42	12	16	.064	1.63	12	16	.064	1.63
48	12	16	.064	1.63	12	16	.064	1.63

* MINIMUM DEPTH OF COVER ABOVE TOP OF PIPE, MAXIMUM DEPTH OF COVER ABOVE TOP OF PIPE IS 20 FEET.

FOR LARGER PIPE SIZES SEE: STORM SEWER AND RIPRAP DETAILS SHEET

INTERCEPTOR STRUCTURE DETAIL NOTES:

1. INTERCEPTOR OUTFALL PIPES WITHIN THE HCFCD RIGHT-OF-WAY SHALL BE CMP OR HDPE PIPE IN ACCORDANCE WITH SPECIFICATION SECTION 02642– CORRUGATED METAL PIPE, HIGH DENSITY POLYETHYLENE (HDPE) PIPE IN ACCORDANCE WITH SPECIFICATION SECTION 2505–HIGH DENSITY POLYETHYLENE, OR APPROVED EQUAL. USE TABLE BELOW FOR CORRUGATED GALVANIZED STEEL PIPE.
2. PROVIDE AND PLACE CEMENT STABILIZED SAND IN ACCORDANCE WITH SPECIFICATION SECTION 02321–CEMENT STABILIZED SAND AND SECTION 02316 – STRUCTURAL EXCAVATING.
3. EXCAVATION, FILL AND BACKFILL FOR STORM SEWER OUTFALLS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02316–STRUCTURAL EXCAVATING AND BACKFILLING.
4. CONCRETE SHALL BE STRUCTURAL CONCRETE IN ACCORDANCE WITH SPECIFICATION SECTION 03310–CONCRETE.
5. INTERCEPTOR STRUCTURES:
   a. ADJUST LENGTH AND WIDTH IN FIELD AS NECESSARY.
   b. 2–FEET DEEP X 8–INCH WIDE TOE ALL AROUND THE STRUCTURE.
   c. STEEL REINFORCING–#4 BARS (GRADE 40) AT 12 INCHES ON CENTER EACH WAY.
   d. ANY INTERCEPTOR OUTFALL PIPE LARGER THAN MAXIMUM SIZE INDICATED REQUIRES A SEPARATE DETAIL.
   e. MATCH TOP OF CONCRETE WITH NATURAL GROUND.
6. IN DETENTION BASINS, SET FLOWLINE OF OUTFALL AT TOE OF THE SLOPE. IN CHANNEL, USE ELEVATION INDICATED IN THE TABLE OR 1 FOOT ABOVE NORMAL WATER LEVEL WHICH EVER IS HIGHER.
7. SEE CONCRETE CHANNEL LINING DETAIL SHEET FOR CMP OUTFALL DETAILS THROUGH CONCRETE CHANNEL LINING.
8. CONCRETE PAD AROUND TYPE "B" INLET: PAID FOR AS CONCRETE INTERCEPTOR STRUCTURE PER UNIT PRICE SCHEDULE. TYPE "B" INLET BOX, COH DWG. NO. 02632–02 WITH GRATE TOP, VULCAN FOUNDRY COMPANY, V–4880–1 OR APPROVED EQUAL, APPROX. 489 SQ.IN. OPENING.
9. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
10. STRUCTURAL CONCRETE WITH #4 BARS (GRADE 40) 12 INCH O.C. EACH WAY – FOR COLLARS ONLY.
11. EPOXY CLEAN WATER CLEAR CHOICE LOGO BUTTON ON INTERCEPTORS. LOCATION TO BE DETERMINED BY THE ENGINEER.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD WHEN COMPLETED BY OTHERS. AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE §137.33 (b) AND (c) OF THE TEXAS STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS.

No.	DATE	REVISIONS	APP.

REV	DESCRIPTION	DATE	APPR

N–T17000–0012–3

LUMPKIN ROAD

INTERCEPTOR STRUCTURE DETAILS

PREPARED: CHECKED: APPROVED:

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

INTERCEPTOR STRUCTURE DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=20'

SHEET: 45 OF 226

9900 Northwest Freeway
Houston, Texas 77092

DATE: 12–21–2010
SCALE: NTS

SHEET NUMBER
OF

HCFCD Standard Detail Sheets_2010

STD\INTERCEPTOR STRUCTURE DETAILS

pw:\\lodpw.lodco.int:prjectwise\Documents\Projects\130-10384-02\1-4-0-Production\4-01-Drawings\Standards\Interceptor Structure Details\45of226.dgn 2:28:24 PM MJGuthrie

GENERAL NOTES

1. GOVERNING CODES AND STANDARDS:
   - A. INTERNATIONAL BUILDING CODE (IBC), 009.
   - B. AMERICAN CONCRETE INSTITUTE (ACI) – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318-05.
   - C. AMERICAN CONCRETE INSTITUTE (ACI) – CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES AND COMMENTARY, ACI 350-06.
2. DESIGN LOADS
   - A. DEAD LOAD INCLUDES WEIGHT OF STRUCTURAL COMPONENTS AND EARTH.

     SOIL UNIT WEIGHT = 130 PCF

   - B. LIVE LOAD ON TOP SLAB:

     HS-20 WHEEL LOAD
3. PRINCIPAL OPENINGS ARE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL EXAMINE THE CIVIL DRAWINGS FOR REQUIRED OPENINGS TO BE PROVIDED, WHETHER SHOWN ON THESE DRAWINGS OR NOT. VERIFY SIZE AND LOCATION OF ALL OPENINGS.
4. SEE CIVIL DRAWINGS FOR FLOOR ELEVATIONS, SLOPES, LOCATION OF DEPRESSED FLOOR AREAS, FLOOR FINISHES, WALKS, CURBS, TOPPING SLABS, ETC. ALL SLAB RECESSES SHALL BE PROVIDED BY THE CONTRACTOR WHETHER SHOWN ON THE STRUCTURAL DRAWINGS OR NOT.
5. STRUCTURAL MEMBERS HAVE BEEN SPACED TO ACCOMMODATE THE EQUIPMENT SPECIFIED. ANY SUBSTITUTIONS CAUSING CHANGES IN THE STRUCTURE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL. THE CALCULATIONS AND ANY ACCOMPANYING DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER, LICENSED IN THE STATE OF TEXAS.
6. ANY REQUIRED CHANGES TO THE STRUCTURAL DRAWINGS DUE TO THE ACCEPTANCE OF ALTERNATES AND/OR SUBSTITUTES IS THE RESPONSIBILITY OF THE CONTRACTOR AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL. THE CALCULATIONS AND ANY ACCOMPANYING DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER, LICENSED IN THE STATE OF TEXAS.
7. REPRODUCTION NOTE:
   THE USE OR REPRODUCTION OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT, AND OBLIGATES HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HEREIN. IN ADDITION, ALL REFERENCES TO LOCKWOOD, ANDREWS AND NEWNAM, INC., INCLUDING ALL PROFESSIONAL SEALS ARE TO BE REMOVED IF THESE CONTRACT DRAWINGS ARE TO BE USED AS SHOP DRAWINGS.
8. REFER TO THE SPECIFICATIONS FOR DETAILED REQUIREMENTS NOT FULLY ADDRESSED IN THESE NOTES.

STRUCTURAL EXCAVATION, BACKFILL, AND COMPACTION NOTES

1. BEFORE THE START OF EARTHWORK OPERATIONS, ADEQUATELY PROTECT EXISTING STRUCTURES, UTILITIES, AND OTHER PERMANENT OBJECTS FROM DAMAGE. THE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ALL DAMAGED ELEMENTS, AT NO ADDITIONAL COST TO THE OWNER.
2. EXCAVATION WORK SHALL BE NEAT AND FREE OF DEBRIS AND LOOSE MATERIAL. REFER TO THE SPECIFICATIONS FOR PROTECTION OF EXCAVATIONS.
3. EXCAVATIONS SHALL NOT BE MADE DURING INCLEMENT WEATHER, WATER ACCUMULATION IN EXCAVATIONS EXCEEDING 1 INCH SHALL BE PUMPED OUT BEFORE THE CONCRETE IS PLACED.
4. ALL EXCAVATIONS AND BACKFILL OPERATIONS SHALL BE IN ACCORDANCE WITH THE LATEST OSHA EXCAVATION SAFETY STANDARDS.
5. ALL SURFICIAL VEGETATION AND OTHER ORGANIC MATTER SHALL BE REMOVED BENEATH PROPOSED FOUNDATIONS AND SLABS-ON-GRADE PRIOR TO CONSTRUCTION. THE EXPOSED SURFACE SHALL BE PROOF-ROLLED WITH ANY SOFT OR WEAK AREAS REMOVED AND REPLACED WITH COMPACTED SELECT FILL.
6. BACKFILL MATERIAL SHALL BE A NON-ORGANIC, NON-EXPANSIVE, WELL-GRADED SOIL AND SHALL BE COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY, MEETING THE REQUIREMENTS OF CLASS I BACKFILL AS SPECIFIED IN SPECIFICATION SECTION 02316 AND 02320.

CONCRETE NOTES

1. CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318 AND ACI 350.
2. CONCRETE FOR THE JUNCTION BOX STRUCTURES SHALL BE NORMAL WEIGHT CONCRETE AND HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 POUNDS PER SQUARE INCH AT 28 DAYS.
3. FOR ALL OTHER CONCRETE STRENGTH REQUIREMENTS, REFER TO THE CIVIL SHEETS.
4. NORMAL WEIGHT CONCRETE SHALL WEIGH NOT MORE THAN 150 PCF.
5. DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS SHALL COMPLY WITH ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" (ACI 315).
6. REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL, CONFORMING TO ASTM A 615 WITH SUPPLEMENTARY REQUIREMENTS S1, GRADE 60. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185, GRADE 60 AND SHALL BE SUPPLIED IN FLAT SHEETS ONLY.
7. PROVIDE ONE NO. 5 x 4'-0" BAR AT ALL RE-ENTRANT CORNERS, PLACED ON THE DIAGONAL WITH 1 INCH CLEARANCE FROM CORNER AND TOP OF SLAB. (THIS INCLUDES ANY RECTILINEAR HOLES MADE DUE TO STANDARD CONSTRUCTION PRACTICES.)
8. PROVIDE A 3/4-INCH CHAMFER AT ALL EXPOSED EDGES OF CONCRETE UNLESS DETAILED OTHERWISE.
9. PROVIDE PLASTIC CHAIRS AND SPACERS AT 5'-0" O.C. FOR ALL SLABS AND BEAMS ABOVE GRADE.
10. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS 30 BAR DIAMETERS UNLESS NOTED OTHERWISE.
11. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. CONSTRUCTION JOINTS SHALL BE MADE IN THE CENTER OF SPANS WITH VERTICAL BULKHEADS UNLESS NOTED OTHERWISE. THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS.
12. HORIZONTAL WALL REINFORCEMENT SHALL BE CONTINUOUS WITH 90 DEGREE BENDS AND 12 INCH RETURNS ALONG EACH WALL AT CORNERS.
13. PROVIDE NO. 4 HORIZONTAL AT 12 INCHES O.C. MAXIMUM IN EACH FACE OF BEAMS EXCEEDING 21 INCHES IN DEPTH.
14. MINIMUM REINFORCING STEEL COVERAGE SHALL BE AS FOLLOWS:

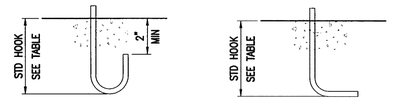
TOP SLABS	1½"
WALLS	1½"
CONCRETE CAST PERMANENTLY AGAINST EARTH	3"
BASE SLABS	3" BOTTOM
	1½" TOP & SIDES

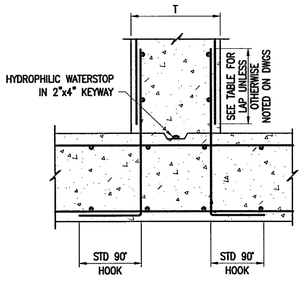
15. COAT THE ENDS OF ANY REINFORCING STEEL BARS LEFT EXPOSED IN THE COMPLETED STRUCTURE.

REINFORCING LAP SPLICE & EMBEDMENT SCHEDULE

BAR SIZE	MIN LAP LENGTH (IN)		MIN EMBEDMENT LENGTH (IN)		
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	STD HOOK
3	24	18	18	14	7
4	32	24	25	19	9
5	40	31	31	24	12
6	48	37	37	28	14
7	70	54	54	42	17
8	80	62	62	47	19
9	90	70	70	54	21
10	102	78	78	60	24
11	113	87	87	67	27

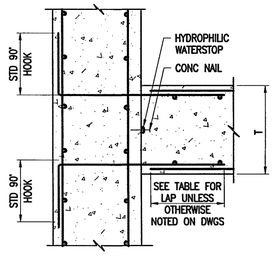
1. LAP SPLICES AND EMBEDMENT LENGTHS NOT SHOWN ON THE DRAWINGS SHALL CONFORM TO THE TABLE ABOVE.
2. TOB BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES DEPTH OF CONCRETE CAST BELOW THE REINFORCING BAR.
3. EMBEDMENT LENGTH OF STANDARD HOOKS.



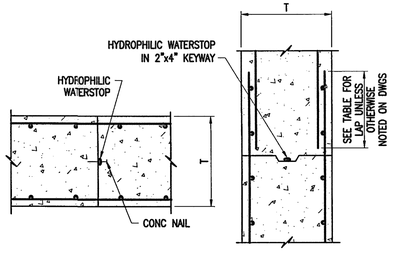


NOTE:
REINFORCING SHALL BE CONTINUOUS THROUGH JOINT. WATERSTOP REQUIRED ONLY IF JOINT IS BELOW MAX. WATER SURFACE OR BELOW FINISHED GRADE.

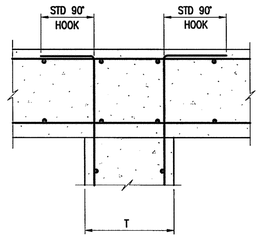
1 CONSTRUCTION JOINT
BASE OF WALLS



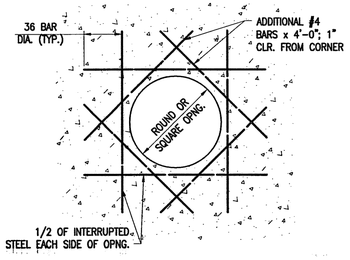
2 CONSTRUCTION JOINT
WALL INTERSECTIONS



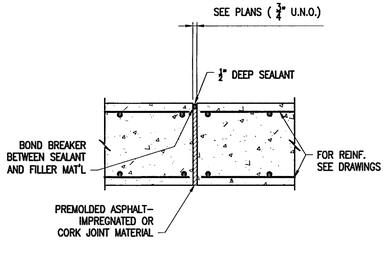
3 CONSTRUCTION JOINT
FOR SLABS AND WALLS



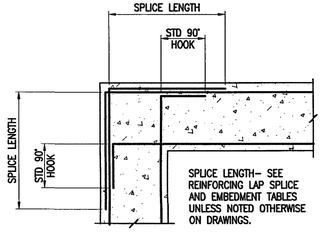
4 CONSTRUCTION JOINT
WALL TO SLAB SOFFIT



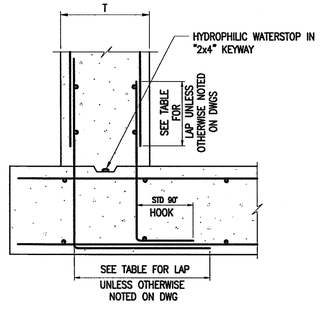
5 REINFORCING AT OPENINGS 8" OR LARGER



6 ISOLATION OR EXPANSION JOINT WITHOUT DOWELS



7 CORNER REINFORCING
FOR WALLS OR GRADE BEAMS



8 CONSTRUCTION JOINT
BASE OF WALLS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
JENNIFER N. SAVAGE
111686
LICENSED
PROFESSIONAL ENGINEER
7/17/14

Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
JUNCTION BOX
GENERAL NOTES AND TYPICAL DETAILS (S1)

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: NONE
CITY DWG NO.
VERT:
HORZ:
SHEET: 46 OF 186

Savage, Jennifer
7/15/2014
10:01:56 AM
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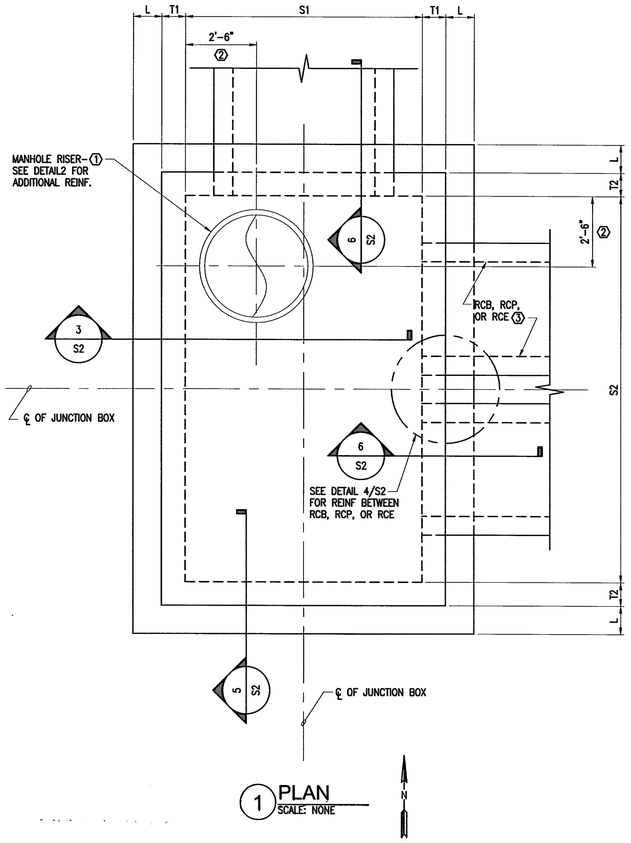
JUNCTION BOX DIMENSIONS										REINFORCING STEEL															
										BARS A		BARS B		BARS C		BARS D		BARS M		BARS N		BARS R		BARS S	
ID	S1	S2	H	T1	T2	TS	BS	L	EL. "A"	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.	SIZE	SPA.
JB AM38A	6'-0"	15'-9"	10'-5 1/2"	12"	18"	1'-0"	1'-3"	1'-0"	65.85'	#4	8"	#5	6"	#5	8"	#7	6"	#5	12"	#5	12"	#5	12"	#5	12"
JB AM38	10'-4"	5'-8"	11'-3 1/4"	18"	12"	1'-0"	1'-3"	1'-0"	65.20'	#5	8"	#7	8"	#4	8"	#5	6"	#5	12"	#5	12"	#5	12"	#5	12"
JB AM42	22'-9"	11'-6"	11'-10 1/2"	21"	18"	1'-3"	1'-3"	1'-0"	64.60'	#5	8"	#7	6"	#5	8"	#7	8"	#5	12"	#5	6"	#5	12"	#5	6"
JB AM44	6'-0"	11'-6"	11'-11 1/2"	12"	18"	1'-0"	1'-3"	1'-0"	68.33'	#4	8"	#5	6"	#5	8"	#7	8"	#5	12"	#5	12"	#5	12"	#5	12"
JB AM56	13'-8"	10'-6"	14'-4 1/4"	21"	21"	1'-3"	1'-3"	1'-0"	64.22'	#5	8"	#7	6"	#5	8"	#7	8"	#5	12"	#5	6"	#5	12"	#5	6"
JB AM58 & AM55	23'-0"	6'-0"	11'-1"	21"	12"	1'-0"	1'-3"	1'-0"	64.49'	#5	8"	#7	6"	#4	8"	#5	6"	#5	12"	#5	12"	#5	12"	#5	12"

KEYED NOTES:

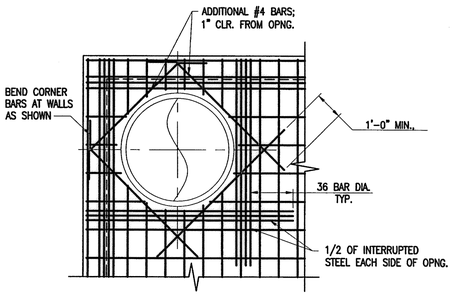
① SEE PLAN AND PROFILE SHEETS FOR THE TOP ELEVATION OF THE MANHOLE COVERS. SEE JUNCTION BOX MANHOLE RISER SHEET FOR MANHOLE DETAILS.

② TYPICAL DIMENSION UNLESS OTHERWISE NOTED ON PLAN.

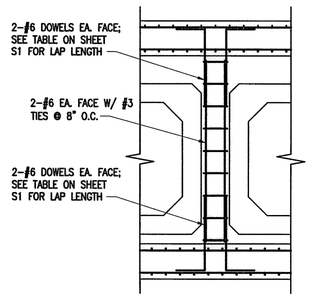
③ SEE PLAN AND PROFILE SHEETS FOR RCB, RCP, OR RCE SIZE, FLOWLINE, AND LOCATION.



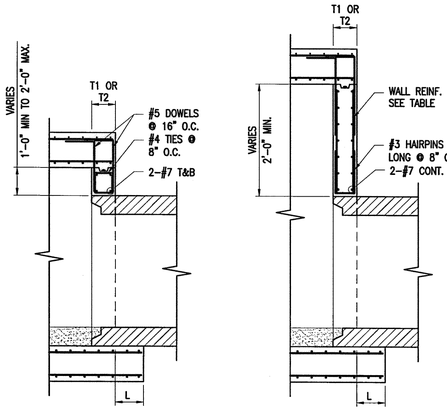
1 PLAN
SCALE: NONE



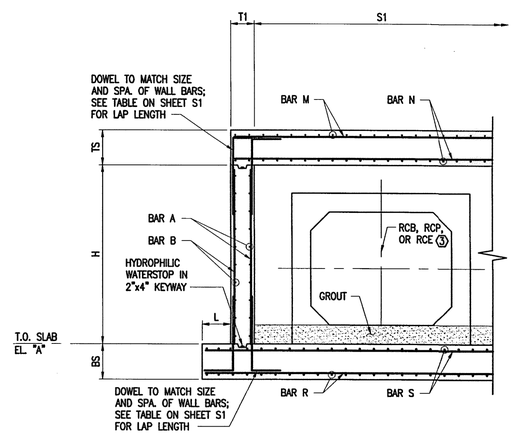
2 PLAN- REINF. STEEL AT RISER OPNG.
SCALE: NONE



4 DETAIL - REINF. BETWEEN RCB OR RCP
SCALE: NONE

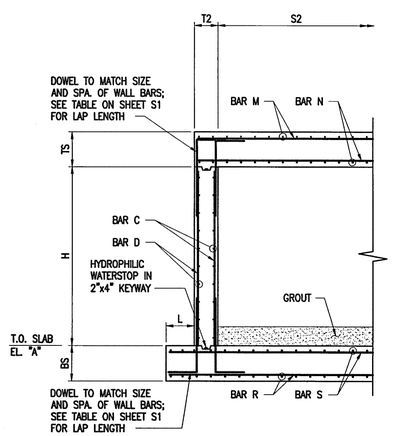


6 SECTION AT WALL OPENINGS
SCALE: NONE



3 SECTION
SCALE: NONE

NOTE: MAIN REINF. FOR TOP AND BOTTOM SLAB TO RUN IN THE SHORT DIRECTION. PLACE MAIN REINF. ON OUTSIDE FACE OF EACH SLAB.



5 SECTION
SCALE: NONE

No.	DATE	REVISIONS	APP.

Savage, Jennifer
7/15/2014 10:01:56 AM

STATE OF TEXAS
JENNIFER N. SAVAGE
111686
LICENSED PROFESSIONAL ENGINEER
7/17/14

Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
JUNCTION BOX
PLAN, SECTION, AND SCHEDULE (S2)

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY:
DRAWING SCALE: NONE | CITY DWG NO.:
VERT:
HORZ:
SHEET: 47 OF 186

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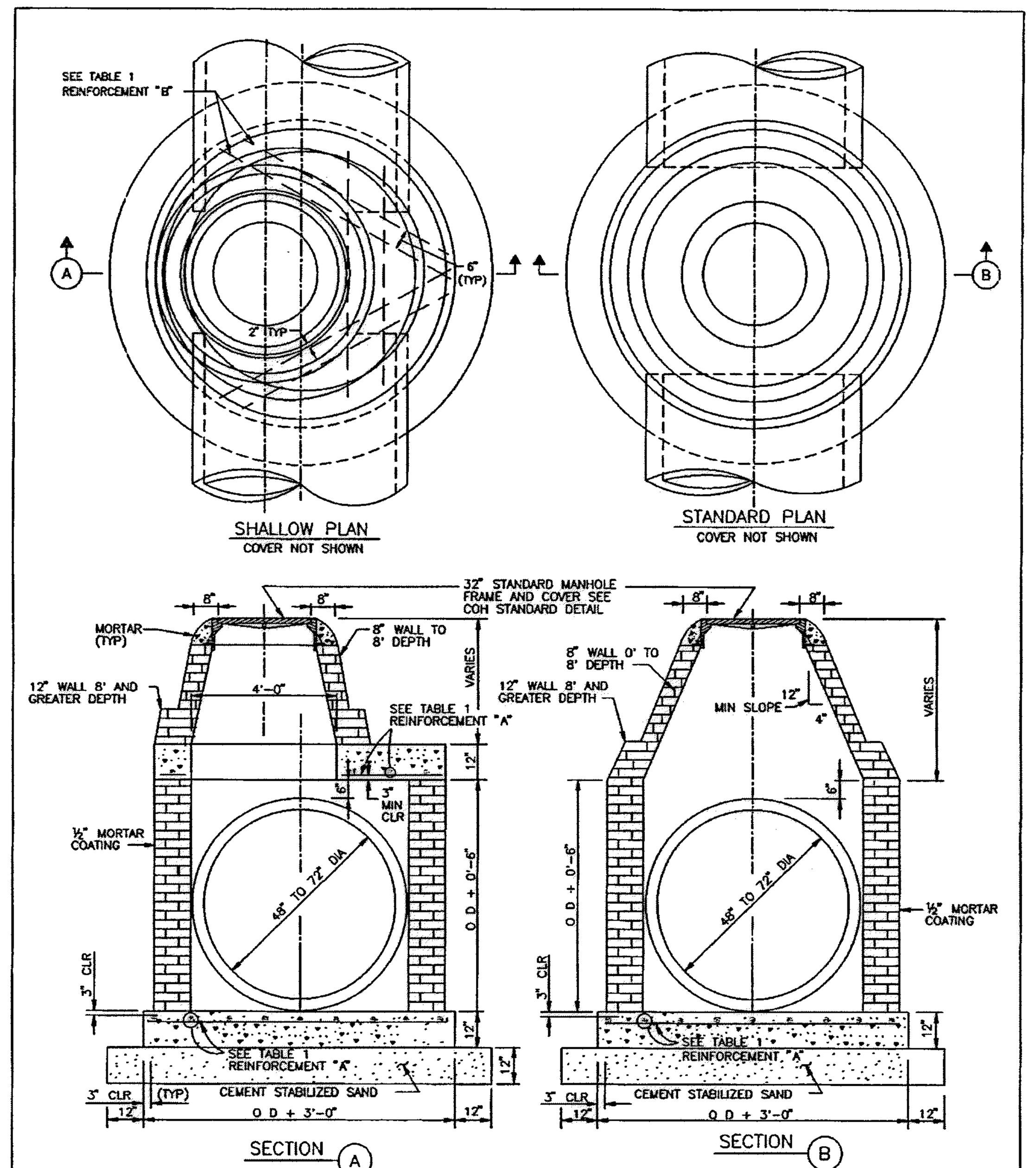


NOTE:
WHEN MANHOLE HAS LESS DEPTH THAN MIN SHOWN ON TABLE 1, BUILD SECTION A OTHERWISE BUILD SECTION B.

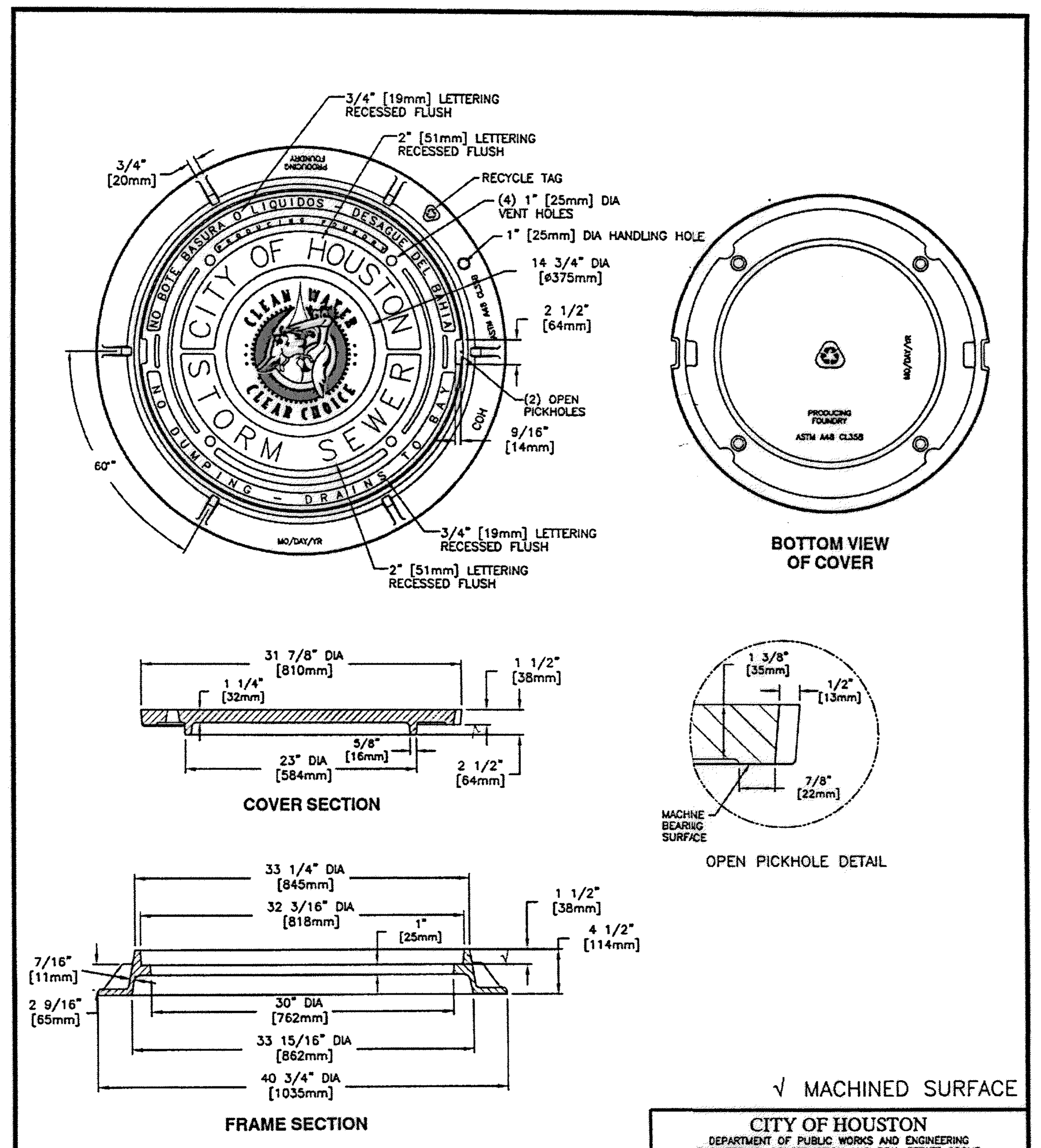
TABLE 1
DATA FOR VARIOUS PIPE DIAMETERS

PIPE DIA (INCHES)	MIN DEPTH	REINFORCEMENT ("A")	REINFORCEMENT ("B")
48"	8'-0"	#5 @ 12 E W	2 - #6
54"	9'-4"	#5 @ 10 E W	2 - #6
60"	10'-7"	#5 @ 8 E W	2 - #7
66"	11'-10"	#5 @ 7 E W	2 - #7
72"	13'-2"	#5 @ 6 E W	2 - #7

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

STORM SEWER
MANHOLE TYPE "C"
FOR 48" TO 72" DIAMETER RCP
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 | DWG NO: 02081-02



1) NOTE: APPROXIMATE WEIGHTS.
FRAME- 170 LBS 77kg
COVER- 270 LBS 123kg
UNIT- 440 LBS 200kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-1420 ASY OR APPROVED EQUAL

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

STORM SEWER MANHOLE FRAME AND COVER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: 04-01-07 | DWG. NO: 02084-02

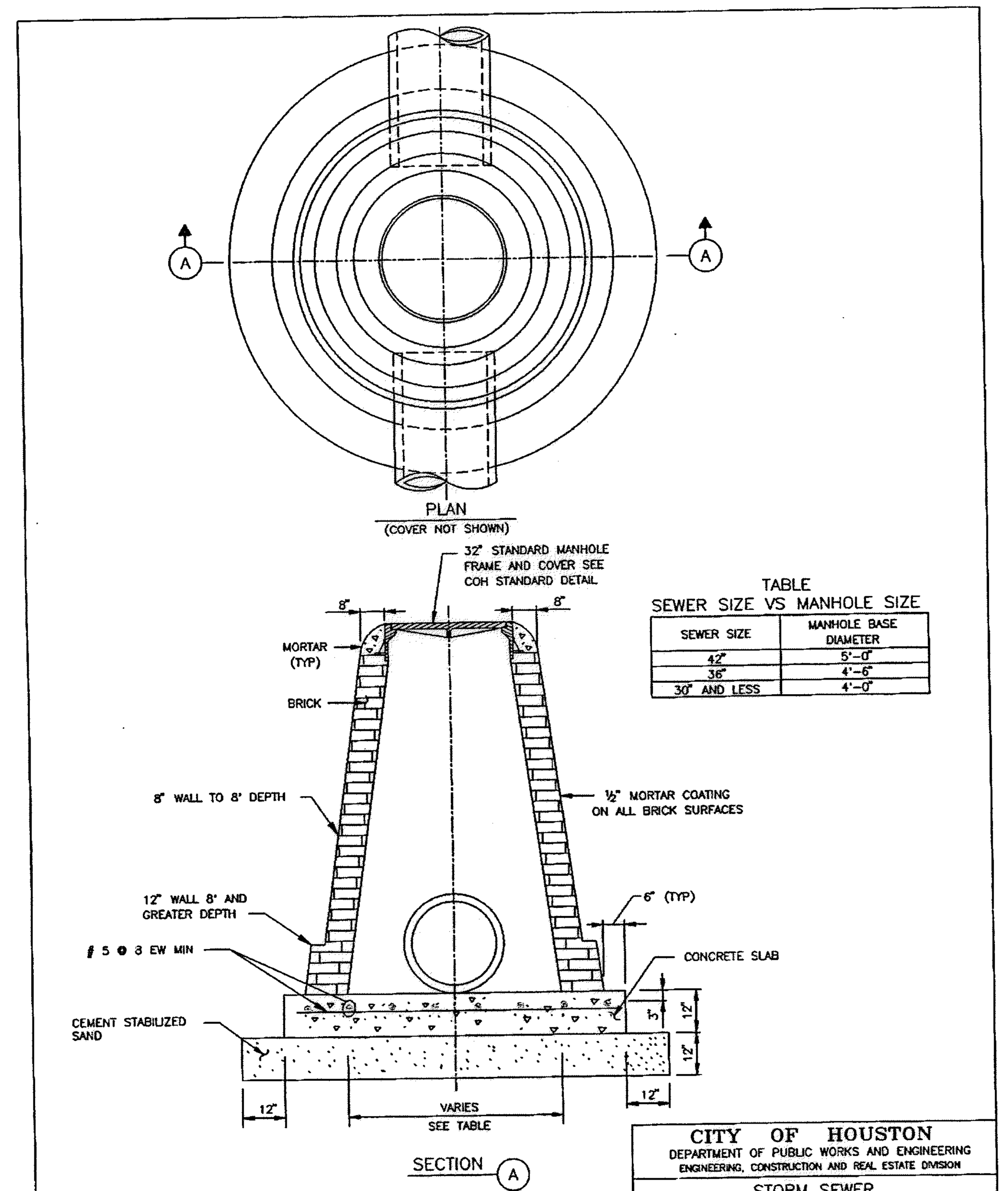


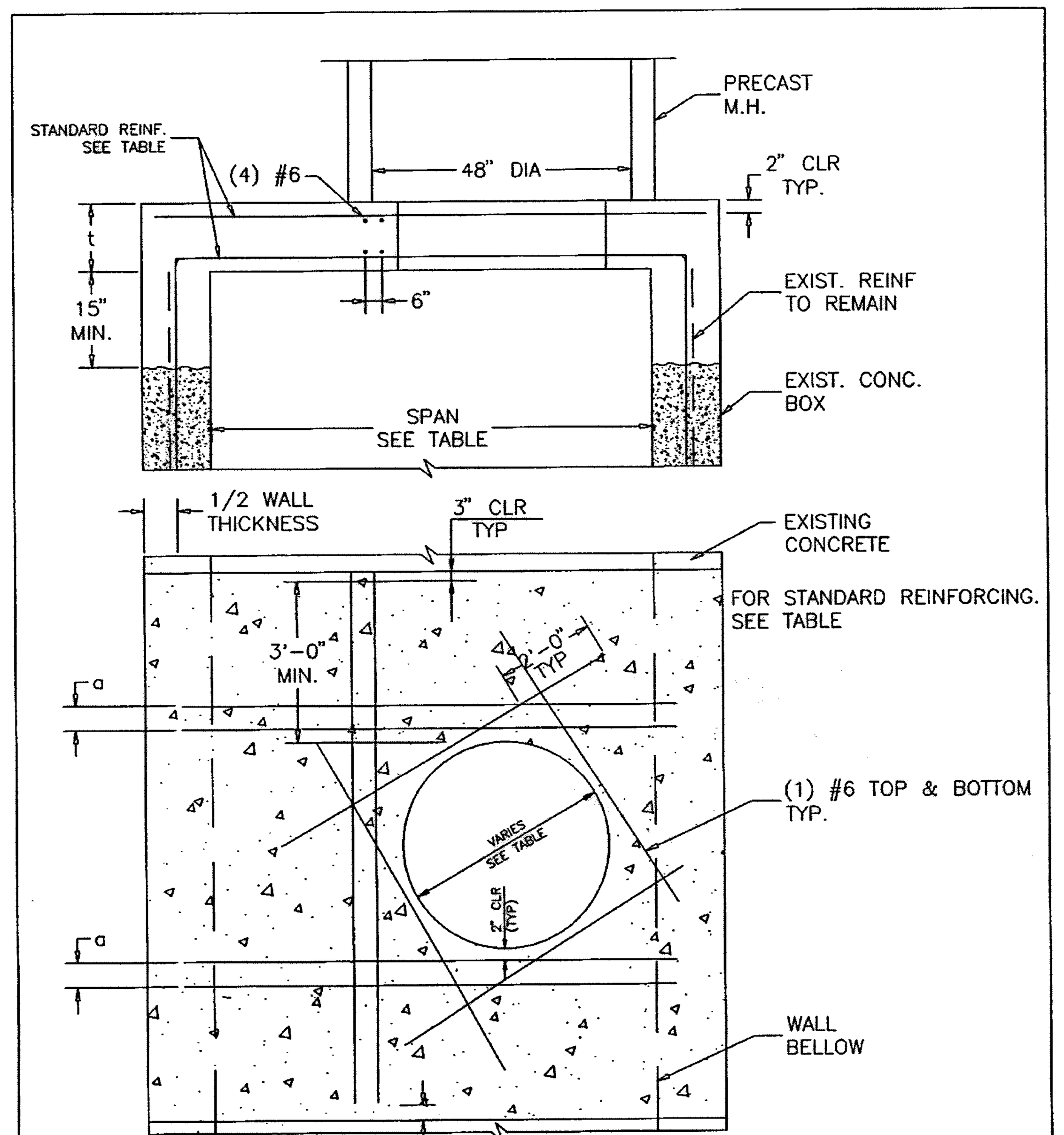
TABLE
SEWER SIZE VS MANHOLE SIZE

SEWER SIZE	MANHOLE BASE DIAMETER
42"	5'-0"
36"	4'-6"
30" AND LESS	4'-0"

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

STORM SEWER
MANHOLE TYPE "C" FOR 42" DIAMETER RCP AND SMALLER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 | DWG NO: 02081-01



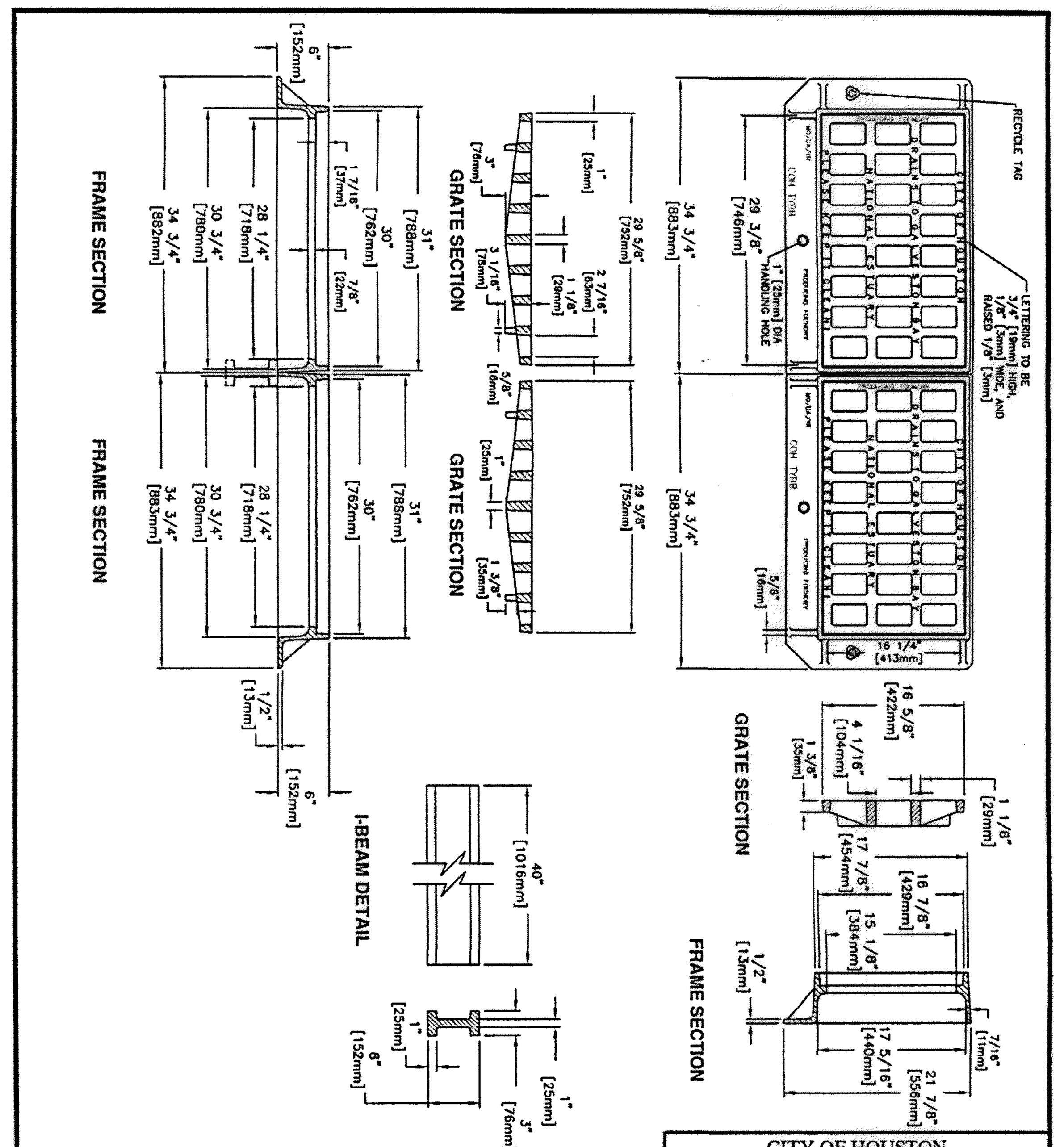
SPAN (ft)	t (in)	STANDARD REINF	OPENING SIZE	a
3	14	#6 @ 11" O.C. T& B	36" f	2#6 @ 5[illegible] O.C. T&B
4	16	#6 @ 9" O.C. T& B	36" f	2#6 @ 4[illegible] O.C. T&B
5	18	#6 @ 8" O.C. T& B	48" f	3#6 @ 4[illegible] O.C. T&B
6	20	#6 @ 7" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
7	20	#6 @ 7" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
8	21	#6 @ 7" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
9	21	#6 @ 7" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
10	22	#6 @ 6" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
11	23	#6 @ 6" O.C. T& B	48" f	4#6 @ 3[illegible] O.C. T&B
12	23	#6 @ 5" O.C. T& B	48" f	5#6 @ 3" O.C. T&B

DESIGNED FOR HS 20 W/ 2'-0" COVER TO 20'-0" COVER

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

PROPOSED MANHOLE ON EXISTING BOX STORM SEWER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 | DWG NO: 02081-08



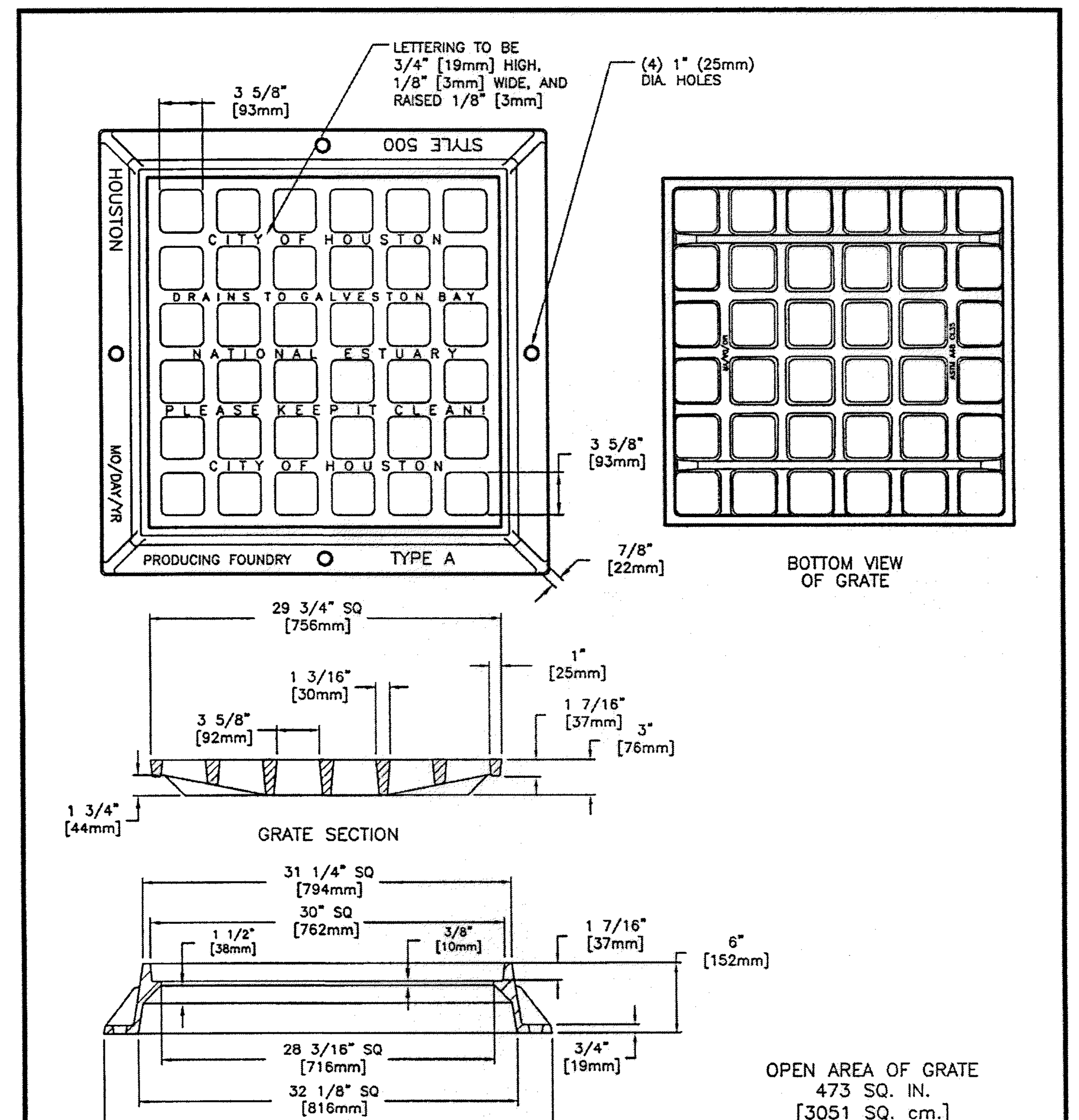
1) NOTE: APPROXIMATE WEIGHTS.
GRATE- 115 LBS 52kg
FRAME- 120 LBS 55kg
I BEAM- 107 LBS 49kg
UNIT- 577 LBS 262kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-4243 ASY OR APPROVED EQUAL

OPEN AREA OF GRATE:
240 SQ. IN.
1548 SQ. cm.

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

STORM SEWER FRAME AND GRATE FOR TYPE "BB" INLET DOUBLE ASSEMBLY
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: 04-01-07 | DWG. NO: 02084-05



OPEN AREA OF GRATE
473 SQ. IN.
[3051 SQ. cm.]

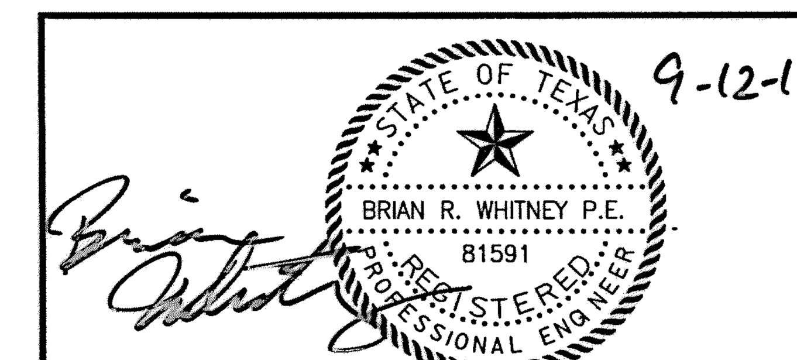
1) NOTE: APPROXIMATE WEIGHTS.
GRATE- 190 LBS 86kg
FRAME- 235 LBS 107kg
UNIT- 425 LBS 193kg
2) MATERIAL- GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-4880 ASY OR APPROVED EQUAL

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

STORM SEWER TYPE "A" INLET GRATE AND FRAME
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: 04-01-07 | DWG. NO: 02084-06

No.	DATE	REVISIONS	APP.



Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD DRAINAGE DETAILS

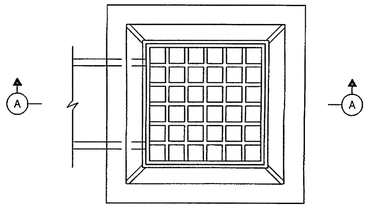
SHEET 1 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

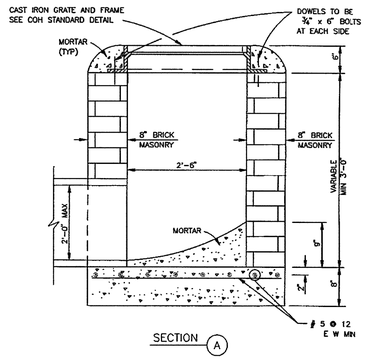
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
VERT: HORZ: NOT TO SCALE
SHEET: 48 OF 226

pw:\\ladpw.lada.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Standards\48-001-Standard Drainage Details32014.dgn 2:29:53 PM MJGuthrie



PLAN

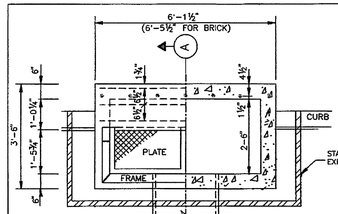


SECTION (A)

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

STORM SEWER
TYPE "A" GRATE INLET
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02632-01



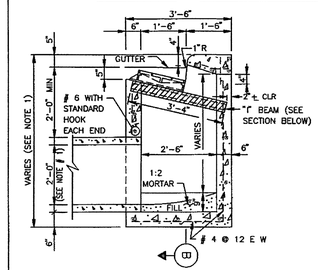
HALF PLAN HALF SECTION PLAN

GENERAL NOTES:

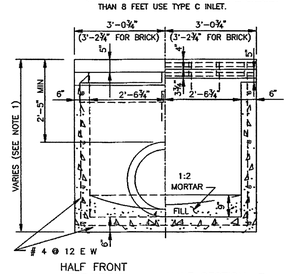
USE STD CAST IRON FRAME & PLATES.
LEAD SHALL LEAVE INLET AT LOCATION AND GRADE REQUIRED.
WHEN BRICK INLETS ARE BUILT EXTEND DOWELS 4 INCHES FROM CURB BEAM INTO BRICKWORK. WHEN BRICK INLETS ARE BUILT, WALLS SHALL BE INCREASED TO 8 INCHES, AND INLET BEAMS TO BE 4 INCHES LONGER.

NOTES:

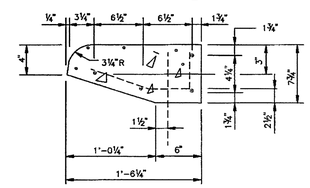
1. DIMENSION VARIES BASED ON PIPE DIAMETER AND WALL THICKNESS.
2. CENTER REINFORCING IN SLAB AND WALLS.
3. CENTER STEEL BEAM ON INLET AND CAST INTO WALLS AS SHOWN.
4. WHEN TOP OF CURB TO FLOWLINE IS GREATER THAN 8 FEET USE TYPE C INLET.



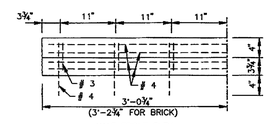
SECTION (A)



HALF FRONT ELEVATION HALF SECTION (B)



TRANSVERSE SECTION



HALF FRONT ELEV

PRECAST CURB BEAM

ACCEPTABLE ALTERNATE STEEL BEAM SIZES:
S6x17.5
W6x16
(GALVANIZED)

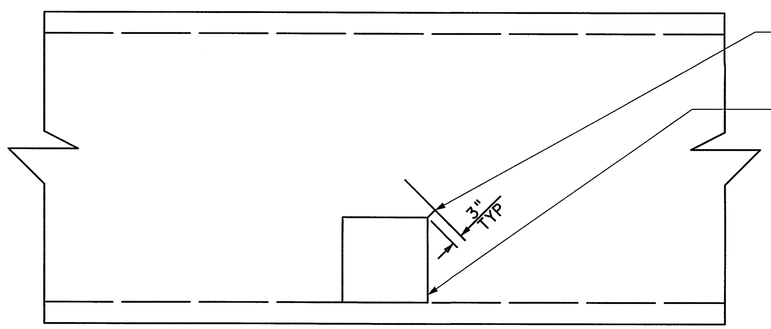
SECTION THRU BEAM

CURB BEAM BAR LIST				
NO	SIZE	LENGTH	SHAPE	LOC
4	# 4	5'-10"	ST	HOR
7	# 4	0'-10"	ST	VERT
7	# 3	1'-6"	BT	

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

STORM SEWER
TYPE "BB" INLET
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02632-04



EQUALIZER DETAIL
N.T.S.

PROVIDE 2 ADDITIONAL #4 BARS X 2'-0" (1 IN EACH FACE OF WALL) AT TOP OF CORNERS OF 2' X 2' EQUALIZER

2' X 2' EQUALIZER OR 30" DIA (MIN)

NOTE:

1. SPACE EQUALIZERS AT PROPOSED PIPE JUNCTIONS AND AT 100-FT (MIN) INTERVALS FROM THESE JUNCTION LOCATIONS.
2. PROVIDE EQUALIZER LOCATIONS WITH BOX CULVERT LAYOUTS FOR APPROVAL OF ENGINEER PRIOR TO CONSTRUCTION.
3. CONTRACTOR MAY PROVIDE ALTERNATE EQUALIZER FOR APPROVAL OF ENGINEER.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
LICENSED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD DRAINAGE DETAILS

SHEET 2 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: NOT TO SCALE HORZ:	
SHEET: 49 OF 226	

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Standards\49-001*Standard Drainage Details 9-12-14.dgn 2:49:48 PM MJGuthrie

GENERAL NOTES:

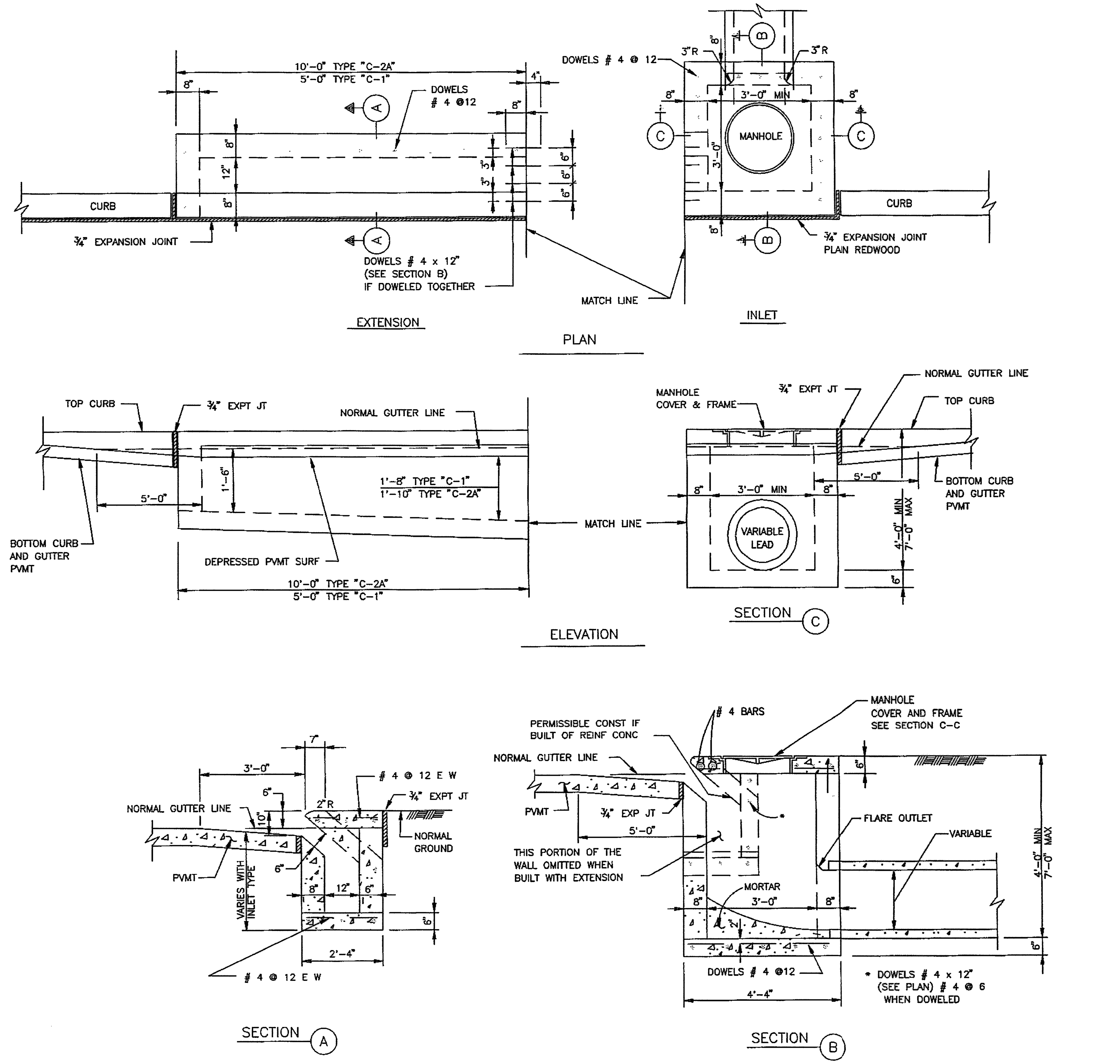
TYPE "C-1" INLET WITH ONE EXTENSION (5'-0" LONG)

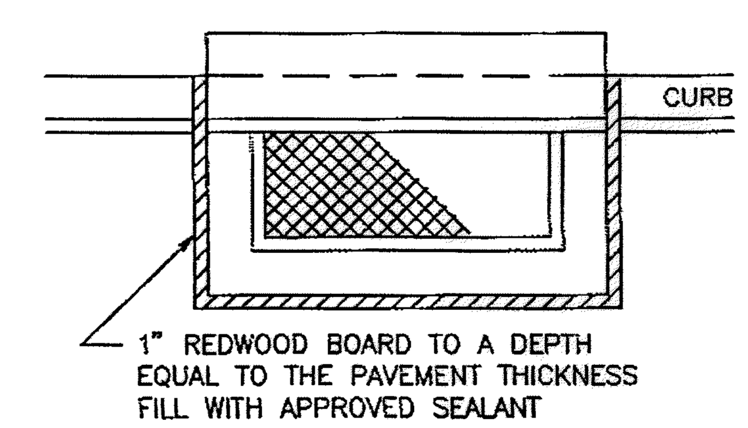
TYPE "C-2" INLET WITH ONE EXTENSION ON EACH SIDE

TYPE "C-2A" INLET WITH DOUBLE EXTENSION (10'-0" LONG)

NOTES:

1. FOR TYPE "C-2A" INLETS PROVIDE A CENTER 6"X6" COLUMNS IN THE CURB LINE BETWEEN ALL EXTENSIONS.
2. WALLS TO BE 6" IF BUILT WITH REINFORCED CONCRETE. WHEN BUILT WITH BRICK WALL, USE STRAIGHT WALL IN BACK WITH 6" REINFORCED CONCRETE TOP SLABS DOWELLED INTO BRICK WALLS WITH # 4 X 8" @ 12.





PLAN VIEW – CURB INLET

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
STORM SEWER TYPE "C-1", "C-2" AND "C-2A" INLETS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02632-06

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER

9-12-14

Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc. — A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD DRAINAGE DETAILS

SHEET 3 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

VERT: HORZ: NOT TO SCALE

SHEET: 50 OF 226

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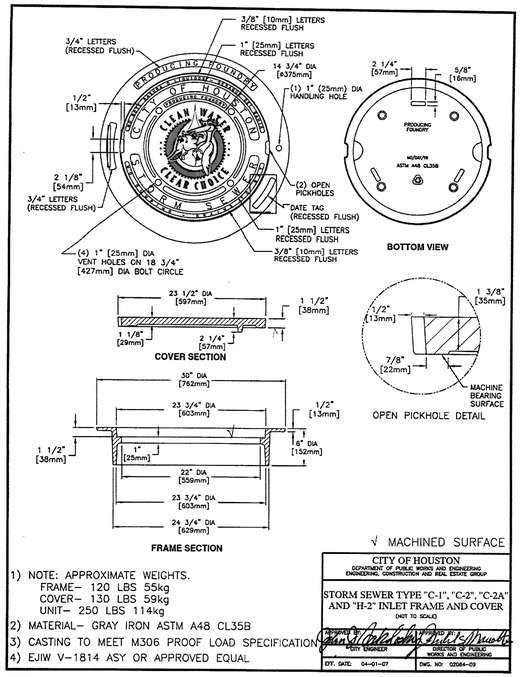


√ MACHINED SURFACE

1) NOTE: APPROXIMATE WEIGHTS.
FRAME– 120 LBS 55kg
COVER– 130 LBS 59kg
UNIT– 250 LBS 114kg
2) MATERIAL– GRAY IRON ASTM A48 CL35B
3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4) EJIW V-1814 ASY OR APPROVED EQUAL

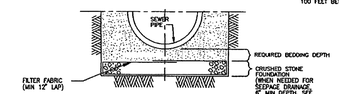
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

STORM SEWER TYPE "C-1", "C-2", "C-2A" AND "H-2" INLET FRAME AND COVER
(NOT TO SCALE)

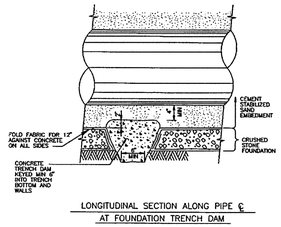
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: 04-01-07 — DWG. NO: 02684-09

NOTES:

1. ACTUAL SHAPE OF CONCRETE FOUNDATION CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT OR OTHER CLASS B EMBEDMENT IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.



CROSS–SECTION
OF CRUSHED STONE FOUNDATION



LONGITUDINAL SECTION ALONG PIPE ℄
AT FOUNDATION TRENCH DAM

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

SANITARY OR STORM SEWER
CRUSHED STONE FOUNDATION
FOR WET STABLE TRENCH
(NOT TO SCALE)

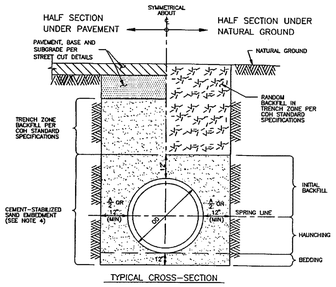
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 — DWG NO: 02317–02

NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER CDH STANDARD. SEE CDH 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"	30"

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 CDH STANDARD SPECIFICATIONS.

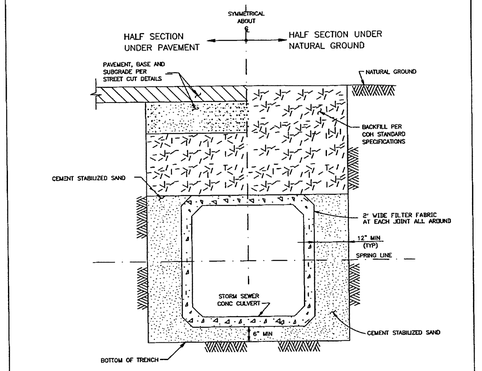


TYPICAL CROSS–SECTION

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

SANITARY OR STORM SEWER
BEDDING AND BACKFILL
FOR DRY STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 — DWG NO: 02317–03



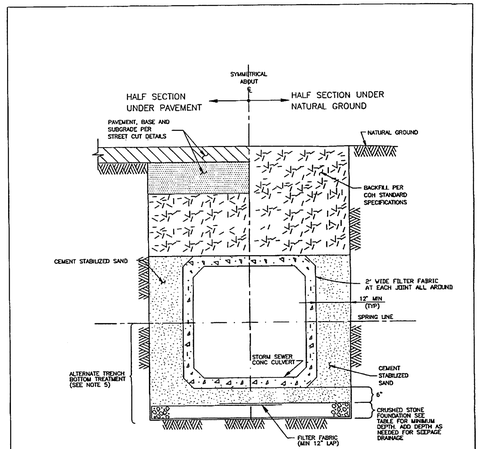
NOTES:

1. WHERE MULTIPLE BOX SEWERS ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPARATION SHALL BE 6".
2. SUBGRADE AND PAVEMENT PER STREET CUT DETAILS – 02951

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

PRECAST CONCRETE BOX
STORM SEWER BEDDING AND BACKFILL
FOR DRY STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 — DWG NO: 02317–05



NOTES:

1. WHERE MULTIPLE BOX SEWERS ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPARATION SHALL BE 6".
2. ALTERNATE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY ENGINEER AND AS PAID FOR IN THE PROPOSAL.

CULVERT SIZE (FT)	FOUNDATION DEPTH (IN)
3' x 2' TO 6' x 6'	12
6' x 6' AND LARGER	18

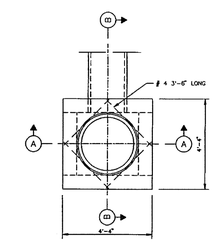
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

PRECAST CONCRETE BOX
STORM SEWER BEDDING AND
BACKFILL FOR WET STABLE TRENCH
(NOT TO SCALE)

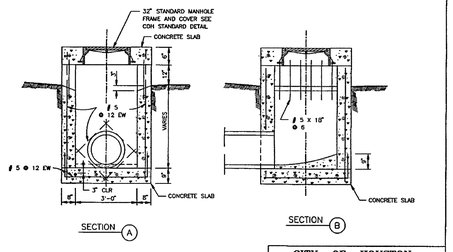
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 — DWG NO: 02317–06

NOTE:

1. TYPE "E" INLET TOP CAN BE CONSTRUCTED ON A STANDARD "C" MANHOLE.



PLAN



SECTION (A) SECTION (B)

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

STORM SEWER
TYPE "E" INLET
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002 — DWG NO: 02632–09

No.	DATE	REVISIONS	APP.

9-12-14

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD DRAINAGE DETAILS

SHEET 4 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY:

DRAWING SCALE: CITY DWG NO.:

VERT: NOT TO SCALE
HORZ:

SHEET: 51 OF 226

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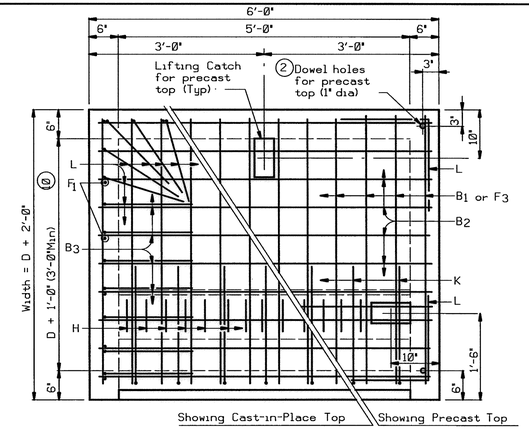
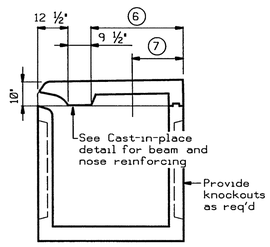
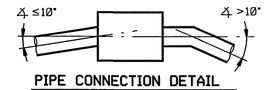


PLAN



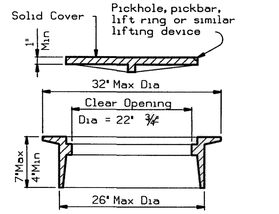
PREFABRICATED INLET

(6) For reinforcing steel and dimensions not shown, see fabricators shop drawings. Structure shall be of the size required to accommodate size of pipe shown elsewhere in the plans. Length of inlet = 6'-0"



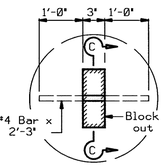
PIPE CONNECTION DETAIL

Connecting pipes should enter within 10° of normal to inlet wall. If necessary, pipe elbow or curved approach alignment should be used to stay within this limit.

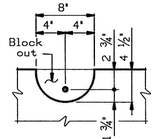


RING AND COVER DETAILS

EJIW No V-1814 or Neenah No R5900-FTX

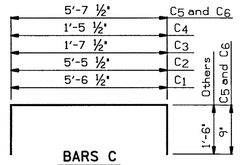


PLAN

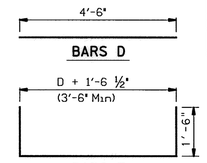


SECTION C-C

LIFTING CATCH

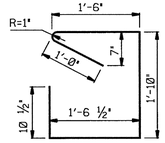


BARS C

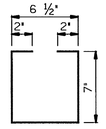


BARS D

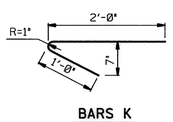
BARS E



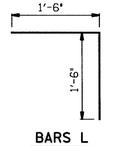
BARS G



BARS H



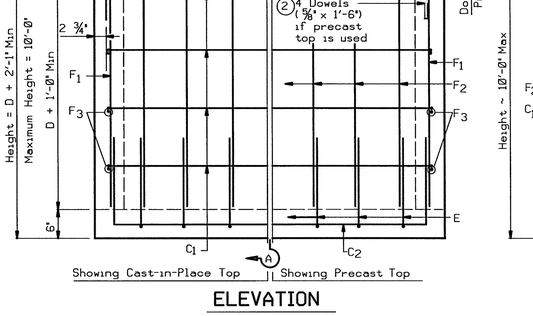
BARS K



BARS L

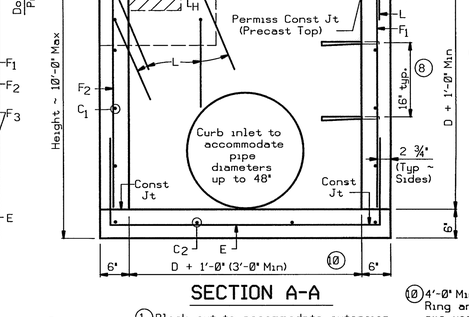
REINF STEEL		
Bar	Size	Spacing
B_1	#4	6"
B_2	#5	6"
B_3	#4	6"
C_{1-2}	#4	12"
C_{3-4}	#4	(9)
C_5	#6	(9)
C_6	#4	(9)
D	#4	(9)
E	#4	12"
F_{1-3}	#4	12"
G	#4	6"
H	#3	4"
K	#4	9"
L	#4	6"

(9) As shown



ELEVATION

(2) If precast top is used, provide 4 ~ ⅞" dia x 1'-6" smooth bars in inlet walls for 1" dia holes

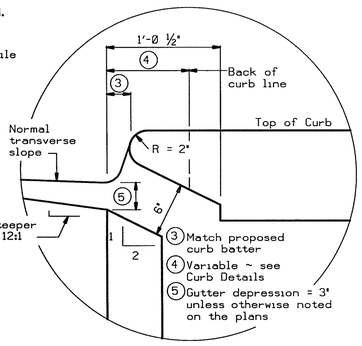


SECTION A-A

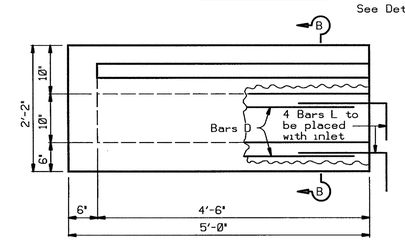
(7) 1'-6" Min, 1'-9" Max Adjust placement of Ring and Cover as necessary to avoid conflict with Bars H.

(8) Ladder rung is Ductile Iron, Aluminum or Cast Iron.

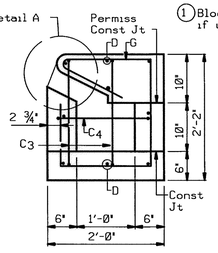
(10) 4'-0" Min when Ring and Cover are used.



DETAIL A

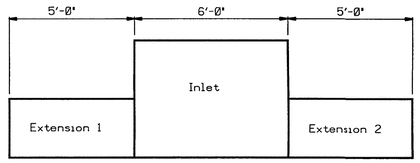


EXTENSION ELEVATION



SECTION B-B

(1) Block out to accommodate extension if used and to place 4 Bars L



Note: If more than one extension is required, they should be located as indicated above. No slope is required in flowline of extension.

EXTENSION PLACEMENT

INSTALL A 3 FT.(HORIZ.) x 6 IN.(VERT.) OPENING ON THE BACK OF THE INLET WHEN SPECIFIED ELSEWHERE ON THE PLANS. MOVE STEPS AS NEEDED. NO REINFORCING ON OPENING/ON 2 IN. ADJACENT TO OPENING.

DESIGNERS: CLARIFY FLOWLINE OF OPENING AND INCLUDE OPENING IN HYDRAULIC CALCULATIONS.

D = Diameter
R = Radius

GENERAL NOTES:

No alternate designs nor alternate details shall be permitted for precast or cast in place inlets.

Quantities shown herein are for Contractor's information only. Unless otherwise shown in the plans, payment will be made for each inlet of the type specified and for each extension. Each five foot curb opening of extension is considered 'one extension' regardless of whether placed monolithically or precast. Extension length shall be in multiples of 5 feet.

Engineer has the option of specifying cast-in-place top with ring and cover or removable precast top as specified elsewhere in plans. Shop drawings are required for Precast Inlets.

In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer.

Ring and cover shall conform to the requirements of AASHTO M306, 'Standard Specification for Drainage Structure Castings'. Materials shall conform to ASTM A48, Class 35B for gray iron castings or ASTM A536, Grade 65-45-12 for ductile iron castings. Aluminum alloy castings shall not be permitted.

Texas Department of Transportation
Houston District

CURB INLET TYPE C
(WITH OR WITHOUT EXTENSION)

HIL-C

FILE: STDD1.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	STD:
©TxDOT Feb 2010	DIST	FED REG	PROJECT NO.		SHEET
REVISIONS	HOUS	6			52
2/2010 Note for alternate design added.	COUNTY		CONTROL	SECT	JOB	HIGHWAY
2/2010 Added note concerning opening on the back of inlet.						

No.	DATE	REVISIONS	APP.

9-12-14
STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CURB INLET TYPE C
(WITH OR WITHOUT EXTENSION)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 52 OF 226

9/3/2014 3:15:53 PM MJGuthrie

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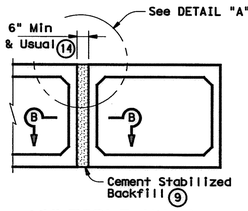
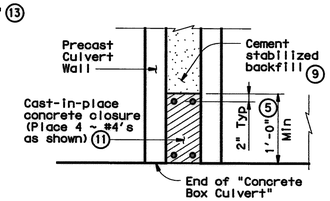
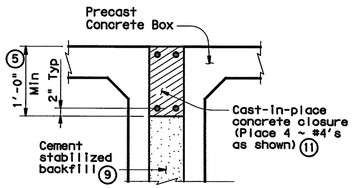


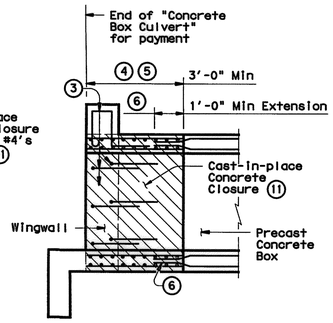
MULTIPLE UNIT PLACEMENT



SECTION B-B

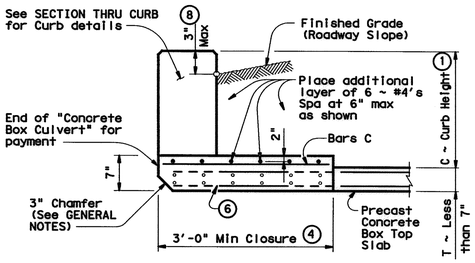


DETAIL "A" (13)

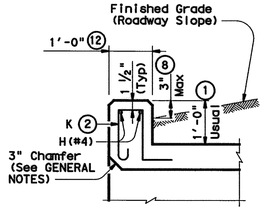


WINGWALL CONNECTION

(Also applies to Safety End Treatment)

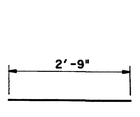


SECTION THRU TOP SLABS LESS THAN 7"

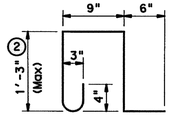


SECTION THRU CURB

(10) QUANTITIES PER FOOT OF CURB	
Reinforcing Steel	4.18 Lb
Concrete	0.037 CY



BARS C ~ #4
(Spa = 1'-0" Max)



BARS K ~ #4
(Spa = 1'-0" Max)
(Length = 4'-3")

1. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.
4. Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be cast short or broken back in the field. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.
5. For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B detail when interior walls are cast full length.
6. Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).
7. Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
   - For structures with bridge rail, curbs shall be flush with finished grade.

   Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement Stabilized Backfill between boxes is considered part of the Box Culvert for payment.
10. All curb concrete and reinforcing is considered part of the Box Culvert for payment.
11. Any additional concrete and reinforcing required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
12. 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in DETAIL "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

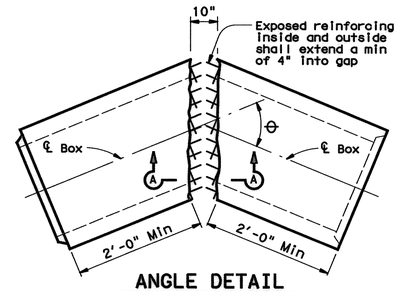
All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Structures".

Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.

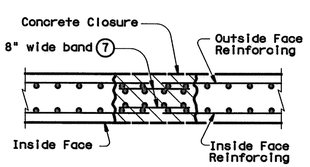
Refer to the Single Box Culverts Precast standard for details not shown.

The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.

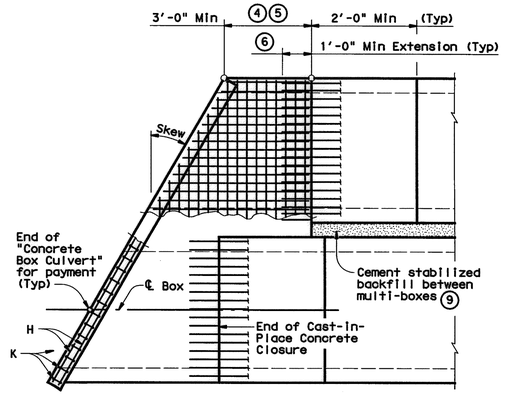
HL93 LOADING



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement)

Texas Department of Transportation — Bridge Division Standard

BOX CULVERTS
PRECAST
MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				53

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PRECAST
MISCELLANEOUS DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=2' HORZ: 1"=20'	
SHEET: 53 OF 226	

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DATE:
FILE:

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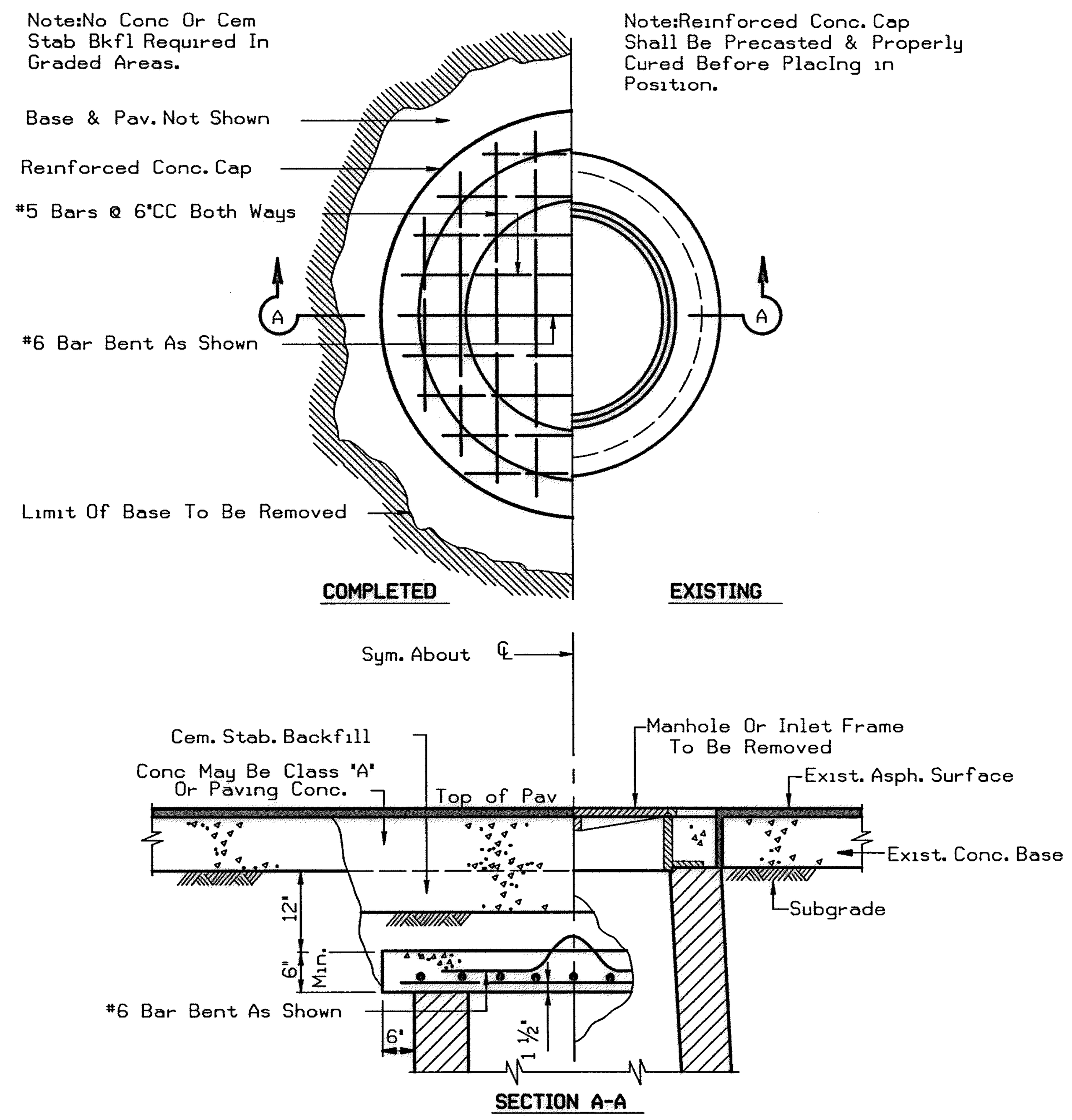
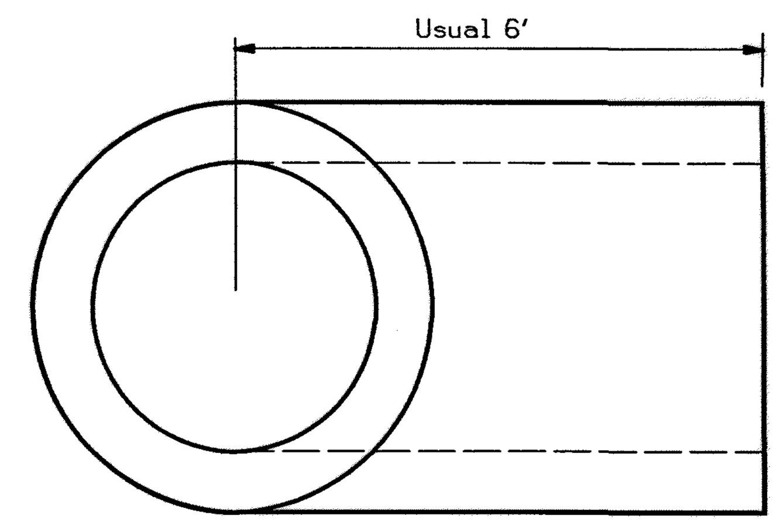
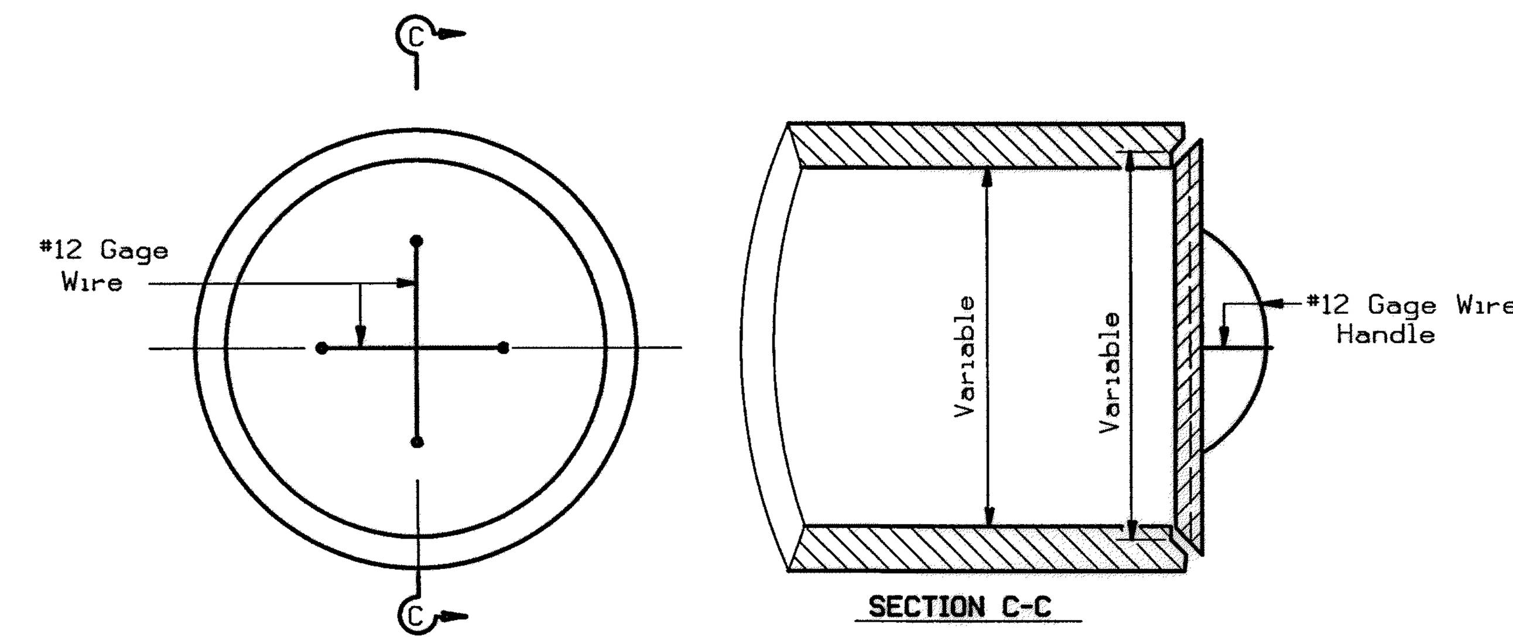


DETAIL SHOWING METHOD OF CAPPING ABANDONED MANHOLES OR INLETS (GRADED OR PAVED AREAS)



Note: Jointing Material Shall Conform To Requirements Of Item 'Reinforced Concrete Pipe.' Material For Tees Shall Conform To Requirements Of Item 'Reinforced Concrete Pipe.' Payment For Tee To Be In Accordance With Item 'Reinforced Concrete Pipe.'

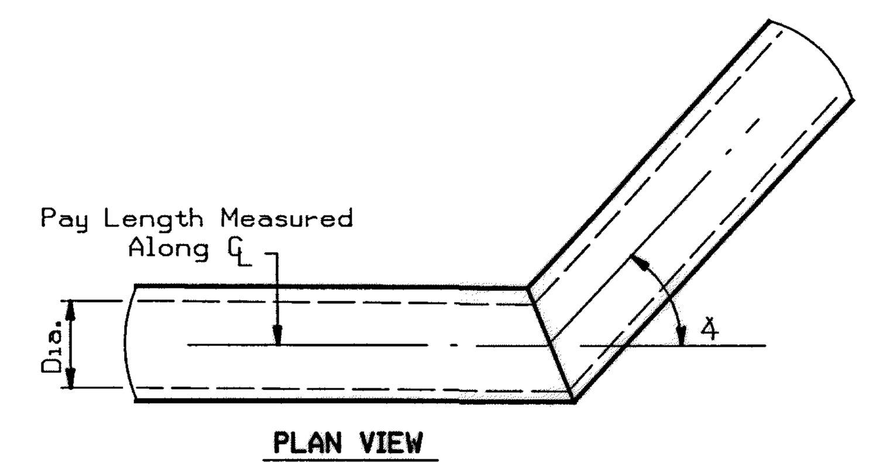
PRECAST STORM SEWER TEE



Note: The Price Of Plug Shall Be Subsidiary To The Unit Bid Price For Pipe Sewer Or RCP. Mortar Joints To Be Used As Directed By The Engineer. Removal Of The Existing Plugs For Storm Sewer Or RCP Conns. Shall Be Considered Incidental To Item 'Excavation And Backfill For Structures.'

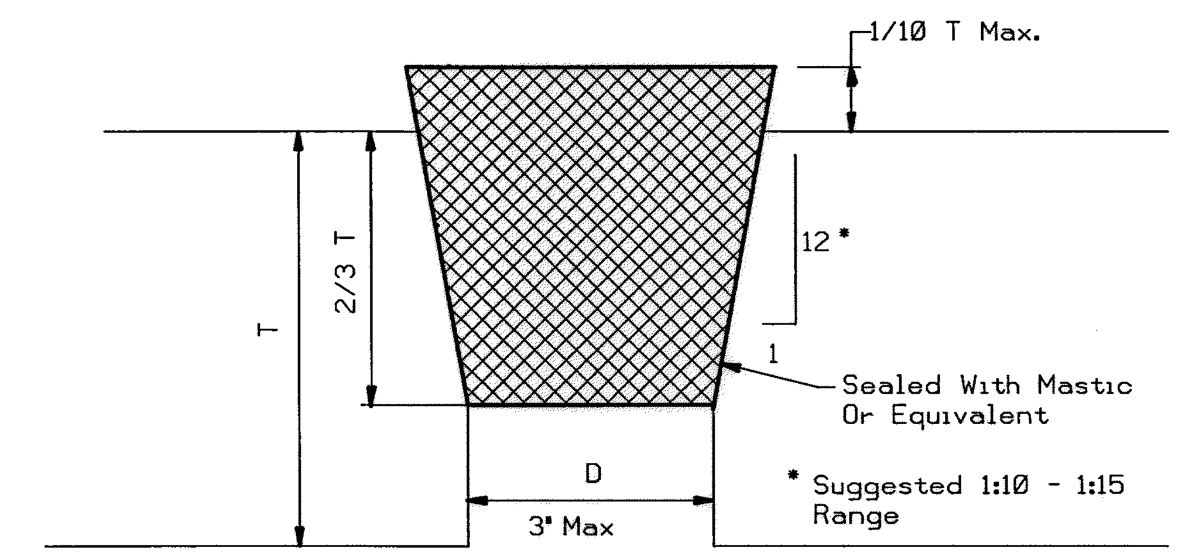
Concrete Plug For End Of Pipe Culvert Or Sewer

CONCRETE PLUG FOR PIPE



BENDING DETAIL

Note: Bending Of Proposed Pipe Sewer Or RCP In A Vertical & /Or Horizontal Plane Shall Be Accomplished By The Use Of A 'Pipe Collar' Or A 'Precast Elbow'. As Approved By The Engineer. Price Of 'Pipe Collar' Or, 'Precast Elbow' Shall Be Subsidiary To The Unit Prices Bid For Item Reinforced Concrete Pipe. Pay Length Measurement To Be Along Horizontal ℄ & Horizontal Plane Of Pipes.

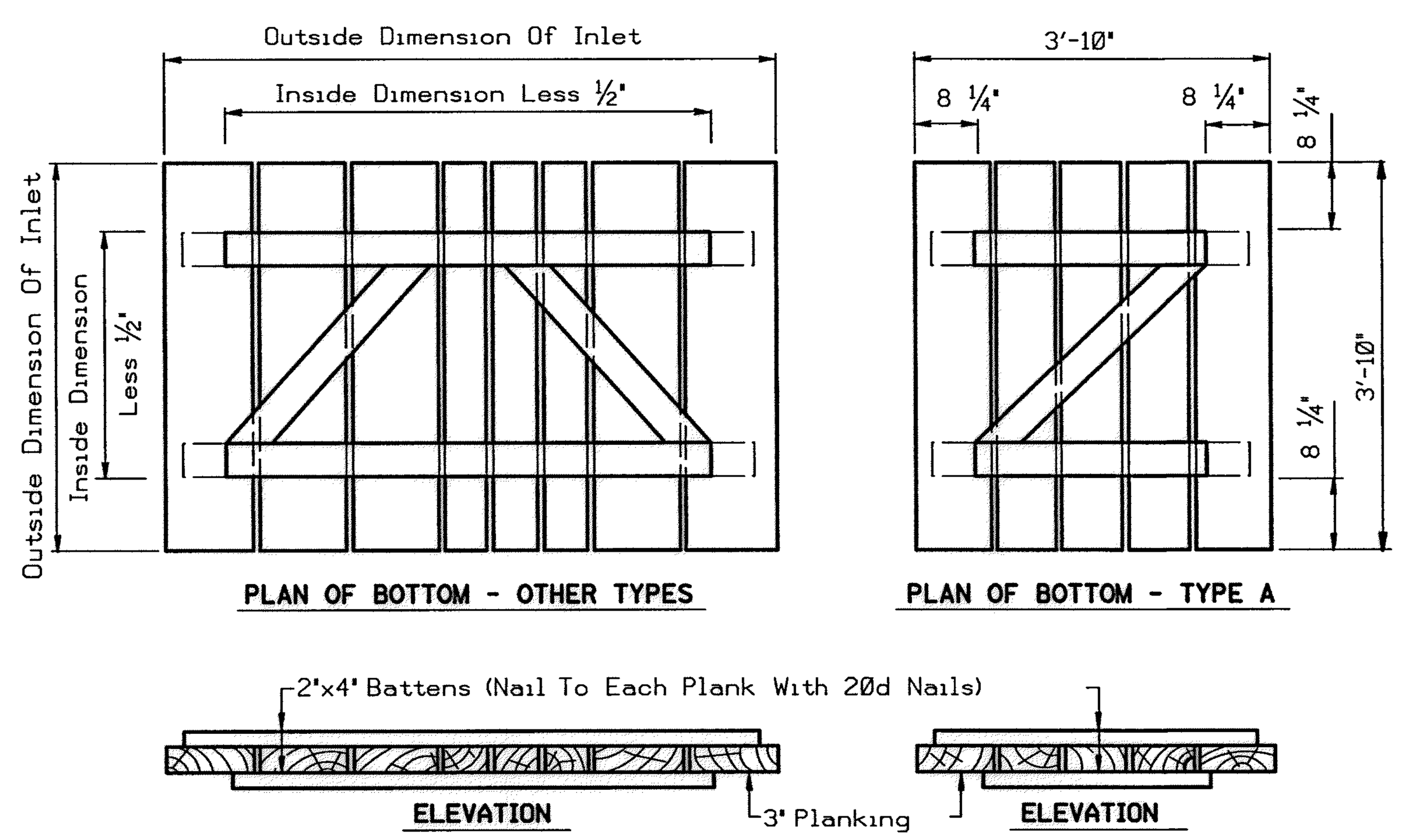


T = Wall Thickness On Top Of Box Or Pipe
D = Diameter Of Lifting Hole

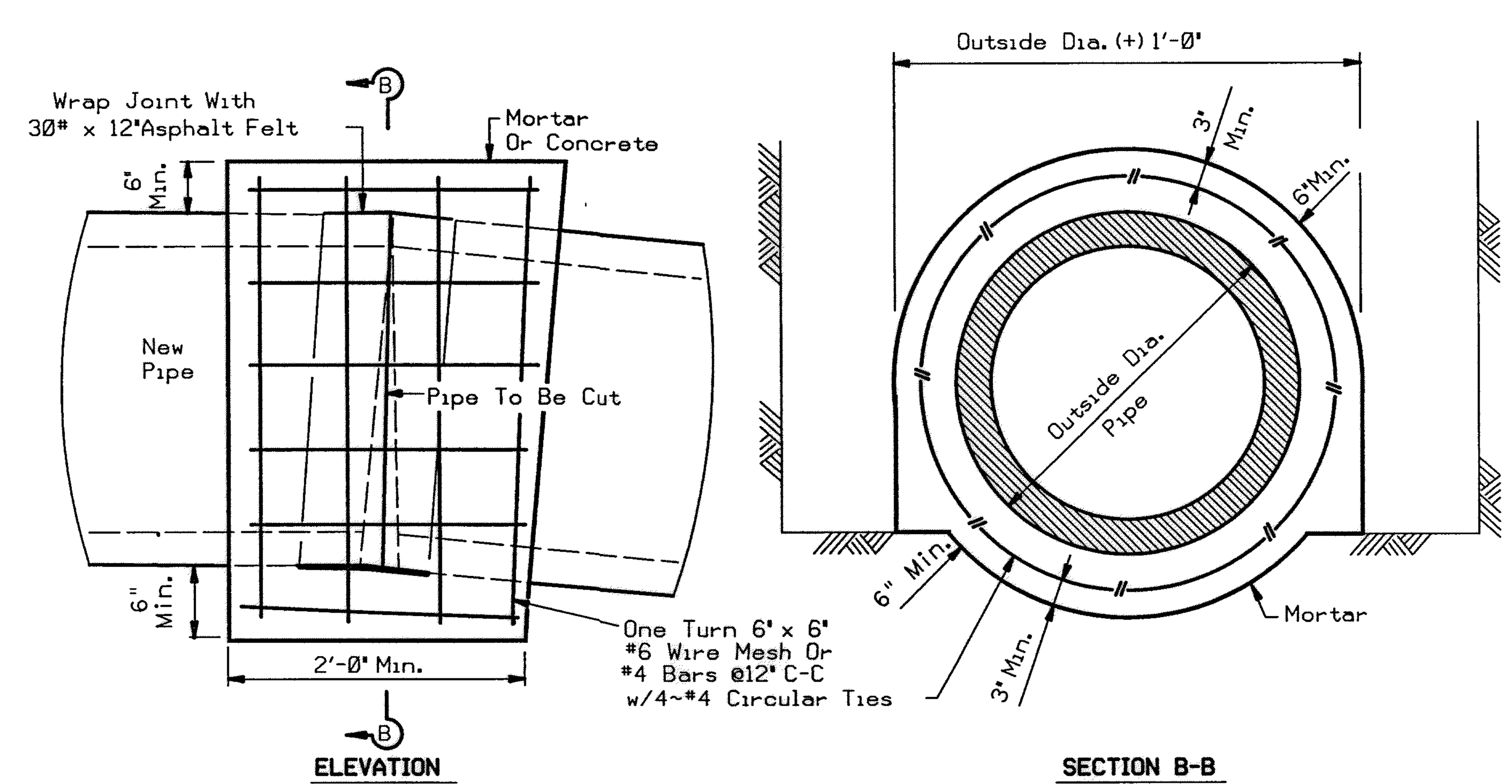
Minimum Length Of Plug Is 2/3 T +/-
Minimum Diameter At Bottom Of Plug = D - ⅛"
Maximum 1/10 T Of Plug Not Seated In Lifting Hole

Note: The Plug Shall Be Cast With The Same Taper As The Lifting Hole.

DETAIL OF PLUG FOR LIFTING HOLES IN RCB AND RCP



TEMPORARY COVERS FOR ALL TYPES OF INLETS



PIPE COLLAR DETAIL

For Horizontal Or Vertical Placement

d = Diameter
R = Radius

Texas Department of Transportation
Houston District (Bridge)

MISCELLANEOUS SEWER DETAILS

MSD

FILE: STD011.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK:
© TxDOT Mar 2004	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS	HOUS	6		53
	COUNTY	CONTROL	SECT JOB	HIGHWAY

STD011.DGN

Brian R. Whitney P.E. 81591 — State of Texas, Registered Professional Engineer
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
MISCELLANEOUS SEWER DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 54 OF 226

No.	DATE	REVISIONS	APP.

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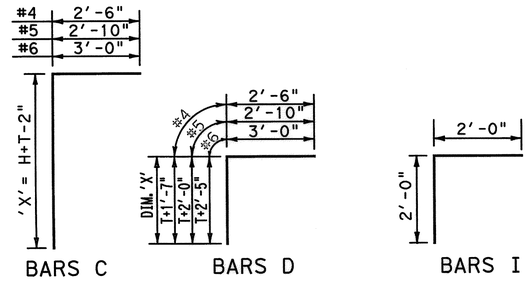
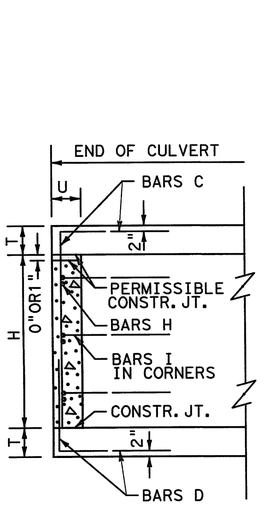
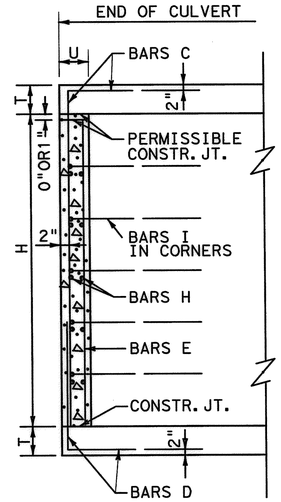
BILLS OF REINFORCING STEEL

CULVERT SIZE S	H	TYPE SECTION	DIMENSIONS T	U	MAX. FILL	TOTAL QUANTITIES C.Y. CONC.	LBS. REINF	BARS C NO.	SIZE	SPA.	LENGTH	WEIGHT	DIM. 'X'	BARS D NO.	SIZE	SPA.	LENGTH	WEIGHT	DIM. 'X'	#4 BARS E @ 18" NO.	LENGTH	WEIGHT	#4 BARS H NO.	SPA.	LENGTH	WEIGHT	#4 BARS I NO.	LENGTH	SPA.	WEIGHT
SC-NA																														
3	2	1	6"	6"	14'	0.11	41	4	#4	9"	4'-10"	13	2'-4"	4	#4	9"	4'-7"	12	2'-1"				2	10"	3'- 9"	5	4	4'	10"	11
	3	1	6"	6"	14'	0.17	44	4	#4	9"	5'-10"	16	3'-4"	4	#4	9"	4'-7"	12	2'-1"				2	14"	3'- 9"	5	4	4'	14"	11
4	2	1	6"	6"	12'	0.15	61	7	#4	7"	4'-10"	23	2'-4"	7	#4	7"	4'-7"	21	2'-1"				2	10"	4'- 9"	6	4	4'	10"	11
	3	1	6"	6"	12'	0.22	65	7	#4	7"	5'-10"	27	3'-4"	7	#4	7"	4'-7"	21	2'-1"				2	14"	4'- 9"	6	4	4'	14"	11
	4	1	6"	6"	12'	0.30	79	7	#4	7"	6'-10"	32	4'-4"	7	#4	7"	4'-7"	21	2'-1"				3	15"	4'- 9"	10	6	4'	15"	16
5	2	1	6"	6"	8'	0.19	69	8	#4	8"	4'-10"	26	2'-4"	8	#4	8"	4'-7"	24	2'-1"				2	10"	5'- 9"	8	4	4'	10"	11
	3	1	6"	6"	8'	0.28	74	8	#4	8"	5'-10"	31	3'-4"	8	#4	8"	4'-7"	24	2'-1"				2	14"	5'- 9"	8	4	4'	14"	11
	4	1	6"	6"	8'	0.37	88	8	#4	8"	6'-10"	36	4'-4"	8	#4	8"	4'-7"	24	2'-1"				3	15"	5'- 9"	12	6	4'	15"	16
	5	2	6"	7"	8'	0.54	135	8	#4	8"	7'-10"	42	5'-4"	8	#4	8"	4'-7"	24	2'-1"	5	4'-11"	16	8	13"	5'-11"	32	8	4'	13"	21
6	3	1	6"	6"	8'	0.33	97	11	#4	6½"	5'-10"	43	3'-4"	11	#4	6½"	4'-7"	34	2'-1"				2	14"	6'- 9"	9	4	4'	14"	11
	4	1	6"	6"	8'	0.44	114	11	#4	6½"	6'-10"	50	4'-4"	11	#4	6½"	4'-7"	34	2'-1"				3	15"	6'- 9"	14	6	4'	15"	16
	5	2	6"	7"	8'	0.65	166	11	#4	6½"	7'-10"	58	5'-4"	11	#4	6½"	4'-7"	34	2'-1"	5	4'-11"	16	8	13"	6'-11"	37	8	4'	13"	21
	6	2	6"	7"	8'	0.78	177	11	#4	6½"	8'-10"	65	6'-4"	11	#4	6½"	4'-7"	34	2'-1"	5	5'-11"	20	8	16"	6'-11"	37	8	4'	16"	21
7	3	1	6½"	6"	6'	0.39	105	12	#4	7"	5'-10"	47	3'-4"	12	#4	7"	4'-8"	37	2'-2"				2	14"	7'- 9"	10	4	4'	14"	11
	4	1	6½"	6"	6'	0.52	124	12	#4	7"	6'-10"	55	4'-4"	12	#4	7"	4'-8"	37	2'-2"				3	15"	7'- 9"	16	6	4'	15"	16
	5	2	6½"	7"	6'	0.76	175	11	#4	8"	7'-10"	58	5'-4"	11	#4	8"	4'-8"	34	2'-2"	6	4'-11"	20	8	14"	7'-11"	42	8	4'	14"	21
	6	2	6½"	7"	6'	0.91	186	11	#4	8"	8'-10"	65	6'-4"	11	#4	8"	4'-8"	34	2'-2"	6	5'-11"	24	8	16"	7'-11"	42	8	4'	16"	21
	7	2	6½"	7"	6'	1.06	214	11	#4	8"	9'-10"	72	7'-4"	11	#4	8"	4'-8"	34	2'-2"	6	6'-11"	28	10	15"	7'-11"	53	10	4'	15"	27
8	4	1	6½"	6"	6'	0.59	157	16	#4	6"	6'-10"	73	4'-4"	16	#4	6"	4'-8"	50	2'-2"				3	14"	8'- 9"	18	6	4'	14"	16
	5	2	6½"	7"	6'	0.86	226	16	#4	6"	7'-10"	84	5'-4"	16	#4	6"	4'-8"	50	2'-2"	7	4'-11"	23	8	14"	8'-11"	48	8	4'	14"	21
	6	2	6½"	7"	6'	1.04	241	16	#4	6"	8'-10"	94	6'-4"	16	#4	6"	4'-8"	50	2'-2"	7	5'-11"	28	8	16"	8'-11"	48	8	4'	16"	21
	7	2	6½"	7"	6'	1.21	274	16	#4	6"	9'-10"	105	7'-4"	16	#4	6"	4'-8"	50	2'-2"	7	6'-11"	32	10	15"	8'-11"	60	10	4'	15"	27
	8	2	6½"	8"	6'	1.58	310	18	#4	5½"	10'-10"	130	8'-4"	18	#4	5½"	4'-8"	56	2'-2"	7	7'-11"	37	10	17"	9'- 1"	60	10	4'	17"	27
9	5	2	7"	7"	6'	0.97	268	12	#5	8½"	8'- 3"	103	5'-5"	12	#5	8½"	5'-5"	68	2'-7"	7	4'-11"	23	8	14"	9'-11"	53	8	4'	14"	21
	6	2	7"	7"	6'	1.17	286	12	#5	8½"	9'- 3"	116	6'-5"	12	#5	8½"	5'-5"	68	2'-7"	7	5'-11"	28	8	16"	9'-11"	53	8	4'	16"	21
	7	2	7"	7"	6'	1.37	321	12	#5	8½"	10'- 3"	128	7'-5"	12	#5	8½"	5'-5"	68	2'-7"	7	6'-11"	32	10	15"	9'-11"	66	10	4'	15"	27
	8	2	7"	8"	6'	1.78	380	12	#5	9"	11'- 3"	141	8'-5"	12	#6	9"	6'-0"	108	3'-0"	7	7'-11"	37	10	17"	10'- 1"	67	10	4'	17"	27
	9	2	7"	8"	6'	2.00	404	12	#5	9"	12'- 3"	141	9'-5"	12	#6	9"	6'-0"	108	3'-0"	7	8'-11"	42	12	16½"	10'- 1"	81	12	4'	16½"	32
10	5	2	7"	7"	6'	1.08	347	17	#5	7"	8'- 3"	146	5'-5"	17	#5	7"	5'-5"	96	2'-7"	8	4'-11"	26	8	14"	10'-11"	58	8	4'	14"	21
	6	2	7"	7"	6'	1.30	371	17	#5	7"	9'- 3"	164	6'-5"	17	#5	7"	5'-5"	96	2'-7"	8	5'-11"	32	8	16"	10'-11"	58	8	4'	16"	21
	7	2	7"	7"	6'	1.51	415	17	#5	7"	10'- 3"	182	7'-5"	17	#5	7"	5'-5"	96	2'-7"	8	6'-11"	37	10	15"	10'-11"	73	10	4'	15"	27
	8	2	7"	8"	6'	1.98	475	16	#5	7½"	11'- 3"	188	8'-5"	16	#6	7½"	6'-0"	144	3'-0"	8	7'-11"	42	10	17"	11'- 1"	74	10	4'	17"	27
	9	2	7"	8"	6'	2.22	517	16	#5	7½"	12'- 3"	204	9'-5"	16	#6	7½"	6'-0"	144	3'-0"	8	8'-11"	48	12	16½"	11'- 1"	89	12	4'	16½"	32
	10	2	7"	8"	6'	2.47	559	16	#5	7½"	13'- 3"	221	10'-5"	16	#6	7½"	6'-0"	144	3'-0"	8	9'-11"	53	14	16"	11'- 1"	104	14	4'	16"	32
SC-NB																														
6	3	1	6"	6"	10'	0.33	104	12	#4	6"	5'-10"	47	3'-4"	12	#4	6"	4'-7"	37	2'-1"				2	14"	6'- 9"	9	4	4'	14"	11
	4	1	6"	6"	10'	0.44	121	12	#4	6"	6'-10"	55	4'-4"	12	#4	6"	4'-7"	37	2'-1"				3	15"	6'- 9"	13	6	4'	15"	16
	5	2	6"	7"	10'	0.65	174	12	#4	6"	7'-10"	63	5'-4"	12	#4	6"	4'-7"	37	2'-1"	5	4'-11"	16	8	14"	6'-11"	37	8	4'	14"	21
	6	2	6"	7"	10'	0.78	204	14	#4	5½"	8'-10"	83	6'-4"	14	#4	5½"	4'-7"	43	2'-1"	5	5'-11"	20	8	16"	6'-11"	37	8	4'	16"	21
7	3	1	6½"	6"	8'	0.39	132	16	#4	5½"	5'-10"	62	3'-4"	16	#4	5½"	4'-7"	49	2'-1"				2	14"	7'- 9"	10	4	4'	14"	11
	4	1	6½"	6"	8'	0.52	139	14	#4	6½"	6'-10"	64	4'-4"	14	#4	6½"	4'-7"	43	2'-1"				3	14"	7'- 9"	16	6	4'	14"	16
	5	2	6½"	7"	8'	0.76	199	14	#4	6½"	7'-10"	73	5'-4"	14	#4	6½"	4'-7"	43	2'-1"	6	4'-11"	20	8	14"	7'-11"	42	8	4'	14"	21
	6	2	6½"	7"	8'	0.91	221	15	#4	6"	8'-10"	88	6'-4"	15	#4	6"	4'-7"	46	2'-1"	6	5'-11"	24	8	16"	7'-11"	42	8	4'	16"	21
	7	2	6½"	7"	8'	1.06	262	16	#4	5½"	9'-10"	105	7'-4"	16	#4	5½"	4'-7"	49	2'-1"	6	6'-11"	28	10	15"	7'-11"	53	10	4'	15"	27
8	4	1	7"	6"	8'	0.59	173	18	#4	5½"	6'-11"	83	4'-5"	18	#4	5½"	4'-8"	56	2'-2"				3	14½"	8'- 9"	18	6	4'	14½"	16
	5	2	7"	7"	8'	0.86	235	17	#4	6"	7'-11"	90	5'-5"	17	#4	6"	4'-8"	53	2'-2"	7	4'-11"	23	8	14"	8'-11"	48	8	4'	14"	21
	6	2	7"	7"	8'	1.04	251	17	#4	6"	8'-11"	101	6'-5"	17	#4	6"	4'-8"	53	2'-2"	7	5'-11"	28	8	16½"	8'-11"	48	8	4'	16½"	21
	7	2	7"	7"	8'	1.21	304	19	#4	5½"	9'-11"	126	7'-5"	19	#4	5½"	4'-8"	59	2'-2"	7	6'-11"	32	10	16"	8'-11"	60	10	4'	16"	27
	8	2	7"	8"	8'	1.58	344	21	#4	5"	10'-11"	153	8'-5"	21	#4	5"	4'-8"	66	2'-2"	7	7'-11"	37	10	18"	9'- 1"	61	10	4'	18"	27
9	5	2	7"	7"	8'	0.97	325	16	#5	7"	8'- 3"	138	5'-5"	16	#5	7"	5'-5"	90	2'-7"	7	4'-11"	23	8	14"	9'-11"	53	8	4'	14"	21
	6	2	7"	7"	8'	1.17	346	16	#5	7"	9'- 3"	154	6'-5"	16	#5	7"	5'-5"	90	2'-7"	7	5'-11"	28	8	16½"	9'-11"	53	8	4'	16½"	21
	7	2	7"	7"	8'	1.36	386	16	#5	7"	10'- 3"	171	7'-5"	16	#5	7"	5'-5"	90	2'-7"	7	6'-11"	32	10	16"	9'-11"	66	10	4'	16"	27
	8	2	7"	8"	8'	1.78	444	18	#5	6½"	11'- 3"	211	8'-5"	18	#5	6½"	5'-5"	102	2'-7"	7	7'-11"	37	10	18"	10'- 1"	67	10	4'	18"	27
	9	2	7"	8"	8'	2.00	487	18	#5	6½"	12'- 3"	230	9'-5"	18	#5	6½"	5'-5"	102	2'-7"	7	8'-11"	42	12	17"	10'- 1"	81	12	4'	17"	32
10	5	2	8"	7"	8'	1.08	379	19	#5	6½"	8'- 4"	165	5'-6"	19	#5	6½"	5'-6"	109	2'-8"	8	4'-11"	26	8	14"	10'-11"	58	8	4'	14"	21
	6	2	8"	7"	8'	1.30	405	19	#5	6½"	9'- 4"	185	6'-6"	19	#5	6½"	5'-6"	109	2'-8"	8	5'-11"	32	8	16½"	10'-11"	58	8	4'	16½"	21
	7	2	8"	7"	8'	1.51	451	19	#5	6½"	10'- 4"	205	7'-6"	19	#5	6½"	5'-6"	109	2'-8"	8	6'-11"	37	10	16"	10'-11"	73	10	4'	16"	27
	8	2	8"	8"	8'	1.98	511	21	#5	6"	11'- 4"	248	8'-6"	21	#5	6"	5'-6"	120	2'-8"	8	7'-11"	42	10	18"	11'- 1"	74	10	4'	18"	27
	9	2	8"	8"	8'	2.22	559	21	#5	6"	12'- 4"	270	9'-6"	21	#5	6"	5'-6"	120	2'-8"	8	8'-11"	48	12	17"	11'- 1"	89	12	4'	17"	32
	10	2	8"	8"	8'	2.47	646	23	#5	5½"	13'- 4"	320	10'-6"	23	#5	5½"	5'-6"	132	2'-8"	8	9'-11"	53	14	16"	11'- 1"	104	14	4'	16"	37
SC-NC																														
7	3	1	6½"	6"	10'	0.39	166	12	#5	7½"	6'- 2"	77	3'-4"	12	#5	7½"	5'-5"	68	2'-7"				2	14"	7'- 9"	10	4	4'	14"	11
	4	1	6½"	6"	10'	0.52	176	11	#5	8"	7'- 2"	82	4'-4"	11	#5	8"	5'-5"	62	2'-7"				3	14"	7'- 9"	16	6	4'	14"	16
	5	2	6½"	7"	10'	0.76	239	11	#5	8"	8'- 2"	94	5'-4"	11	#5	8"	5'-5"	62	2'-7"	6	4'-11"	20	8	14"	7'-11"	42	8	4'	14"	21
	6	2	6½"	7"	10'	0.91	254	11	#5	8"	9'- 2"	105	6'-4"	11	#5	8"	5'-5"	62	2'-7"	6	5'-11"	24	8	16"	7'-11"	42	8	4'	16"	21
	7	2	6½"	7"	10'	1.06	304	12	#5	7½"	10'- 2"	128	7'-4"	12	#5	7½"	5'-5"	68	2'-7"	6	6'-11"	28	10	15"	7'-11"	53	10	4'	15"	27
8	4	1	7½"	6"	10'	0.59	207	13	#5	7½"	7'- 3"	98	4'-5"	13	#5	7½"	5'-6"	75	2'-8"				3	14½"	8'- 9"	18	6	4'	14½"	16
	5	2	7½"	7"	10'	0.86	279	13	#5	8"	8'- 3"	112	5'-5"	13	#5	8"	5'-6"	75	2'-8"	7	4'-11"	23	8	14"	8'-11"	48	8	4'	14"	21
	6	2	7½"	7"	10'	1.04	297	13	#5	8"	9'- 3"	125	6'-5"	13	#5	8"	5'-6"	75	2'-8"	7	5'-11"	28	8	16½"	8'-11"	48	8	4'	16½"	21
	7	2	7½"	7"	10'	1.21	349	14	#5	7½"	10'- 3"	150	7'-5"	14	#5	7½"	5'-6"	80	2'-8"	7	6'-11"	32	10	16"	8'-11"	60	10	4'	16"	27
	8	2	7½"	8"	10'	1.58	387	15	#5	7"	11'- 3"	176	8'-5"	15	#5	7"	5'-6"	86	2'-8"	7	7'-11"	37	10	18"	9'- 1"	61	10	4'	18"	27
9	5	2	8"	7"	10'	0.97	356	18	#5	6½"	8'- 4"	156	5'-6"	18	#5	6½"	5'-6"	103	2'-8"	7	4'-11"	23	8	14"	9'-11"	53	8	4'	14"	21
	6	2	8"	7"	10'	1.17	380	18	#5	6½"	9'- 4"	175	6'-6"	18	#5	6½"	5'-6"	103	2'-8"	7	5'-11"	28	8	16½"	9'-11"	53	8	4'	16½"	21
	7	2	8"	7"	10'	1.36	422	18	#5	6½"	10'- 4"	194	7'-6"	18	#5	6½"	5'-6"	103	2'-8"	7	6'-11"	32	10	16"	9'-11"	66	10	4'	16"	27
	8	2	8"	8"	10'	1.78	447	18	#5	6½"	11'- 4"	213	8'-6"	18	#5	6½"	5'-6"	103	2'-8"	7	7'-11"	37	10	18"	10'- 1"	67	10	4'	18"	27
	9	2	8"	8"	10'	2.00	508	19	#5	6"	12'- 4"	244	9'-6"	19	#5	6"	5'-6"	109	2'-8"	7	8'-11"	42	12	17"	10'- 1"	81	12	4'	17"	32
10	5	2	8½"	7"	10'	1.08	457	16	#6	8"	8'- 6"	204	5'-6"	16	#6	8"	6'-2"	148	3'-2"	8	4'-11"	26	8	14"	10'-11"	58	8	4'	14"	21
	6	2	8½"	7"	10'	1.30	487	16	#6	8"	9'- 6"	228	6'-6"	16	#6	8"	6'-2"	148	3'-2"	8	5'-11"	32	8	16½"	10'-11"	58	8	4'	16½"	21
	7	2	8½"	7"	10'	1.51	537	16	#6	8"	10'- 6"	252	7'-6"	16	#6	8"	6'-2"	148	3'-2"	8	6'-11"	37	10	16"	10'-11"	73	10	4'	16"	27
	8	2	8½"	8"	10'	1.98	567	16	#6	8"	11'- 6"	276	8'-6"	16	#6	8"	6'-2"	148	3'-2"	8	7'-11"	42	10	18"	11'- 1"	74	10	4'	18"	27
	9	2	8½"	8"	10'	2.22	646	17	#6	7½"	12'- 6"	319	9'-6"	17	#6	7½"	6'-2"	158	3'-2"	8	8'-11"	48	12	17"	11'- 1"	89	12	4'	17"	32
	10	2	8½"	8"	10'	2.47	726	18	#6	7"	13'- 6"	365	10'-6"	18	#6	7"	6'-2"	167	3'-2"	8	9'-11"	53	14	16"	11'- 1"	104	14	4'	16"	37





TYPE 1



TYPE 2

GENERAL NOTES:

DESIGNED FOR HS20 LOADING AND MAXIMUM FILL HEIGHTS SHOWN.

ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS. REINFORCING BARS SHALL BE ADJUSTED TO PROVIDE A MINIMUM OF 1 1/4" INCHES CLEAR COVER.

CONCRETE IS TO BE SAME CLASS AS USED IN CULVERT.

END CAPS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE RELATED STD ITEMS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

CULVERT END CAP CEC (FW)

ORIGINAL - DEC. 92 - R.S.W.

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		54

STATE	STATE DIST.NO.	COUNTY
TEXAS	FORT WORTH	

CONT.	SECT.	JOB	HIGHWAY NO.

/public/standard/CECFW.DGN

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CULVERT END CAP
CEC (FW)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=20'

SHEET:
55 OF 226

9/3/2014 3:02:56 PM MJGuthrie

pw:\\ladpw.ladco.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Standards\55-cecfw.dgn

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

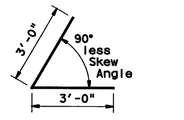
Dimensions					Variable Reinforcing				Estimated ④ Quantities per ft of wing (2-Wings)		Estimated Quantities per ft of Toewall (1-Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'- 0"	2'-10"	2'- 2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'- 5"	3'- 0"	2'- 5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'- 2"	3'- 6"	2'- 8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'- 8"	3'- 9"	2'-11"	1'- 0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'- 2"	4'- 0"	3'- 2"	1'- 2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'- 5"	3'- 5"	1'- 4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'- 6"	4'-10"	3'- 8"	1'- 6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'- 0"	3'-11"	1'- 7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2-Wings)

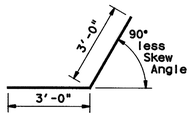
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

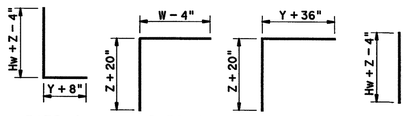
Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

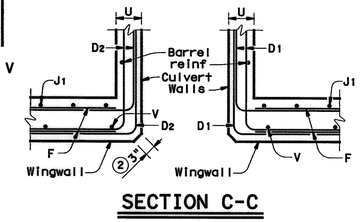
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2) (Hw) (Lw) for Ty PW-1
= (2) (Hw) (Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2) (Hw) (Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL:1 = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

See applicable box culvert standard for S, H, T and U values.



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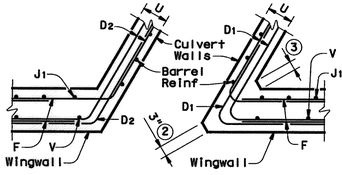
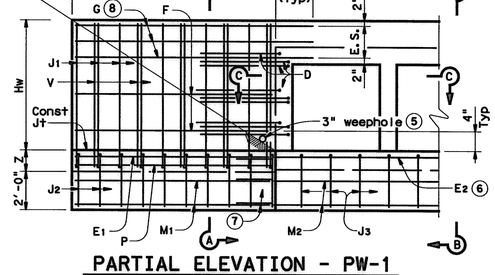
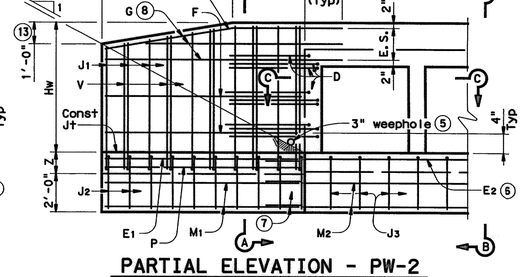


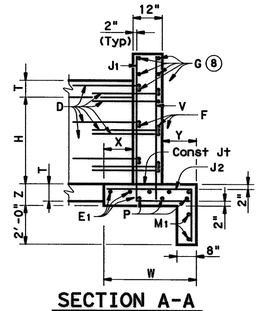
SECTION C-C



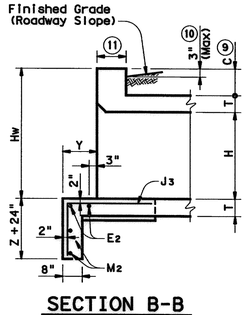
PARTIAL ELEVATION - PW-1



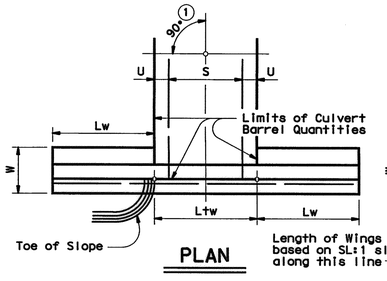
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing Wing Reinf)

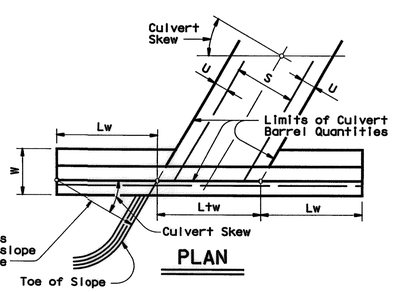


SECTION B-B
(Showing Wing Reinf)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° Skew)

① Skew Angle = 0°

② At discharge end, chamfer may be ¾".

③ For 15° Skew ~ 1"
For 30° Skew ~ 2"
For 45° Skew ~ 3"

④ Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.

⑤ Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.

⑥ Extend Bars E2 1'-6" minimum into the wingwall footing.

⑦ Lap Bars M1 1'-6" minimum with Bars M2.

⑧ Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.

⑨ 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs cannot project more than 3" above finished grade.
- For structures with bridge rail, build curbs flush with finished grade.
Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

⑪ 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.

⑫ 3'-0" for Hw < 4'.

⑬ 6" for Hw < 4'.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.
Provide 1 ¼" Min clear cover to reinforcing steel.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See BCS sheet for wingwall type and additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST	COUNTY		SHEET NO. 55

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or for damages resulting from its use.

DATE:
FILE:

No.	DATE	REVISIONS	APP.

BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER — STATE OF TEXAS — 9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CONCRETE WINGWALLS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 56 OF 226

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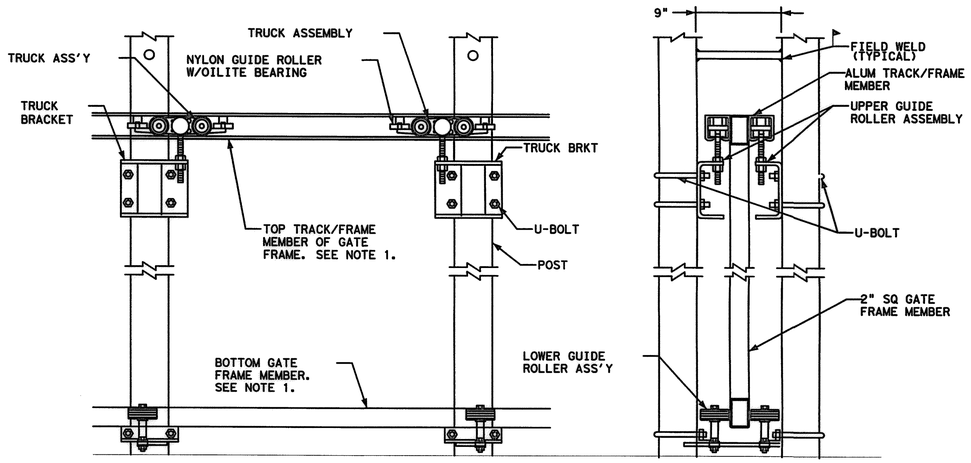


ELEVATION

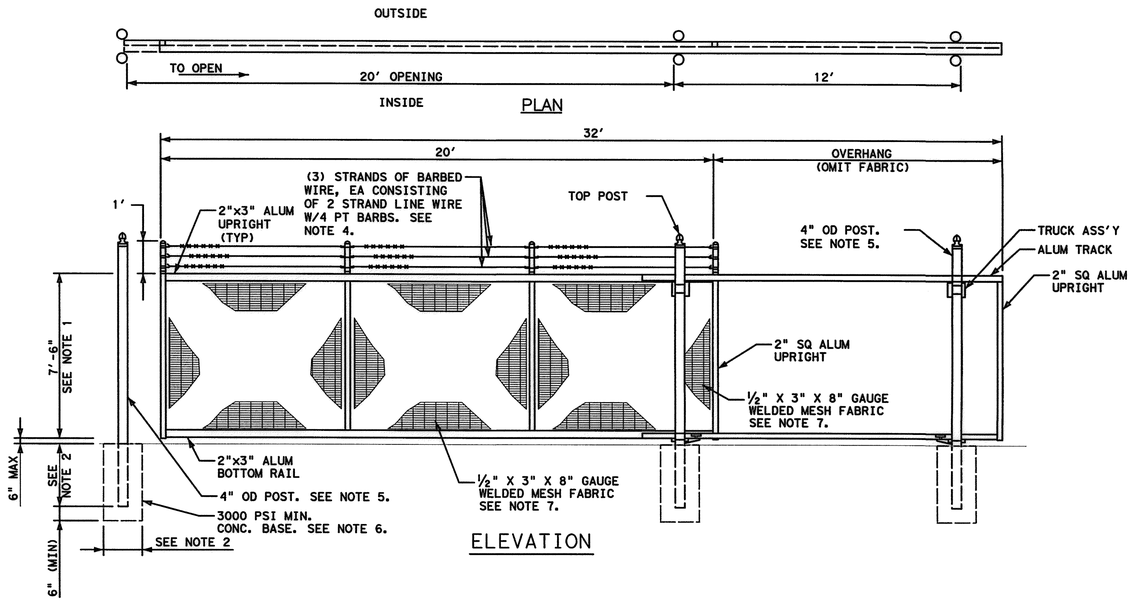
END VIEW

1/39 20' CANTILEVER GATE

NTS

NOTES:

1. TOP AND BOTTOM GATE FRAME MEMBERS SHALL BE 2"X3" HOT-DIPPED GALVANIZED AND CONFORM TO THE STRENGTH REQUIREMENTS OF ASTM A 53, GRADE A.



ELEVATION

2/39 20' CANTILEVER GATE

NTS

NOTES:

1. MAINTAIN SAME HEIGHT AS EXISTING FENCE. CONTRACTOR SHALL FIELD VERIFY.
2. FOOTING WIDTH TO BE (4)X POST WIDTH MIN. DEPTH TO BE 36" MIN.
3. GATE SHALL BE FOR MANUAL OPERATON.
4. BARB WIRE SHALL BE 12-1/2 GAUGE CLASS III, HOT DIPPED GALVANIZED ITEMS TO COMPLY WITH ASTM A-641 WITH TENSILE STRENGTH OF 83 KSI ZINC COATED AFTER WELDING IN ACCORDANCE WITH ASTM A-123, 1.2 oz ZINC/FT AS SPECIFIED.
5. ALL POSTS SHALL CONFORM TO STRENGTH REQUIREMENTS OF ASTM A-53, GRADE A, HOT DIPPED GALVANIZED.
6. FOUNDATION POST TO BE SET IN CONCRETE. MIX SHALL BE IN ACCORDANCE WITH ASTM C-94.
7. WELDED MESH FABRIC SHALL BE CONSTRUCTED BY COMPUTER RESISTANCE WELDING, HIGH-TENSILE CARBON STEEL LINE, WITH STAY WIRE TOGETHER. MESH SHALL BE NON-CLIMB AND CUT RESITANT.

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

GATE DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: NTS
CITY DWG NO.
VERT:
HORZ:
SHEET: 57 OF 226

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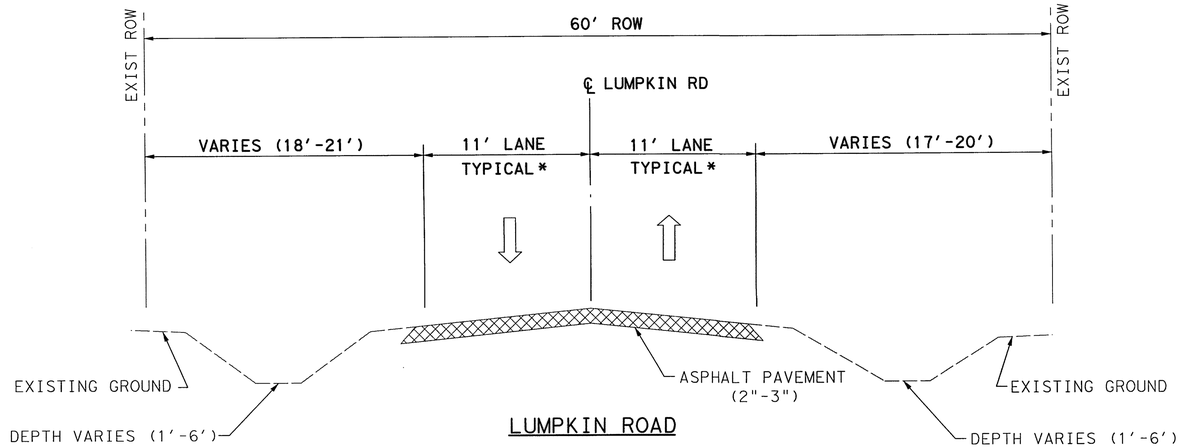
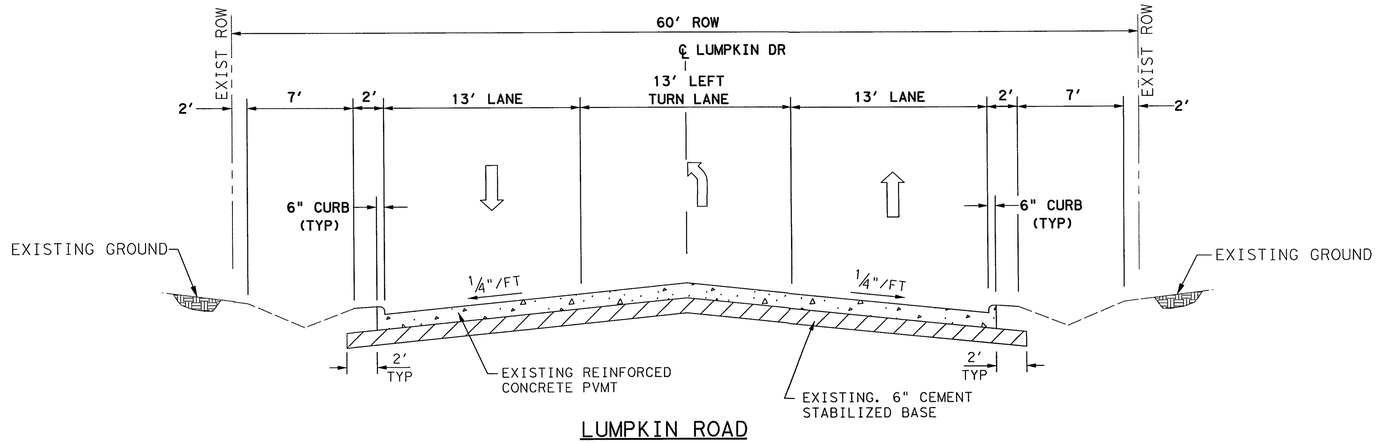


LUMPKIN ROAD

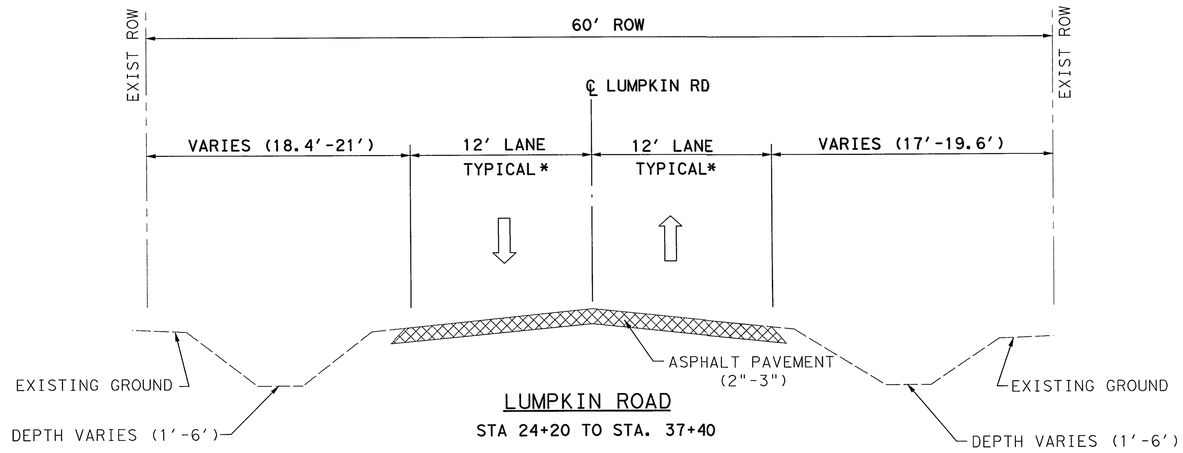
FROM IH 10 FRONTAGE ROAD TO 400' SOUTH OF WESTVIEW

*STA. 19+50 TO STA. 22+50 - PAVEMENT TRANSITIONS FROM 22' TO 39'



LUMPKIN ROAD

STA. 20+90 TO STA. 24+20 - 39' CONCRETE CURB AND GUTTER



LUMPKIN ROAD

STA 24+20 TO STA. 37+40

LEGEND

EXIST ROW

EXISTING TRAFFIC FLOW

NOTE:

1. NORTHBOUND & SOUTHBOUND LEFT TURN LANES EXIST AT THE INTERSECTION OF WESTVIEW ROAD.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING
TYPICAL SECTIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=5'	
SHEET: 58 OF 226	

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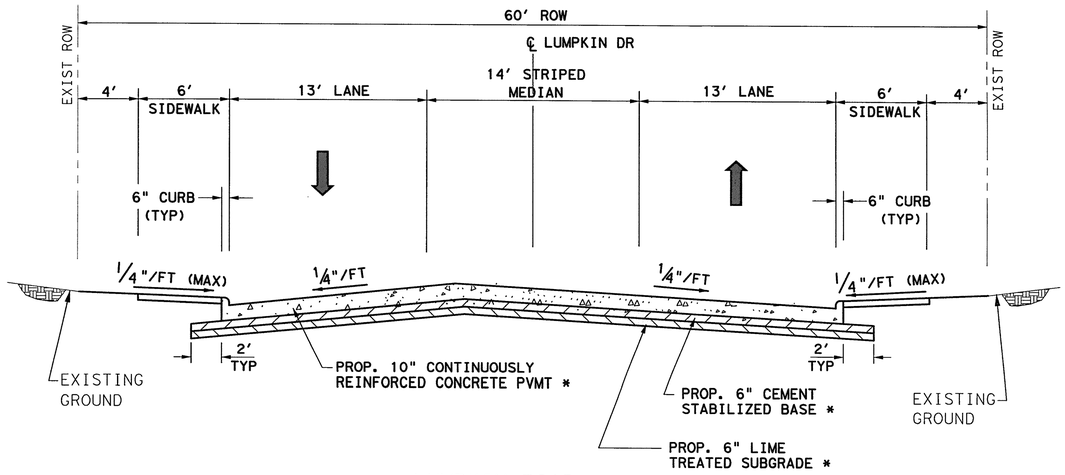
LEGEND

EXISTING ROW

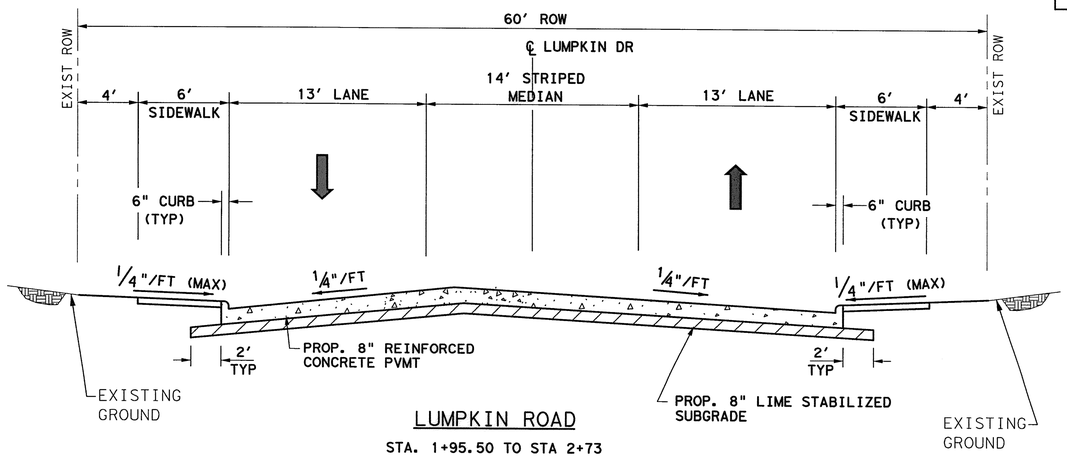
PROPOSED TRAFFIC FLOW



LUMPKIN ROAD

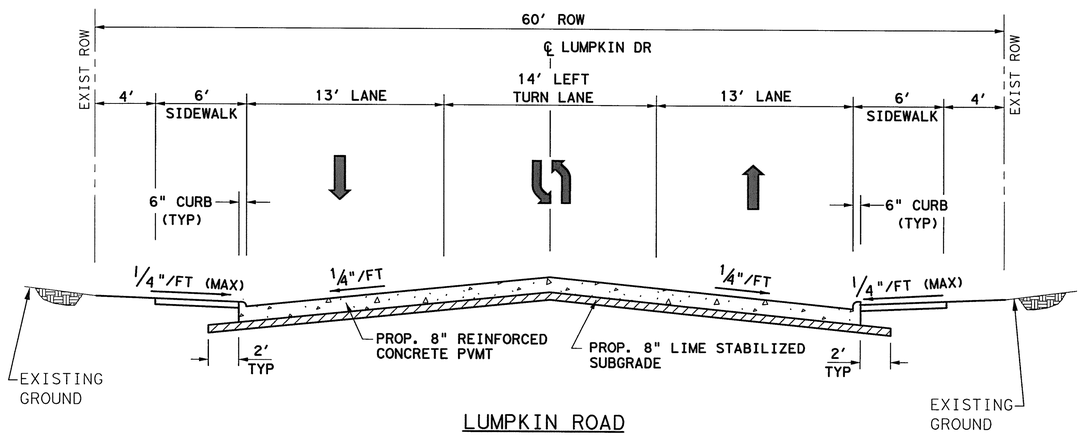
STA. 1+51.86 TO STA. 1+95.50

* MATCH TxDOT PAVEMENT



LUMPKIN ROAD

STA. 1+95.50 TO STA 2+73



LUMPKIN ROAD

STA. 2+73 TO STA 9+87,
STA 13+58 TO STA 16+78,
STA 20+46 TO STA 22+86,
STA 24+15 TO STA. 34+78 (ALTERNATE BID)

NOTE:

1. FOR STATION 17+00 TO 18+00 (FAULT ZONE LIMITS) SEE "PROPOSED TYPICAL SECTIONS SHEET 3 OF 3 FOR DETAILS.
2. NORTHBOUND & SOUTHBOUND LEFT TURN LANES EXIST AT THE INTERSECTION OF WESTVIEW ROAD.
3. REFER TO CITY OF HOUSTON STANDARD DETAIL "CONCRETE PAVEMENT DETAIL" (DWG NO. 02751-01) FOR REINFORCING STEEL BAR SIZES AND SPACINGS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED
TYPICAL SECTIONS

SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=5'	
SHEET: 59 OF 226	

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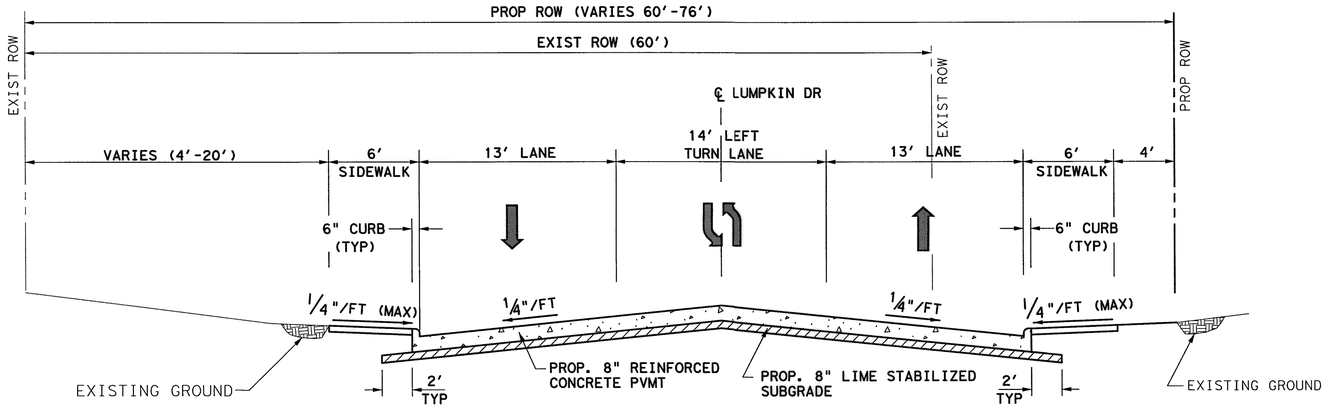
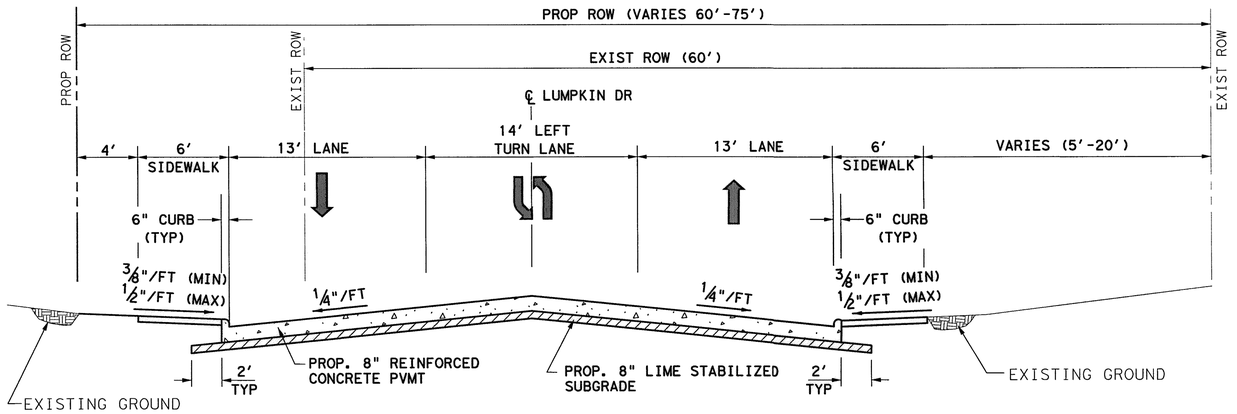


LUMPKIN ROAD

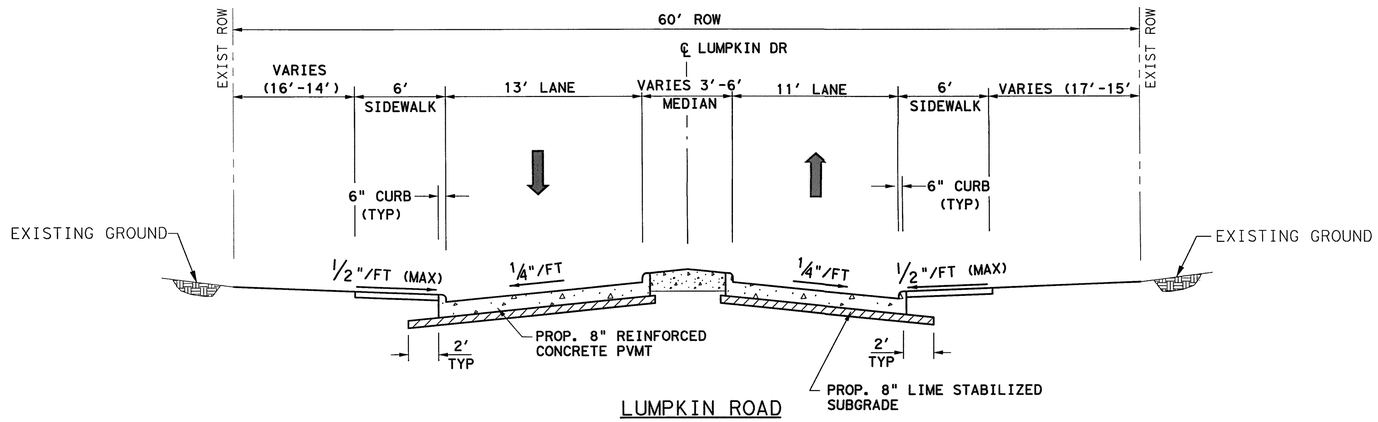
STA 9+87 TO 13+58



LUMPKIN ROAD

STA 16+78 TO STA 17+00

STA 18+00 TO STA 20+46



LUMPKIN ROAD

FROM STA 36+56 TO STA 37+14

STA 34+78 TO STA. 37+12.50 (TRANSITION FROM 40'-27')

LEGEND

EXISTING ROW

PROPOSED TRAFFIC FLOW

NOTE:

1. FOR STATION 17+00 TO 18+00 (FAULT ZONE LIMITS) SEE PROPOSED TYPICAL SECTIONS SHEET 3 OF 3 FOR DETAILS
2. NORTHBOUND & SOUTHBOUND LEFT TURN LANES EXIST AT THE INTERSECTION OF WESTVIEW ROAD.
3. REFER TO CITY OF HOUSTON STANDARD DETAIL "CONCRETE PAVEMENT DETAIL" (DWG NO. 02751-01) FOR REINFORCING STEEL BAR SIZES AND SPACINGS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
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98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROPOSED
TYPICAL SECTIONS

SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

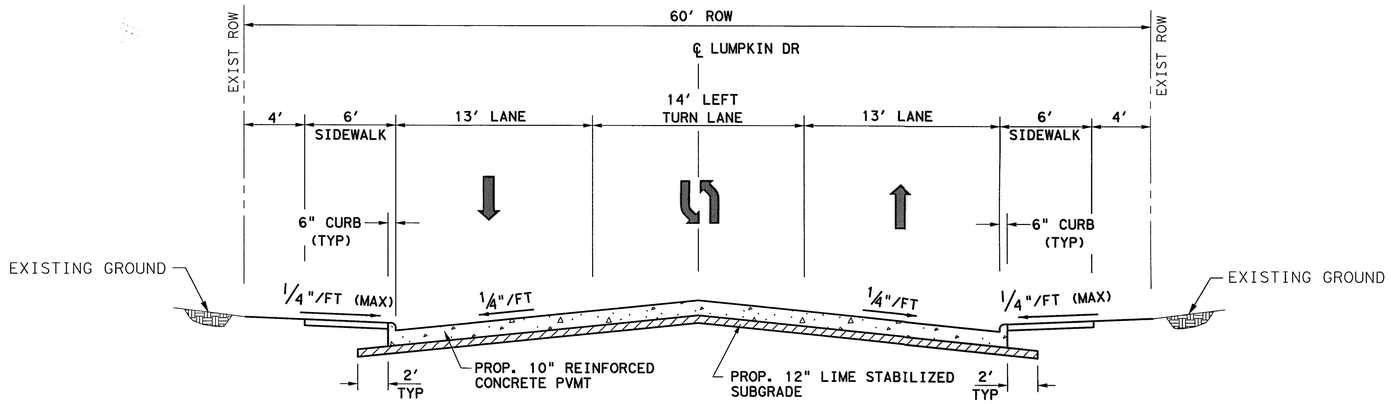
FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=5'	
SHEET: 60 OF 226	

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Roadway\51-001*PROPOSED*typical-02.dgn 9/3/2014 11:11:00 AM MJGuthrie

LEGEND

EXISTING ROW

PROPOSED TRAFFIC FLOW



LUMPKIN ROAD

WITHIN FAULT ZONE LIMITS
(STA. 17+00 TO STA. 18+00)

NOTE:

1. NORTHBOUND & SOUTHBOUND LEFT TURN LANES EXIST AT THE INTERSECTION OF WESTVIEW ROAD.
2. REFER TO CITY OF HOUSTON STANDARD DETAIL "CONCRETE PAVEMENT DETAIL" (DWG NO. 02751-01) FOR REINFORCING STEEL BAR SIZES AND SPACINGS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED
TYPICAL SECTIONS

SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=5'	
SHEET: 61 OF 226	

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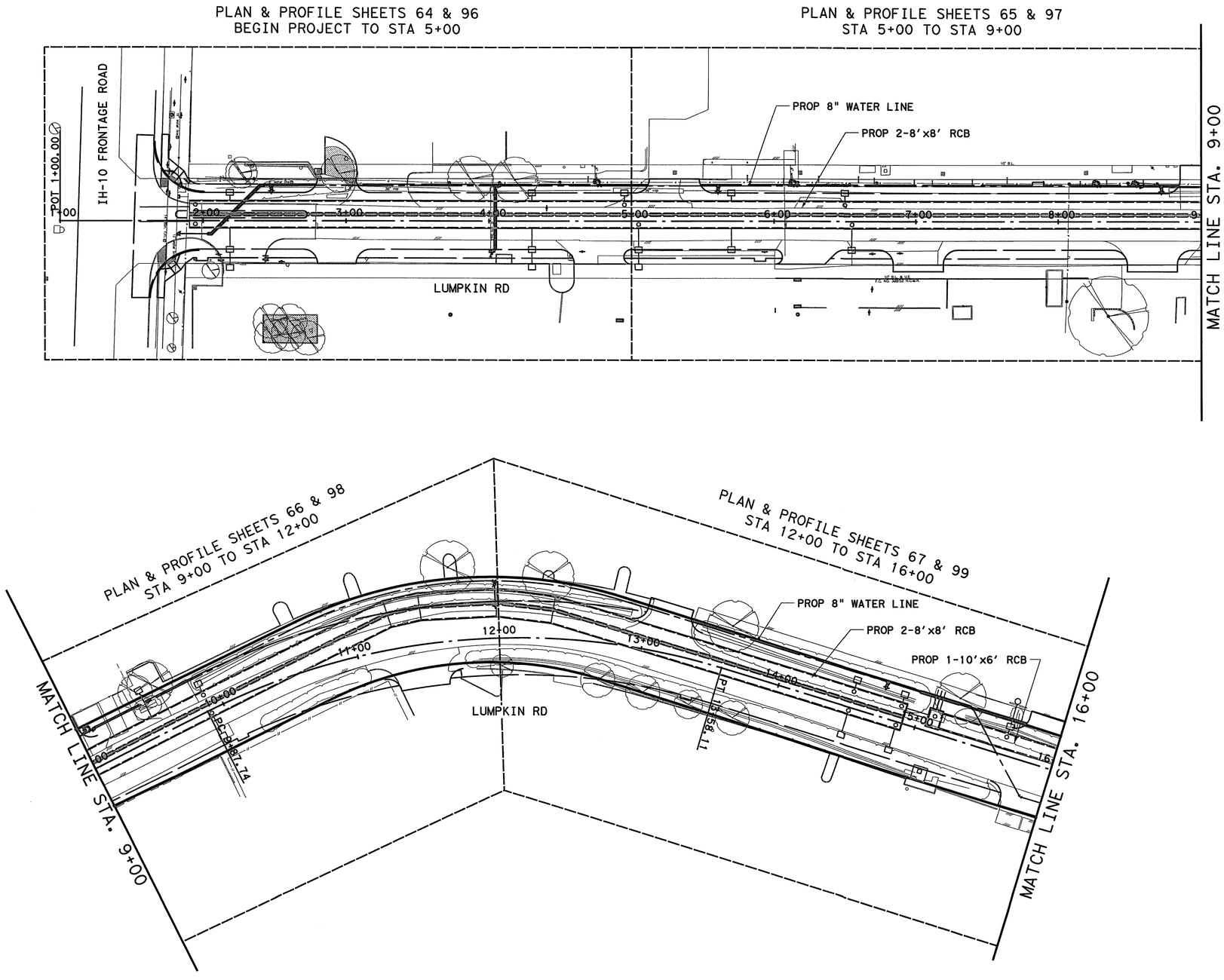

LEGEND

- PROPOSED PVMT
- PROPOSED 8" WATERLINE
- PROPOSED 18" SAN SWR
- PROPOSED STM BOXES
- PROPOSED "BB" INLET
- PROPOSED C-1 INLET
- PROPOSED MANHOLE
- PROPOSED JUCTION BOX
- BH05 APPROXIMATE BORING LOCATION

NOTE:

1. THE LAYOUT SKETCH OF THE PROPOSED IMPROVEMENTS IS SHOWN AS APPROXIMATE ONLY. THIS SHEET IS FOR GENERAL INFORMATION. FOR BORING INFORMATION, SEE GEOTECHNICAL INVESTIGATION RECONSTRUCTION OF LUMPKIN ROAD BETWEEN IH10 AND WESTVIEW DRIVE, DATED FEBRUARY 2013, BY AVILES ENGINERING CORP., REPORT No. G153-10 AND GEOTECHNICAL INVESTIGATION LUMPKIN ROAD FROM WESTVIEW TO NORTHBROOK, DATED MARCH 2014, BY AVILES ENGINEERING CORP., REPORT No. G157-13.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-5-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SHEET LAYOUT

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 62 OF 226	

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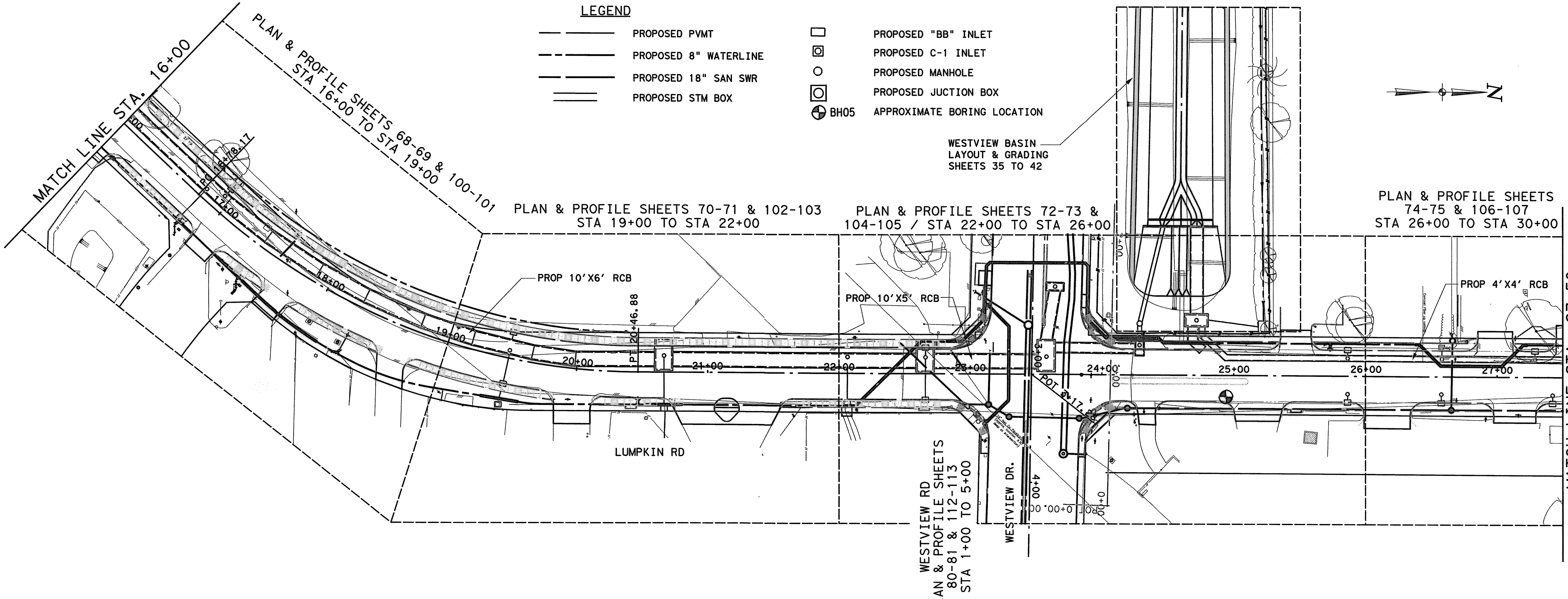
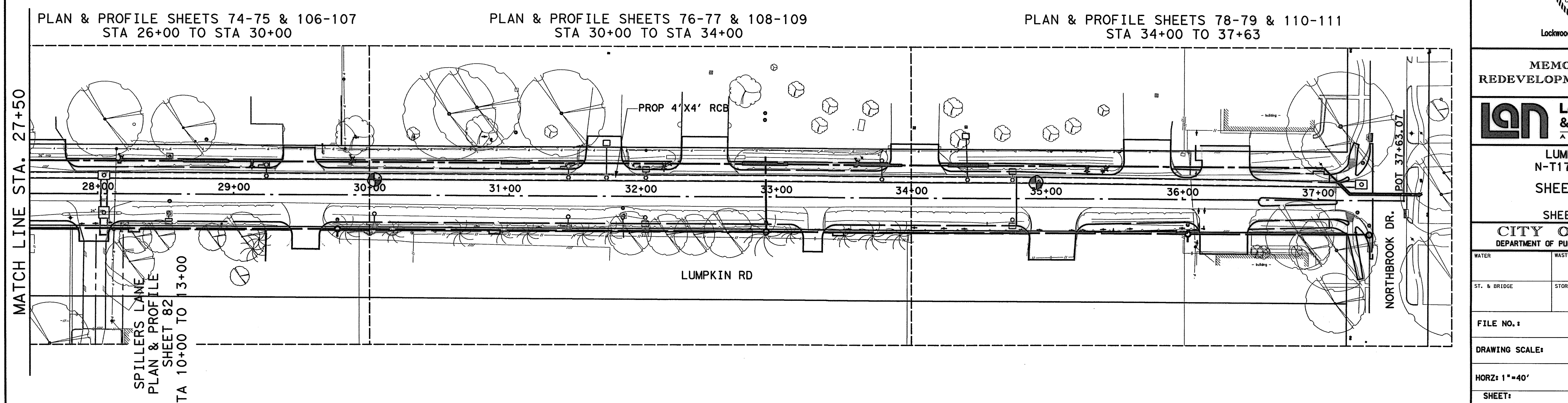

LEGEND
PROPOSED PVMT
PROPOSED 8" WATERLINE
PROPOSED 18" SAN SWR
PROPOSED STM BOX
PROPOSED "BB" INLET
PROPOSED C-1 INLET
PROPOSED MANHOLE
PROPOSED JUCTION BOX
BH05 APPROXIMATE BORING LOCATION
MATCH LINE STA. 16+00
PLAN & PROFILE SHEETS 68-69 & 100-101 STA 16+00 TO STA 19+00
PLAN & PROFILE SHEETS 70-71 & 102-103 STA 19+00 TO STA 22+00
PLAN & PROFILE SHEETS 72-73 & 104-105 / STA 22+00 TO STA 26+00
WESTVIEW BASIN LAYOUT & GRADING SHEETS 35 TO 42
PLAN & PROFILE SHEETS 74-75 & 106-107 STA 26+00 TO STA 30+00
PROP 10'X6' RCB
PROP 10'X5' RCB
PROP 4'X4' RCB
PT 20+46.88
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00
LUMPKIN RD
WESTVIEW RD PLAN & PROFILE SHEETS 80-81 & 112-113 STA 1+00 TO 5+00
WESTVIEW DR.
MATCH LINE STA. 27+50

PLAN & PROFILE SHEETS 74-75 & 106-107 STA 26+00 TO STA 30+00
PLAN & PROFILE SHEETS 76-77 & 108-109 STA 30+00 TO STA 34+00
PLAN & PROFILE SHEETS 78-79 & 110-111 STA 34+00 TO 37+63
MATCH LINE STA. 27+50
PROP 4'X4' RCB
28+00
29+00
30+00
31+00
32+00
33+00
34+00
35+00
36+00
37+00
POT 37+63.07
LUMPKIN RD
NORTHBROOK DR.
SPILLERS LANE PLAN & PROFILE SHEET 82 STA 10+00 TO 13+00

9-15-2014

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SHEET LAYOUT

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 63 OF 226	

No.	DATE	REVISIONS	APP.

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STA 1+51.86, 0.00'RT
BEGIN (3)(35)
MATCH EXIST

CRITICAL LOCATION
SEE SPEC 02317
SEE NOTE 8

PROP TYP. "C" MH ON BOX BM11
STA 1+94.50, 11.6'LT
TR = 78.56

ADJUST TYP "A" INLET TO MATCH PROP DRIVEWAY #B06
STA 2+80.50, 35'LT
TG = 78.47

PROP TYP "BB" INLET #B09
STA 4+95.00, 20'LT
TC = 78.31

PROP TYP. "C" MH ON BOX BM09
STA 4+95.00, 11.6'LT
TR = 77.98

PROP TYP "BB" INLET #B12
2+18.75, 20'LT
TC = 78.65

REMOVE LANDSCAPE AREA AND PAVE PROP DRIVEWAY

PROP 8" WATERLINE SEE NOTE 3

PROP 6' SIDEWALK

PROP TYP "BB" INLET #B09C
STA 4+30.00, 20'LT
TC = 78.51
– building –

PROP 24" LEAD

IH-10 FRONTAGE ROAD

POT 1+00.00

1+00

2+00

3+00

4+00

5+00

MATCHLINE STA 5+00 SEE SHT 2 OF 18

SEE NOTE 6

PROP 2-24"RCP TO EXIST 5'X9' RCB CORE BOX AT CENTER OF EXIST. BOX SEGMENT CRITICAL LOCATION SEE SPEC. 02317.

B LUMPKIN ROAD

LUMPKIN RD

EXIST ROW

PROP 2-8'x8' RCB

PROP 24" LEAD

PROP 24" LEAD

PROP TYP "BB" INLET #B14
STA 2+18.75, 20'RT
TC = 78.65

PROP TYP "A" INLET #C05
STA 2+18.75, 32.74'RT
TG = 77.32

PROP TYP "C" MH ON BOX #BM11A
STA 1+94.50, 2.25'RT
TR = 78.73

PROP 6' SIDEWALK (60)

ADJUST EXIST VAULT COVER TO GRADE

PROP TYP "BB" INLET #B09D
STA 4+30.00, 20'RT
TC = 78.51

PLUG EXIST. 12" STM

* PROP TYP "A" INLET
STA 4+30.00, 32.1'RT
TG = 77.50

*TEMPORARY INLET. NO DRAINAGE CALCULATIONS

SEE TxDOT STANDARDS

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV. =82.18 FEET (NAVD 88\GEOID09)

T.B.M. #46
SET ½" I.R. LOCATED AT NORTHWEST CORNER OF LUMPKIN RD. AND I-10 FRONTAGE ROAD INTERSECTION.
CL STA. 1+83.38, 23.46' LT.
ELEV. =78.75'

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. REMOVE EXIST. 36" SET AND PIPE AND PLUG REMAINING PIPE INTO IH-10.
7. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
10. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

AT&T UTILITY LINES SHOWN — DATE 9-25-14
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY — DATE 10/7/14
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. — DATE 10/7/14
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

PREPARED BY
STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — PROFESSIONAL ENGINEER
STATE OF TEXAS — BRIAN R. WHITNEY P.E. — 81591 — REGISTERED PROFESSIONAL ENGINEER
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614
9-15-2014 — 9-22-14

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN & PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
BEGIN PROJECT TO STA 5+00
SHEET 1 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 64 OF 226

No.	DATE	REVISIONS	APP.

HORIZONTAL GEOMETRY DATA

NO.	DESCRIP	STATION	OFFSET
A	PC	1+65.51	56.0 LT
B	PT	1+95.50	20.00 LT
C	PC	2+69.90	20.00 LT
D	PT	2+79.90	30.00 LT
E	PC	3+06.90	30.00 LT
F	PT	3+16.90	20.00 LT
G	PC	1+62.26	53.85 RT
H	PT	1+92.25	20.00 RT
I	PC	2+69.99	20.00 RT
J	PT	2+79.99	29.99 RT
K	PT	3+16.99	20.00 RT
L	PC	3+06.99	30.02 RT
M	PC	4+49.67	20.00 RT
N	PT	4+59.67	30.02 RT
O	PT	4+99.61	20.00 RT
P	PC	4+98.85	29.94 RT

E/R STA = 1+97.08
EL = 78.37' (E)

E/R STA = 1+65.69
EL = 78.68' (E)

E/R STA = 1+65.69
EL = 78.23' (W)

E/R STA = 2+00.67
EL = 78.58' (W)

VPI STA = 2+18.71
EL = 78.53' (W)

VPI STA = 2+18.71
EL = 78.31' (E)

VPI STA = 3+00.00
EL = 78.90' (W)

VPI STA = 3+00.00
EL = 78.87' (E)

(+)1.00 % (-)0.30 %
(-)1.00 % (+)0.30 %
(+)0.70 %
(+)0.46 %
(-)0.30 %
(-)0.30 %

PROP W TOC
PROP E TOC
PROP E&W TOC
100-YR HGL
2YR HGL
31' MIN COVER
4' MIN COVER
1' MIN CLR
1' MIN CLR

PROP CONC. CULVERT END CAP W/ 24"OUTLET EACH BOX SEE BOX END DETAIL

PROP 34 LF 2-24" RCP @ 0.18%

CORE EXIST.5'x9' RCB AT CENTER OF BOX JOINT AND PRIVIDE WATERTIGHT CONNECTION PROP 24" RCP

PROP 310 LF 2-8'x8' RCB @ 0.05%

PROP TYP "C" MH ON BOX #BM11A
STA 1+94.50
TR = 78.73
24"Ø = 64.65 (S)
2-8'x8'RCB Ø=64.40(N)

PROP TYP "C" MH ON BOX #BM11
STA 1+94.50
TR = 78.56
24"Ø = 64.65 (S)
2-8'x8'RCB Ø=64.40(N)

PROP TYP "A" INLET #C05
STA 2+18.75
TG = 77.32
24"Ø = 71.66 (W)

PROP TYP "BB" INLET #B14
STA 2+18.75
TC = 78.65
24"Ø = 70.09 (W)
24"Ø = 71.62 (E)

PROP TYP "BB" INLET #B12
STA 2+18.75
TC = 78.65
24"Ø = 69.99 (E)

PROP TYP "A" INLET
STA 4+30.00
TG = 77.50
24"Ø = 70.70 (W)

PROP TYP "BB" INLET #B09C
STA 4+30.00
TC = 78.51
24"Ø = 70.20 (E)

PROP TYP "BB" INLET #B09D
STA 4+30.00
TC = 78.51
24"Ø = 70.50 (E,W)

PROP TYP "C" MH ON BOX #BM09
STA 4+95.00
TR = 77.98
2-8'x8' RCB Ø = 64.55 (N,S)
24"Ø = 70.43 (W)

PROP TYP "BB" INLET #B09
STA 4+95.00
TC = 78.31
24"Ø = 70.27 (E)

Ø = 64.65
Ø = 64.40
Ø = 64.59
Ø = 64.55

PROP WEST TOC
PROP EAST TOC

2+00 3+00 4+00 5+00

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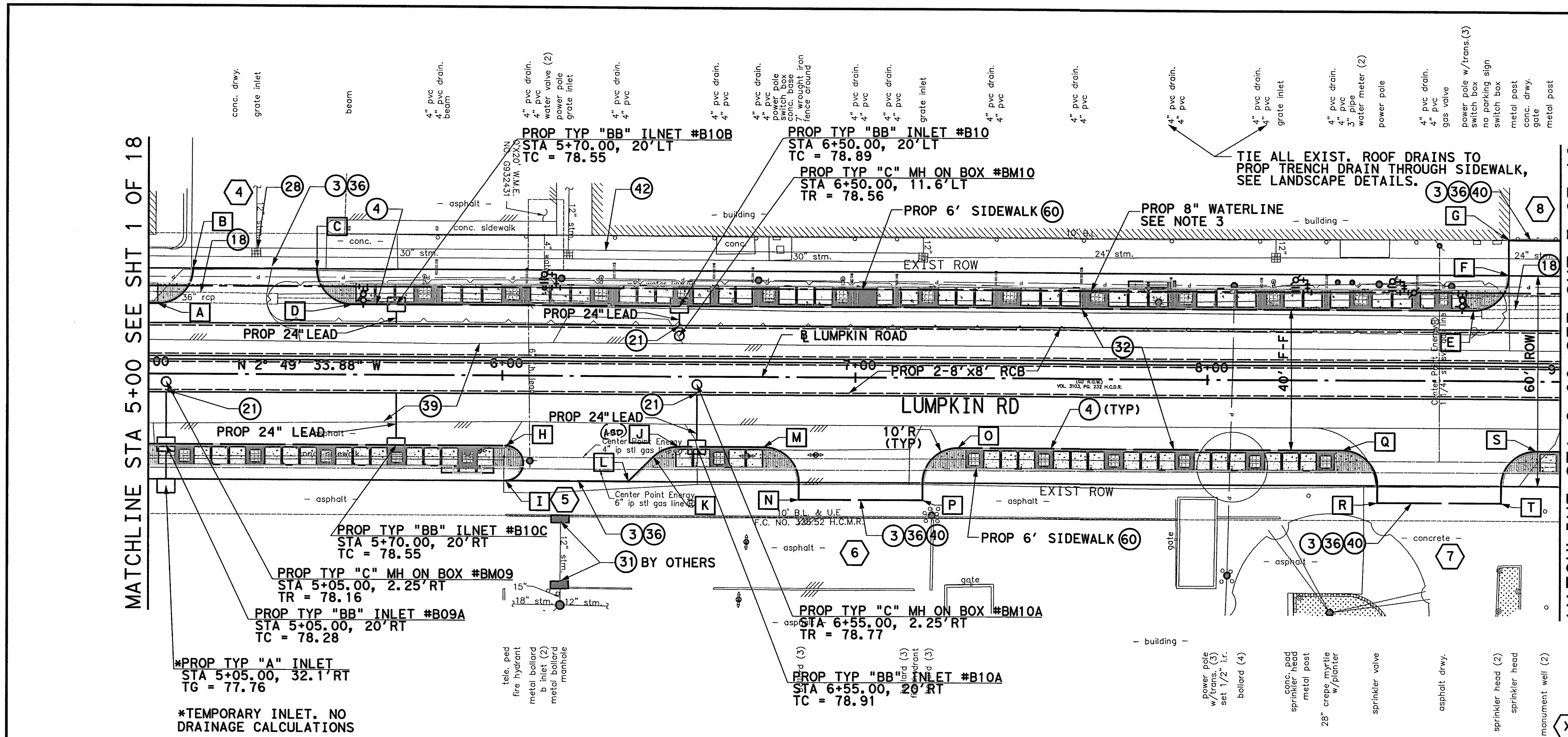

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #46
SET 1/2" I.R. LOCATED AT EAST SIDE OF LUMPKIN ROAD.
APPROX. 622 FT NORTH OF LUMPKIN ROAD AND IH 10 INTERSECTION.
D STA. 8+07.15, 24.86' RT.
ELEV.=80.03'

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
9. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.
10. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

AT&T UTILITY LINES SHOWN — DATE 9-25-14
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY — DATE 10/7/14
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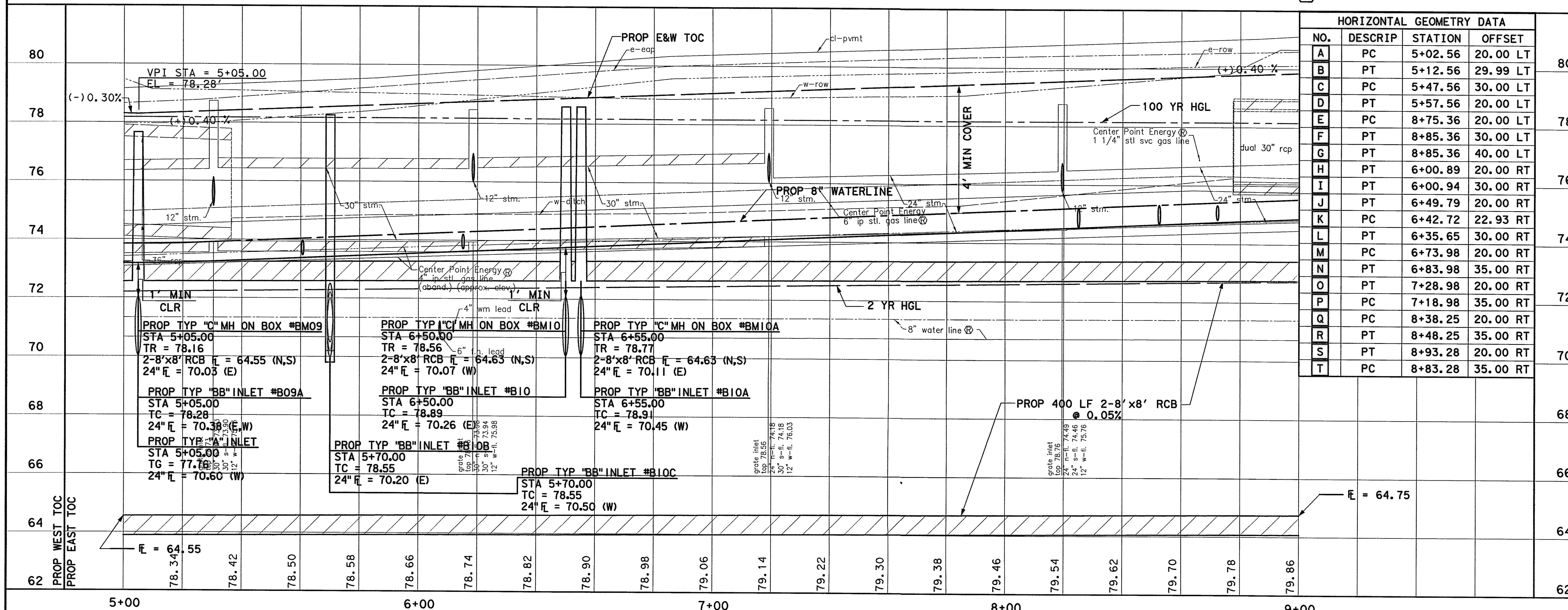
STATE OF TEXAS — MUHAMMAD M ALI, P.E. 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014
STATE OF TEXAS — BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER — 9-22-14
Lockwood, Andrews & Newnam, Inc. Firm No. 2614



HORIZONTAL GEOMETRY DATA

NO.	DESCRIP	STATION	OFFSET
A	PC	5+02.56	20.00 LT
B	PT	5+12.56	29.99 LT
C	PC	5+47.56	30.00 LT
D	PT	5+57.56	20.00 LT
E	PC	8+75.36	20.00 LT
F	PT	8+85.36	30.00 LT
G	PT	8+85.36	40.00 LT
H	PT	6+00.89	20.00 RT
I	PT	6+00.94	30.00 RT
J	PT	6+49.79	20.00 RT
K	PC	6+42.72	22.93 RT
L	PT	6+35.65	30.00 RT
M	PC	6+73.98	20.00 RT
N	PT	6+83.98	35.00 RT
O	PT	7+28.98	20.00 RT
P	PC	7+18.98	35.00 RT
Q	PC	8+38.25	20.00 RT
R	PT	8+48.25	35.00 RT
S	PT	8+93.28	20.00 RT
T	PC	8+83.28	35.00 RT

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN & PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 5+00 TO STA 9+00
SHEET 2 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 65 OF 226

REVISIONS — NO. — DATE — APP.

MJGuthrie 3:23:44 PM 9/17/2014
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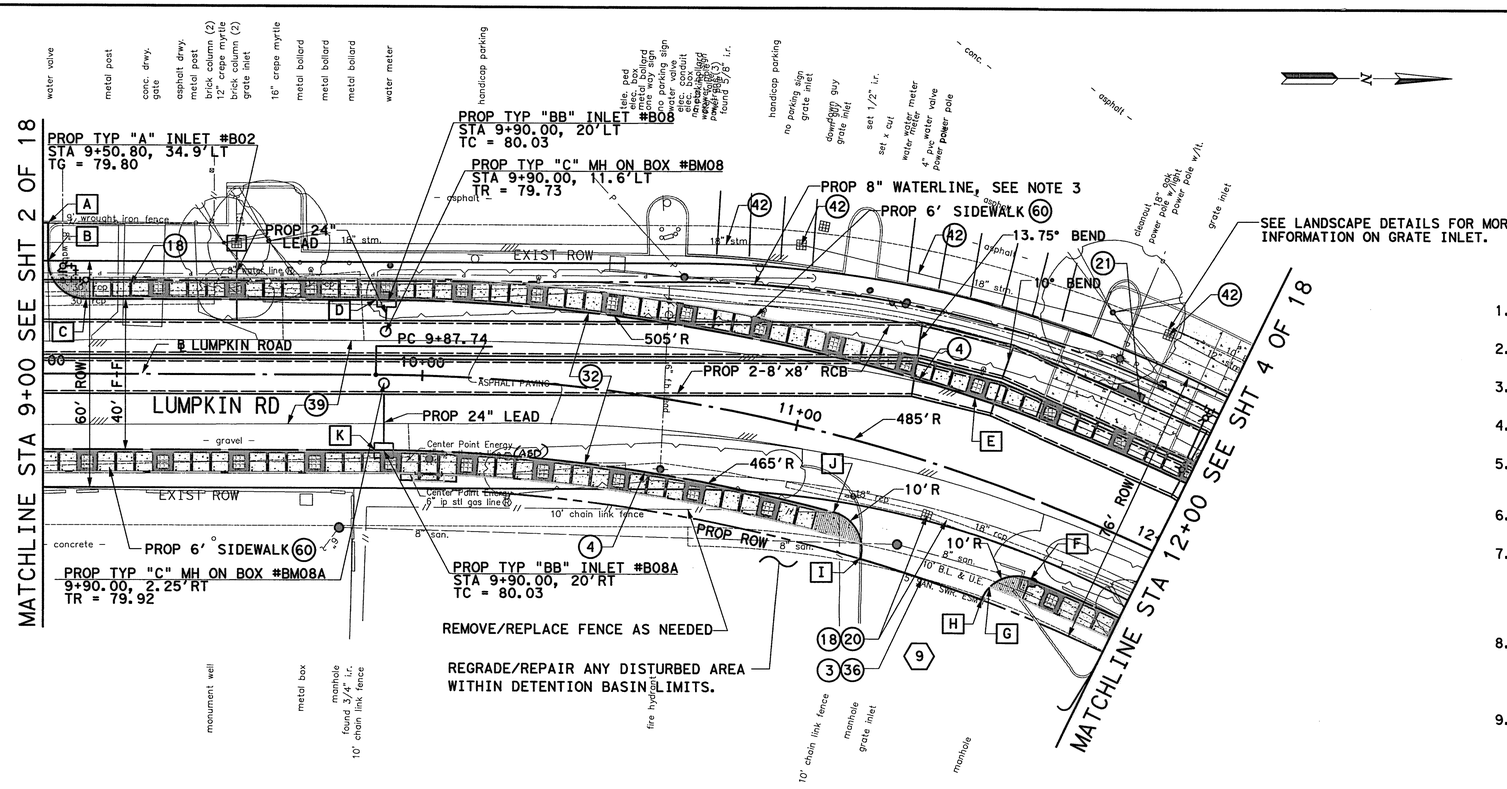


BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #45

SET ½"I.R. LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 587 FT SOUTH OF LUMPKIN ROAD AND LARSTON DRIVE INTERSECTION.
D STA. 11+04.75, 40.32' LT
ELEV.=80.32'

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
9. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PT	9+01.36	40.00 LT
B	PC	9+01.36	30.00 LT
C	PT	9+11.36	20.00 LT
D	PC	9+87.74	20.00 LT
E	PC	11+42.46	20.00 LT
F	PCC	11+67.15	20.00 RT
G	PC	11+61.95	25.76 RT
H	PT	11+62.09	29.75 RT
I	PT	11+25.89	29.62 RT
J	PCC	11+15.24	20.00 RT
K	PC	9+87.55	20.00 RT

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Preliminary Only
STATE OF TEXAS
MUHAMMAD M ALI, P.E.
99146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc. 9-22-14
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

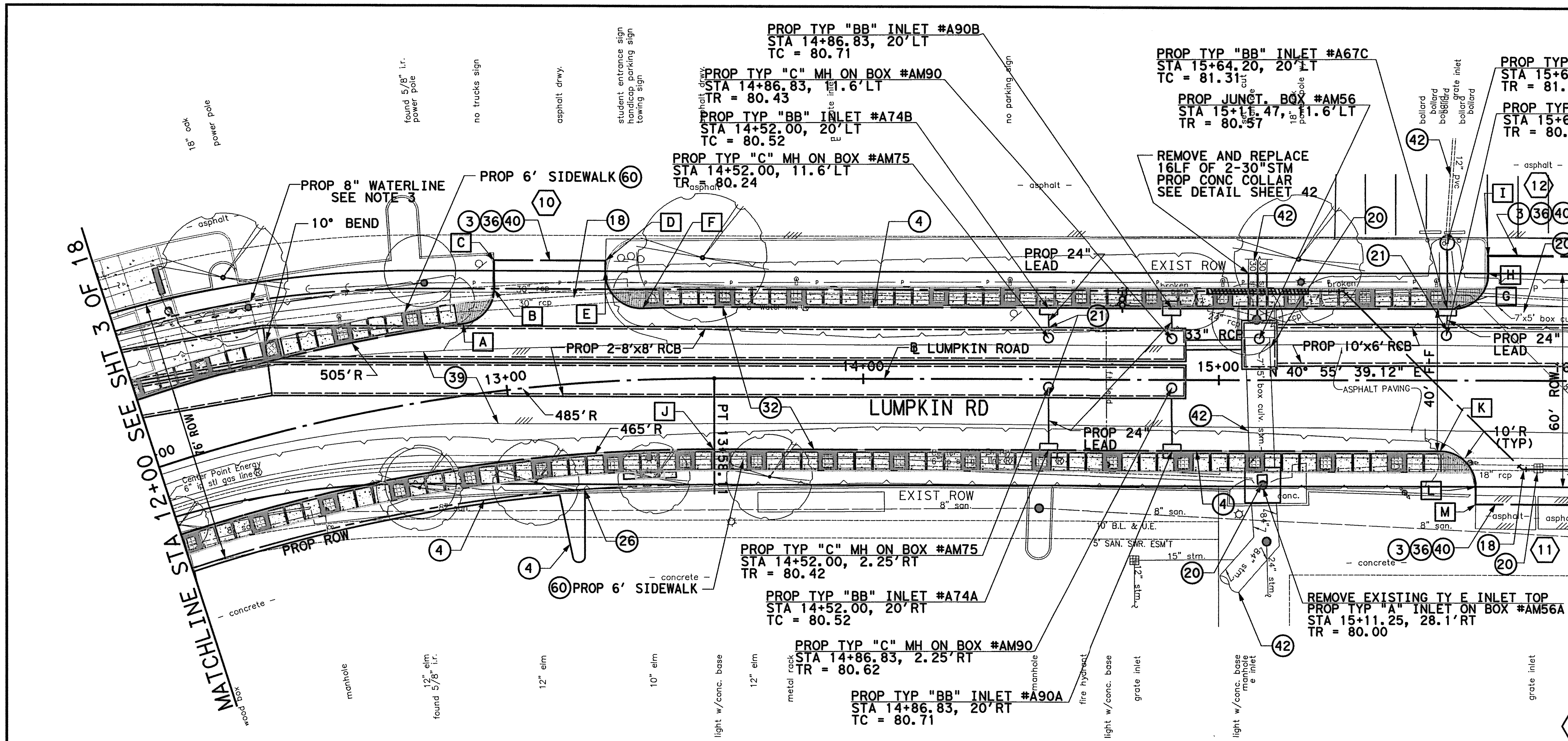
LUMPKIN ROAD
N-T17000-0012-3
PLAN & PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 9+00 TO STA 12+00
SHEET 3 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE:
VERT: 1"=2'
HORZ: 1"=20'
CITY DWG NO.
SHEET: 66 OF 226

MJGuthrie 3:24:03 PM 9/17/2014
pw:\\ladpw.ladco.int\projectwise\Documents\Projects\130-10384-0011\4-0-Production\4-01-Drawings\Roadway\57-001-P&P-RDWY-03.dgn



BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #44
SET X CUT LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 166 FT SOUTH OF LUMPKIN ROAD AND LARSTON DRIVE INTERSECTION.
D STA. 15+08.09, 17.04' LT
ELEV.=82.25'

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
7. SEE JUNCTION BOX DETAILS SHEET FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
10. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T/UTILITY LINES SHOWN — DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

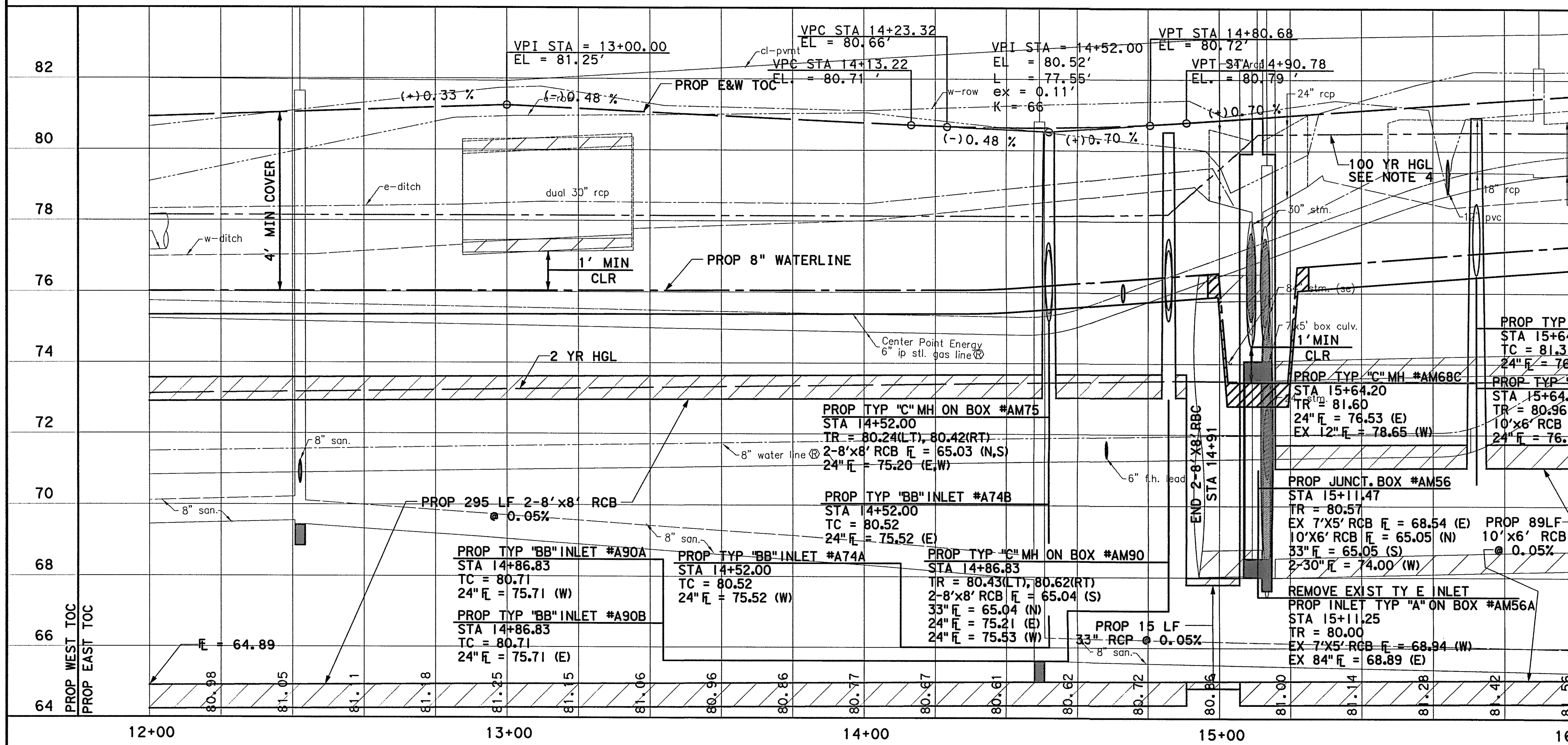
10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY — DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. — DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014
STATE OF TEXAS — BRIAN R. WHITNEY P.E. — 81591 — REGISTERED PROFESSIONAL ENGINEER — 9-12-14
Lockwood, Andrews & Newnan, Inc. Firm No. 2614

HORIZONTAL GEOMETRY DATA

NO.	DESCRIP	STATION	OFFSET
A	PRC	12+90.47	20.00 LT
B	PT	12+99.79	28.46 LT
C	PT	13+00.71	36.64 LT
D	PT	13+29.63	33.88 LT
E	PC	13+29.46	30.90 LT
F	PRC	13+38.83	20.00 LT
G	PC	15+65.62	20.00 LT
H	PT	15+75.62	30.00 LT
I	PT	15+75.63	35.04 LT
J	PT	13+57.91	20.00 RT
K	PC	15+62.05	20.00 RT
L	PT	15+72.05	30.00 RT
M	PT	15+71.99	35.00 RT



MEMORIAL CITY REDEVELOPMENT AUTHORITY

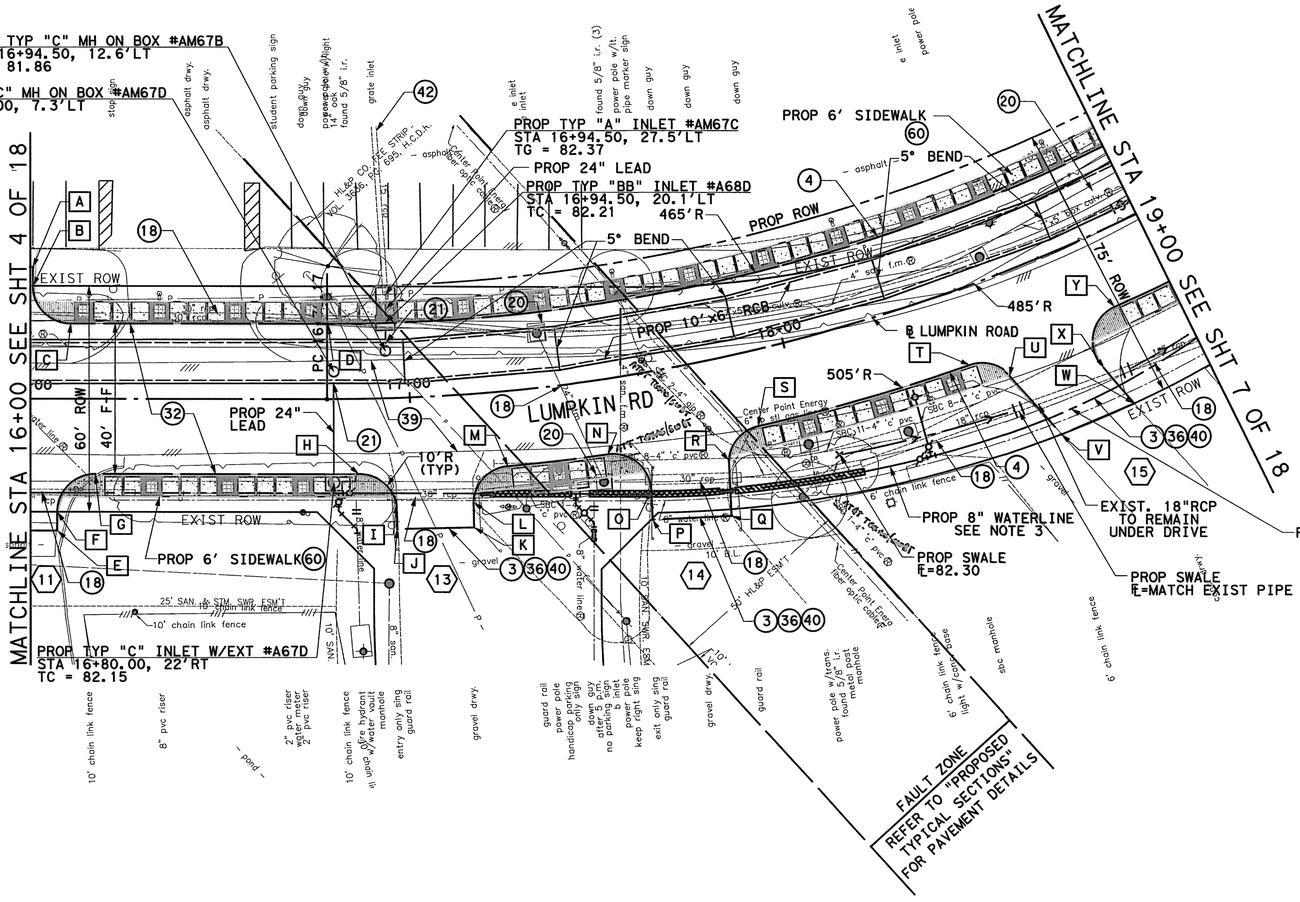
Lockwood, Andrews & Newnan, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN & PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 12+00 TO STA 16+00
SHEET 4 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'



SEE PROFILE VIEW SHEET 6 OF 18

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PT	16+00.63	35.00 LT
B	PC	16+00.62	30.00 LT
C	PT	16+10.62	20.00 LT
D	PC	16+78.37	20.00 LT
E	PT	16+07.03	35.00 RT
F	PC	16+07.03	30.00 RT
G	PT	16+17.06	20.00 RT
H	PRC	16+86.19	20.00 RT
I	PT	16+95.47	28.17 RT
J	PT	16+95.40	34.79 RT
K	PT	17+14.34	35.40 RT
L	PC	17+14.65	28.79 RT
M	PRC	17+24.01	20.00 RT
N	PRC	17+49.55	20.00 RT
O	PT	17+58.90	31.18 RT
P	PT	17+58.05	38.86 RT
Q	PT	17+77.24	41.71 RT
R	PC	17+79.40	27.21 RT
S	PRC	17+88.47	20.00 RT
T	PRC	18+44.53	20.00 RT
U	PT	18+53.32	26.33 RT
V	PT	18+58.19	45.79 RT
W	PT	18+77.71	45.53 RT
X	PC	18+75.86	33.62 RT
Y	PRC	18+84.61	20.00 RT

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #43

SET ½"I.R. LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 361 FT SOUTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 19+50.97, 26.24' RT.
ELEV.=85.17'

No.	DATE	REVISIONS	APP.

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
5. REGRADE EXIST SWALE TO NORTH UNDER DRIVE TO PIPE OPENING AT STA 19+10
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR INFORMATION.
7. SEE JUNCTION BOX DETAILS SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
10. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/1/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Preliminary
STATE OF TEXAS
MUHAMMAD M ALI, P.E.
88146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 16+00 TO STA 19+00
SHEET 5 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 68 OF 226

M.J.Guthrie
9:57:15 AM
9/11/2014
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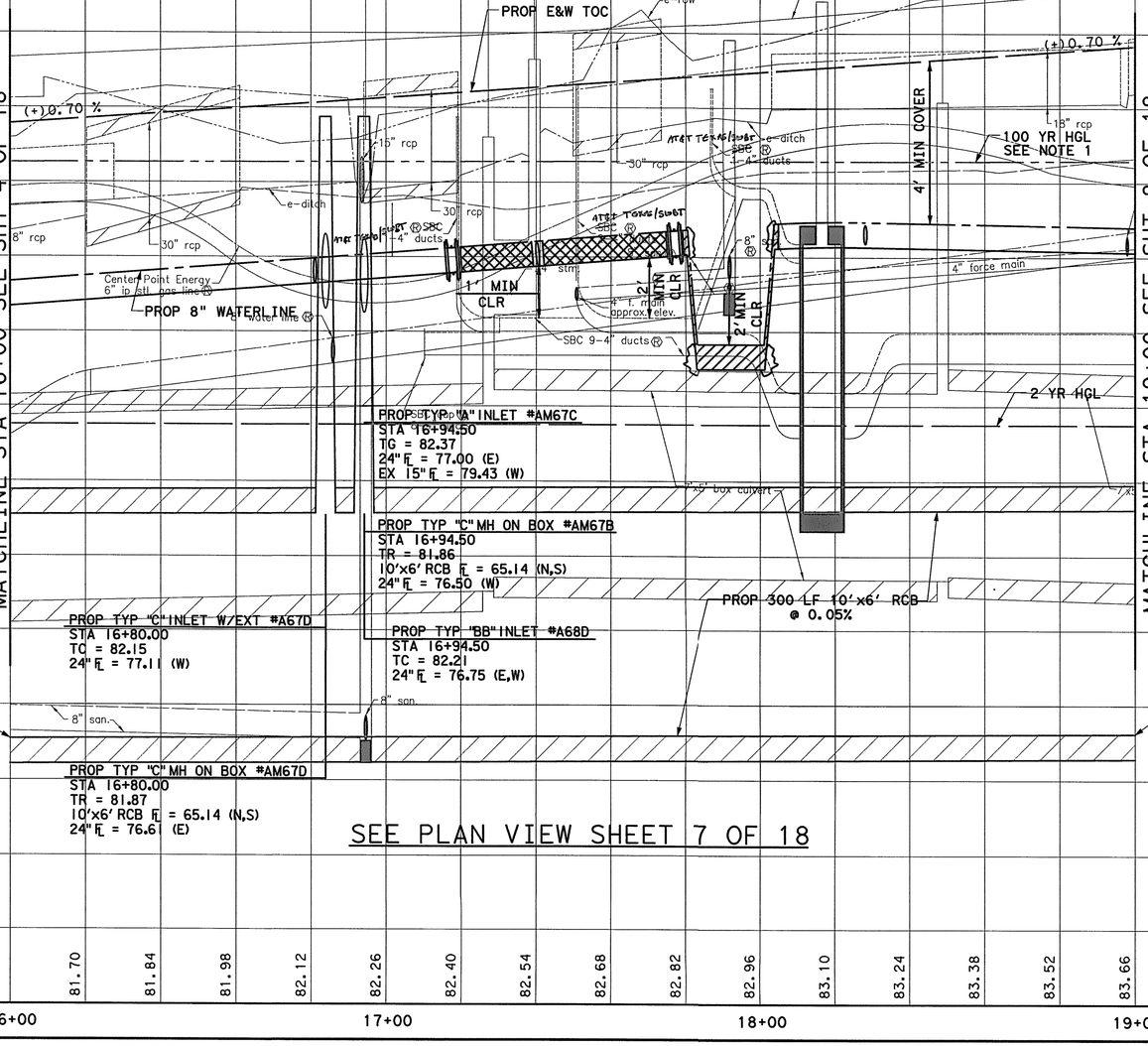

NOTES:

1. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS DATE FACILITIES VERIFICTION ONLY
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE ELECTRICAL FACILITIES VERIFICATION ONLY.
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 16+00 TO STA 19+00
SHEET 6 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 69 OF 226

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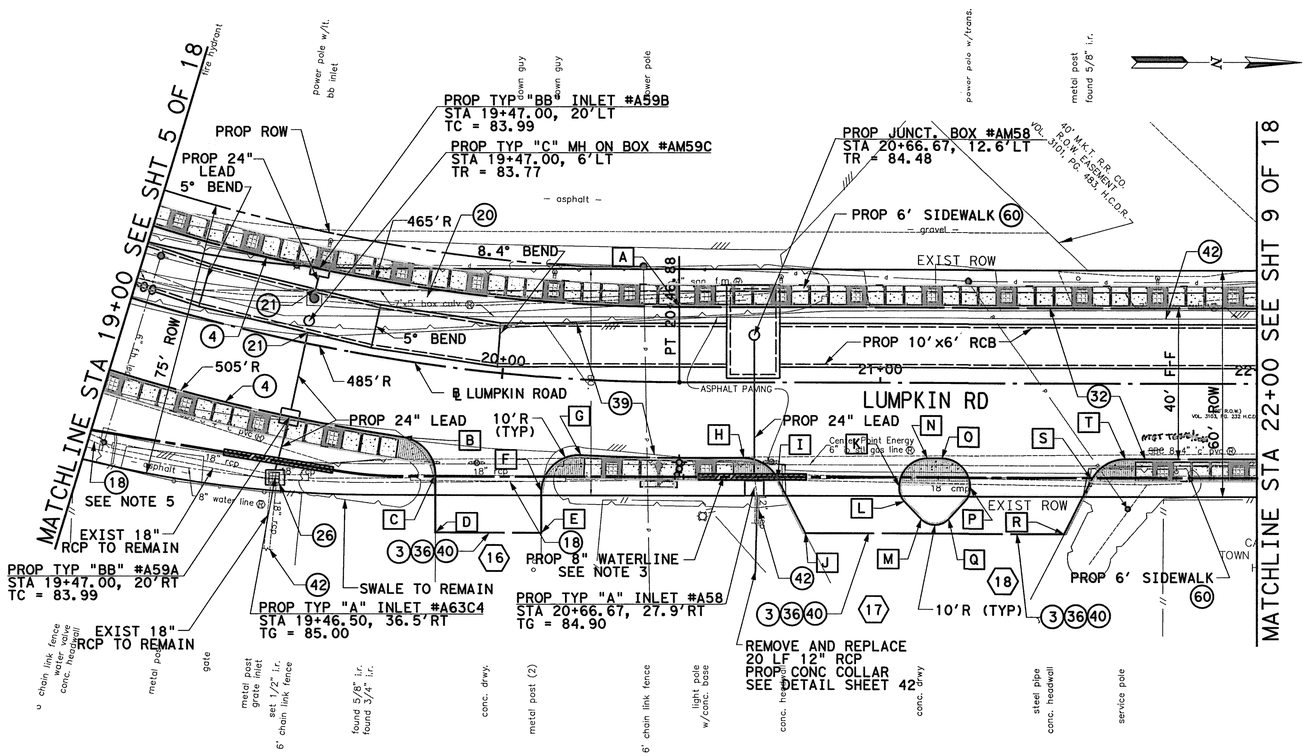
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #42

SET 1/2"I.R. LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 361 FT SOUTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 19+50.97, 26.24' RT.
ELEV.=85.17'

No.	DATE	REVISIONS	APP.



SEE PROFILE VIEW SHEET 8 OF 18

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
5. REMOVE EXIST 18" CULVERT TO DRIVE AND GRADE DITCH TO EXIST 18" RCP TO REMAIN.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
9. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PT	20+47.07	20.00 LT
B	PRC	19+76.47	20.00 RT
C	PT	19+85.82	28.65 RT
D	PT	19+86.74	40.00 RT
E	PT	20+12.65	40.00 RT
F	PC	20+12.42	30.22 RT
G	PRC	20+21.83	20.00 RT
H	PC	20+63.88	20.00 RT
I	PT	20+72.81	25.50 RT
J	PT	20+80.10	40.00 RT
K	PC	21+05.06	27.53 RT
L	PT	21+06.42	31.44 RT
M	PC	21+10.80	36.10 RT
N	PT	21+12.56	20.00 RT
O	PC	21+16.45	20.00 RT
P	PT	21+23.95	27.47 RT
Q	PT	21+18.11	36.07 RT
R	PT	21+48.84	40.00 RT
S	PC	21+56.30	25.44 RT
T	PT	21+65.20	20.00 RT

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DO NOT SCALE DRAWING

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98746
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY, P.E.
81591
REGISTERED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc. 9-12-14
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

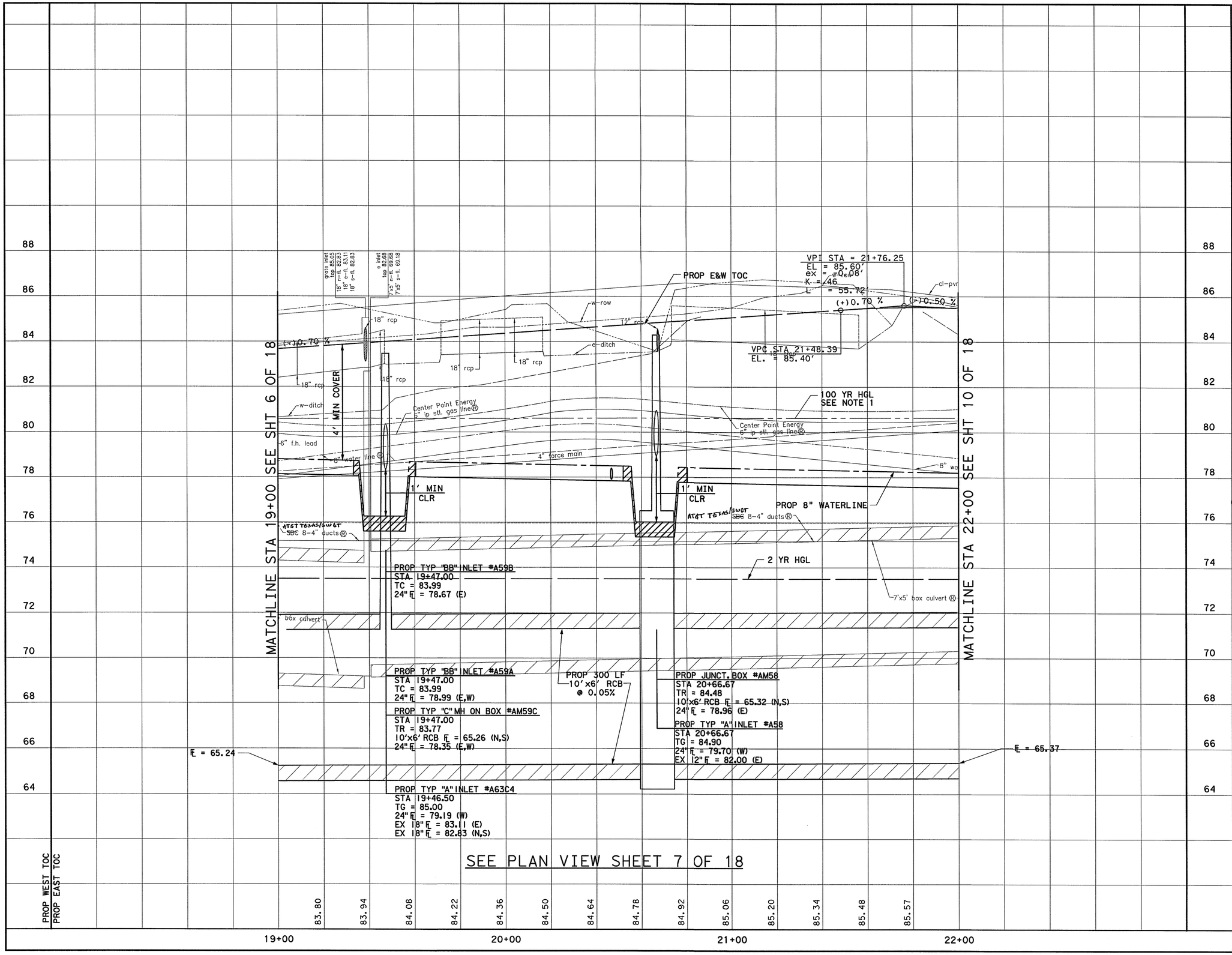
LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 19+00 TO STA 22+00
SHEET 7 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE:
VERT: 1"=2'
HORZ: 1"=20'
CITY DWG NO.
SHEET: 70 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Roadway\61-001-P&P-RDWY-07.dgn 9:57:35 AM 9/11/2014 MJGuthrie



NOTES:

1. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.

No.	DATE	REVISIONS	APP.

0 20 40 80

(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9.25.14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
MUHAMMAD M AU, P.E.
98148
LICENSED PROFESSIONAL ENGINEER
9-15-2014

DRAWINGS ONLY
STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

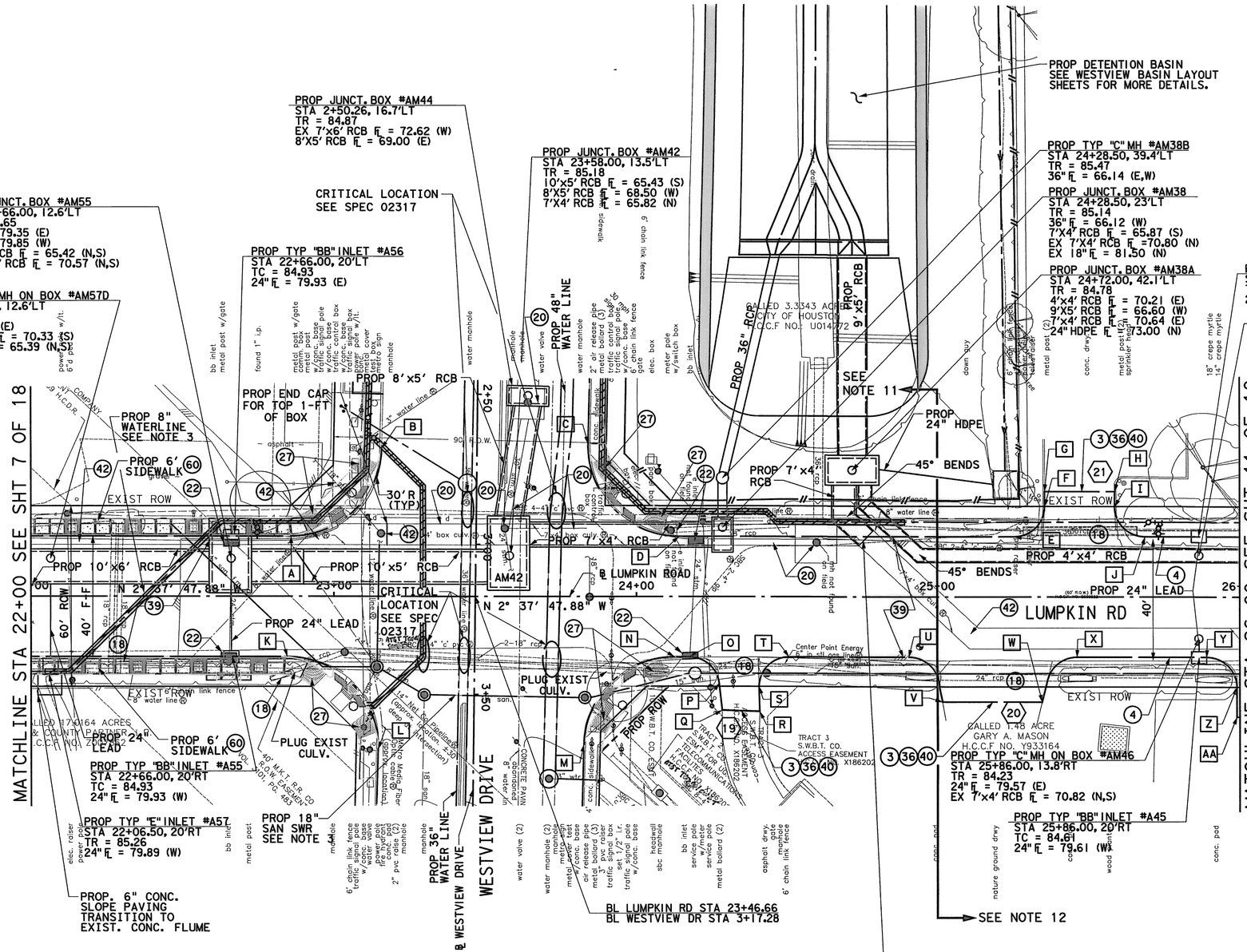
LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 19+00 TO STA 22+00
SHEET 8 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 71 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Productions\4-01-Drawings\Roadway\62-001-P&P-RDWY-08.dgn 9/17/2014 3:24:37 PM MJGuthrie



BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV. =82.18 FEET (NAVD 88\GEOID09)

T.B.M. #41

SET ½" I.R. LOCATED NORTHEAST CORNER OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 23+93.54, 31.79' RT.
ELEV. =85.29'

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PC	22+85.86	20.00 LT
B	PT	23+15.85	49.25 LT
C	PC	23+84.09	50.81 LT
D	PT	24+14.08	20.00 LT
E	PC	25+25.55	20.00 LT
F	PT	25+35.55	30.04 LT
G	PT	25+35.55	35.00 LT
H	PT	25+58.71	35.00 LT
I	PC	25+58.71	30.02 LT
J	PT	25+68.71	20.00 LT
K	PRC	22+84.52	20.00 RT
L	PT	23+14.51	50.85 RT
M	PC	23+82.52	49.20 RT
N	PT	24+12.51	20.00 RT
O	PC	24+17.41	20.00 RT
P	PT	24+27.35	28.86 RT
Q	PT	24+28.37	37.81 RT
R	PT	24+40.81	37.93 RT
S	PC	24+40.57	29.88 RT
T	PRC	24+50.57	20.00 RT
U	PC	24+90.67	20.00 RT
V	PT	25+00.67	35.00 RT
W	PC	25+36.24	35.00 RT
X	PT	25+46.24	20.00 RT
Y	PC	25+89.05	20.00 RT
Z	PT	25+99.04	30.01 RT
AA	PT	25+99.03	39.97 RT

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

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

PRIVATE UTILITY LINES SHOWN

AT&T UTILITY LINES SHOWN — DATE 9/25/14
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY — DATE 10/7/14
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. — DATE 10/7/14
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAINAGE ONLY
STATE OF TEXAS — MUHAMMAD M ALI, P.E. 98146 — LICENSED PROFESSIONAL ENGINEER — 9-12-2014
STATE OF TEXAS — BRIAN R. WHITNEY P.E. 81591 — REGISTERED PROFESSIONAL ENGINEER — 9-12-14
Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 22+00 TO STA 26+00
SHEET 9 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 72 OF 226

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
5. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
6. SEE JUNCTION BOX DETAILS SHEETS FOR MORE INFORMATION.
7. SEE WESTVIEW PLAN & PROFILE SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
10. SEE TOE WALL DETAILS SHEET FOR PROPOSED TOE WALL LOCATIONS AND DETAILS.
11. STATION 25+00: END PROPOSED BASE BID ITEMS (SEE SPECIFICATION 01110 FOR DETAILS).
12. STATION 25+00: BEGIN PROPOSED ALTERNATE BID ITEMS (SEE SPECIFICATION 01110 FOR DETAILS).

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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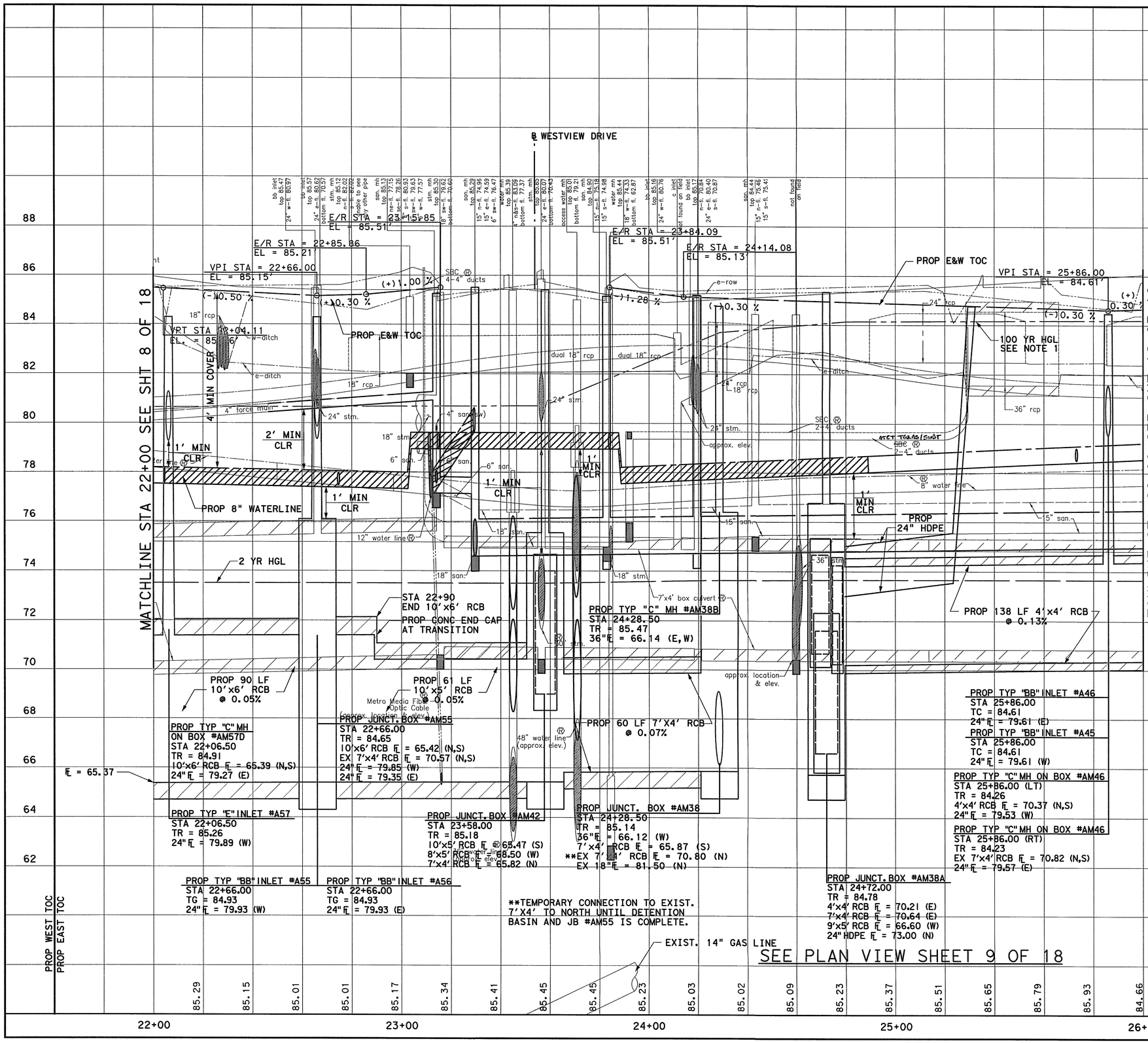
9/17/2014



NOTES:

1. PROPOSED HGL CALCULATED FOR ULTIMATE PROJECT CONDITIONS USING INFOWORKS SD.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING ONLY

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
59146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 22+00 TO END OF PROJECT
SHEET 10 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 73 OF 226

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NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR INFORMATION.
7. SEE JUNCTION BOX DETAILS SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

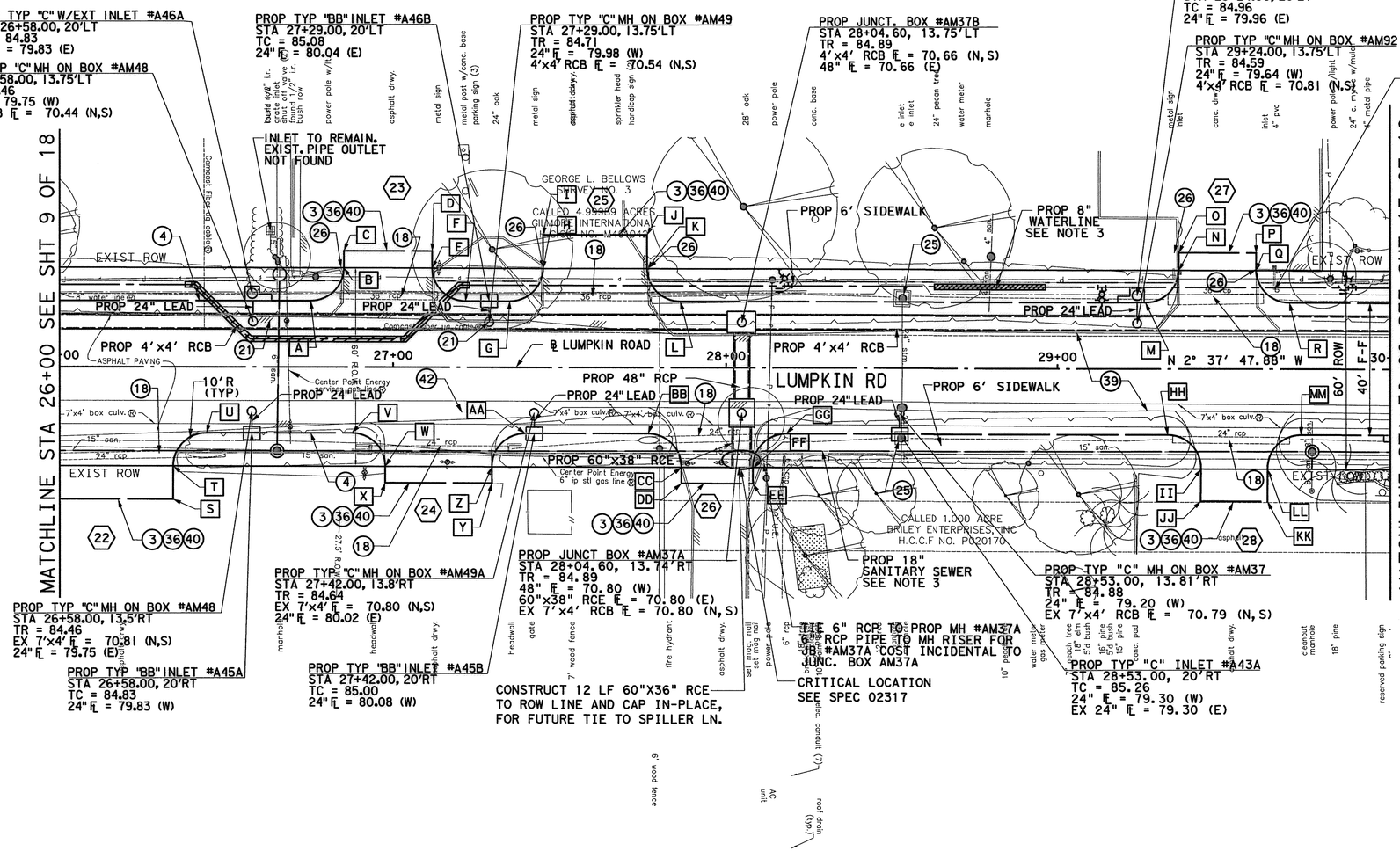
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV. =82.18 FEET (NAVD 88\GEOID09)

T.B.M. #40

SET MAG NAIL LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 418 FT NORTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 28+08.56, 18.18' RT.
ELEV. =86.39'

No.	DATE	REVISIONS	APP.



SEE PROFILE VIEW SHEET 12 OF 18

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PC	26+75.27	20.00 LT
B	PT	26+85.27	29.92 LT
C	PT	26+85.27	35.00 LT
D	PT	27+11.72	35.00 LT
E	PC	27+11.72	29.89 LT
F	PT	27+21.72	20.00 LT
G	PC	27+34.98	20.00 LT
H	PT	27+44.98	29.87 LT
I	PT	27+44.98	40.00 LT
J	PT	27+76.24	40.00 LT
K	PC	27+76.23	29.84 LT
L	PT	27+86.23	20.00 LT
M	PC	29+26.55	20.00 LT
N	PT	29+36.55	29.70 LT
O	PT	29+36.56	35.01 LT
P	PT	29+59.78	34.98 LT
Q	PC	29+59.78	29.68 LT
R	PT	29+69.77	20.00 LT
S	PT	26+34.03	40.03 RT
T	PC	26+34.05	30.04 RT
U	PT	26+44.05	20.00 RT
V	PC	26+87.61	20.00 RT
W	PT	26+97.61	30.09 RT
X	PT	26+97.61	35.00 RT
Y	PT	27+29.58	35.00 RT
Z	PC	27+29.58	30.12 RT
AA	PT	27+39.58	20.00 RT
BB	PC	27+76.54	20.00 RT
CC	PT	27+86.54	30.17 RT
DD	PT	27+86.54	35.00 RT
EE	PT	28+08.03	35.00 RT
FF	PC	28+08.04	30.19 RT
GG	PT	28+18.03	20.00 RT
HH	PC	29+33.11	20.00 RT
II	PT	29+43.11	30.30 RT
JJ	PT	29+43.08	39.96 RT
KK	PT	29+63.09	40.03 RT
LL	PC	29+63.12	30.32 RT
MM	PT	29+73.11	20.00 RT

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS DATE FACILITIES VERIFICTION ONLY
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE ELECTRICAL FACILITIES VERIFICATION ONLY.
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING ONLY

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY, P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 26+00 TO STA 30+00
SHEET 11 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 74 OF 226

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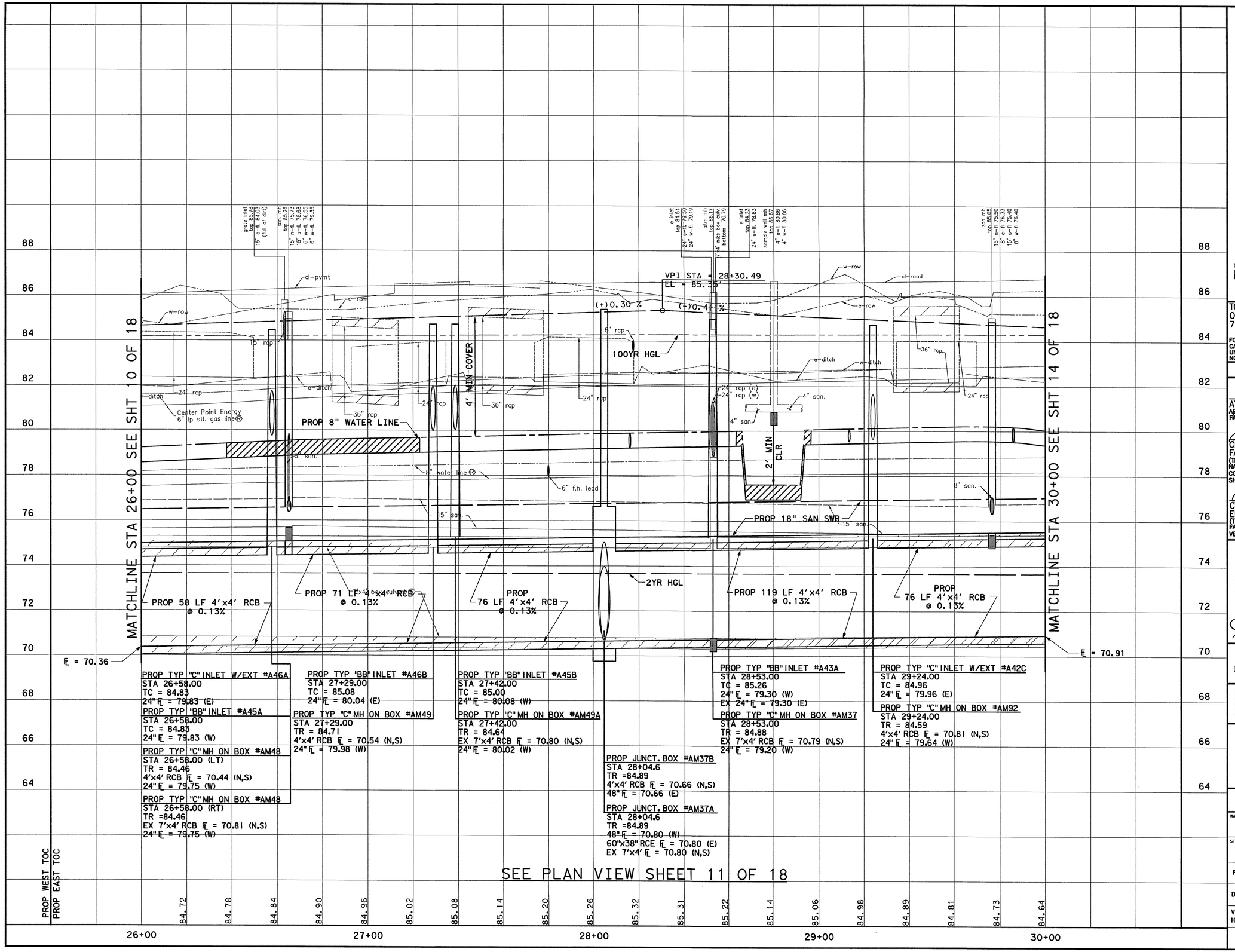

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9.25.14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING ONLY
STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

DRAWING ONLY
STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 26+00 TO STA 30+00
SHEET 12 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 75 OF 226

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NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. CONTRACTOR TO FIELD LOCATE EXIST. 24"RCP PRIOR TO CONSTRUCTION OF MANHOLE/INLET.
7. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

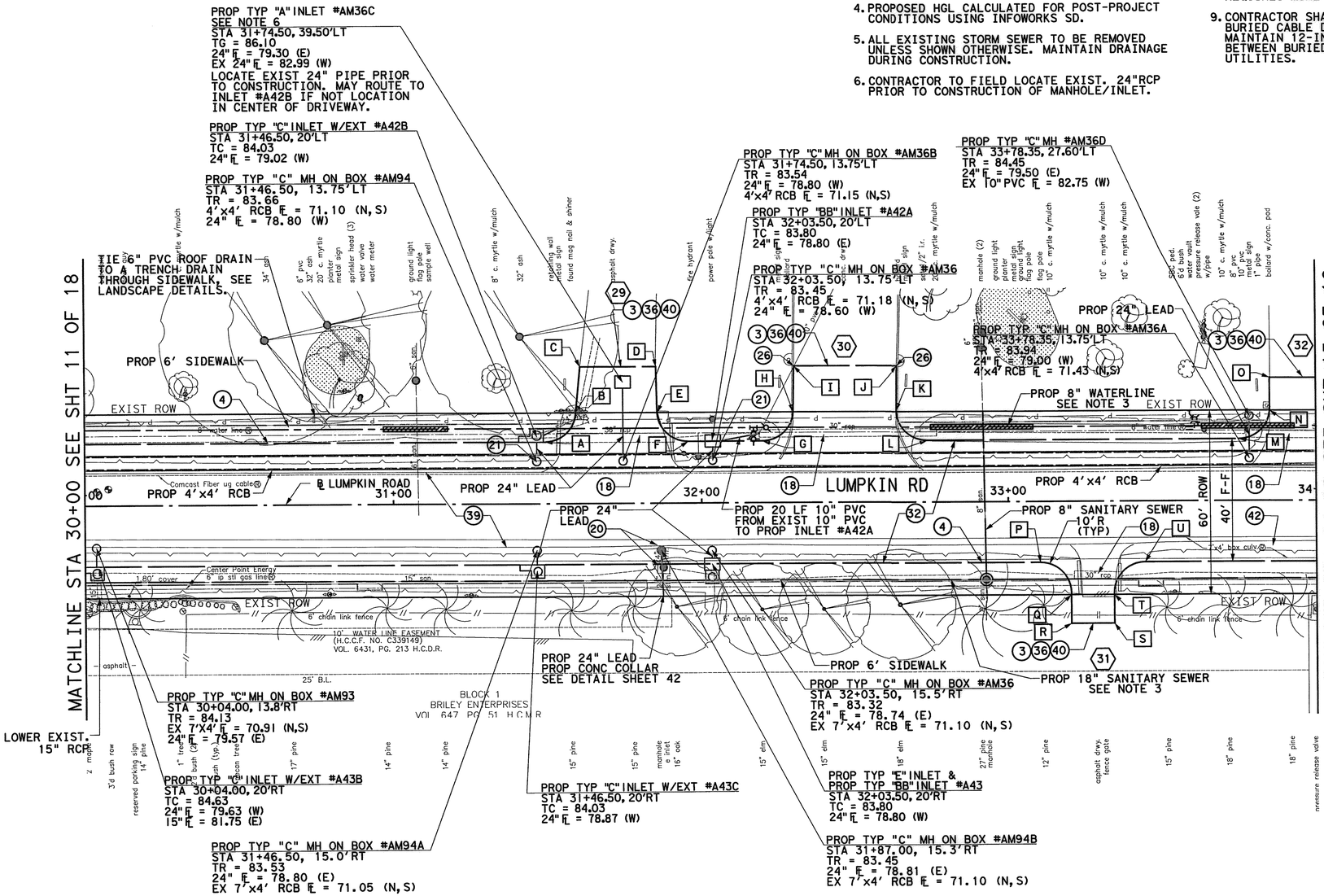
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #52

SET ½" I.R. LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 466 FT NORTH OF LUMPKIN ROAD AND NORTHBROOK DRIVE INTERSECTION.
D STA. 32+76.49, 11.77' LT.
ELEV.=86.60'

No.	DATE	REVISIONS	APP'D



SEE PROFILE VIEW SHEET 14 OF 18

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PC	31+49.06	20.00 LT
B	PT	31+59.05	29.52 LT
C	PT	31+58.94	45.00 LT
D	PT	31+85.65	45.00 LT
E	PC	31+85.76	29.49 LT
F	PT	31+95.75	20.00 LT
G	PC	32+19.90	20.00 LT
H	PT	32+29.88	29.46 LT
I	PT	32+29.76	45.00 LT
J	PT	32+63.71	45.00 LT
K	PC	32+63.83	29.43 LT
L	PT	32+73.81	20.00 LT
M	PC	33+75.00	20.00 LT
N	PT	33+84.98	29.33 LT
O	PT	33+85.00	40.03 LT
P	PC	33+10.37	20.00 RT
Q	PT	33+20.35	30.62 RT
R	PT	33+20.35	40.00 RT
S	PT	33+34.39	40.00 RT
T	PC	33+34.39	30.63 RT
U	PT	33+44.37	20.00 RT

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

N

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING ONLY

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS — BRIAN R. WHITNEY P.E. — 81591 — REGISTERED PROFESSIONAL ENGINEER
Lockwood, Andrews & Newnam, Inc. 9-12-14
Firm No. 2614
9-15-2014

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 30+00 TO STA 34+00
SHEET 13 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 76 OF 226

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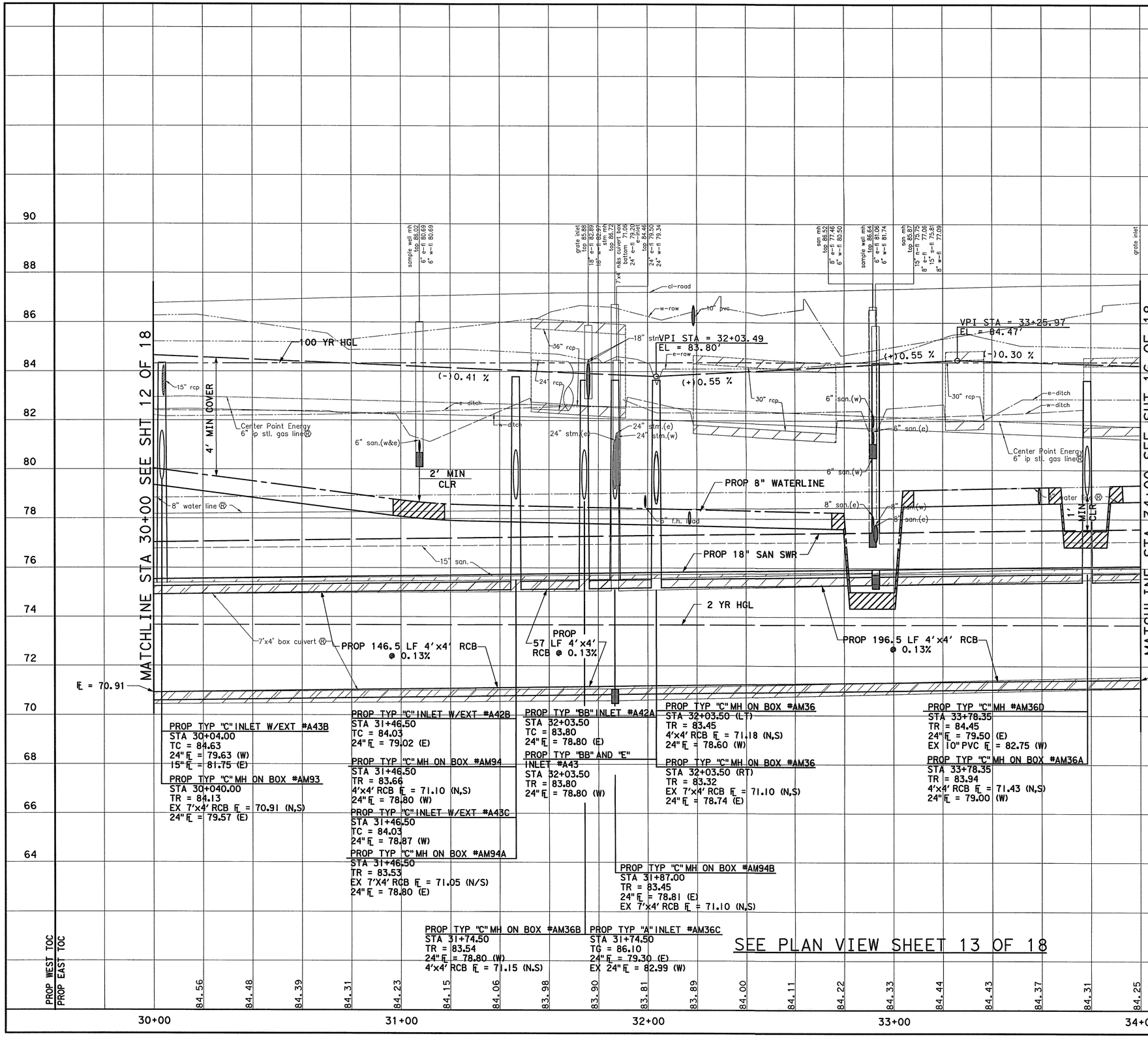

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

MUHAMMAD M ALI, P.E. 98146 LICENSED PROFESSIONAL ENGINEER
9-15-2014

BRIAN R. WHITNEY, P.E. 81591 REGISTERED PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 30+00 TO STA 34+00
SHEET 14 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 77 OF 226

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NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING INFOWORKS SD.
5. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
6. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

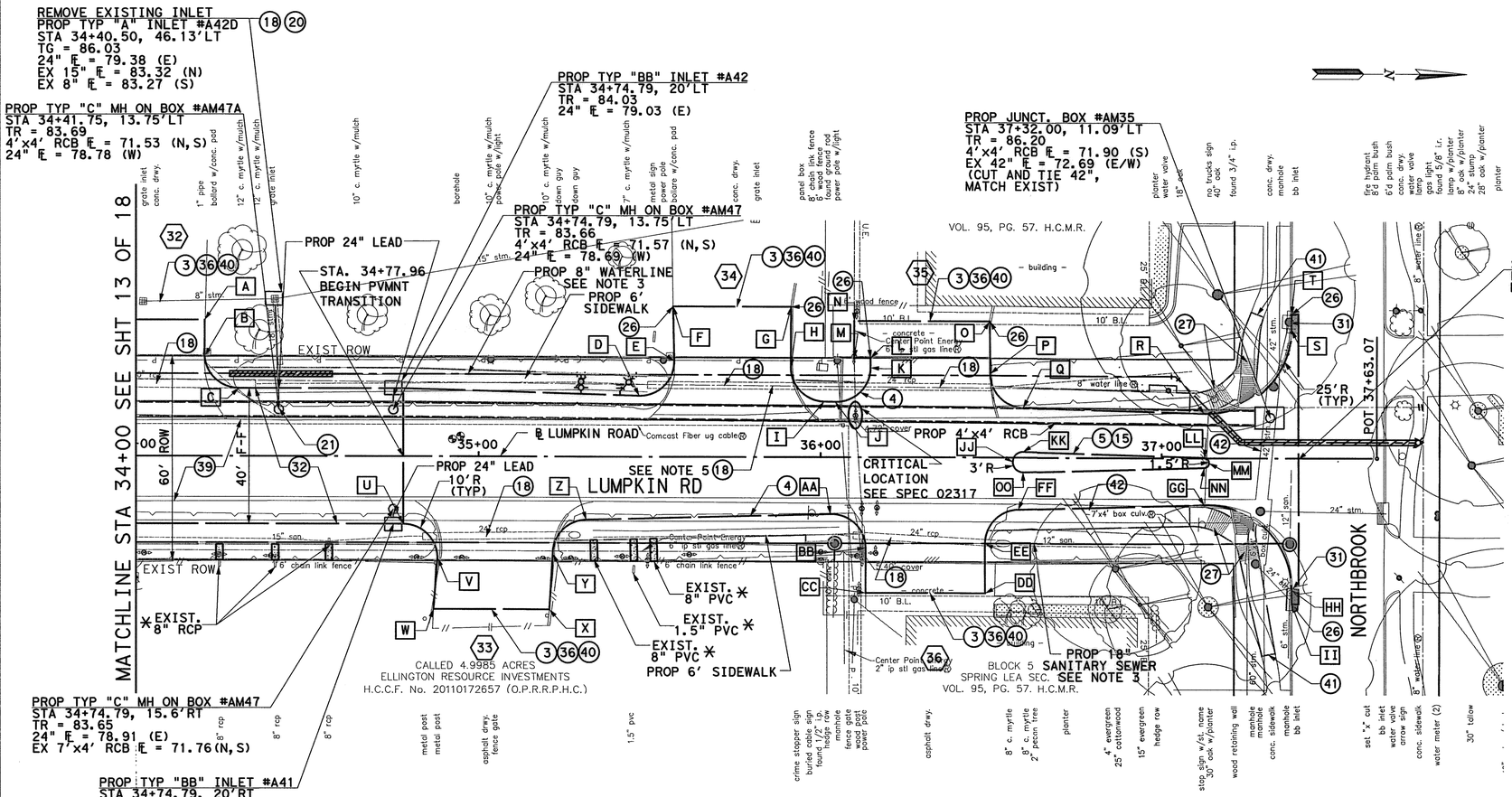
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #53

SET "X" LOCATED NORTH SIDE OF LUMPKIN ROAD AND NORTHBROOK DRIVE INTERSECTION.
D STA. 37+59.36, 0.22' RT.
ELEV.=85.72'

No.	DATE	REVISIONS	APP.



* AT LOCATIONS INDICATED INSTALL CONC. CHANNEL THROUGH SIDEWALK WITH GRATE TOP AS PER LANDSCAPING DETAILS. PROP 2-FT WIDE 5" THICK CONC. SLOPE PAVING FLUME FROM ROW/ EXISTING PIPE FLOWLINE TO PROP CONC. CHANNEL FLOWLINE AS PER SIDEWALK TRENCH DETAILS. V-CHANNEL FOR FLUME TO MATCH FLOWLINE OF EXISTING PIPE AT ROW, AND TO MATCH PROP SIDEWALK TRENCH. MATCH SIDES OF FLUME TO PROPOSED SLOPE FROM SIDEWALK TO ROW IN GRASS AREAS PER TYPICAL CROSS-SECTIONS.

SEE PROFILE VIEW SHEET 16 OF 18

(X) SEE DRIVEWAY TABULATION & DETAILS SHEET

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PT	34+20.04	39.97 LT
B	PC	34+20.02	29.30 LT
C	PT	34+29.99	20.00 LT
D	PC	35+46.79	17.99 LT
E	PT	35+57.08	28.18 LT
F	PT	35+57.09	40.01 LT
G	PT	35+91.30	39.99 LT
H	PC	35+91.29	26.45 LT
I	PT	36+01.00	16.40 LT
J	PC	36+04.26	16.30 LT
K	PT	36+14.55	26.29 LT
L	PT	36+14.55	29.13 LT
M	PT	36+09.79	29.14 LT
N	PT	36+09.81	40.02 LT
O	PT	36+49.56	39.99 LT
P	PC	36+49.55	24.70 LT
Q	PT	36+59.25	14.70 LT
R	PC	37+12.43	13.14 LT
S	PT	37+38.16	37.79 LT
T	PT	37+38.15	42.27 LT
U	PC	34+77.97	20.00 RT
V	PT	34+87.97	30.00 RT
W	PT	34+87.95	45.00 RT
X	PT	35+21.65	45.00 RT
Y	PC	35+21.59	28.67 RT
Z	PT	35+31.34	18.63 RT
AA	PC	36+02.82	16.81 RT
BB	PT	36+13.07	26.77 RT
CC	PT	36+13.06	40.00 RT
DD	PT	36+48.06	40.00 RT
EE	PC	36+48.07	25.43 RT
FF	PT	36+57.81	15.40 RT
GG	PC	37+12.48	13.86 RT
HH	PT	37+38.18	38.84 RT
II	PT	37+38.18	42.99 RT
JJ	PC	36+56.20	1.30 RT
KK	PT	36+59.20	1.69 LT
LL	PC	37+12.58	0.13 LT
MM	PC	37+13.90	1.41 RT
NN	PT	37+12.48	2.86 RT
OO	PT	36+59.27	4.35 RT

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T/UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING ONLY

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98746
LICENSED PROFESSIONAL ENGINEER
9-15-2014

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 34+00 TO END PROJECT
SHEET 15 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 78 OF 226

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MJGuthrie
9/11/2014 9:58:56 AM

MATCHLINE STA 34+00 SEE SHT 14 OF 18

top 86.30
8" in-fl 83.99

grate inlet
top 86.32
15" in-fl 83.32
18" e-fl 83.23
8" s-fl 83.27

grate inlet
top 86.62
15" s-fl 84.62

storm mh
top 85.39
12" n-fl 76.39
12" e-fl 77.18
15" s-fl 75.99

stm mh
top 85.81
bottom fl 72.31
24" n-fl 81.31
42" w-fl 73.41
stm mh
top 85.35
24" ne-fl 81.71
60" e-fl 75.13
72" w-fl 72.12
bb-inlet
top 85.69
42" e-fl 72.69
24" w-fl 81.4
42" w-fl 76.87
bb-inlet
top 86.06
24" e-fl 81.82
storm mh
top 85.68
12" s-fl 76.56
12" w-fl 76.57
bb-inlet
top 86.04
6" e-fl 83.73
24" sw-fl 81.73
bb-inlet
top 86.02
24" s-fl 81.52

VPI STA = 34+74.79
EL = 84.03'

VPI STA = 35+99.10
EL = 84.87'

VPI STA = 37+11.66
EL = 85.99'

VPI STA = 37+35.84
EL = 86.23'

cl-road
w-row
e-row
cl-road
18" stm.
8" stm.
30" rcp
15" stm.
(-)0.30 %
(+)0.6 %
24" rcp
(+)0.67 %
e-ditch
w-ditch
4' MIN COVER
(+)1.00 %
24" rcp
24" rcp
100 YR HGL
6" stm.
24" stm.
24" stm.
8" water line
Center Point Energy
6" lp stl. gas line
PROP 8" WATER LINE
60" stm.
42" stm.(w)
Center Point Energy
6" lp stl. gas line
8" water line
1' MIN CLR
8" san.(e)
42" stm.
12" san.
PROP 18" SAN SWR
12" san.
15" san.
PROP
33 LF 4'x4'
RCB @ 0.13%
2 YR HGL
42" stm.(d)
PROP
42 LF 4'x4'
RCB @ 0.13%
7'x4' box culvert
PROP TYP "C" MH ON BOX #AM47
STA 34+74.79
TR = 83.66
4'x4' RCB fl = 71.57 (N,S)
24" fl = 78.69 (W)
PROP 257 LF 4'x4' RCB
@ 0.13%
6'x3' box culvert
6'x3' box culvert
(approx. elev.) fl = 71.90
fl = 71.46
PROP TYP "A" INLET #A42D
STA 34+40.50
TG = 86.03
24" fl = 79.38 (E)
EX 15" fl = 83.32 (N)
EX 8" fl = 83.27 (S)
PROP TYP "C" MH ON BOX #AM47A
STA 34+41.75
TR = 83.69
4'x4' RCB fl = 71.53 (N,S)
24" fl = 78.78 (W)
PROP TYP "C" MH ON BOX #AM47
STA 34+74.79
TR = 83.65
EX 7'x4' RCB fl = 71.76 (N,S)
24" fl = 78.91 (E)
PROP TYP "BB" INLET #A42
STA 34+74.79
TC = 84.03
24" fl = 79.03 (E)
PROP TYP "C" INLET #A41
STA 34+74.79
TC = 84.03
24" fl = 78.99 (W)
PROP JUNCT. BOX #AM35
STA 37+32.00
TR = 86.20
4'x4' RCB fl = 71.90 (S)
EX 42" fl = 72.69 (E/W)
EX 7'X4' RCB fl = 72.37 (S)
(MATCH EXIST)

SEE PLAN VIEW SHEET 15 OF 18

PROP WEST TOC
PROP EAST TOC
84.19
84.13
84.07
84.06
84.20
84.33
84.47
84.60
84.74
84.87
85.07
85.27
85.47
85.67
85.87
86.07

34+00
35+00
36+00
37+00
38+00

90 88 86 84 82 80 78 76 74 72 70 68 66 64

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

NOTICE:
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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/1/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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DRAWING ONLY
STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

DRAWING ONLY
STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 34+00 TO END PROJECT
SHEET 16 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 79 OF 226

pw:\\ladpw.ladoo.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Roadway\70-001-P&P-RDWY-16.dgn
9/17/2014 3:25:10 PM MJGuthrie

T.B.M. #48

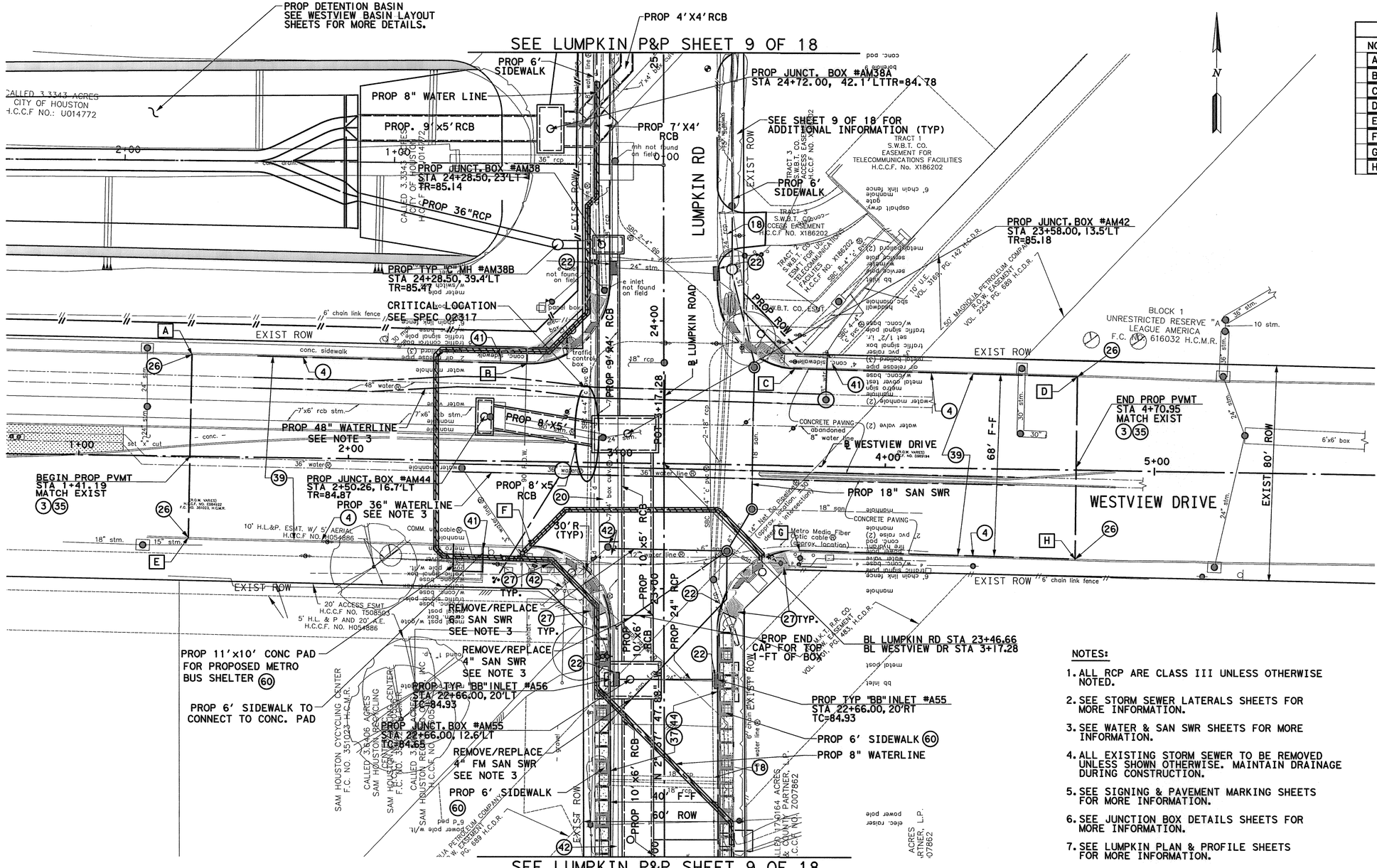
SET "X" LOCATED CENTERLINE OF WESTVIEW DRIVE, APPROX. 175 FT WEST OF LUMPKIN DRIVE AND WESTVIEW DRIVE INTERSECTION. D STA. 37+59.36, 0.22' RT. ELEV.=85.53'

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID09)

No.	DATE	REVISIONS	APP.

HORIZONTAL GEOMETRY DATA			
NO.	DESCRIP	STATION	OFFSET
A	PT	1+41.48	38.16 LT
B	PC	2+65.97	36.76 LT
C	PT	3+65.99	36.53 LT
D	PT	4+70.95	35.12 LT
E	PT	1+40.95	30.25 RT
F	PC	2+68.46	31.48 RT
G	PC	3+68.56	31.45 RT
H	PT	4+70.95	33.13 RT



0 20 40 80

(IN FEET)
1 INCH = 20 FEET

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

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/2/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

DRAWING NOT VALID UNLESS SIGNED, DATED AND SEALED

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS — BRIAN R. WHITNEY P.E. — 81591 — REGISTERED PROFESSIONAL ENGINEER

9-5-2014

Lockwood, Andrews & Newnam, Inc. 9-12-14
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

WESTVIEW DRIVE
N-T17000-0012-3
PLAN VIEW
PVMT & STM SWR IMPROVEMENTS
STA 1+00 TO STA 5+00
SHEET 17 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=2' HORZ: 1"=20'	
SHEET: 80 OF 226	

NOTES:

1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
4. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
5. SEE SIGNING & PAVEMENT MARKING SHEETS FOR MORE INFORMATION.
6. SEE JUNCTION BOX DETAILS SHEETS FOR MORE INFORMATION.
7. SEE LUMPKIN PLAN & PROFILE SHEETS FOR MORE INFORMATION.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

B LUMPKIN ROAD

PROP N&S TOC

VPI STA = 1+41.00
EL = 85.00'
MATCH EXIST

(+)0.41 %

(S) (-)1.00%

(N) (-)1.28%

(S) E/R STA = 2+98.15
EL = 85.21

(N&S) E/R STA = 2+65.97
EL = 85.51

(N) E/R STA = 2+96.37
EL = 85.13

(S) E/R STA = 3+38.15
EL = 85.21

(S) (+)1.00 %

(N) (+)1.28 %

(-)0.37 %

PROP N&S TOC

VPI STA = 4+71+00
EL = 85.03'
MATCH EXIST

(N&S) E/R STA = 3+65.99
EL = 85.43'

(N) E/R STA = 3+36.39
EL = 85.13'

PROP 8" WATER LINE

PROP 48" WATER LINE

PROP 18" SAN SWR

PROP 36" WATER LINE

1' MIN CLR

2' MIN CLR

2' MIN CLR

1' MIN CLR

PROP 42 LF 8'X5' RCB @1.19%

PROP JUNCT. BOX #AM44
STA 2+50.26
TR = 84.87
EX 7'X6' RCB f=72.62 (W)
8'X5' RCB f=69.00 (E)

f=68.50

SEE SHEET 10 OF 18 FOR JUNC. BOX #AM42 INFORMATION

PROP 7'X4' RCB (N)

PROP 10'X5' RCB (S)

Metro Media Fiber Optic Cable Ⓚ

Net Co 14" pipeline Ⓚ (approx. location & elev.)

SEE LUMPKIN P&P SHEETS

PROP WEST TOC
PROP EAST TOC

84.70 84.84 84.98 85.12 85.26 85.22 85.06 85.33 85.41 85.33 85.26 85.18

1+00 2+00 3+00 4+00 5+00

58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

NOTICE:
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PRIVATE UTILITY LINES SHOWN

AT&T UTILITY LINES SHOWN — DATE 9-25-14
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY — DATE 10/7/14
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CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICTION ONLY. — DATE 10/7/14
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

MUHAMMAD M ALI, P.E. 98146 LICENSED PROFESSIONAL ENGINEER — 9-15-2014
BRIAN R. WHITNEY P.E. 81591 REGISTERED PROFESSIONAL ENGINEER — 9-22-14
Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

WESTVIEW DRIVE
N-T17000-0012-3
PROFILE VIEW
PVMT & STM SWR IMPROVEMENTS
STA 1+00 TO STA 5+00
SHEET 18 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 81 OF 226

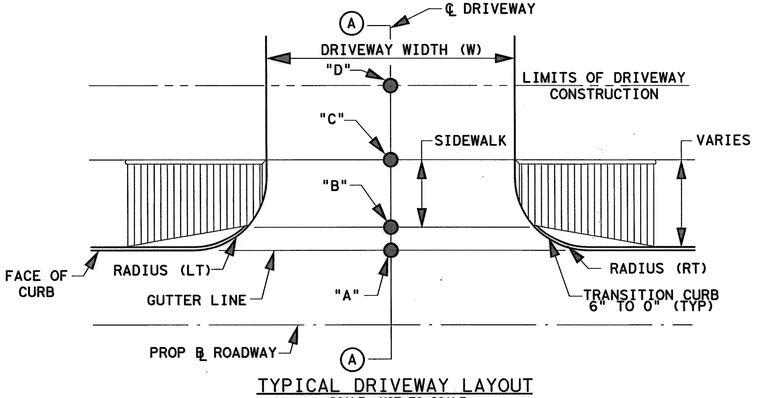
No.	DATE	REVISIONS	APP.

MJGuthrie 3:25:18 PM 9/17/2014

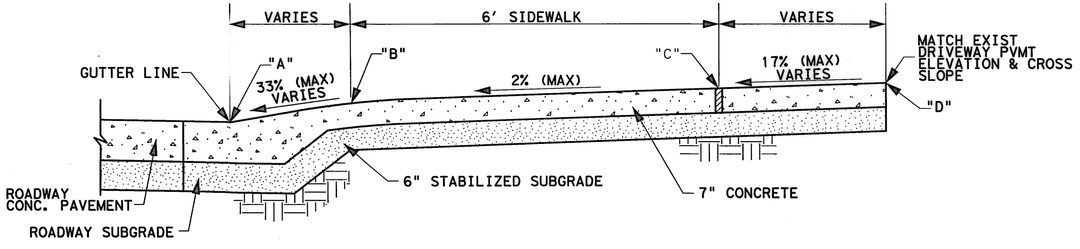
pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Roadway\72-001-P&P-RDWY-18.dgn

LUMPKIN RD.

DRIVEWAY NO.	DRIVEWAY CL STATION	LT/RT	OFFSET *				ELEVATION				RADIUS		DRIVEWAY WIDTH (W)	DRIVEWAY THICKNESS	Slope (%)			SIDEWALK WIDTH THRU DRIVEWAY	DRIVEWAY TYPE
			POINT "A"	POINT "B"	POINT "C"	POINT "D"	POINT "A"	POINT "B"	POINT "C"	POINT "D"	LT	RT			A-B	B-C	C-D		
1	2+93.40	LT	20.00	21.50	26.00	30.00	78.38	78.53	78.62	78.62	10'	10'	27.00	7" CONC	10.0%	2.0%	0.0%	4.5'	COMMERCIAL
2	2+93.49	RT	20.00	21.50	26.00	30.00	78.38	78.53	78.62	78.62	10'	10'	27.00	7" CONC	10.0%	2.0%	0.0%	4.5'	COMMERCIAL
3	4+77.53	RT	20.00	21.50	26.00	30.00	77.86	78.01	78.10	78.10	10'	10'	35.00	7" CONC	10.0%	2.0%	0.0%	4.5'	COMMERCIAL
4	5+30.06	LT	20.00	21.50	26.00	30.00	77.89	78.19	78.28	78.79	10'	10'	35.00	7" CONC	20.0%	2.0%	12.8%	4.5'	COMMERCIAL
5	6+21.27	RT	20.00	21.50	26.00	30.00	78.27	78.42	78.51	78.79	10'	10'	35.00	7" CONC	10.0%	2.0%	7.0%	4.5'	COMMERCIAL
6	7+01.48	RT	20.00	21.50	26.00	35.00	78.61	78.76	78.85	79.47	10'	10'	35.00	7" CONC	10.0%	2.0%	6.9%	4.5'	COMMERCIAL
7	8+65.76	RT	20.00	21.50	26.00	35.00	79.30	79.45	79.54	80.10	10'	10'	35.00	7" CONC	10.0%	2.0%	6.2%	4.5'	COMMERCIAL
8	8+93.36	LT	20.00	21.50	26.00	40.00	79.41	79.56	79.65	80.68	10'	10'	16.00	7" CONC	10.0%	2.0%	7.4%	4.5'	COMMERCIAL
9	11+43.34	RT	20.00	21.50	26.00	30.00	80.00	80.15	80.24	80.47	10'	10'	35.00	7" CONC	10.0%	2.0%	5.7%	4.5'	COMMERCIAL
10	13+15.45	LT	20.00	21.50	26.00	35.00	80.43	80.66	80.75	81.82	10'	10'	31.00	7" CONC	15.0%	2.0%	11.9%	4.5'	COMMERCIAL
11	15+88.13	LT	20.00	21.50	26.00	35.00	80.97	81.20	81.29	82.20	10'	10'	35.00	7" CONC	15.0%	2.0%	10.2%	4.5'	COMMERCIAL
12	15+89.58	RT	20.00	21.50	26.00	35.00	80.98	81.21	81.30	82.20	10'	10'	25.00	7" CONC	15.0%	2.0%	10.1%	4.5'	COMMERCIAL
13	17+05.06	RT	20.00	21.50	26.00	35.00	81.79	82.02	82.11	82.97	10'	10'	20.00	7" CONC	15.0%	2.0%	9.6%	4.5'	COMMERCIAL
14	17+68.29	RT	20.00	21.50	26.00	40.00	82.24	82.47	82.56	84.53	10'	10'	20.00	7" CONC	15.0%	2.0%	14.1%	4.5'	COMMERCIAL
15	18+67.02	RT	20.00	21.50	26.00	40.00	82.93	83.16	83.25	85.03	10'	10'	20.00	7" CONC	15.0%	2.0%	12.8%	4.5'	COMMERCIAL
16	19+99.37	RT	20.00	21.50	26.00	40.00	83.86	84.01	84.10	85.40	10'	10'	28.00	7" CONC	10.0%	2.0%	9.3%	4.5'	COMMERCIAL
17	20+97.29	RT	20.00	21.50	26.00	40.00	84.54	84.69	84.78	86.67	10'	10'	30.00	7" CONC	10.0%	2.0%	13.5%	4.5'	COMMERCIAL
18	21+31.65	RT	20.00	21.50	26.00	40.00	84.79	84.94	85.03	86.72	10'	10'	30.00	7" CONC	10.0%	2.0%	12.1%	4.5'	COMMERCIAL
19	24+34.02	RT	20.00	21.50	26.00	38.00	84.57	84.80	84.89	85.44	10'	10'	13.00	7" CONC	15.0%	2.0%	4.6%	4.5'	COMMERCIAL
20	25+18.46	RT	20.00	21.50	26.00	35.00	84.32	84.47	84.56	85.49	10'	10'	35.00	7" CONC	10.0%	2.0%	10.3%	4.5'	COMMERCIAL
21	25+47.13	LT	20.00	21.50	26.00	35.00	84.23	84.46	84.55	85.55	10'	10'	23.00	7" CONC	15.0%	2.0%	11.2%	4.5'	COMMERCIAL
22	26+16.60	RT	20.00	21.50	26.00	40.00	84.20	84.43	84.52	86.48	10'	10'	35.00	7" CONC	15.0%	2.0%	14.0%	4.5'	COMMERCIAL
23	26+98.50	LT	20.00	21.50	26.00	35.00	84.45	84.68	84.77	85.94	10'	10'	29.00	7" CONC	15.0%	2.0%	13.1%	4.5'	COMMERCIAL
24	27+13.60	RT	20.00	21.50	26.00	35.00	84.50	84.73	84.82	86.12	10'	10'	32.00	7" CONC	15.0%	2.0%	14.5%	4.5'	COMMERCIAL
25	27+60.60	LT	20.00	21.50	26.00	40.00	84.64	84.87	84.96	86.43	10'	10'	31.00	7" CONC	15.0%	2.0%	10.5%	4.5'	COMMERCIAL
26	27+97.29	RT	20.00	21.50	26.00	35.00	84.75	84.98	85.07	86.35	10'	10'	21.00	7" CONC	15.0%	2.0%	14.3%	4.5'	COMMERCIAL
27	29+48.15	LT	20.00	21.50	26.00	35.00	84.36	84.59	84.68	86.00	10'	10'	23.00	7" CONC	15.0%	2.0%	14.7%	4.5'	COMMERCIAL
28	29+53.18	RT	20.00	21.50	26.00	40.00	84.34	84.57	84.66	86.57	10'	10'	20.00	7" CONC	15.0%	2.0%	13.7%	4.5'	COMMERCIAL
29	31+72.32	LT	20.00	21.50	26.00	45.00	83.43	83.73	83.82	86.48	10'	10'	27.00	7" CONC	20.0%	2.0%	14.0%	4.5'	COMMERCIAL
30	32+46.77	LT	20.00	21.50	26.00	45.00	83.55	83.85	83.94	86.28	10'	10'	34.00	7" CONC	20.0%	2.0%	12.3%	4.5'	COMMERCIAL
31	33+27.40	RT	20.00	21.50	26.00	40.00	83.97	84.12	84.21	85.48	10'	10'	14.00	7" CONC	10.0%	2.0%	9.1%	4.5'	COMMERCIAL
32	34+02.45	LT	20.00	21.50	26.00	40.00	83.74	84.04	84.13	86.31	10'	10'	35.00	7" CONC	20.0%	2.0%	15.6%	4.5'	COMMERCIAL
33	35+04.98	RT	20.00	21.50	26.00	45.00	83.73	83.96	84.05	86.71	10'	10'	34.00	7" CONC	15.0%	2.0%	14.0%	4.5'	COMMERCIAL
34	35+74.05	LT	20.00	21.50	26.00	45.00	84.20	84.43	84.52	86.58	10'	10'	34.00	7" CONC	15.0%	2.0%	10.9%	4.5'	COMMERCIAL
35	36+30.62	LT	20.00	21.50	26.00	40.00	84.68	84.91	85.00	87.17	10'	10'	35.00	7" CONC	15.0%	2.0%	15.5%	4.5'	RESIDENTIAL
36	36+32.06	RT	20.00	21.50	26.00	40.00	84.70	84.93	85.02	87.15	10'	10'	35.00	7" CONC	15.0%	2.0%	15.3%	4.5'	RESIDENTIAL



TYPICAL DRIVEWAY LAYOUT
SCALE: NOT TO SCALE



SECTION A
TYPICAL DRIVEWAY SECTION
SCALE: NOT TO SCALE

NOTE:

1. REFER TO CONCRETE SIDEWALK & DRIVEWAY DETAILS FOR ADDITIONAL INFORMATION
2. ELEVATION AT POINT "D" IS(+/-) AS SHOWN IN DRIVEWAY TABLE. MATCH EXISTING ELEVATION AT ROW.
3. REFER TO PLAN & PROFILE SHEETS FOR ADDITIONAL INFORMATION

LEGEND:

* OFFSET DISTANCE TO POINT "D" IS FROM PROPOSED CL LUMPKIN.

APP.	DATE	No.	REVISIONS

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

DRIVEWAY TABULATION DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: N.T.S.
CITY DWG NO.
SHEET: 82 OF 226

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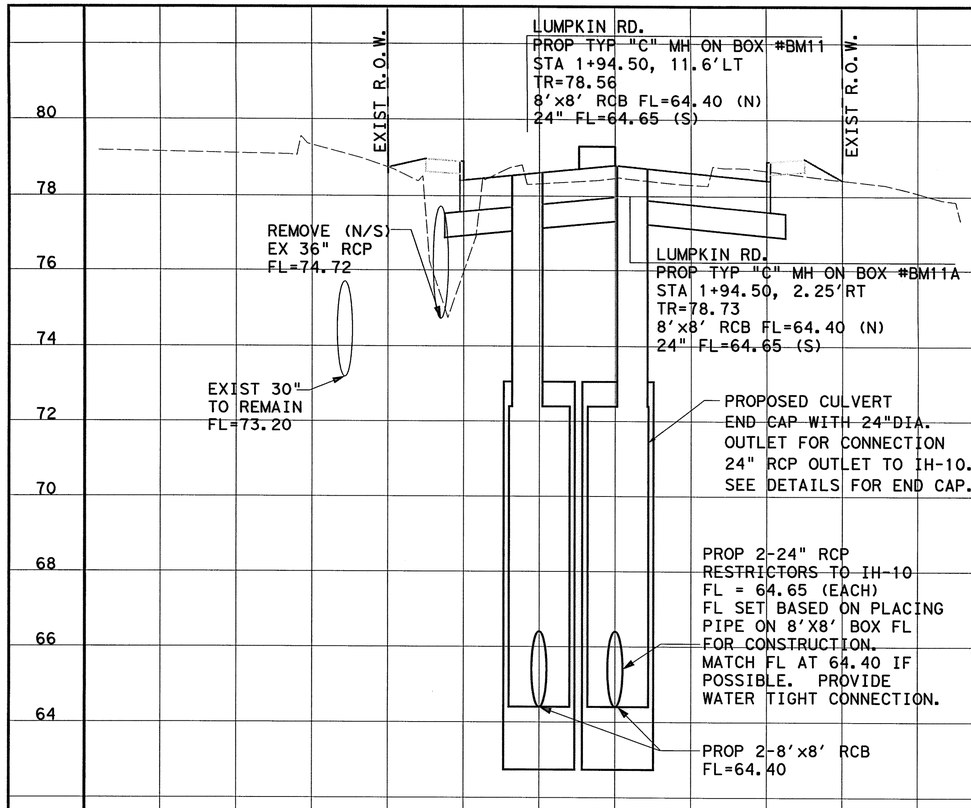
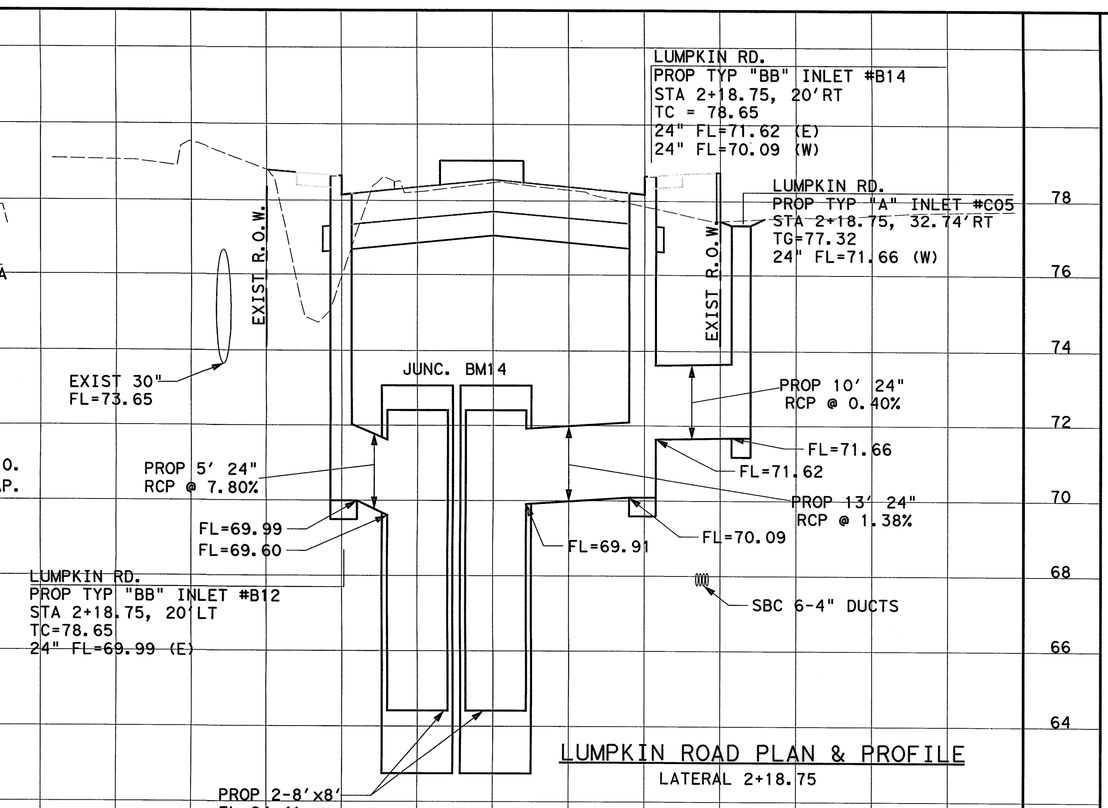


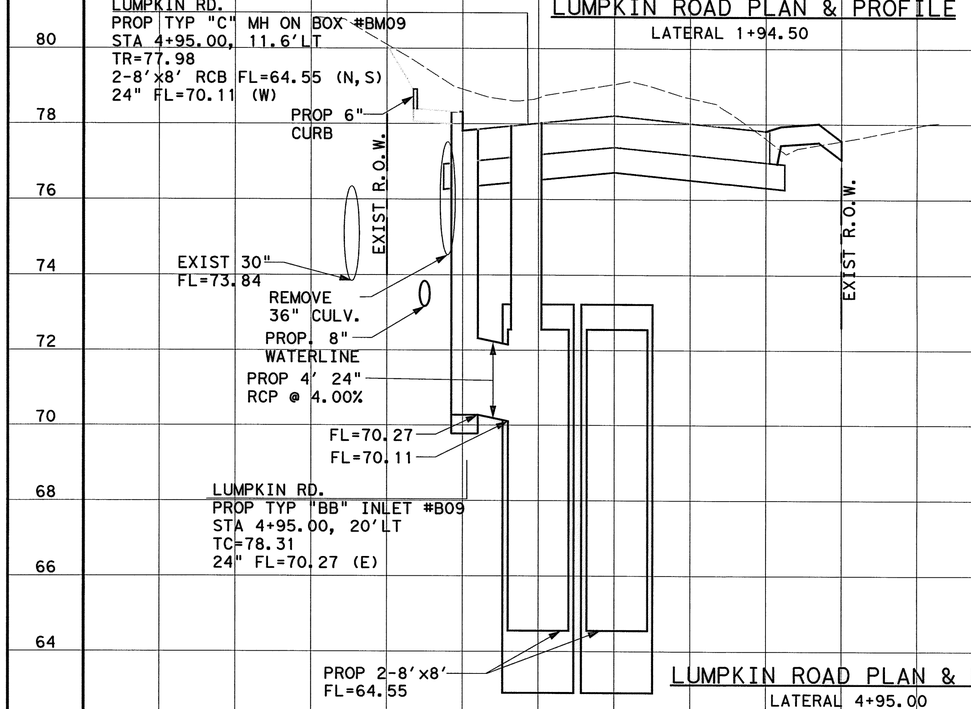
LUMPKIN ROAD PLAN & PROFILE

LATERAL 1+94.50



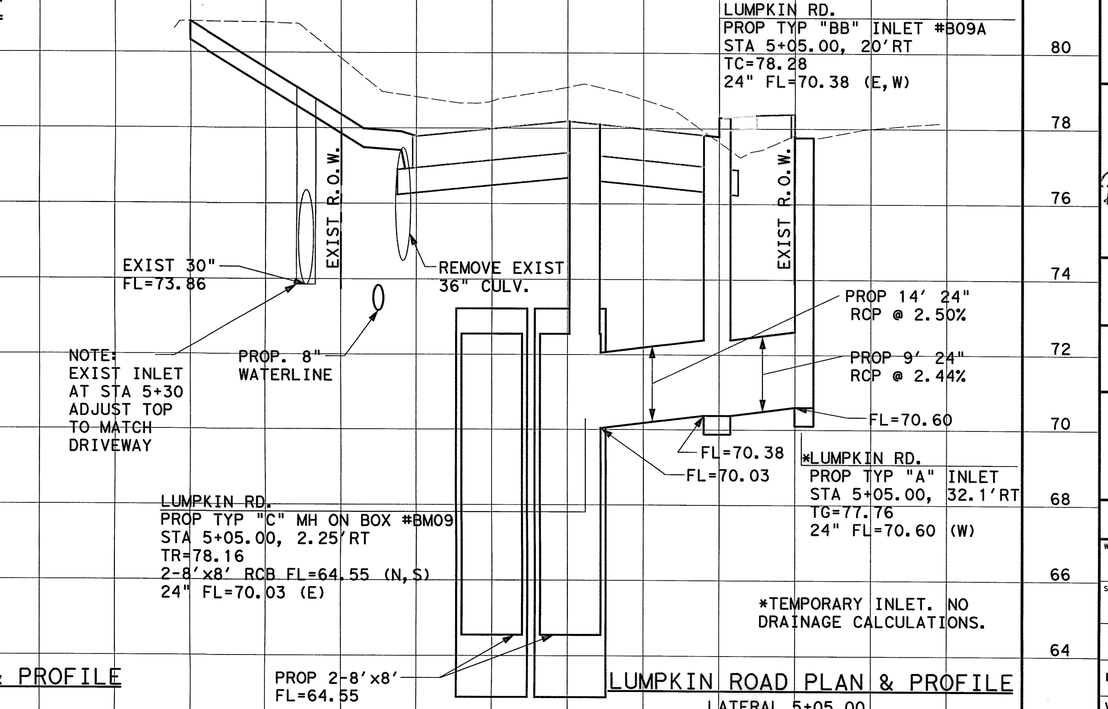
LUMPKIN ROAD PLAN & PROFILE

LATERAL 2+18.75



LUMPKIN ROAD PLAN & PROFILE

LATERAL 4+95.00



*TEMPORARY INLET. NO DRAINAGE CALCULATIONS.

LUMPKIN ROAD PLAN & PROFILE

LATERAL 5+05.00

NOTES:

1. SEE LATERAL SHEET 7 OF 7 FOR LATERALS AT STA 4+30.00, 5+70.00, AND 14+86.83.

No.	DATE	REVISIONS	APP.

0 10 20 40

(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED
PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER
LATERALS

SHEET 1 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE: CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=10'

SHEET:
83 OF 226

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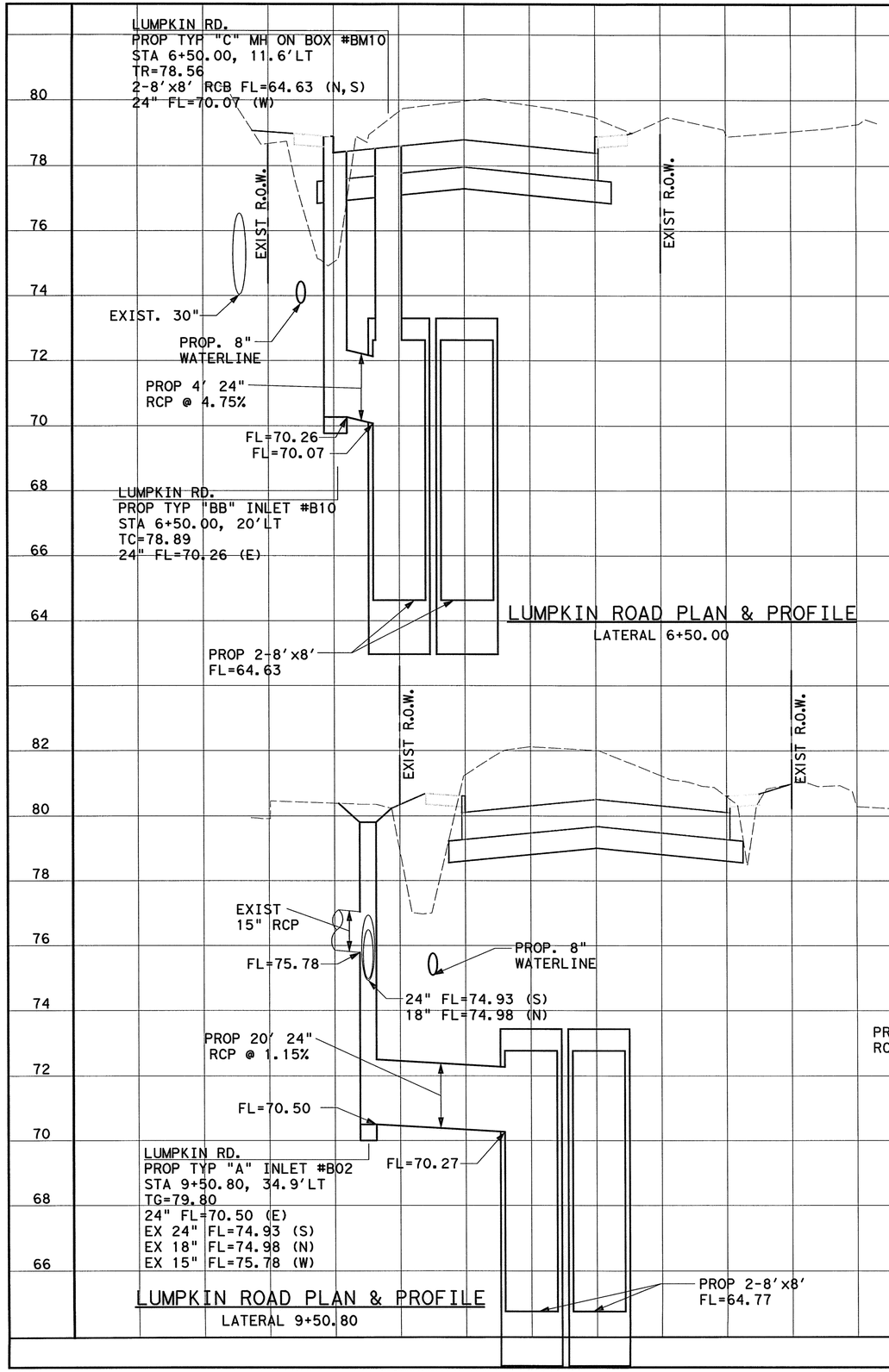
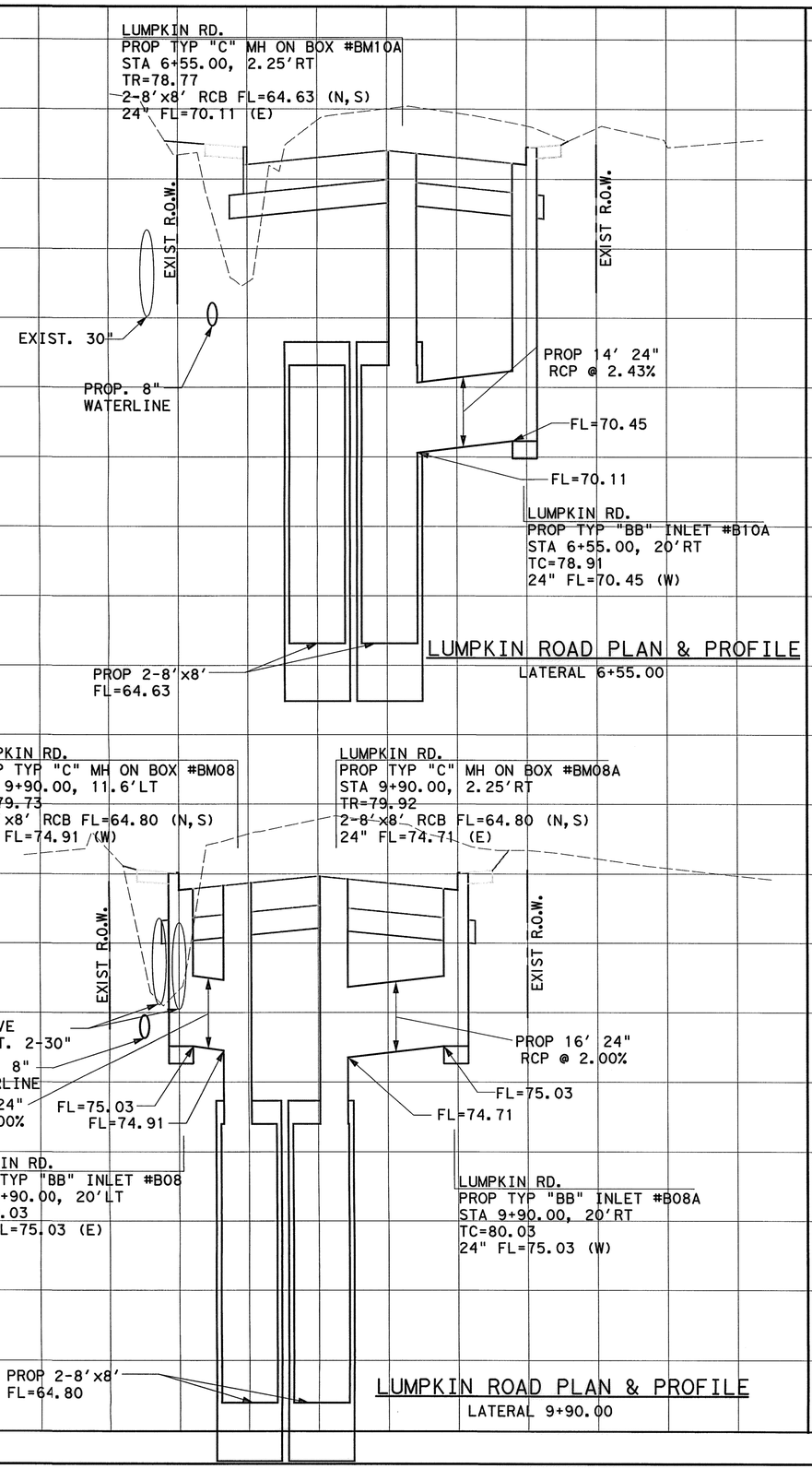


LUMPKIN ROAD PLAN & PROFILE
LATERAL 6+50.00



LUMPKIN ROAD PLAN & PROFILE
LATERAL 6+55.00

LUMPKIN ROAD PLAN & PROFILE
LATERAL 9+50.80

LUMPKIN ROAD PLAN & PROFILE
LATERAL 9+90.00

NOTES:

1. SEE LATERAL SHEET 7 OF 7 FOR LATERALS AT STA 4+30.00, 5+70.00, AND 14+86.83.

No.	DATE	REVISIONS	APP.

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 2 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET: 84 OF 226

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LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM75
STA 14+52.00, 11.6'LT
TR=80.24
2-8'x8' RCB FL=65.03 (N,S)
24" FL=75.20 (W)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM75
STA 14+52.00, 2.25'RT
TR=80.42
2-8'x8' RCB FL=65.03 (N,S)
24" FL=75.20 (E)

LUMPKIN RD.
PROP JUNCT. BOX #AM56
STA 15+11.50, 11.6'LT
TR=80.57
10'x6' RCB FL=65.05 (N)
2-30" FL=74.00 (W)
33" FL=65.05 (S)
EX 7'X5' RCB FL=68.54 (E)

EXIST R.O.W.

PROP 6' 24" RCP @ 5.33%
PROP. 8" WATERLINE FL=75.52
FL=75.20

PROP 16' 24" RCP @ 2.00%
FL=75.52
FL=75.20

EXIST 2-24" CULV
EXIST. 2-30"
PROP CONC COLLAR AT CONNECTION TO EXIST 2-30" RCP SEE DETAILS
PROP 2-30" FL=74.00
PROP. 8" WATERLINE 1' CLR (MIN)

REMOVE EXIST. INLET TOP - PROP. TYPE A INLET TOP = 80.00

EXIST. 7'X5' TO REMAIN
EXIST. FL=68.94 +/-
EXIST. 84" TO REMAIN
EXIST. FL=68.89
PROP 12" THK. MASONRY /CONC PLUG W/ 21"X21" OPENING OR EQUIVALENT EXIST. FL=68.54
INSPECT AND REPAIR EXIST. MH AS REQUIRED TO PREPARE FOR PROP TYPE A INLET CONST.

LUMPKIN RD.
PROP TYP "BB" INLET #A74B
STA 14+52.00, 20'LT
TC=80.52
24" FL=75.52 (E)

LUMPKIN RD.
PROP TYP "BB" INLET #A74A
STA 14+52.00, 20'RT
TC=80.52
24" FL=75.52 (W)

PROP 10'x6' (N) & PROP 33" (S) FL=65.05

PROP 2-8'x8' FL=65.03

LUMPKIN ROAD PLAN & PROFILE
LATERAL 14+52.00

LUMPKIN ROAD PLAN & PROFILE
LATERAL 15+11.50

LUMPKIN RD.
PROP TYP "BB" INLET #A67C
STA 15+64.20, 20'LT
TC=81.31
24" FL=76.32 (E,W)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM68B
STA 15+64.20, 12.6'LT
TR=80.96
10'x6' RCB FL=65.07 (N,S)
24" FL=76.11 (W)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM67D
STA 16+80.00, 7.3'LT
TR=81.87
10'x6' RCB FL=65.14 (N,S)
24" FL=76.61 (E)

EXIST. FL=78.65
EXIST. 12" RCP TO REMAIN
PROP 16' 24" RCP @ 1.31%
PROP 6' 24" RCP @ 3.5%
PROP 28' 24" RCP @ 1.79%
FL=76.53
FL=76.32
FL=76.11
PROP. 8" WATERLINE
FL=76.61
FL=77.11
PROP. 8" WATERLINE

EXIST R.O.W.

LUMPKIN RD.
PROP TYP "C" MH #AM68C
STA 15+64.20, 38.7'LT
TR=81.60
24" FL=76.53 (E)
EX 12" FL=78.65 (W)

LUMPKIN RD.
PROP TYP "C" INLET W/EXT #A67D
STA 16+80.00, 22'RT
TC=82.15
24" FL=77.11 (W)

LUMPKIN ROAD PLAN & PROFILE
LATERAL 15+64.20

PROP 10'x6' FL=65.07

PROP 10'x6' FL=65.14

LUMPKIN ROAD PLAN & PROFILE
LATERAL 16+80.00

NOTES:

1. SEE LATERAL SHEET 7 OF 7 FOR LATERALS AT STA 4+30.00, 5+70.00, AND 14+86.83.

No.	DATE	REVISIONS	APP.

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 3 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET: 85 OF 226

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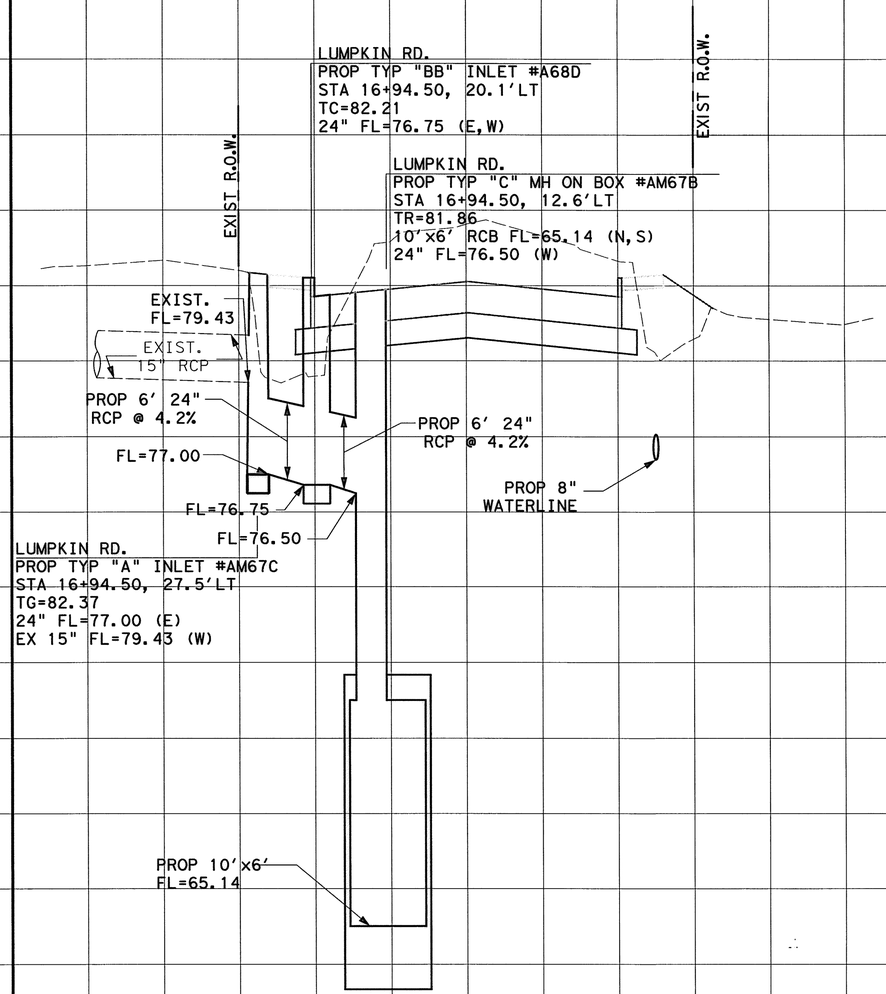
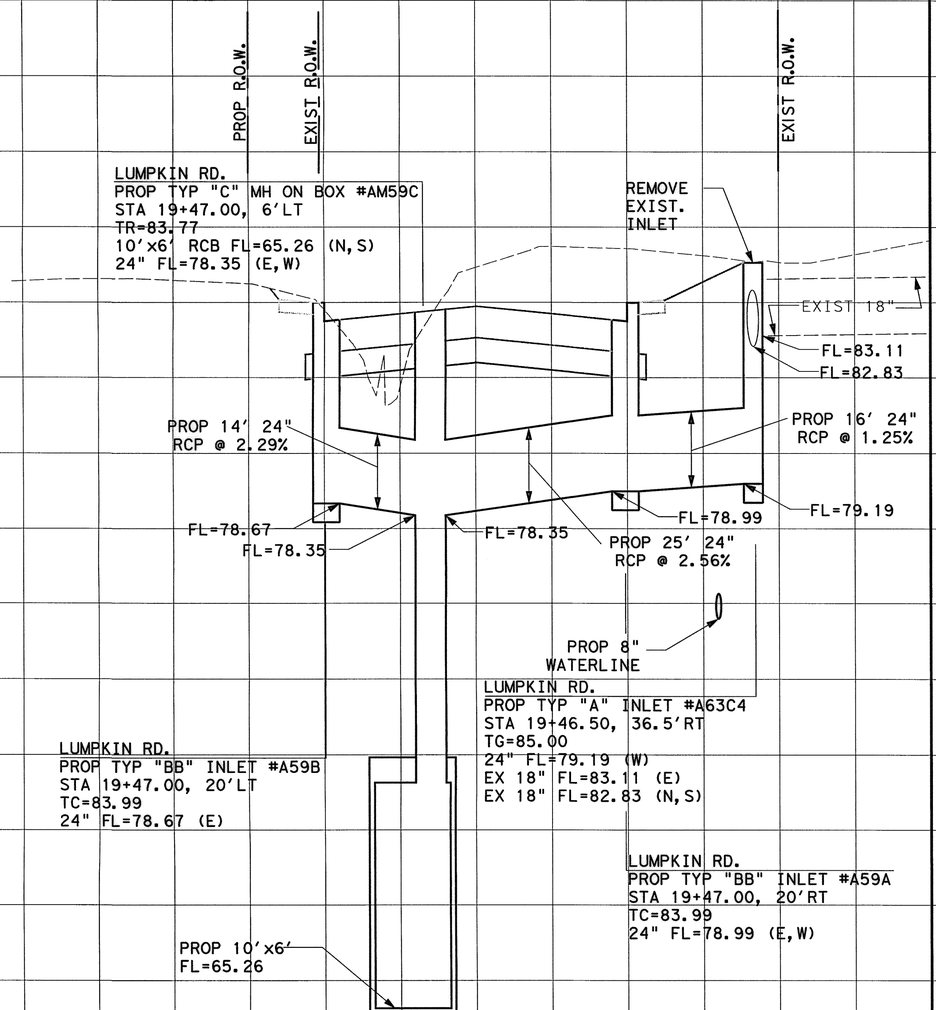


LUMPKIN ROAD PLAN & PROFILE
LATERAL 16+94.50



LUMPKIN ROAD PLAN & PROFILE
LATERAL 19+47.00

No.	DATE	REVISIONS	APP.

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(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER
LATERALS

SHEET 4 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWO

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET: 86 OF 226

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EXIST R.O.W.

EXIST R.O.W.

EXIST R.O.W.

EXIST R.O.W.

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM58
STA 20+66.67, 12.6'LT
TR=84.48
10'X6' RCB FL=65.32 (N,S)
24" FL=78.96 (E)

PROP CONC. COLLAR AT CONNECTION SEE DETAIL

EXIST. 12" RCP

REMOVE AND REPLACE 20 LF 12" RCP

TIE 12"RCP TO INLET FL=82.00

PROP 37' 24" RCP @ 2.00%

FL=78.96

FL=79.70

PROP 8" WATERLINE

LUMPKIN RD.
PROP TYP "A" INLET #A58
STA 20+66.67, 27.9'RT
TG=84.90
24" FL=79.70 (W)
12" FL=82.00 (E)

REMOVE EXIST. 7'X5' FL=69.98

PROP. 10'X6' FL=65.32

LUMPKIN ROAD PLAN & PROFILE
LATERAL 20+66.67

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM57D
STA 22+06.50, 12.6'LT
TR=84.91
10'X6' RCB FL=65.39 (N,S)
24" FL=79.27 (E)

EXIST. CONC. FLUME

PROP 6" CONC. TRANS-ITION TO EXIST. CONC. FLUME

PROP 32' 24" RCP @ 1.94%

FL=79.27

FL=79.89

PROP 8" WATERLINE

LUMPKIN RD.
PROP TYP "E" INLET #A57
STA 22+06.50, 20'RT
TR=85.26
24" FL=79.89 (W)

REMOVE EXIST. 7'X5' FL=70.33

PROP. 10'X6' FL=65.39

LUMPKIN ROAD PLAN & PROFILE
LATERAL 22+06.50

88 86 84 82 80 78 76 74 72 70 68 66 64 62

No.	DATE	REVISIONS	APP.

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 5 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET:
87 OF 226

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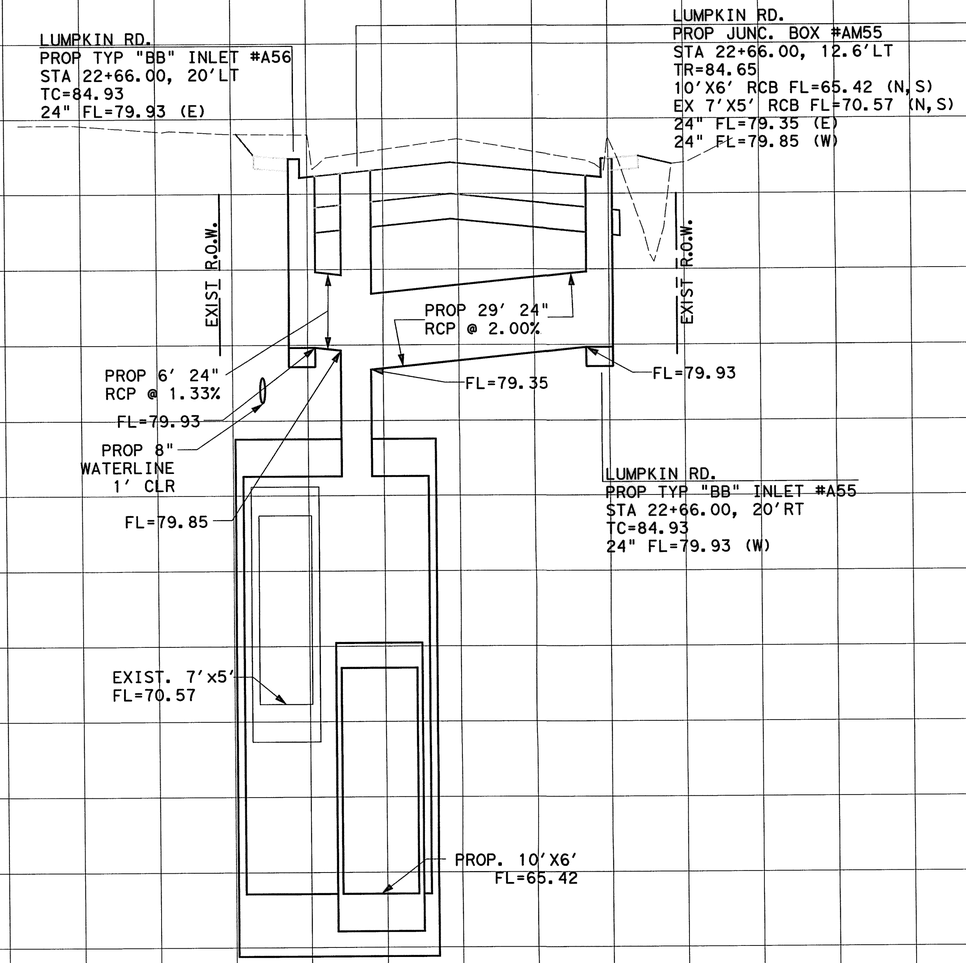

LUMPKIN ROAD PLAN & PROFILE
LATERAL 22+66.00

No.	DATE	REVISIONS	APP.

0 10 20 40
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MEMORIAL CITY
REDEVELOPMENT AUTHORITY

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LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER
LATERALS

SHEET 6 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET:
88 OF 226

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LUMPKIN RD.
PROP TYP "BB" INLET #B09C
STA 4+30.00, 20'LT
TC=78.51
24" FL=70.20 (E)

PROP 6" CURB

EXIST R.O.W.

EXIST 30" FL=73.73

PROP. 8" WATERLINE

PROP 5' 24" RCP @ 4.00%

JUNCTION BM20

FL=70.20

FL=70.00

FL=70.00

PROP 2-8'x8' FL=64.51

LUMPKIN RD.
PROP TYP "BB" INLET #B09D
STA 4+30.00, 20'RT
TC=78.51
24" FL=70.50 (W)

EXIST R.O.W.

PROP 16' 24" RCP @ 3.13%

PROP 9' 24" RCP @ 2.22%

FL=70.70

FL=70.50

*LUMPKIN RD.
PROP TYP "A" INLET
STA 4+30.00, 32.1'RT
TG=77.50
24" FL=70.70 (W)
*TEMPORARY INLET. NO DRAINAGE CALCULATIONS.

LUMPKIN ROAD PLAN & PROFILE
LATERAL 4+30.00

LUMPKIN RD.
PROP TYP "BB" INLET #B10B
STA 5+70.00, 20'LT
TC=78.55
24" FL=70.20 (E)

EXIST R.O.W.

EXIST 30" FL=73.79

PROP. 8" WATERLINE

PROP 5' 24" RCP @ 4.00%

JUNCTION BM21

FL=70.20

FL=70.00

PROP 2-8'x8' FL=64.59

LUMPKIN RD.
PROP TYP "BB" INLET #B10C
STA 5+70.00, 20'RT
TC=78.55
24" FL=70.50 (W)

EXIST R.O.W.

PROP 16' 24" RCP @ 3.13%

FL=70.50

FL=70.00

LUMPKIN ROAD PLAN & PROFILE
LATERAL 5+70.00

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM90
STA 14+86.83, 11.6'LT
TC=80.43
2-8'X8' RCB FL=65.04 (S)
33" FL=65.04 (N)
24" FL=75.53 (W)

LUMPKIN RD.
PROP TYP "BB" INLET #AM90
STA 14+86.83, 2.25' RT
TC=80.62
2-8'X8' RCB FL=65.04 (S)
33" FL=65.04 (N)
24" FL=75.21 (E)

PROP 6' 24" RCP @ 3.00%

PROP. 8" WATERLINE

FL=75.71

FL=75.53

PROP 16' 24" RCP @ 3.13%

FL=75.21

FL=75.71

EXIST R.O.W.

EXIST R.O.W.

LUMPKIN RD.
PROP TYP "BB" INLET #A90B
STA 14+86.83, 20'LT
TC=80.71
24" FL=75.71 (E)

LUMPKIN RD.
PROP TYP "BB" INLET #A90A
STA 14+86.83, 20'RT
TC=80.71
24" FL=75.71 (W)

PROP 2-8'x8' FL=65.04

LUMPKIN ROAD PLAN & PROFILE
LATERAL 14+86.83

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9-12-14

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A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 7 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET:
89 OF 226

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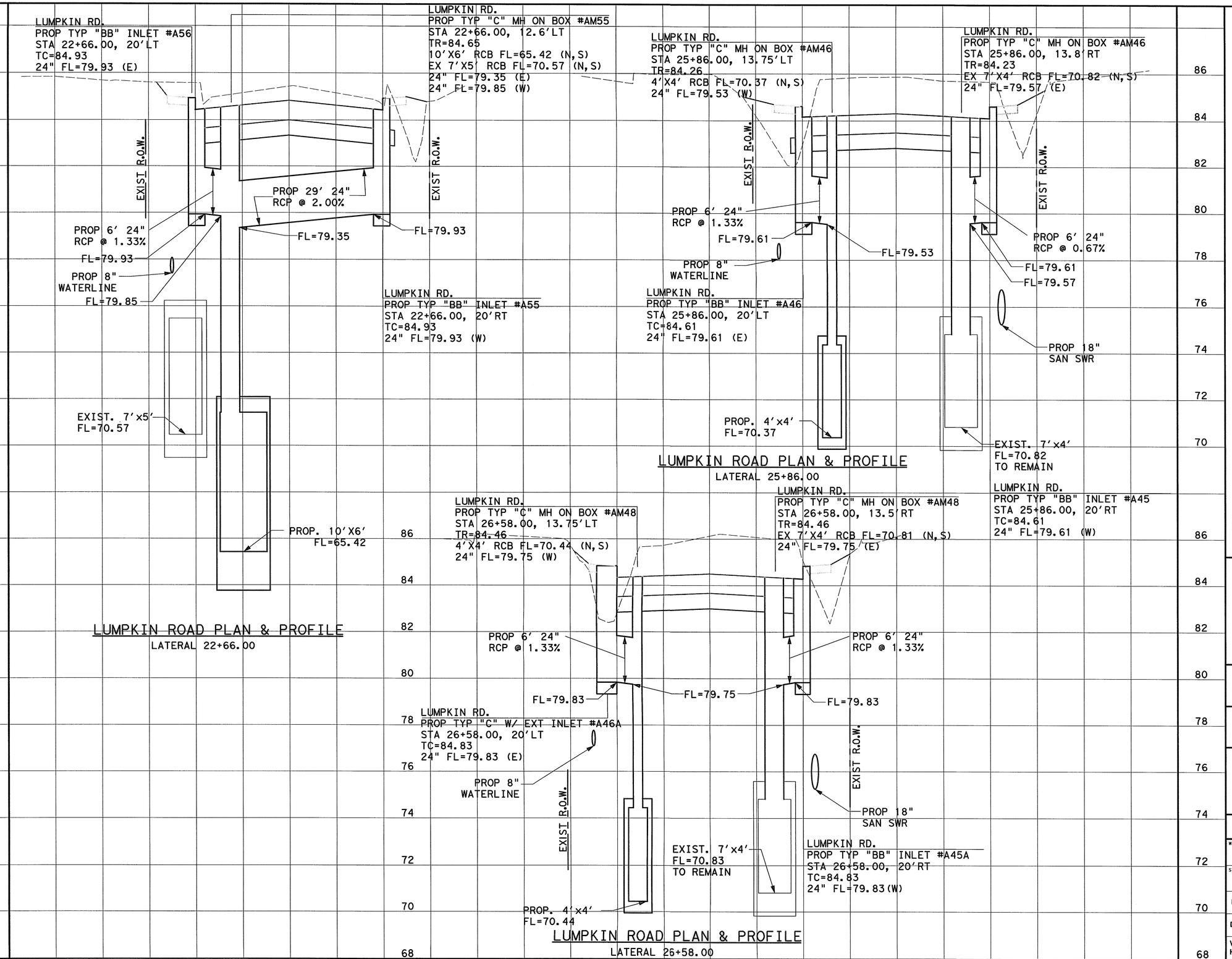

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LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 8 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE:
VERT: 1"=2'
HORZ: 1"=10'

CITY DWG NO.

SHEET:
90 OF 226

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LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM49
STA 27+29.00, 13.75'LT
TR=84.71
4'X4' RCB FL=70.54 (N,S)
24" FL=79.98 (W)

EXIST R.O.W.

EXIST R.O.W.

PROP 6' 24"
RCP @ 1.00%

PROP 8"
WATERLINE

FL=80.04

FL=79.98

LUMPKIN RD.
PROP TYP "BB" INLET #A46B
STA 27+29.00, 20'LT
TC=85.08
24" FL=80.04 (E)

PROP 18"
SAN SWR

EXIST. 7'x4'
FL=70.81
TO REMAIN

PROP. 4'x4'
FL=70.54

LUMPKIN ROAD PLAN & PROFILE

LATERAL 27+29.00

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM37
STA 28+53.00, 13.8'RT
TR=84.88
EX 7'X4' RCB FL=70.79 (N,S)
24" FL=79.20 (E)

LUMPKIN RD.
PROP TYP "C" INLET #A43A
STA 28+53.00, 20'RT
TC=85.26
24" FL=79.30 (W)
EX 24" FL=79.30 (E)

EXIST R.O.W.

EXIST R.O.W.

EXIST. 24" RCP

PROP 6' 24"
RCP @ 1.67%

FL=79.30

FL=79.20

PROP 8"
WATERLINE

PROP 18"
SAN SWR

EXIST. 7'x4'
FL=70.79
TO REMAIN

PROP. 4'x4'
FL=70.72

LUMPKIN ROAD PLAN & PROFILE

LATERAL 28+53.00

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM49A
STA 27+42.00, 13.8'RT
TR=84.64
EX 7'X4' RCB FL=70.80 (N,S)
24" FL=80.02 (E)

LUMPKIN RD.
PROP TYP "C" INLET #A45B
STA 27+42.00, 20'RT
TC=85.00
24" FL=80.08 (W)

EXIST R.O.W.

EXIST R.O.W.

PROP 6' 24"
RCP @ 1.00%

FL=80.08

FL=80.02

PROP 8"
WATERLINE

PROP 18"
SAN SWR

EXIST. 7'x4'
FL=70.80
TO REMAIN

PROP. 4'x4'
FL=70.57

LUMPKIN ROAD PLAN & PROFILE

LATERAL 27+42.00

LUMPKIN RD.
PROP TYP "C" INLET
W/EXT #A42C
STA 29+24.00, 20'LT
TC=84.96
24" FL=79.96 (E)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM92
STA 29+24.00, 13.75'LT
TR=84.59
4'X4' RCB FL=70.81 (N,S)
24" FL=79.64 (W)

EXIST R.O.W.

EXIST R.O.W.

PROP 6' 24"
RCP @ 5.33%

PROP 8"
WATERLINE

FL=79.96

FL=79.64

PROP 18"
SAN SWR

EXIST. 7'x4'
FL=70.85
TO REMAIN

PROP. 4'x4'
FL=70.81

LUMPKIN ROAD PLAN & PROFILE

LATERAL 29+24.00

No.	DATE	REVISIONS	APP.

0 10 20 40
(IN FEET)
1 INCH = 10 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
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PROFESSIONAL ENGINEER
9-12-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER
LATERALS

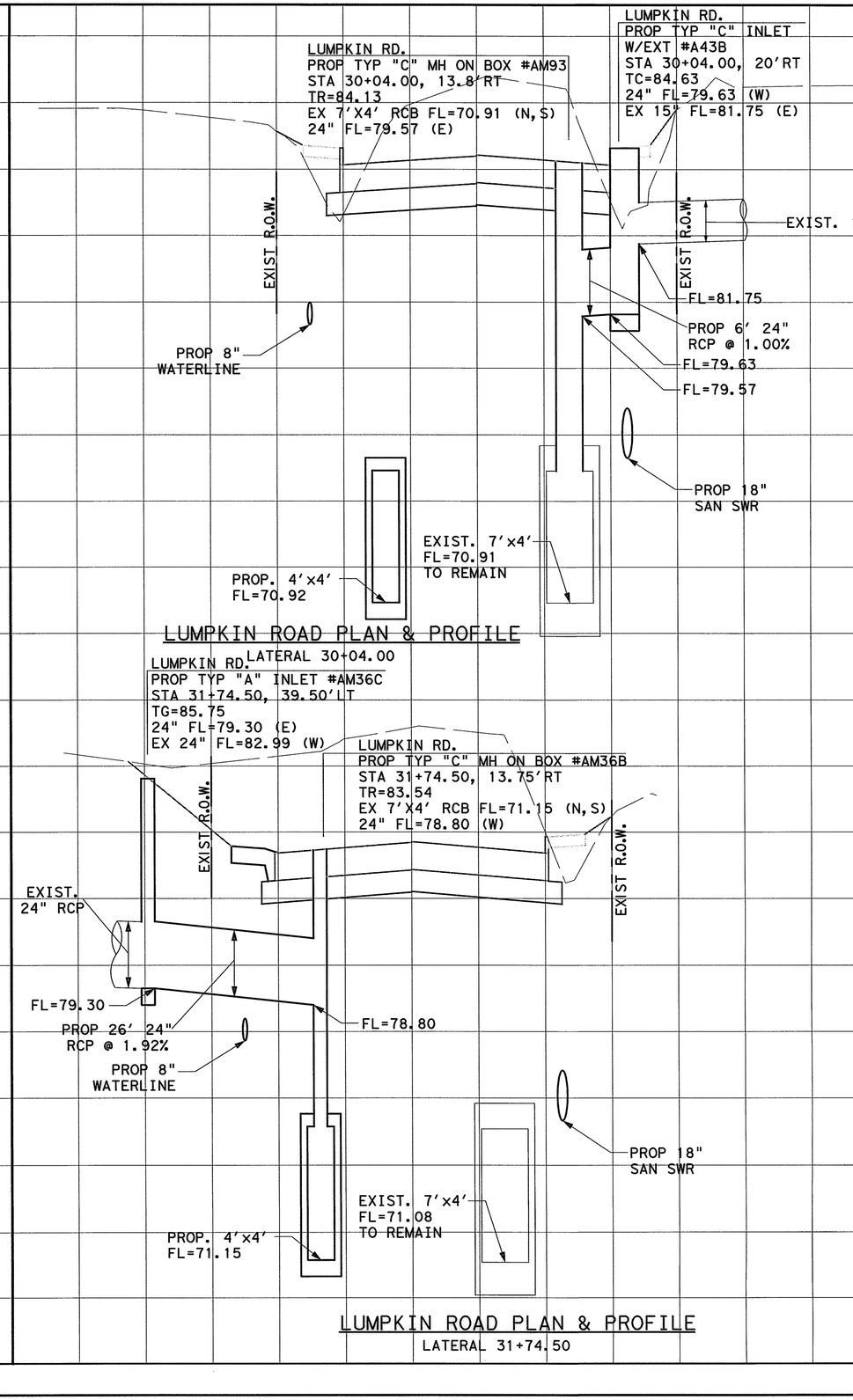
SHEET 9 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=10'
SHEET:
91 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\90-001*STORM*SWR*LAT*09.dgn 9/5/2014 8:36:21 AM MJGuthrie

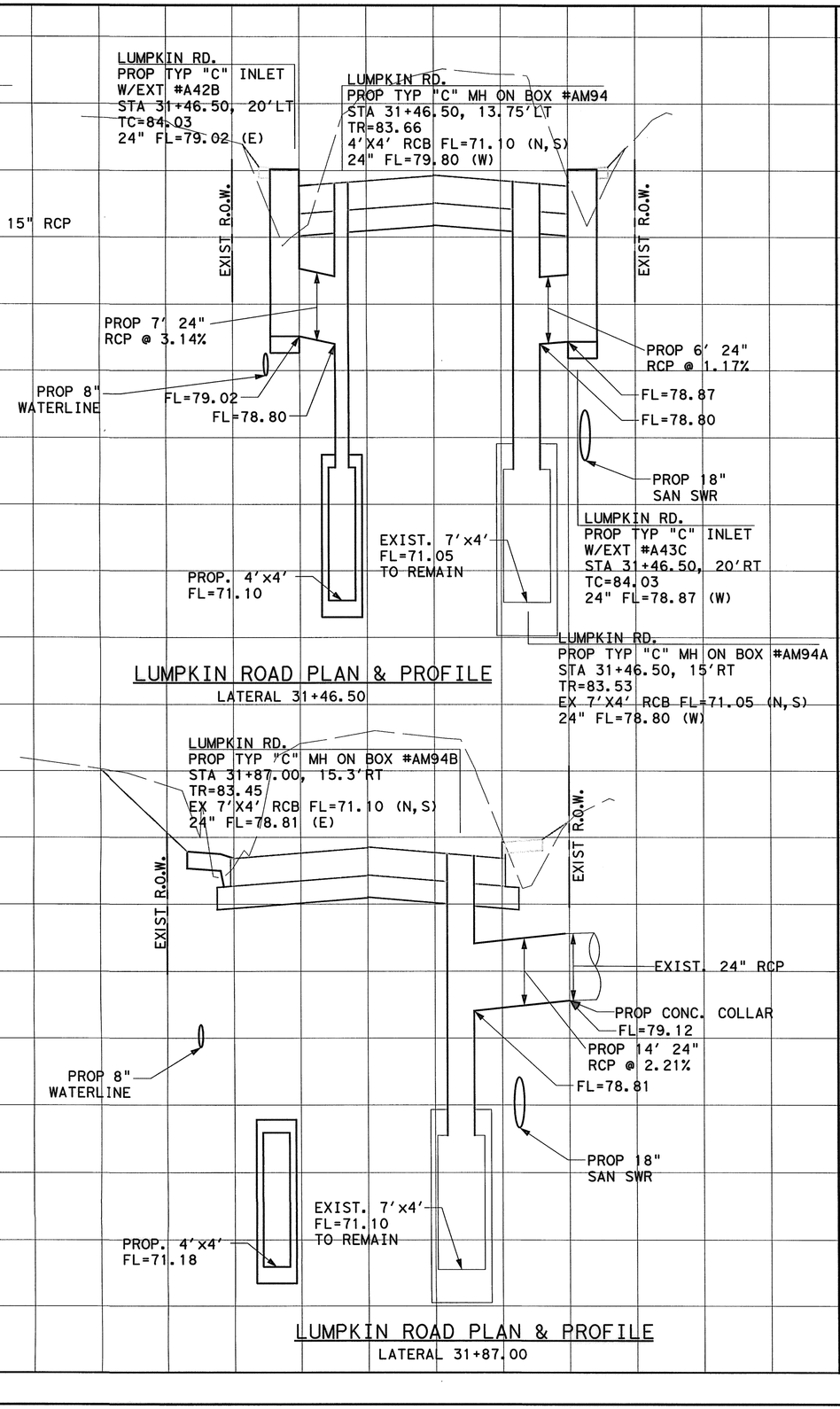


LUMPKIN ROAD PLAN & PROFILE

LATERAL 30+04.00

LUMPKIN ROAD PLAN & PROFILE

LATERAL 31+74.50



LUMPKIN ROAD PLAN & PROFILE

LATERAL 31+46.50

LUMPKIN ROAD PLAN & PROFILE

LATERAL 31+87.00

No.	DATE	REVISIONS	APP.

0 10 20 40

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LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER
LATERALS

SHEET 10 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=10'

SHEET:
92 OF 226

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LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM36
STA 32+03.50, 13.75'LT
TR=83.45
4'X4' RCB FL=71.18 (N,S)
24" FL=78.60 (W)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM36
STA 32+03.50, 15.5'RT
TR=83.32
EX 7'X4' RCB FL=71.10 (N,S)
24" FL=78.74 (W)

EXIST R.O.W.

EXIST R.O.W.

MATCH EXISTING SWALE FLOWLINE

PROP 6" CONC SLOPE PAVING TO ROW

FL=82.80

PROP 5' 24" RCP @ 4.00%

PROP 6' 24" RCP @ 1.00%

CONST. 24" DIAMETER OPENING BETWEEN BOTH INLETS (MIN)

FL=78.80

FL=78.60

FL=78.80

FL=78.74

PROP 8" WATERLINE

LUMPKIN RD.
PROP TYP "BB" INLET #A42A
STA 32+03.50, 20'LT
TC=83.80
24" FL=78.80 (E)

PROP. 4'x4'
FL=71.18

EXIST. 7'x4'
FL=71.10
TO REMAIN

LUMPKIN RD.
PROP TYP "BB" &
PROP TYP "E" #A43
STA 32+03.50, 20'RT
TC=83.80
24" FL=78.80 (W)

PROP 18" SAN SWR

LUMPKIN ROAD PLAN & PROFILE
LATERAL 32+03.50

EXIST R.O.W.

EXIST R.O.W.

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM36A
STA 33+78.35, 13.75'LT
TR=83.94
4'X4' RCB FL=71.43 (N,S)
24" FL=79.00 (W)

EXIST 10" PVC

FL=82.75

PROP 12' 24" RCP @ 4.17%

FL=79.50

FL=79.00

1' CLR (MIN)

PROP 8" WATERLINE

LUMPKIN RD.
PROP TYP "C" MH #AM36D
STA 33+78.35, 27.6'LT
TR=84.45
24" FL=79.50 (E)
EX 10" PVC FL=82.75 (W)

PROP 18" SAN SWR

EXIST. 7'x4'
FL=71.52
TO REMAIN

PROP. 4'x4'
FL=71.43

LUMPKIN ROAD PLAN & PROFILE
LATERAL 33+78.35

86 84 82 80 78 76 74 72 70

No.	DATE	REVISIONS	APP.

0 10 20 40
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STATE OF TEXAS
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LUMPKIN ROAD
N-T17000-0012-3

STORM SEWER LATERALS

SHEET 11 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
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SHEET: 93 OF 226

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LUMPKIN RD.
REMOVE EXIST. INLET
PROP TYP "A" INLET #A42D
STA 34+40.50, 46.13'LT
TG=86.03
24" FL=79.38 (E)
EX 15" FL=83.32 (N)
EX 8" FL=83.27 (S)

EXIST R.O.W.

EXIST 18" (REMOVE)

EXIST 8" (S)
EXIST 15" (N)

PROP 30' 24" RCP @ 2.00%

FL=79.38

FL=78.78

1-FT CLR (MIN)

PROP 8" WL

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM47A
STA 34+41.50, 13.75'LT
TR=83.69
4'X4' RCB FL=71.53 (N,S)
24" FL=78.78 (W)

EXIST R.O.W.

PROP 18" SAN SWR

EXIST. 7'x4'
FL=71.67
TO REMAIN

PROP. 4'x4'
FL=71.53

LUMPKIN ROAD PLAN & PROFILE
LATERAL 34+41.50

LUMPKIN RD.
PROP TYP "BB" INLET #A42
STA 34+74.79, 20'LT
TC=84.03
24" FL=79.03 (E)

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM47
STA 34+74.79, 13.75'LT
TR=83.66
4'x4' RCB FL=71.57 (N,S)
24" FL=78.69 (W)

EXIST R.O.W.

PROP 8" WL

PROP 4' 24" RCP @ 8.50%

FL=79.03

FL=78.69

EXIST. 7'x4'
FL=71.76
TO REMAIN

PROP. 4'x4'
FL=71.57

LUMPKIN RD.
PROP TYP "C" MH ON BOX #AM47
STA 34+74.79, 15.6'RT
TR=83.65
EX 7'x4' RCB FL=71.76 (N,S)
24" FL=78.91 (E)

EXIST R.O.W.

PROP 2' 24" RCP @ 4.00%

FL=78.99

FL=78.91

PROP 18" SAN SWR

LUMPKIN RD.
PROP TYP "C" INLET #A41
STA 34+74.79, 20'RT
TC=84.03
24" FL=78.99 (W)

LUMPKIN ROAD PLAN & PROFILE
LATERAL 34+74.79

86 84 82 80 78 76 74 72 70

No.	DATE	REVISIONS	APP.

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STORM SEWER LATERALS

SHEET 12 OF 12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
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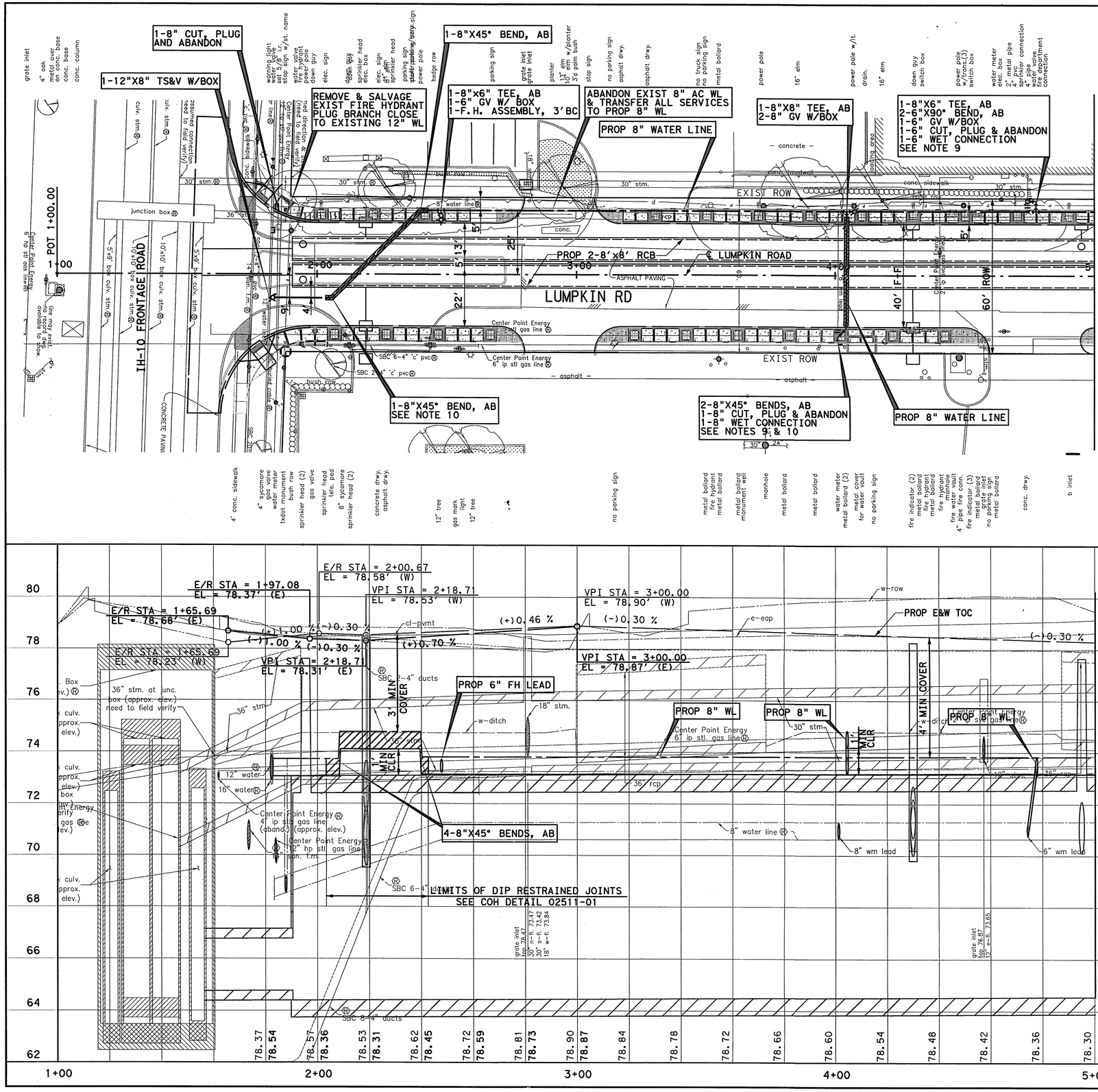
pw:\\ladpw.ladoo.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Drainage\93-001*STORM*SWR*LAT*12.dgn 9/5/2014 8:36:51 AM MJGuthrie



BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #46
SET 5/8" I.R. LOCATED AT NORTHWEST CORNER OF LUMPKIN RD. AND I-10 FRONTAGE ROAD INTERSECTION.
CL STA. 1+83.38, 23.46' LT.
ELEV.=78.75'

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
3. CAUTION-EXISTING 8"AC WATERLINE IN CLOSE PROXIMITY TO PROPOSED WORK MAY LEAK. NO SEPARATE PAYMENT FOR GROUNDWATER CONTROL RESULTING FROM LEAKING PIPE. AVOID DISTURBING EXISTING 8"AC WATERLINE.
4. CRITICAL LOCATE EXISTING 8"AC WATERLINE AT 200 FT MAX SPACING. SEE SECTION 01110.
5. CONTRACTOR TO BRACE POWER POLES WHEN 2 FOOT CLEARANCE CANNOT BE MAINTAINED.
6. ALL CONNECTIONS TO EXISTING WATER LINES TO BE MADE WITHIN ROW LIMITS.
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
9. CONTRACTOR TO LOCATE UNMETERED FIRE SERVICES AND RESTORE CONNECTIONS.
10. SEE WATER & SANITARY CROSSING SHEETS.

MATCHLINE STA 5+00 SEE SHT 2 OF 18

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

METER COUNTS	
ADDRESS	SIZE
1000 W SAM HOUSTON PKWY	2
1010 W SAM HOUSTON PKWY	1.5
1010 W SAM HOUSTON PKWY	2
1050 W SAM HOUSTON PKWY	1.5
1060 W SAM HOUSTON PKWY	2
1100 W SAM HOUSTON PKWY	1.5
10518 KATY FREEWAY	2

No.	DATE	REVISIONS	APP.

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED
PROFESSIONAL ENGINEER
9/11/14
Christine H. Kirby
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
BEGIN PROJECT TO 5+00
SHEET 1 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 95 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Civil\05-001-P&P-WTR-01.dgn
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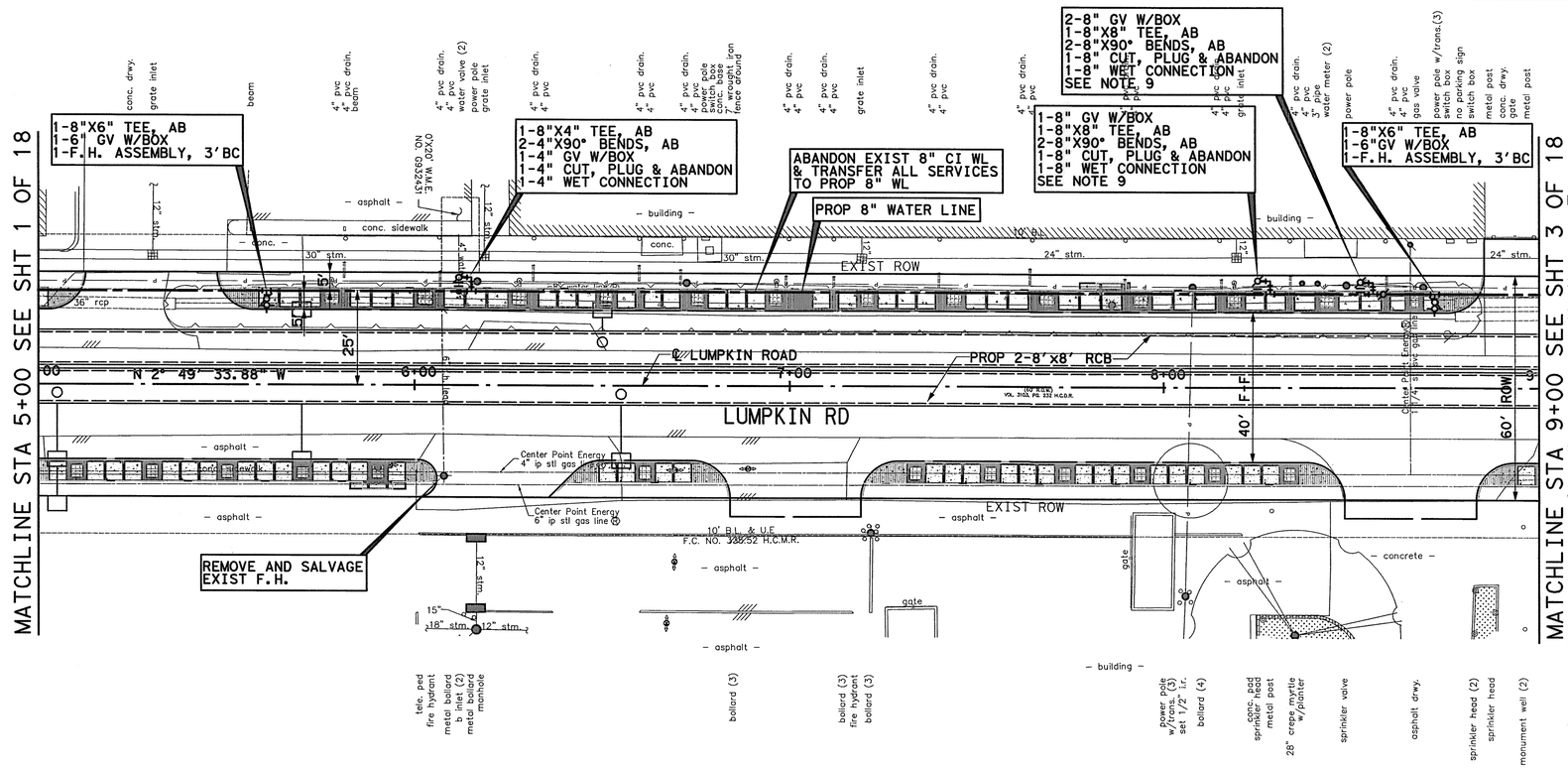
9/17/2014



BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #46
SET 1/2" I.R. LOCATED AT EAST SIDE OF LUMPKIN ROAD.
APPROX. 622 FT NORTH OF LUMPKIN ROAD AND IH 10 INTERSECTION.
D STA. 8+07.15, 24.86' RT.
ELEV.=80.03'

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
3. CAUTION-EXISTING 8"AC WATERLINE IN CLOSE PROXIMITY TO PROPOSED WORK MAY LEAK. NO SEPARATE PAYMENT FOR GROUNDWATER CONTROL RESULTING FROM LEAKING PIPE. AVOID DISTURBING EXISTING 8"AC WATERLINE.
4. CRITICAL LOCATE EXISTING 8"AC WATERLINE AT 200 FT MAX SPACING. SEE SECTION 01110.
5. CONTRACTOR TO BRACE POWER POLES WHEN 2 FOOT CLEARANCE CANNOT BE MAINTAINED.
6. ALL CONNECTIONS TO EXISTING WATER LINES TO BE MADE WITHIN ROW LIMITS.
7. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
8. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
9. CONTRACTOR TO LOCATE UNMETERED FIRE SERVICES AND RESTORE CONNECTIONS.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

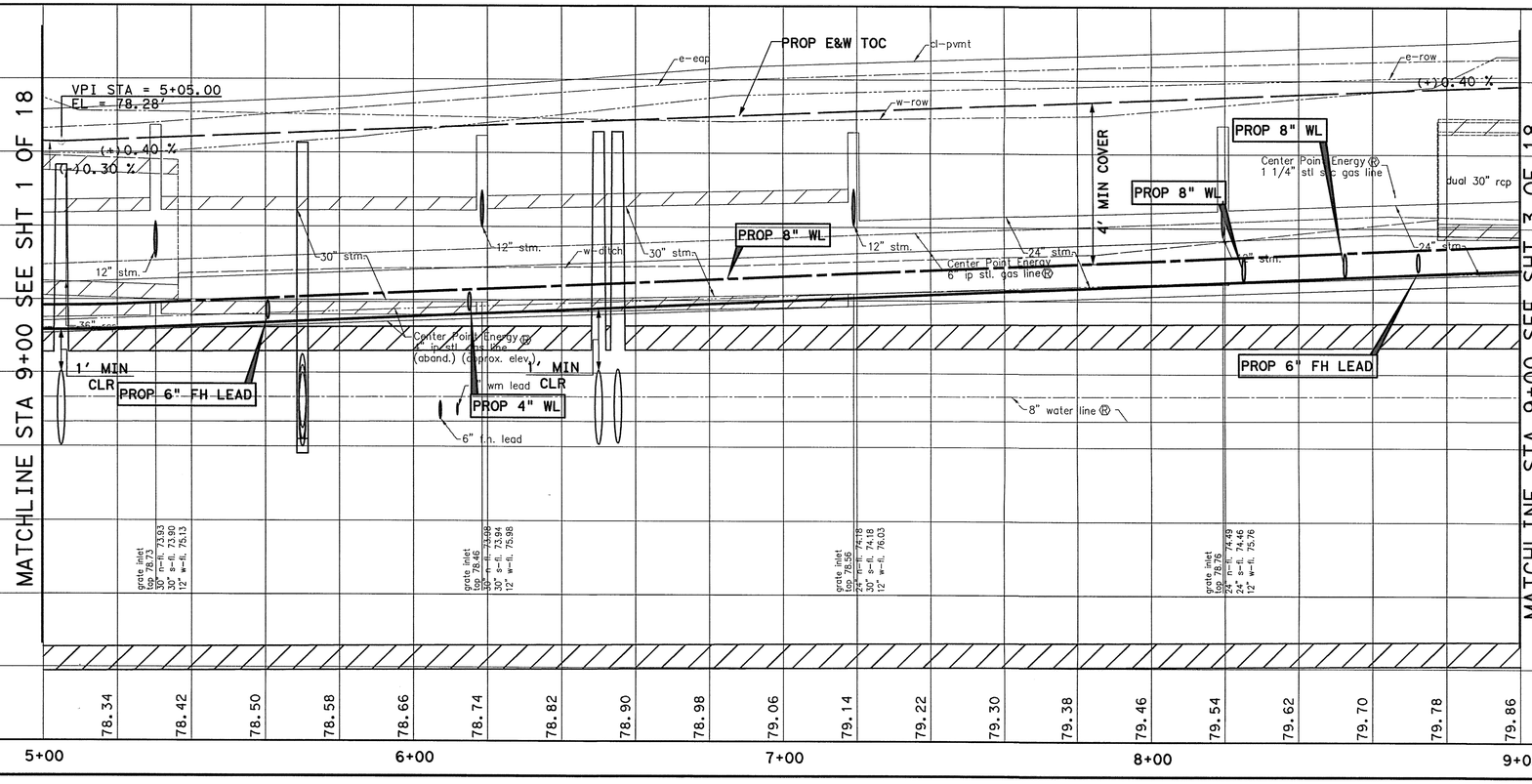
9254 4
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

METER COUNTS	
ADDRESS	SIZE
1100 LUMPKIN ROAD	2



MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 5+00 TO STA 9+00
SHEET 2 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 96 OF 226

No.	DATE	REVISIONS	APP.

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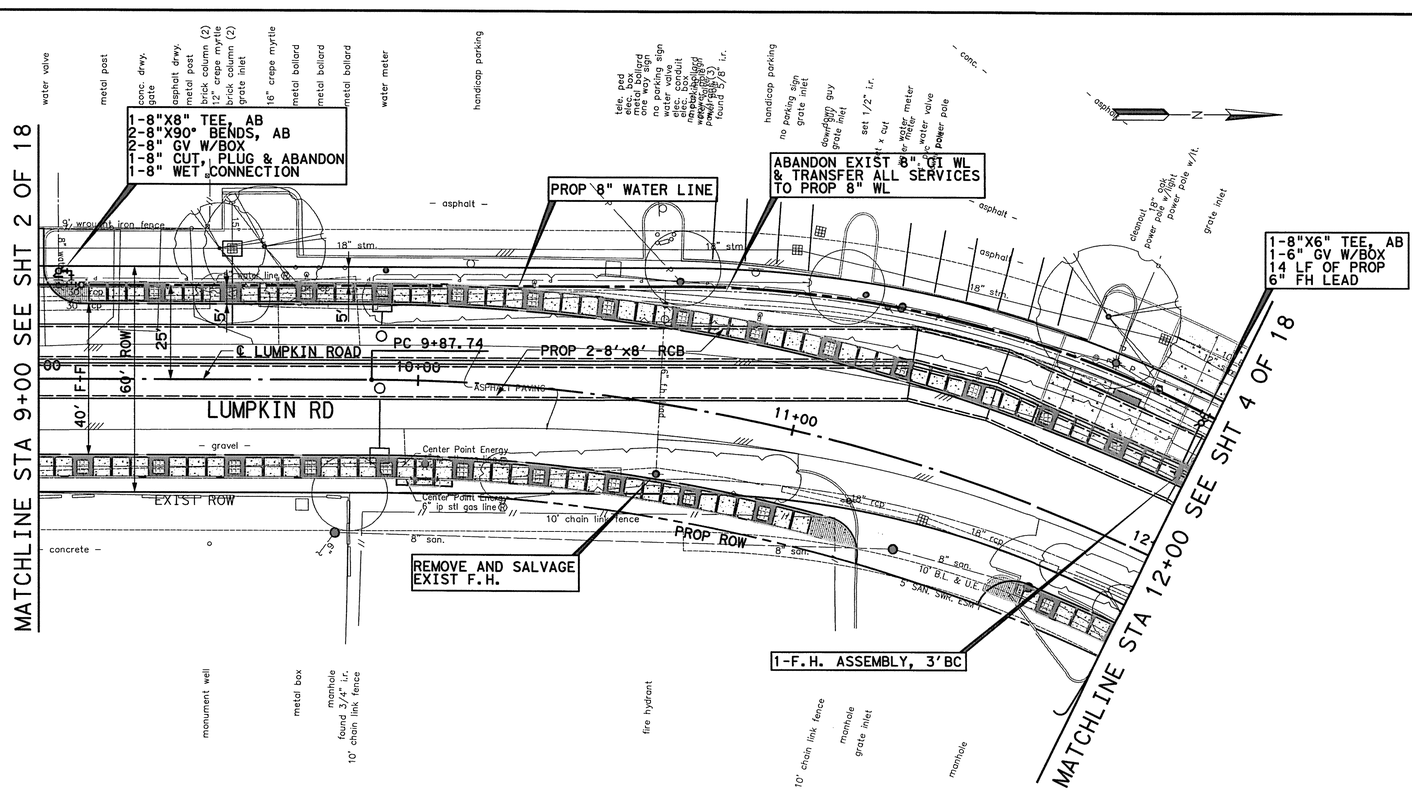

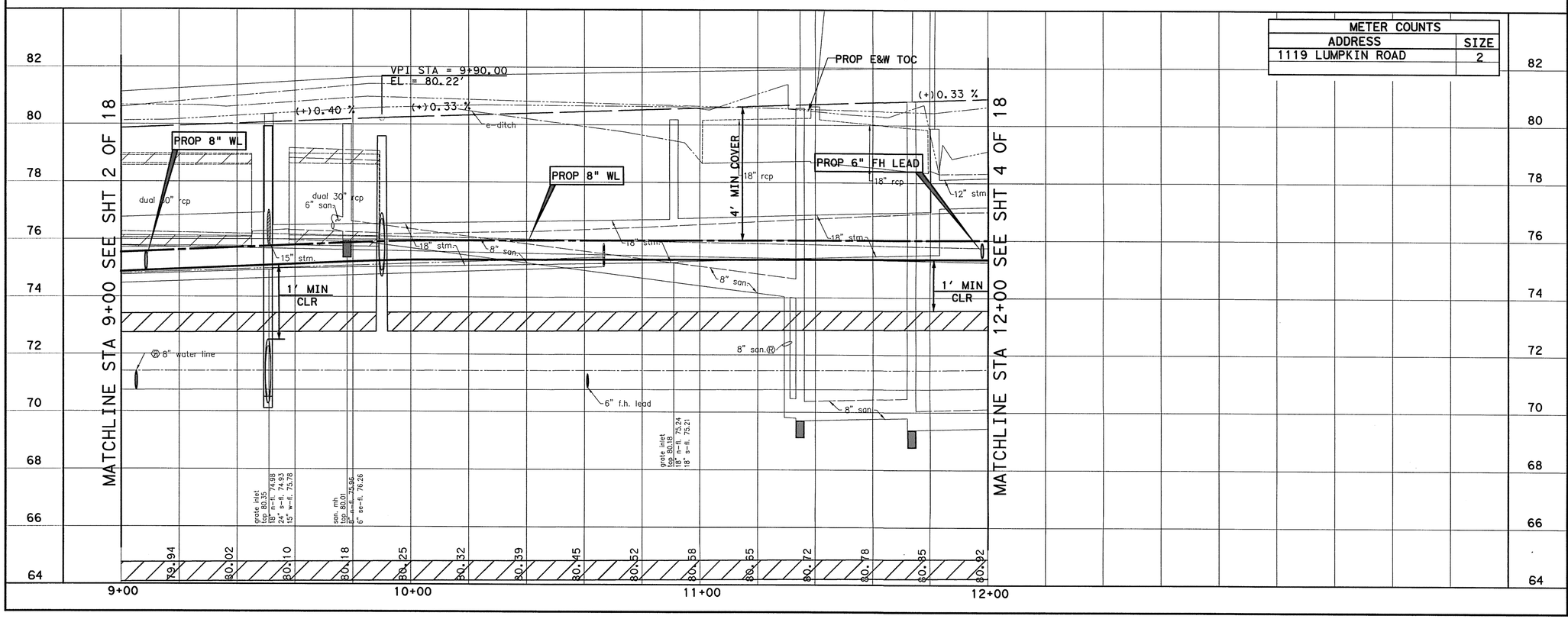

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV. =82.18 FEET (NAVD 88\GEOID09)

T.B.M. #44

SET ½"I.R. LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 587 FT SOUTH OF LUMPKIN ROAD AND LARSTON DRIVE INTERSECTION.
D STA. 11+04.75, 40.32' LT
ELEV. =80.32'

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
3. CAUTION-EXISTING 8"AC WATERLINE IN CLOSE PROXIMITY TO PROPOSED WORK MAY LEAK. NO SEPARATE PAYMENT FOR GROUNDWATER CONTROL RESULTING FROM LEAKING PIPE. AVOID DISTURBING EXISTING 8"AC WATERLINE.
4. CRITICAL LOCATE EXISTING 8"AC WATERLINE AT 200 FT MAX SPACING. SEE SECTION 01110.
5. RECONNECT ALL EXIST SERVICES TO PROPOSED WATERLINE.
6. CONTRACTOR TO BRACE POWER POLES WHEN 2 FOOT CLEARANCE CANNOT BE MAINTAINED.
7. ALL CONNECTIONS TO EXISTING WATER LINES TO BE MADE WITHIN ROW LIMITS.
8. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
9. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

METER COUNTS	
ADDRESS	SIZE
1119 LUMPKIN ROAD	2

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 9+00 TO STA 12+00
SHEET 3 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 97 OF 226

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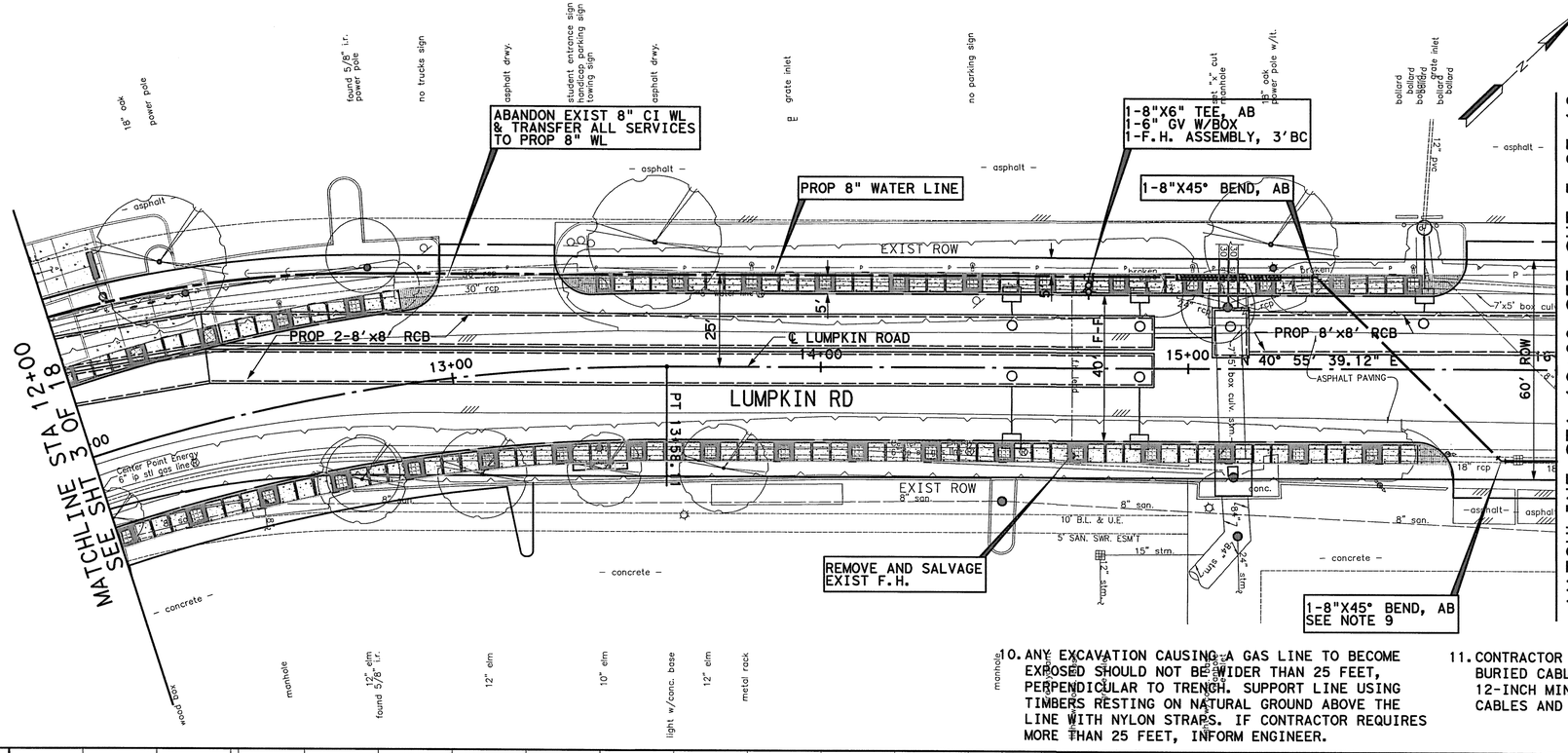

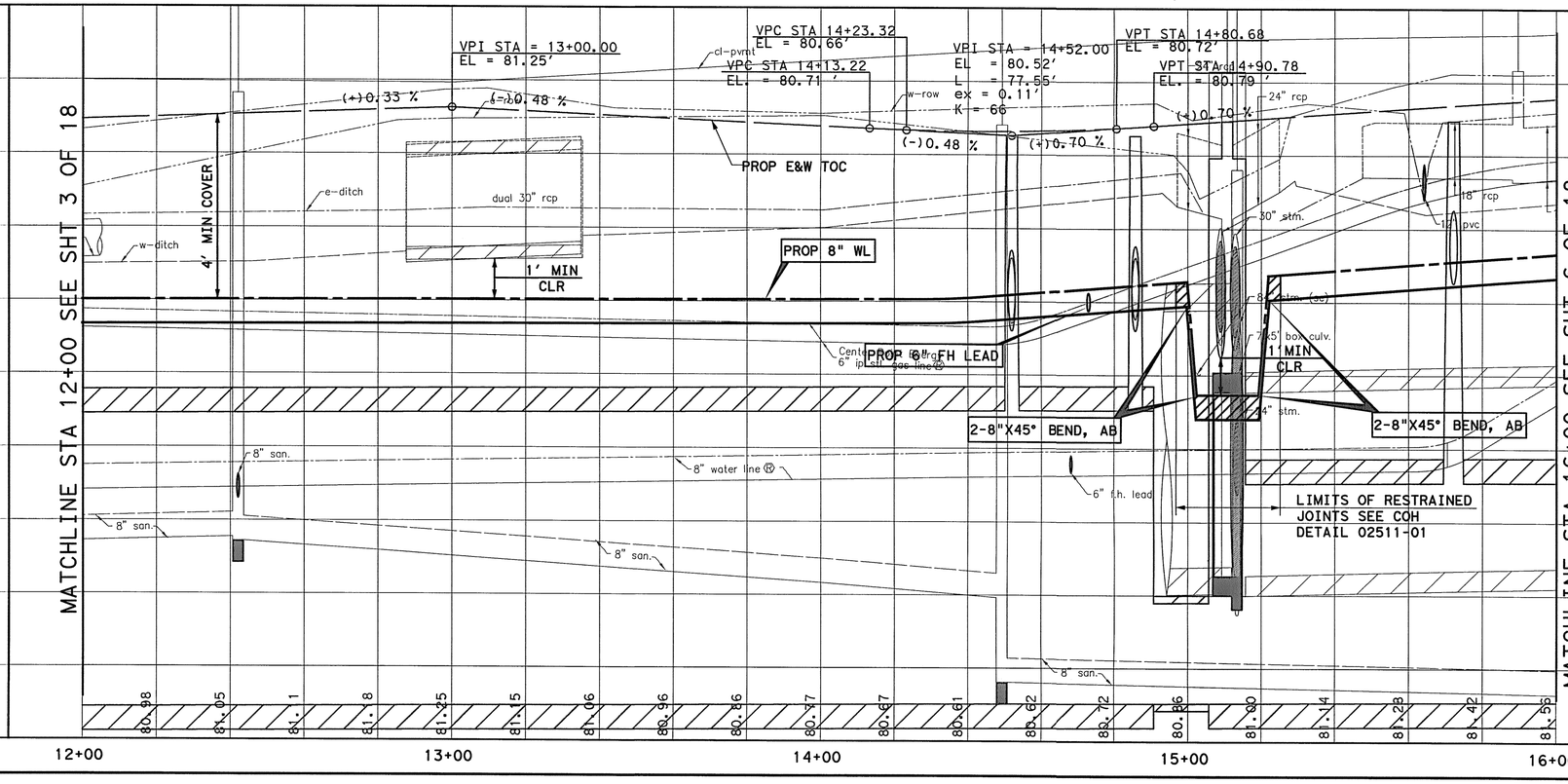

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #43
SET X CUT LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 166 FT SOUTH OF LUMPKIN ROAD AND LARSTON DRIVE INTERSECTION.
D STA. 15+08.09, 17.04' LT
ELEV.=82.25'

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
3. INSTALL PROPOSED 8" WATERLINE IN 16" DIA. CASING. SUPPORT CARRIER PIPE AT 5' INTERVALS AND FILL TO SPRINGLINE WITH WASHED SAND
4. CAUTION-EXISTING 8"AC WATERLINE IN CLOSE PROXIMITY TO PROPOSED WORK MAY LEAK. NO SEPARATE PAYMENT FOR GROUNDWATER CONTROL RESULTING FROM LEAKING PIPE. AVOID DISTURBING EXISTING 8"AC WATERLINE.
5. CRITICAL LOCATE EXISTING 8"AC WATERLINE AT 200 FT MAX SPACING. SEE SECTION 01110.
6. RECONNECT ALL EXIST SERVICES TO PROPOSED WATERLINE.
7. CONTRACTOR TO BRACE POWER POLES WHEN 2 FOOT CLEARANCE CANNOT BE MAINTAINED.
8. ALL CONNECTIONS TO EXISTING WATER LINES TO BE MADE WITHIN ROW LIMITS.
9. SEE WATER & SANITARY SEWER CROSSING SHEETS.
10. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
11. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

AT&T UTILITY LINES SHOWN — DATE 9-25-14
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY — DATE 10/7/14
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICTION ONLY. — DATE 10/7/14
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 12+00 TO STA 16+00
SHEET 4 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 98 OF 226

No.	DATE	REVISIONS	APP.

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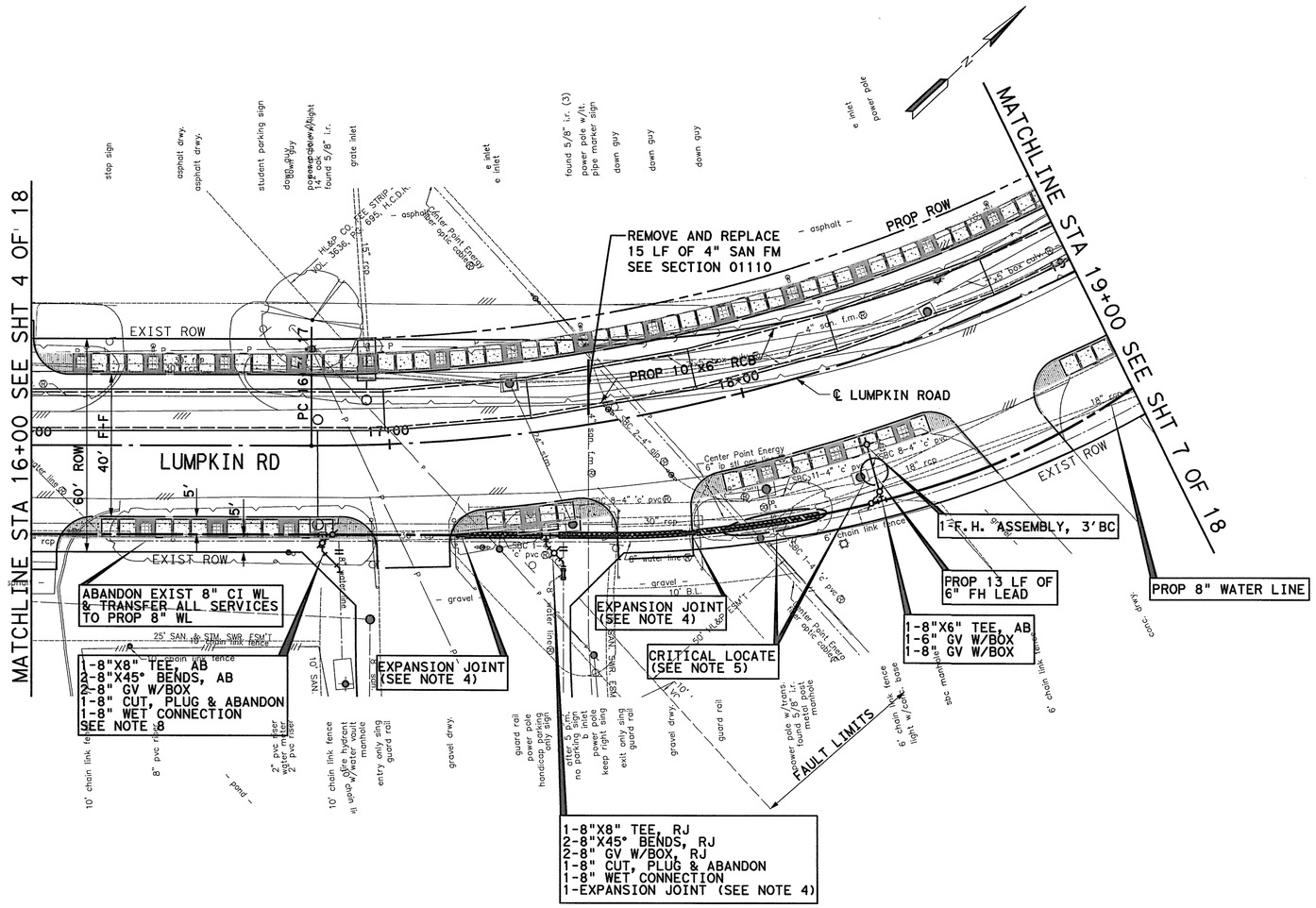
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #42

SET ½"I.R. LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 361 FT SOUTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 19+50.97, 26.24' RT.
ELEV.=85.17'



SEE PROFILE VIEW SHEET 6 OF 18

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. INSTALL 8-INCH WATER LINE BETWEEN THE PROPOSED EXPANSION JOINTS AT STATION 17+18 AND 17+77 USING DUCTILE IRON PIPE, PRESSURE CLASS 350 PSI, WITH INTEGRAL RESTRAINED JOINTS. PROVIDE EBAA IRON DOUBLE-BALL FLEX-TEND FORCE BALANCED FLEXIBLE EXPANSION JOINTS OR APPROVED EQUAL. INSTALL TWO WRAPS OF 4-MIL HDPE WRAP AROUND EXPANSION JOINTS IN ACCORDANCE WITH AWWA C105. LIMITS OF PAYMENT WILL BE BETWEEN STATION 17+18 AND 17+77, BETWEEN THE PROPOSED EXPANSION JOINTS.
5. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
6. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
7. VERIFY LOCATION OF EXISTING 8-INCH WATER LINE. IF CONFLICT IS FOUND, UTILIZE LINESTOP ON EXISTING 8-INCH WATER LINE TO ALLOW INSTALLATION OF PROPOSED 8-INCH WATER LINE.
8. CONTRACTOR TO LOCATE UNMETERED FIRE SERVICES AND RESTORE CONNECTIONS.

○ CRITICAL LOCATE SEE SPEC 02317

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 16+00 TO STA 19+00
SHEET 5 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 99 OF 226

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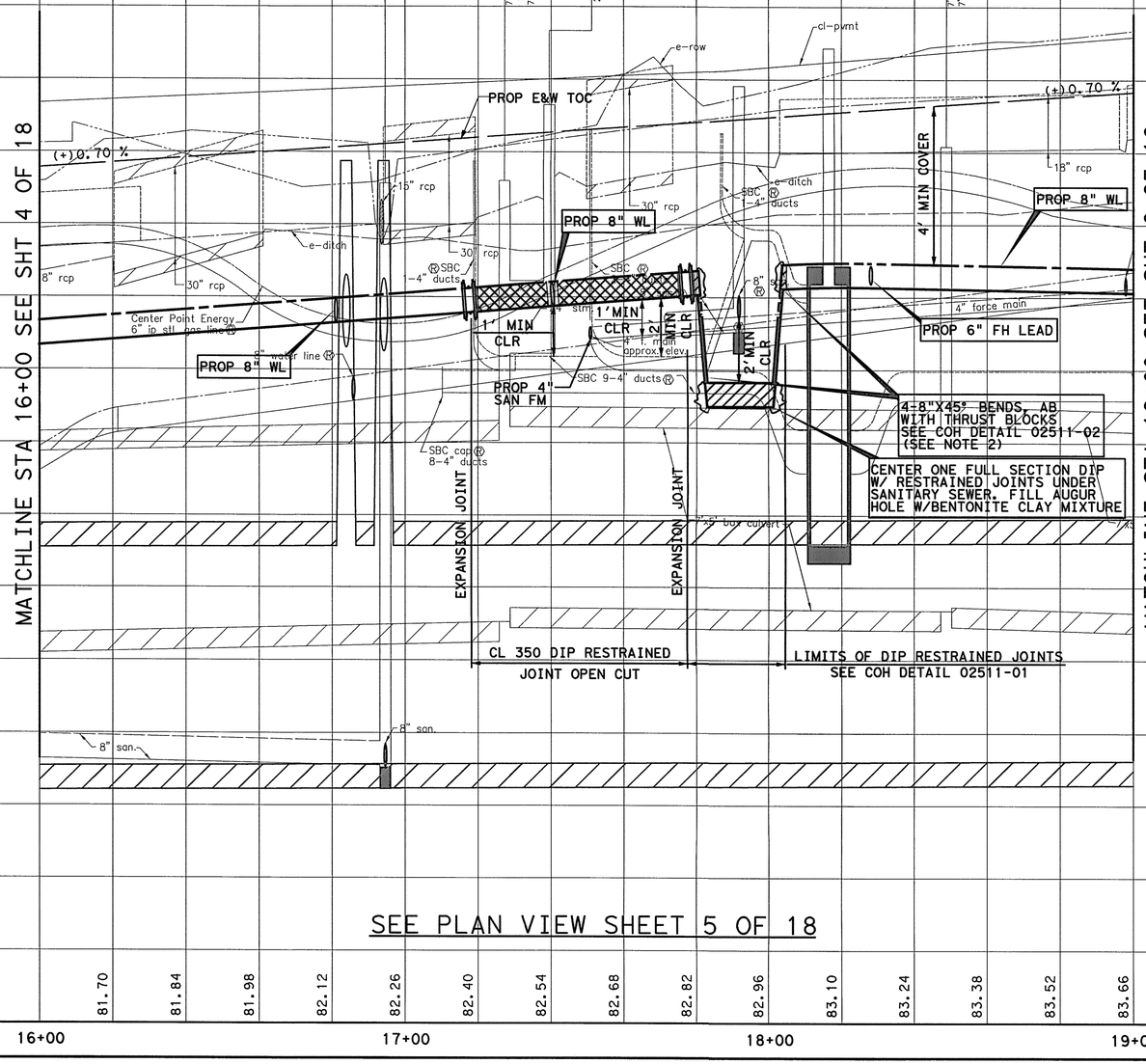

SEE PLAN VIEW SHEET 5 OF 18

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
2. NO SEPARATE PAY FOR THRUST BLOCKS.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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NOTICE:
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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS DATE FACILITIES VERIFICTION ONLY
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE ELECTRICAL FACILITIES VERIFICATION ONLY.
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
84776
LICENSED
PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 16+00 TO STA 19+00
SHEET 6 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
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VERT: 1"=2'
HORZ: 1"=20'
SHEET: 100 OF 226

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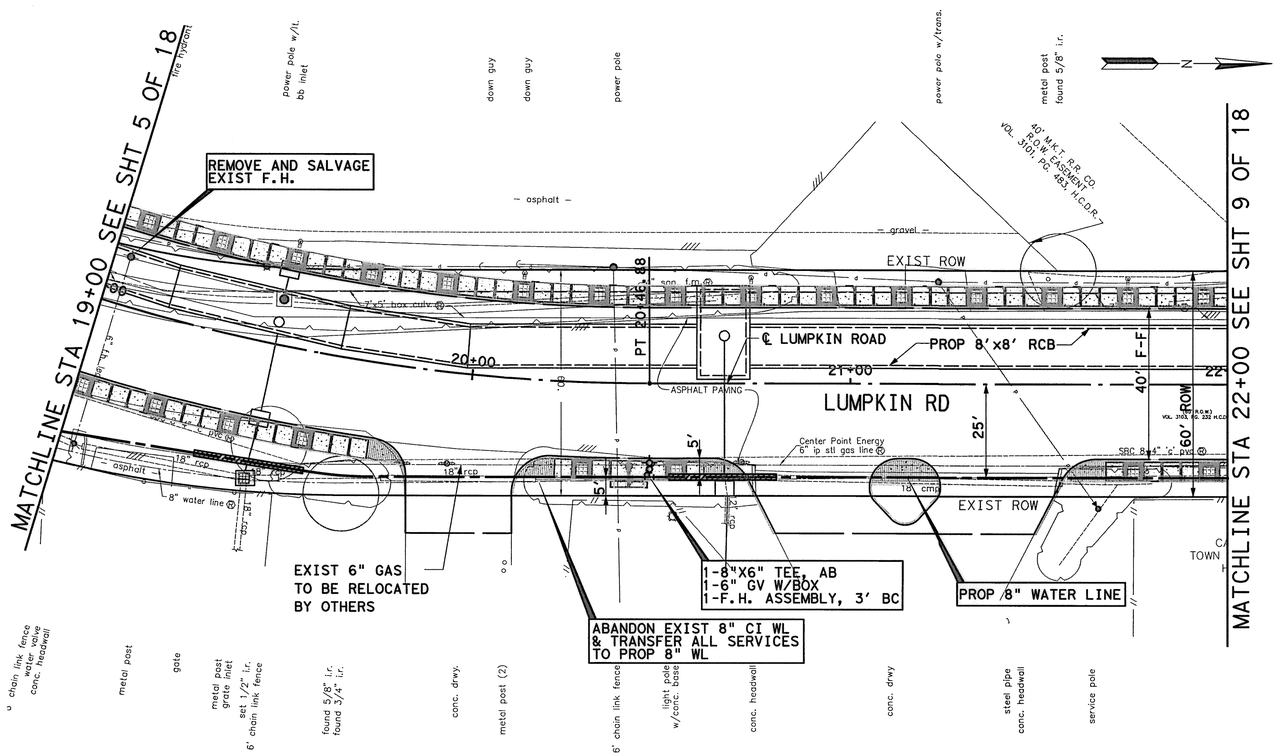
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #42

SET ½"I.R. LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 361 FT SOUTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 19+50.97, 26.24' RT.
ELEV.=85.17'

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
5. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
6. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
7. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.



SEE PROFILE VIEW SHEET 8 OF 18

METER COUNTS	
ADDRESS	SIZE
1123 LUMPKIN ROAD	1.5

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS DATE FACILITIES VERIFICTION ONLY
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE ELECTRICAL FACILITIES VERIFICATION ONLY.
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 19+00 TO STA 22+00
SHEET 7 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 101 OF 226

No.	DATE	REVISIONS	APP.

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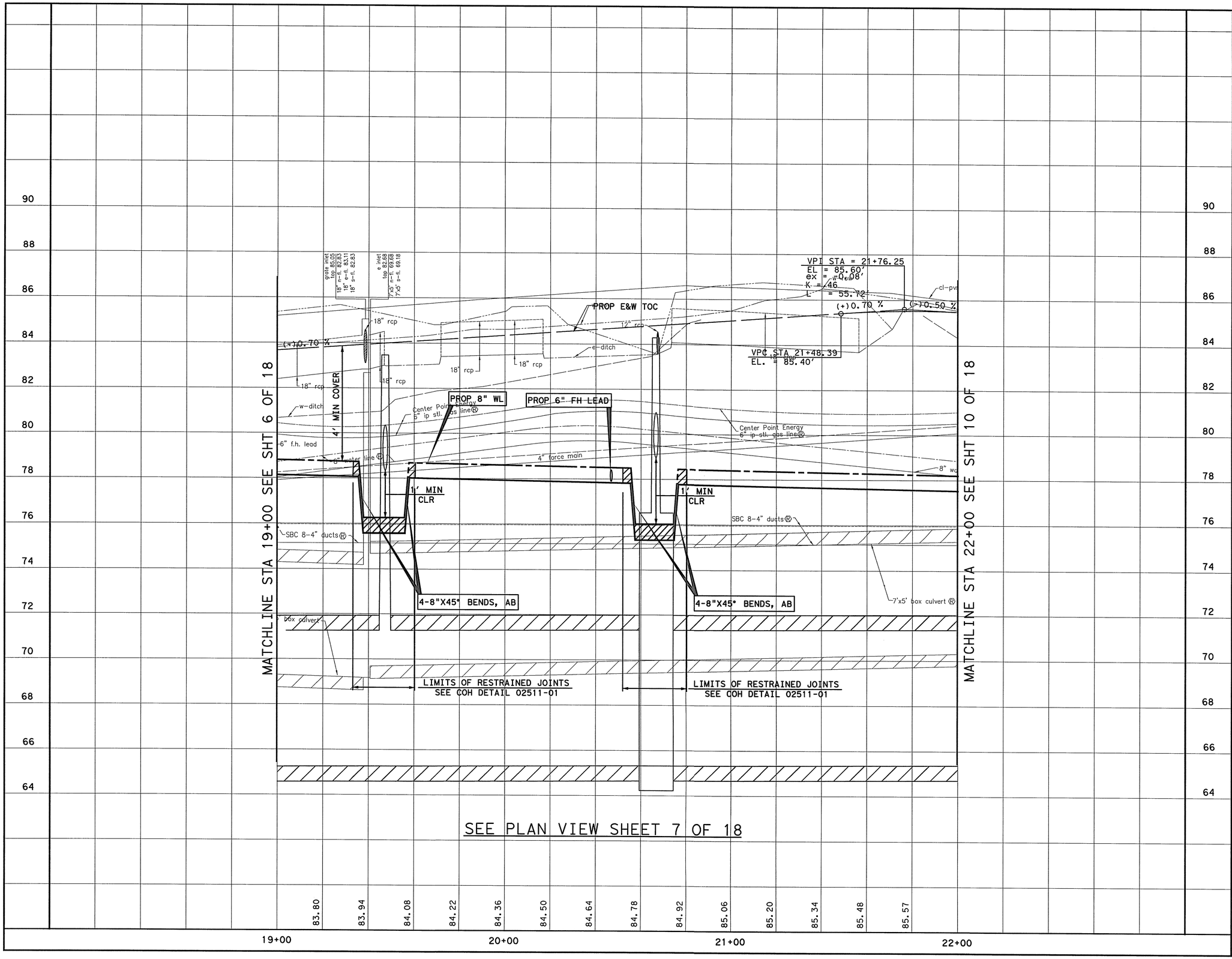


NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 19+00 TO STA 22+00
SHEET 8 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 102 OF 226

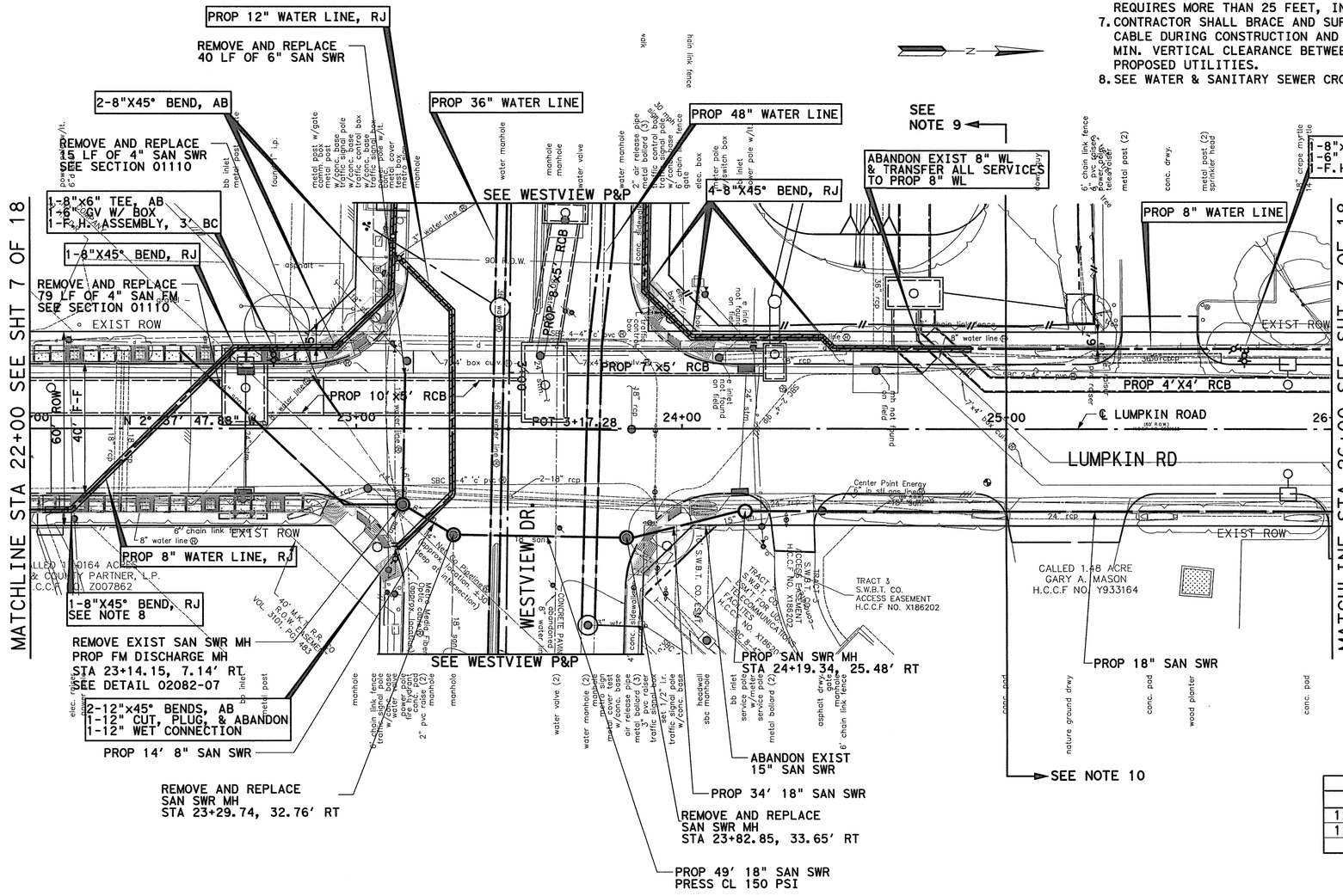
NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS.
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. RECONNECT ALL EXIST SERVICES TO PROP SAN SWR.
5. RECONNECT ALL EXIST LATERALS TO PROP SAN SWR MH.
6. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
7. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
8. SEE WATER & SANITARY SEWER CROSSING SHEETS.

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #41

SET ½" I.R. LOCATED NORTHEAST CORNER OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 23+93.54, 31.79' RT.
ELEV.=85.29'



SEE PROFILE VIEW SHEET 10 OF 18

9. END PROPOSED BASE BID ITEMS (SEE SPECIFICATION 01110 FOR DETAILS).

10. BEGIN PROPOSED ALTERNATE BID ITEMS (SEE SPECIFICATION 01110 FOR DETAILS).

METER COUNTS	
ADDRESS	SIZE
1220 LUMPKIN ROAD	2
1221 LUMPKIN ROAD	1

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T/UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
10/7/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 22+00 TO STA 26+00
SHEET 9 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=2' HORZ: 1"=20'	
SHEET: 103 OF 226	

No.	DATE	REVISIONS	APP.

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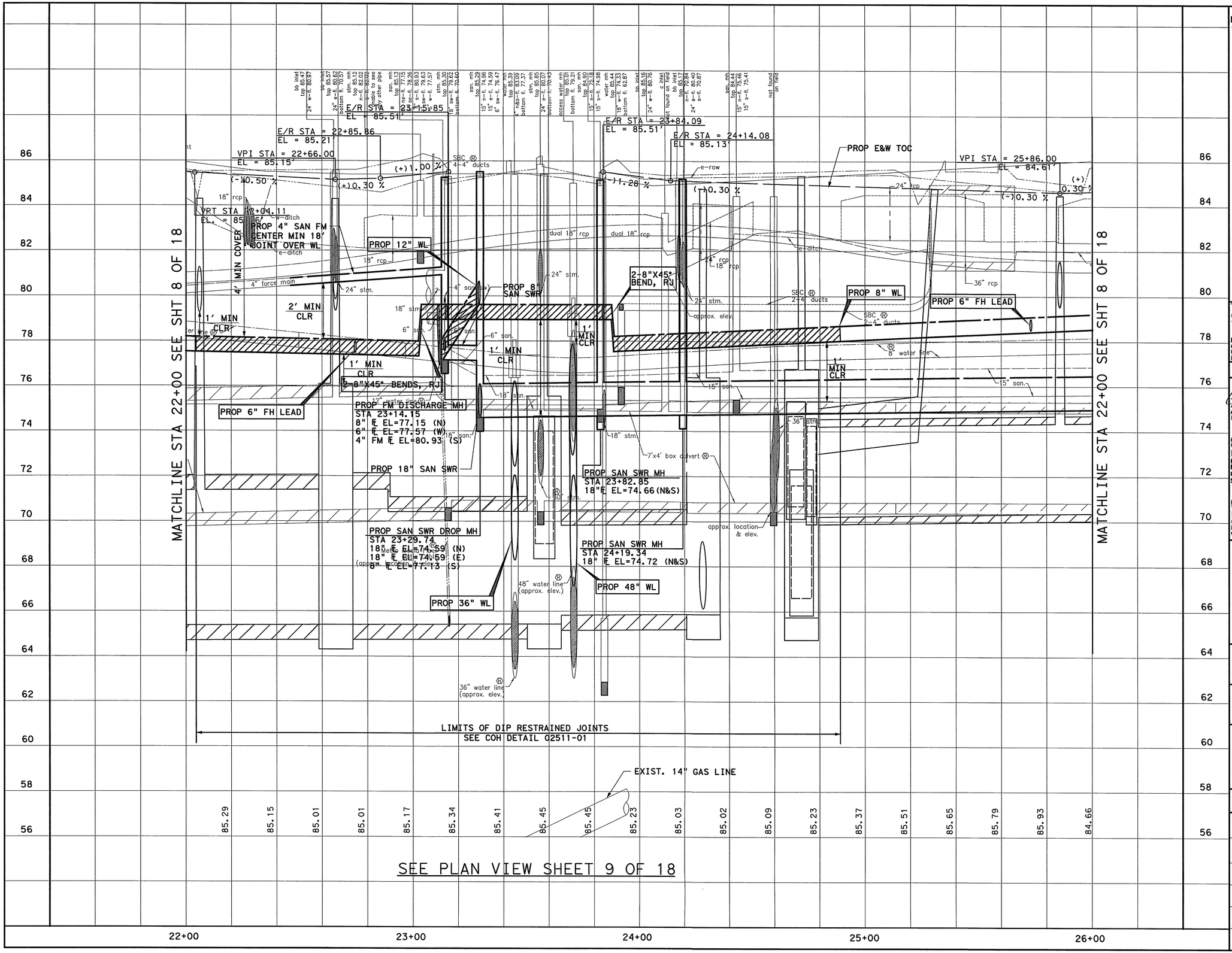

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 22+00 TO STA 26+00
SHEET 10 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 104 OF 226

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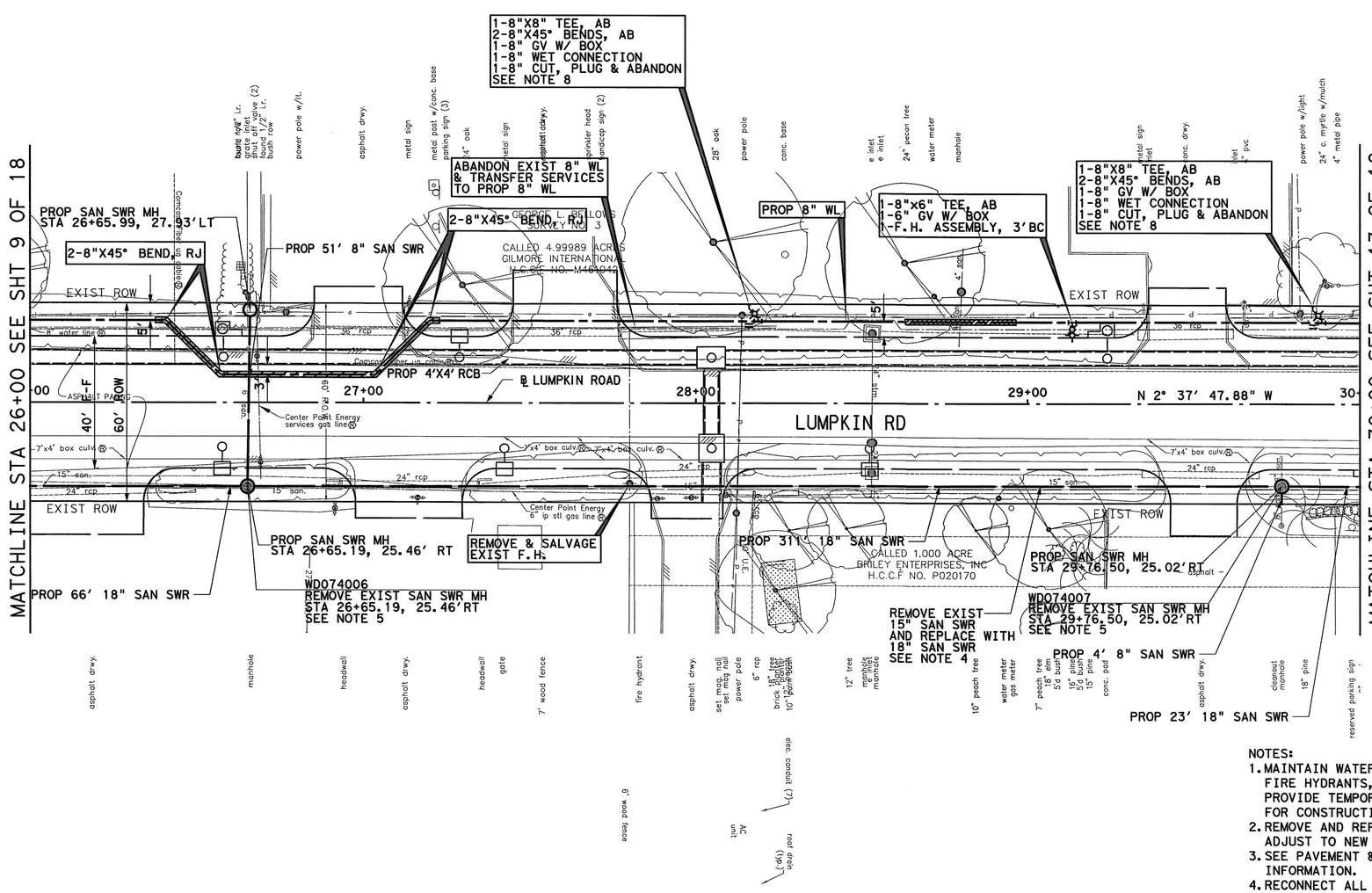
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #40

SET MAG NAIL LOCATED EAST SIDE OF LUMPKIN ROAD.
APPROX. 418 FT NORTH OF LUMPKIN ROAD AND WESTVIEW DRIVE INTERSECTION.
D STA. 28+08.56, 18.18' RT.
ELEV.=86.39'

No.	DATE	REVISIONS	APP.



SEE PROFILE VIEW SHEET 12 OF 18

METER COUNTS	
ADDRESS	SIZE
1230 LUMPKIN ROAD	1
1231 LUMPKIN ROAD	2
1251 LUMPKIN ROAD	1.5

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. RECONNECT ALL EXIST SERVICES TO PROP SAN SWR.
5. RECONNECT ALL EXIST LATERALS TO PROP SAN SWR MH.
6. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
7. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
8. CONTRACTOR TO LOCATE UNMETERED FIRE SERVICES AND RESTORE CONNECTIONS.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR
10/2/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.
10/2/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 26+00 TO STA 30+00
SHEET 11 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 105 OF 226

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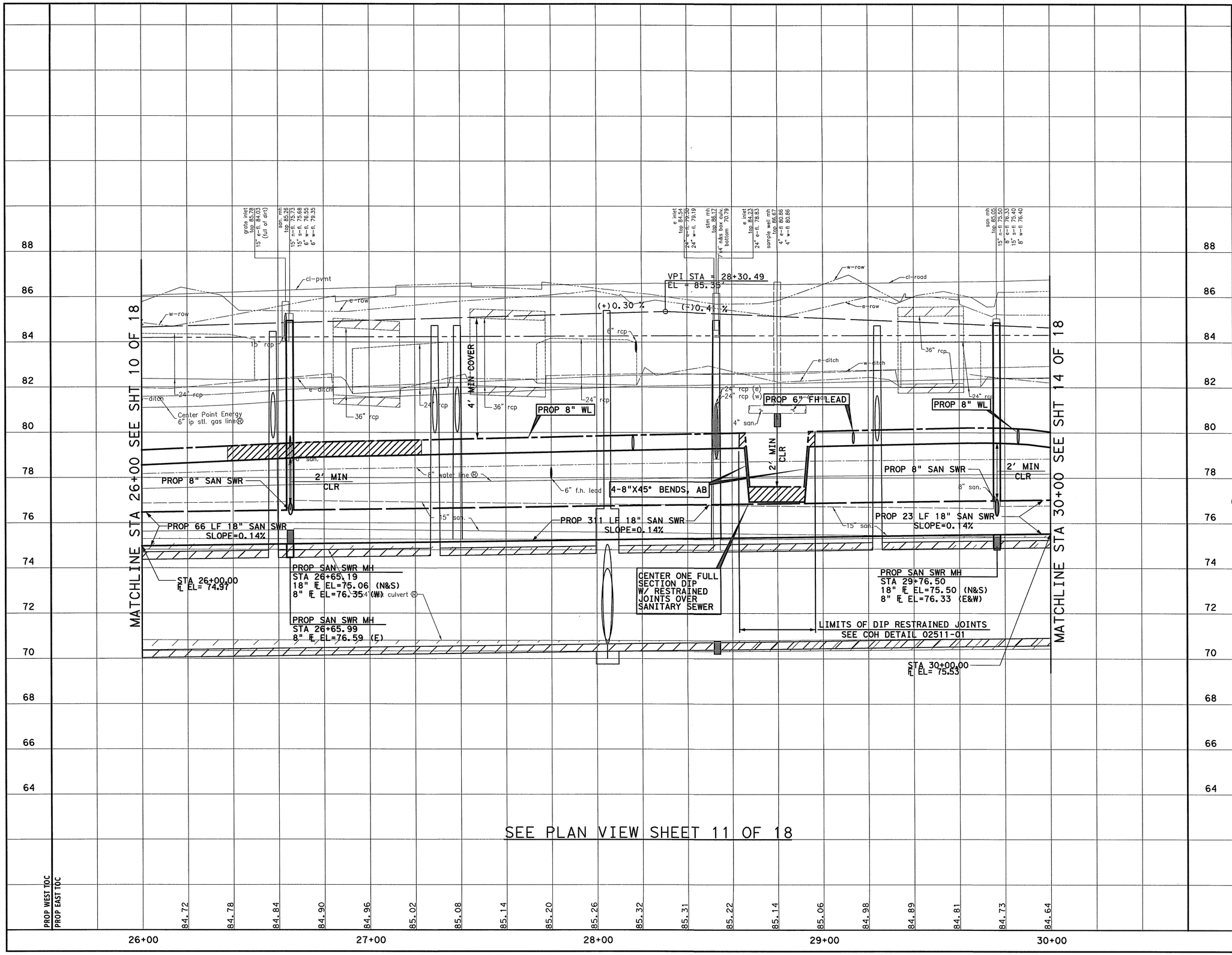

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
Christine H. Kirby
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 26+00 TO STA 30+00
SHEET 12 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

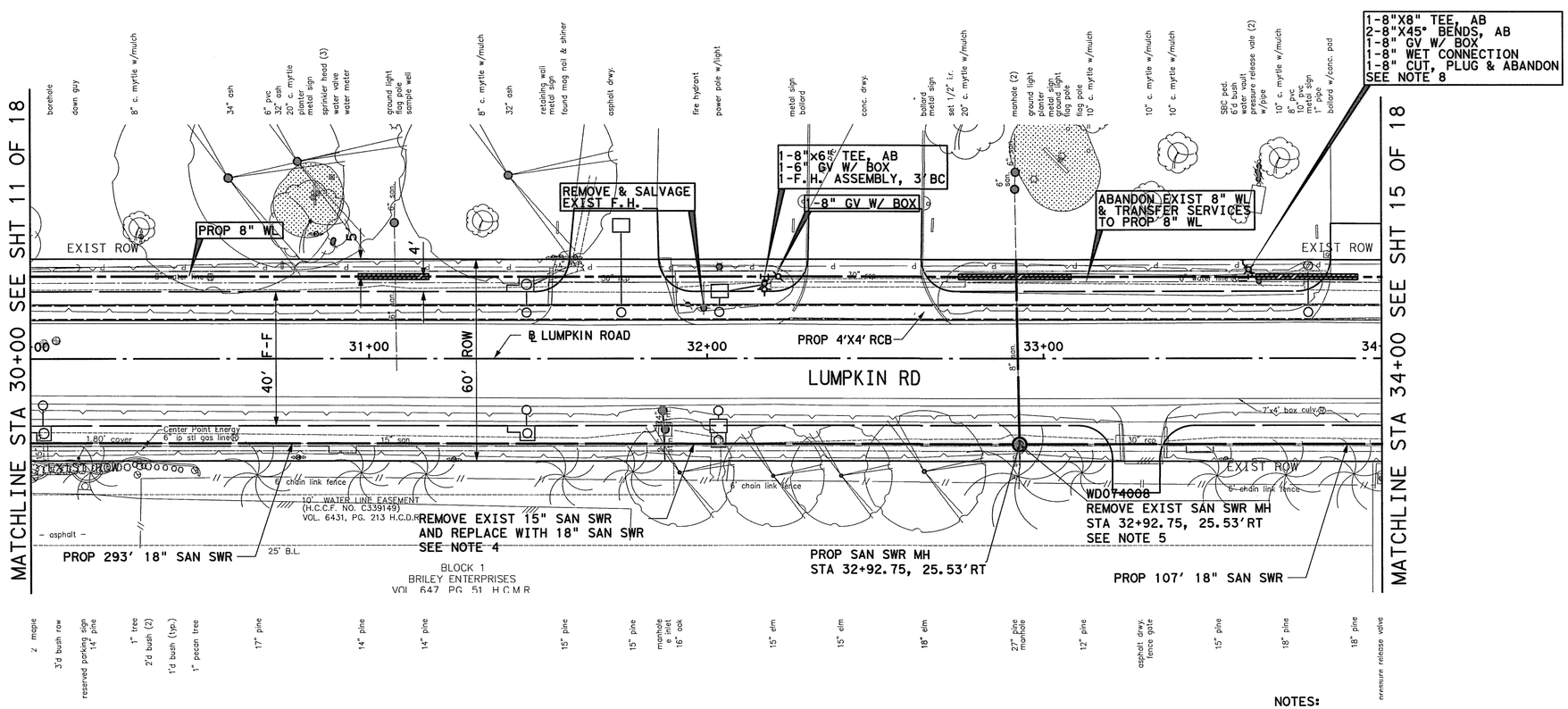
FILE NO.: FACILITY:
DRAWING SCALE: CITY DWG NO.:
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 106 OF 226

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #52

SET 1/2" I.R. LOCATED WEST SIDE OF LUMPKIN ROAD.
APPROX. 466 FT NORTH OF LUMPKIN ROAD AND NORTHBROOK DRIVE INTERSECTION.
D STA. 32+76.49, 11.77' LT.
ELEV.=86.60'



SEE PROFILE VIEW SHEET 14 OF 18

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. RECONNECT ALL EXIST SERVICES TO PROP SAN SWR.
5. RECONNECT ALL EXIST LATERALS TO PROP SAN SWR MH.
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7. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
8. CONTRACTOR TO LOCATE UNMETERED FIRE SERVICES AND RESTORE CONNECTIONS.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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PRIVATE UTILITY LINES SHOWN

9.25.14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 30+00 TO STA 34+00
SHEET 13 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=2' HORZ: 1"=20'	
SHEET: 107 OF 226	

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9/11/2014
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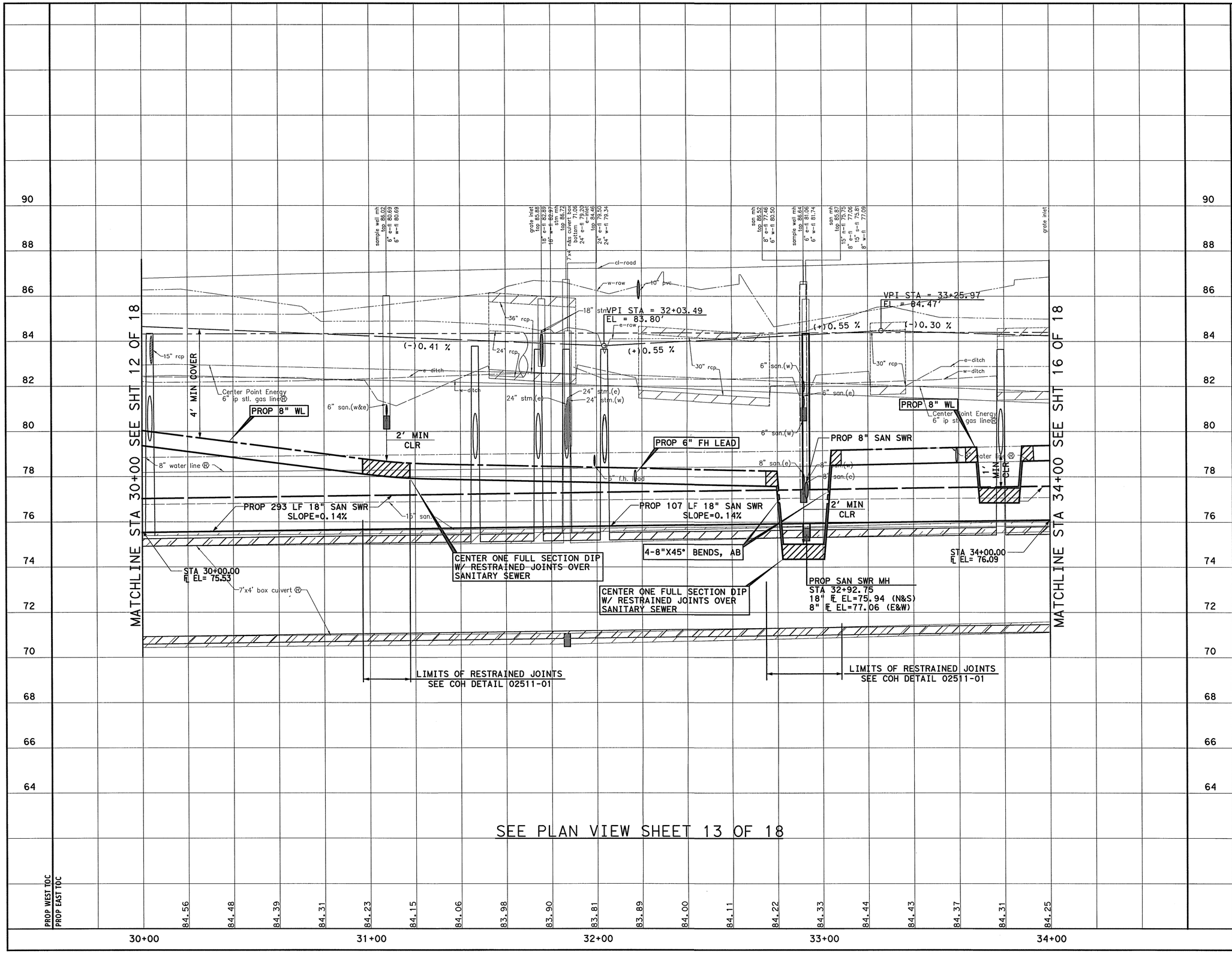

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS DATE
FACILITIES VERIFICTION ONLY
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY — NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE
ELECTRICAL FACILITIES VERIFICATION ONLY.
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES — NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 30+00 TO STA 34+00
SHEET 14 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 108 OF 226

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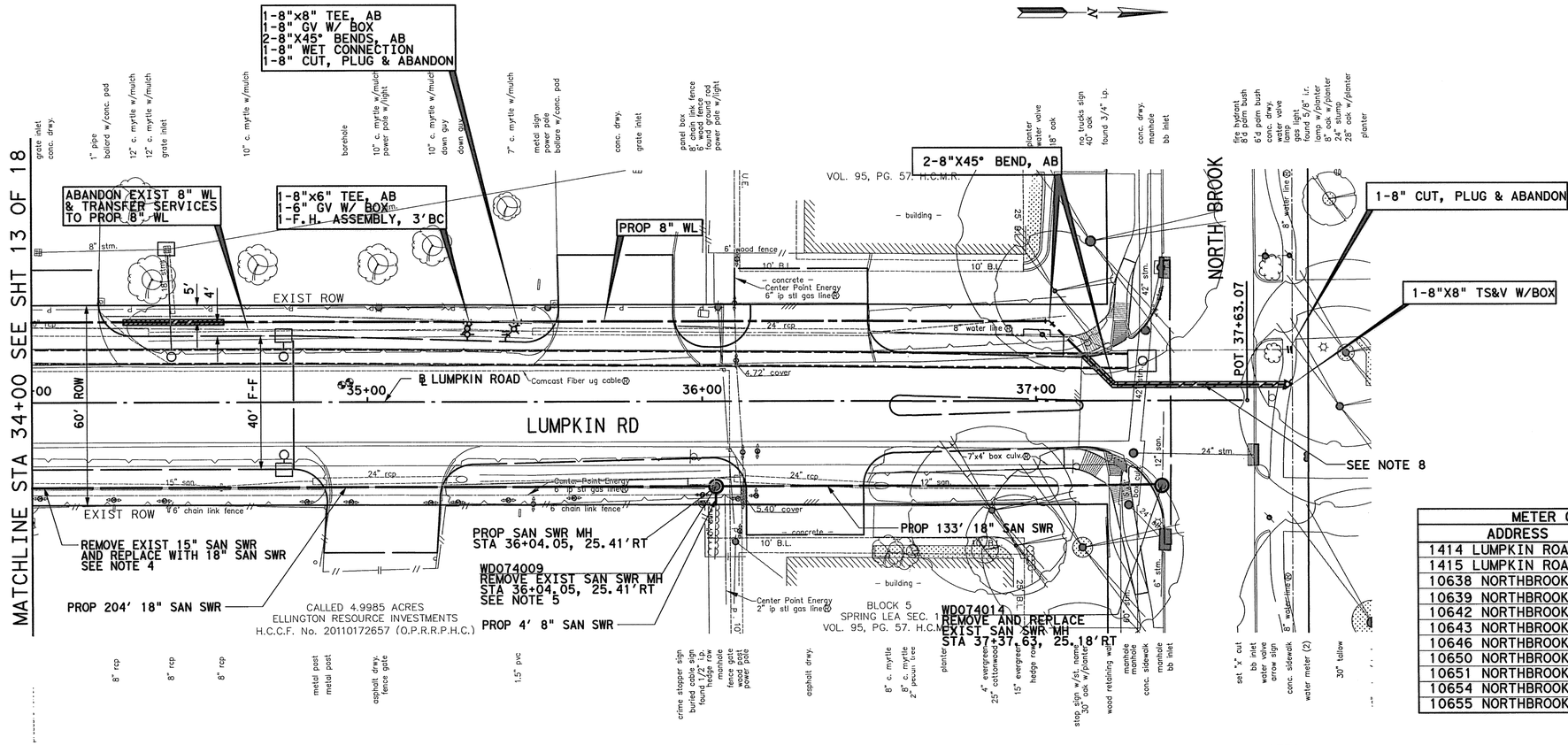
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #53

SET "X" LOCATED NORTH SIDE OF LUMPKIN ROAD AND NORTHBROOK DRIVE INTERSECTION.
D STA. 37+59.36, 0.22' RT.
ELEV.=85.72'

No.	DATE	REVISIONS	APP.



SEE PROFILE VIEW SHEET 16 OF 18

METER COUNTS	
ADDRESS	SIZE
1414 LUMPKIN ROAD	1
1415 LUMPKIN ROAD	4
10638 NORTHBROOK DRIVE	5/8
10639 NORTHBROOK DRIVE	5/8
10642 NORTHBROOK DRIVE	5/8
10643 NORTHBROOK DRIVE	5/8
10646 NORTHBROOK DRIVE	5/8
10650 NORTHBROOK DRIVE	5/8
10651 NORTHBROOK DRIVE	5/8
10654 NORTHBROOK DRIVE	5/8
10655 NORTHBROOK DRIVE	5/8

NOTES:
1. MAINTAIN WATER SERVICES TO ALL CUSTOMERS, FIRE HYDRANTS, AND INTERCONNECTIONS. PROVIDE TEMPORARY CONNECTION AS NECESSARY FOR CONSTRUCTION.
2. REMOVE AND REPLACE MH FRAME AND COVER AND ADJUST TO NEW GRADE, SEE DETAILS
3. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.
4. RECONNECT ALL EXIST SERVICES TO PROP SAN SWR.
5. RECONNECT ALL EXIST LATERALS TO PROP SAN SWR MH.
6. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
7. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
8. USE TRENCHLESS METHODS TO CROSS NORTHBROOK.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED
PROFESSIONAL ENGINEER
9/11/14
Christine H. Kirby
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 34+00 TO END PROJECT
SHEET 15 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 109 OF 226

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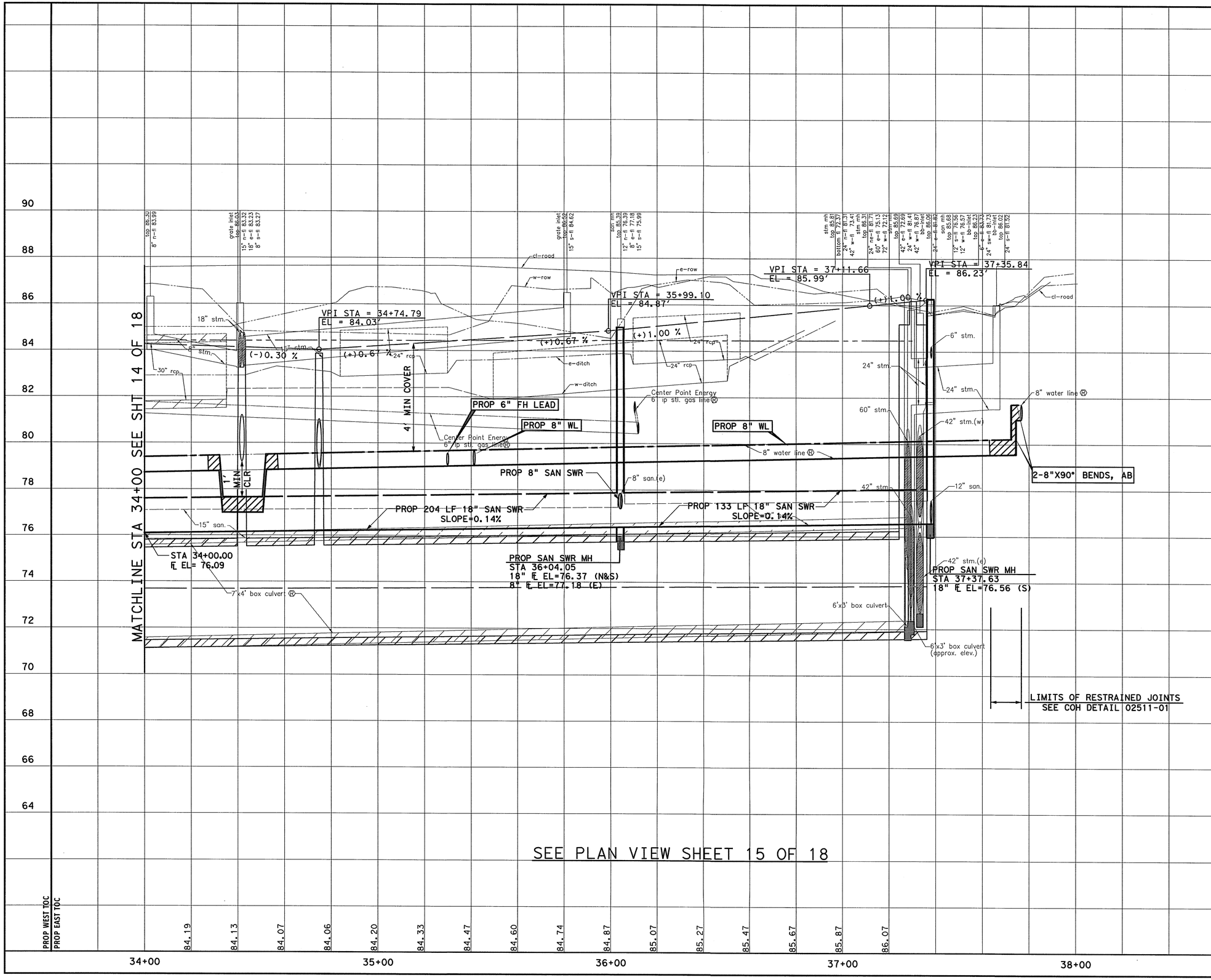

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
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LICENSED PROFESSIONAL ENGINEER
9/11/14
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Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 34+00 TO END PROJECT
SHEET 16 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 110 OF 226

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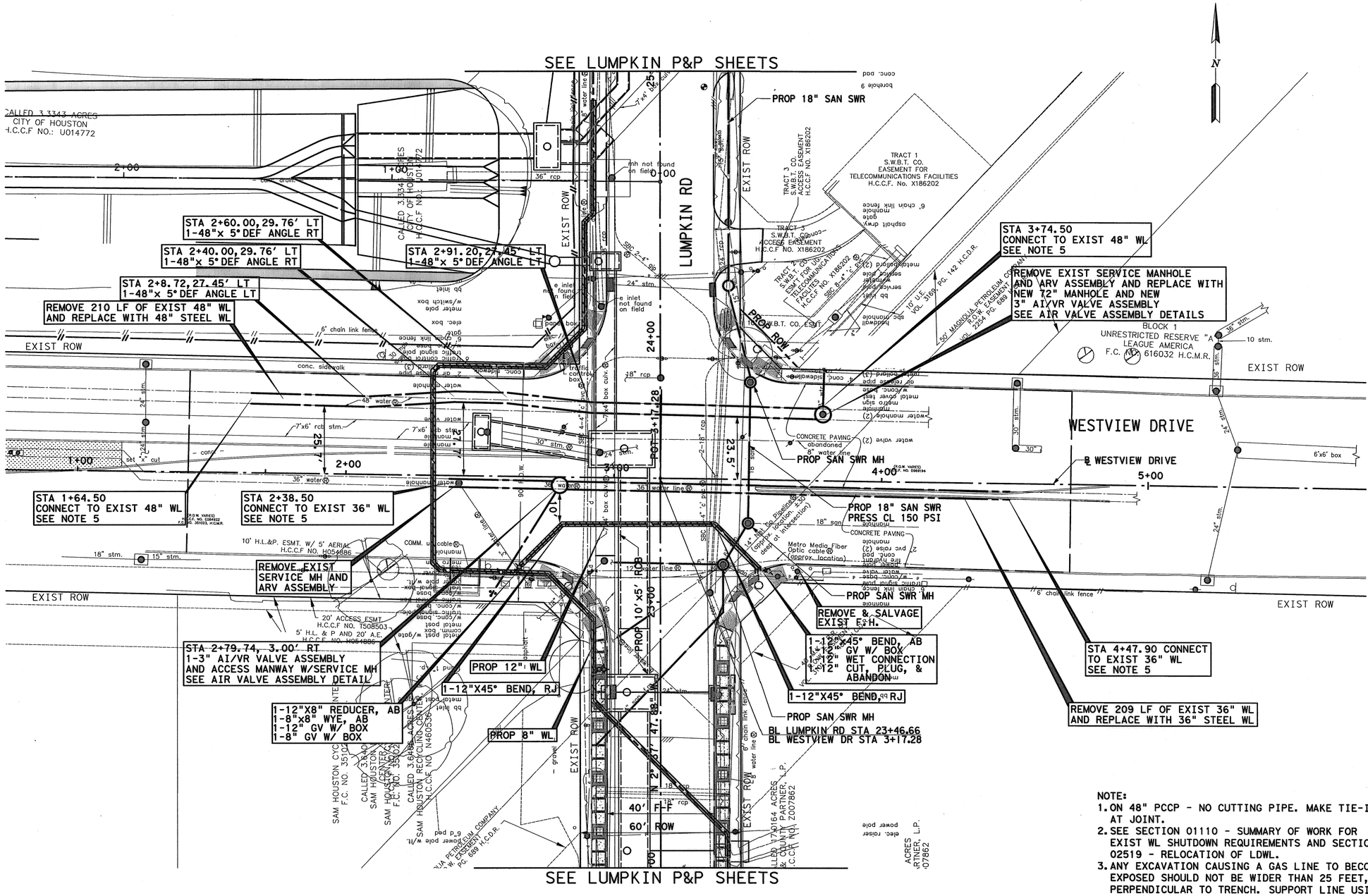
BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID09)

T.B.M. #48

SET "X" LOCATED CENTERLINE OF WESTVIEW DRIVE. APPROX. 175 FT WEST OF LUMPKIN DRIVE AND WESTVIEW DRIVE INTERSECTION. D STA. 37+59.36, 0.22' RT. ELEV.=85.53'

No.	DATE	REVISIONS	APP.



SEE PROFILE VIEW SHEET 18 OF 18

NOTE:
1. ON 48" PCCP - NO CUTTING PIPE. MAKE TIE-INS AT JOINT.
2. SEE SECTION 01110 - SUMMARY OF WORK FOR EXIST WL SHUTDOWN REQUIREMENTS AND SECTION 02519 - RELOCATION OF LDWL.
3. ANY EXCAVATION CAUSING A GAS LINE TO BECOME EXPOSED SHOULD NOT BE WIDER THAN 25 FEET, PERPENDICULAR TO TRENCH. SUPPORT LINE USING TIMBERS RESTING ON NATURAL GROUND ABOVE THE LINE WITH NYLON STRAPS. IF CONTRACTOR REQUIRES MORE THAN 25 FEET, INFORM ENGINEER.
4. CONTRACTOR SHALL BRACE AND SUPPORT ATT BURIED CABLE DURING CONSTRUCTION AND MAINTAIN 12-INCH MIN. VERTICAL CLEARANCE BETWEEN BURIED CABLES AND PROPOSED UTILITIES.
5. SEE LARGE DIAMETER STANDARD WATER CONNECTION DETAILS

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T/ UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

WESTVIEW DRIVE
N-T17000-0012-3
PLAN VIEW
WATER & SAN SWR IMPROVEMENTS
STA 22+00 TO STA 25+00
SHEET 17 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=2' HORZ: 1"=20'	
SHEET: 111 OF 226	

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LIMITS OF RESTRAINED JOINTS FOR 12" WL SEE DETAIL 02511-01

LIMITS OF RESTRAINED JOINTS FOR 8" WL SEE DETAIL 02511-01

VPI STA = 1+41.00
EL = 85.00'
MATCH EXIST

PROP N&S TOC

(+)0.41 %

(S) (-)1.00%

(N) (-)1.28%

(S) E/R STA = 2+98.15
EL = 85.21

(S) E/R STA = 3+38.15
EL = 85.21

(-)0.37 %

(S) (+)1.00 %

(N) (+)1.28 %

VPI STA = 4+71+00
EL = 85.03'
MATCH EXIST

PROP N&S TOC

STA 1+71.59
1-3" CAV AND
ACCESS MANWAY
W/SERVICE MH
EL = 85.51
SEE AIR VALVE ASSEMBLY
DETAILS

(N&S) E/R STA = 2+65.97

(N) E/R STA = 2+96.37
EL = 85.13

STA 4+41.89
1-3" CAV AND
ACCESS MANWAY
W/SERVICE MH
EL = 85.43'

(N&S) E/R STA = 3+56.39

SEE AIR VALVE ASSEMBLY DETAILS

PROP SAN SWR DROP MH
STA 3+49.92
18"ø=74.96 (N)
18"ø=74.59 (E)
6"ø=77.15 (S)

(N) E/R STA = 3+56.39
EL = 85.13'

PROP 8" WL

2-12"X45° BENDS, RJ

2-12"X45° BENDS, RJ

PROP 18" SAN SWR

1' MIN CLR

2' MIN CLR

2' MIN CLR

48"WATER LINE
STA 3+72.06
VPI EL=73.93

STA 3+74.50
PROP 48" STEEL WL
CONNECT TO EXIST 48" WL

36"WATER LINE
STA 3+69.40
VPI EL=72.07

36"WATER LINE
STA 3+66.17
VPI EL=68.84

48"WATER LINE
STA 3+65.97
VPI EL=67.84

STA 4+45.90
PROP 36" STEEL WL
CONNECT TO EXIST 36" WL

PROP 36" STEEL WL

PROP 48" STEEL WL

STA 2+64.50
PROP 48" STEEL WL
CONNECT TO EXIST 48" WL

STA 2+38.50
PROP 36" STEEL WL
CONNECT TO EXIST 36" WL

PROP 36" STEEL WL

48" WL
STA 2+96.83
VPI EL=73.67

PROP 7'x4' RCB

PROP 10'x5' RCB

36"WATER LINE
STA 3+31.71
EL=73.07

48"WATER LINE
STA 3+28.80
VPI EL=73.67

36"WATER LINE
STA 3+35.94
VPI EL=68.84

48"WATER LINE
STA 3+34.63
VPI EL=67.84

Metro Media Fiber Optic Cable Ⓜ

Net Co 14" pipeline Ⓜ (approx. location & elev.)

LIMITS OF RESTRAINED JOINTS FOR 36" WL SEE DETAIL 02511-01

LIMITS OF RESTRAINED JOINTS FOR 48" WL SEE DETAIL 02511-01

2+00 3+00 4+00

84.70 84.84 84.98 85.12 85.26 85.22 85.06 85.33 85.41 85.33 85.26 85.18

1+00 2+00 3+00 4+00 5+00

88 86 84 82 80 78 76 74 72 70 68 66 64 62 60 58

SEE PLAN VIEW SHEET 17 OF 18

NOTE:
1. SEE PAVEMENT & STORM SEWER SHEETS XX TO XX FOR MORE INFORMATION.

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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NOTICE:
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PRIVATE UTILITY LINES SHOWN

9.25.14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS DATE
FACILITIES VERIFICTION ONLY
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10/7/14
CENTERPOINT ENERGY/UNDERGROUND DATE
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

WESTVIEW DRIVE
N-T17000-0012-3
PROFILE VIEW
WATER & SAN SWR IMPROVEMENTS
STA 1+00 TO STA 5+00
SHEET 18 OF 18

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE:

VERT: 1"=2'
HORZ: 1"=20'

CITY DWG NO.

SHEET: 112 OF 226

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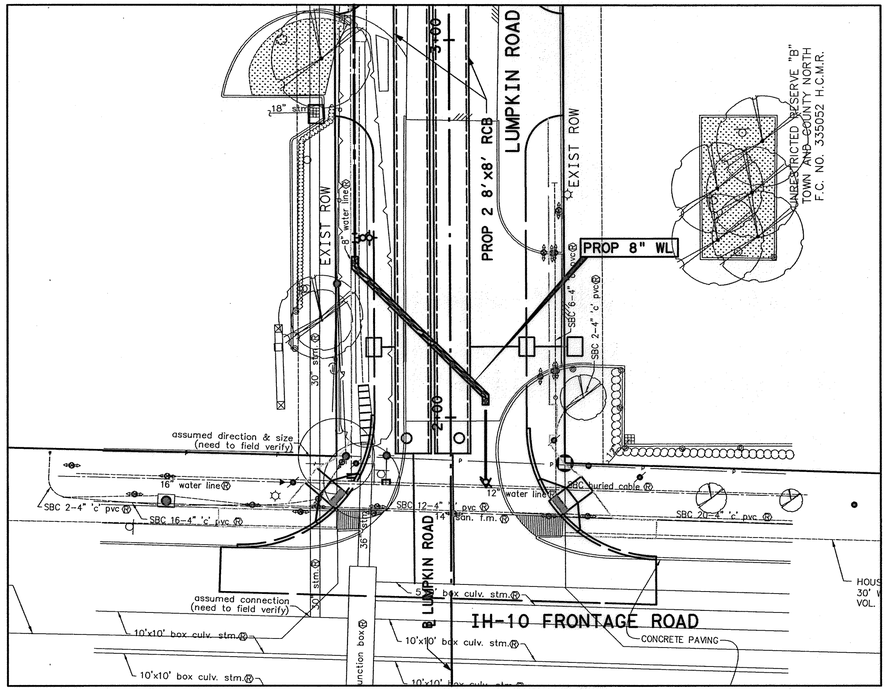

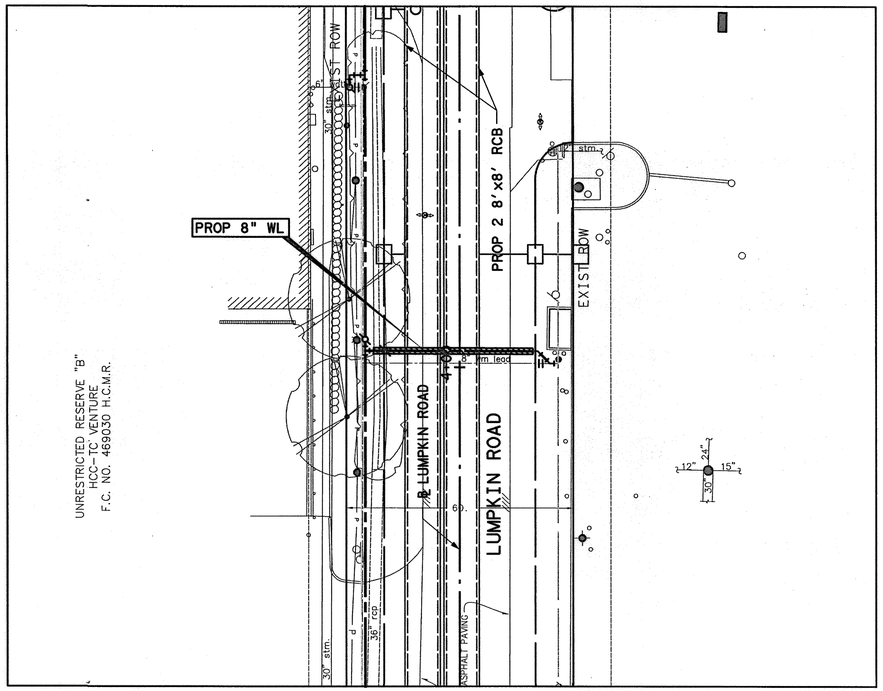

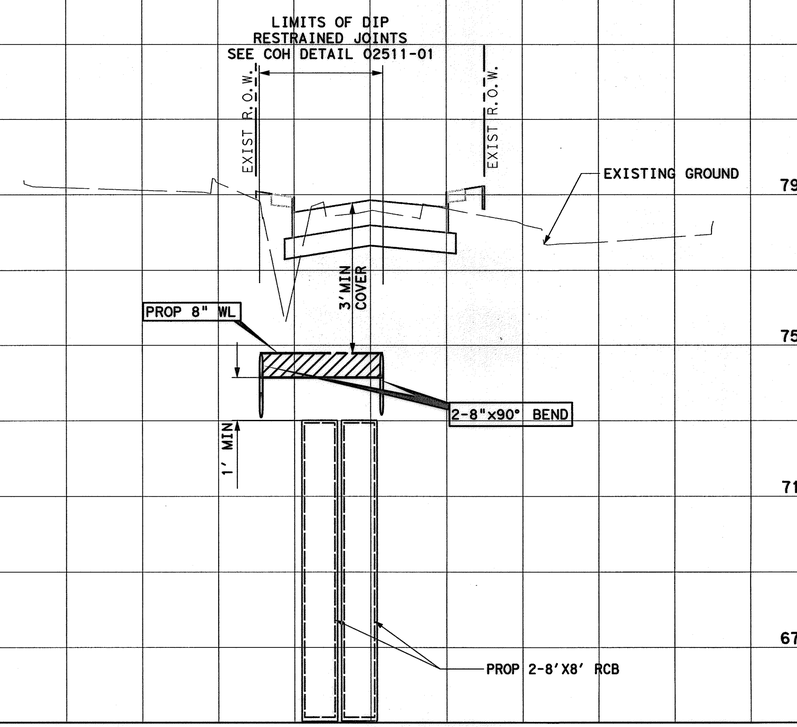

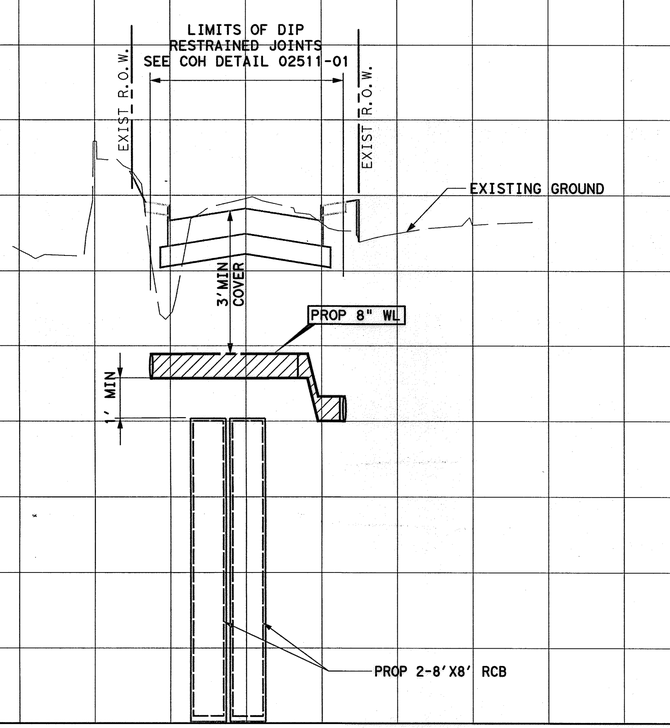

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.

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

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/2/14
CENTERPOINT ENERGY/NATURAL GAS DATE
FACILITIES VERIFICTION ONLY
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10/2/14
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STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
WATER & SANITARY SEWER CROSSING
SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=4'
HORZ: 1"=40'
SHEET: 113 OF 226

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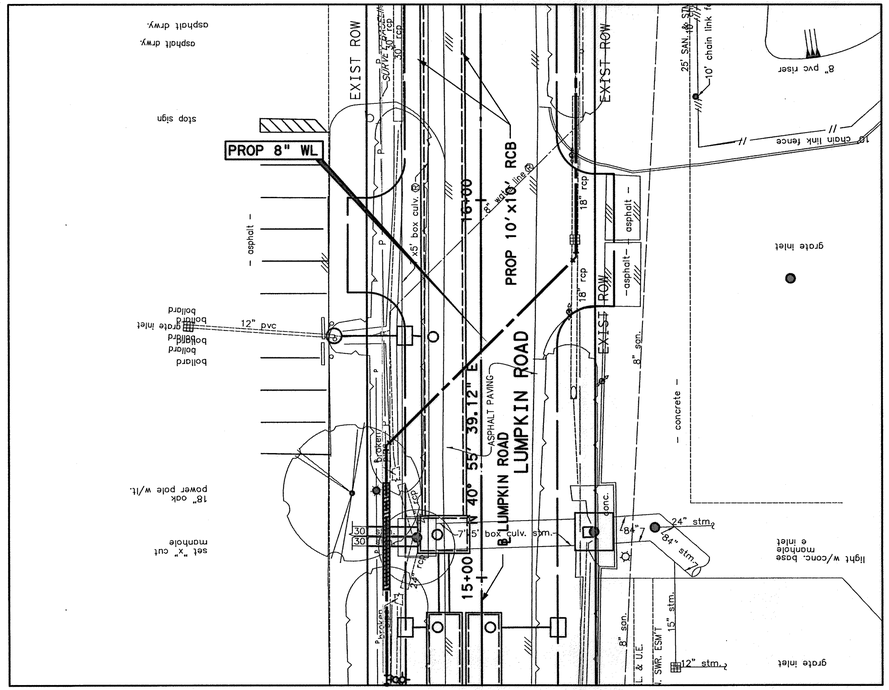

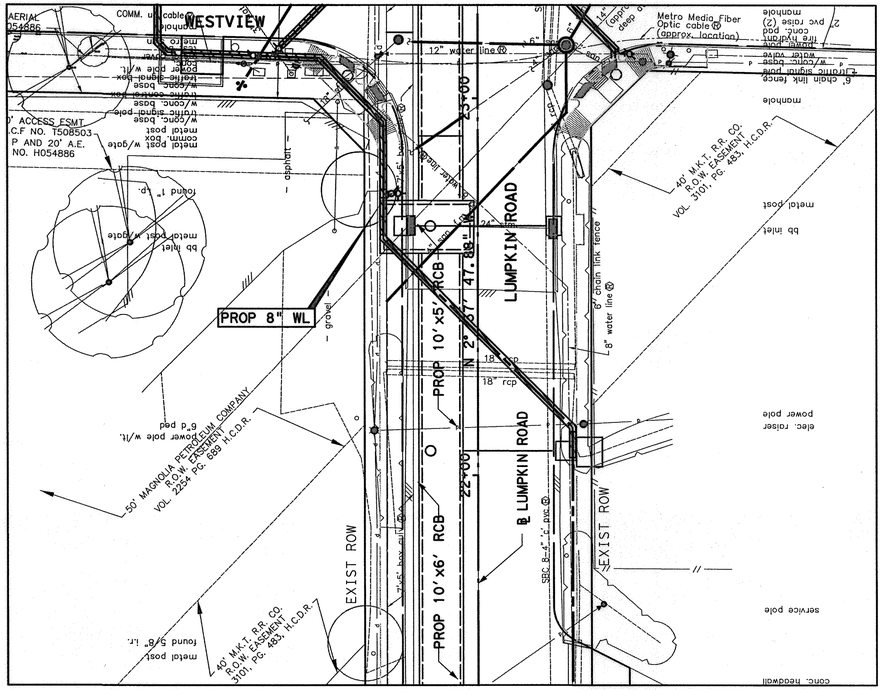

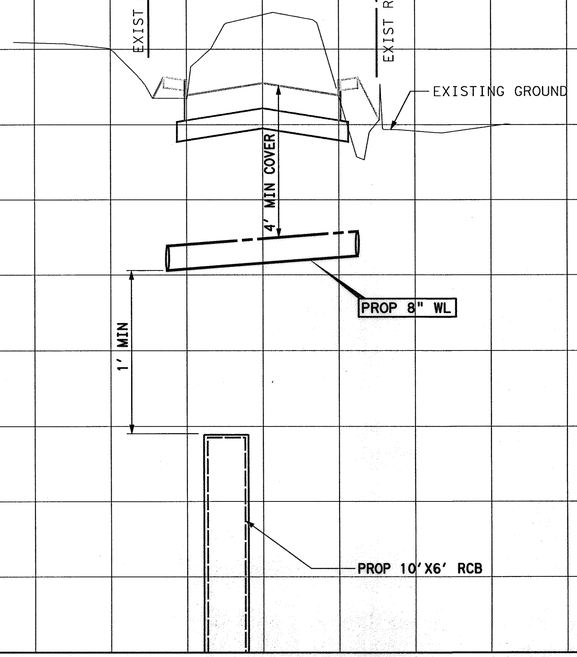

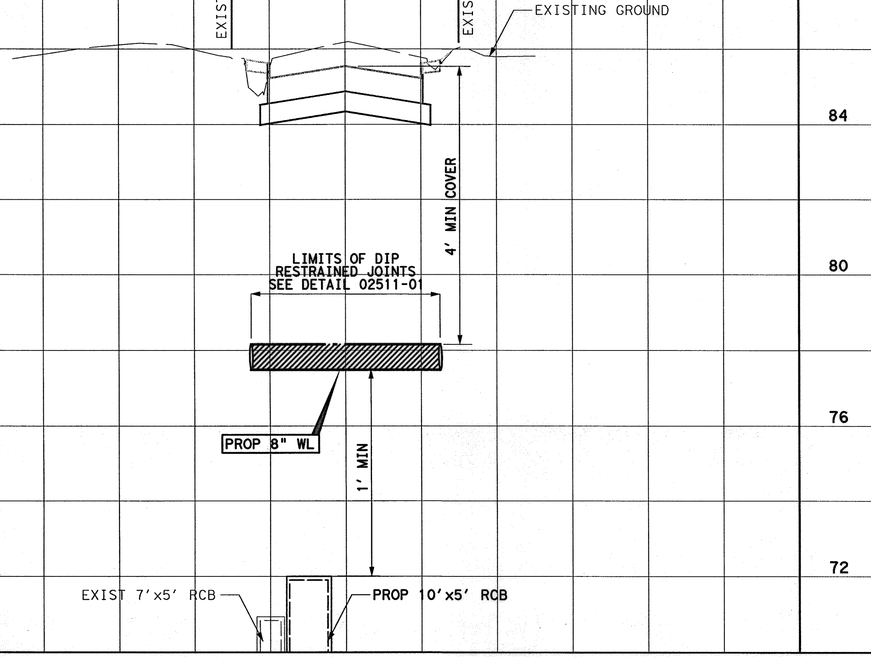

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z
ELEV. =82.18 FEET (NAVD 88\GEOID09)

N

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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

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PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
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STATE OF TEXAS
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9/11/14
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Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
WATER & SANITARY SEWER CROSSING
SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 114 OF 226

No.	DATE	REVISIONS	APP.

MJGuthrie
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9/3/2014
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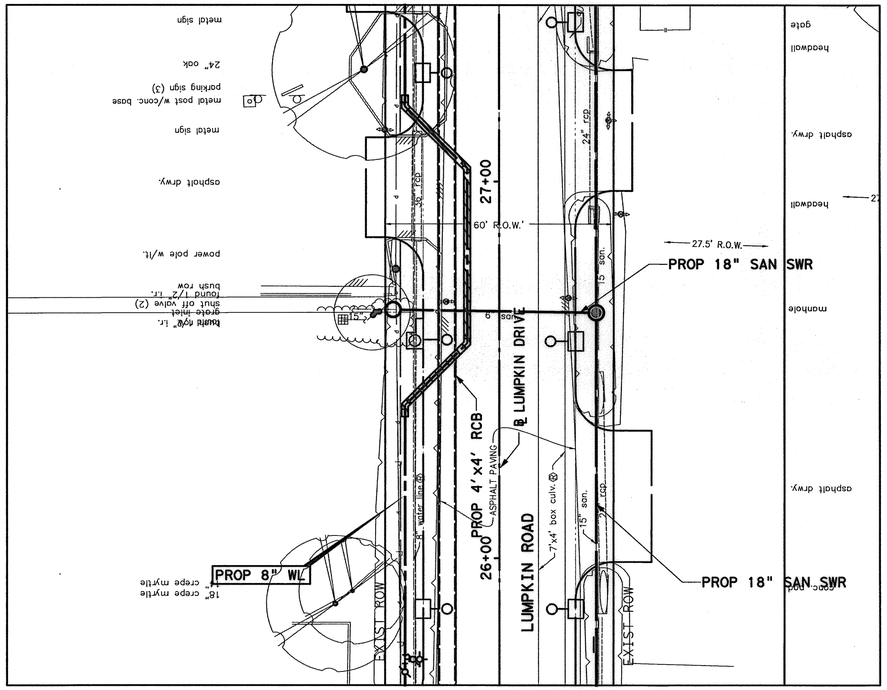
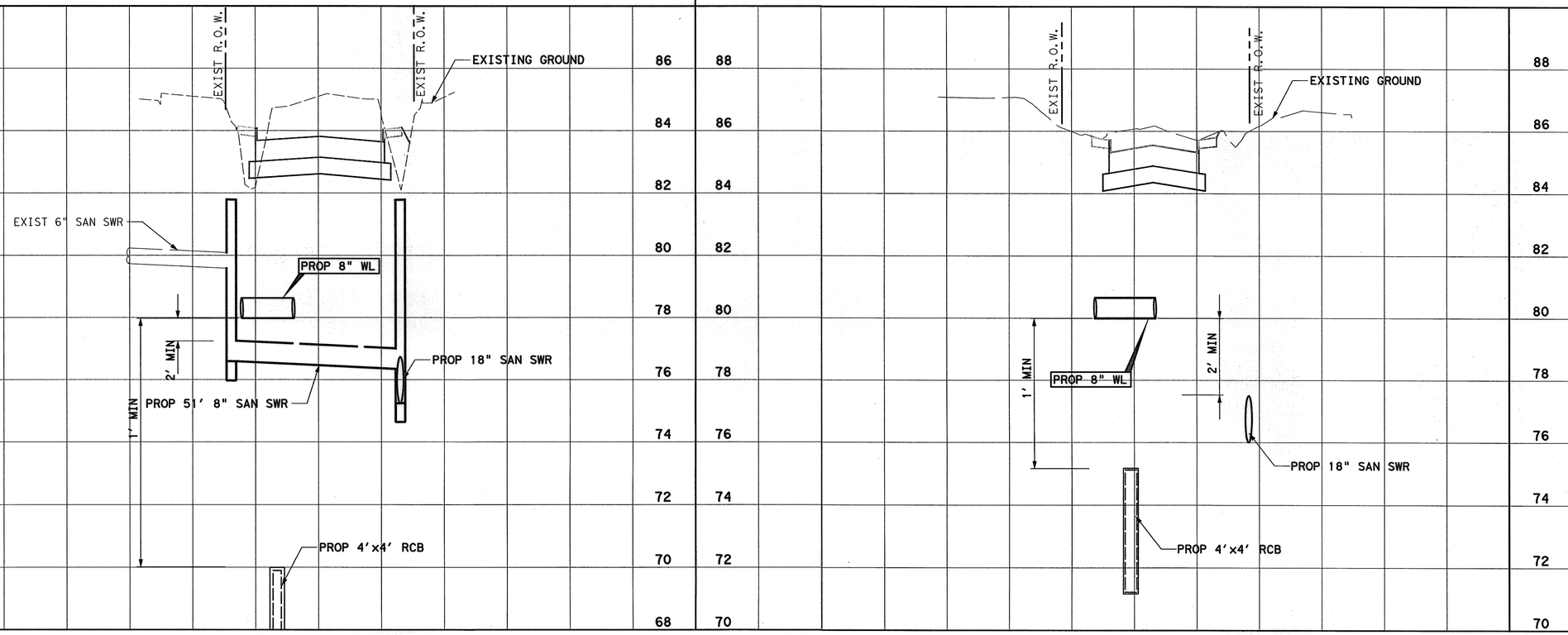




BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID09)

No.	DATE	REVISIONS	APP.

N

0 40 80 160

(IN FEET)
1 INCH = 20 FEET

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/9/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
WATER & SANITARY SEWER CROSSING
SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY:
DRAWING SCALE:
VERT: 1"=2'
HORZ: 1"=20'
CITY DWG NO.:
SHEET: 115 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Civil\1044-001-WTR-SAN CROSSING-03.dgn 9/3/2014 4:15:15 PM MJGuthrie

GENERAL NOTES

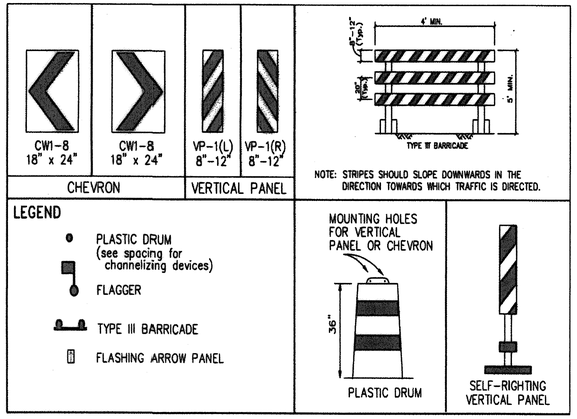
1. The Contractor shall provide and install traffic control devices in conformance with Part VI of Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. All signs and traffic control devices shall conform to the latest version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

SPACING FOR CHANNELIZING DEVICES

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

I. Spacing shown on traffic control shall supersede the above spacing.
J. Spacing may be adjusted to provide driveways, intersections and /or median openings.

CHANNELIZATION AND BARRICADES



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

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

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TCP NOTES
CHANNELIZING DEVICES
AND BARRICADES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

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

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
GENERAL NOTES

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: NOT TO SCALE
CITY DWG NO.
SHEET: 116 OF 226

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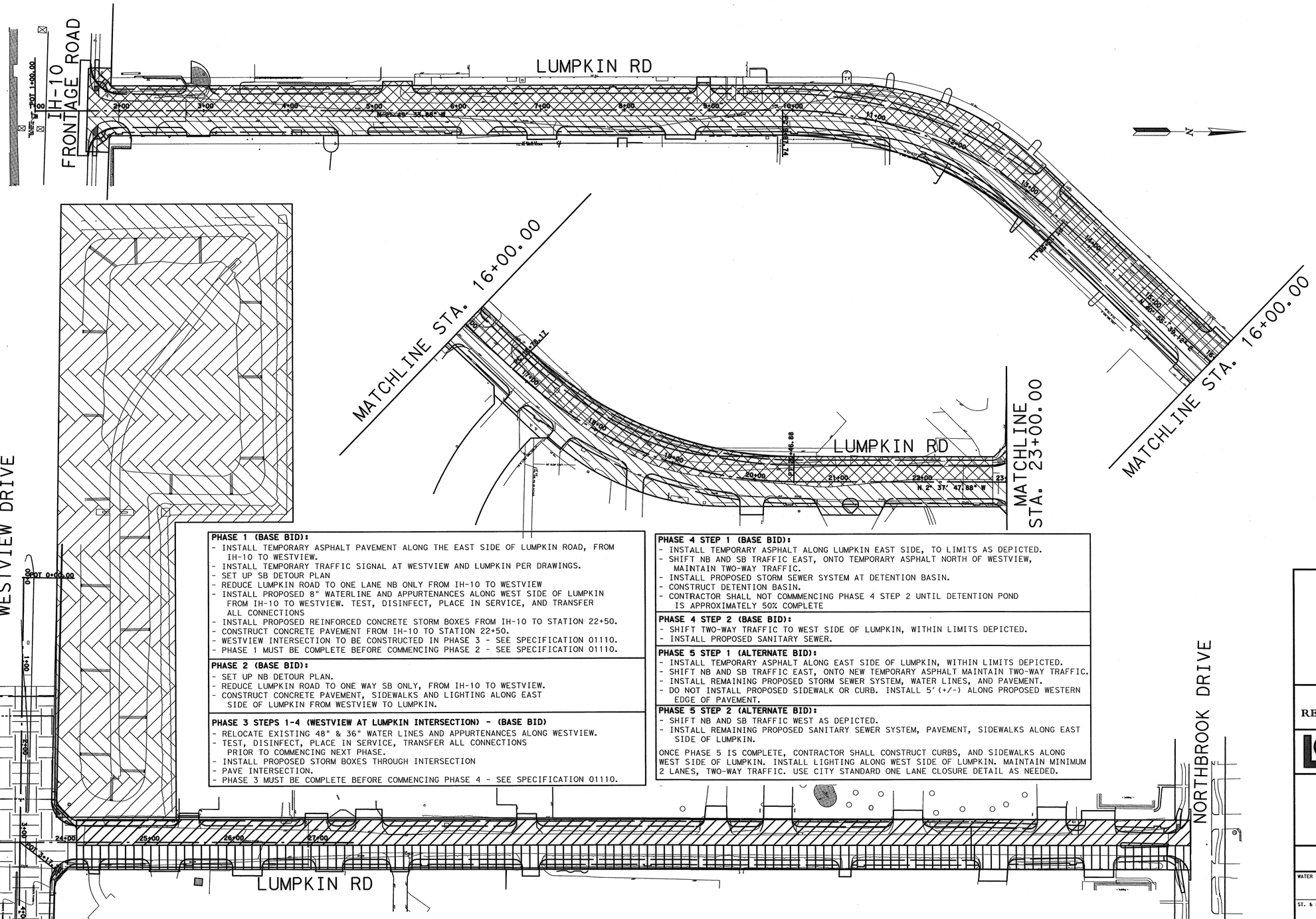

PHASE 1 (BASE BID):
- INSTALL TEMPORARY ASPHALT PAVEMENT ALONG THE EAST SIDE OF LUMPKIN ROAD, FROM IH-10 TO WESTVIEW.
- INSTALL TEMPORARY TRAFFIC SIGNAL AT WESTVIEW AND LUMPKIN PER DRAWINGS.
- SET UP SB DETOUR PLAN
- REDUCE LUMPKIN ROAD TO ONE LANE NB ONLY FROM IH-10 TO WESTVIEW
- INSTALL PROPOSED 8" WATERLINE AND APPURTENANCES ALONG WEST SIDE OF LUMPKIN FROM IH-10 TO WESTVIEW. TEST, DISINFECT, PLACE IN SERVICE, AND TRANSFER ALL CONNECTIONS
- INSTALL PROPOSED REINFORCED CONCRETE STORM BOXES FROM IH-10 TO STATION 22+50.
- CONSTRUCT CONCRETE PAVEMENT FROM IH-10 TO STATION 22+50.
- WESTVIEW INTERSECTION TO BE CONSTRUCTED IN PHASE 3 - SEE SPECIFICATION 01110.
- PHASE 1 MUST BE COMPLETE BEFORE COMMENCING PHASE 2 - SEE SPECIFICATION 01110.

PHASE 2 (BASE BID):
- SET UP NB DETOUR PLAN.
- REDUCE LUMPKIN ROAD TO ONE WAY SB ONLY, FROM IH-10 TO WESTVIEW.
- CONSTRUCT CONCRETE PAVEMENT, SIDEWALKS AND LIGHTING ALONG EAST SIDE OF LUMPKIN FROM WESTVIEW TO LUMPKIN.

PHASE 3 STEPS 1-4 (WESTVIEW AT LUMPKIN INTERSECTION) - (BASE BID)
- RELOCATE EXISTING 48" & 36" WATER LINES AND APPURTENANCES ALONG WESTVIEW.
- TEST, DISINFECT, PLACE IN SERVICE, TRANSFER ALL CONNECTIONS PRIOR TO COMMENCING NEXT PHASE.
- INSTALL PROPOSED STORM BOXES THROUGH INTERSECTION
- PAVE INTERSECTION.
- PHASE 3 MUST BE COMPLETE BEFORE COMMENCING PHASE 4 - SEE SPECIFICATION 01110.

PHASE 4 STEP 1 (BASE BID):
- INSTALL TEMPORARY ASPHALT ALONG LUMPKIN EAST SIDE, TO LIMITS AS DEPICTED.
- SHIFT NB AND SB TRAFFIC EAST, ONTO TEMPORARY ASPHALT NORTH OF WESTVIEW, MAINTAIN TWO-WAY TRAFFIC.
- INSTALL PROPOSED STORM SEWER SYSTEM AT DETENTION BASIN.
- CONSTRUCT DETENTION BASIN.
- CONTRACTOR SHALL NOT COMMMENCING PHASE 4 STEP 2 UNTIL DETENTION POND IS APPROXIMATELY 50% COMPLETE

PHASE 4 STEP 2 (BASE BID):
- SHIFT TWO-WAY TRAFFIC TO WEST SIDE OF LUMPKIN, WITHIN LIMITS DEPICTED.
- INSTALL PROPOSED SANITARY SEWER.

PHASE 5 STEP 1 (ALTERNATE BID):
- INSTALL TEMPORARY ASPHALT ALONG EAST SIDE OF LUMPKIN, WITHIN LIMITS DEPICTED.
- SHIFT NB AND SB TRAFFIC EAST, ONTO NEW TEMPORARY ASPHALT MAINTAIN TWO-WAY TRAFFIC.
- INSTALL REMAINING PROPOSED STORM SEWER SYSTEM, WATER LINES, AND PAVEMENT.
- DO NOT INSTALL PROPOSED SIDEWALK OR CURB. INSTALL 5' (+/-) ALONG PROPOSED WESTERN EDGE OF PAVEMENT.

PHASE 5 STEP 2 (ALTERNATE BID):
- SHIFT NB AND SB TRAFFIC WEST AS DEPICTED.
- INSTALL REMAINING PROPOSED SANITARY SEWER SYSTEM, PAVEMENT, SIDEWALKS ALONG EAST SIDE OF LUMPKIN.

ONCE PHASE 5 IS COMPLETE, CONTRACTOR SHALL CONSTRUCT CURBS, AND SIDEWALKS ALONG WEST SIDE OF LUMPKIN. INSTALL LIGHTING ALONG WEST SIDE OF LUMPKIN. MAINTAIN MINIMUM 2 LANES, TWO-WAY TRAFFIC. USE CITY STANDARD ONE LANE CLOSURE DETAIL AS NEEDED.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
OVERALL LAYOUT

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1"=60'
CITY DWG NO.
HORZ:
SHEET: 117 OF 226

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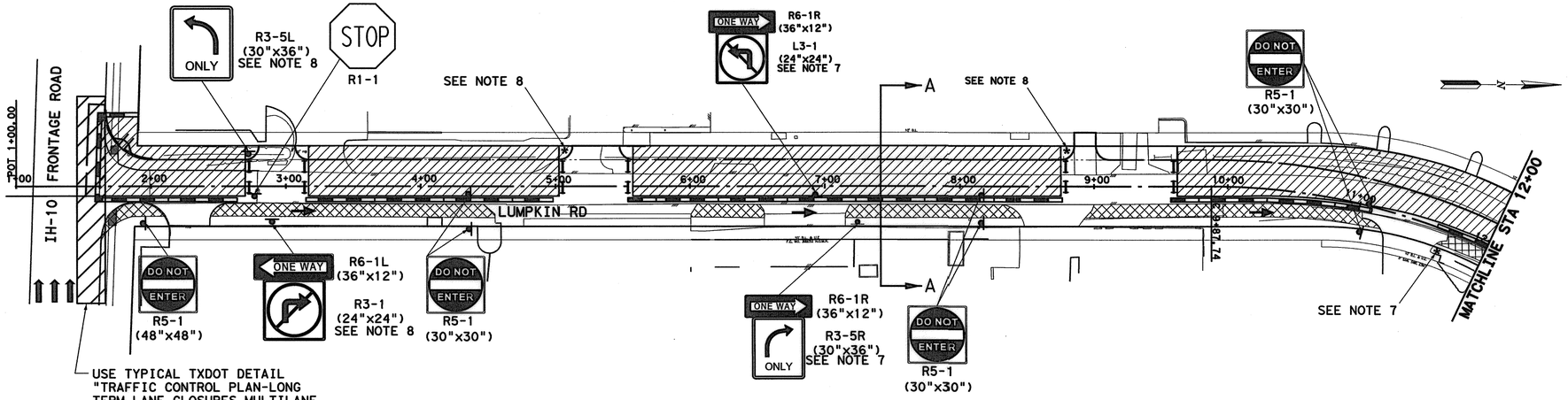
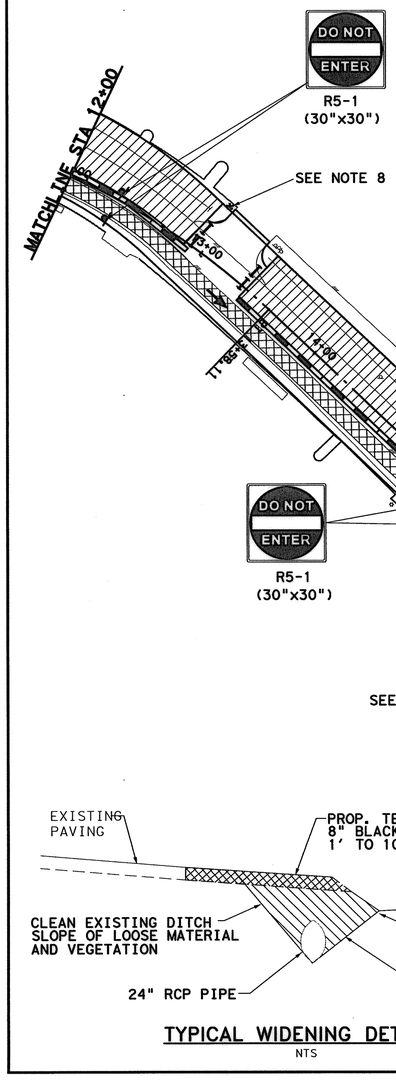
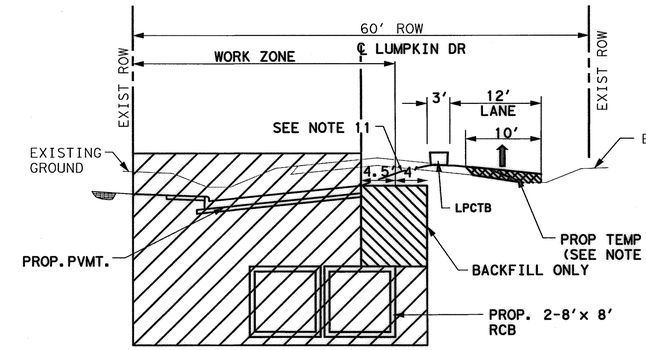
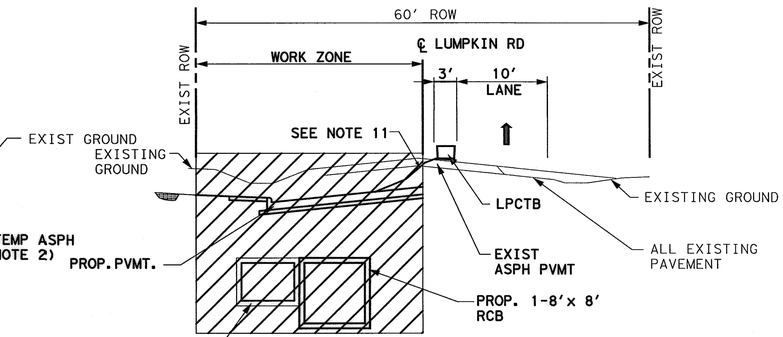
9/15/2014
201-TCP02 Cont-Phasing (Updated)



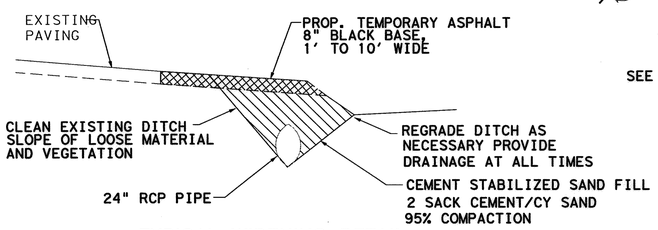




TYPICAL TRAFFIC CONTROL SECTION
SECTION A-A
LUMPKIN ROAD
(STA. 1+60 TO STA. 16+00)

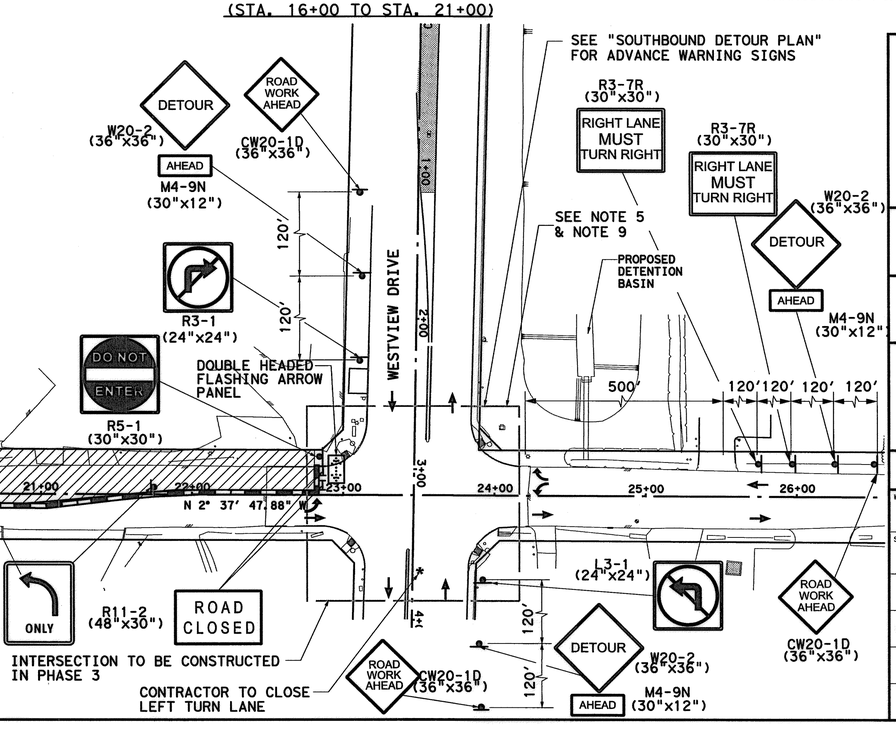


TYPICAL TRAFFIC CONTROL SECTION
SECTION B-B
LUMPKIN ROAD
(STA. 16+00 TO STA. 21+00)



TYPICAL WIDENING DETAIL
NTS

LUMPKIN SPEED LIMIT = 30 MPH



LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- FLASHING DOUBLE ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. INSTALL TEMP. ASPHALT AS SHOWN PRIOR TO COMMENCING THIS PHASE.
2. INSTALL TEMPORARY 24-INCH RCP UNDER PROPOSED TEMPORARY ASPHALT AS NEEDED TO MAINTAIN DRAINAGE.
3. SET UP DETOUR FOR SB LUMPKIN.
4. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
5. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
6. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
7. SIGNS (R6-IR) WITH (L3-1) AND (R6-IL) WITH (R3-5L) TO BE PLACED AT ALL DRIVEWAYS ALONG THE EAST SIDE OF LUMPKIN ROAD.
8. SIGN (R3-5L) & (R-11) WITH (R3-1) & (R6-1L) SHALL PLACED AT ALL DRIVEWAYS ALONG THE WEST SIDE OF LUMPKIN ROAD.
9. CONTRACTOR TO RE-ALIGN TEMPORARY TRAFFIC SIGNAL HEADS AS NEEDED.
10. DUE TO VARYING ELEVATION DIFFERENCES AT DRIVEWAYS, CONTRACTOR TO COORDINATE COMPLETE CLOSURE/DETOUR OF DRIVEWAYS PRIOR TO CONSTRUCTION.
11. CONTRACTOR TO PROVIDE TEMPORARY PAVEMENT TRANSITIONS FOR DRIVEWAY ACCESS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 1

TCP-1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
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CITY DWG NO.
HORZ: 1"=50'
SHEET: 118 OF 226

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MJGuthrie

END ROAD WORK G20-2 (36"X18")

LUMPKIN ROAD

LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9R (30"x24")

HCC CAMPUS M4-9N (30"x12")
DETOUR M9-9R (30"x24")

LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9S (30"x24")

HCC CAMPUS M4-9N (30"x12")
DETOUR M9-9S (30"x24")

SOUTHBOUND M4-9N (30"x12")
LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9S (30"x24")

SOUTHBOUND M4-9N (30"x12")
LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9L (30"x24")

LUMPKIN ROAD

NORTHBROOK DR

SPILLERS LN

BRINWOOD DR

SHADOW OAKS DR

IH-10 FRONTAGE RD

WESTVIEW DR

SOUTHBOUND M4-9N (30"x12")
LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9L (30"x24")

SHADOWLAKE DR

LUMPKIN RD M4-9N (30"x12")
HCC CAMPUS M4-9N (30"x12")
DETOUR M9-9S (30"x24")

WISTERWOOD DR

LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9S (30"x24")

LUMPKIN RD M4-9N (30"x12")
HCC CAMPUS M4-9N (30"x12")
DETOUR M9-9R (30"x24")

GEORGIBELLE DR

LARSTON ST

SHADELAND DR

WESTVIEW DR

SHADOW OAKS DR

LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9S (30"x24")

M4-9N (30"x12")
M4-9N (30"x12")
M9-9R (30"x24")

LUMPKIN RD
HCC CAMPUS
DETOUR

BROOKTREE DR

CONRAD SAUER DR

CONRAD SAUER DR

CONRAD SAUER DR

ROAD WORK AHEAD CW20-1D (36"x36")

DETOUR AHEAD CW20-2(D) (36"x36")

120'

SOUTHBOUND M4-9N (30"x12")
LUMPKIN RD M4-9N (30"x12")
DETOUR M9-9L (30"x24")

N

LEGEND

TEMP GROUND MOUNTED SIGNS

DIRECTION OF TRAFFIC

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

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Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

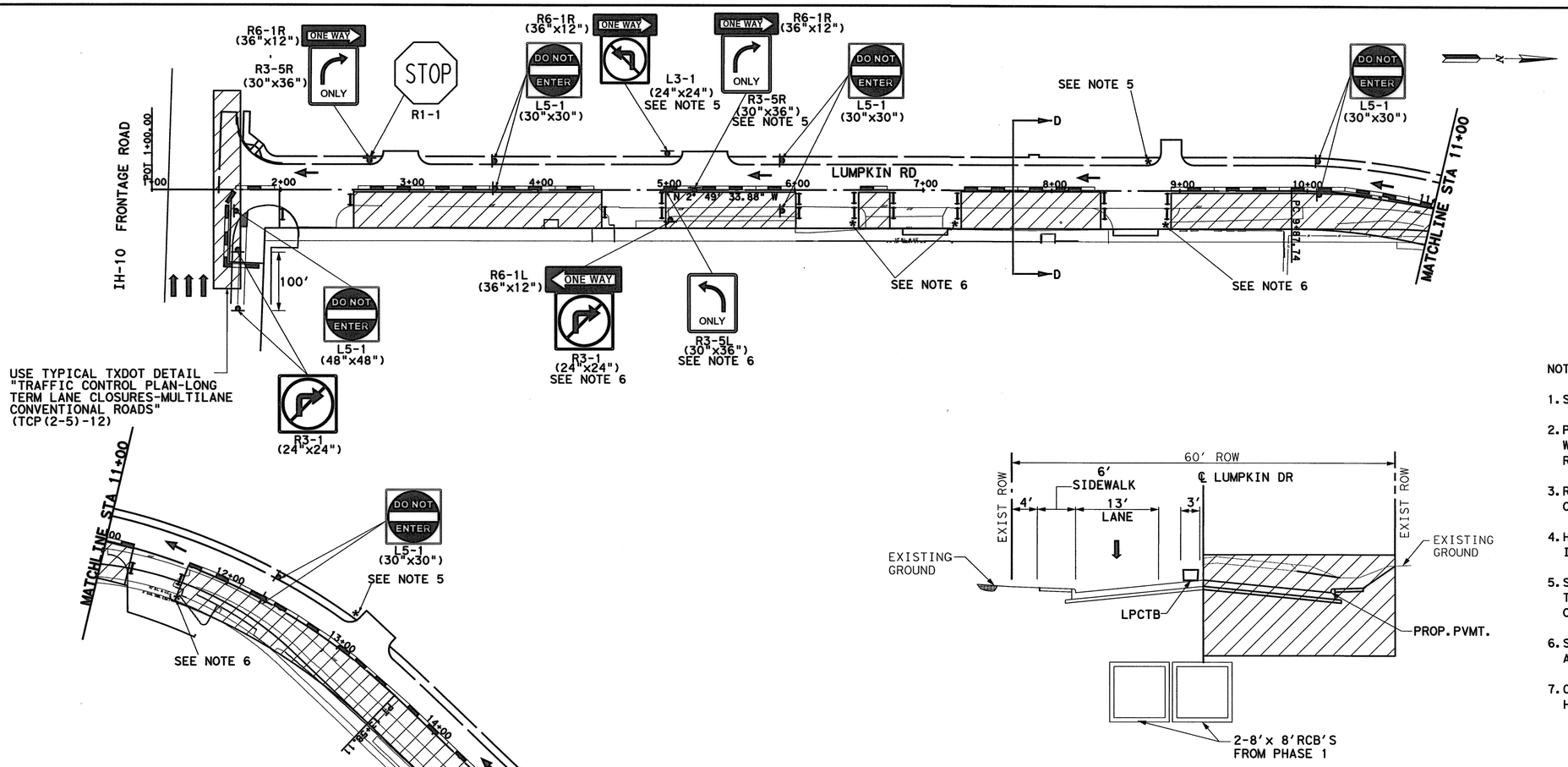
SOUTHBOUND DETOUR PLAN
PHASE 1 AND
PHASE 3 STEP 3 TCP-D1

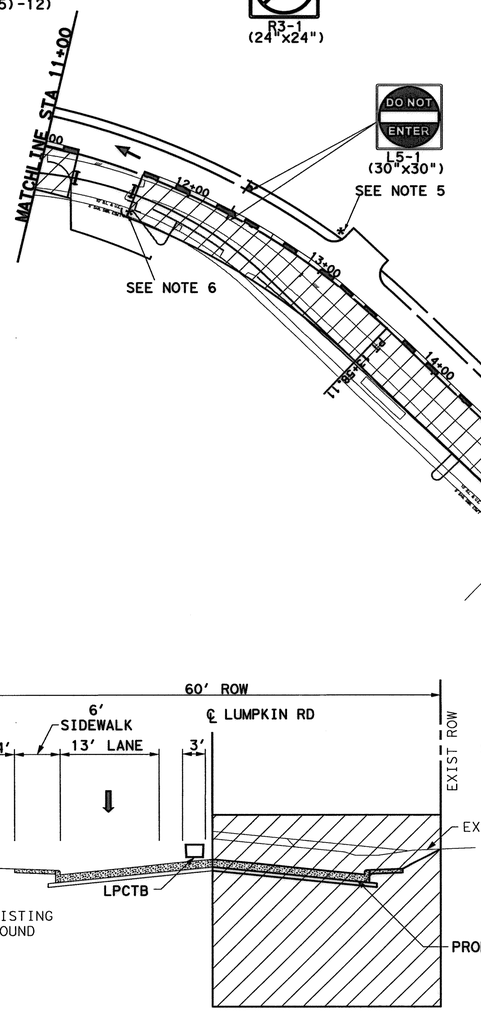
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

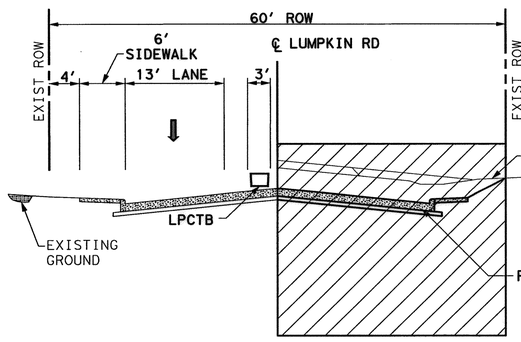
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: N.T.S.	CITY DWG NO.
SHEET: 119 OF 226	

pw\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\TCP\108-001-TCP-01* DETOUR PH1 .dgn 9/4/2014 11:26:13 AM MJGuthrie







TYPICAL TRAFFIC CONTROL SECTION
SECTOION E-E
LUMPKIN ROAD

TYPICAL TRAFFIC CONTROL SECTION
SECTION D-D
LUMPKIN ROAD

LUMPKIN SPEED LIMIT = 30 MPH

LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. SET UP DETOUR FOR SB LUMPKIN.
2. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
3. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
4. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
5. SIGNS (R6-IR) WITH (L3-1) AND (R6-IL) WITH (R3-5L) TO BE PLACED AT ALL DRIVEWAYS ALONG THE EAST SIDE OF LUMPKIN ROAD.
6. SIGN (R3-5L) & (R-11) WITH (R3-1) SHALL PLACED AT ALL DRIVEWAYS ALONG THE WEST SIDE OF LUMPKIN ROAD.
7. CONTRACTOR TO RE-ALIGN TEMPORARY TRAFFIC SIGNAL HEADS AS NEEDED.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 2

TCP-2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
HORIZ: 1"=50'
SHEET: 120 OF 226

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SAM HOUSTON BELTWAY 8

FRONTAGE RD

LUMPKIN ROAD

LUMPKIN ROAD

IH-10 FRONTAGE RD

WESTVIEW DR

WESTVIEW DR

NORTHBROOK DR

SPILLERS LN

BRINWOOD DR

SHADOW OAKS DR

SHADOW OAKS DR

SHADOWLAKE DR

WISTERWOOD DR

SHADELAND DR

M4-9N (30"x12")
LUMPKIN RD
HCC CAMPUS
DETOUR
M9-9R (30"x24")

M4-9N (30"x12")
LUMPKIN RD
HCC CAMPUS
DETOUR
M9-9S (30"x24")

M4-9N (30"x12")
LUMPKIN RD
HCC CAMPUS
DETOUR
M9-9R (30"x24")

M4-9N (30"x12")
LUMPKIN RD
HCC CAMPUS
DETOUR
M9-9S (30"x24")

M4-9N (30"x12")
LUMPKIN RD
HCC CAMPUS
DETOUR
M9-9R (30"x24")

M4-9N (30"x12")
NORTHBOUND
LUMPKIN RD
DETOUR
M9-9S (30"x24")

R3-1 (24"x24")

M4-9N (30"x12")
HCC CAMPUS
DETOUR
M9-9S (30"x24")

R3-1 (24"x24")

DETOUR AHEAD
CW20-2(D) (36"x36")

N

LEGEND

TEMP GROUND MOUNTED SIGNS

DIRECTION OF TRAFFIC

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

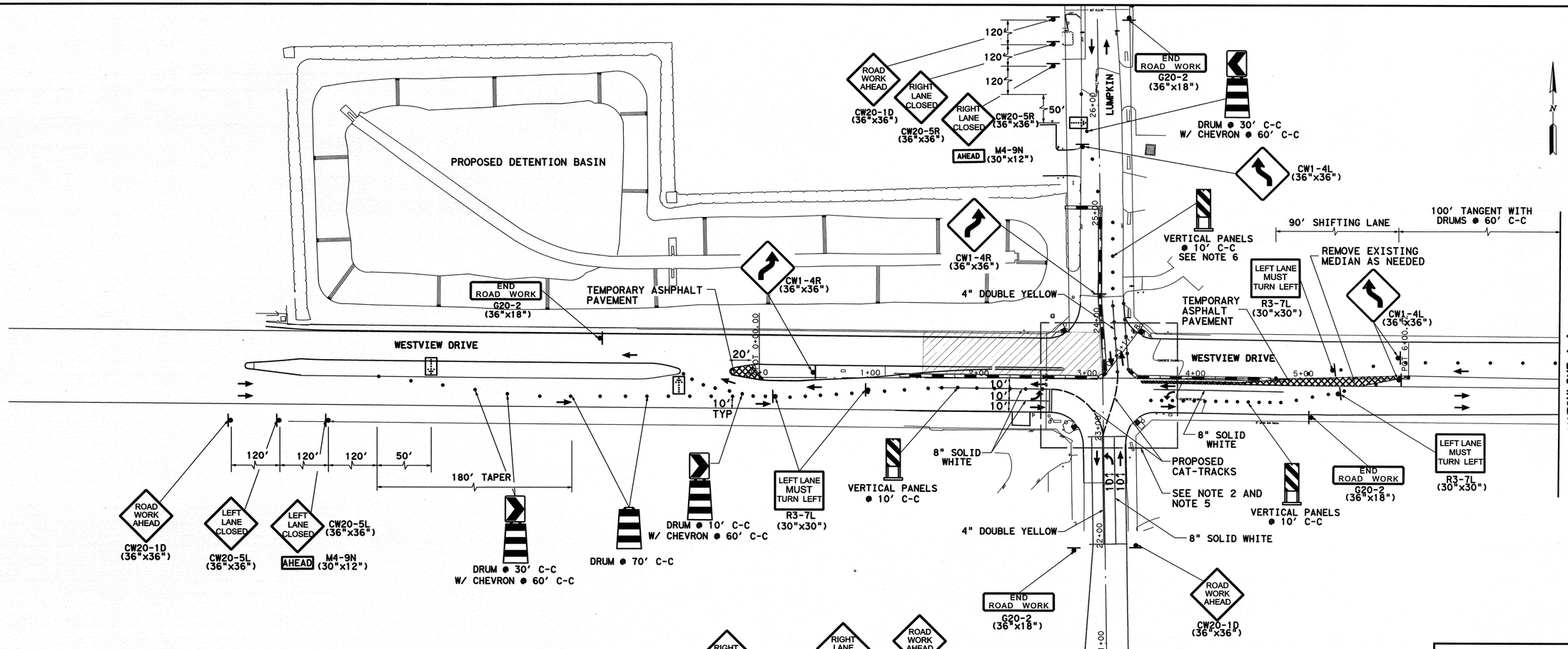
NORTHBOUND DETOUR PLAN
PHASE 2 AND
PHASE 3 STEP 4 TCP-D2

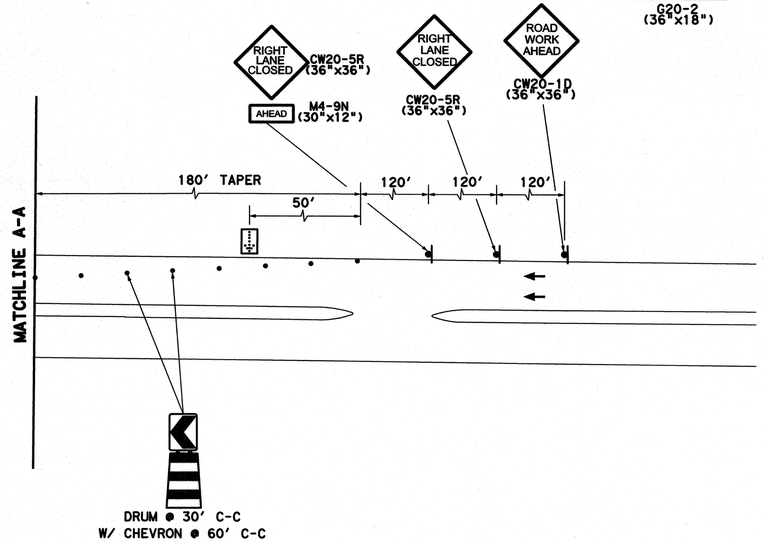
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: N. T. S.	CITY DWG NO.
SHEET: 121 OF 226	

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-1038A-001\4-0-Production\4-01-Drawings\TCP\110-001-TCP-D2-DETOUR PH2.dgn 9/4/2014 11:26:40 AM MJGuthrie





LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
2. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
3. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
4. CONTRACTOR TO RESTORE MEDIANS ONCE PHASE THREE IS COMPLETE.
5. CONTRACTOR TO REALIGN TEMPORARY TRAFFIC SIGNALS AS NEEDED.
6. CONTRACTOR MAY USE TEMPORARY RAISED YELLOW PAVEMENT MARKERS INSTEAD OF VERTICAL PANELS PER PROJECT MANAGERS APPROVAL.
7. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO LANDSCAPE/IRRIGATION SYSTEM WITHIN MEDIANS. NO SEPARATE PAY.

WESTVIEW SPEED LIMIT = 30 MPH

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
10-21-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 3 - STEP 1

TCP-3S1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
HORZ: 1"=50'
SHEET: 122 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\TCP\111-001-TCP-Ph

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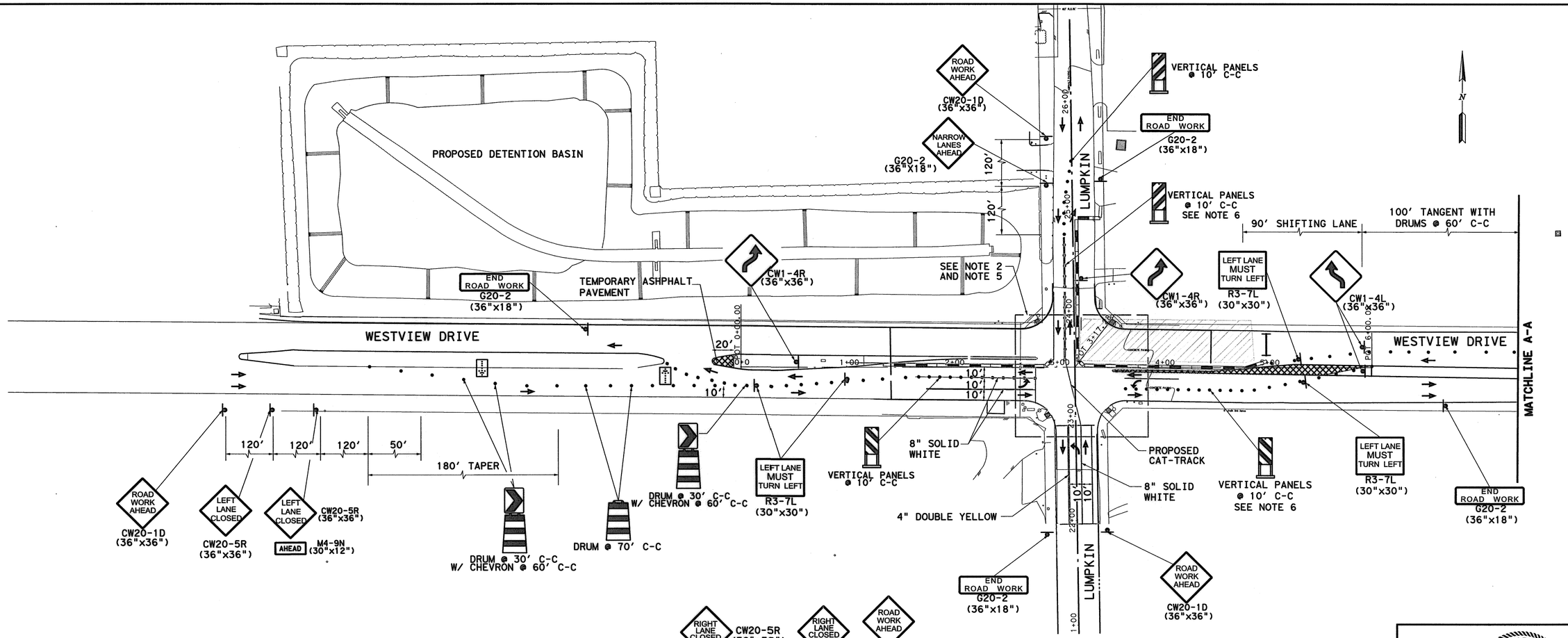


LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
2. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
3. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
4. CONTRACTOR TO RESTORE MEDIANS ONCE PHASE THREE IS COMPLETE.
5. CONTRACTOR TO REALIGN TEMPORARY TRAFFIC SIGNALS AS NEEDED.
6. CONTRACTOR MAY USE TEMPORARY RAISED YELLOW PAVEMENT MARKERS INSTEAD OF VERTICAL PANELS PER PROJECT MANAGERS APPROVAL.
7. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO LANDSCAPE/IRRIGATION SYSTEM WITHIN MEDIANS. NO SEPARATE

WESTVIEW SPEED LIMIT = 30 MPH

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 3 - STEP 2

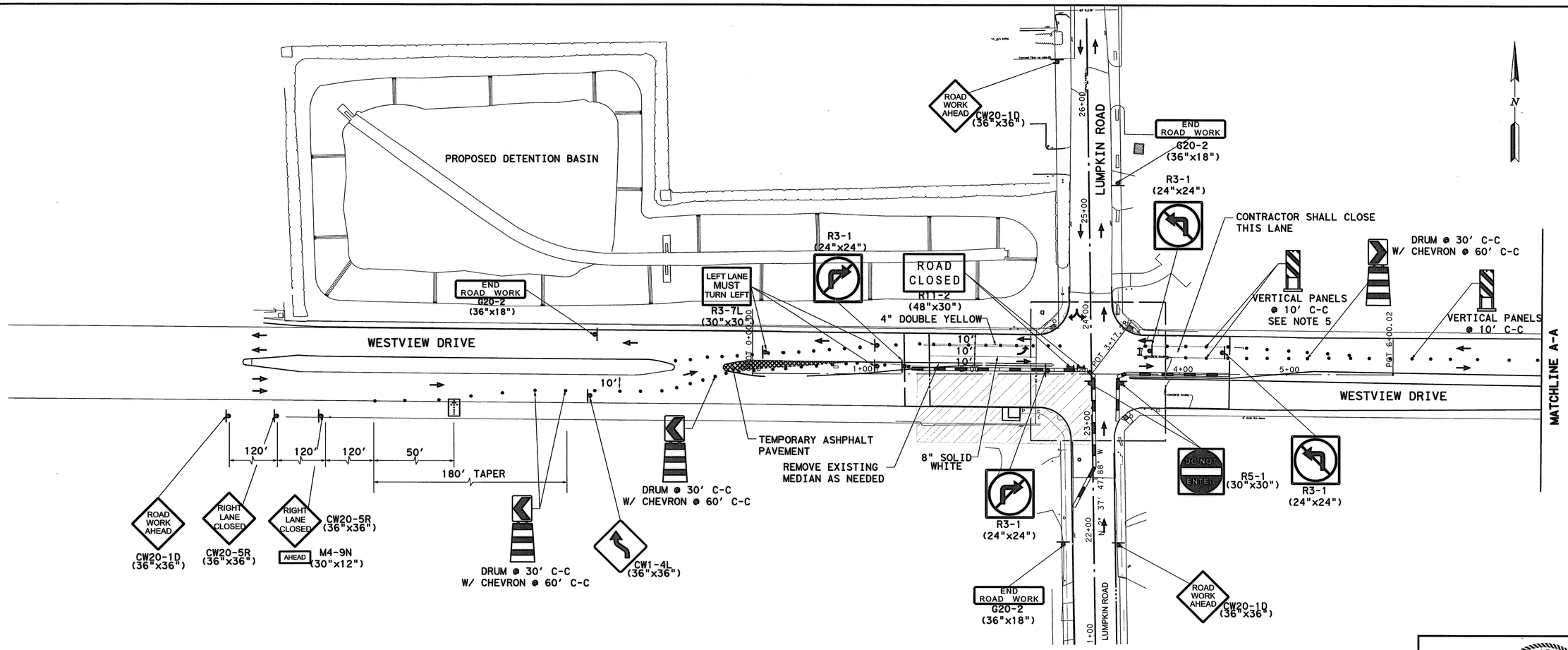
TCP-3S2

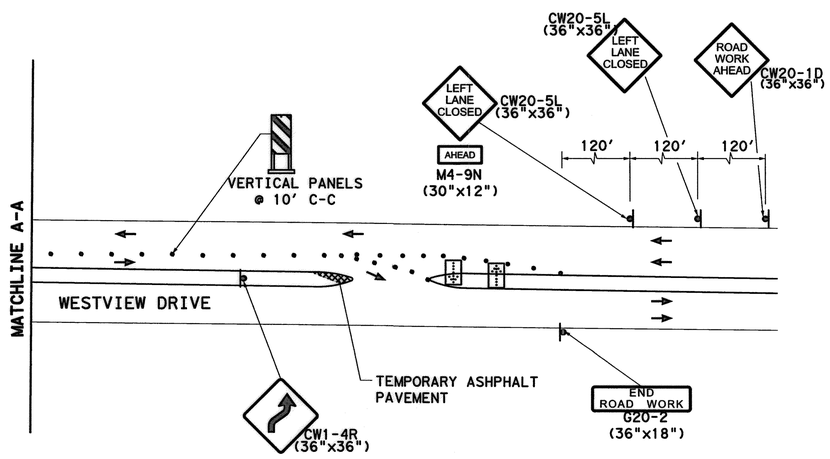
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=50'	
SHEET: 123 OF 226	

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\TCP\112-001-TCP-Phase 3-Step 2.dgn 9/4/2014 11:27:24 AM MJGuthrie





LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. SETUP "SOUTH BOUND DETOUR" PRIOR TO COMMENCING THIS PHASE.
2. SEE SHEET "SOUTHBOUND DETOUR PLAN" FOR DETAILS.
3. CONTRACTOR TO RESTORE MEDIANS ONCE PHASE THREE IS COMPLETE.
4. CONTRACTOR TO REALIGN TEMPORARY TRAFFIC SIGNALS AS NEEDED.
5. CONTRACTOR MAY USE TEMPORARY RAISED YELLOW PAVEMENT MARKERS INSTEAD OF VERTICAL PANELS PER PROJECT MANAGER'S APPROVAL.
6. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS AND DRIVEWAYS.
7. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO LANDSCAPE/IRRIGATION SYSTEM WITHIN MEDIANS. NO SEPARATE PAY.

WESTVIEW SPEED LIMIT = 30 MPH

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 3 - STEP 3

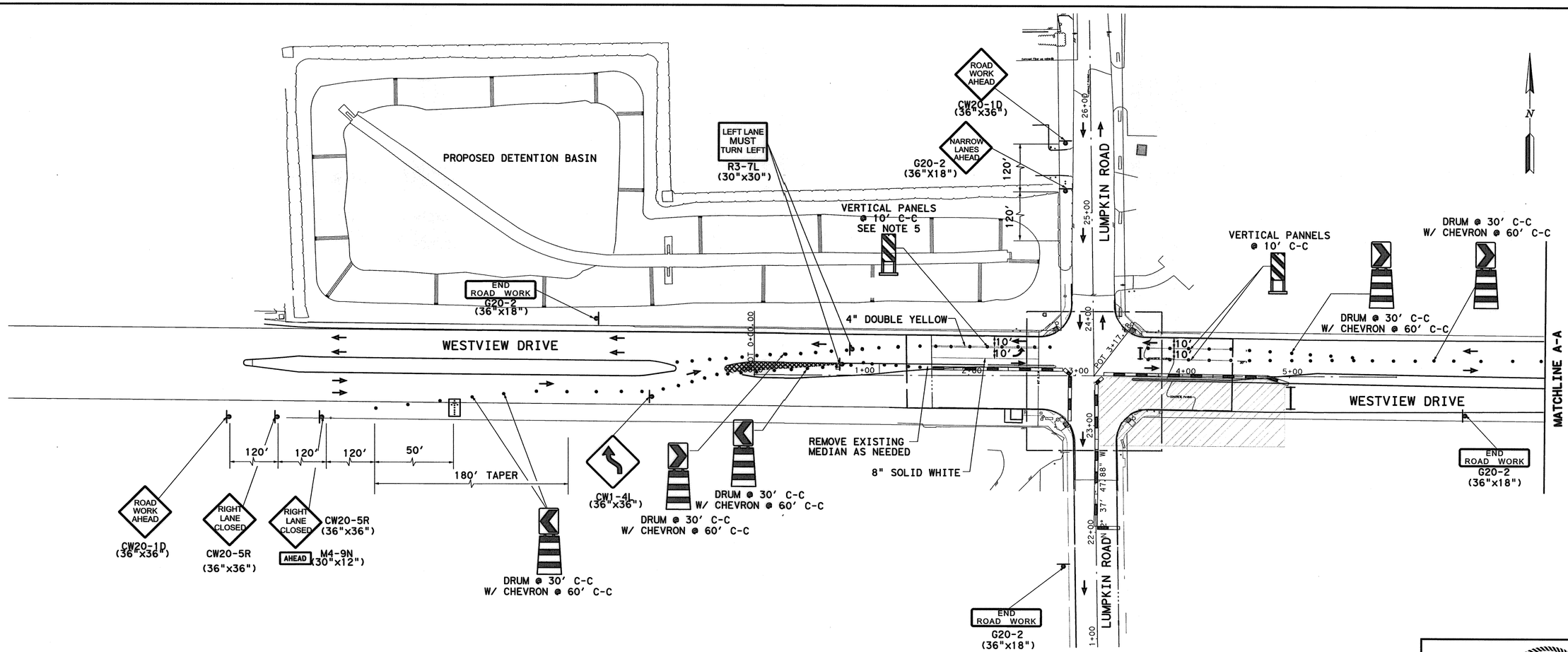
TCP-3S3

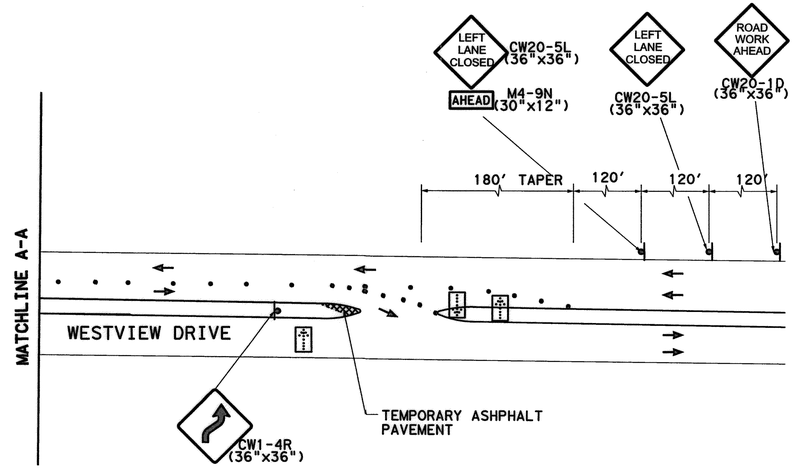
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=50'	
SHEET: 124 OF 226	

pw:\\ladpw.ladoo.int:projectwise\Documents\Projects\130-1038+001\4-01-Production\4-01-Drawings\TCP\113-001-TCP-Phase 3-Step 3.dgn 9/4/2014 11:27:55 AM MJGuthrie





LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. SETUP "SOUTH BOUND DETOUR" PRIOR TO COMMENCING THIS PHASE.
2. SEE SHEET "SOUTHBOUND DETOUR PLAN" FOR DETAILS.
3. CONTRACTOR TO RESTORE MEDIANS ONCE PHASE THREE IS COMPLETE.
4. CONTRACTOR TO REALIGN TEMPORARY TRAFFIC SIGNALS AS NEEDED.
5. CONTRACTOR MAY USE TEMPORARY RAISED YELLOW PAVEMENT MARKERS INSTEAD OF VERTICAL PANELS PER PROJECT MANAGER'S APPROVAL.
6. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS AND DRIVEWAYS.
7. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO LANDSCAPE/IRRIGATION SYSTEM WITHIN MEDIANS. NO SEPARATE PAY.

WESTVIEW SPEED LIMIT = 30 MPH

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 3 - STEP 4

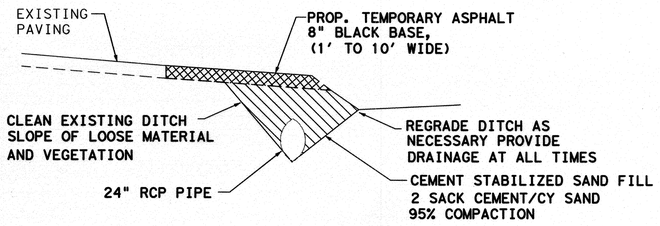
TCP-3S4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

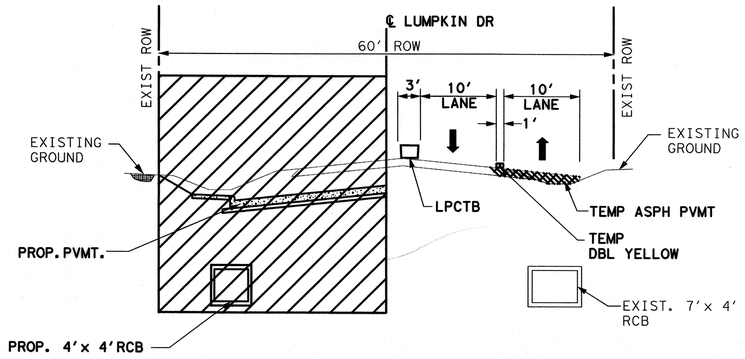
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
HORZ: 1"=50'
SHEET: 125 OF 226

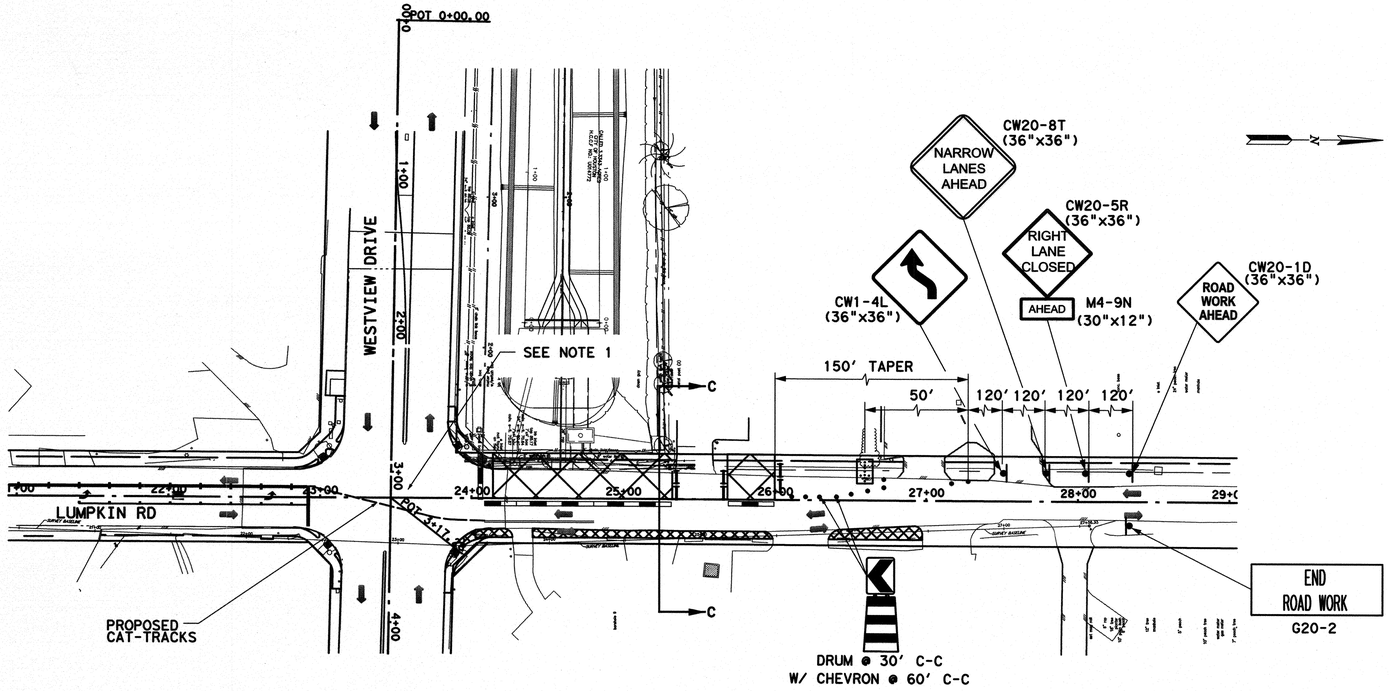
pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\TCP\114-001-TCP-Phase 3-Step 4.dgn 9/4/2014 11:28:28 AM MJGuthrie



TYPICAL WIDENING DETAIL
NTS



TYPICAL TRAFFIC CONTROL SECTION
SECTION C-C
LUMPKIN ROAD
(STA. 24+30 TO STA. 26+00)



LUMPKIN SPEED LIMIT = 30 MPH

LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. TRANSITION SOUTHBOUND TRAFFIC THROUGH INTERSECTION ONTO NEW LUMPKIN ROAD, SOUTH OF WESTVIEW.
2. DO NOT CONSTRUCT PROPOSED CURB OR SIDEWALK (WEST SIDE) UNTIL AFTER PHASE 5.
3. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
4. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
5. INSTALL 5' (+/-) TEMP. ASPHALT ALONG WEST EDGE OF NEW CONCRETE.
6. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
7. BASIN CONSTRUCTION CAN BE CONCURRENT WITH PHASE 2.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
10-21-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 4 STEP 1
TCP-4S1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=50'	
SHEET: 126 OF 226	

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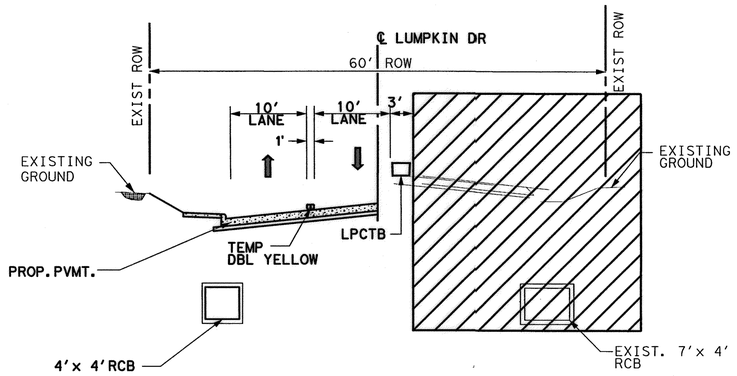
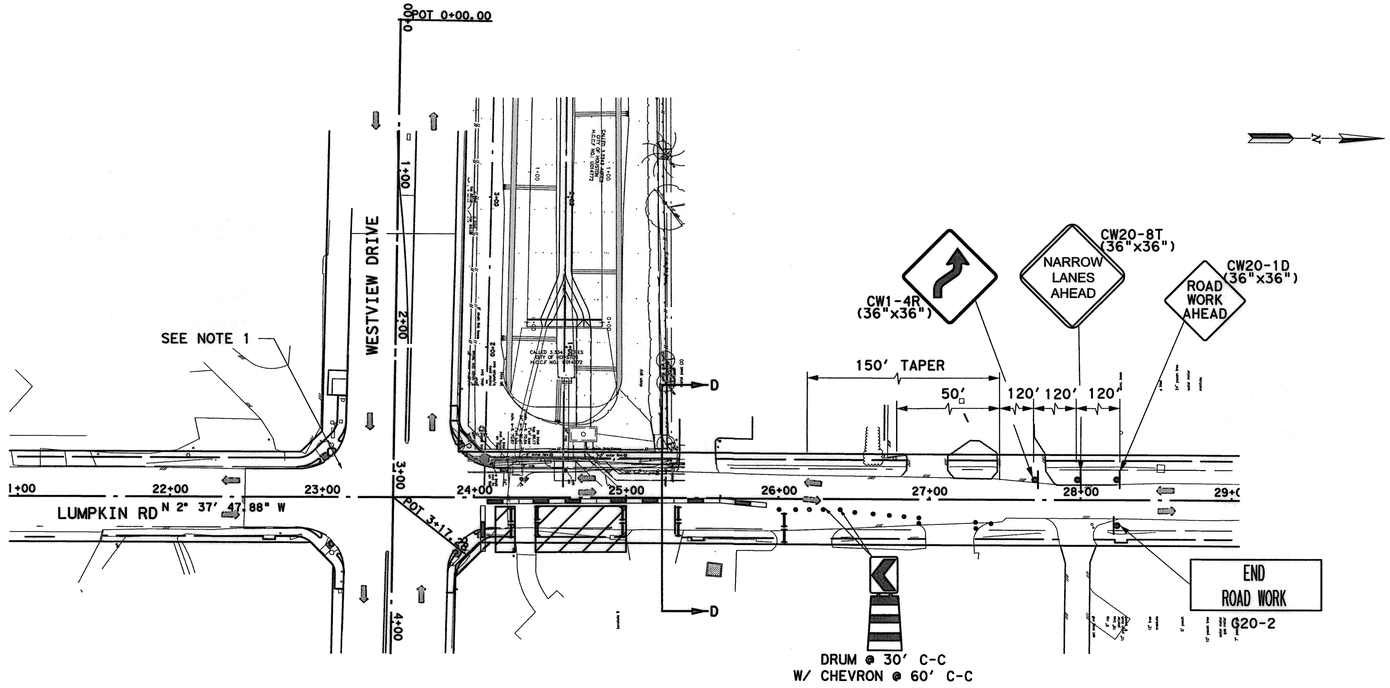


TYPICAL TRAFFIC CONTROL SECTION
SECTION D-D
LUMPKIN ROAD
(STA. 24+30 TO STA. 26+00)



LUMPKIN SPEED LIMIT = 30 MPH

LEGEND

- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. TRANSITION SOUTHBOUND TRAFFIC THROUGH INTERSECTION ONTO NEW LUMPKIN ROAD, SOUTH OF WESTVIEW.
2. DO NOT CONSTRUCT PROPOSED CURB OR SIDEWALK (WEST SIDE) UNTIL AFTER THIS STEP.
3. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
4. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
5. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
6. BASIN CONSTRUCTION CAN BE CONCURRENT WITH PHASE 2.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 4 STEP 2

TCP-4S2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=50'	
SHEET: 127 OF 226	

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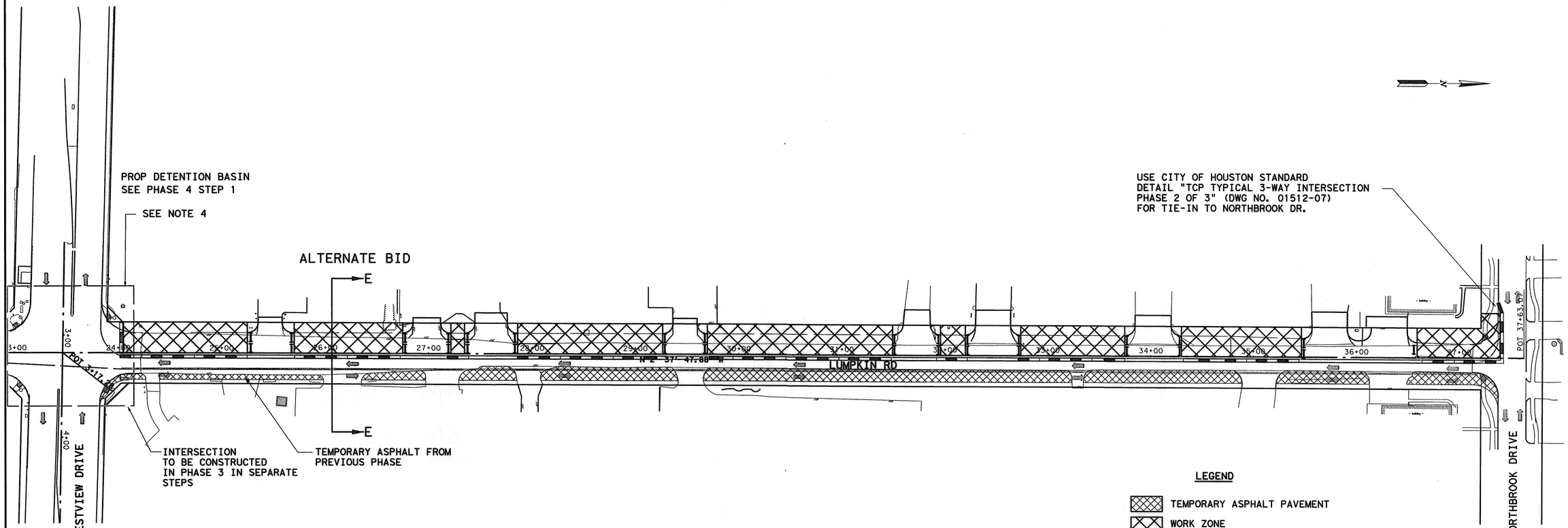
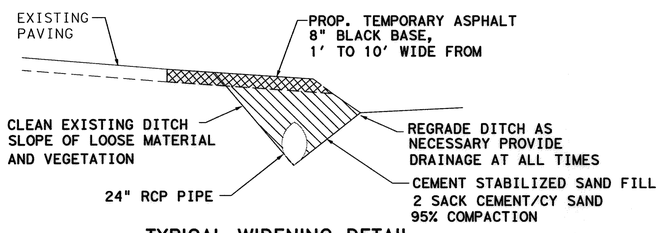
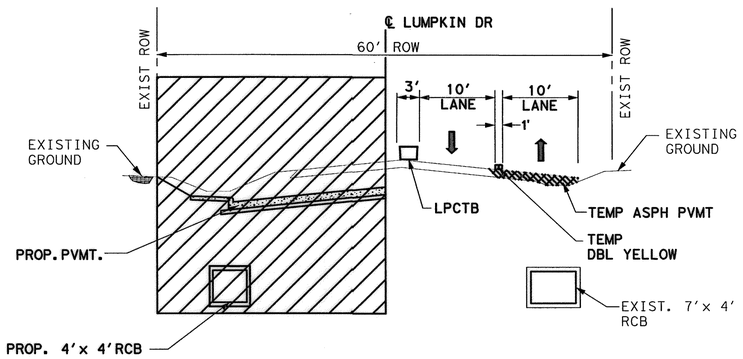




TYPICAL WIDENING DETAIL
NTS



TYPICAL TRAFFIC CONTROL SECTION
SECTION E-E
LUMPKIN ROAD
(STA. 24+30 TO STA. 37+50)
(ALTERBNATE BID)

LUMPKIN SPEED LIMIT = 30 MPH

LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. TRANSITION SOUTHBOUND TRAFFIC THROUGH INTERSECTION ONTO NEW LUMPKIN ROAD, SOUTH OF WESTVIEW.
2. DO NOT CONSTRUCT PROPOSED CURB OR SIDEWALK (WEST SIDE) UNTIL AFTER PHASE 5.
3. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
4. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
5. INSTALL 5' (+/-) TEMP. ASPHALT ALONG WEST EDGE OF NEW CONCRETE.
6. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-15-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
TRAFFIC CONTROL PLAN
PHASE 5 STEP 1
(ALTERNATE BID)
TCP-5S1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=50'	
SHEET: 128 OF 226	

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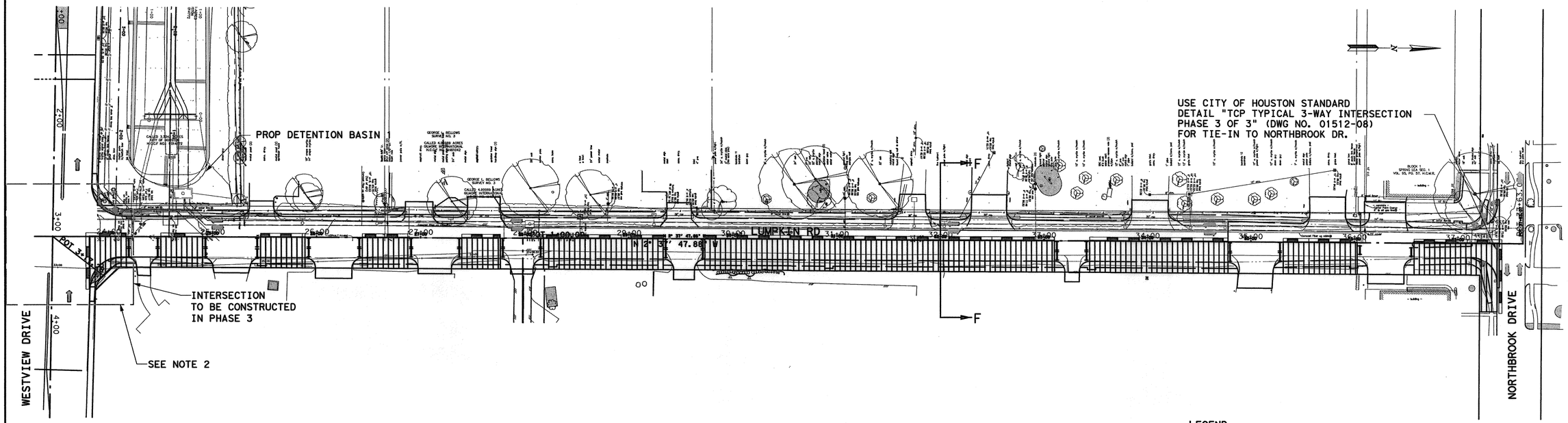

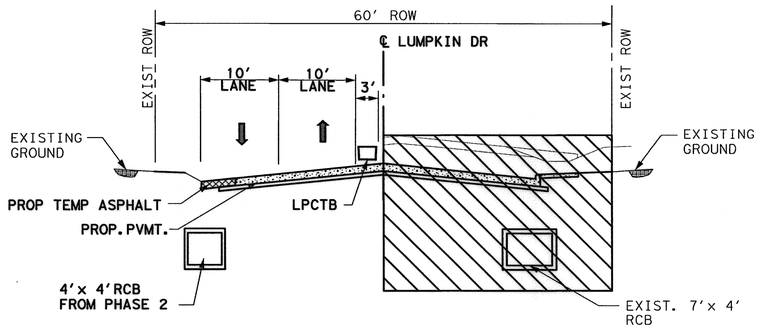

TYPICAL TRAFFIC CONTROL SECTION
SECTION F-F
LUMPKIN ROAD
(STA. 24+30 TO STA. 37+50
(ALTERNATE BID)

LUMPKIN SPEED LIMIT = 30 MPH

LEGEND

- TEMPORARY ASPHALT PAVEMENT
- WORK ZONE
- TYPE III BARRICADE W/ ROAD CLOSED SIGN
- FLASHING ARROW PANEL
- DRUMS
- EXISTING STRIPING
- TEMP GROUND MOUNTED SIGNS
- DIRECTION OF TRAFFIC
- TY I WITH TY II END TREATMENT LOW PROFILE CONC BARRIER

NOTES:

1. PRIOR TO CONSTRUCTION ACROSS DRIVEWAY COORDINATE WITH PROPERTY OWNER TO PROVIDE ACCESS TO BUSINESS & RESIDENTS AT ALL TIMES.
2. REFER TO "TEMPORARY SIGNAL LAYOUT" FOR SIGNAL OPERATION DURING CONSTRUCTION.
3. HIGH EARLY STRENGTH CONCRETE SHALL BE USED ON ALL INTERSECTIONS & DRIVEWAYS.
4. ONCE PHASE 5 IS COMPLETE, USE CITY STANDARD ONE LANE CLOSURE FOR WEST SIDE CURB AND SIDEWALK CONSTRUCTION.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
PHASE 5 STEP 2

TCP-5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=50'	
SHEET: 129 OF 226	

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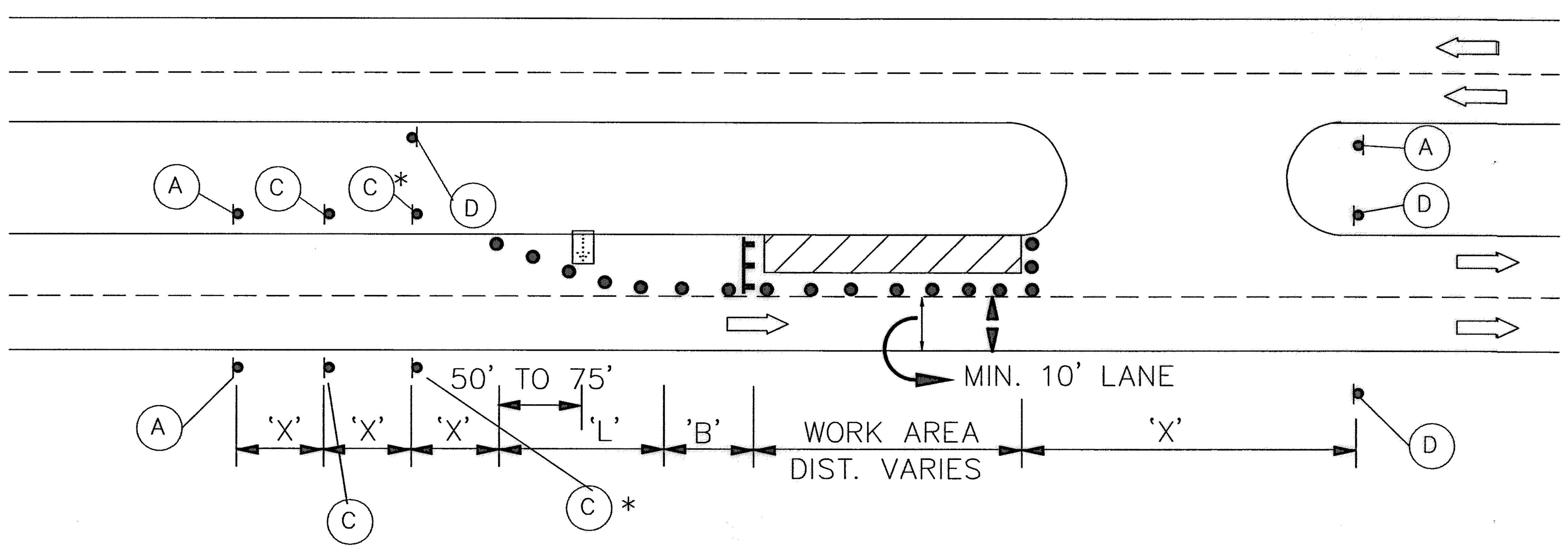


TYPICAL LEFT LANE CLOSURE OF A MULTILANE STEET

SPECIAL TRAFFIC REQUIREMENTS

1. Contractor shall provide and install traffic control devices in conformance with part VI of the Texas Manual on Uniform Traffic Control Devices (Texas MUTCD, most recent edition with revisions) during construction.
2. Contractor will be responsible for replacing and maintaining pavement markings which include centerline, barrier lines, lane lines and raised pavement markings.
3. This traffic control plan represents the minimum required by traffic conditions in the field. Contractor to maintain access to adjacent properties at all times.

4a. No lanes shall be closed from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday thru Friday.
4b. No lanes shall be blocked between 7:00 a.m. to 6:00 p.m. Monday thru Friday in downtown area. Exception to these times, if necessary, should be sought during lane closure permit application.

5. Contractor shall cover open pavement excavations with anchored steel plates during non-working hours, and open lanes for normal traffic flow.
6. Off-duty Uniformed Police Officers are required to direct traffic when lanes are blocked.
7. Lane closure time(s) shall be specified on the lane closure permit.
8. If the contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, they shall be responsible to prepare and submit an alternate set of plans* to Plan Review Section for approval ten working days prior to implementation.
   *These plans shall be drawn to scale on reproducible mylars and sealed by a Licensed Engineer in the State of Texas. Plans will become a part of the contract drawings.
9. Approved copies of Traffic Control Plans and lane closure permits shall be available for inspection at job site at all times. Contractor must secure 'Lane Closure Permits' from City's Traffic Management and Maintenance Branch before closing a lane/sidewalk. The request must be made at least ten business days prior to the date for which the closure is sought. Note that working hours may be restricted or the request may be denied. Call 713-837-7280 for an application.
10. Lanes shall be kept closed during pavement surface restoration and opened only after pavement is restored completely.

SPACING FOR CHANNELIZING DEVICES

1. Plastic drums on merging taper @ 30' c-c with chevron sign @ 60' c-c and type 'C' warning light (for overnight closure)
2. Plastic drums on downstream taper @ 35' c-c
3. Plastic drums on radii @ 5' c-c
4. Plastic drums on tangent @ 35' c- c with vertical panel @ 70' c-c and type 'C' warning light @ 70' c-c (for overnight closure)
5. Plastic drums in front of construction zone @ 20' c-c with vertical panel @ 40' c-c and Type 'A' warning light @ 40' c-c (for overnight closure)
6. Concrete traffic barrier (CTB) or low profile concrete traffic barrier (lpctb) with reflectors @ 10' c-c if pavement drop is more than twelve inches (12")
7. Tubular marker @ 20' C-C.

Note: Spacing shown on traffic control plans shall supersede the above spacings.

Length for Longitudinal Buffer

Posted Speed (mph)	Length in Feet (B)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335

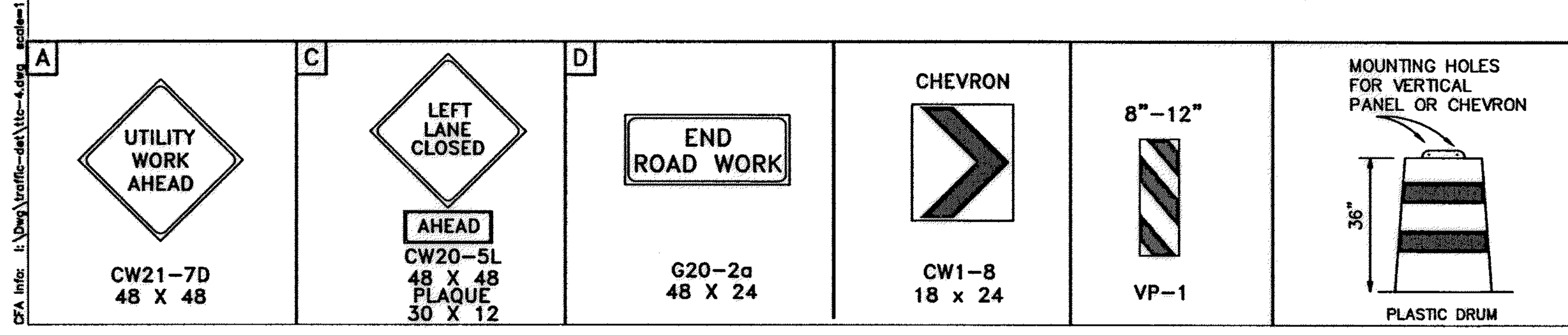
LEGEND (TYPICAL)

- • PLASTIC DRUM (see spacing for channelizing devices)
- OFF-DUTY UNIFORMED POLICE OFFICER
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- ∘ TUBULAR MARKER

TYPICAL SIGN SPACING AND TAPER LENGTHS.

Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L" 10' Offset	11' Offset	12' Offset
30	120'	150'	165'	180'
35	160'	205'	225'	245'
40	240'	265'	295'	320'
45	320'	450'	495'	540'
50	400'	500'	550'	600'
55	500'	550'	605'	660'

* ENGINEER TO STRIKE THROUGH ALL SPEED LIMITS NOT APPLICABLE



* PLAQUE NOT REQUIRED

LUMPKIN ROAD	30 MPH
STREET NAME	SPEED LIMIT

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL TRAFFIC CONTROL
TYPICAL LEFT LANE CLOSURE OF A MULTILANE STREET

SCALE: PLAN 1"= PROFILE VERT. 1"= PROFILE HORZ. 1"=

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: DATE	DWG NO: NUMBER

REVISION	REVISION DATE	DESCRIPTION	INITIAL

AJ HAQUE DWG No2

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TYPICAL TRAFFIC CONTROL
TYPICAL LEFT LANE CLOSURE OF A MULTILANE STREET
TCP-11

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

VERT: 1"=2'
HORZ: 1"=20'

SHEET:
130 OF 226

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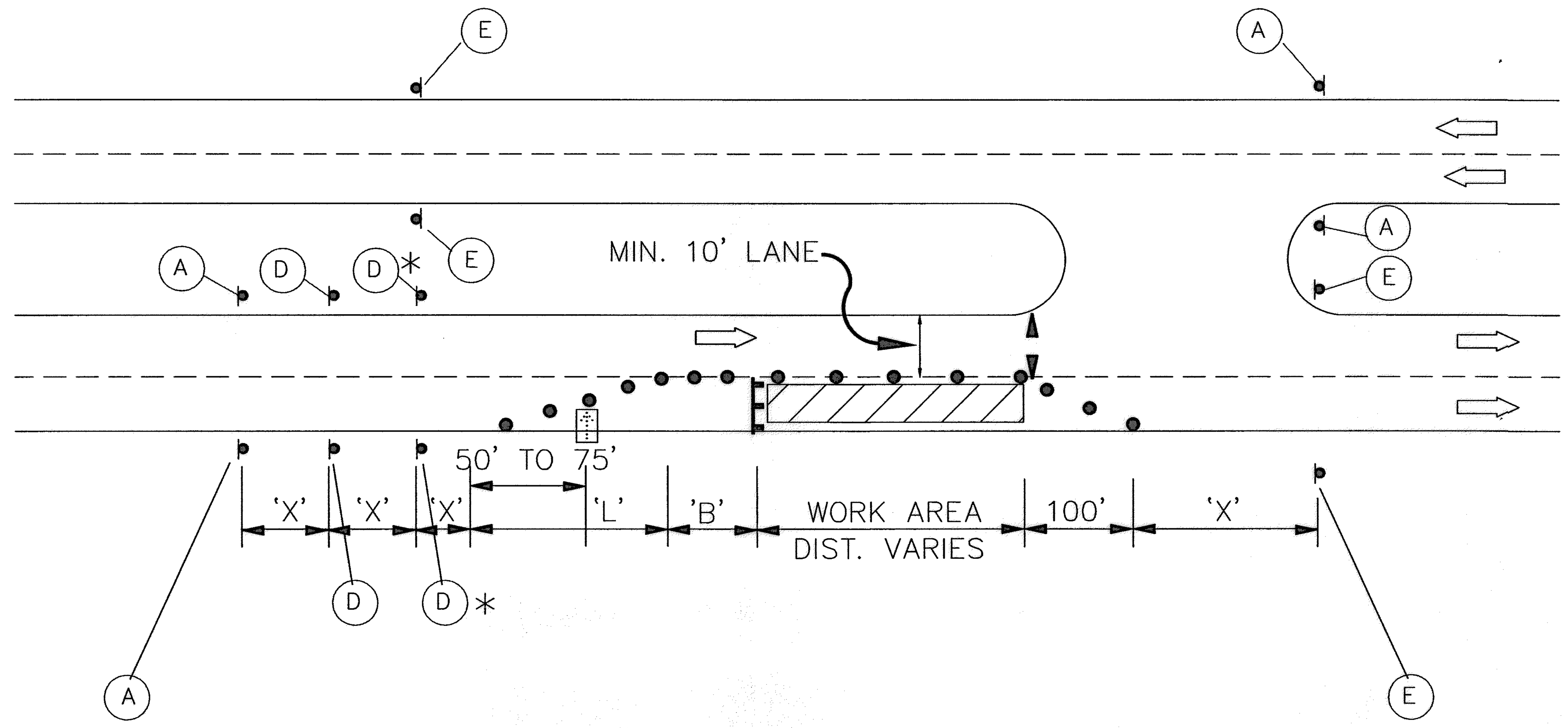

TYPICAL RIGHT LANE CLOSURE OF A MULTILANE STREET

SPECIAL TRAFFIC REQUIREMENTS

1. Contractor shall provide and install traffic control devices in conformance with part VI of the Texas Manual on Uniform Traffic Control Devices (Texas MUTCD, most recent edition with revisions) during construction.
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3. This traffic control plan represents the minimum required by traffic conditions in the field. Contractor to maintain access to adjacent properties at all times.

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4b. No lanes shall be blocked between 7:00 a.m. to 6:00 p.m. Monday thru Friday in downtown area. Exception to these times, if necessary, should be sought during lane closure permit application.

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6. Off–duty Uniformed Police Officers are required to direct traffic when lanes are blocked.
7. Lane closure time(s) shall be specified on the lane closure permit.
8. If the contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, they shall be responsible to prepare and submit an alternate set of plans* to Plan Review Section for approval ten working days prior to implementation.
   *These plans shall be drawn to scale on reproducible mylars and sealed by a Licensed Engineer in the State of Texas. Plans will become a part of the contract drawings.
9. Approved copies of Traffic Control Plans and lane closure permits shall be available for inspection at job site at all times. Contractor must secure 'Lane Closure Permits' from City's Traffic Management and Maintenance Branch before closing a lane/sidewalk. The request must be made at least ten business days prior to the date for which the closure is sought. Note that working hours may be restricted or the request may be denied. Call 713–837–7280 for an application.
10. Lanes shall be kept closed during pavement surface restoration and opened only after pavement is restored completely.

SPACING FOR CHANNELIZING DEVICES

1. Plastic drums on merging taper @ 30' c–c with chevron sign @ 60' c–c and type 'C' warning light (for overnight closure)
2. Plastic drums on downstream taper @ 35' c–c
3. Plastic drums on radii @ 5' c–c
4. Plastic drums on tangent @ 35' c– c with vertical panel @ 70' c–c and type 'C' warning light @ 70' c–c (for overnight closure)
5. Plastic drums in front of construction zone @ 20' c–c with vertical panel @ 40' c–c and Type 'A' warning light @ 40' c–c (for overnight closure)
6. Concrete traffic barrier (CTB) or low profile concrete traffic barrier (lpctb) with reflectors @ 10' c–c if pavement drop is more than twelve inches (12")
7. Tubular marker @ 20' C–C.

Note: Spacing shown on traffic control plans shall supersede the above spacings.

Length for Longitudinal Buffer

Posted Speed (mph)	Length in Feet (B)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335

LEGEND (TYPICAL)

- • PLASTIC DRUM (see spacing for channelizing devices)
- OFF-DUTY UNIFORMED POLICE OFFICER
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- ∘ TUBULAR MARKER

TYPICAL SIGN SPACING AND TAPER LENGTHS.

Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L" 10' Offset	11' Offset	12' Offset
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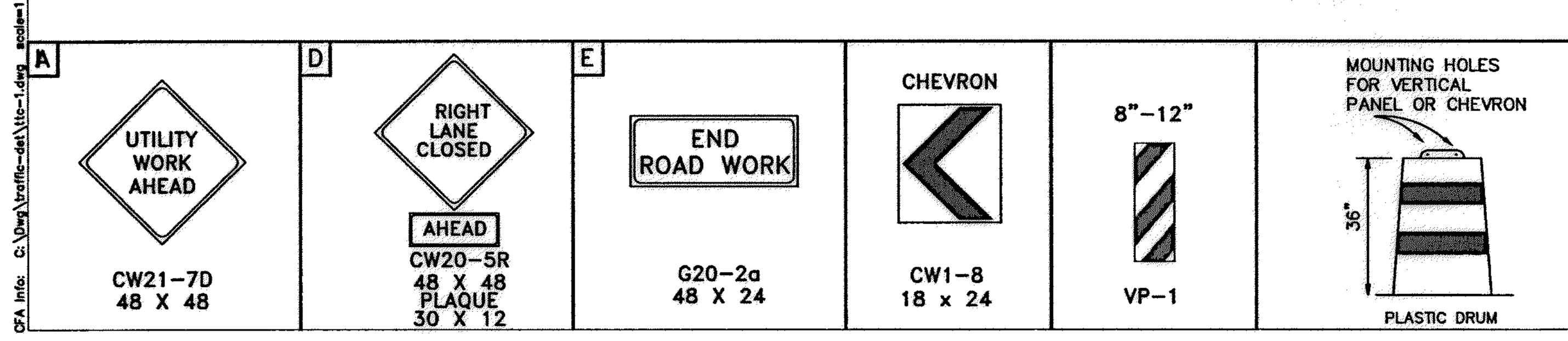
45	320'	450'	495'	540'
50	400'	500'	550'	600'
55	500'	550'	605'	660'

* ENGINEER TO STRIKE THROUGH ALL SPEED LIMITS NOT APPLICABLE

STREET NAME	SPEED LIMIT
WESTVIEW DRIVE	30 MPH
LUMPKIN ROAD	30 MPH



* PLAQUE NOT REQUIRED

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL TRAFFIC CONTROL
TYPICAL RIGHT LANE CLOSURE OF A MULTILANE STREET

SCALE: PLAN 1"= PROFILE VERT. 1"= PROFILE HORZ. 1"=

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: DATE	DWG NO: NUMBER

REVISION	REVISION DATE	DESCRIPTION	INITIAL

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
TYPICAL TRAFFIC CONTROL
TYPICAL RIGHT LANE CLOSURE
OF A MULTILANE STREET
TCP-12

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET:
131 OF 226

AJ HAQUE DWG No1

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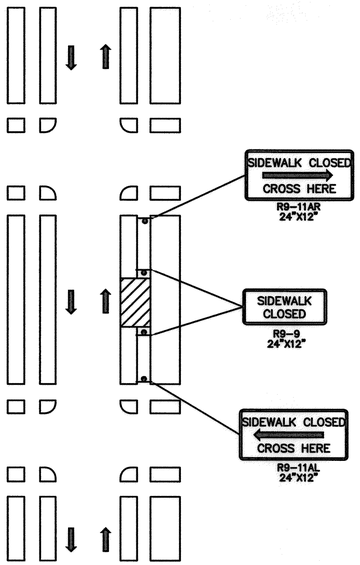
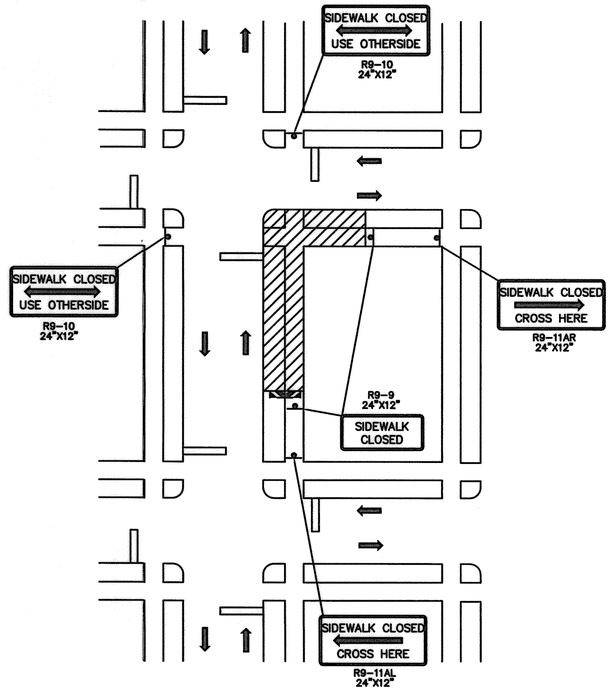
LEGEND

- CHANNELIZING DEVICE WITH CHEVRONS OR VERTICAL PANELS
- DIRECTIONAL ARROW
- WORK ZONE
- TYPE III BARRICADE WITH TYPE "A" FLASHING WARNING LIGHTS.
- TRAFFIC CONTROL SIGN
- FLASHING ARROW PANEL
- LOW PROFILE CONCRETE TRAFFIC BARRIER



SIDEWALK DETOUR

N.T.S.



CROSSWALK CLOSURES AND PEDESTRIAN DETOURS

N.T.S.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC CONTROL PLAN
TYPICAL PEDESTRIAN DETAILS

TCP-13

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 132 OF 226	

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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.
8. OVERHEAD STREET NAME SIGNS SHALL BE INSTALLED SUCH THAT THE BOTTOM OF THE SIGN IS NO LESS THAN 17 FEET ABOVE THE ROADWAY PAVEMENT OR NO LESS THAN 16 FEET ABOVE THE FINISHED GRADE BEYOND THE SHOULDER.
9. THE LOCATION OF EACH NEW POLE FOUNDATION, PULL BOX, CONTROLLER CABINET FOUNDATION, UPS CABINET FOUNDATION AND ELECTRIC SERVICE PEDESTAL FOUNDATION SHALL BE MARKED IN THE FIELD AS SHOWN ON THE PLANS. THE EXACT LOCATION SHALL BE APPROVED BY THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE PRIOR TO BEGINNING INSTALLATION OF THE FOUNDATION.
10. THE TOP OF THE POLE FOUNDATION SHALL BE LEVEL WITH THE FINISHED GRADE. IF THE SLOPE OR SHOULDER DROPS OFF FROM FINISHED GRADE, THE CONTRACTOR SHALL GRADE AROUND POLE FOUNDATION. THE TOP OF THE FOUNDATION SHALL EXTEND NO MORE THAN 4 INCHES ABOVE SURROUNDING GRADE.
11. ALL CONCRETE USED FOR TRAFFIC SIGNAL POLE AND CABINET\FOUNDATIONS SHALL BE CLASS "A" (REFER TO THE CITY OF HOUSTON SPECIFICATION FOR CONCRETE).
12. MAST ARM POLES SHALL NOT BE INSTALLED ON THE FOUNDATIONS LESS THAN SEVEN DAYS AFTER THE PLACEMENT OF THE CONCRETE FOR THE FOUNDATION.
13. ANCHOR BOLTS FOR SIGNAL POLES SHALL BE SET SO THAT TWO ARE IN COMPRESSION AND TWO ARE IN TENSION. PRIOR TO THE INSTALLATION OF THE NUT, THE THREADS OF THE ANCHOR BOLT SHALL BE COATED WITH PIPE JOINT COMPOUND.
14. ALL UNDERGROUND CONSTRUCTION (CONDUIT, FOUNDATIONS AND PULL BOXES) FOR THE INTERSECTION SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF POLES, SIGNALS AND CABINETS. THE CONTRACTOR SHALL NOT PROCEED TO ABOVE GROUND WORK UNTIL THE ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE HAD CONFIRMED THAT THE MATERIALS FOR A COMPLETE INSTALLATION ARE AVAILABLE.
15. UNDERGROUND CONDUIT FOR SIGNAL CABLE SHALL BE SCHEDULE 80 ELECTRICAL PVC CONDUIT OF THE DIAMETER SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.
16. ALL ABOVE GROUND CONDUIT FOR SIGNAL CABLE AND INTERCONNECT MEDIA SHALL BE HOT DIPPED GALVANIZED STEEL RIGID METAL CONDUIT OF THE DIAMETERS SHOWN ON THE PLANS, UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF.
17. ONLY NEW CONDUIT AND CABLE SHALL BE INSTALLED.
18. CONDUIT INSTALLED UNDER EXISTING PAVED DRIVEWAYS, ROADWAYS OR SIDEWALKS, WHICH ARE NOT SCHEDULED TO BE RECONSTRUCTED AS PART OF THIS PROJECT, SHALL BE INSTALLED BY MEANS OF BORING. THE CONTRACTOR SHALL NOT CUT OPEN ANY STREET OR DRIVEWAY FOR CONDUIT INSTALLATION WITHOUT THE PRIOR APPROVAL OF THE ENGINEER AND/OR THE APPROVED CITY OF HOUSTON REPRESENTATIVE.
19. CONDUIT NOT PLACED UNDER PAVED DRIVEWAYS, ROADWAY PAVEMENT OR SIDEWALK MAY BE PLACED BY CUTTING A TRENCH, INSTALLING THE CONDUIT AND BACKFILLING. ANY TRENCHING FOR CONDUIT WIDER THAN THEE (3) INCHES SHALL BE RESODDED.
20. PULL BOXES SHALL NOT BE INSTALLED WITHIN CONCRETE CURB ACCESS RAMPS. IN ADDITION, ANY PULL BOXES INSTALLED BEHIND CURBS SHALL BE INSTALLED BETWEEN THE CURB AND THE PROPOSED / FUTURE SIDEWALK OR BEYOND THE PROPOSED / FUTURE SIDEWALK. AN EXCEPTION TO THIS NOTE WOULD BE PULL BOXES INSTALLED IN A MEDIAN. ANY PULL BOXES INSTALLED ALONG AN UNCURBED ROADWAY SHALL BE INSTALLED ADJACENT TO, BUT NOT WITHIN, THE SHOULDER.
21. A 5/8 IN. X 10 FT. GROUND ROD SHALL BE INSTALLED IN THE NO. 7 PULL BOX LOCATED ON EACH CORNER. TWO GROUND ROD CLAMPS SHALL BE FURNISHED FOR GROUNDING THE GROUND WIRE.
22. ALL CONDUITS SHALL BE CLEANED BY COMPRESSED AIR AND A PROPERLY SIZED CONDUIT PISTON OR MANDREL SHALL BE PULLED THROUGH THE CONDUIT PRIOR TO CABLE INSTALLATION.
23. WHEN PULLING TRAFFIC SIGNAL SYSTEM CABLES THROUGH CONDUIT, THE CABLES SHALL BE LUBRICATED WITH A LUBRICANT NORMALLY USED FOR THIS PURPOSE. ANY ABRASION TO ANY CONDUCTOR INSULATION WHICH OCCURS WHILE PULLING CABLE FOR THE TRAFFIC SIGNAL SYSTEM WILL BE CAUSE FOR THE IMMEDIATE REJECTION OF THE CABLE. IF THIS OCCURS, THE CONTRACTOR SHALL REMOVE AND REPLACE THE ENTIRE CABLE RUN AT THEIR EXPENSE.
24. A MINIMUM OF THREE (3) FEET OF EACH WIRE AND CABLE MEASURED FROM THE TOP OF THE PULL BOX SHALL BE LEFT IN EACH PULL BOX AND AT EACH POLE BASE.
25. ALL CABLES SHALL BE STRIPPED, FORMED AND TERMINATED IN A NEAT AND UNIFORM MANNER WHETHER IN THE SIGNAL HEAD OR CONTROLLER CABINET. ALL CABLE SHALL BE BROUGHT INTO THE TERMINAL HOUSING OF SIGNALS AND/OR CONTROLLER CABINETS AND A SUFFICIENT LENGTH OF CABLE SHALL BE LEFT SO THAT ALL TERMINAL CONNECTIONS MAY BE MADE WITHOUT THE NECESSITY OF SPLICING THE CABLE.
26. THE HIGH VOLTAGE CABLES SHOULD BE SEPARATED FROM THE LOW VOLTAGE CABLES AS MUCH AS POSSIBLE.
27. NO LOOP DETECTOR SHALL BE CUT IN A PARALLEL EXPANSION JOINT. LOOPS CUT ACROSS EXPANSION JOINTS SHALL HAVE A SLACK IN THE CABLE FOR EXPANSION.
28. ALL VEHICLE ROADWAY DETECTION LOOP CABLES SHALL BE #14 AWG IMSA 51-5-1985 CABLE. LEAD-IN CABLES SHALL BE #16 AWG IMSA 50-2-1984 CABLE. NO SPLICES SHALL BE ALLOWED IN THE ROADWAY DETECTION LOOP CABLE EXCEPT AT THE PULL BOX ADJACENT TO LOOP. THE DETECTOR LEAD-IN CABLE SHALL NOT BE SPLICED.
29. DETECTION LOOP SAW CUTS SHALL BE FLUSHED WITH WATER UNDER PRESSURE AND THEN DRIED WITH AIR UNDER PRESSURE.
30. THERE SHALL BE NO SPLICING IN CONDUCTORS EXCEPT FOR THE NECESSARY SPLICE BETWEEN ROADWAY LOOP WIRE AND DETECTOR LEAD-IN CABLE IN THE PULL BOX ADJACENT TO THE DETECTOR. THESE SPLICES SHALL BE WATERPROOF AND SHALL BE IN COMPLIANCE WITH THE CITY OF HOUSTON STANDARD DRAWINGS FOR TRAFFIC SIGNAL CONSTRUCTION. THESE SPLICES SHALL BE MADE BY THE CONTRACTOR. DO NOT GROUND THE CABLE SHIELD AT THE PULL BOX.
31. 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.
32. THE EMERGENCY VEHICLE PRE-EMPTION SENSOR CABLE SHALL BE OPTICOM DETECTOR CABLE MODEL NO. 138. THE CABLE SHALL NOT BE SPLICED.
33. ALL VEHICLE AND PEDESTRIAN INDICATIONS SHALL BE LED.
34. THE CONTRACTOR SHALL BAG ALL NEWLY INSTALLED VEHICULAR AND/OR PEDESTRIAN TRAFFIC SIGNAL HEADS WITH BURLAP OR OTHER APPROVED MATERIAL UNTIL THE FINAL INSPECTION AND ACCEPTANCE BY THE CITY TRAFFIC ENGINEER AND/OR APPROVED CITY OF HOUSTON REPRESENTATIVE. THE BURLAP OR OTHER APPROVED MATERIAL/DEVICE SHALL COMPLETELY COVER THE TRAFFIC SIGNAL HEAD AND SHALL OBSCURE THE VIEW OF THE TRAFFIC SIGNAL INDICATIONS SO THAT THEY CANNOT BE SEEN UNTIL THE TRAFFIC SIGNAL IS PLACED IN OPERATION. DURING CONSTRUCTION, THE TRAFFIC SIGNAL WILL BE DE-ENERGIZED WHILE NOT IN USE FOR TESTING.
35. THE TRAFFIC SIGNAL OPERATION AT EXISTING SIGNALIZED INTERSECTIONS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
36. ALL STRIPING AND PAVEMENT MARKINGS ARE TO BE DONE UNDER THIS CONTRACT AND SHALL BE IN PLACE PRIOR TO THE ACTIVATION OF THE TRAFFIC SIGNAL. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL STOP LINES PRIOR TO THE INSTALLATION OF LOOP DETECTORS.
37. 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), VEHICLE DETECTION LOOPS, WIRELESS COMMUNICATION SYSTEM, EMERGENCY VEHICLE PREEMPTION 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 SIGNAL INSPECTOR (713-881-3172 OR CITYTRAFFICINSPECTOR@HOUSTONTRANSTAR.ORG) 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 SHALL BE RETURNED TO THE CITY OF HOUSTON TRAFFIC OPERATIONS CENTER, 2200 PATTERSON STREET. THE EQUIPMENT SHALL BE UNLOADED BY THE CONTRACTOR. CONTACT THE TRAFFIC SIGNAL INSPECTOR (713-881-3172 OR CITYTRAFFICINSPECTOR@HOUSTONTRANSTAR.ORG) AT LEAST 2 WORKING DAYS PRIOR TO RETURNING THE EQUIPMENT.
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.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED
PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TRAFFIC SIGNAL DESIGN
GENERAL NOTES

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 133 OF 226	

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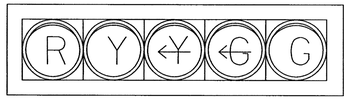

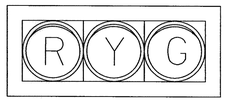

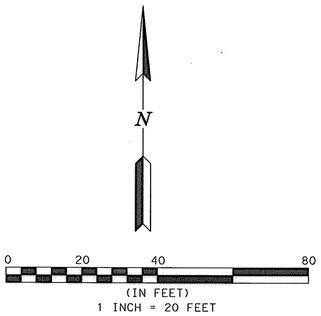

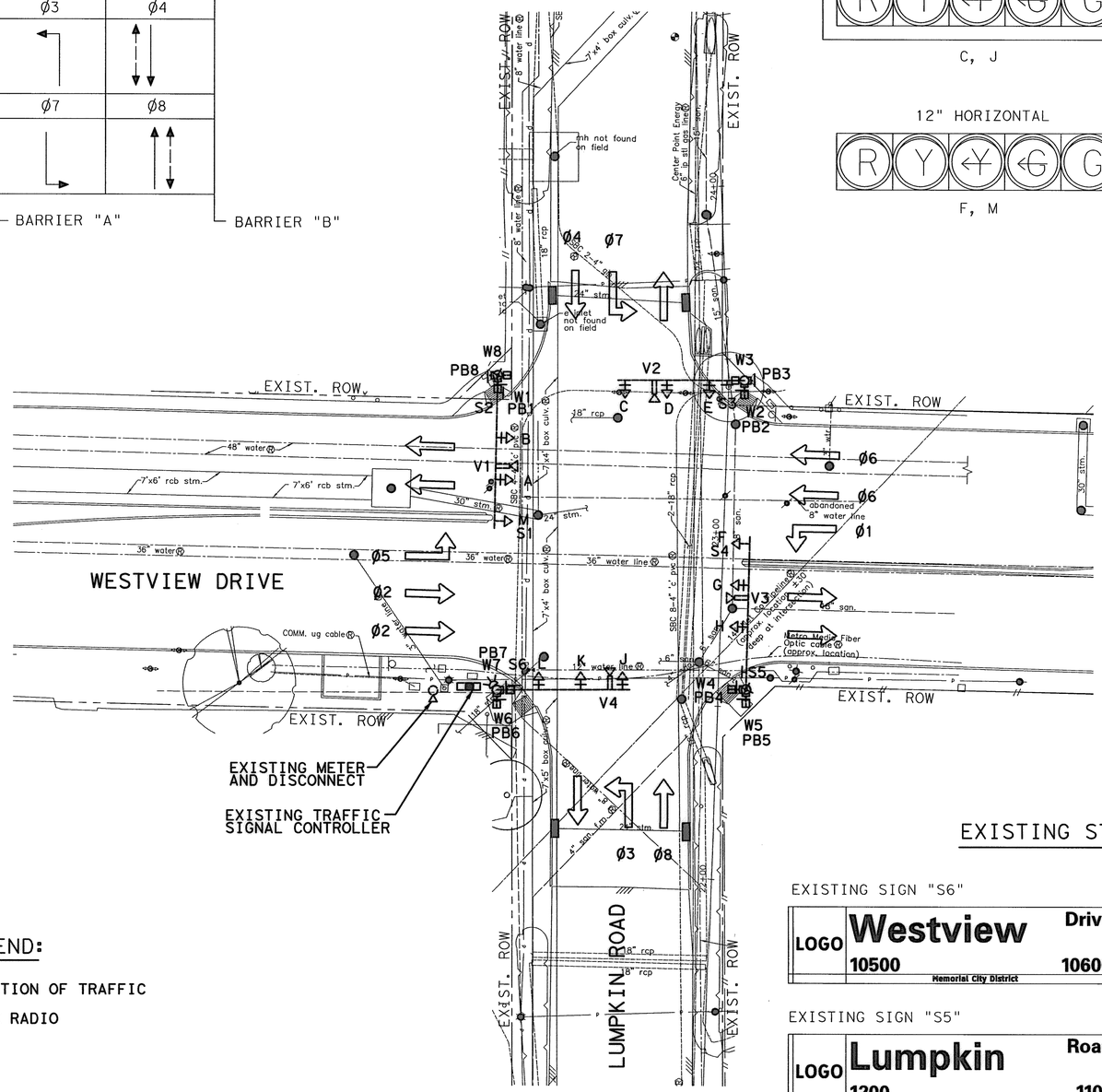

EXISTING TRAFFIC SIGNAL PHASING

EXISTING SIGNAL HEAD SCHEDULE

EXISTING STREET NAME SIGNS

EXISTING SIGN "S6"

LOGO **Westview** Drive
10500 10600
Memorial City District

EXISTING SIGN "S2"

LOGO **Lumpkin** Road
1100 1200
Memorial City District

EXISTING SIGN "S5"

LOGO **Lumpkin** Road
1200 1100
Memorial City District

EXISTING SIGN "S3"

LOGO **Westview** Dr
10600 10500

EXISTING SIGN "S1", "S4"

LEFT TURN
YIELD ON ●

LEGEND:

⇨ DIRECTION OF TRAFFIC

WIMAX RADIO

No.	DATE	REVISIONS	APP.

THOMAS D. DUNCAN P.E.
98353
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXISTING TRAFFIC SIGNAL
LAYOUT AT WESTVIEW DRIVE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:
1" = 20'

CITY DWG NO.

SHEET:
134 OF 226

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STOP LINE & LOOP PRE-FORMED DETECTOR LOCATIONS

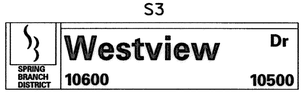
ITEM BY DIRECTION	STATION LUMPKIN ROAD	OFFSET LUMPKIN ROAD
EASTBOUND		
STOP LINE @ GUTTER	23+17.0	43.5'LT
STOP LINE @ MEDIAN	23+53.0	42.5'LT
1-PH 5 PRESENCE LOOP 6'x50' LEADING EDGE	23+48.0	CENTERED IN LANE
2-PH 2 PRESENCE LOOP 6'x6' LEADING EDGE	23+37.0	CENTERED IN LANE
3-PH 2 PRESENCE LOOP 6'x6' LEADING EDGE	23+26.0	CENTERED IN LANE
4-PH 2 PRESENCE LOOP 6'x6' LEADING EDGE	23+44.7	CENTERED IN LANE
5-PH 2 PRESENCE LOOP 6'x6' LEADING EDGE	23+33.7	CENTERED IN LANE
WESTBOUND		
STOP LINE @ GUTTER	23+81.5	41.5'RT
STOP LINE @ MEDIAN	23+45.0	43.0'RT
1-PH 1 PRESENCE LOOP 6'x50' LEADING EDGE	23+50.0	CENTERED IN LANE
2-PH 6 PRESENCE LOOP 6'x6' LEADING EDGE	23+61.0	CENTERED IN LANE
3-PH 6 PRESENCE LOOP 6'x6' LEADING EDGE	23+72.0	CENTERED IN LANE
4-PH 6 PRESENCE LOOP 6'x6' LEADING EDGE	23+52.9	CENTERED IN LANE
5-PH 6 PRESENCE LOOP 6'x6' LEADING EDGE	23+63.9	CENTERED IN LANE
NORTHBOUND		
STOP LINE @ GUTTER	22+93.0	19.5'RT
STOP LINE @ ℄ STRIPE	22+93.0	8.0'LT
1-PH 3 PRESENCE LOOP 6'x50' LEADING EDGE	22+93.0	CENTERED IN LANE
2-PH 8 PRESENCE LOOP 6'x6' LEADING EDGE	22+93.0	CENTERED IN LANE
3-PH 8 PRESENCE LOOP 6'x6' LEADING EDGE	22+78.0	CENTERED IN LANE
SOUTHBOUND		
STOP LINE @ GUTTER	24+06.5	19.0'LT
STOP LINE @ ℄ STRIPE	24+06.5	2.5' RT
1-PH 7 PRESENCE LOOP 6'x50' LEADING EDGE	24+06.5	CENTERED IN LANE
2-PH 4 PRESENCE LOOP 6'x6' LEADING EDGE	24+06.5	CENTERED IN LANE
3-PH 4 PRESENCE LOOP 6'x6' LEADING EDGE	24+21.5	CENTERED IN LANE

OVERHEAD SIGNS

S1

S2

S3



S4

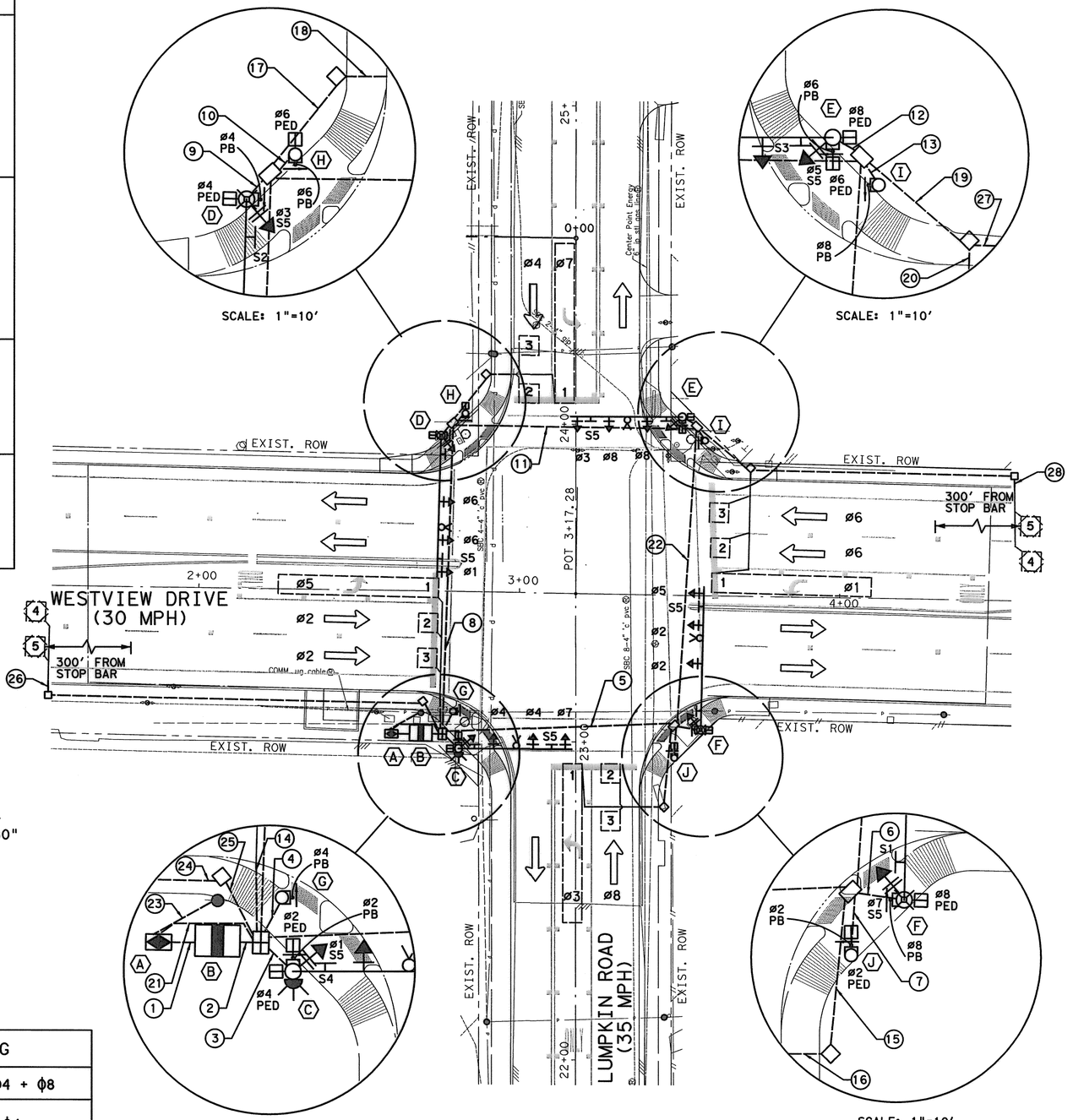
S5: R10-17T
SIZE: 30" X 30"

NOTE:

1. REFER TO SIGN DETAIL FOR OVERHEAD STREET NAME SIGNS.

PROPOSED TRAFFIC SIGNAL PHASING

ϕ1 + ϕ5	ϕ2 + ϕ6	ϕ3 + ϕ7	ϕ4 + ϕ8
ϕ1, ϕ5	ϕ6 PED, ϕ6, ϕ2, ϕ2 PED	ϕ7, ϕ3	ϕ4, ϕ4 PED, ϕ8, ϕ8 PED



LEGEND:

- DIRECTION OF TRAFFIC
- WIMAX RADIO
- SAW CUT DETECTION ZONE
- PRE-FORMED DETECTION ZONE

NOTES:

1. POLE FOUNDATIONS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH 2009 COH TRAFFIC SIGNAL DETAIL 02893-05.
2. MAST ARM POLE ASSEMBLIES SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH 2009 COH TRAFFIC SIGNAL DETAILS 02893-04A/04B.
3. FOR SIDEWALK PLANS AND RAMP DETAILS SEE SHEET X FOR MORE INFORMATION.
4. WESTVIEW DRIVE AND LUMPKIN ROAD IS CONNECTING TO TRANSTAR VIA WIMAX. CONTRACTOR IS RESPONSIBLE FOR WIMAX TO REMAIN OPERATIONAL AND ALL EQUIPMENT IF DAMAGED.
5. THE CONTRACTOR SHALL MAINTAIN AND KEEP OPERATIONAL ALL INTELLIGENT TRANSPORTATION SYSTEMS (ITS) INFRASTRUCTURE DURING CONSTRUCTION. INFRASTRUCTURE INCLUDES, BUT NOT LIMITED TO, FIBER CABLE, COPPER, ETHERNET SWITCHES, WIMAX, BLUETOOTH, ETC. INTERRUPTION OF ITS OPERATIONS SHALL REQUIRE APPROVAL FROM THE CITY OF HOUSTON TRAFFIC OPERATIONS DIVISION/ITS SECTION AT A MINIMUM OF ONE WEEK IN ADVANCE. PLEASE CONTACT THE TRAFFIC OPERATIONS DIVISION/ITS SECTION FOR QUESTIONS AT 713.881.3172.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

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No.	DATE	REVISIONS	APP.

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

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

PRIVATE UTILITY LINES SHOWN

9-25-14
AT&T UTILITY LINES SHOWN DATE
APPROVED FOR AT&T/SWBT UNDERGROUND CONDUIT FACILITIES ONLY. SIGNATURE VALID FOR ONE YEAR

10/7/14
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICTION ONLY DATE
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY – NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

10/7/14
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. DATE
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES – NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

9/12/14
STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED TRAFFIC SIGNAL LAYOUT AT WESTVIEW DRIVE
SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: 1" = 20'
CITY DWG NO.
SHEET: 135 OF 226

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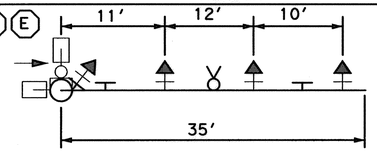
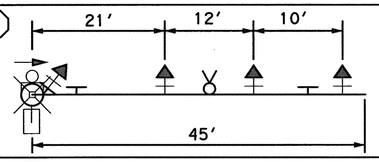
POLE SCHEDULE

POLE NUMBER	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION	STANDARDS
		SIGNAL	LUMIN	MTG.	FACE					
(C) (E) 	TYPE 1	35′	-	4 ASTROBRAC 2 PED	2H3 1H4LF 1V4LF 2CDP	-	POLARA NAVIGATOR R10-3E(L)	1 PRE-EMPT SENSOR 1 STREET NAME SIGN POLE C - 1 WIMAX RADIO 2 R10-17T "S5"	BY ENGINEER IN FIELD AT APPROX. POLE C - STA. 22+97.7 36.3′ LT POLE E - STA. 24+02.4 33.5′ RT LUMPKIN ROAD	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(D) (F) 	TYPE 2	45′	15′	4 ASTROBRAC 1 PED	2H3 1H4LF 1V4LF 1CDP	250 W HPS WITH PHOTOELECTRIC CELL ON POLE D	POLARA NAVIGATOR R10-3E(L)	1 PRE-EMPT SENSOR 1 STREET NAME SIGN 2 R10-17T "S5"	BY ENGINEER IN FIELD AT APPROX. POLE D - STA. 23+96.2 41.8′ LT POLE F - STA. 23+03.8 39.3′ RT LUMPKIN ROAD	02893-02 02893-03 02893-04A 02893-04B 02893-05 02893-09
(G) (I) 	5′	-	-	-	-	-	POLARA NAVIGATOR R10-3E(R)	-	BY ENGINEER IN FIELD AT APPROX. POLE G - STA. 23+09.3 38.0′ LT POLE I - STA. 23+94.9 40.6′ RT LUMPKIN ROAD	02893-02 02893-03 02893-07
(H) 	15′	-	-	1 PED	1CDP	-	POLARA NAVIGATOR R10-3E(R)	-	BY ENGINEER IN FIELD AT APPROX. POLE H - STA. 24+03.3 34.2′ LT LUMPKIN ROAD	02893-02 02893-03 02893-07
(J) 	15′	-	-	1 PED	1CDP	-	POLARA NAVIGATOR R10-3E(R)	-	BY ENGINEER IN FIELD AT APPROX. POLE J - STA. 22+95.1 31.0′ RT LUMPKIN ROAD	02893-02 02893-03 02893-07

TRAFFIC SIGNAL CONTROLLER

CABINET	TYPE	CONTROLLER	AUX. CONTROL	REMARKS	LOCATION	STANDARDS
(A) 	UL TYPE 3R	METERED SERVICE PEDESTAL WITH TWO SINGLE POLE 30 AND 60 AMP CIRCUIT BREAKERS	-	-	BY ENGINEER IN FIELD AT APPROX. STA. 23+02.3 57.3′ LT LUMPKIN ROAD	02893-14
(B)	ITS 340	2070L WITH GPS SERIAL COMMUNICATION MODULE AND BATTERY BACKUP SYSTEM	THREE POLE STREET LIGHTING CONTACTOR	STANDARD SPECIFICATION 16730, 16731 16732, AND 16785	BY ENGINEER IN FIELD AT APPROX. STA. 23+02.5 48.1′ LT LUMPKIN ROAD	02893-10C

No.	DATE	REVISIONS	APP.

9/12/14

THOMAS D. DUNCAN P.E. 98353 LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PROPOSED TRAFFIC SIGNAL LAYOUT AT WESTVIEW DRIVE

SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
N.T.S.	
SHEET: 136 OF 226	

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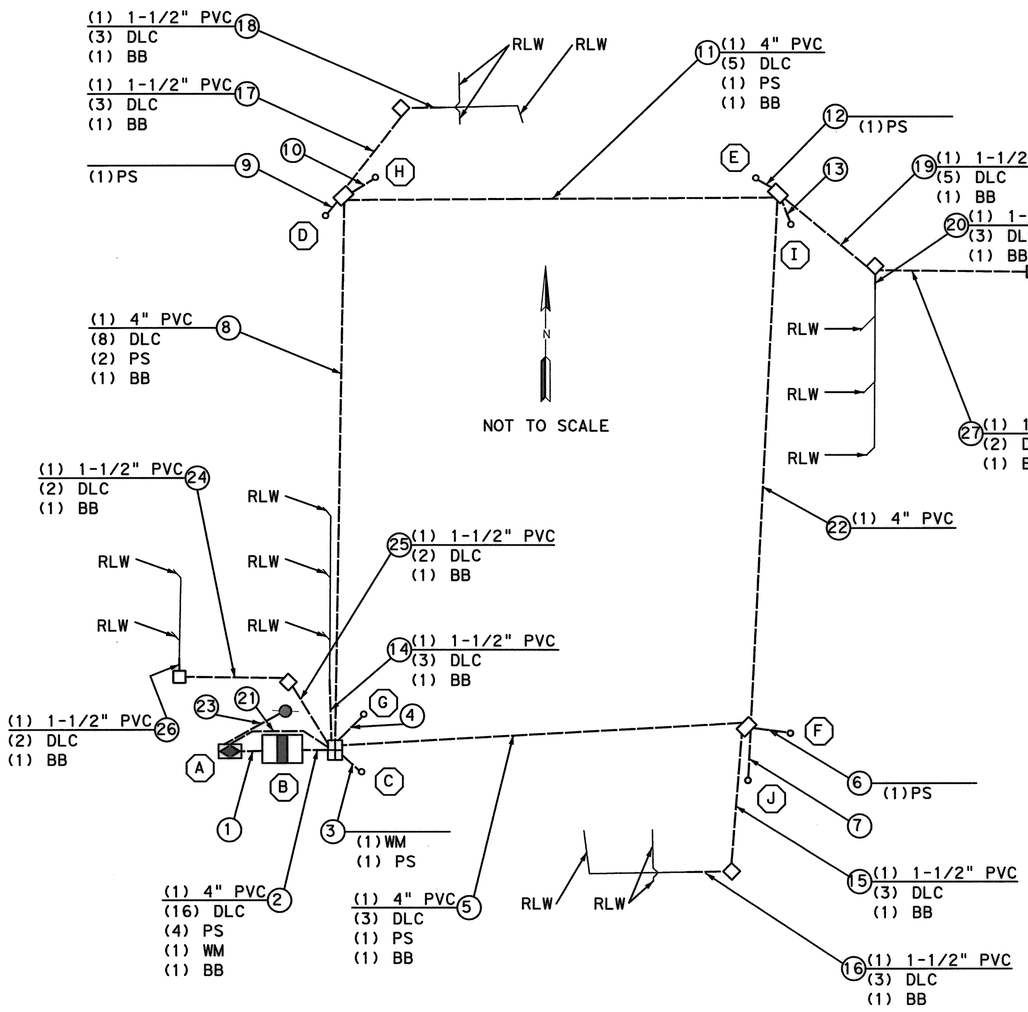
LOW VOLTAGE CIRCUIT

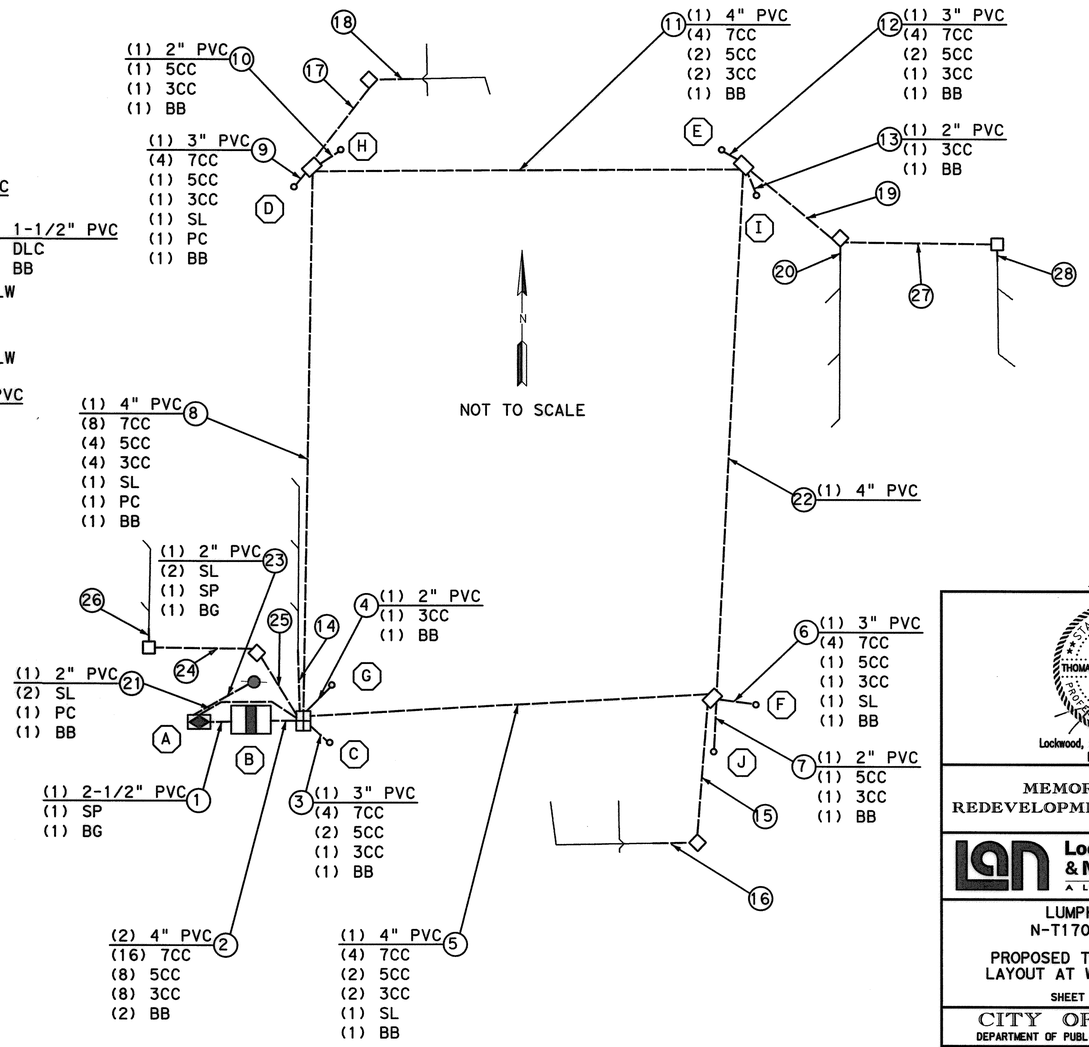
(X)Y"C =NUMBER, SIZE, AND TYPE OF CONDUIT
DLC =DETECTOR LEAD-IN CABLE, 14 AWG (I.M.S.A. 50-2-1984)
PS =PRE-EMPT SENSOR, OPTICOM, 20 3CC-SHIELDED CABLE (3M MODEL 138)
RLW =ROADWAY LOOP DETECTOR WIRE, 14 AWG (I.M.S.A. 51-5-1985)
WM =WIMAX CAT5E CABLE



HIGH VOLTAGE CIRCUIT

(X)Y"C =NUMBER, SIZE, AND TYPE OF CONDUIT
(X) =NUMBER OF CABLES (SIGNALS)
CC =14AWG SOLID CONDUCTOR
BB =BARE BOND AND 8 AWG SOLID
BG =BARE GROUND, 8 AWG SOLID
SP =SIGNAL POWER, #4 THHN
SL =STREET LIGHTING, 2-10 AWG XHHW
PC =PHOTO CELL, 2-10 AWG XHHW

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



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PROPOSED TRAFFIC SIGNAL
LAYOUT AT WESTVIEW DRIVE

SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
N. T. S.
SHEET: 137 OF 226

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RELOCATED EXISTING STREET NAME SIGNS

S1

LOGO	Lumpkin Road	
	1200	1100
	Memorial City District	

S2

LOGO	Lumpkin Road	
	1100	1200
	Memorial City District	

S3

LOGO	Westview Drive	
	10600	10500
	Memorial City District	

S4

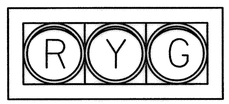
LOGO	Westview Drive	
	10500	10600
	Memorial City District	

NOTE:

1. RELOCATE EXISTING OVERHEAD STREET NAME SIGNS DURING CONSTRUCTION PHASE. REFER FOR COH TRAFFIC SIGNAL DETAIL NO. 02893-09 FOR SPAN WIRE HANGER DETAIL.

SIGNAL HEAD SCHEDULE

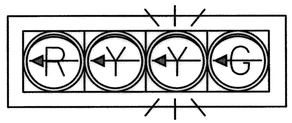
12" HORIZONTAL



B, D, E, G, K, L, M, N

W1 THROUGH W8

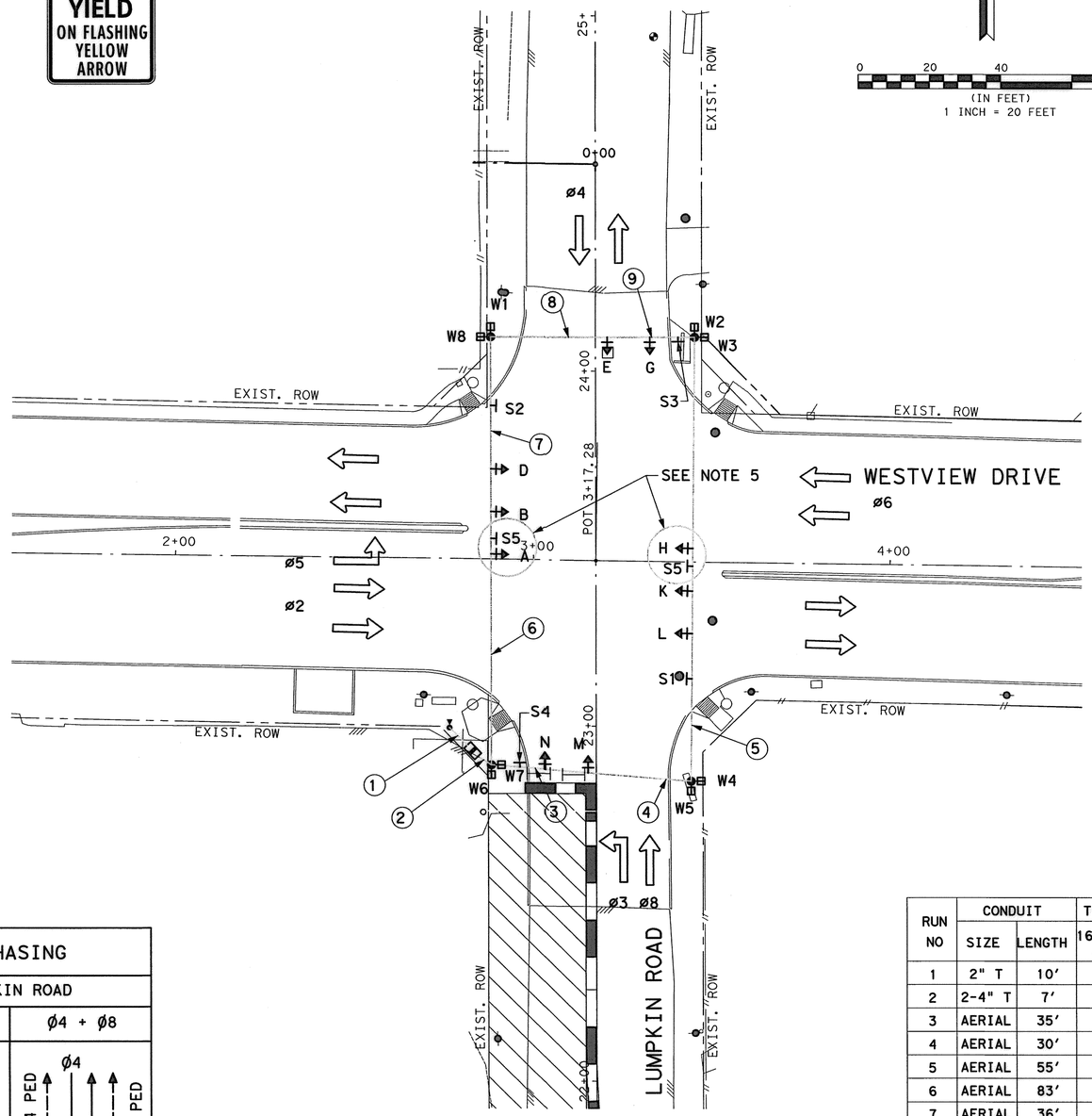
12" HORIZONTAL

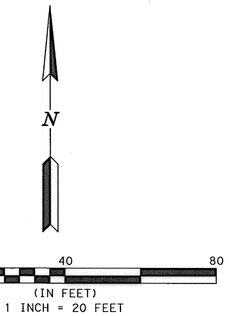


A, H

PROPOSED OVERHEAD SIGNS

S5: R10-17T
SIZE: 30" X 30"





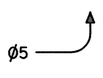
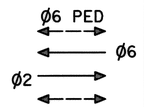
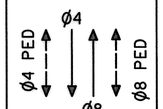
LEGEND:

- DIRECTION OF TRAFFIC
- SPAN WIRE
- 40' WOOD POLE
- WORK ZONE
- TEMPORARY ASPHALT PAVEMENT
- TYPE III BARRICADE W/ ROAD CLOSED SIGN

NOTES:

1. THE CONTRACTOR SHALL ADJUST THE SIGNALS AS NEEDED DURING THE CONSTRUCTION OF THIS INTERSECTION.
2. COORDINATE WITH THE CITY OF HOUSTON TRAFFIC OPERATIONS BRANCH FOR APPROVED PHASING AND TIMING PLANS.
3. THE TEMPORARY SIGNALS SHALL OPERATE AS FIXED TIME DURING CONSTRUCTION.
4. SEE TRAFFIC CONTROL PLANS FOR ADDITIONAL INFORMATION.
5. COVER LEFT TURN SIGNAL HEAD AND S5 USING BLACK PLASTIC OR APPROVED EQUAL WHEN REQUIRED DUE TO CLOSURE OF LEFT TURN BAY.

TEMPORARY TRAFFIC SIGNAL PHASING

WESTVIEW DRIVE		LUMPKIN ROAD	
ø5	ø2 + ø6	ø3	ø4 + ø8
			

SHOWN FOR THIS PHASE ONLY

RUN NO	CONDUIT		TRAFFIC SIGNAL CABLE		
	SIZE	LENGTH	16C #14 AWG	1C #4 AWG	1C #8AWG (BARE)
1	2" T	10'		2	1
2	2-4" T	7'	6		2
3	AERIAL	35'	3		
4	AERIAL	30'	2		
5	AERIAL	55'	2		
6	AERIAL	83'	3		
7	AERIAL	36'	2		
8	AERIAL	40'	1		
9	AERIAL	20'	1		

T = TRENCH

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TEMPORARY TRAFFIC SIGNAL LAYOUT AT WESTVIEW DRIVE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1" = 20'
CITY DWG NO.
SHEET: 138 OF 226

9/3/2014 5:09:00 PM MJGuthrie

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\136-10384-001\4-0-Production\4-01-Drawings\Traffic\001-TS-TEMP01

SUMMARY OF SIGNS

PLAN SHEET NO	SIGN NO	SIGN NOMENCLATURE	SIGN TEXT	DIMENSION (INCHES)	SQUARE POST	SIGNAL MOUNT	ROUND POST (PERMISSION NEEDED FROM CITY TRAFFIC ENGINEER)	NUMBER OF POSTS (1 OR 2)	SIGN AREA SQ. FT. (FOR INFORMATION ONLY NOT INTENDED FOR BID)	SIGN POST SIZE (TABLE A)
1 OF 3	1	D3-1	KATY FRWY ROAD / 10500	48X9	X			1	3	
		D3-1	LUMPKIN ROAD / 1000	48X9					3	
		R1-1	STOP	36X36					9	
		R6-2R	ONE WAY WITH RIGHT ARROW	24X30					5	
	2	R3-5R	RIGHT ONLY	30X36	X			1	7.5	
	3	R3-9cP	BEGIN	24X8	X			1	1.3	
		R3-9B	TWO-WAY LEFT TURN LANE	24X36					6	
	4	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	5	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	6	R3-9dP	END	24X8	X			1	1.3	
		R3-9B	TWO-WAY LEFT TURN LANE	24X36					6	
	7	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	8	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	9	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	10	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	11	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	12	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	13	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	14	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	15	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	16	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	17	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	18	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	19	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	20	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	21	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	22	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	23	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	24	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	25	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	26	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	27	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	28	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	29	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	30	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
2 OF 3	31	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	32	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	33	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	34	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	35	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	36	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	37	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	38	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	39	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	40	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	41	R7-2A(MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
SUMMARY OF SIGNS

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER | WASTEWATER | STORMWATER | ST. & BRIDGE | TRAFFIC | SWD | FACILITY

FILE NO.:
DRAWING SCALE:
CITY DWG NO.
SHEET:
139 OF 226

Lockwood, Andrews & Newnam, Inc.
Firm No. 2814

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
93333
REGISTERED PROFESSIONAL ENGINEER
9/12/14

No.	DATE	REVISIONS	APP.

SUMMARY OF SIGNS

PLAN SHEET NO	SIGN NO	SIGN NOMENCLATURE	SIGN TEXT	DIMENSION (INCHES)	SQUARE POST	SIGNAL MOUNT	ROUND POST (PERMISSION NEEDED FROM CITY TRAFFIC ENGINEER)	NUMBER OF POSTS (1 OR 2)	SIGN AREA SQ. FT. (FOR INFORMATION ONLY NOT INTENDED FOR BID)	SIGN POST SIZE (TABLE A)
3 OF 3	42	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	43	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	44	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	45	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	46	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	47	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	48	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	49	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	50	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	51	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	52	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	53	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	54	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	55	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	56	R3-9B	TWO-WAY LEFT TURN LANE	24X36	X			1	6	
	57	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	58	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	59	R5-2	NO TRUCKS (SYMBOL)	24X24	X			1	4	
	60	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	61	R7-2A (MOD)	NO PARKING WITH DOUBLE ARROW	12X18	X			1	1.5	
		R7-201A	TOW-AWAY ZONE	12X6					0.5	
	62	R5-2	NO TRUCKS (SYMBOL)	24X24	X			1	4	
SITE 1	63	R1-1	STOP	30X30	X			1	6.3	
SITE 3	64	R1-1	STOP	30X30	X			1	6.3	

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SUMMARY OF SIGNS

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.

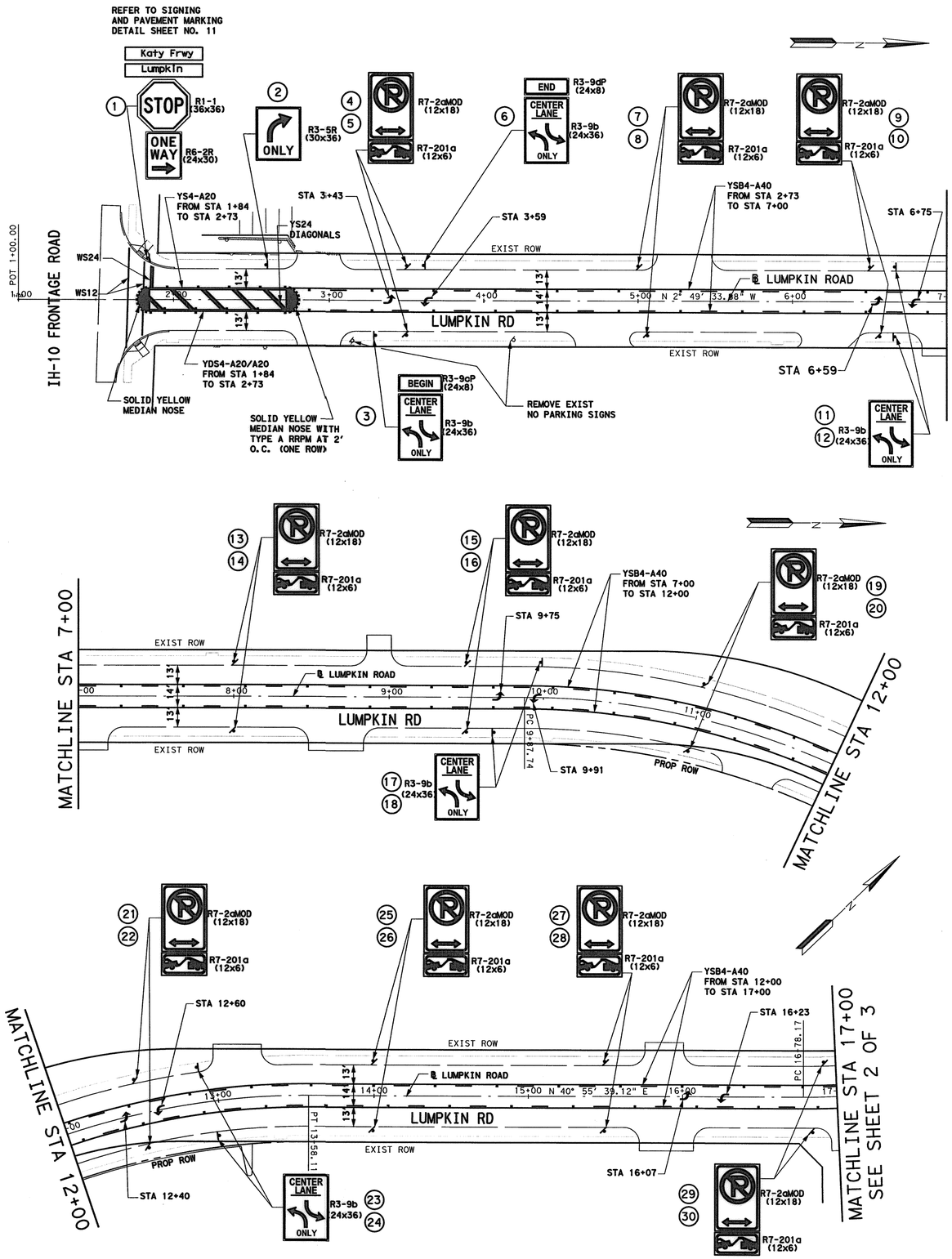
SHEET:
140 OF 226

REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02764	RRPM, Type II-A-A "A"	EA	93
02767	TPM (12-Inch, Solid, White "WS12")	LF	112
02767	TPM (24-Inch, Solid, White "WS24")	LF	13
02767	TPM (4-Inch, Solid, Yellow "YS4")	LF	90
02767	TPM (4-Inch, Solid & Broken, Yellow "YSB4")	LF	2854
02767	TPM (4-Inch, Double Solid, Yellow "YDS4")	LF	180
02767	TPM (24-Inch, Solid, Yellow "YS24")	LF	60
02767	TPM (Arrow)	EA	10
02767	TPM (Solid Yellow Median Nose)	EA	2
01554	Placement of Permanent Signs	EA	30

RRPM = RAISED REFLECTIVE PAVEMENT MARKERS
TPM = THERMOPLASTIC PAVEMENT MARKINGS

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 THOUGHOUT THE PROJECT AND AT THE PROJECT 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: 35 MPH. THE POSTED SPEED LIMIT IS: 30 MPH.
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 STRIPING 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 THEMOPLASTIC. ALL PAVEMENT ARROWS AND LEGENDS SHALL ALSO BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. PREFORMED THEMOPLASTIC 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 THE CITY 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 THE 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 MARKINGS 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 TRAFFIC OPERATIONS DIVISION REPRESENTATIVE (713-803-3054).



No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING
BEGIN PROJECT TO STA 17+00

SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1" = 40'
CITY DWG NO.
SHEET: 141 OF 226

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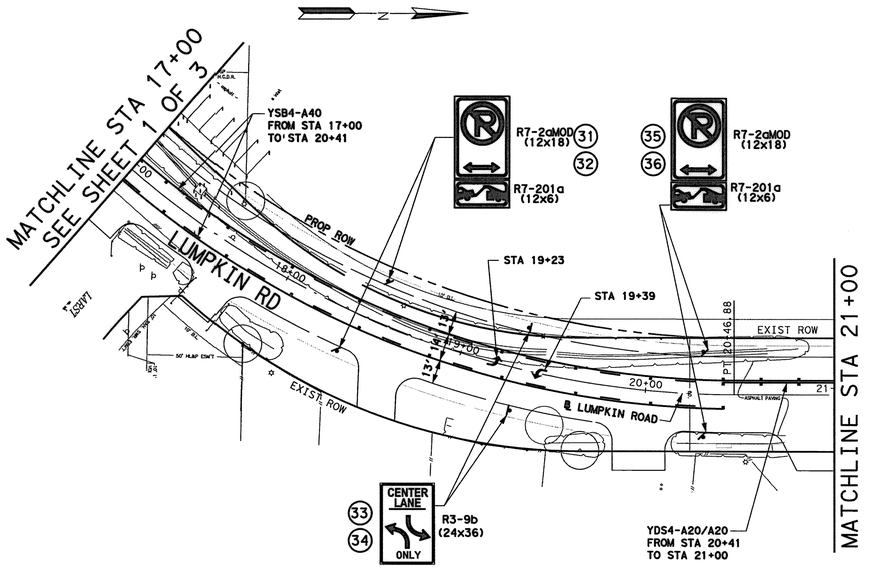
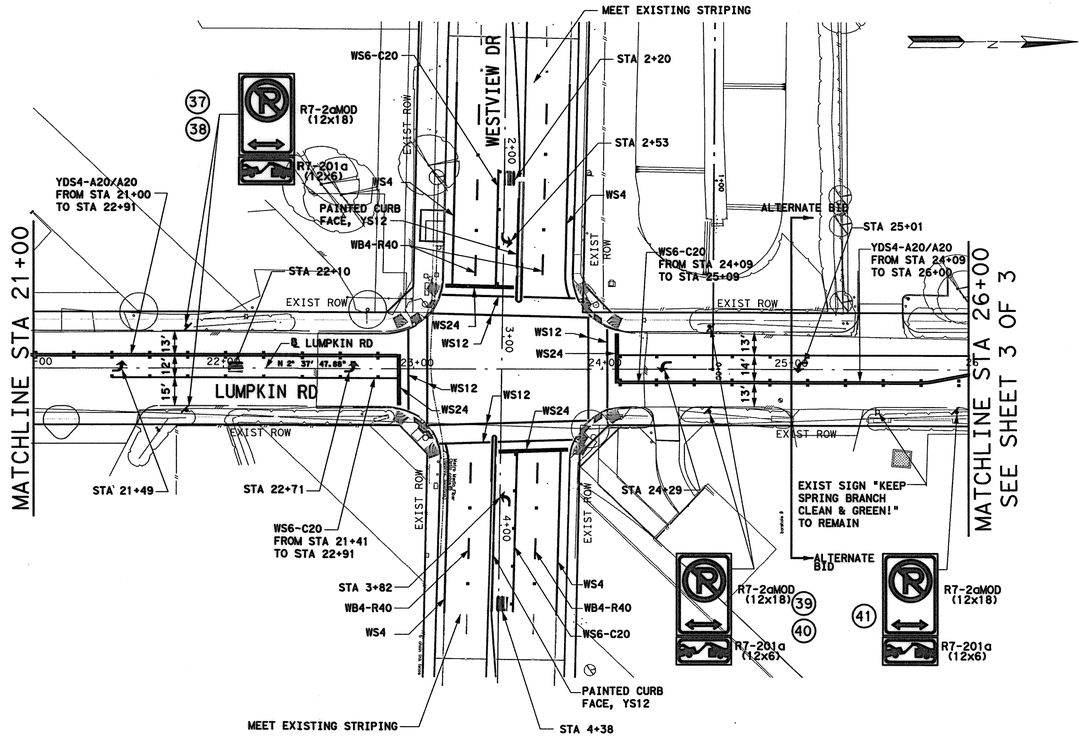
REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02764	RRPM, Type I-C "C"	EA	23
02764	RRPM, Type II-C-R "R"	EA	8
02764	RRPM, Type II-A-A "A"	EA	59
02767	TPM (4-Inch, Double Solid, Yellow "YDS4")	LF	538
02767	TPM (4-Inch, Solid & Broken, Yellow "YSB4")	LF	682
02767	TPM (12-Inch, Solid, Yellow "YS12")	LF	209
02767	TPM (4-Inch, Solid, White "WS4")	LF	353
02767	TPM (4-Inch, Broken, White "WB4")	LF	320
02767	TPM (6-Inch, Solid, White "WS6")	LF	250
02767	TPM (12-Inch, Solid, White "WS12")	LF	530
02767	TPM (24-Inch, Solid, White "WS24")	LF	133
02767	TPM (Word)	EA	3
02767	TPM (Arrow)	EA	8
01554	Placement of Permanent Signs	EA	11

RRPM = RAISED REFLECTIVE PAVEMENT MARKERS
TPM = THERMOPLASTIC PAVEMENT MARKINGS

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 THOUGHOUT THE PROJECT AND AT THE PROJECT 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: 35 MPH. THE POSTED SPEED LIMIT IS: 30 MPH.
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 STRIPING 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 THEMOPLASTIC. ALL PAVEMENT ARROWS AND LEGENDS SHALL ALSO BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. PREFORMED THEMOPLASTIC 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 THE CITY 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 THE 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 MARKINGS 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 TRAFFIC OPERATIONS DIVISION REPRESENTATIVE (713-803-3054).





0 40 80 160
(IN FEET)
1 INCH = 40 FEET

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING
STA 17+00 TO STA 26+00

SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: 1" = 40'
CITY DWG NO.
SHEET: 142 OF 226

No.	DATE	REVISIONS	APP.

pw:\\ladpw.ladoo.int\projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Sign-Pavement Marking\001-PM-02.dgn
MJGuthrie
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9/12/2014

REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02764	RRPM, Type II-A-A "A"	EA	81
02767	TPM (4-Inch, Double Solid, Yellow "YDS4")	LF	367
02767	TPM (4-Inch, Solid & Broken, Yellow "YSB4")	LF	1738
02767	TPM (Arrow)	EA	6
01554	Relocate Existing Signs	EA	2
01554	Placement of Permanent Signs	EA	21

RRPM = RAISED REFLECTIVE PAVEMENT MARKERS
TPM = THERMOPLASTIC PAVEMENT MARKINGS

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 THOUGHOUT THE PROJECT AND AT THE PROJECT COMPLETION.
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15. FOR ALL CONSTRUCTION, ALL PAVEMENT MARKINGS AND SIGNING SHALL BE INSTALLED AND SHALL BE PAID BY THE PROJECT OWNER/DEVELOPER.
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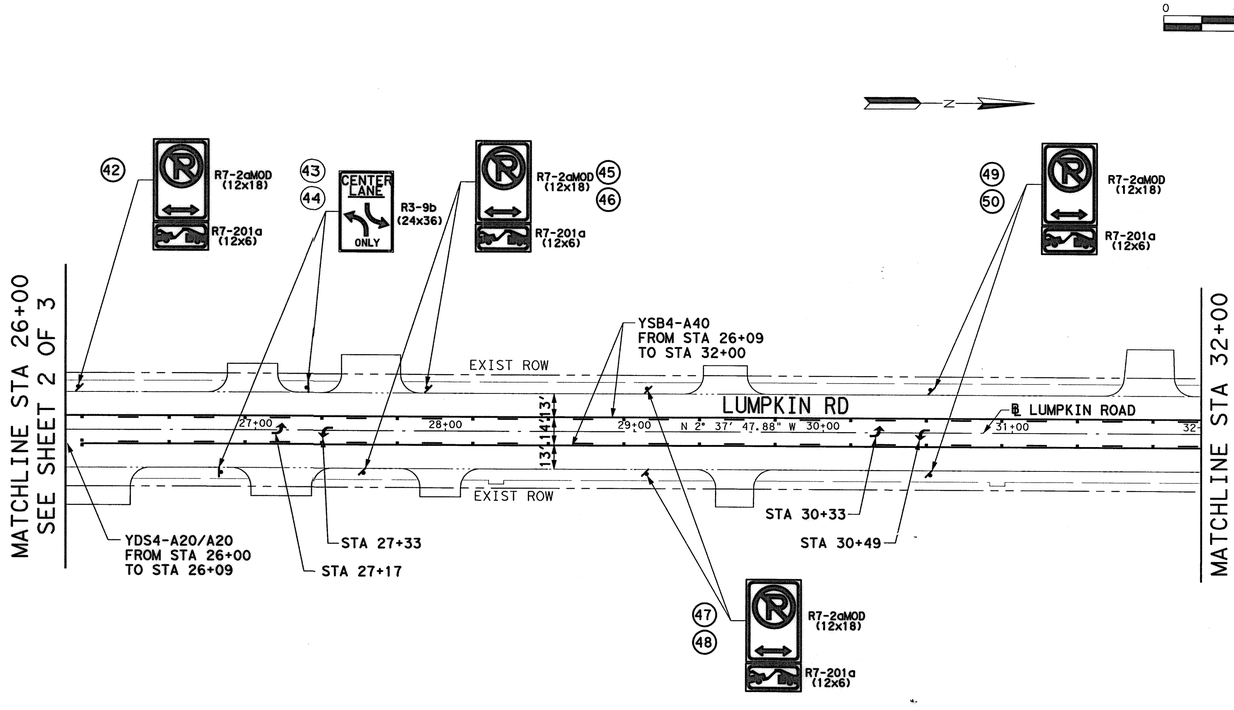
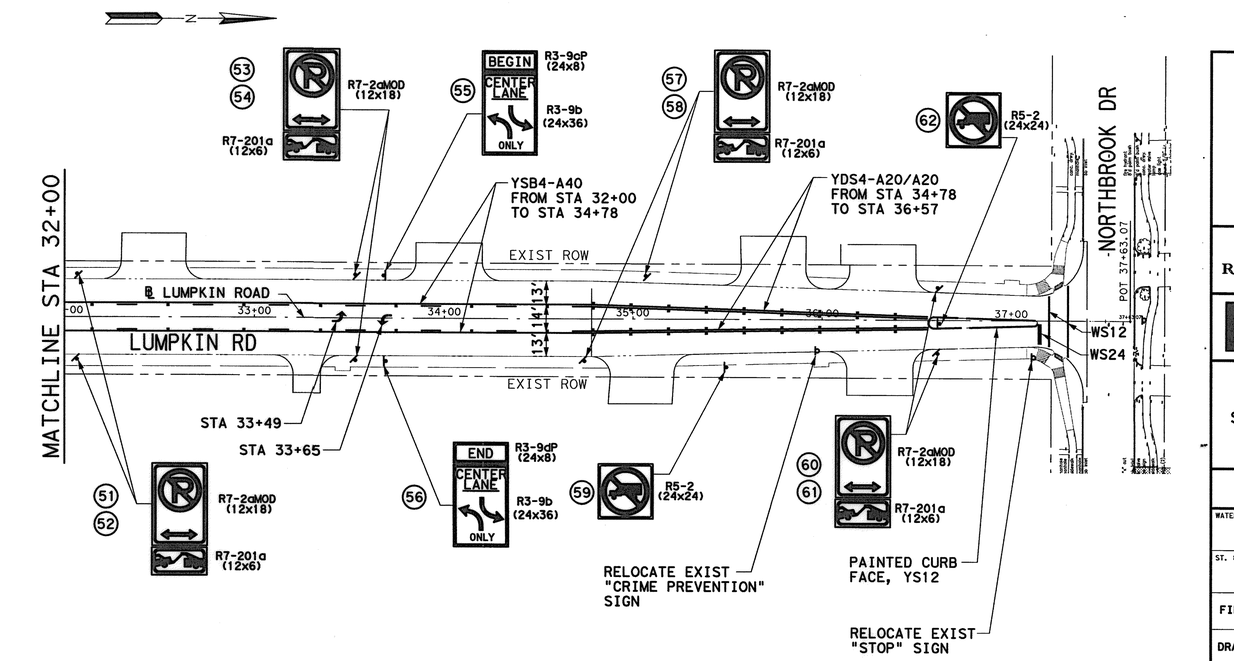




No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98553
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING
STA 26+00 TO END PROJECT

SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

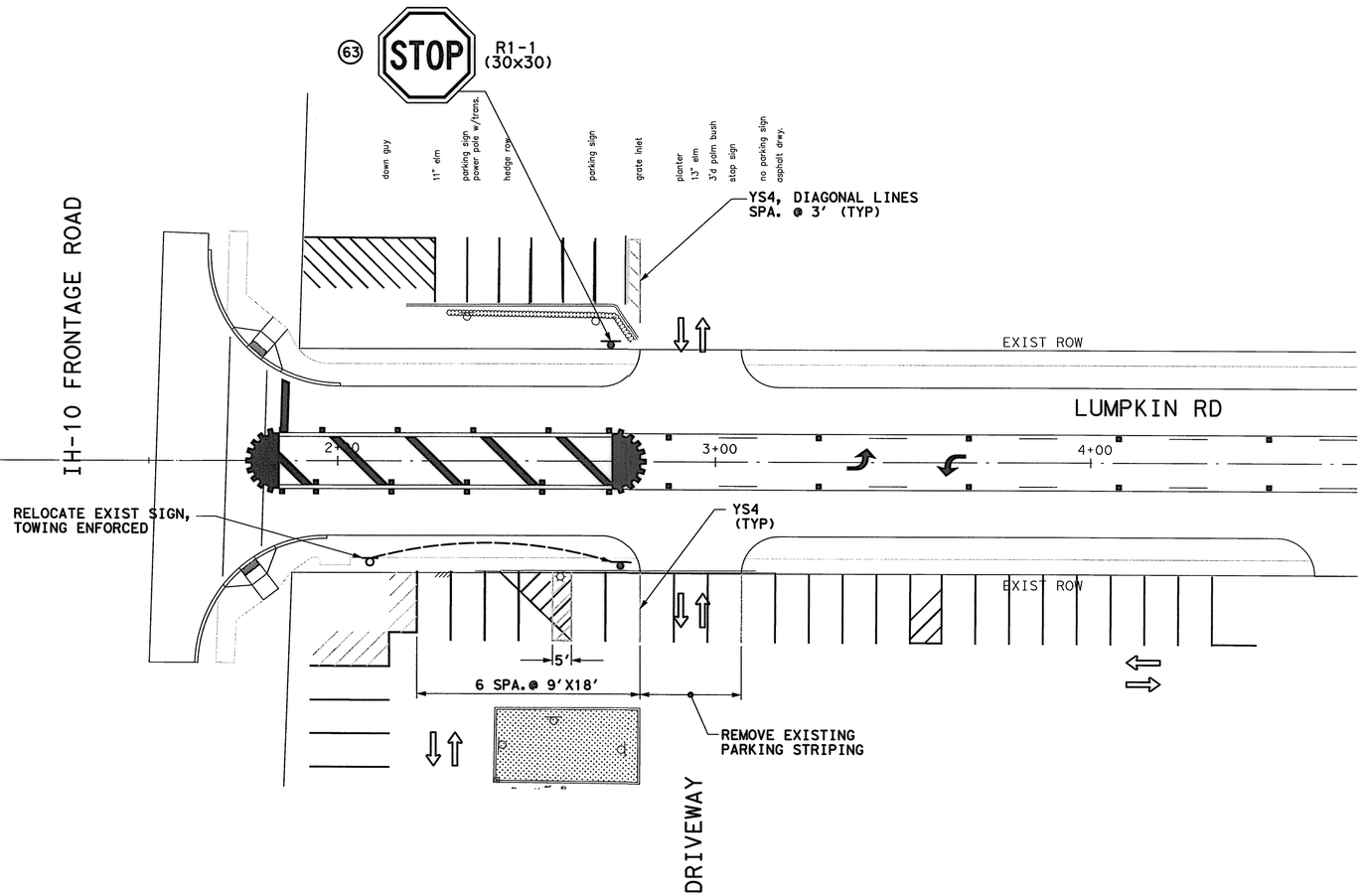
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

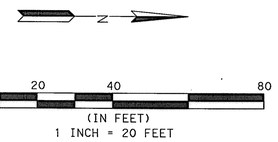
FILE NO.:
FACILITY
DRAWING SCALE: 1" = 40'
CITY DWG NO.
SHEET: 143 OF 226

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-10384-001\4-0-Production\4-01-Drawings\Sign-Pavement Marking\001-PM-03.dgn 9/12/2014 12:32:17 PM MJGuthrie

REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02767	Remove Existing Striping	LF	180
02767	TPM (4-Inch, Solid, Yellow "YS4")	LF	390
01554	Relocate Existing Signs	EA	1
01554	Placement of Permanent Signs	SF	7

TPM = THERMOPLASTIC PAVEMENT MARKINGS





LEGEND:

⇨ TRAFFIC CIRCULATION

EXISTING PARKING STALLS REMOVED	= 4 SPACES
NEW PARKING STALLS INSTALLED	= 4 SPACES

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
Licensed Professional Engineer
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SITE PARKING LAYOUT

SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

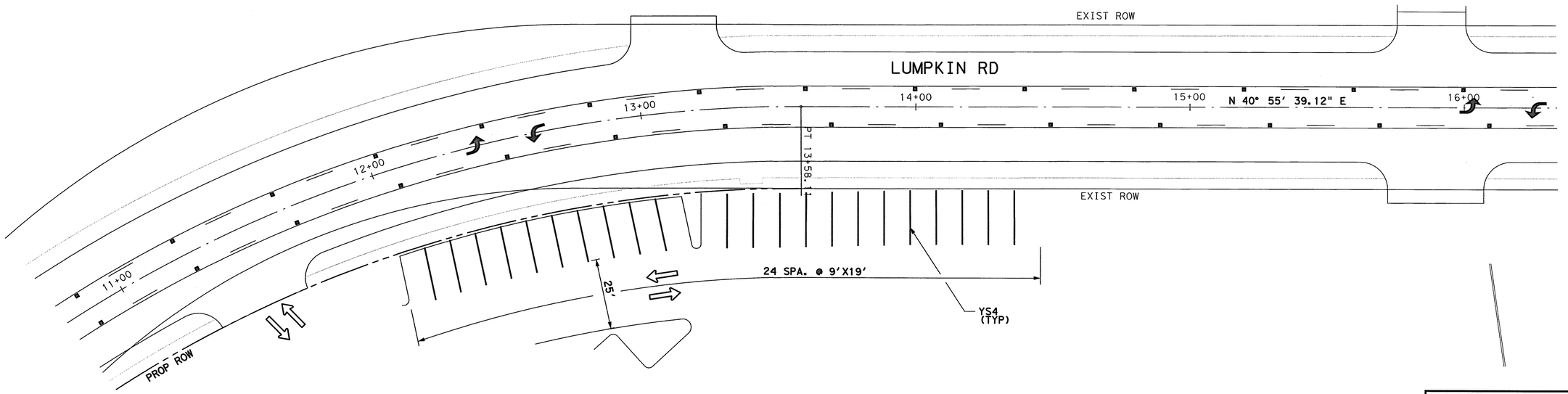
FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
1" = 20'	
SHEET: 144 OF 226	

REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02767	TPM (4-Inch, Solid, Yellow "YS4")	LF	418

TPM = THERMOPLASTIC PAVEMENT MARKINGS

HOUSTON COMMUNITY COLLEGE

0 20 40 80
(IN FEET)
1 INCH = 20 FEET



HOME DEPOT PARKING LOT
(SHOWN PARTIALLY)

LEGEND:

⇨ TRAFFIC CIRCULATION

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SITE PARKING LAYOUT

SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: 1" = 20'	CITY DWG NO.
SHEET: 145 OF 226	

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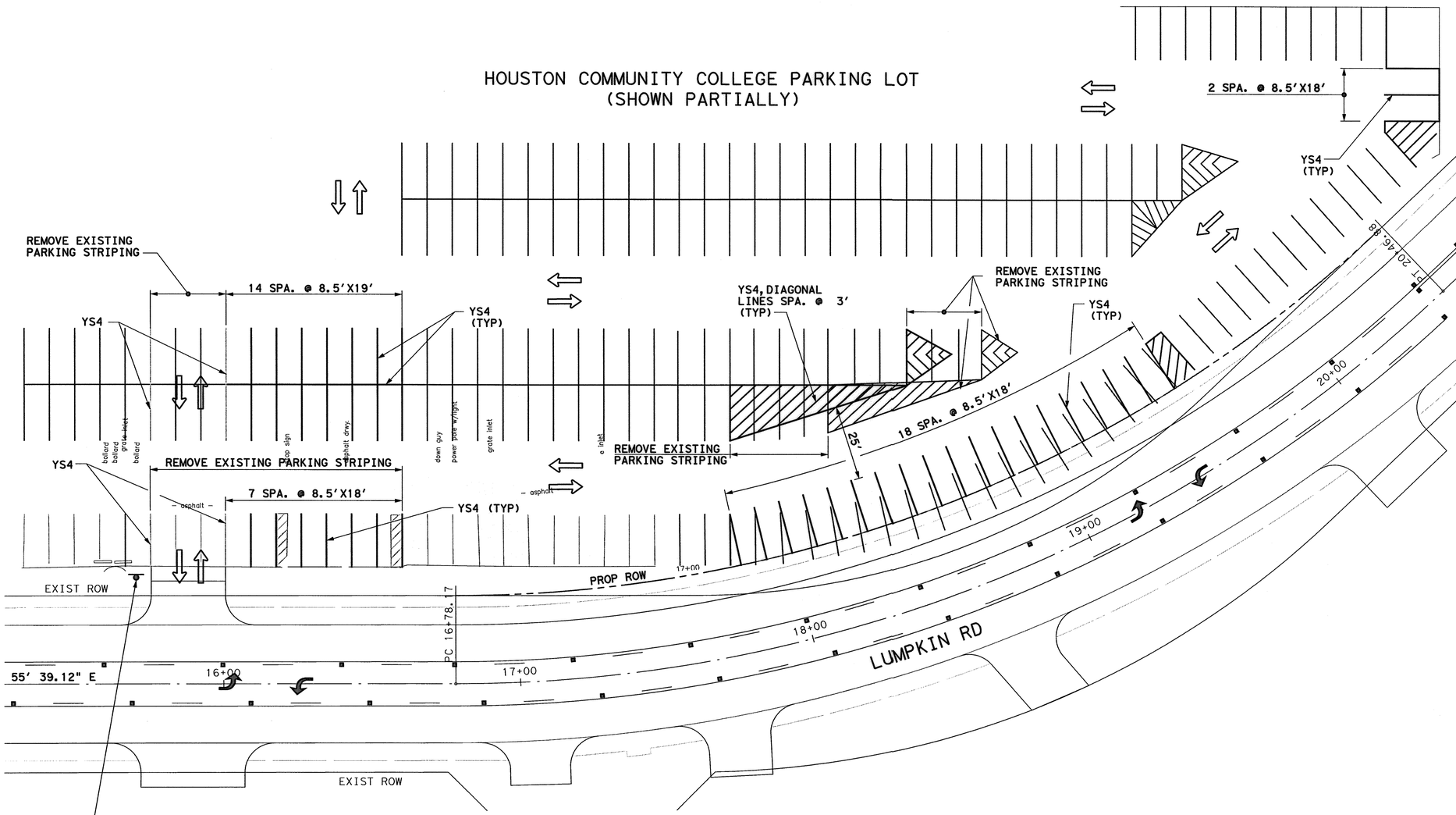
REFERENCE SPEC. NO.	DESCRIPTION	UNIT	QTY
02767	Remove Existing Striping	LF	1480
02767	TPM (4-Inch, Solid, Yellow "YS4")	LF	1580
01554	Placement of Permanent Signs	SF	7

TPM = THERMOPLASTIC PAVEMENT MARKINGS



0 20 40 80
(IN FEET)
1 INCH = 20 FEET

LEGEND:

TRAFFIC CIRCULATION

EXISTING PARKING STALLS REMOVED	= 37 SPACES
NEW PARKING STALLS INSTALLED	= 35 SPACES

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SITE PARKING LAYOUT

SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: 1" = 20'	CITY DWG NO.
SHEET: 146 OF 226	

pw:\\ladpw.ladco.int:projectwise\Documents\Projects\130-12384-001\4-Production\4-01-Drawings\Sign-Pavement Marking\001-PM-SITE03.dgn 9/12/2014 12:35:44 PM MJGuthrie

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3. THE PERMANENT PAVEMENT MARKINGS MAY BE MODIFIED AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
4. THE DESIGN SPEED FOR THE ROAD IS: 35. 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.
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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.
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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" 6" 12" 24" 24" 12", 24"	- Edge lines to delineate the right edge of the roadway. - Left edge of bicycle lane and lane lines between travel lanes in the same direction where changing of lanes is discouraged. - Perpendicular crosswalk lines. - Stop bars at intersections (signalized and unsignalized). - Hatching at high visibility crosswalks. - Diagonal hatching used in gores between same direction of travel lanes.
WG	White	Guide (2' stripe w/6' gap)	6" 6"	- Guide lines through intersections. - Taper lines for turn lanes.
YS	Yellow	Solid	4" 12", 24"	- Edge lines to delineate the left edge of a divided roadway, a one-way road, or ramp. - 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.
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).

Description and Application of Reflective Raised Pavement Markers (RRPM)

RRPM Types	Color	COH Stand. 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 (Y)
- Pattern (SB)
- Width of stripe (4)
- RPM Type (A)
- RPM spacing (40)
- RPM type (A)
- RPM spacing (40)

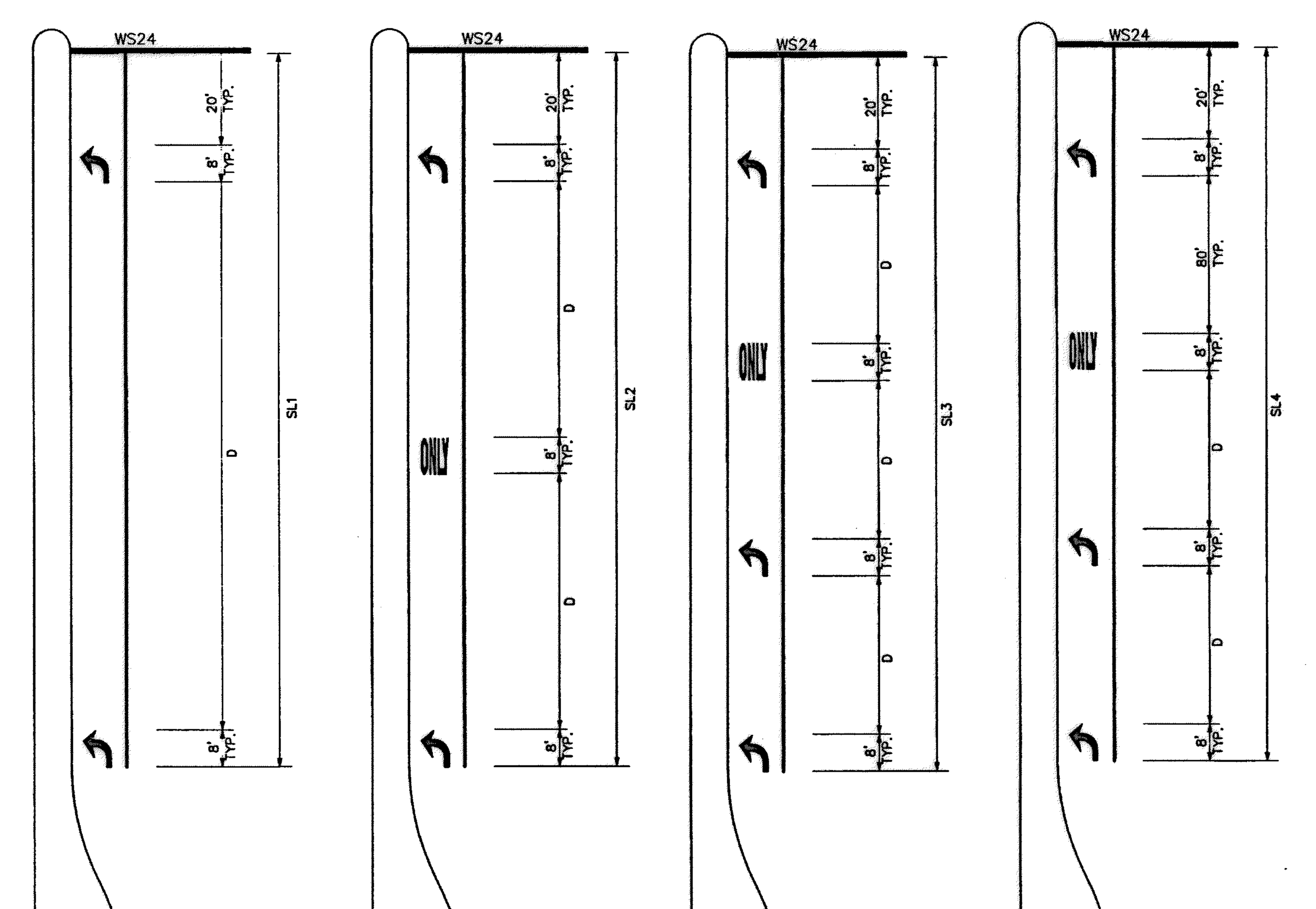
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

GENERAL NOTES AND LEGENDS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | DWG NO: 01510-01



CASE 1 (SL1)
SL < 110'
D= SL - 36

CASE 2 (SL2)
110' < SL < 200'
$D = \frac{(SL - 44)}{2}$

CASE 3 (SL3)
201' < SL < 300'
$D = \frac{(SL - 52)}{3}$

CASE 4 (SL4)
SL > 300'
$D = \frac{(SL - 132)}{2}$

KEY (FOR TURN LANES ONLY):

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND/OR WORDS (FEET)

GENERAL NOTES:

1. ALL CASES AND DETAILS ALSO APPLY TO RIGHT-TURN LANES.
2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
3. SL DIMENSION IS FROM BACK OF STOP LINE TO END OF TURN LANE. NOTE: DO NOT INCLUDE TAPER LENGTH.
4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT ALL SIGNALIZED INTERSECTIONS AND AT ALL UNSIGNALIZED INTERSECTIONS THAT HAVE TURN LANES.
5. MINIMUM SL= 100'. SL MAY BE LESS THAN 100 FEET ONLY BY APPROVAL OF THE CITY TRAFFIC ENGINEER.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LEFT/RIGHT-TURN "ONLY" AND ARROW SPACING

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | DWG NO: 01510-02

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING DETAILS
(SHEET 1 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE: NOT TO SCALE

CITY DWG NO.

SHEET: 147 OF 226

No.	DATE	REVISIONS	APP.

MJGuthrie

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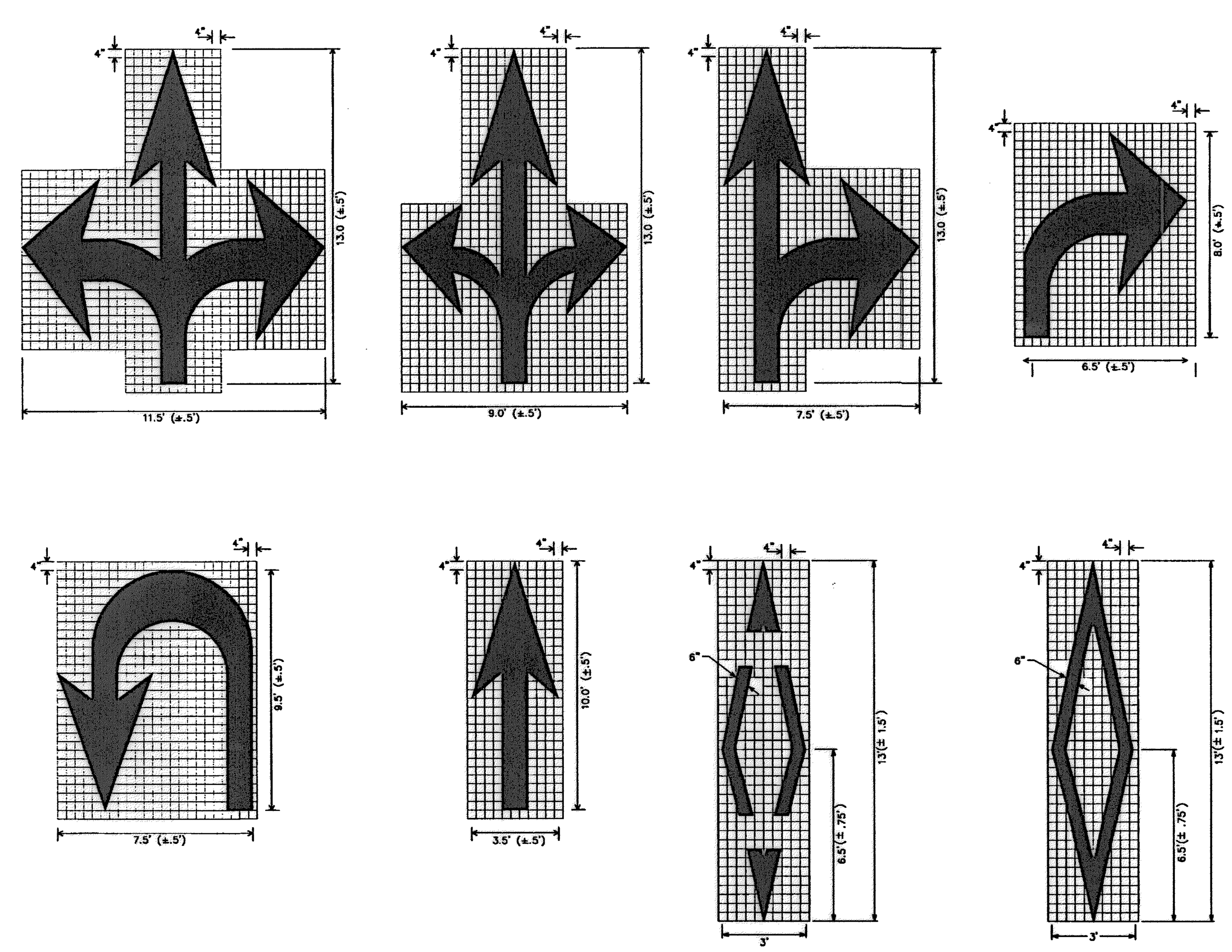
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PAVEMENT MARKING (WORDS)

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | 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 30 FEET.
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
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PAVEMENT MARKING – SYMBOLS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | DWG NO: 01510-04

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
SIGNING AND PAVEMENT MARKING DETAILS
(SHEET 2 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
NOT TO SCALE
SHEET: 148 OF 226

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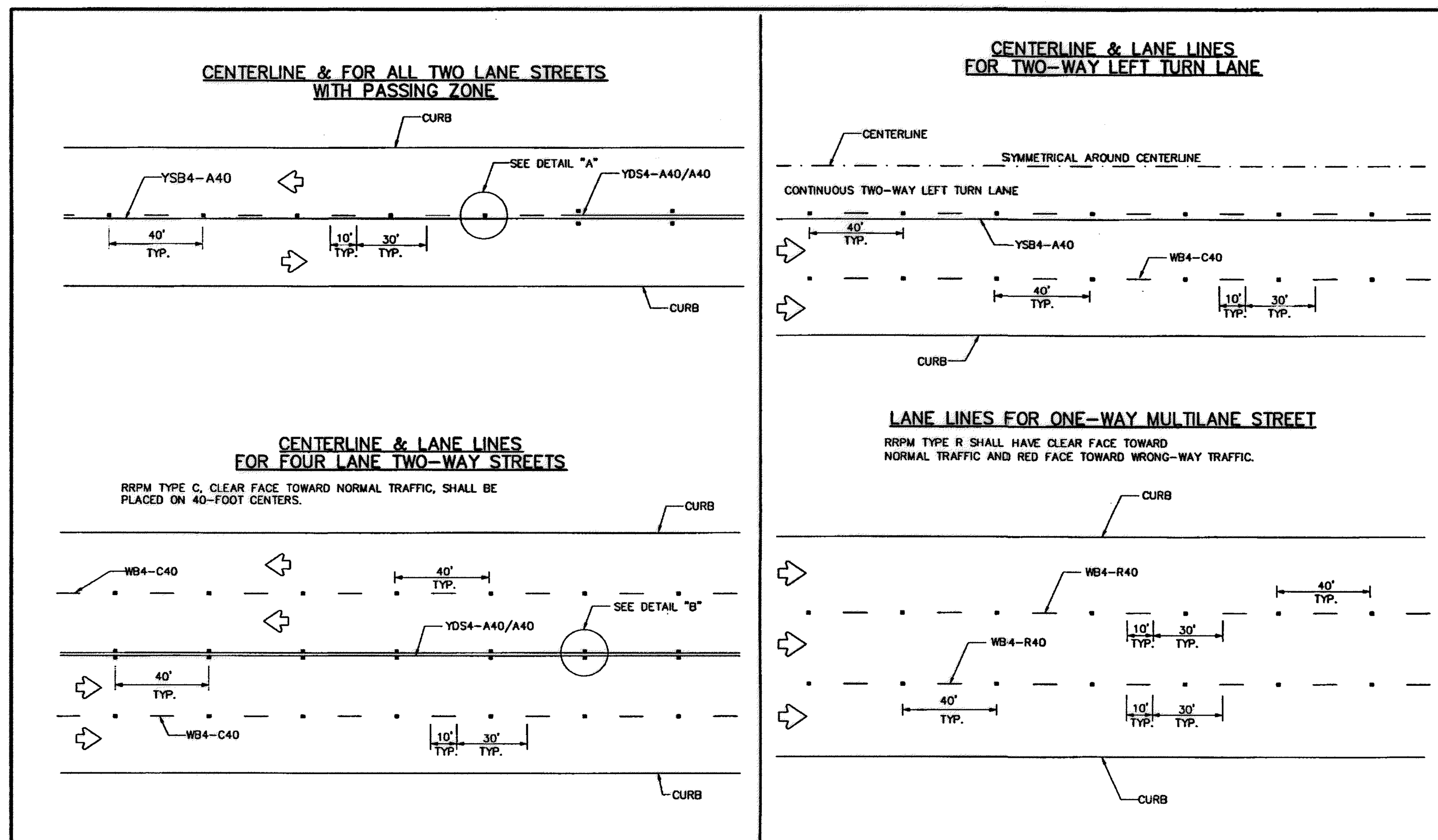
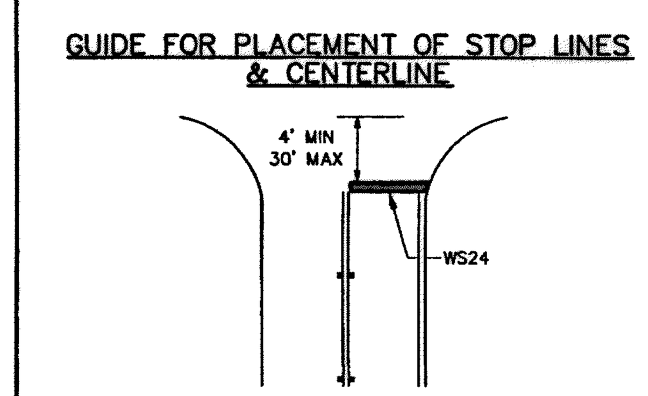
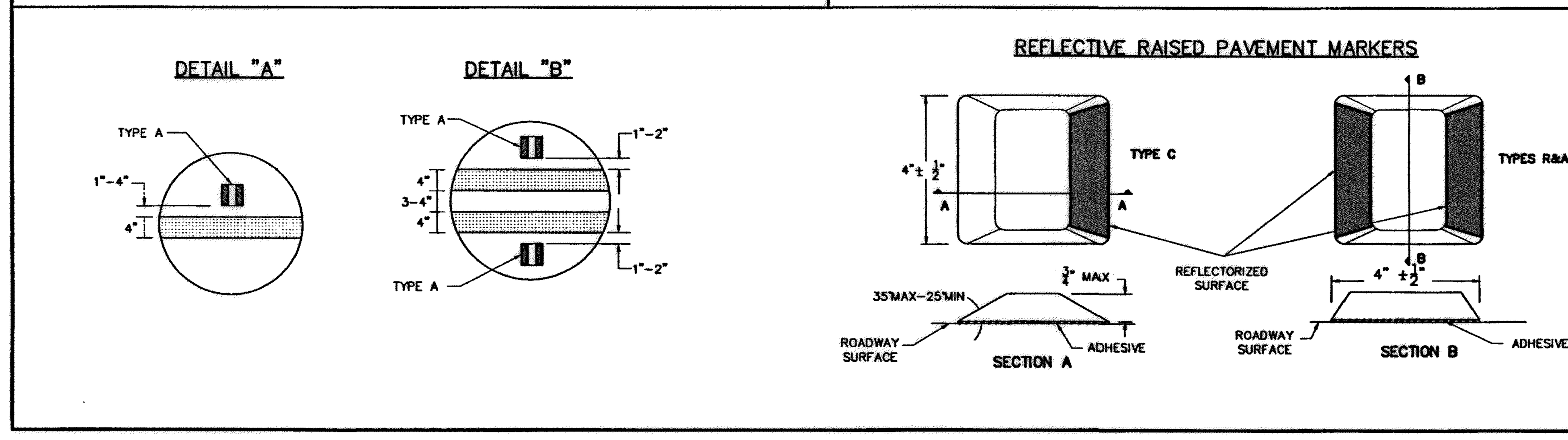


GENERAL NOTES:

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.





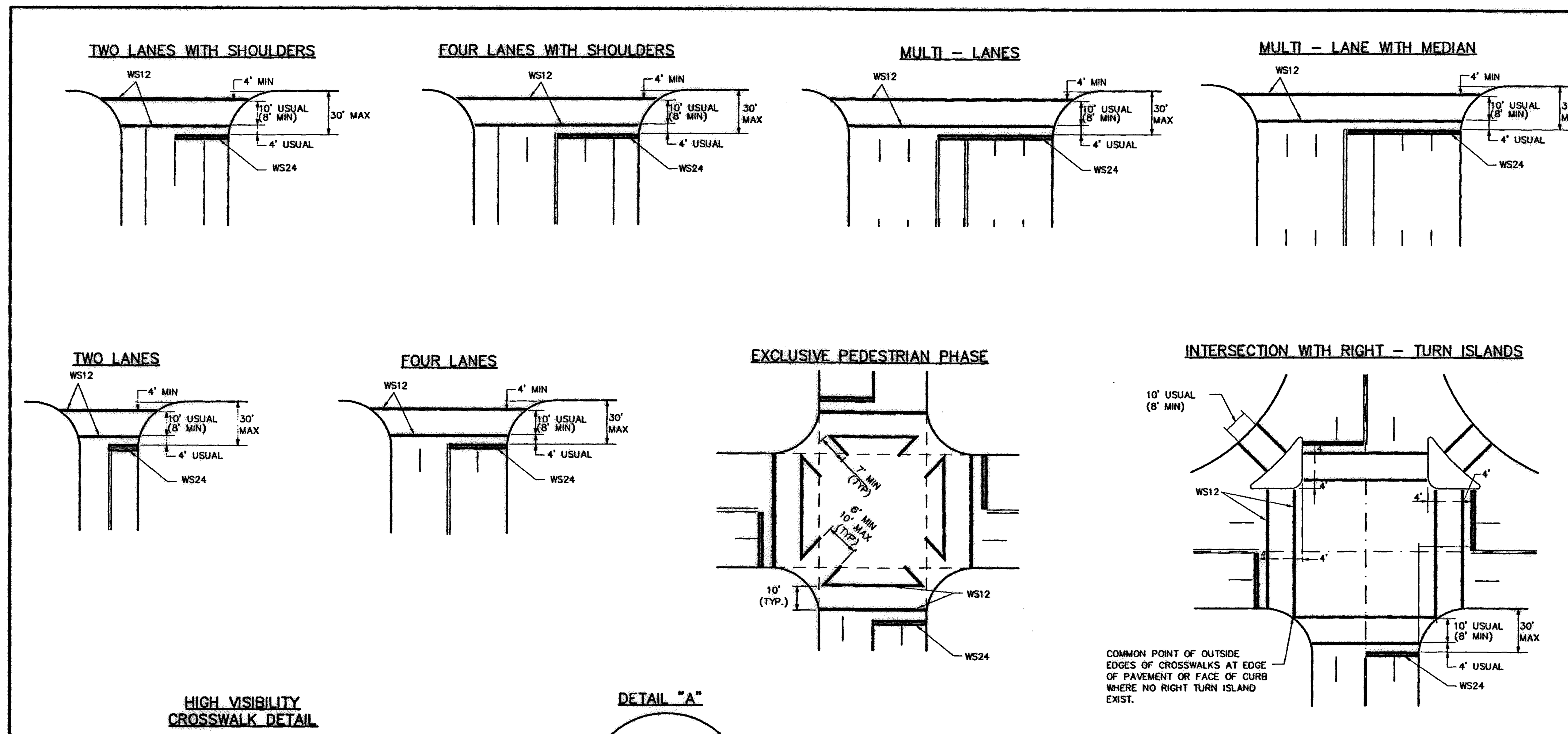
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

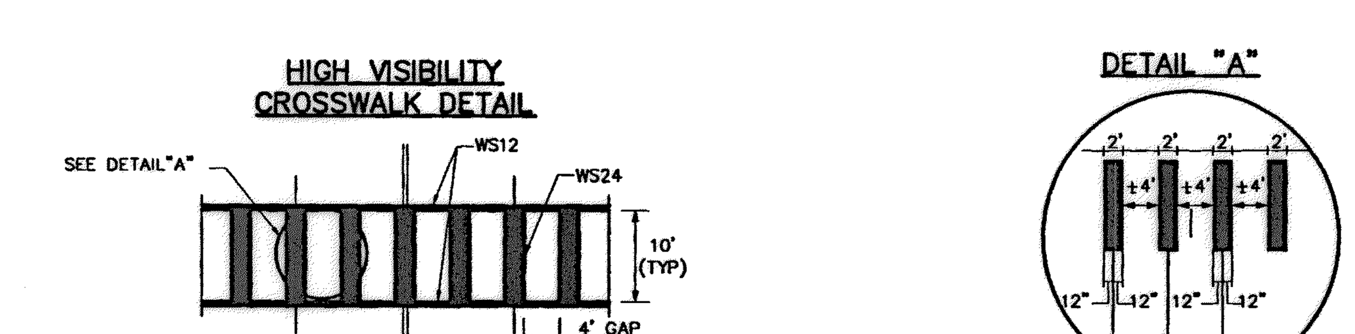
STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | DWG NO: 01510-05





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

NOTES:

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

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TYPICAL CROSSWALK DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 | DWG NO: 01510-10

THOMAS D. DUNCAN P.E. 98353 — STATE OF TEXAS — LICENSED PROFESSIONAL ENGINEER

9/12/14

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Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING DETAILS (SHEET 3 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE: NOT TO SCALE

CITY DWG NO.

SHEET: 149 OF 226

REVISIONS

No.	DATE	APP.

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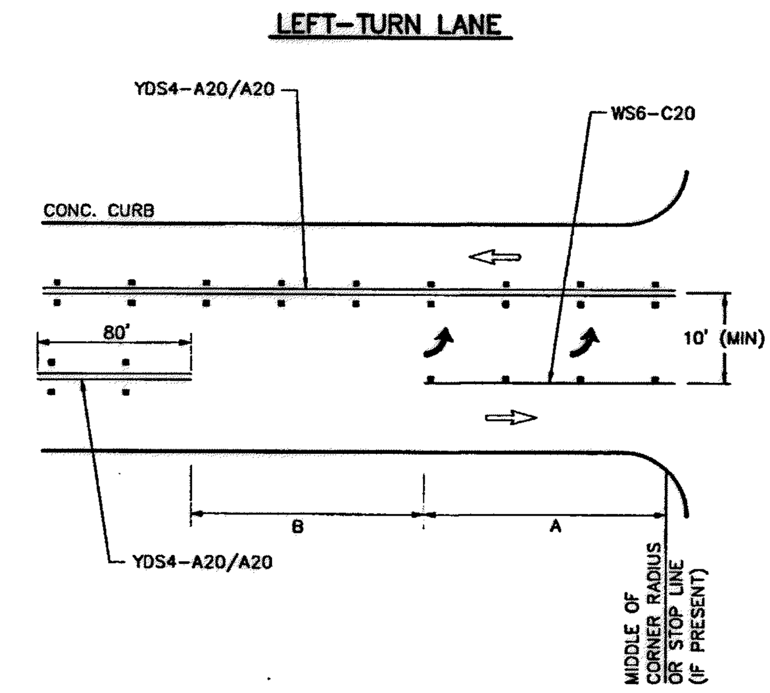
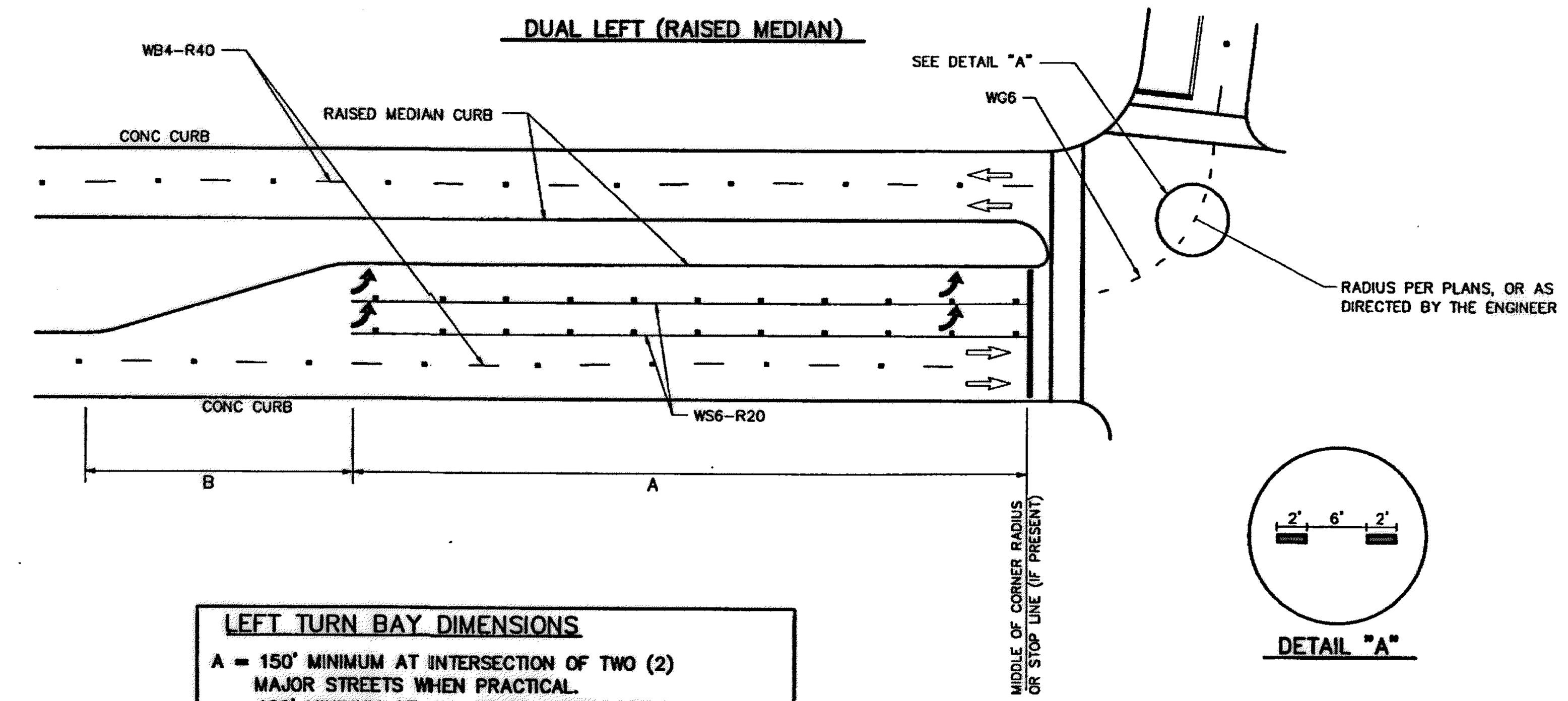
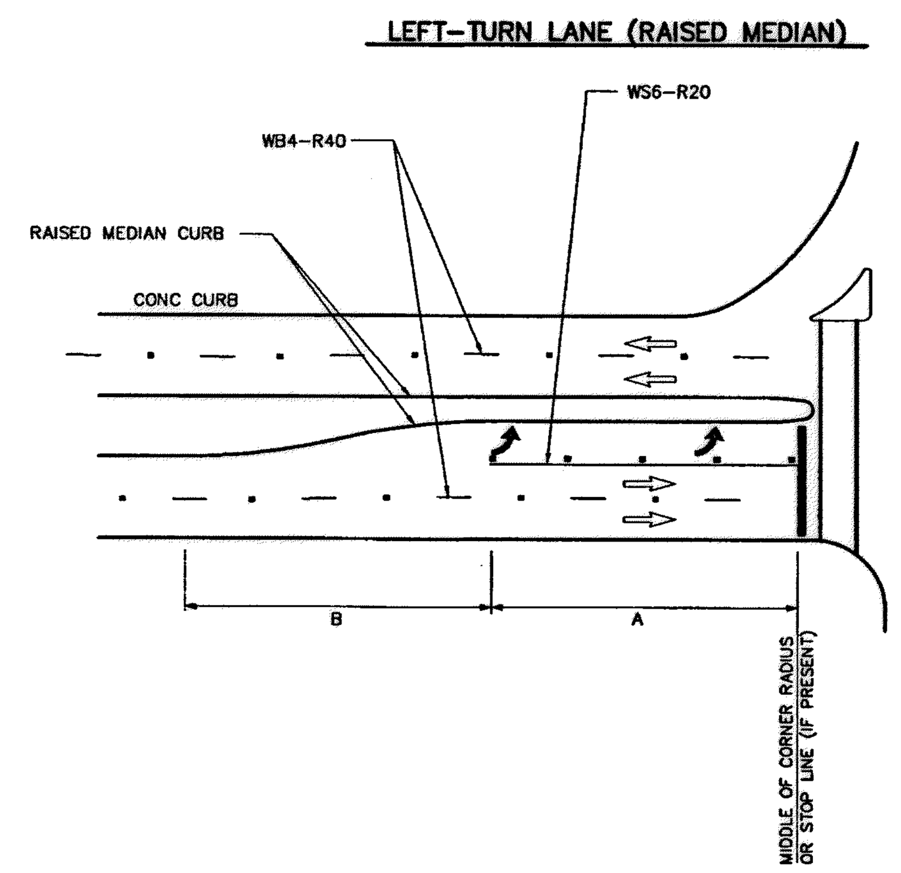






LEFT TURN BAY DIMENSIONS

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.

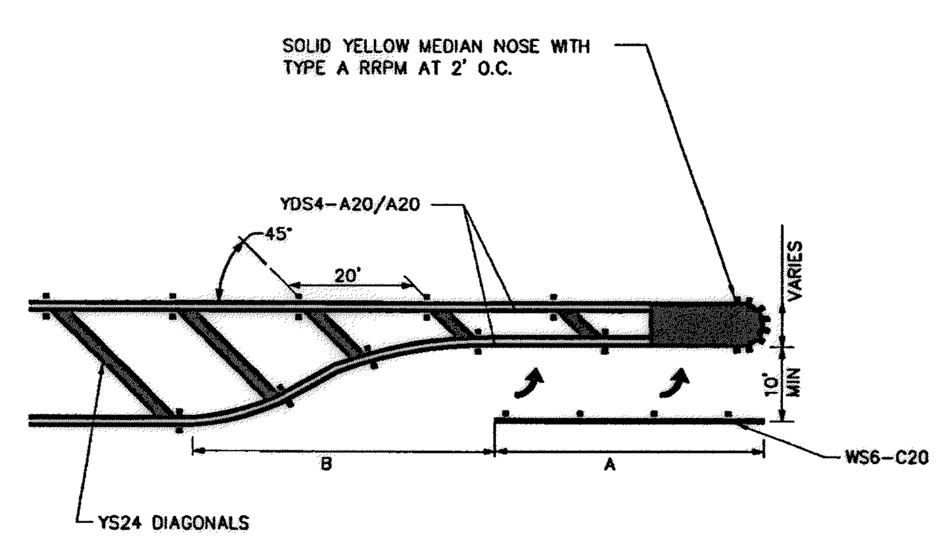
NOTE:
1. DIMENSIONS SHALL BE ADJUSTED AS DETERMINED BY CITY OF HOUSTON TRAFFIC ENGINEER.
2. REFER TO CITY OF HOUSTON DESIGN MANUAL (DWG No. 10.06-07) FOR DETAILS.

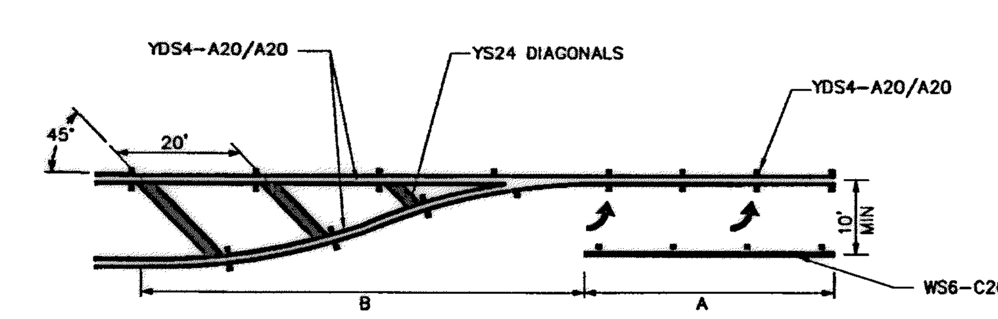
NOTES:

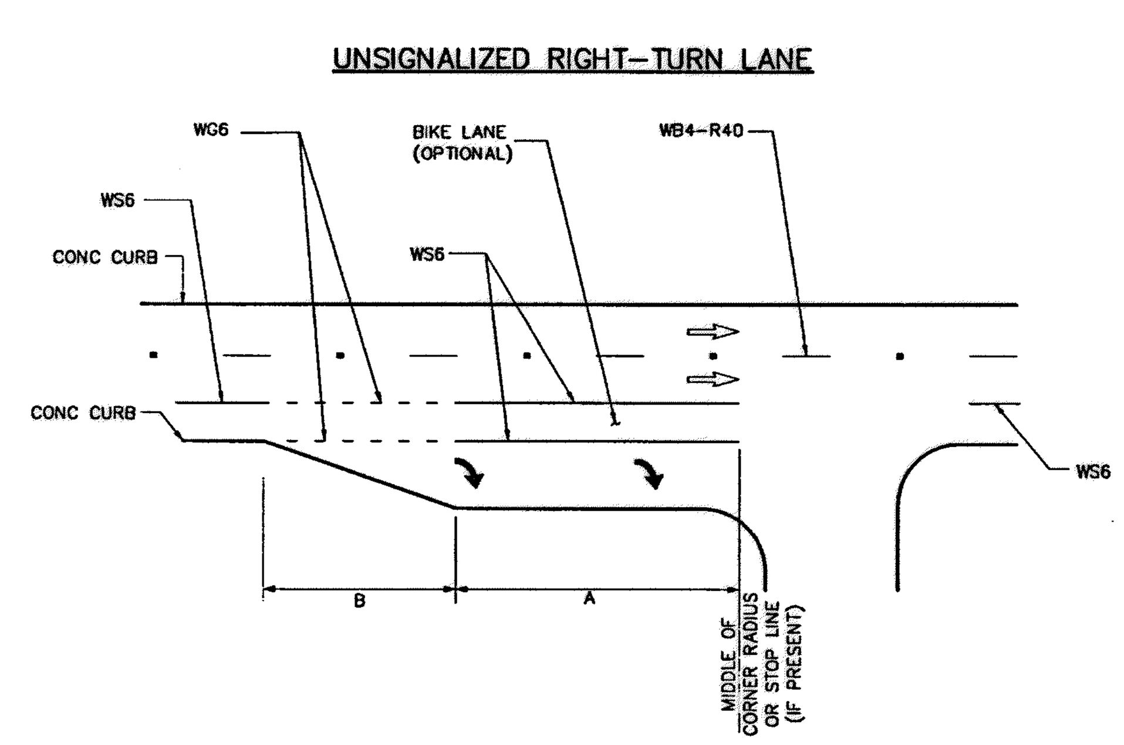
1. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
2. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS.
3. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" 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 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1 (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2012	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.

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 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2 (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2012	DWG NO: 01510-12

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
THOMAS D. DUNCAN P.E.
98353
LICENSED PROFESSIONAL ENGINEER
9/12/14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

SIGNING AND PAVEMENT MARKING DETAILS (SHEET 4 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 150 OF 226	

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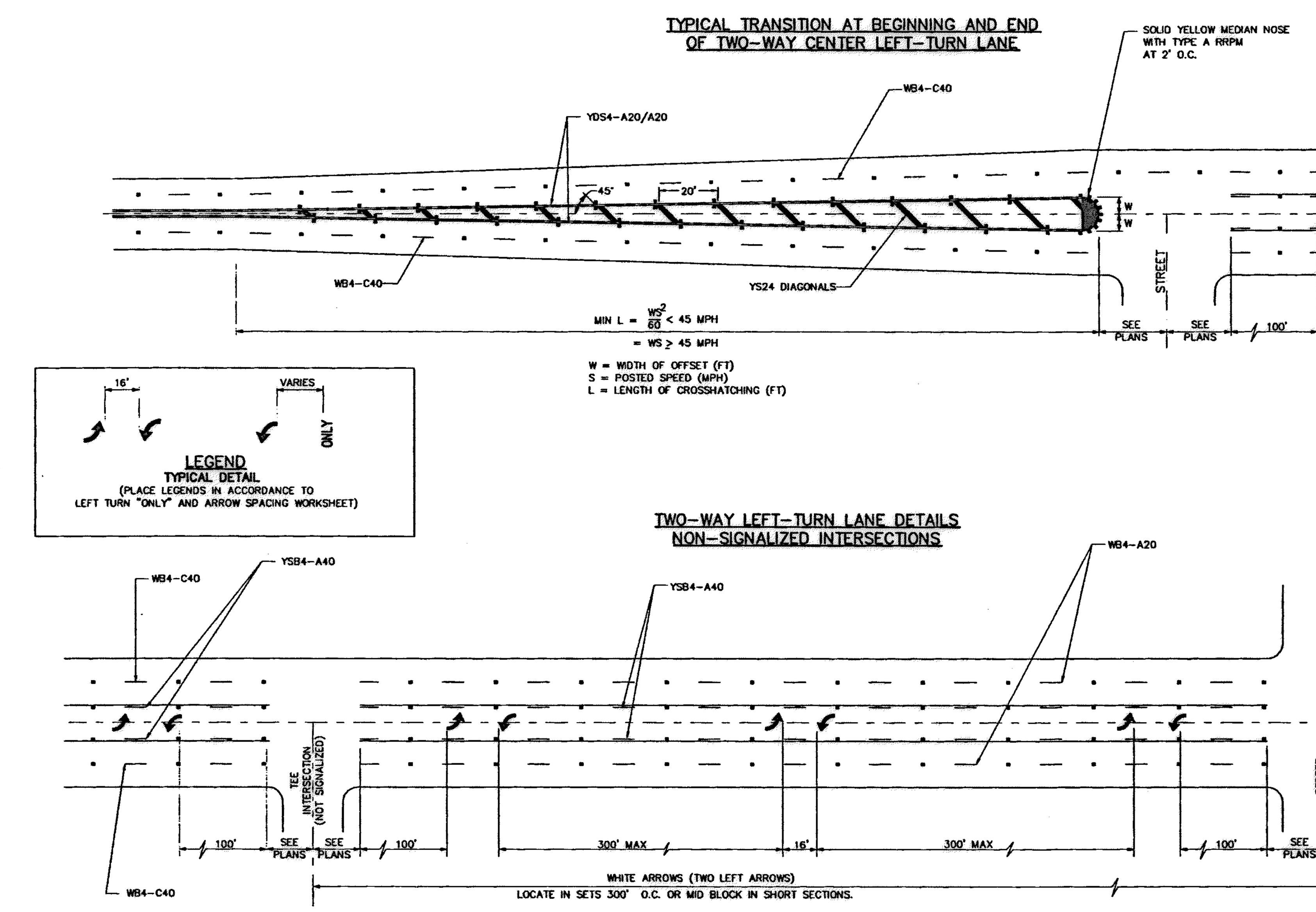
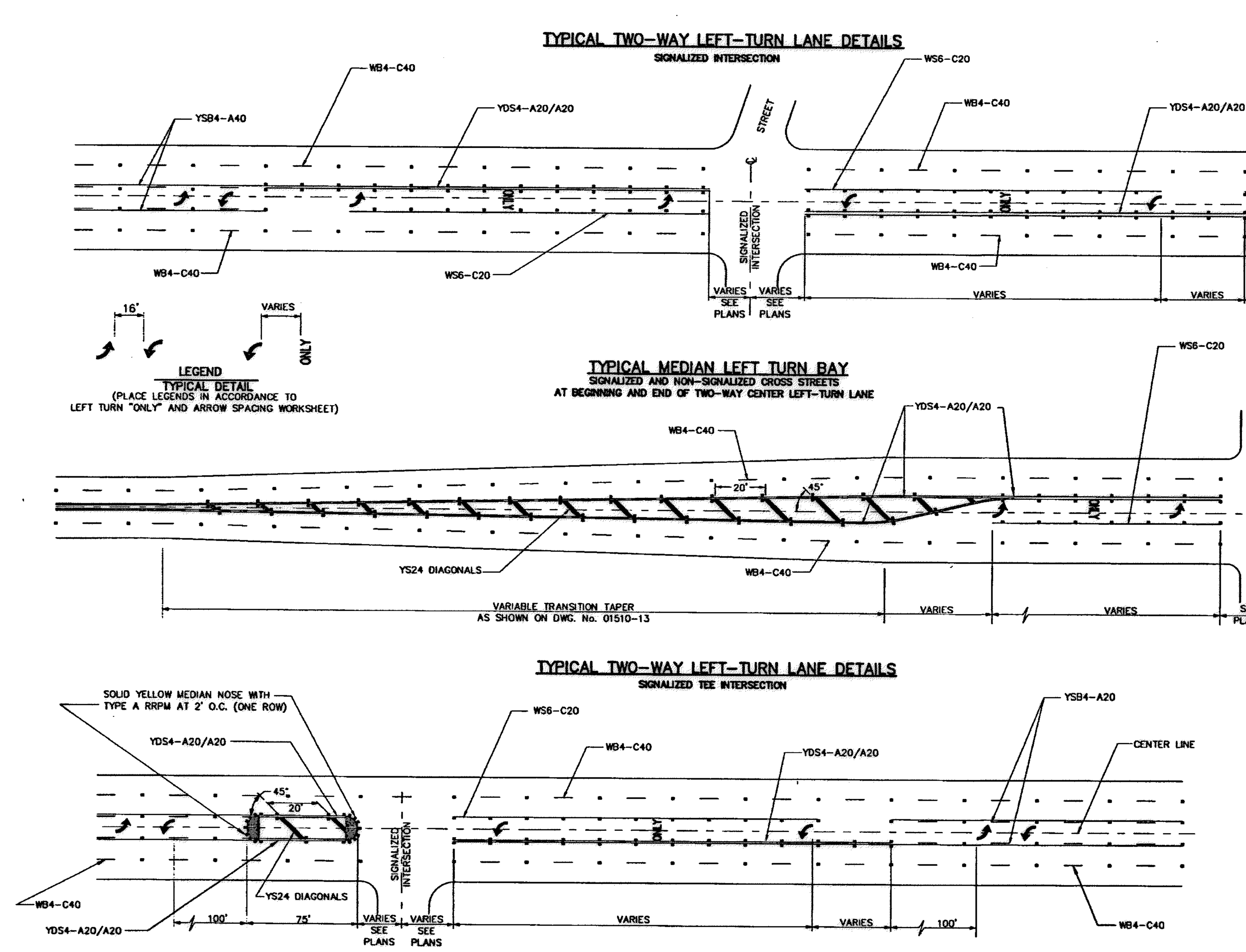


NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

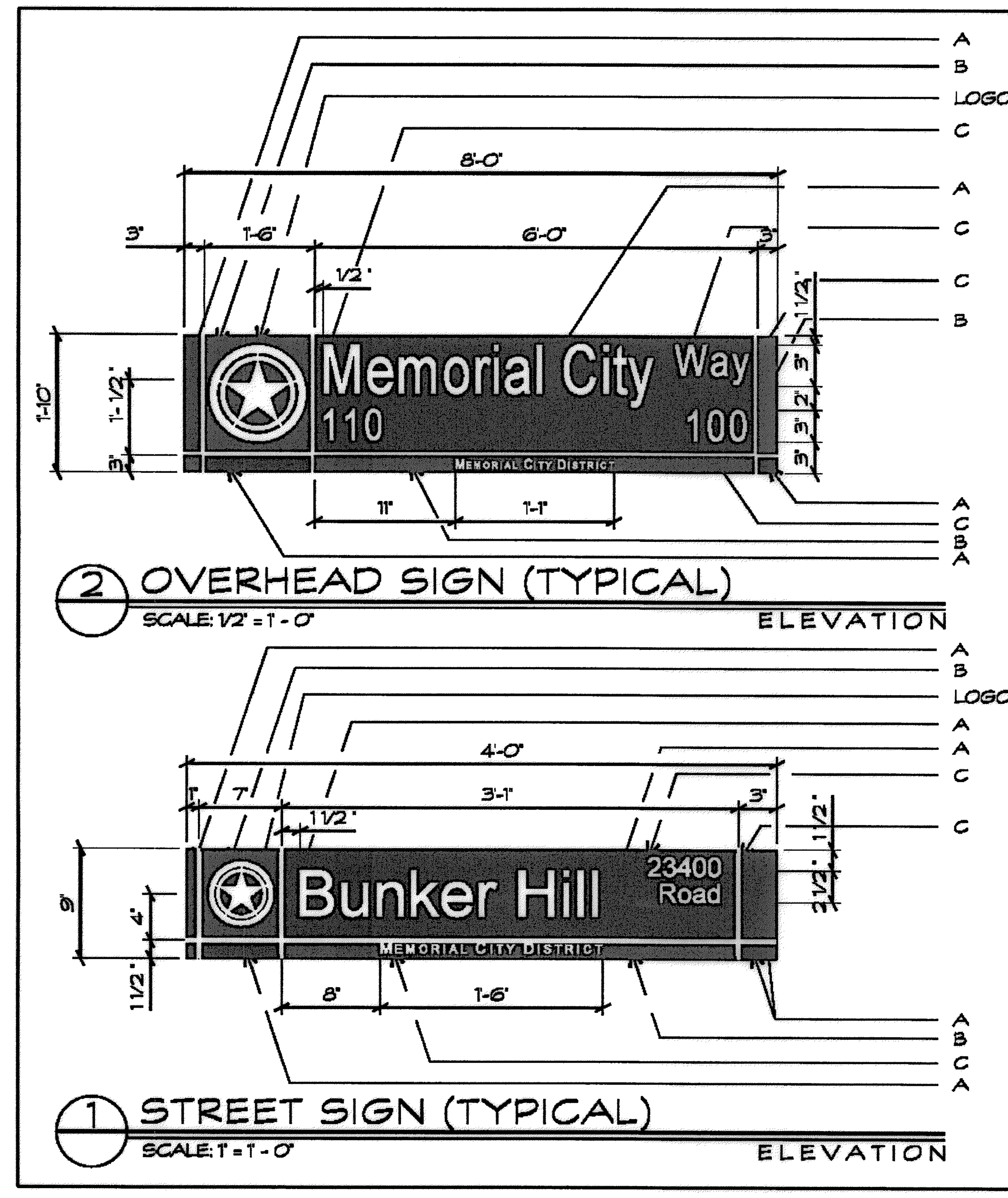
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
TWO-WAY LEFT-TURN LANE
DETAIL 1
(NOT TO SCALE)
APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2012 | DWG NO: 01510-13



NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
TWO-WAY LEFT-TURN LANE
DETAIL 2
(NOT TO SCALE)
APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2012 | DWG NO: 01510-14



NOTE:
1. OVERHEAD SIGNS TO BE FABRICATED FROM 1/8" ALUMINUM.
2. OVERHEAD SIGNS TO BE MOUNTED TO WIRES OR TRAFFIC ARMS. TRAFFIC ARM MOUNTINGS TO USE 1 ASTRO SIGN-BRAC, BY PELCO, PER SIGN. WIRE MOUNTS TO BE INSTALLED PER EXISTING DISTRICT STANDARDS.
3. 3M HIGH INTENSITY REFLECTIVE PRISMATIC SHEETING APPLIED AS FIRST LAYER.
4. STREET NAMES AND NUMBERS TO BE CUT OUT OF VINYL SHEETING OVERLAYED ONTO REFLECTIVE MATERIAL. REFER TO LAYOUT SHEETS FOR STREET NAMES & BLOCK NUMBERS
5. PAINT HEAD OF SCREW SAME COLOR.

COLOR KEY:
(A) - 3M SCOTHCAL TRANSLUSCENT GRAPHIC FILM, COLOR TO BE PROVIDED
(B) - 3M SCOTHCAL TRANSLUSCENT GRAPHIC FILM, COLOR TO BE PROVIDED
(C) - 3M SCOTHCAL TRANSLUSCENT GRAPHIC FILM, COLOR TO BE PROVIDED
(D) - LOGO IS A DIGITAL PRINT; FILE TO BE PROVIDED; SEAL WITH UV SEALANT

TYPESTYLE IS AVENIR 45 BOOK LIGHT; CONDENSE AS NEEDED

NOTE:
1. STREET SIGNS TO BE FABRICATED FROM 1/8" ALUMINUM.
2. STREET SIGNS TO BE MOUNTED TO 2" ROUND POLE. SEE SHEET 1/ L2.05FOR CONNECTION METHOD AND INSTALLATION SPECIFICATIONS.
3. 3M HIGH INTENSITY REFLECTIVE PRISMATIC SHEETING APPLIED AS FIRST LAYER.
4. STREET NAMES AND NUMBERS TO BE CUT OUT OF VINYL SHEETING OVERLAYED ONTO REFLECTIVE MATERIAL. REFER TO LAYOUT SHEETS STREET NAMES & BLOCK NUMBERS

Memorial City Management District Street Signage Package
DATE/ISSUE: 11/27/2008 ISSUE FOR PRICING
KUDELA & WEINHEIMER
LANDSCAPE ARCHITECTURE
SITE PLANNING
URBAN DESIGN
7155 OLD KATY ROAD
SUITE 270
HOUSTON, TEXAS 77024
713-880-0987
713-880-0808 FAX
WWW.KWTEXAS.COM
PROJECT NUMBER: MCD-703
SCALE: as indicated
SHEET TITLE: HARDSCAPE DETAILS
SHEET NUMBER: L-2.01

COLOR KEY:

(A) DARK BROWN - 3630-59
(B) LIGHT RUST BROWN - 3630-109
(C) WHITE - 3290

No.	DATE	REVISIONS	APP.

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SIGNING AND PAVEMENT MARKING DETAILS
(SHEET 5 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
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SHEET: 151 OF 226

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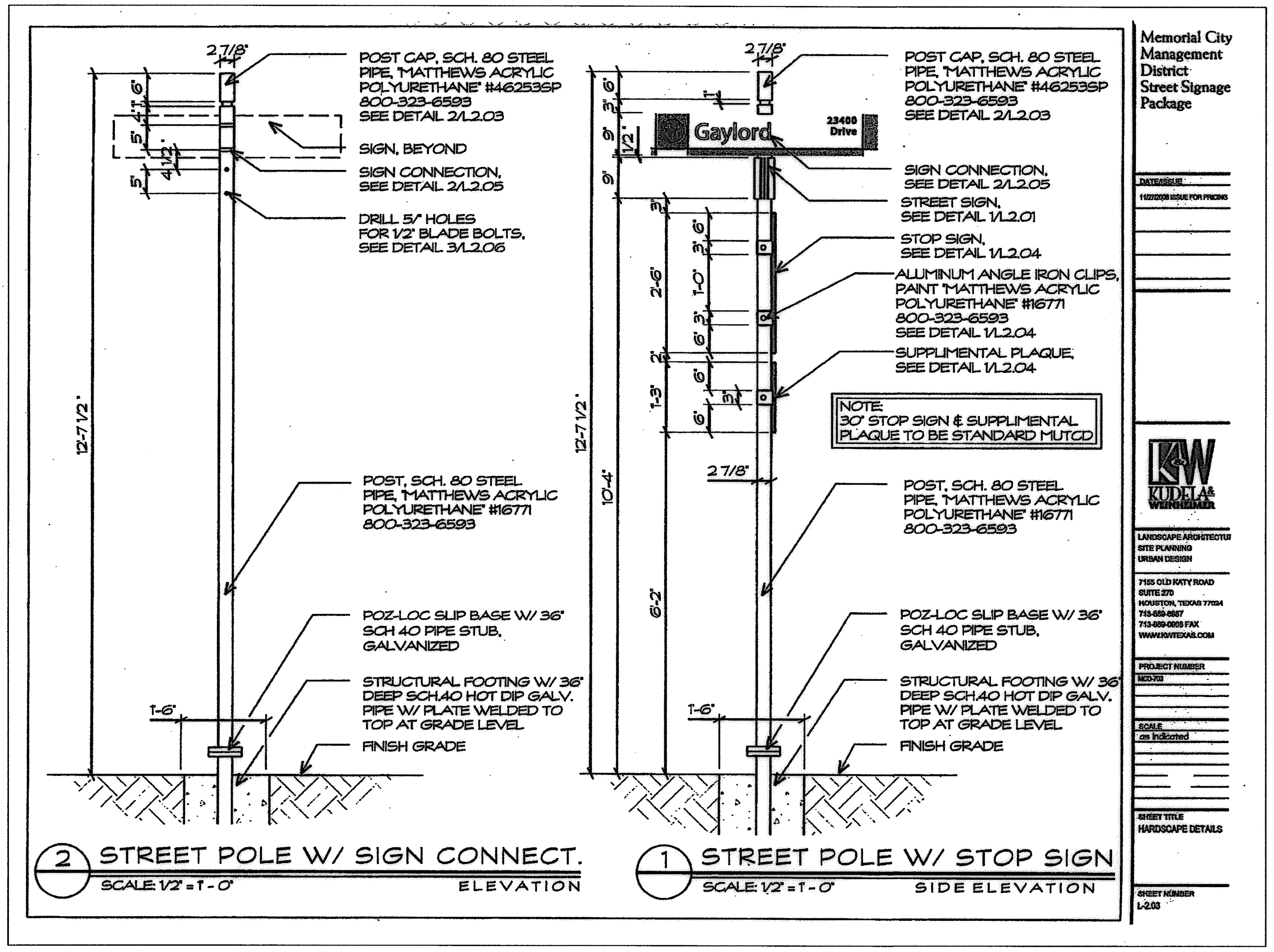

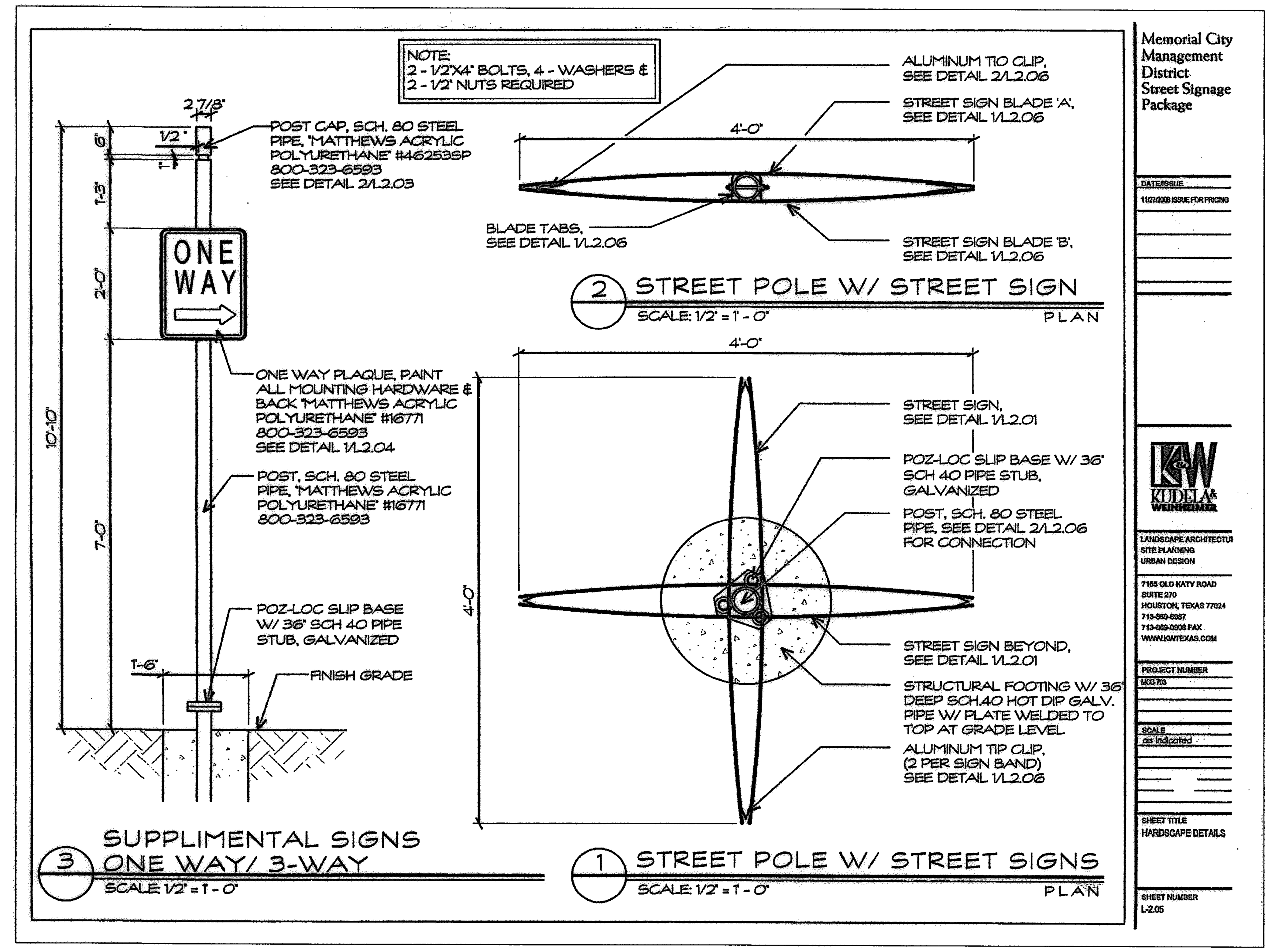

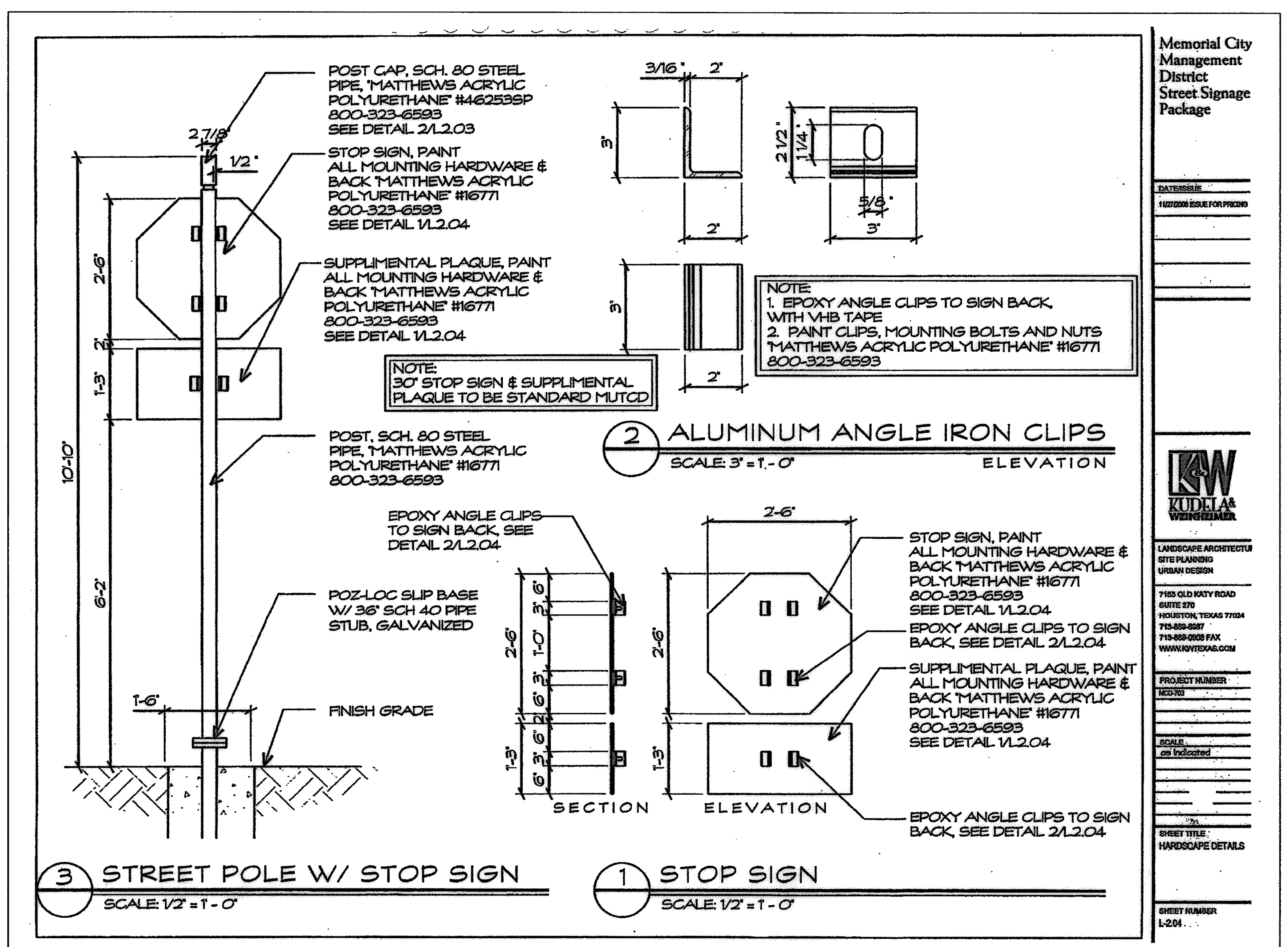

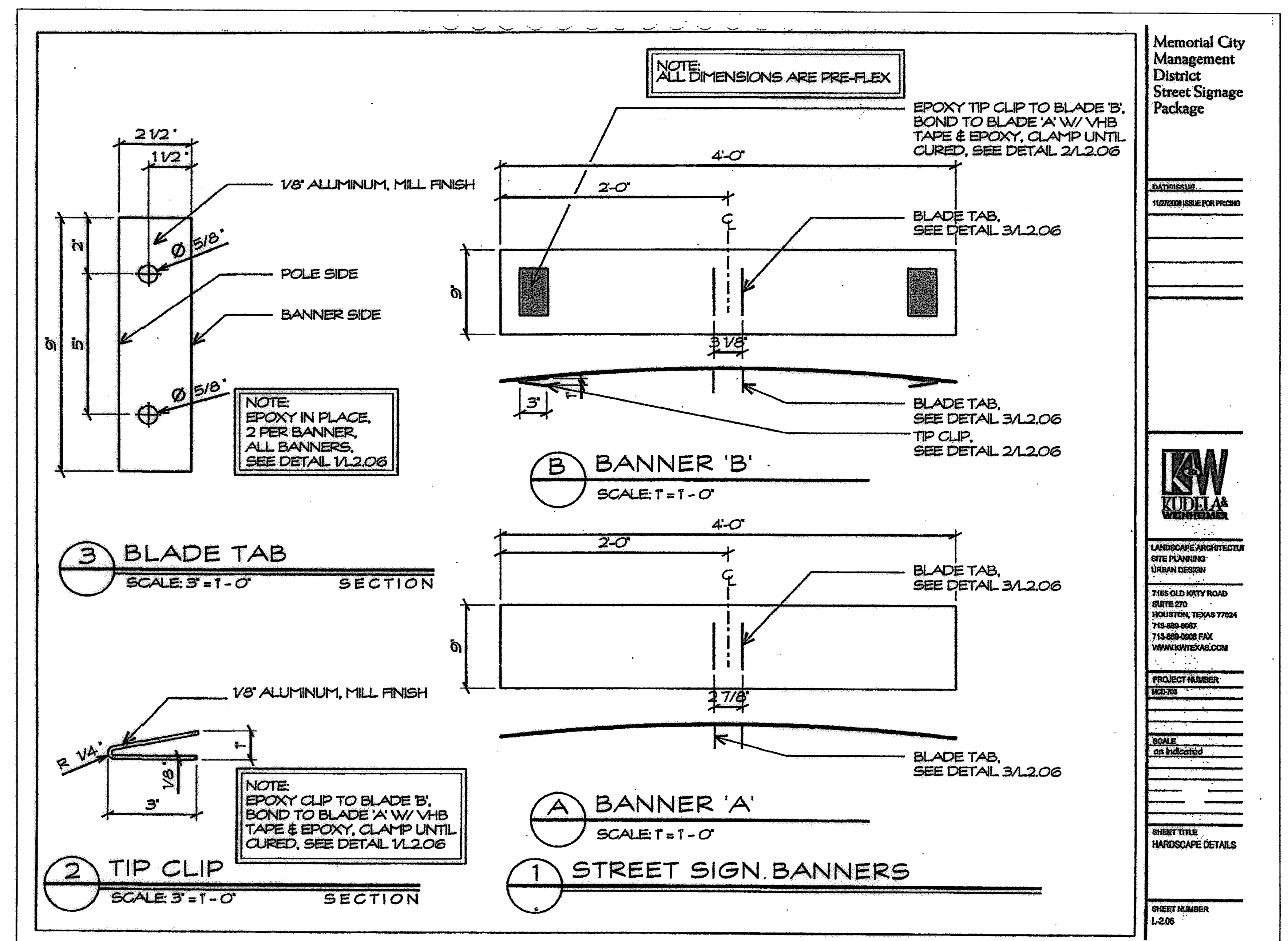

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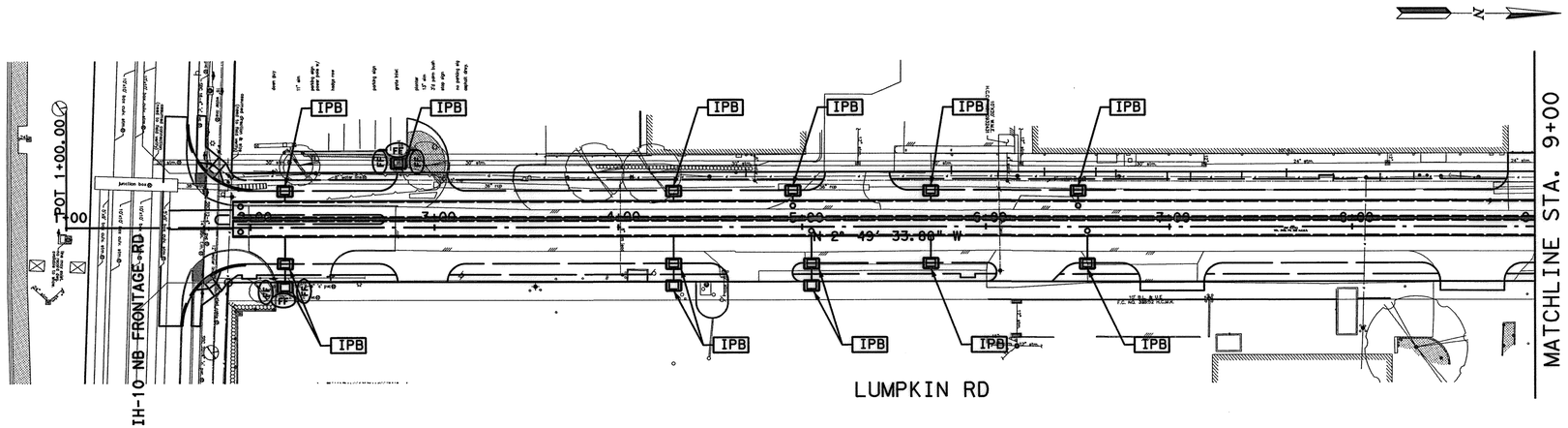
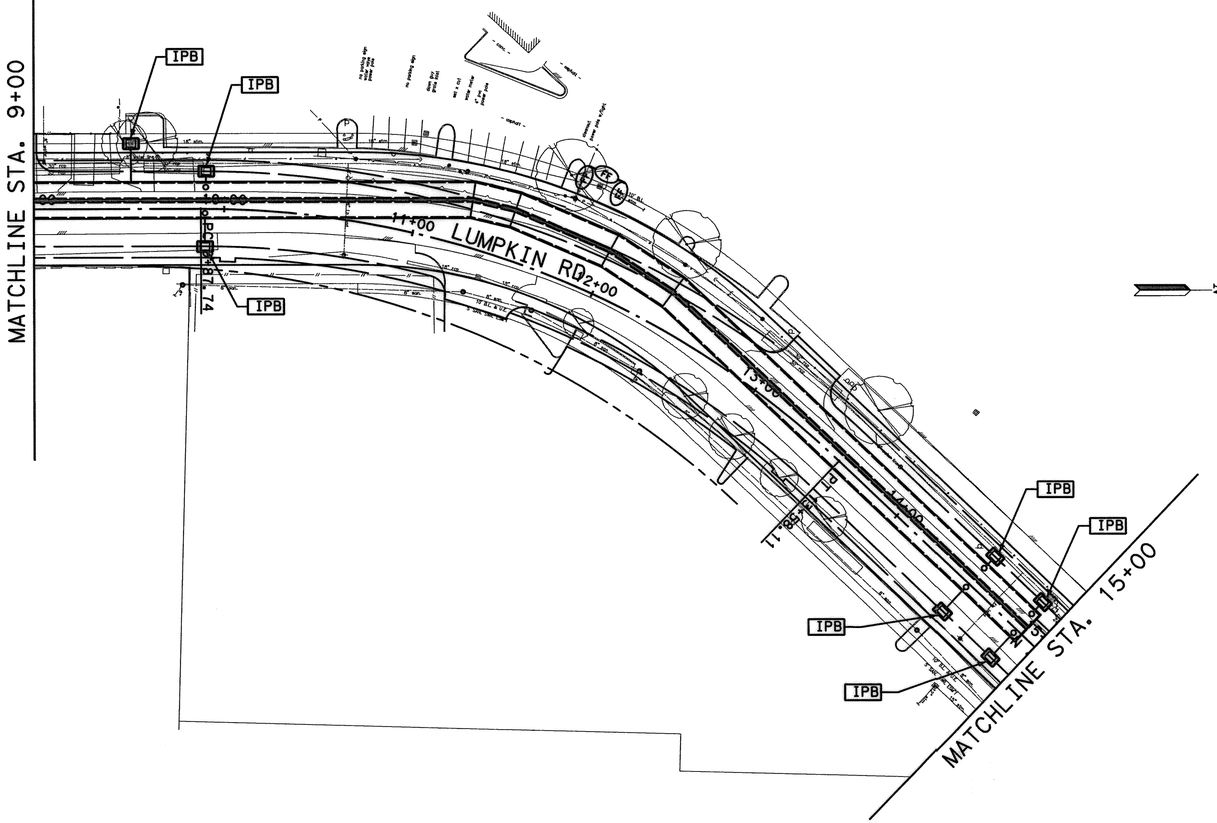
SIGNING AND PAVEMENT MARKING DETAILS (SHEET 6 OF 6)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET: 152 OF 226





LEGEND

IPB	INLET PROTECTION BARRIER
FF	FILTER FABRIC FENCE
R	REINFORCED FILTER FABRIC FENCE
HBF	HAY BALE FENCE

NOTES:

1. ALL INLET PROTECTION SHOULD INCLUDE:
   PROPOSED INLETS - STAGE A (SILT FENCE) AND STAGE 2 (GRAVEL BAG).
   EXISTING INLETS - STAGE B (GRAVEL BAGS) ONLY.
2. CONTRACTOR SHALL UTILIZE INLET PROTECTION BARRIERS ON ALL INLETS, MANHOLES, AND PIPE STUBS DURING CONSTRUCTION OF STORM SEWER.
3. UPON COMPLETION OF ROADWAY PAVEMENT, SAND BAGS SHALL BE PLACED AT PROPOSED INLETS.
4. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION 01575 FOR INFORMATION REGARDING STABILIZED CONSTRUCTION EXITS.
5. GRATE INLETS LOCATED IN TEMPORARY ASPHALT TRAVEL LANES TO BE PROTECTED BY FILTER FABRIC FENCING PLACED AROUND THE NEARBY CONSTRUCTION ZONE.

0 40 80 160
(IN FEET)
1 INCH = 40 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM WATER POLLUTION PREVENTION PLAN

SHEET 1 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 153 OF 226	

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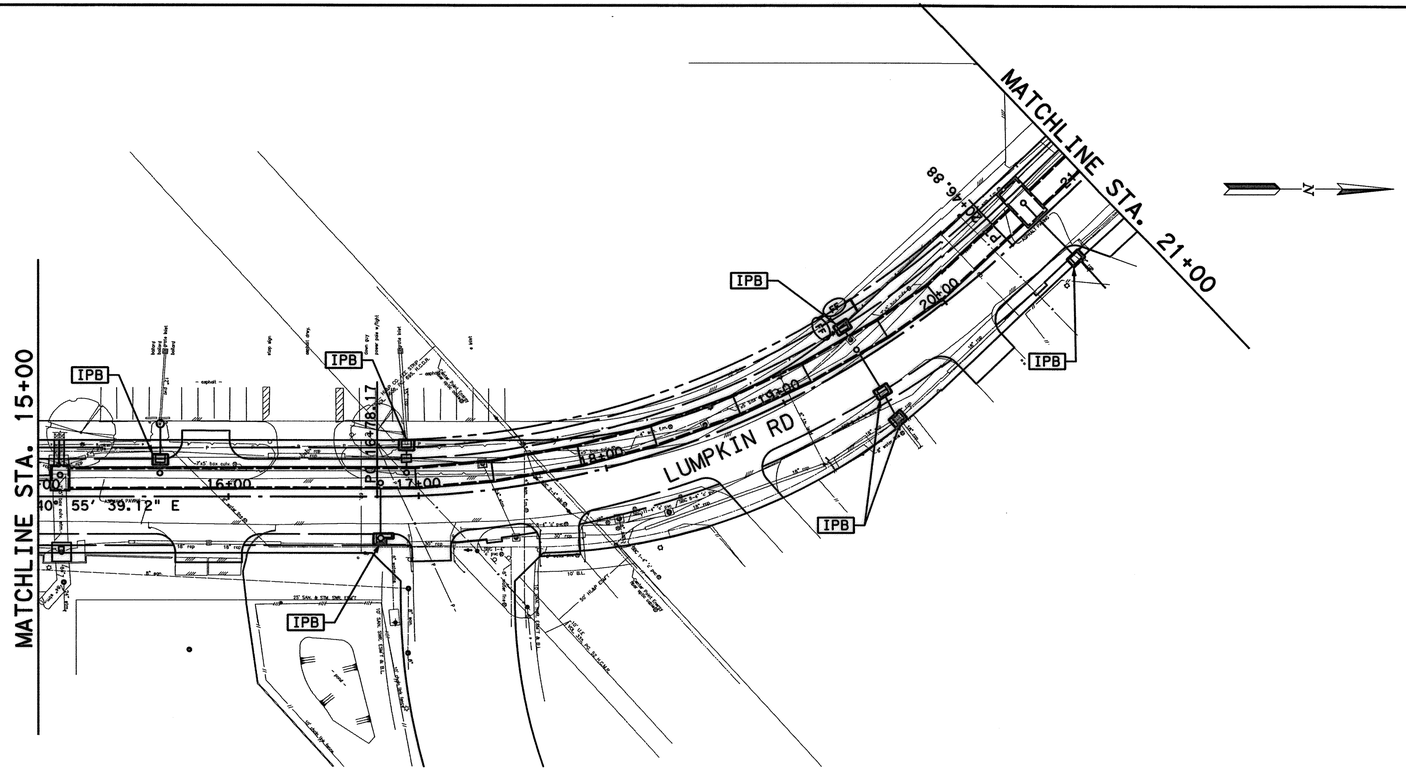

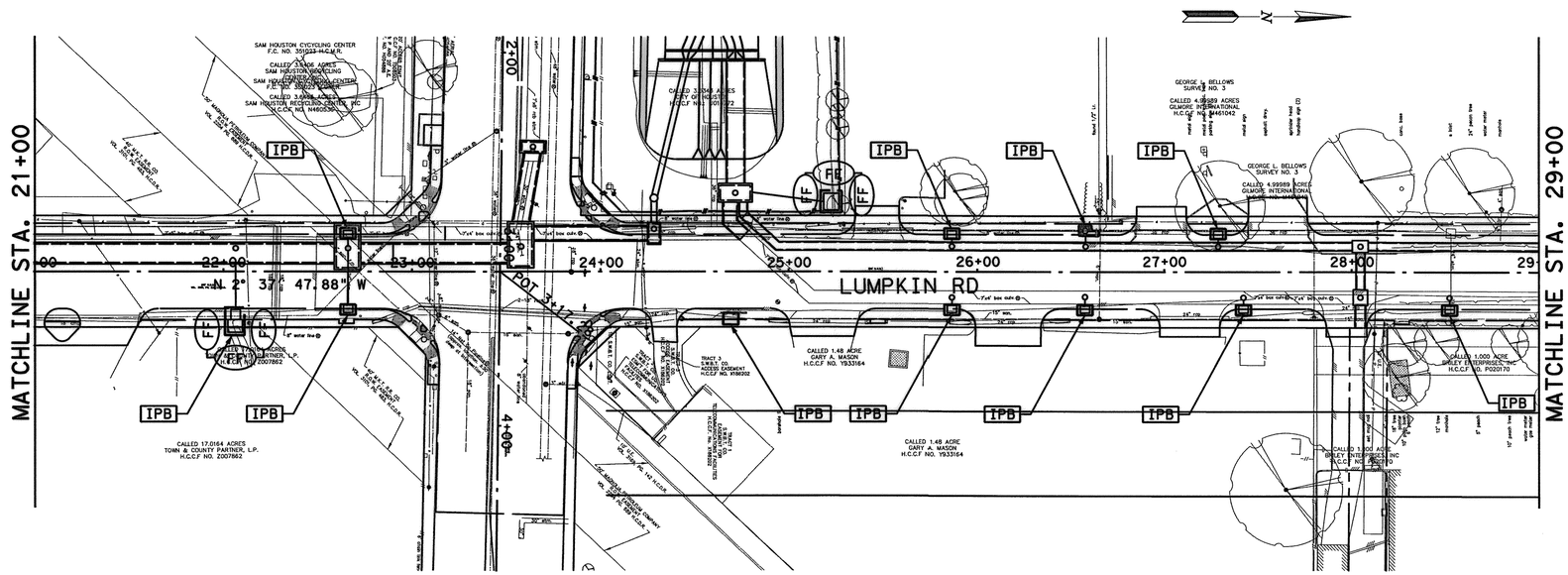

LEGEND

- IPB — INLET PROTECTION BARRIER
- FF — FILTER FABRIC FENCE
- R — REINFORCED FILTER FABRIC FENCE
- HBF — HAY BALE FENCE

NOTES:

1. ALL INLET PROTECTION SHOULD INCLUDE: PROPOSED INLETS - STAGE A (SILT FENCE) AND STAGE 2 (GRAVEL BAG). EXISTING INLETS - STAGE B (GRAVEL BAGS) ONLY.
2. CONTRACTOR SHALL UTILIZE INLET PROTECTION BARRIERS ON ALL INLETS, MANHOLES, AND PIPE STUBS DURING CONSTRUCTION OF STORM SEWER.
3. UPON COMPLETION OF ROADWAY PAVEMENT, SAND BAGS SHALL BE PLACED AT PROPOSED INLETS.
4. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION 01575 FOR INFORMATION REGARDING STABILIZED CONSTRUCTION EXITS.
5. GRATE INLETS LOCATED IN TEMPORARY ASPHALT TRAVEL LANES TO BE PROTECTED BY FILTER FABRIC FENCING PLACED AROUND THE NEARBY CONSTRUCTION ZONE.

0 40 80 160
(IN FEET)
1 INCH = 40 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED PROFESSIONAL ENGINEER
9-22-14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
STORM WATER POLLUTION PREVENTION PLAN

SHEET 2 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 154 OF 226	

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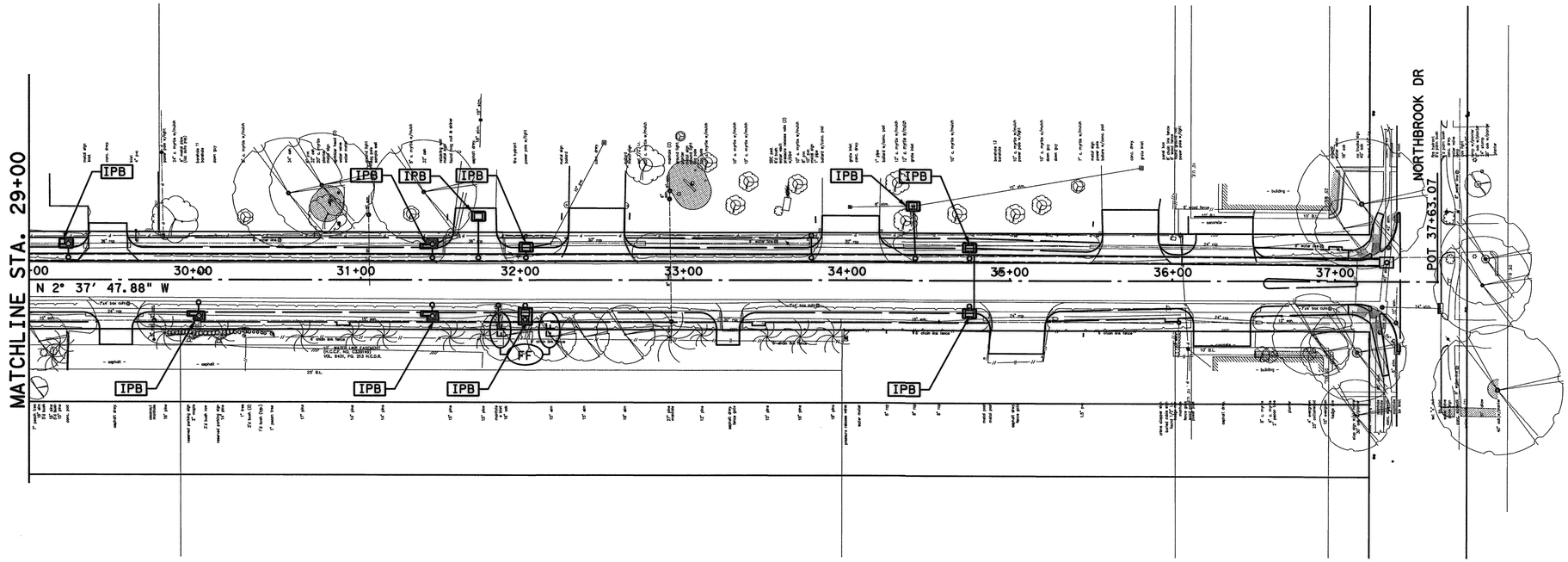

LEGEND

- IPB — INLET PROTECTION BARRIER
- FF — FILTER FABRIC FENCE
- R — REINFORCED FILTER FABRIC FENCE
- HBF — HAY BALE FENCE

NOTES:

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2. CONTRACTOR SHALL UTILIZE INLET PROTECTION BARRIERS ON ALL INLETS, MANHOLES, AND PIPE STUBS DURING CONSTRUCTION OF STORM SEWER.
3. UPON COMPLETION OF ROADWAY PAVEMENT, SAND BAGS SHALL BE PLACED AT PROPOSED INLETS.
4. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION 01575 FOR INFORMATION REGARDING STABILIZED CONSTRUCTION EXITS.
5. GRATE INLETS LOCATED IN TEMPORARY ASPHALT TRAVEL LANES TO BE PROTECTED BY FILTER FABRIC FENCING PLACED AROUND THE NEARBY CONSTRUCTION ZONE.

0 40 80 160
(IN FEET)
1 INCH = 40 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
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Lockwood, Andrews & Newnam, Inc.
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LUMPKIN ROAD
N-T17000-0012-3
STORM WATER POLLUTION PREVENTION PLAN

SHEET 3 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 155 OF 226	

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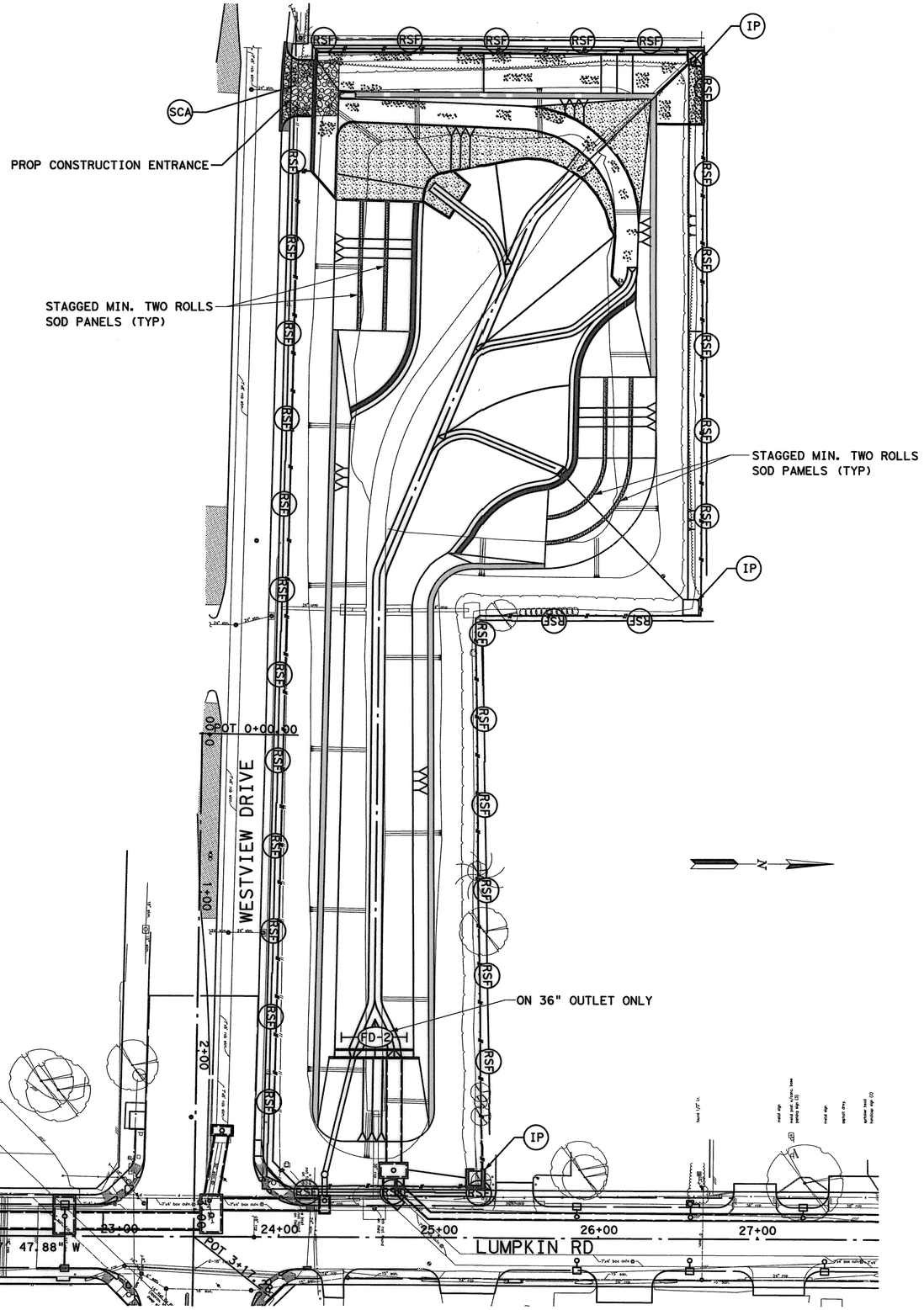

LEGEND

- FF — FILTER FABRIC FENCE
- RSF — REINFORCED FILTER FABRIC FENCE
- FD-2 — ROCK FILTER DAM
- IP — INLET PROTECTION BARRIER
- SCA — STABILIZED CONST. ACCESS

NOTES:

1. CONTRACTOR TO REFER TO HCFCD STORMWATER POLLUTION PREVENTION DETAILS FOR BASIN ONLY
2. ALL INLET PROTECTION SHOULD INCLUDE:
   PROPOSED INLETS - STAGE
   A (SILT FENCE) AND STAGE 2 (GRAVEL BAG).
   EXISTING INLETS - STAGE
   B (GRAVEL BAGS) ONLY.
3. CONTRACTOR SHALL UTILIZE INLET PROTECTION BARRIERS ON ALL INLETS, MANHOLES, AND PIPE STUBS DURING CONSTRUCTION OF STORM SEWER.

0 40 80 160
(IN FEET)
1 INCH = 40 FEET

STATE OF TEXAS
BRIAN R. WHITNEY P.E.
81591
REGISTERED
PROFESSIONAL ENGINEER
9-22-14

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STORM WATER POLLUTION PREVENTION PLAN

SHEET 4 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
HORZ: 1"=40'	
SHEET: 156 OF 226	

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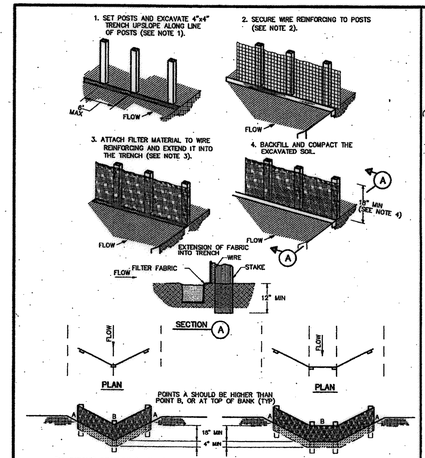
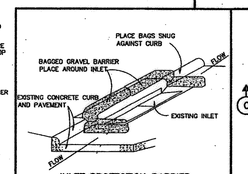


CONSTRUCTION NOTES:

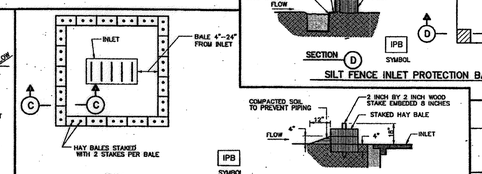
1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 8 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
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

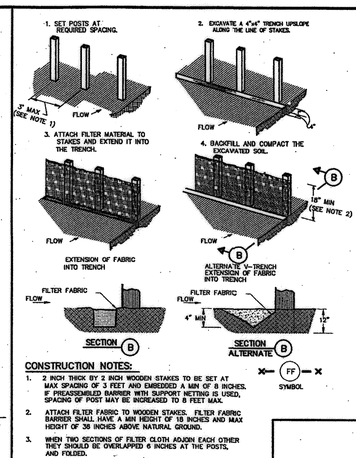
REINFORCED FILTER FABRIC BARRIER



INLET PROTECTION BARRIER
(FOR STAGE II INLETS)
BAGGED GRAVEL BARRIER



HAY BALE INLET PROTECTION BARRIER

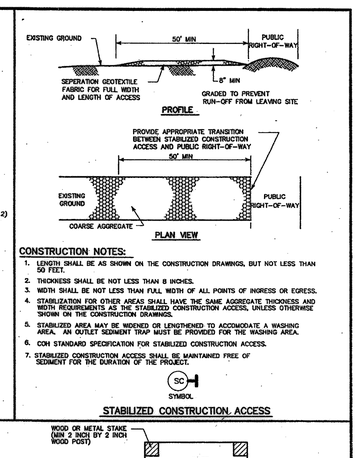


CONSTRUCTION NOTES:

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

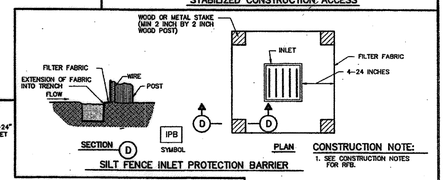


CONSTRUCTION NOTES:

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.

SYMBOL

STABILIZED CONSTRUCTION ACCESS



SILT FENCE INLET PROTECTION BARRIER

CONSTRUCTION NOTE:
1. SEE CONSTRUCTION NOTES FOR RFB.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS
(NOT TO SCALE)

APPROVED: CITY ENGINEER — DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO: 01571-01

No.	DATE	REVISIONS	APP.

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STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

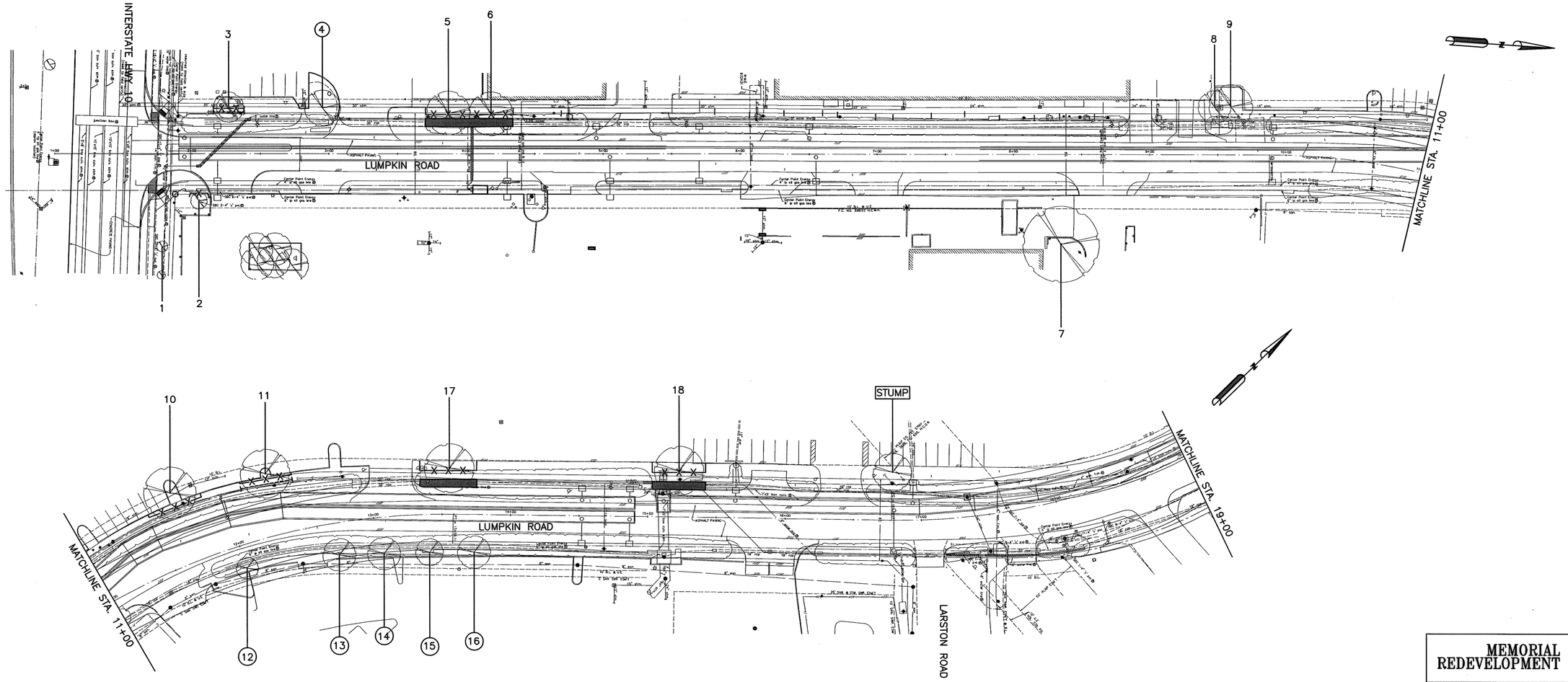
LUMPKIN ROAD
N-T17000-0012-3

STORM WATER POLLUTION PREVENTION PLAN DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 157 OF 226	



Tree No.	Description	Comments	Treatment
1	5" Sycamore	Private tree, will not be impacted	
2	5" Sycamore	Top broken at guy wire from planting, Poor, Private tree, will not be impacted	Fence
3	6" Lacebark Elm	Private tree	Root prune for waterline, Fence, Clearance prune
4	8" Lacebark Elm	Topped by utility, Private tree, remove for new HCCS driveway	Private tree, Poor condition, Remove tree, No replacement required
5	12" Lacebark Elm	Topped by utility, Private tree	Form&Pour sidewalk without damage to tree roots 1" diameter or larger, Fence, Bore water line, Clearance prune
6	11" Lacebark Elm	Leaning, Topped by utility, Private tree	Form&Pour sidewalk without damage to tree roots 1" diameter or larger, Fence, Bore water line, Clearance prune
7	15" Crepe Myrtle	Private tree, will not be impacted	
8	6" Crepe Myrtle	Topped, Private, will not be impacted	
9	6" Crepe Myrtle	Topped, Private, will not be impacted	
10	14" Live Oak	Utility pruned, Private tree	Root prune for storm, Fence, Clearance prune
11	13" Live Oak	Utility pruned, Private tree	Root prune for storm, Fence, Clearance prune
12	9" Cedar Elm	Dead, Remove for sidewalk	Remove tree, No replacement required
13	9" Cedar Elm	Remove for sidewalk	Remove tree, Provide 9" replacement
14	8" Cedar Elm	Remove for sidewalk	Remove tree, Provide 8" replacement
15	10" Cedar Elm	Ordinance tree, Remove for new street & walk	Remove tree, Prvoide 10" in replacement planting
16	11" Cedar Elm	Ordinance tree, Remove for new street & walk	Remove tree, Prvoide 11" in replacement planting
17	14" Live Oak	Utility pruned, Private tree	Form&Pour sidewalk without damage to tree roots 1" diameter or larger, Fence, Bore water line, Clearance prune
18	13" Live Oak	Utility pruned, Private tree	Form&Pour sidewalk without damage to tree roots 1" diameter or larger, Fence, Clearance prune

TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- (1) — TREE TO BE REMOVED
- -X-X- — TREE PROTECTION FENCE
- ROOT PRUNING TRENCH
- DEMO, FORM, POUR WALK WITHOUT DAMAGE TO ROOTS 1" OR LARGER

NOTE:
THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED JULY 2014. 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.

No.	DATE	REVISIONS	APP.

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

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

APPROVED: Craig N. Koehl 7-16-14

LUMPKIN ROAD
N-T17000-0012-3

TREE PROTECTION PLAN
SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

VERT:
HORZ: 1"=40'

SHEET: 158 OF 186

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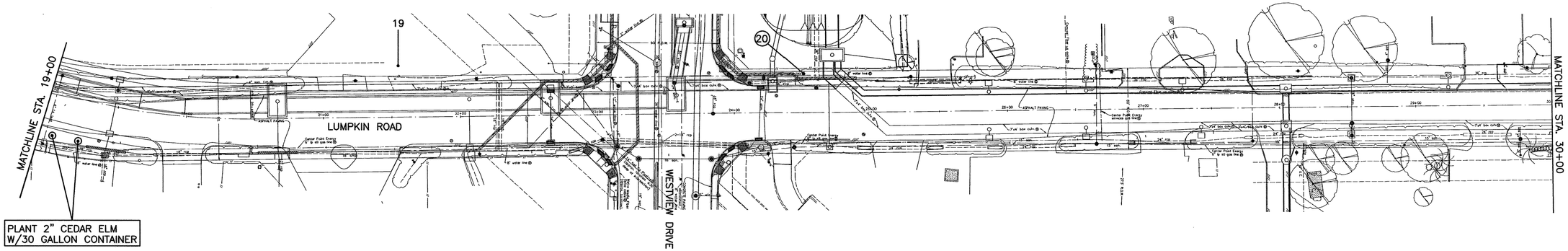

Tree No.	Description	Comments	Treatment
19	22" Tallow	Private tree, will not be impacted	

TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- (1) — TREE TO BE REMOVED
- ⊙ — REPLACEMENT TREES
- —X—X— — TREE PROTECTION FENCE
- ----- — ROOT PRUNING TRENCH
- ▬ — DEMO, FORM, POUR WALK WITHOUT DAMAGE TO ROOTS 1" OR LARGER

NOTE:
THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED JULY 2014. 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.

No.	DATE	REVISIONS	APP.

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

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APPROVED: Craig N. Koehl 7-16-14

LUMPKIN ROAD
N-T17000-0012-3

TREE PROTECTION PLAN
SHEET 2 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=40'	
SHEET: 159 OF 186	

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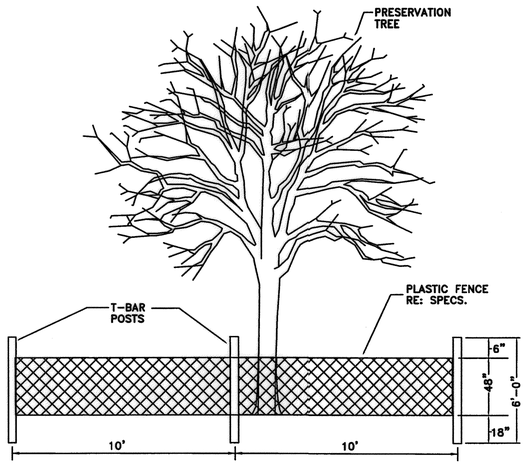
Tree Removal List

Tree No.	Description	Comments	Replacement requirement
4	8" Lacebark Elm	Topped by utility, Private tree, remove for new HCCS driveway	0
12	9" Cedar Elm	Dead, Remove for sidewalk	0
13	9" Cedar Elm	Remove for sidewalk	9
14	8" Cedar Elm	Remove for sidewalk	8
15	10" Cedar Elm	Ordinance tree, Remove for new street & walk	10
16	11" Cedar Elm	Ordinance tree, Remove for new street & walk	11
		TOTAL REPLACEMENT INCHES REQUIRED	**38**

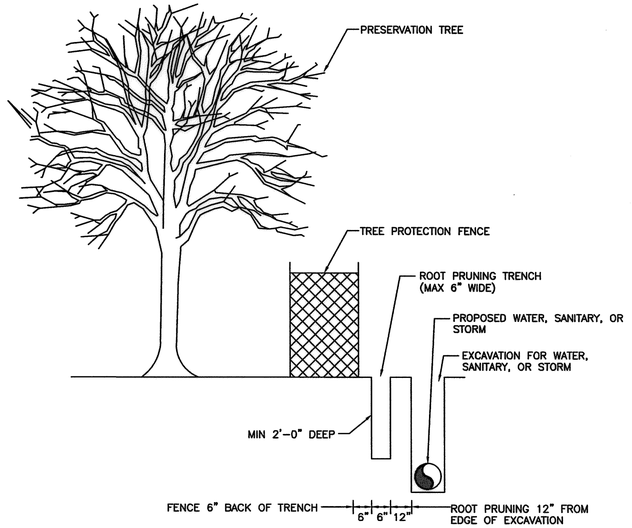
Tree Replacement List

Quantity	Caliper Size	Species	Container/Tree Spade size
		Replacement planting included in Landscape Architecture Plans	
		TOTAL REPLACEMENT INCHES INCLUDED IN PLAN	**0**

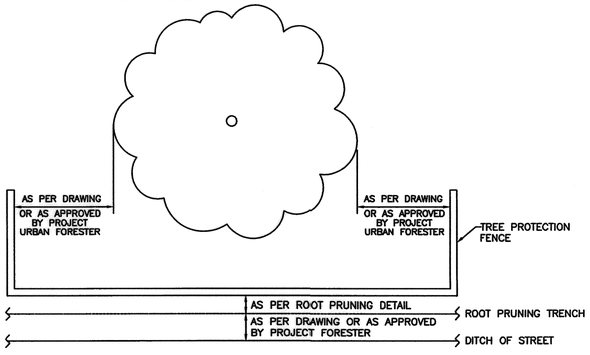
NOTE: TREE REPLACEMENT LOCATIONS SHOWN ON PLANS MUST BE COORDINATED WITH ADJACENT PROPERTY OWNER AND CITY OF HOUSTON URBAN FORESTRY PRIOR TO EXCAVATION FOR PLANTING. COORDINATION SHALL BE COMPLETED BY CONSTRUCTION CONTRACTOR'S CERTIFIED ARBORIST. TREES TO BE MAINTAINED AND WATERED FOR 2 YEARS FOLLOWING 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 URBAN FORESTRY. TREES IN ESPLANADE GROUPINGS TO BE PLANTED IN COMMON BED WITH 4" OF HARDWOOD MULCH BETWEEN TREES.



TREE PROTECTION FENCING DETAIL A
NOT TO SCALE



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



TREE PROTECTION FENCING DETAIL B
NOT TO SCALE

No.	DATE	REVISIONS	APP.

$USERNAME$ $TIME$ $DATE$

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

C.N. Koehl
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APPROVED: Craig N. Koehl 7–16–14

LUMPKIN ROAD
N–T17000–0012–3

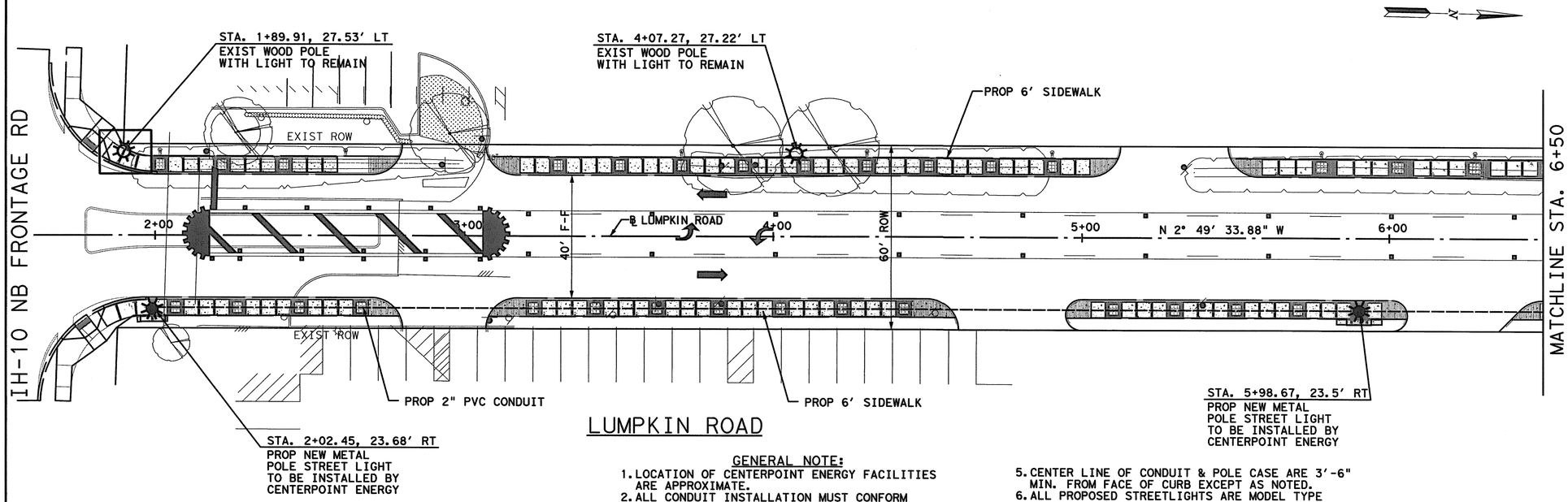
TREE PROTECTION PLAN
SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=40'	
SHEET: 160 OF 186	

$FILE$



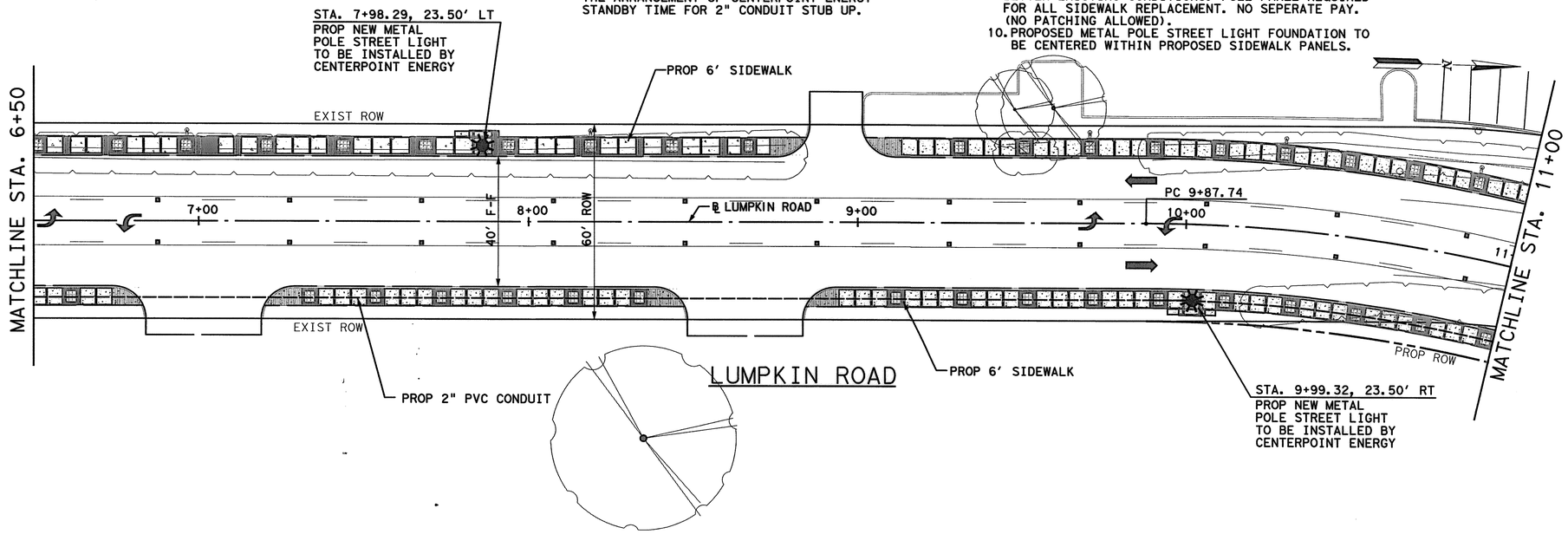
LUMPKIN ROAD

GENERAL NOTE:

1. LOCATION OF CENTERPOINT ENERGY FACILITIES ARE APPROXIMATE.
2. ALL CONDUIT INSTALLATION MUST CONFORM TO CENTERPOINT ENERGY SPECIFICATION (FORMERLY HL&P SPECIFICATION 007-371-081), LATEST REVISION, UNLESS OTHERWISE AUTHORIZED BY CENTERPOINT ENERGY LIGHTING DESIGN SERVICES DEPARTMENT.
3. CONTRACTOR SHALL INSTALL STREETLIGHT FOUNDATION PER CENTERPOINT ENERGY SPECIFICATION. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING SPECIAL FOUNDATIONS DUE TO CONFLICTS WITH FOUNDATION DEPTH REQUIREMENTS. THE LIGHTING DESIGN SERVICES DEPARTMENT MUST REVIEW SPECIAL FOUNDATION DESIGN PRIOR TO INSTALLATION.
4. CONTRACTOR TO CALL (713) 945-3222 FOR THE ARRANGEMENT OF CENTERPOINT ENERGY STANDBY TIME FOR 2" CONDUIT STUB UP.
5. CENTER LINE OF CONDUIT & POLE CASE ARE 3'-6" MIN. FROM FACE OF CURB EXCEPT AS NOTED.
6. ALL PROPOSED STREETLIGHTS ARE MODEL TYPE CONSTELLATIONS.
7. CONTRACTOR TO INSTALL LIGHT POLE FOUNDATION, CONDUIT & PULLBOXES. CENTERPOINT ENERGY WILL INSTALL CABLING AND LIGHT POLES. COORDINATE WITH CPE ON MATERIALS TO BE PROVIDED BY CPE.
8. PROPOSED STREET LIGHT CONDUIT TO BE BORED WHEN WITHIN EXISTING TREE DRIPLINE. CONTRACTOR RESPONSIBLE FOR ANY DAMAGE TO EXISTING TREES DUE TO STREET LIGHTING INSTALLATION.
9. PAVEMENT REMOVAL FOR EXISTING STREET LIGHT REMOVAL AND PROPOSED STREET LIGHT AND CONDUIT CONSTRUCTION OUTSIDE PROPOSED SIDEWALK CONSTRUCTION LIMITS TO BE REPLACED TO EQUAL OR BETTER EXISTING CONDITIONS. FULL PANEL REQUIRED FOR ALL SIDEWALK REPLACEMENT. NO SEPERATE PAY. (NO PATCHING ALLOWED).
10. PROPOSED METAL POLE STREET LIGHT FOUNDATION TO BE CENTERED WITHIN PROPOSED SIDEWALK PANELS.

STREETLIGHT LEGEND

- PROPOSED NEW 250W HPS METAL POLE STREET LIGHT TO BE INSTALLED BY CENTERPOINT ENERGY
- PROPOSED UNDERGROUND STREET LIGHT CIRCUIT IN 2-INCH PVC, SCHEDULE 40 CONDUIT PER CENTERPOINT ENERGY SPECIFICATIONS.
- EXIST STREET LIGHT PULLBOX. CONTRACTOR TO STUB PROPOSED 2" CONDUIT INTO PULLBOX WITH 90° ELBOW. CENTERPOINT ENERGY PERSONNEL MUST STAND BY DURING INSTALLATION. SEE GENERAL NOTE 4.
- PROPOSED TREE LOCATION
- EXIST. WOOD POLE WITH LIGHT (TO REMAIN)
- EXIST. WOOD POLE WITH LIGHT (TO BE RELOCATED)



LUMPKIN ROAD

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STREET LIGHTING PLAN

SHEET 1 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 161 OF 226	

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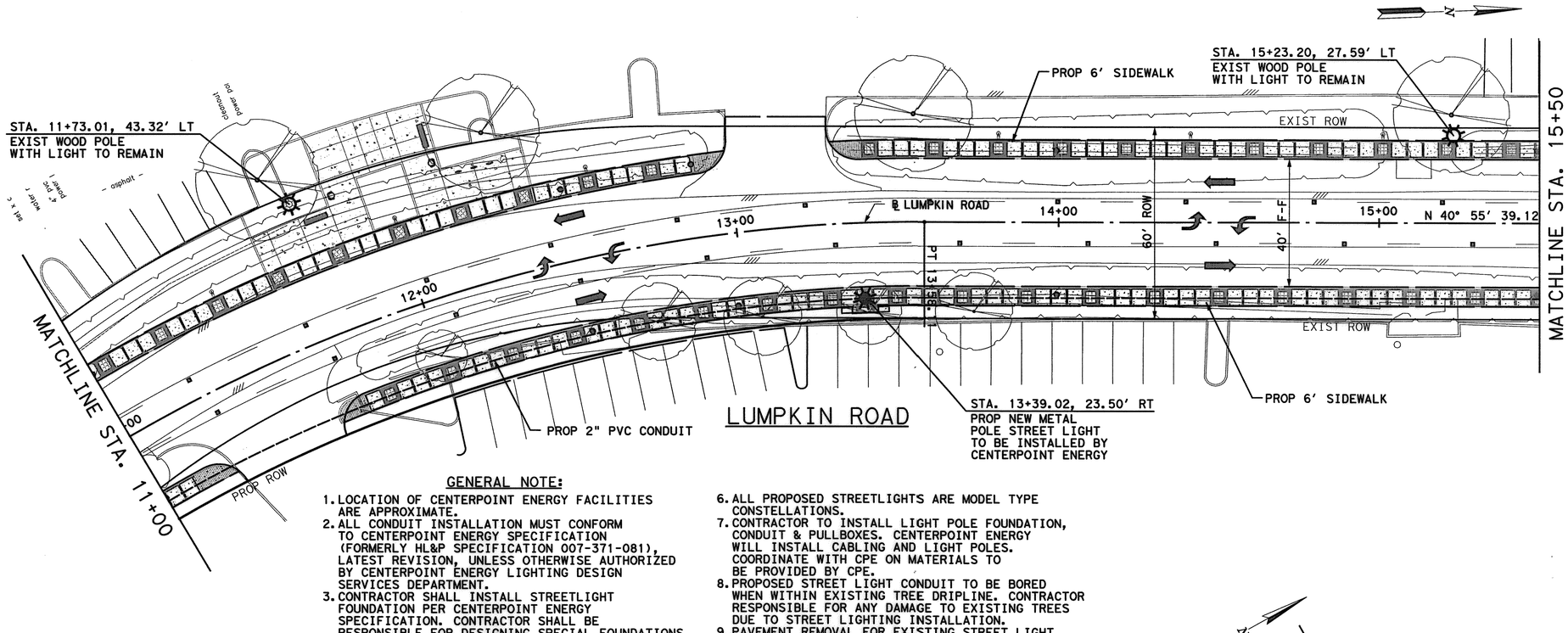

STREETLIGHT LEGEND

- PROPOSED NEW 250W HPS METAL POLE STREET LIGHT TO BE INSTALLED BY CENTERPOINT ENERGY
- PROPOSED UNDERGROUND STREET LIGHT CIRCUIT IN 2-INCH PVC, SCHEDULE 40 CONDUIT PER CENTERPOINT ENERGY SPECIFICATIONS.
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- EXIST. WOOD POLE WITH LIGHT (TO REMAIN)
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GENERAL NOTE:

1. LOCATION OF CENTERPOINT ENERGY FACILITIES ARE APPROXIMATE.
2. ALL CONDUIT INSTALLATION MUST CONFORM TO CENTERPOINT ENERGY SPECIFICATION (FORMERLY HL&P SPECIFICATION 007-371-081), LATEST REVISION, UNLESS OTHERWISE AUTHORIZED BY CENTERPOINT ENERGY LIGHTING DESIGN SERVICES DEPARTMENT.
3. CONTRACTOR SHALL INSTALL STREETLIGHT FOUNDATION PER CENTERPOINT ENERGY SPECIFICATION. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING SPECIAL FOUNDATIONS DUE TO CONFLICTS WITH FOUNDATION DEPTH REQUIREMENTS. THE LIGHTING DESIGN SERVICES DEPARTMENT MUST REVIEW SPECIAL FOUNDATION DESIGN PRIOR TO INSTALLATION.
4. CONTRACTOR TO CALL (713) 945-3222 FOR THE ARRANGEMENT OF CENTERPOINT ENERGY STANDBY TIME FOR 2" CONDUIT STUB UP.
5. CENTER LINE OF CONDUIT & POLE CASE ARE 3'-6" MIN. FROM FACE OF CURB EXCEPT AS NOTED.
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7. CONTRACTOR TO INSTALL LIGHT POLE FOUNDATION, CONDUIT & PULLBOXES. CENTERPOINT ENERGY WILL INSTALL CABLING AND LIGHT POLES. COORDINATE WITH CPE ON MATERIALS TO BE PROVIDED BY CPE.
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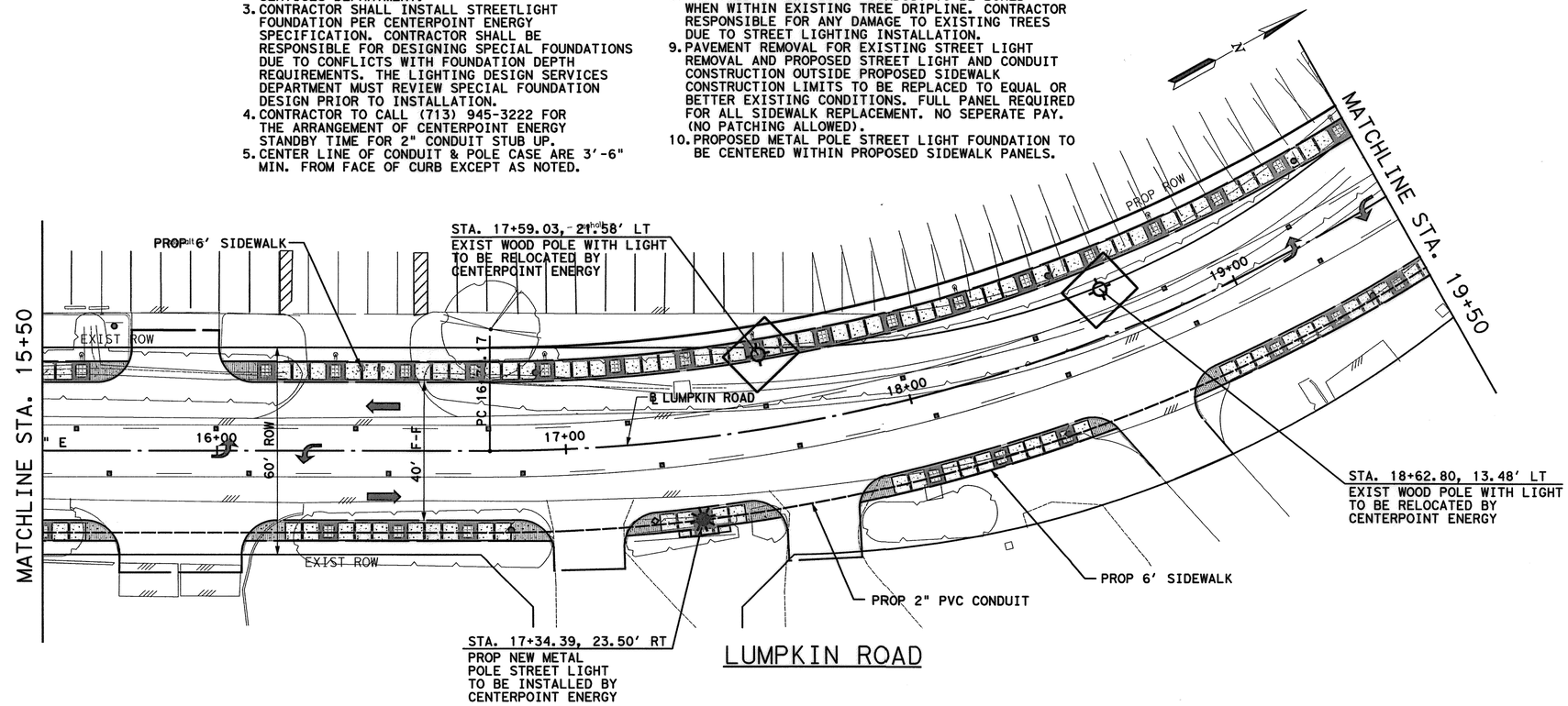
10. PROPOSED METAL POLE STREET LIGHT FOUNDATION TO BE CENTERED WITHIN PROPOSED SIDEWALK PANELS.



MUHAMMAD M ALI, P.E. 98146 LICENSED PROFESSIONAL ENGINEER 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STREET LIGHTING PLAN

SHEET 2 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 162 OF 226	

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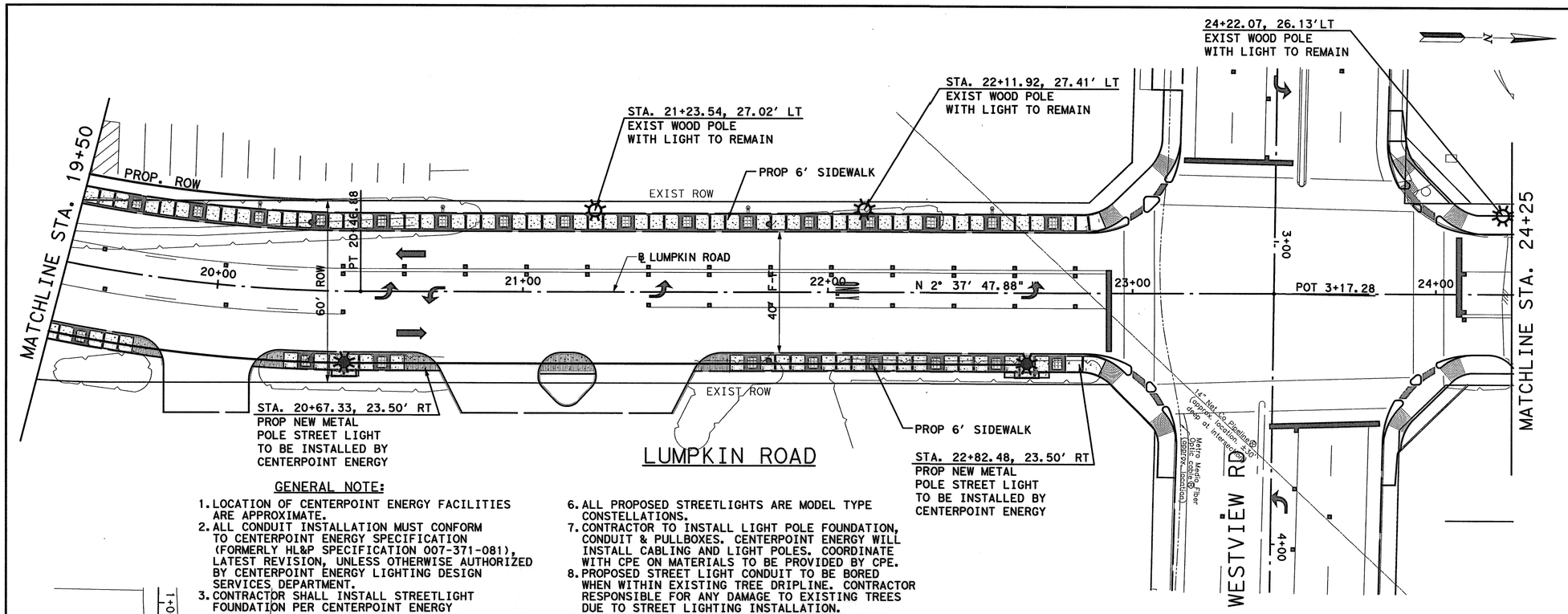

STREETLIGHT LEGEND

- PROPOSED NEW 250W HPS METAL POLE STREET LIGHT TO BE INSTALLED BY CENTERPOINT ENERGY
- PROPOSED UNDERGROUND STREET LIGHT CIRCUIT IN 2-INCH PVC, SCHEDULE 40 CONDUIT PER CENTERPOINT ENERGY SPECIFICATIONS.
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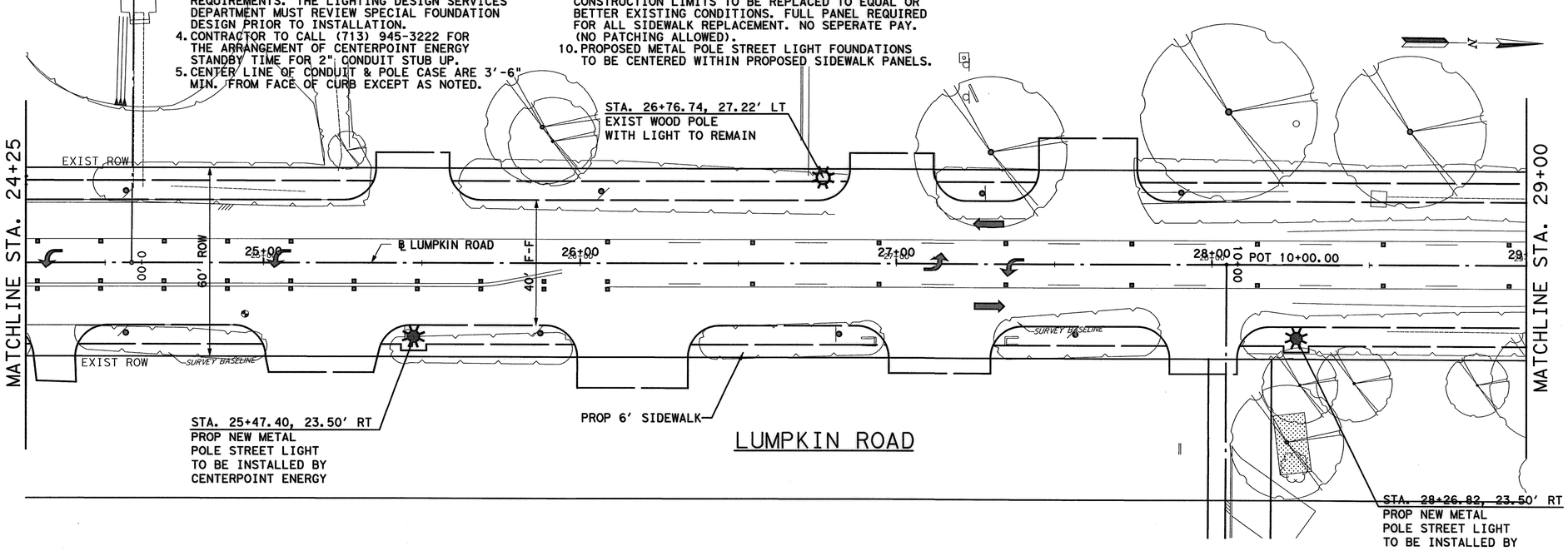

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STREET LIGHTING PLAN

SHEET 3 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET:
163 OF 226

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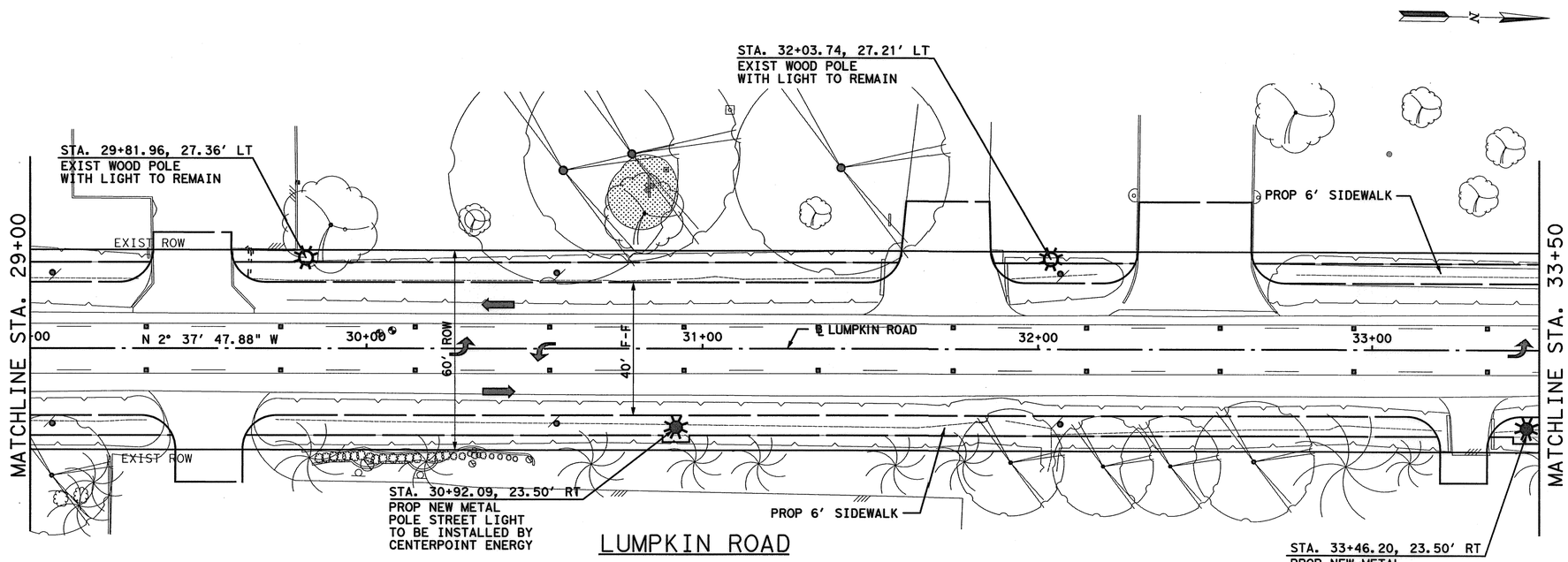

STREETLIGHT LEGEND

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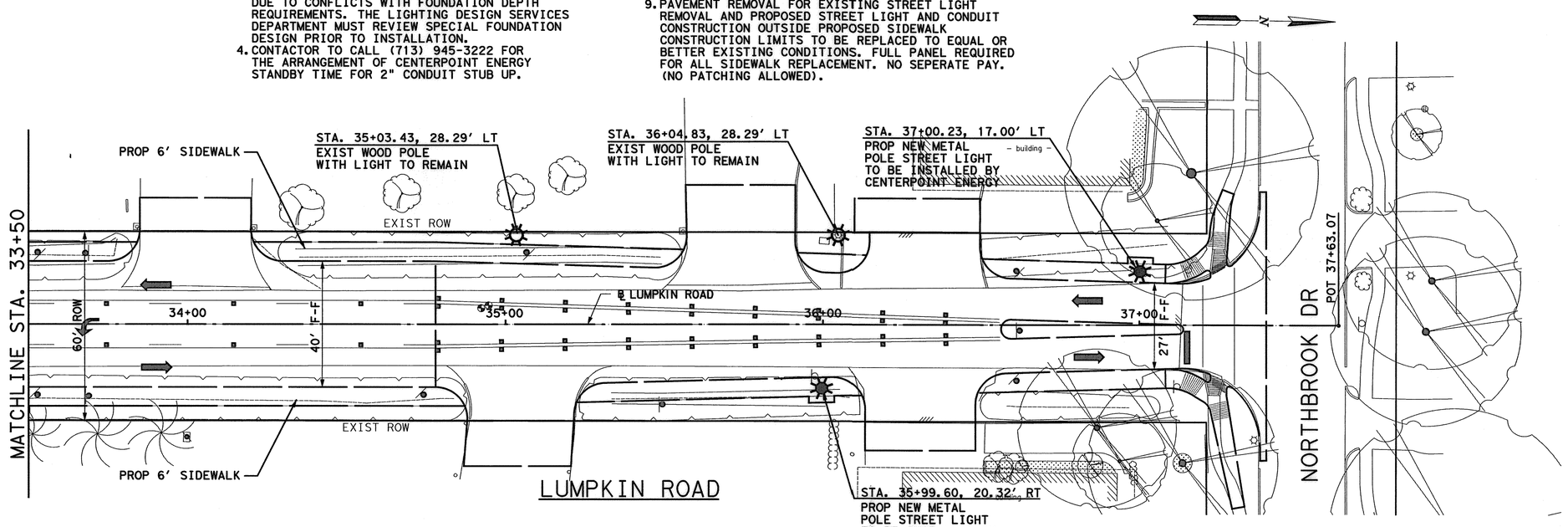

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STREET LIGHTING PLAN

SHEET 4 OF 4

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 164 OF 226	

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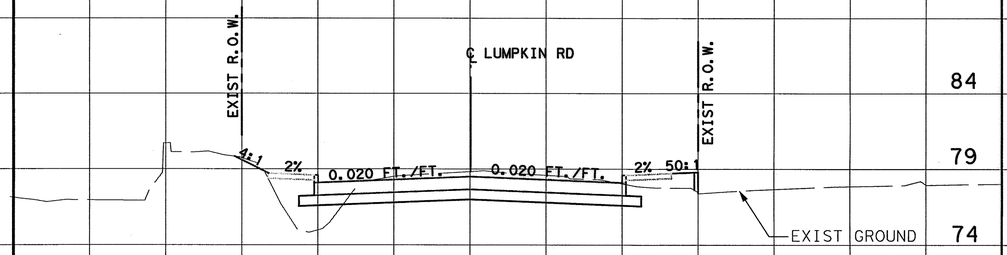

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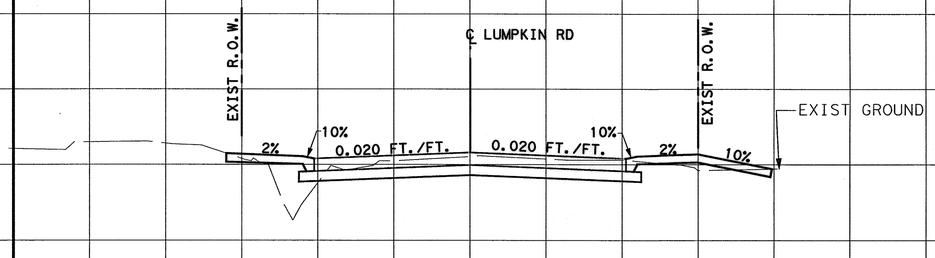

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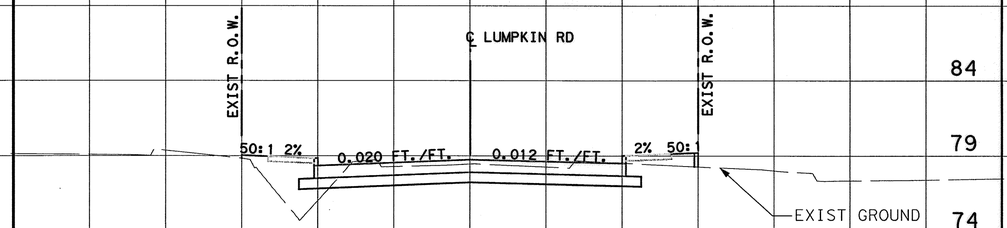

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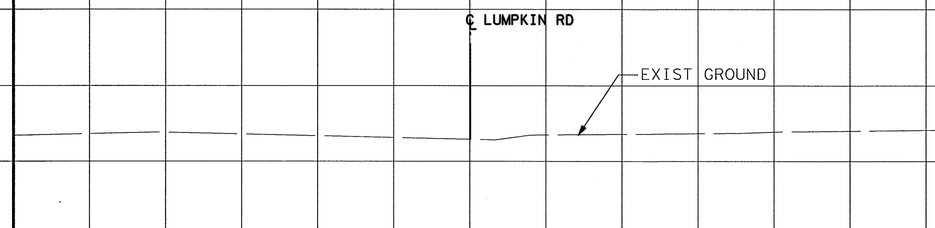

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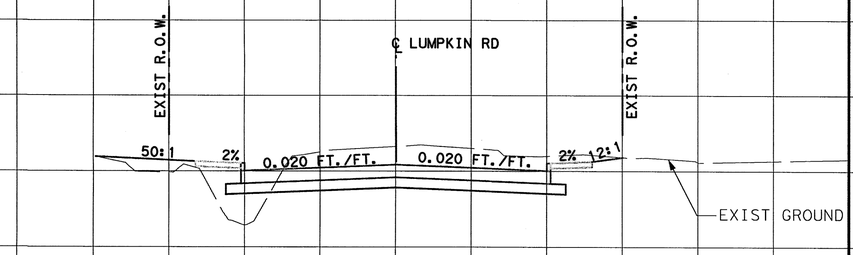

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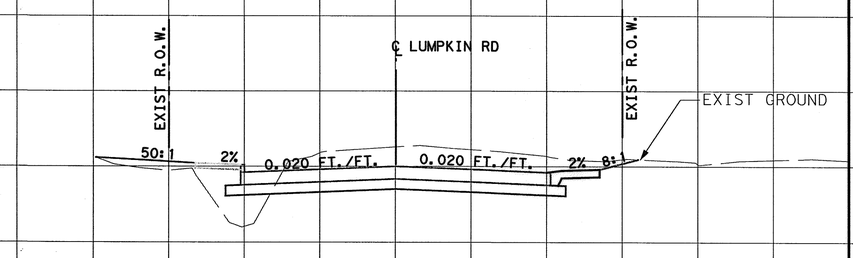

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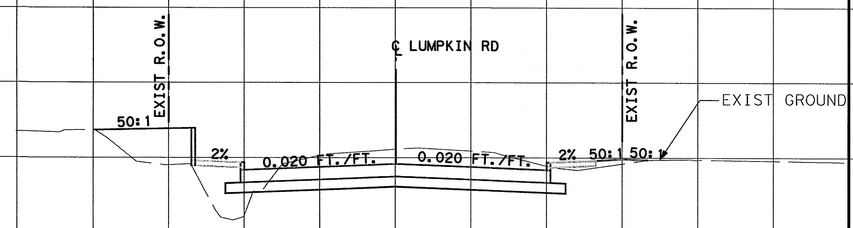

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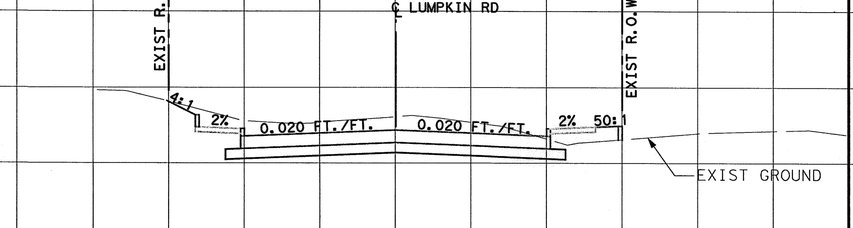

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No.	DATE	REVISIONS	APP.

NOTE:
REFER TO TOE WALL DETAILS SHEET FOR SPECIFIC TOE WALL DETAILS AND LIMITS.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CROSS SECTIONS

SHEET 1 OF 5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET:
165 OF 226

M.J.Guthrie
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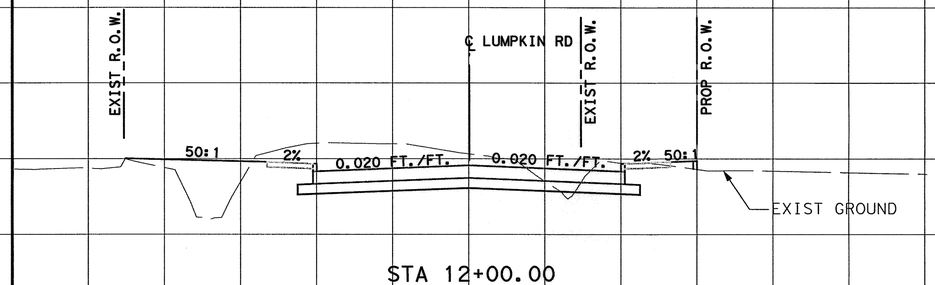

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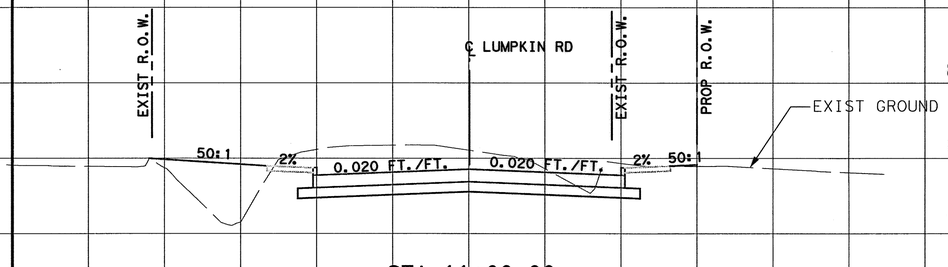

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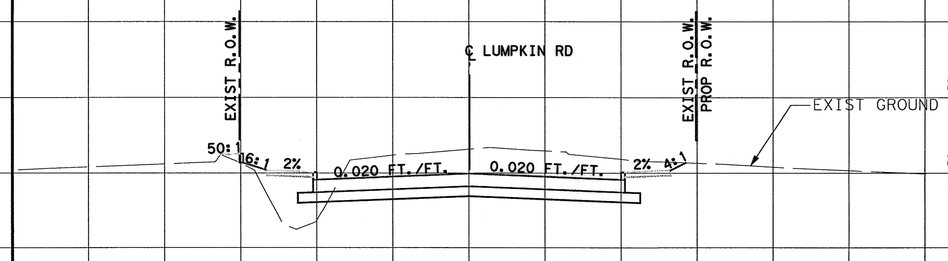

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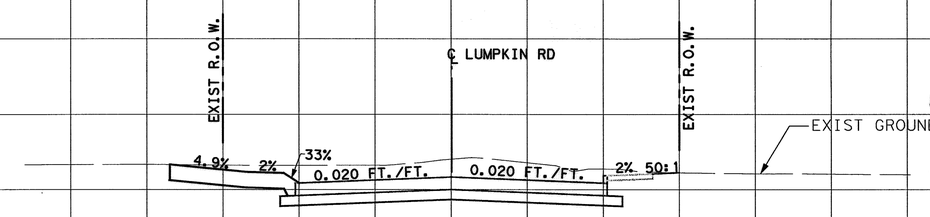

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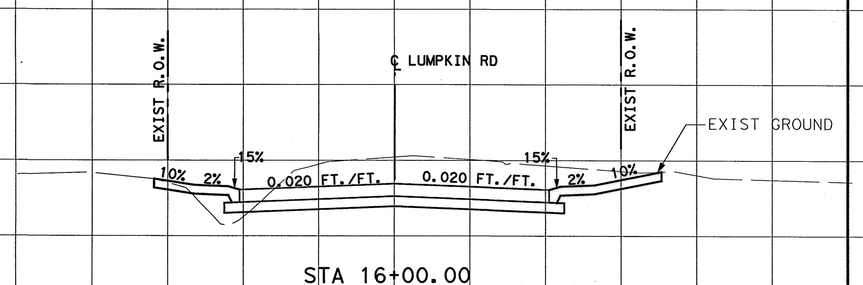

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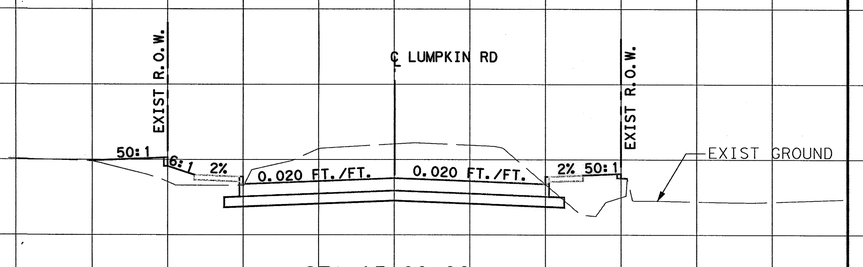

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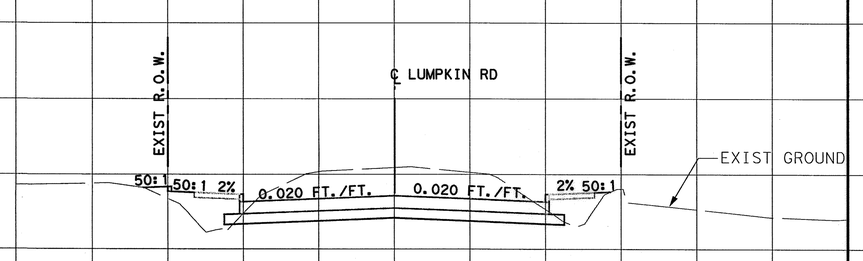

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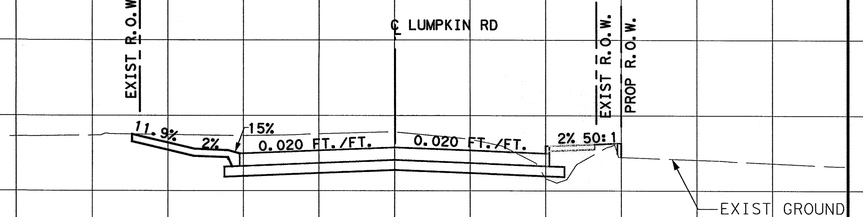

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LUMPKIN ROAD
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CROSS SECTIONS

SHEET 2 OF 5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 166 OF 226

No.	DATE	REVISIONS	APP.

MJGuthrie
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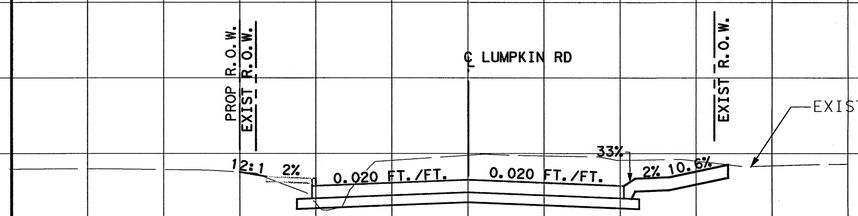

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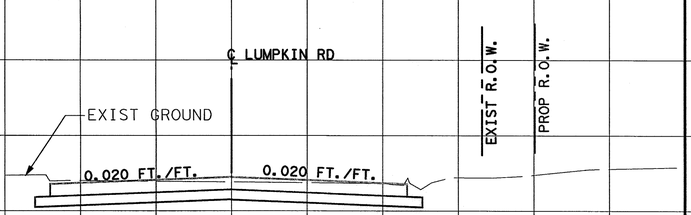

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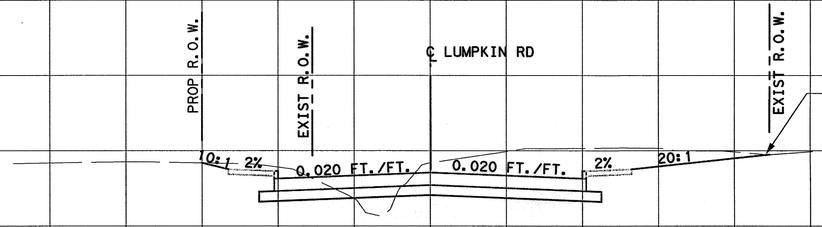

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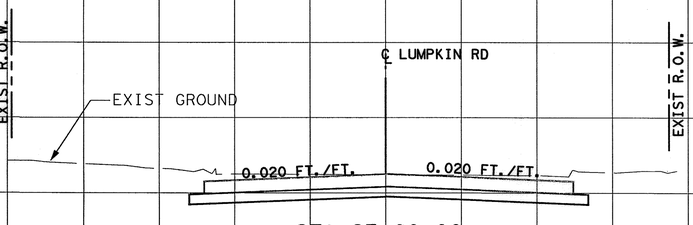

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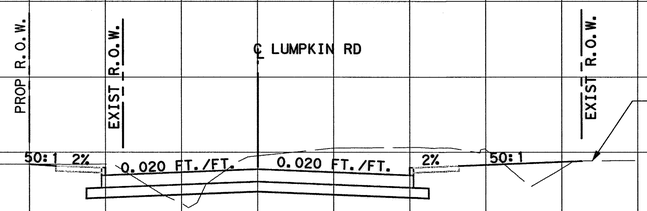

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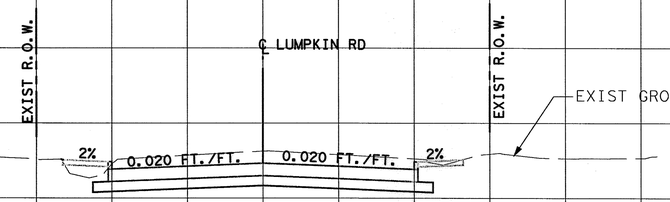

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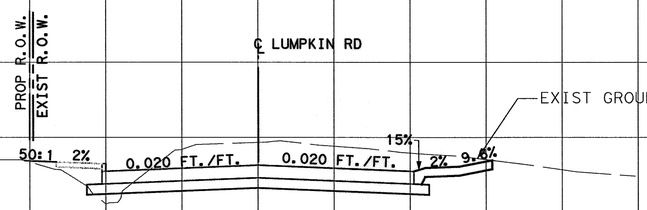

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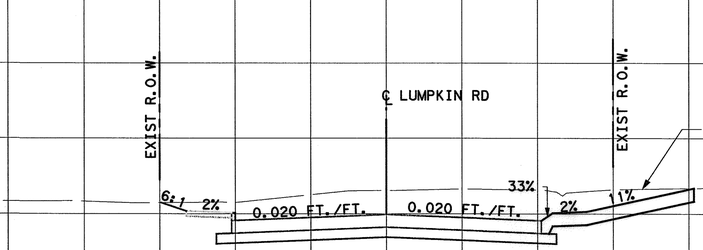

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No.	DATE	REVISIONS	APP.

MUHAMMAD M ALI, P.E. 98146 LICENSED PROFESSIONAL ENGINEER 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CROSS SECTIONS

SHEET 3 OF 5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 167 OF 226

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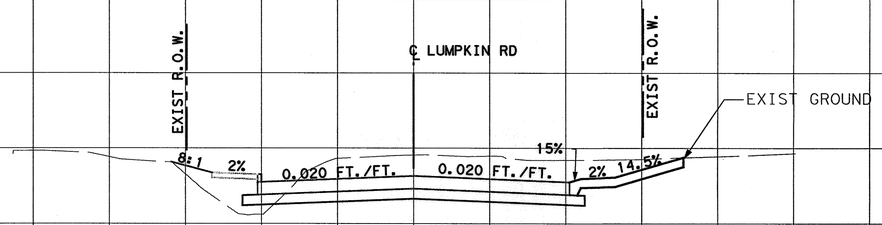

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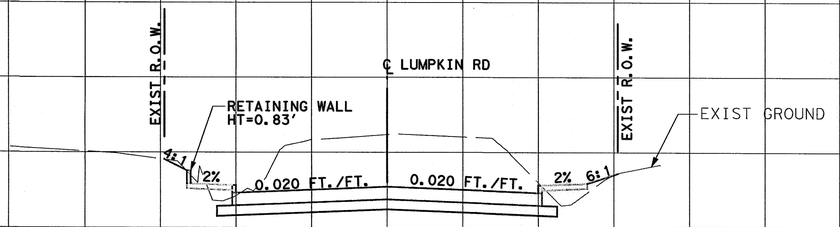

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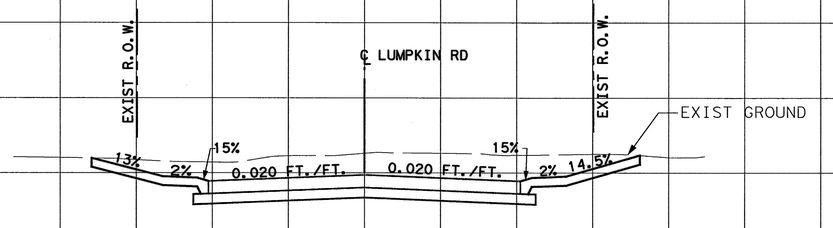

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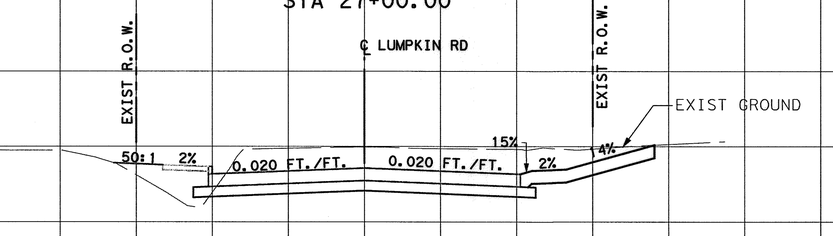

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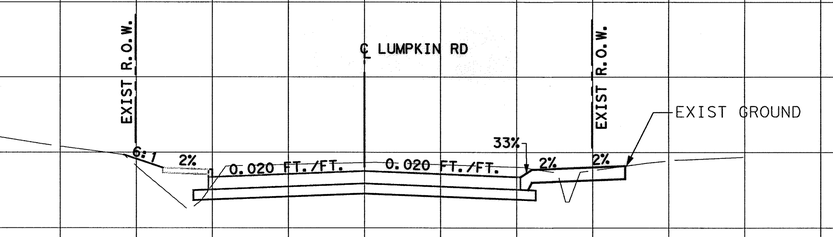

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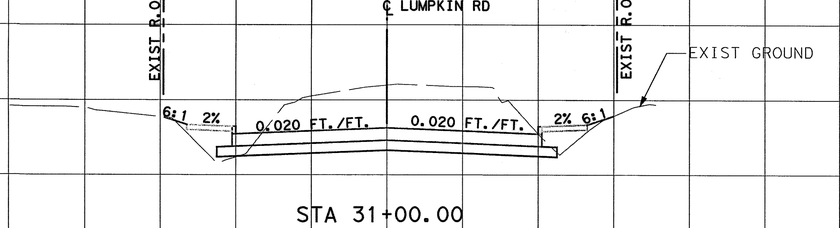

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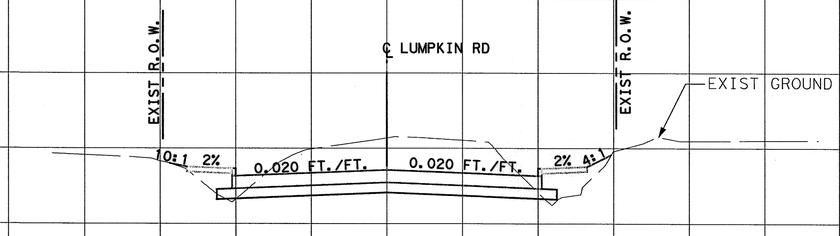

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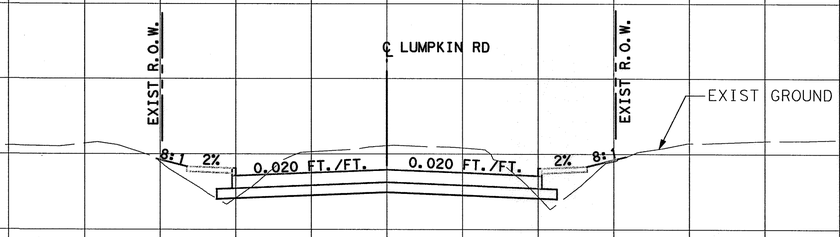

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No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CROSS SECTIONS

SHEET 4 OF 5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 168 OF 226

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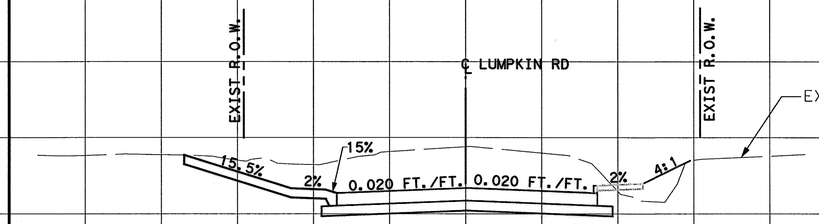

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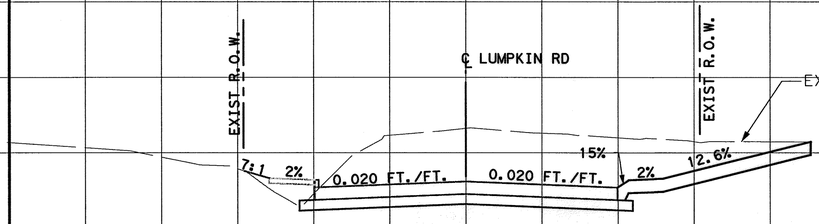

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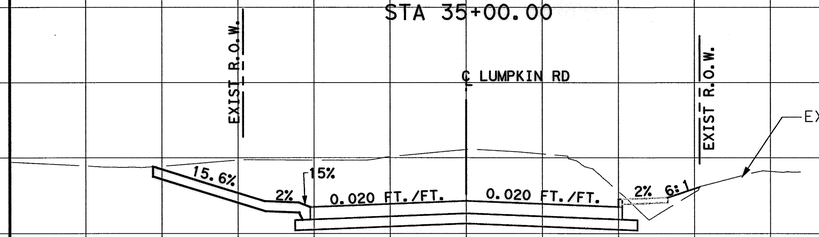

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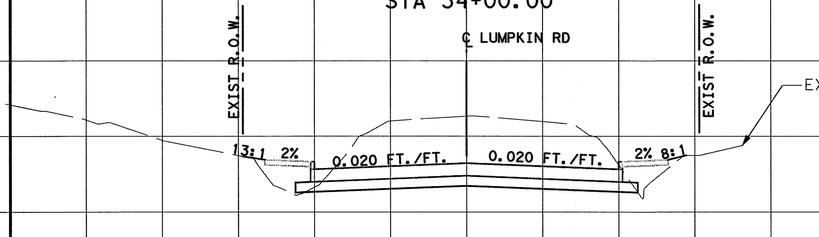

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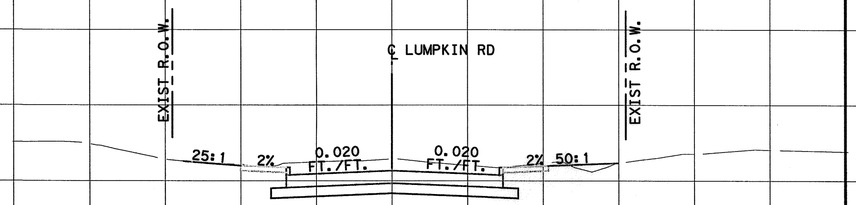

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No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

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A LEO A DALY COMPANY

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CROSS SECTIONS

SHEET 5 OF 5

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
SHEET: 169 OF 226

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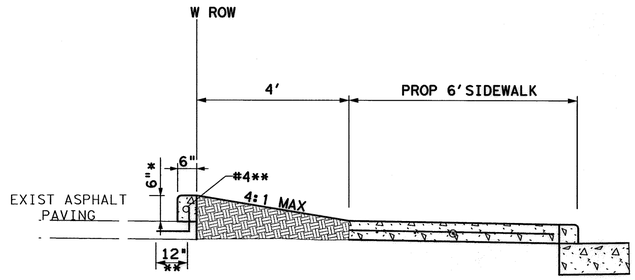
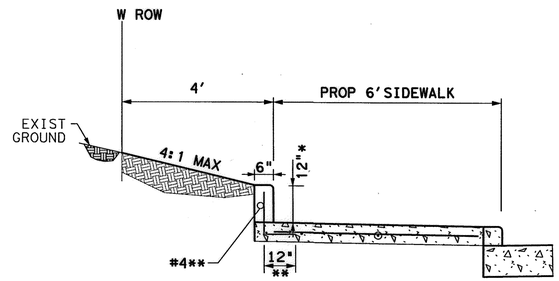


Ⓐ TOE WALL DETAILS
STA 3+20 TO 3+30



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AND
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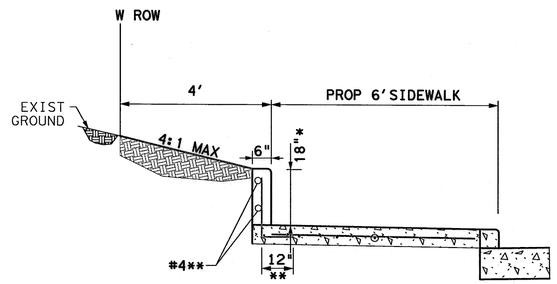

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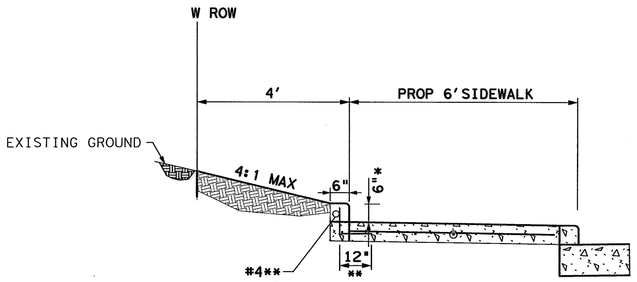

Ⓓ TOE WALL DETAILS
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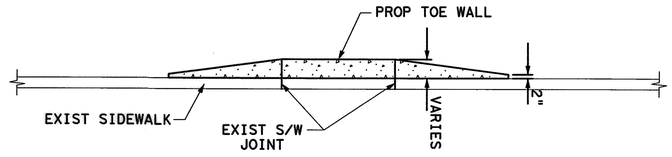
STA 6+90 TO 8+00,
STA 10+00 TO 10+20,
AND
STA 15+00 TO 15+50

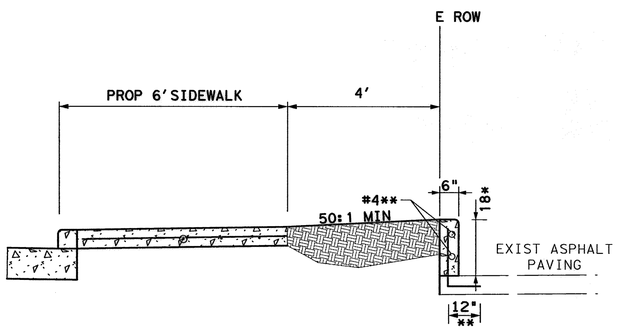


PROP TOE WALL DETAIL
N. T. S.

NOTE:

* CONTRACTOR MUST ADJUST WALL HEIGHT WHERE NECESSARY FOR WALL HEIGHT TRANSITIONS AND TO MAINTAIN POSITIVE DRAINAGE.

** REFER TO CITY OF HOUSTON STANDARD DETAIL NO. 02771-01



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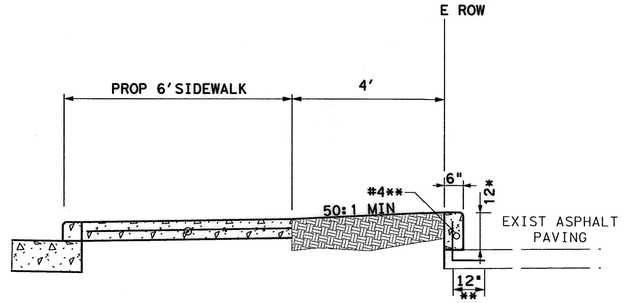

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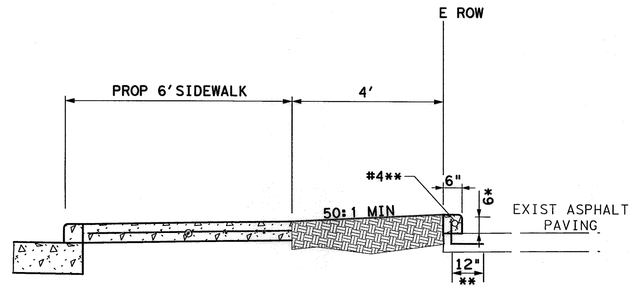

Ⓒ TOE WALL DETAILS
STA 5+00 TO 5+90
AND
STA 12+00 TO 13+00

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TOE WALL DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT: 1"=2'
HORZ: 1"=20'
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TREE PROTECTION NOTES:

1. ALL GUIDELINES STATED BELOW SHALL BE STRICTLY ADHERED TO AND MONITORED BY THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS CONTRACTED BY THE GENERAL CONTRACTOR, OWNER AND/OR OTHER CONSULTANTS.
2. TREE DRIP LINE IS DEFINED AS THE OUTER LIMIT OF THE TREE CANOPY EDGE AT ALL POINTS (360° AROUND TREE PERIMETER) SET AT FURTHEST OUTREACH OF SUCH NOTED TREE CANOPY.
3. PRIOR TO TREE CLEARING, BRUSH REMOVAL, MASS GRADING OR ANY OTHER TYPE OF CONSTRUCTION OPERATION, THE GENERAL CONTRACTOR SHALL CLEARLY TAG OR MARK ALL TREES TO BE REMOVED AND OBTAIN THE COSL ARBORIST AND THE LANDSCAPE ARCHITECT'S FINAL APPROVAL PRIOR TO SUCH TREE REMOVAL AND TREE PROTECTION FENCING OPERATION COMMENCES.
4. **THE GENERAL CONTRACTOR SHALL PROVIDE AND SET TREE PROTECTION FENCING AROUND EACH TREE OR GROUP OF TREES TO BE RETAINED AS NOTED IN THESE DOCUMENTS TO PREVENT THE REMOVAL OF PROTECTED TREES, STORAGE OF CONSTRUCTION MATERIALS, PLACEMENT OF DEBRIS OR FILL, CONSTRUCTION OPERATIONS AND/OR EQUIPMENT USAGE WITHIN THE DRIP LINE.**
5. DURING CONSTRUCTION OPERATIONS, THE GENERAL CONTRACTOR SHALL PROHIBIT CLEANING, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS UNDER THE CANOPY OF TREES AND PREVENT RUN-OFF FROM SUCH NOTED ITEMS. THE CONTRACTOR SHALL NOT ALLOW THE DISPOSAL OF ANY WASTE MATERIAL SUCH AS, BUT NOT LIMITED TO, PAINT, OIL, SOLVENTS, ASPHALT, CONCRETE, MORTAR, ETC., OR ALLOW RUN-OFF FROM ANY SUCH ITEMS IN TO THE CANOPY AREA.
6. NO ATTACHMENTS OR WIRES OF ANY KIND, OTHER THAN THOSE OF A PROTECTIVE NATURE, SHOULD BE ATTACHED TO ANY TREE.
7. NO FILL OR STORAGE OF FILL MATERIALS OR ANY EXCAVATION OPERATIONS SHALL OCCUR WITHIN THE DRIP LINE OF A TREE TO BE PRESERVED UNLESS THERE IS A SPECIFIC APPROVED PLAN FOR USE OF TREE WELLS OR RETAINING WALLS. MAJOR CHANGES OF GRADE (SIX INCHES OR GREATER) WILL REQUIRE ADDITIONAL MEASURES TO MAINTAIN PROPER OXYGEN AND WATER EXCHANGE WITH THE ROOTS. IN ADDITION, THE DEVELOPER SHOULD ADHERE TO THE FOLLOWING GUIDELINES TO PROTECT THE TREES TO BE PRESERVED.
8. REFER TO TREE PROTECTION/REMOVAL DOCUMENTS FOR FENCING LAYOUT AND TYPE OF FENCE REFERENCE INCLUDING TYPE AND SPECIFICATION OF FENCING REQUIRED.
9. ANY ADDITIONAL TREES REQUIRED FOR REMOVAL FOR CONSTRUCTION PROCESSES, UTILITY INSTALLATIONS, ETC. THAT ARE NOT NOTED OR REFERENCED ON PLANS SHALL BE NOTED ON PLAN (8.5 X 11) WITH REASON FOR REMOVAL AND SUBMITTED TO COSL ARBORIST AND THE LANDSCAPE ARCHITECT FOR REVIEW. UPON APPROVAL OF SUBJECT TREE'S REMOVAL BY COSL ARBORIST SUCH TREE CAN BE REMOVED IN MANNER DEEMED APPROPRIATE. CONTRACTOR TO ALLOW MIN. FIVE (5) WORKING DAYS FOR SUCH NOTED APPROVAL.

DEMOLITION NOTES:

1. CONTRACTOR SHALL DEMOLISH ALL ITEMS NECESSARY TO INSTALL NEW WORK PER PLANS AND SPECIFICATIONS. DEMOLITION WORK SHALL INCLUDE BUT NOT BE LIMITED TO ITEMS INDICATED BY REFERENCED NOTES AND SYMBOLS ON THE DEMOLITION PLANS.
2. CONTRACTOR SHALL VERIFY IN FIELD ALL DIMENSIONS AND ITEMS TO BE REMOVED. PROMPTLY NOTIFY THE LANDSCAPE ARCHITECT IN WRITING OF ANY DISCREPANCIES.
3. REFER TO SPECIFICATIONS SECTION 024119 FOR GENERAL DEMOLITION REQUIREMENTS.
4. INSTALL TEMPORARY BARRIERS TO SEPARATE CONSTRUCTION FROM OCCUPIED AREAS OR AREAS ACCESSIBLE TO PUBLIC OR OWNER EMPLOYEES. BARRIER SHALL BE DUST-TIGHT. COORDINATE DEMOLITION SCHEDULE WITH OWNER. MINIMIZE DISRUPTIONS FROM SOUND OR CONSTRUCTION EQUIPMENT AND PERSONNEL TO OCCUPIED AREAS.
5. FOR ALL EXISTING PLUMBING - IRRIGATION AND DRAINAGE ITEMS REMOVED, DEMOLISH LINES BACK TO GRADE OR WALLS TO REMAIN, ABOVE OR BELOW FLOOR. CAP ALL LINES.

ABBREVIATIONS:

ADJ	ADJACENT
APPROX	APPROXIMATE
BC	BOTTOM OF CURB
BLDG	BUILDING
BR	BOTTOM OF RAMP
BS	BOTTOM OF STEP
BL	BUILDING LINE
BOC	BACK OF CURB
BW	BOTTOM OF WALL
CJ	CONTROL JOINT
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT	CONTINUOUS
CL	CENTERLINE
DIA	DIAMETER
DWG	DRAWINGS
EFL	EAST FLOW LINE
EJ	EXPANSION JOINT
ELEV	ELEVATION
EP	EDGE OF PAVEMENT
EQ	EQUAL
EXIST	EXISTING
FG	FINISHED GRADE
FOC	FACE OF CURB
FIN	FINISH
IJ	ISOLATION JOINT
LP	LOW POINT
MAX	MAXIMUM
MIN	MINIMUM
NFL	NORTH FLOW LINE
OC	ON CENTER
PA	PLANTING AREA
PERP	PERPENDICULAR
PL	PROPERTY LINE
POB	POINT OF BEGINNING
PROP	PROPOSED
R	RADIUS
RE	REFER TO
REF	REFERENCE
REINF	REINFORCED
REQ	REQUIRED
ROW	RIGHT OF WAY
SCH	SCHEDULE
SSEJ	SUB-SURFACE EXPANSION JOINT
SEC	SECTION
SFL	SOUTH FLOW LINE
SHT	SHEET
SIM	SIMILAR
SQ	SQUARE
SWE	STATIC WATER ELEVATION
TC	TOP OF CURB
TOB	TOP OF BANK
TOS	TOE OF SLOPE
TP	TO OF PAVING
TR	TOP OF RAMP
TS	TOP OF STEP
TW	TOP OF WALL
TY	WLAL
TYP	TYPICAL
WL	WATER LEVEL
WFL	WEST FLOW LINE

LAYOUT & MATERIALS LEGEND

- CENTER LINE
- ALIGN
- EJ — EXPANSION JOINT
- CJ — CONTROL OR CONSTRUCTION JOINTS
- R5'-0" — RADIUS
- X / LX.XX — PLAN ENLARGEMENT REFERENCE
- X / LX.XX — SECTION REFERENCE
- X / LX.XX — ELEVATION REFERENCE
- X / LX.XX — DETAIL REFERENCE
- XX — MATERIAL, KEYNOTE REFERENCE
- VEHICULAR STREET LIGHT
- PEDESTRIAN LIGHT
- ACCESSIBLE RAMP

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

NOTES:

REFER TO CIVIL FOR REPAIR OF DISTURBED AREAS.

ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

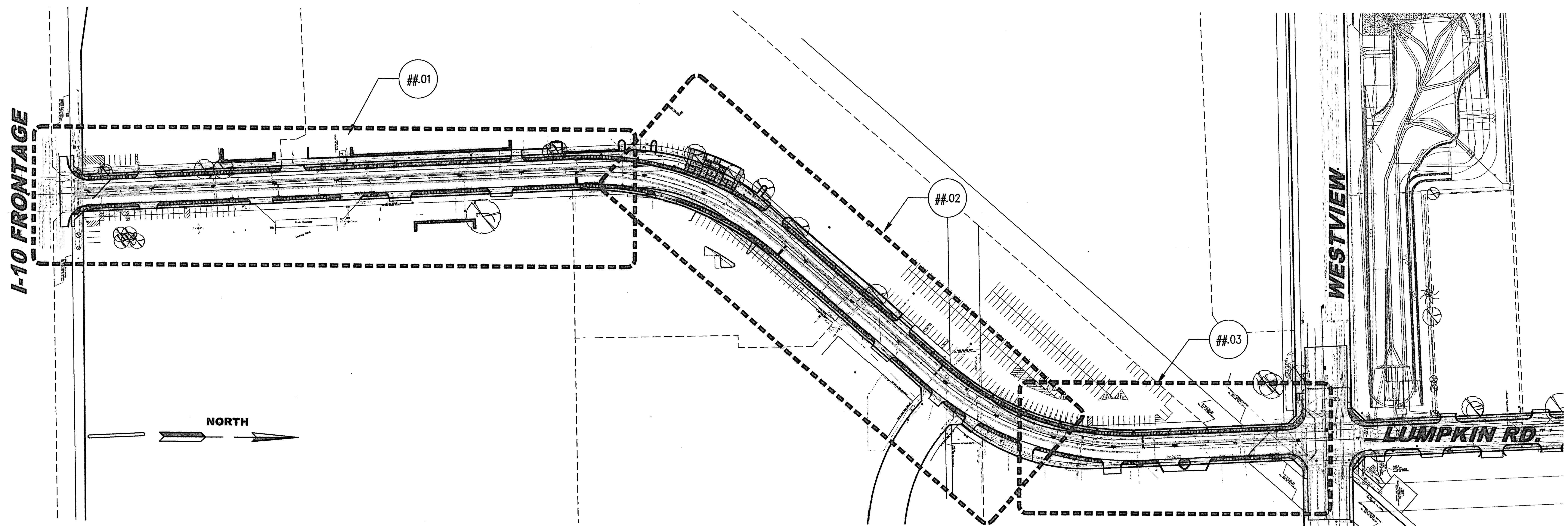
REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

No.	DATE	REVISIONS	APP.



1 KEY PLAN
1" = 100'-0"

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT #10477

1 OCTOBER 2014

SWA Group
1245 W 18th Street
Houston, TX 77008
www.swagroup.com

Lockwood, Andrews & Newnam, Inc.
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LUMPKIN ROAD
N-T17000-0012-3

LANDSCAPE NOTES AND LEGEND

L0.00

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

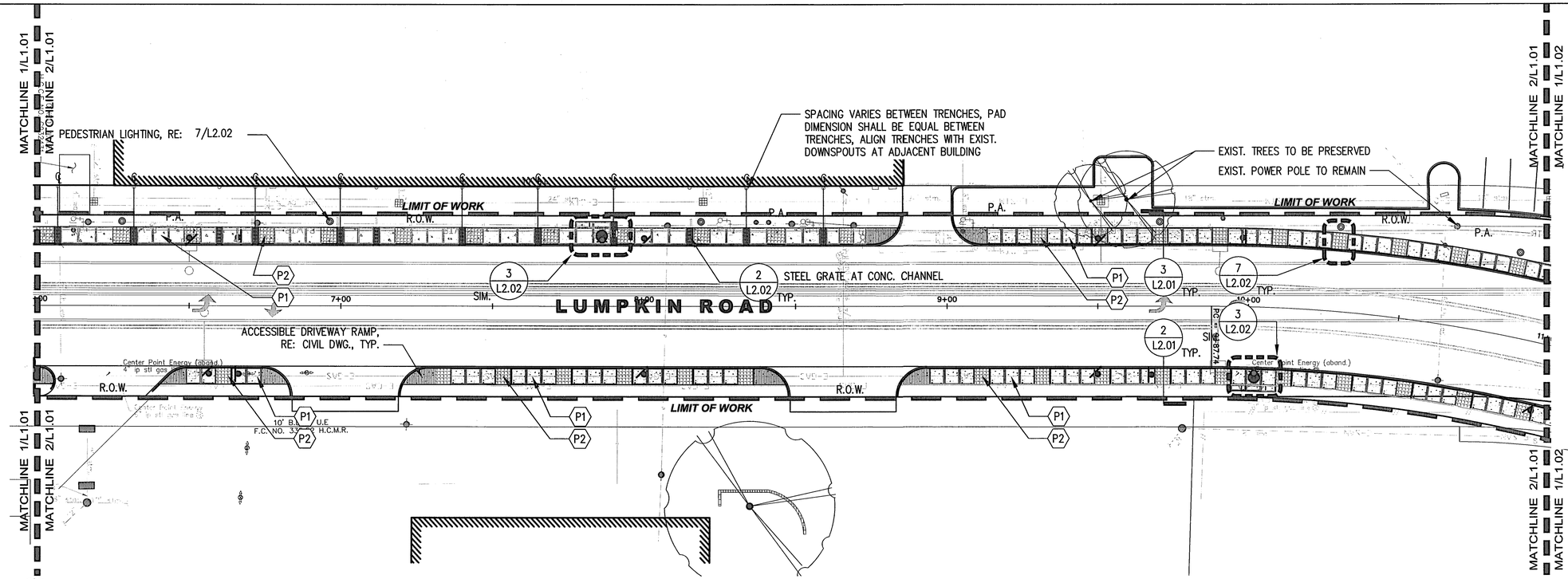
DRAWING SCALE:

CITY DWG NO.

VERT:
HORZ: 1"=20'

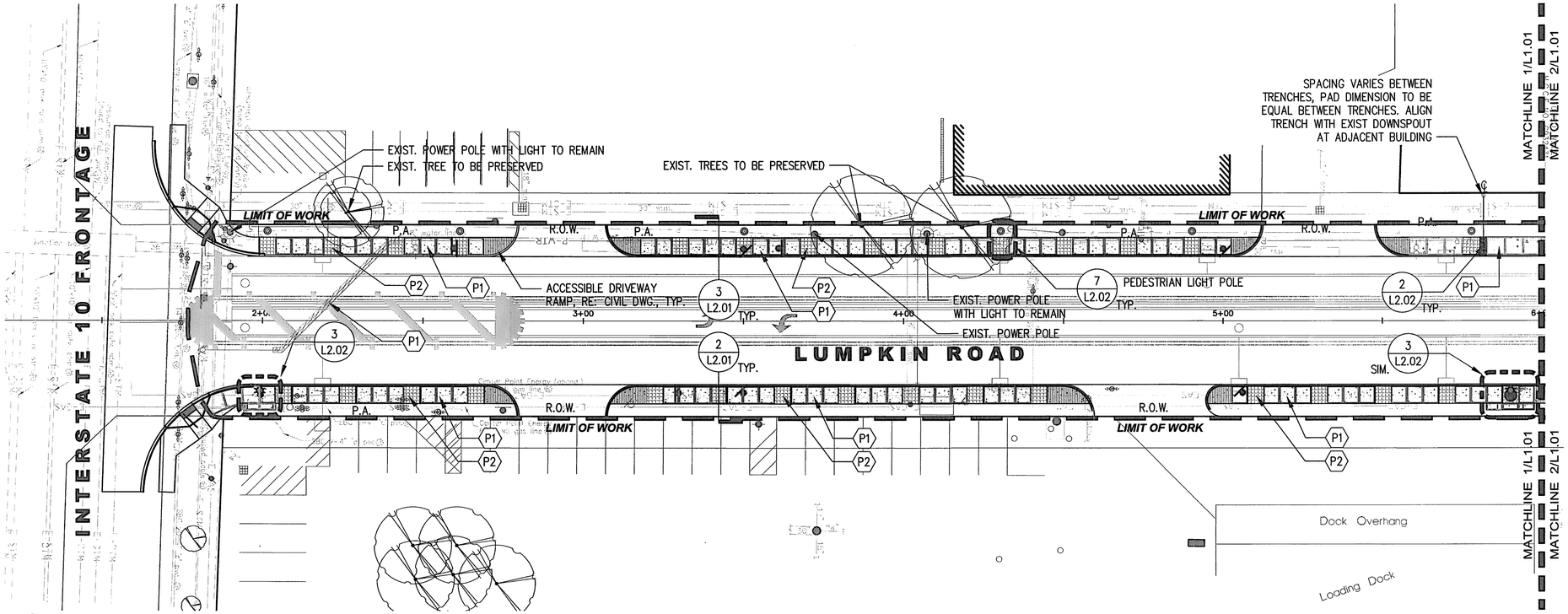
SHEET:
171 OF 226

\\HOU1FS801\DATA\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L0.00 LANDSCAPE NOTES AND LEGEND.dwg 14_10-01 04:32 CGENTILE



2 LAYOUT & MATERIAL PLAN

1" = 20'



1 LAYOUT & MATERIAL PLAN

1" = 20'

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

NOTES:

REFER TO CIVIL FOR REPAIR OF DISTURBED AREAS.

ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

0 20 40 80

(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.

1 OCTOBER 2014

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N-T17000-0012-3

LAYOUT & MATERIAL PLAN
1+00 TO 11+00
L1.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 172 OF 226	

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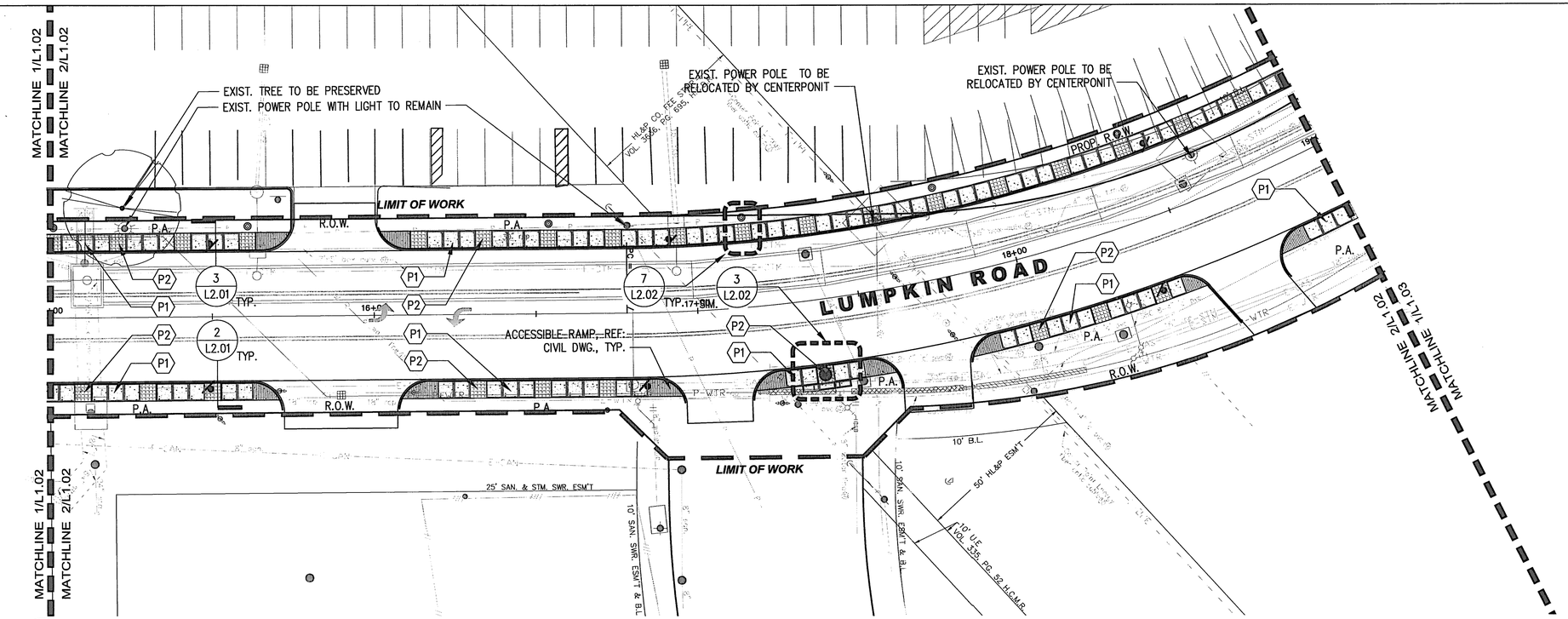
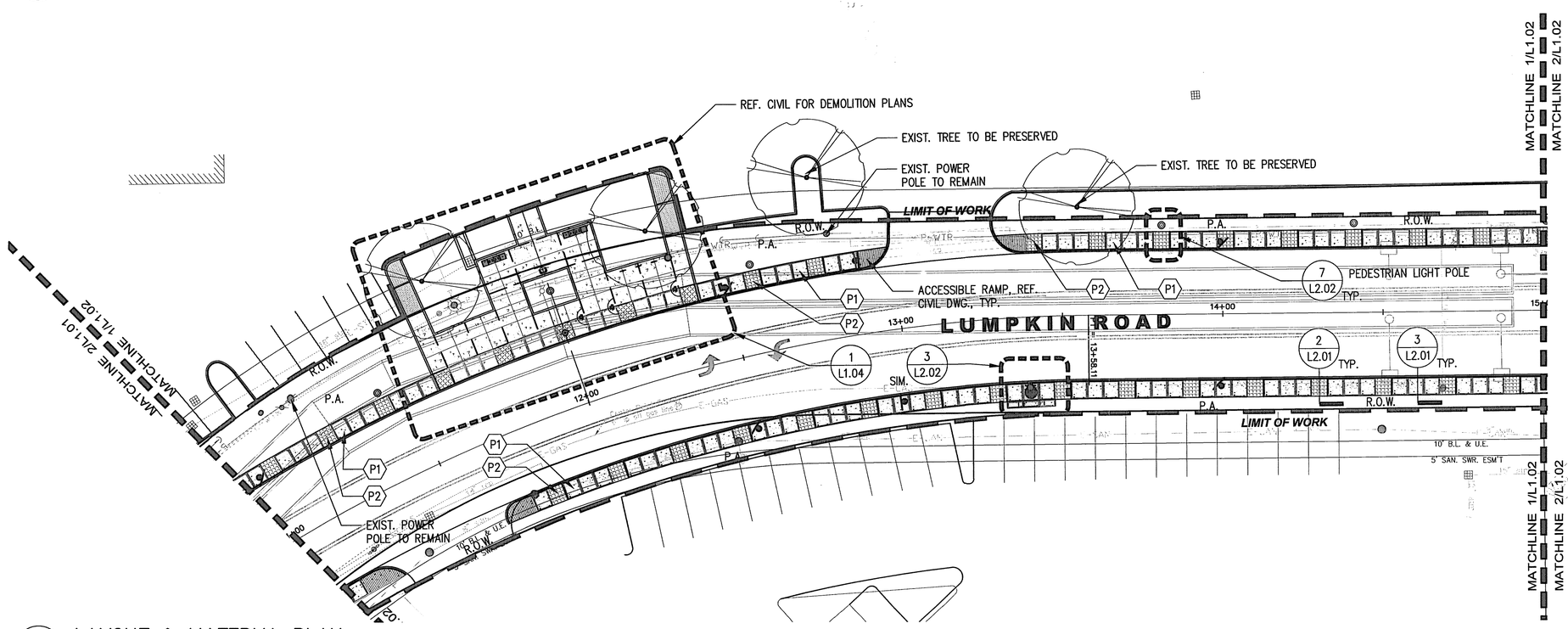
04:32
14_10-01

\\HOUTFS801\DATA\Project\RHT\RHTS401 Memorial W04 Lumkin CD\4 Drawings\Graphics\AutoCAD\Sheets\L1\L1.01 LAYOUT & MATERIAL PLAN.dwg



2 LAYOUT & MATERIAL PLAN
1" = 20'



1 LAYOUT & MATERIAL PLAN
1" = 20'

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EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.

TEXAS BOARD OF ARCHTECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT #10477

1 OCTOBER 2014

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LAYOUT & MATERIAL PLAN
12+00 TO 19+00
L1.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 173 OF 226	

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\\HOUIFS801\DATA\Project\RHT\RHTS401 Memorial W04 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L1\L1.02 LAYOUT & MATERIAL PLAN.dwg

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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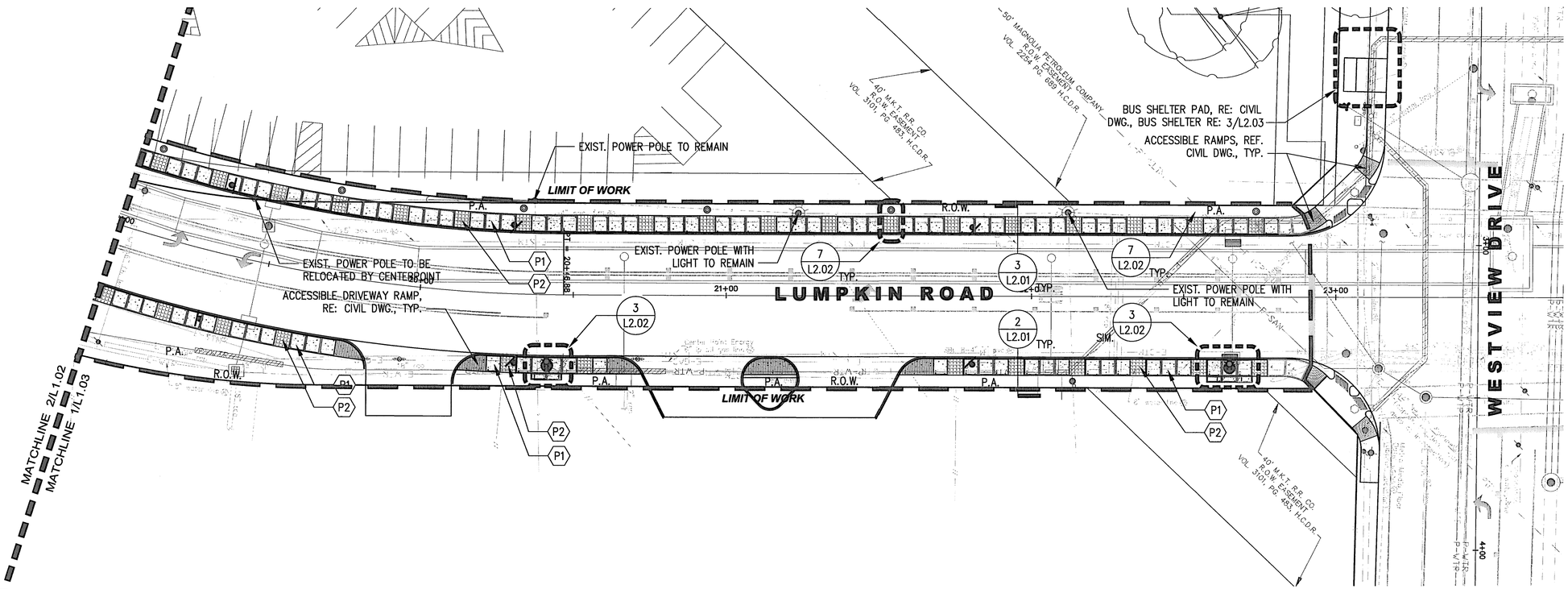
0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.



1 LAYOUT & MATERIAL PLAN
1" = 20'

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT 10417
1 OCTOBER 2014

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LAYOUT & MATERIAL PLAN
19+00 TO 23+50
L1.03

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 174 OF 226	

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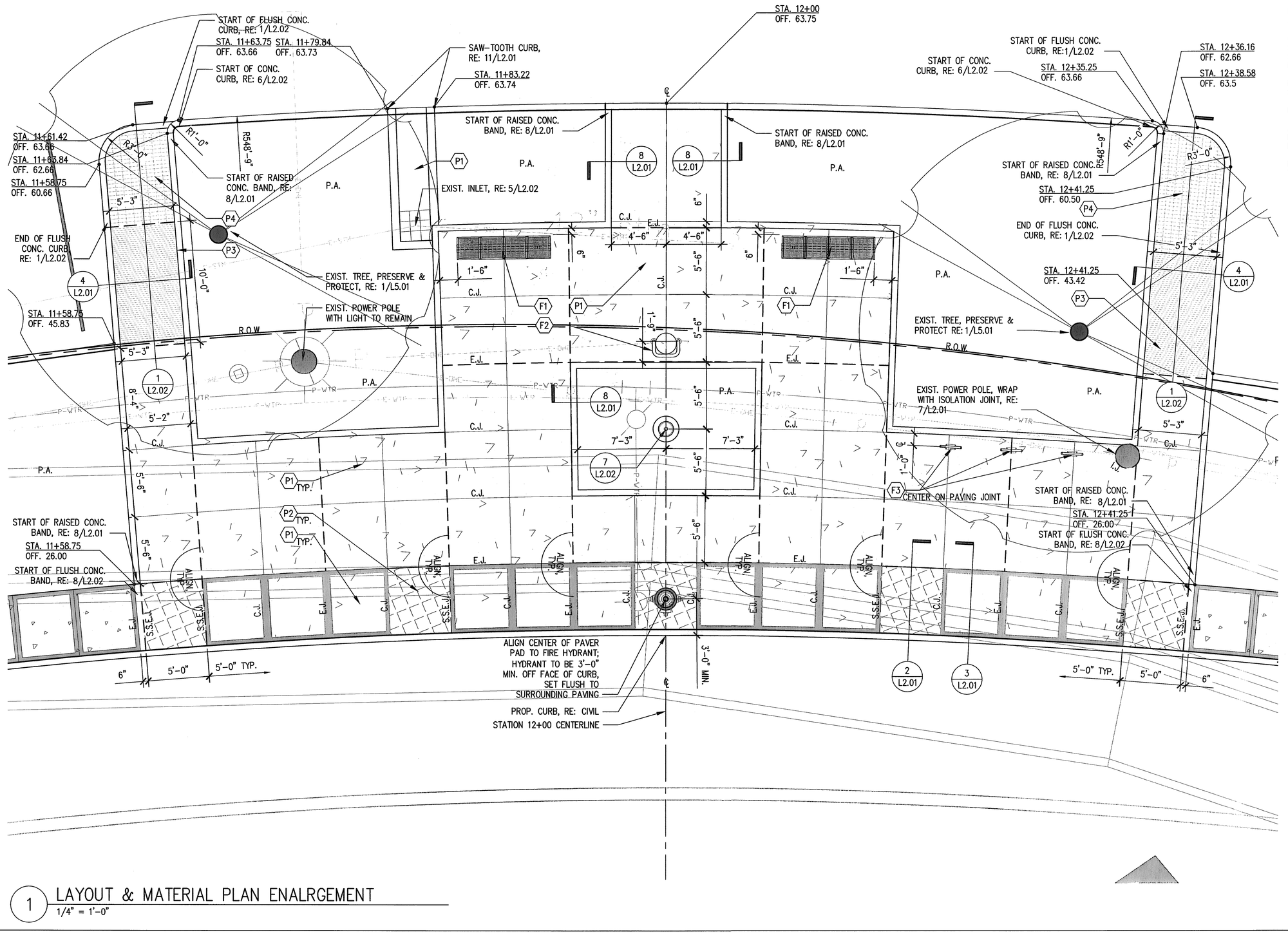
04:33
\\HOUTFS801\DATA\Project\RHT\RHTS401 Memorial W04 Lumkin CD\4 Drawings\Graphics\AutoCAD\Sheets\L1\L1.03 LAYOUT & MATERIAL PLAN.dwg



1 LAYOUT & MATERIAL PLAN ENALRGEMENT
1/4" = 1'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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REF. 4/L5.02 FOR PLANTING SCHEDULE

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No.	DATE	REVISIONS	APP.

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
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ARCHITECT 10477

1 OCTOBER 2014

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ENLARGEMENT PLAN
LAYOUT & MATERIALS
12+00
L1.04

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 175 OF 226	

\\Houfs601\data\Project\RHT\RHTS401 Memorial W04 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L1\L1.04 ENLARGEMENT PLAN LAYOUT & MATERIALS.dwg 14_10_01 04:33 CGENTILE

NOTE:
1. TOP OF CURB OUTSIDE OF R.O.W. TO BE 6" ABOVE EXISTING GRADE, REF. 6/L2.02
2. CONTRACTOR TO VERIFY EXISTING GRADES TO ENSURE PROPER DRAINAGE, REF.1/L2.02
3. NOTIFY LANDSCAPE ARCHITECT IF CHANGES ARE REQUIRED

NOTE:
1. TOP OF CURB OUTSIDE OF R.O.W. TO BE 6" ABOVE EXISTING GRADE, REF. 6/L2.02
2. CONTRACTOR TO VERIFY EXISTING GRADES TO ENSURE PROPER DRAINAGE, REF.1/L2.02
3. NOTIFY LANDSCAPE ARCHITECT IF CHANGES ARE REQUIRED

SLOPE TO DRAIN

TC 81.04
SEE NOTE

TC 81.07
TP 80.32
FG 80.76
SEE NOTE

TC 80.44
TP 80.41
SEE NOTE

TC 80.82
TP 80.39
FG 80.61
SEE NOTE

FG 80.59

TC 81.18
BC 80.68
SEE NOTE

TC 81.19
TP 81.16
FG 80.36

TC 81.23
TP 81.20
FG 80.13

RIM 79.89
NFL 77.11
SFL 75.49
NFL 77.00
EFL 77.00

TC 81.22
TP 81.19
FG 79.89

TC 81.27
TP 81.24
FG 80.17

TC 81.30
TP 81.27
FG 79.94

TC 81.35
TP 81.32
FG 79.66

8" PVC @ 1% ~ 41.83'

8" PVC @ 1% ~ 25.43'

2'-0" MIN.

9
L2.02

RIM 79.56
SFL 77.42

TC 81.39
SEE NOTE

TC 81.42
TP 80.89
FG 80.95
SEE NOTE

TC 81.04
TP 81.01
SEE NOTE

TC 81.52
TP 80.99
FG 80.75
SEE NOTE

FG 79.69

TC 81.54
TP 81.51
BC 80.83

TC 81.52
TP 81.49
FG 80.96

TC 81.42
TP 81.39

TC 81.39
TP 81.36
FG 81.09

P.A.

B R E A K L I N E

1
L2.02

TC 81.32
TP 81.29
FG 80.49

TC 81.30
TP 81.27
BC 80.29

TC 81.16
TP 81.13
FG 80.66

TC 81.34
TP 81.31
FG 80.11

TC 81.23
TP 81.20
FG 80.22

TC 81.39
TP 81.36
FG 81.28

TC 81.44
TP 81.41
FG 81.33

2
L2.06
PEDESTRIAN LIGHT POLE

TC 81.46
TP 81.43
FG 79.76

TC 81.35
TP 81.32
FG 80.01

TC 81.21
TP 81.18
FG 81.10

RIM 80.77
SFL 77.25

TC 81.15
TP 81.12

TC 81.14
TP 81.11

TC 80.92
TP 80.89

EXIST. POWER POLE

TC 81.20
BC 81.17

ADJUST HYDRANT TO MATCH
PROPOSED ADJACENT GRADE
STATION 12+00 CENTERLINE

1 LAYOUT & MATERIAL PLAN ENALRGEMENT
1/4" = 1'-0"

BENCHMARK:

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No.	DATE	REVISIONS	APP.

STATE OF TEXAS BOARD OF ARCHITECTURAL EXAMINERS JAMES W. VICK ARCHITECT #10017

1 OCTOBER 2014

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ENLARGMENT PLAN GRADING & DRAINAGE
12+00
L1.05

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 176 OF 226	

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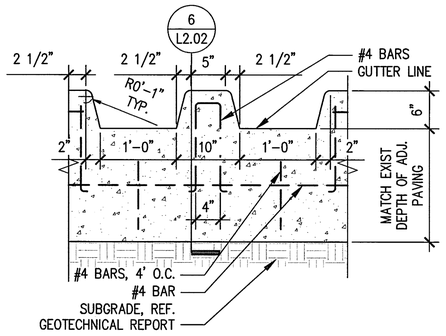
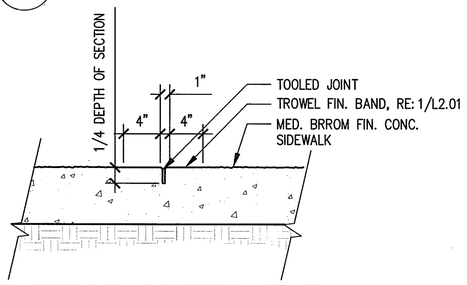
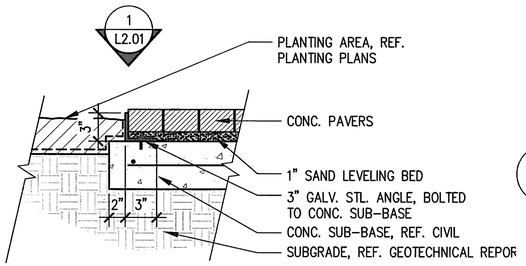
\\Hou1fs801\data\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 Drawings\Graphics\AutoCAD\Sheets\L1\L1.05 ENLARGMENT PLAN GRADING & DRAINAGE.dwg



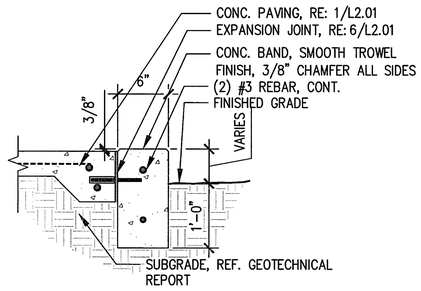
11 SAW TOOTH CURB DETAIL
1" = 1'-0"



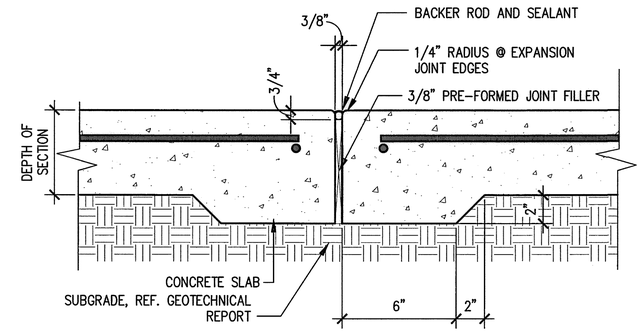
10 TYPICAL CONTROL JOINT – SECTION
1 1/2" = 1'-0"



9 CONC. PAVER RESTRAINT – SECTION
1 1/2" = 1'-0"

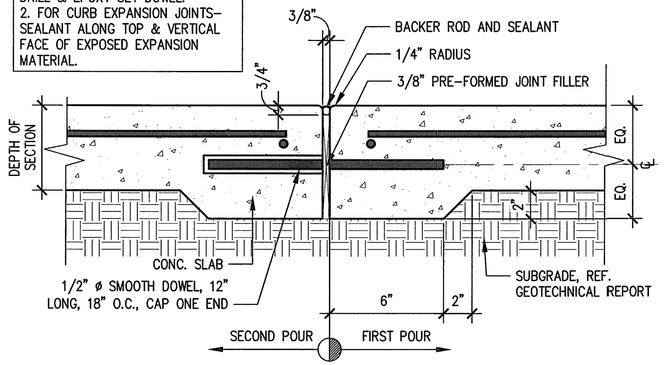


8 RAISED CONCRETE BAND – SECTION
1" = 1'-0"

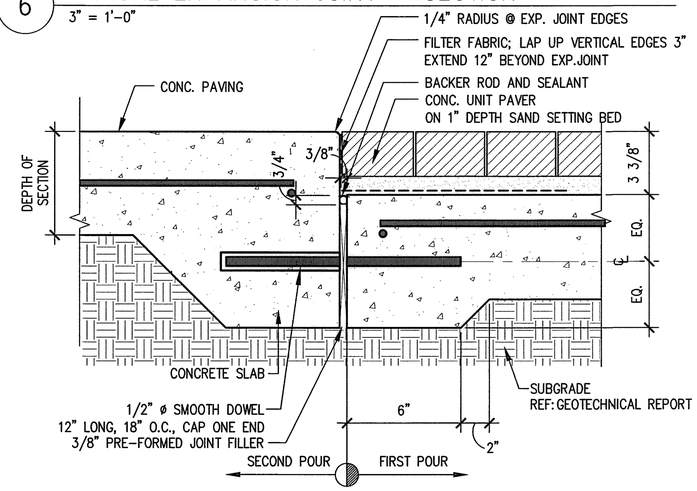


7 ISOLATION JOINT – SECTION
3" = 1'-0"

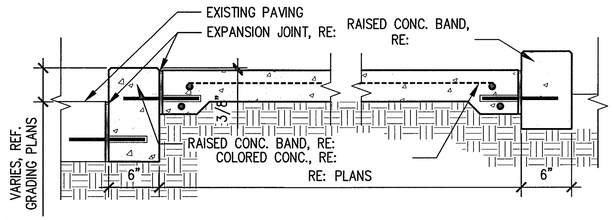
NOTE:
1. AT EXISTING CONCRETE, CORE DRILL & EPOXY SET DOWEL.
2. FOR CURB EXPANSION JOINTS– SEALANT ALONG TOP & VERTICAL FACE OF EXPOSED EXPANSION MATERIAL.



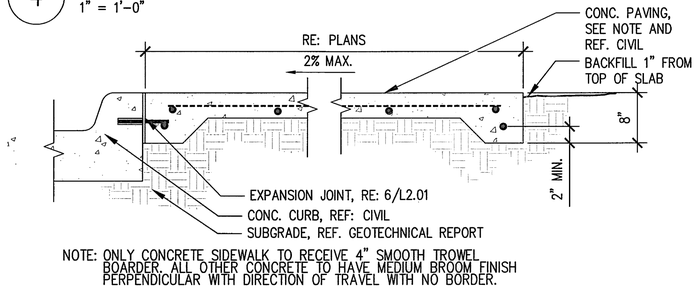
6 TYPICAL EXPANSION JOINT – SECTION
3" = 1'-0"



5 SUB-SURFACE EXPANSION JOINT – SECTION
3" = 1'-0"

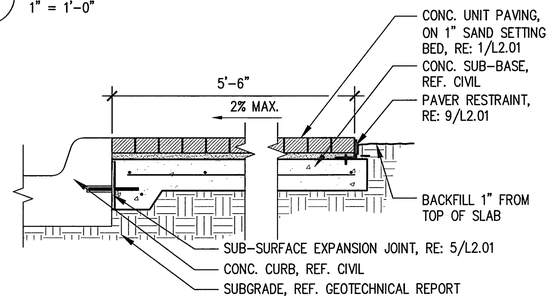


4 ACCESSIBLE RAMP – SECTION
1" = 1'-0"

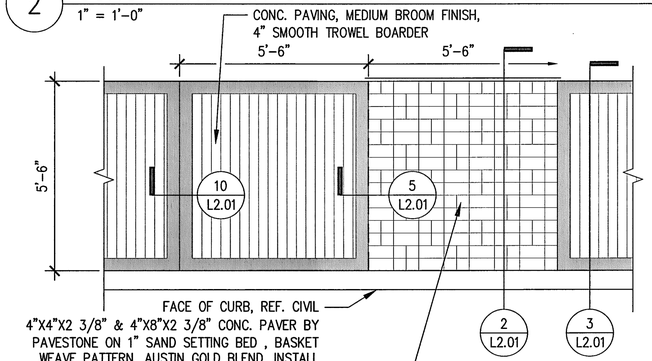


NOTE: ONLY CONCRETE SIDEWALK TO RECEIVE 4" SMOOTH TROWEL BOARDER. ALL OTHER CONCRETE TO HAVE MEDIUM BROOM FINISH PERPENDICULAR WITH DIRECTION OF TRAVEL WITH NO BORDER.

3 TYPICAL CONCRETE PAVING – SECTION
1" = 1'-0"



2 CONC. PAVER IN CONCRETE – SECTION
1" = 1'-0"



1 TYPICAL CONCRETE PAVING – PLAN
1/2" = 1'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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No.	DATE	REVISIONS	APP.

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
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ARCHITECT # 10417
1 OCTOBER 2014

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HARDSCAPE DETAILS

L2.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 177 OF 226	

CGENTILE
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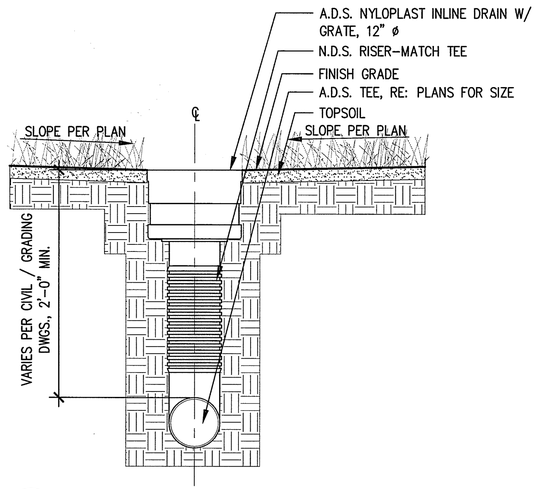
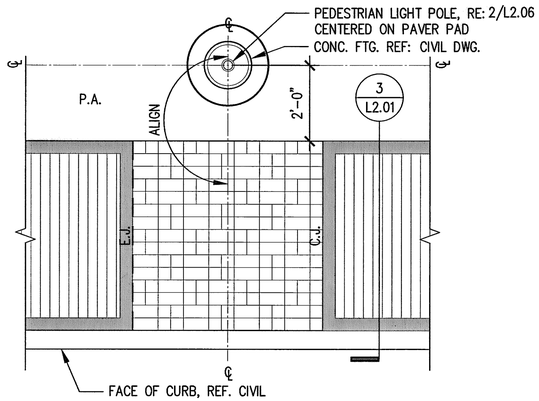
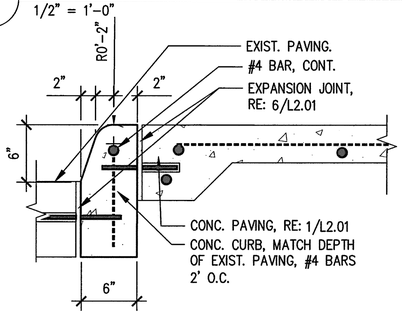
\\HOUTFS801\DATA\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L2\L2.01 HARDSCAPE DETAILS.dwg



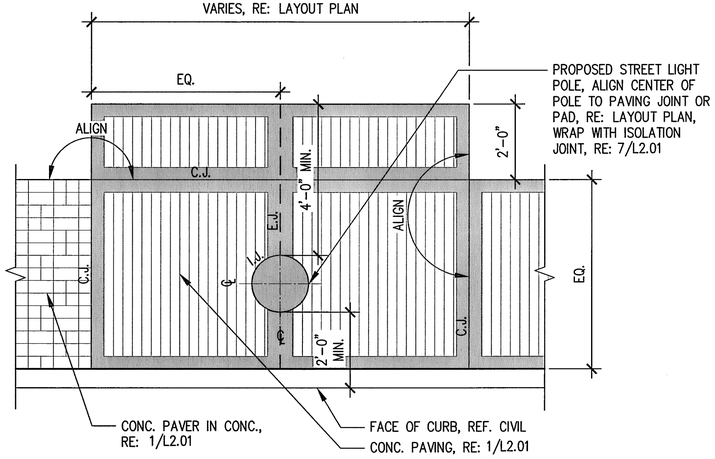
9 AREA DRAIN IN PLANTER
1" = 1'–0"



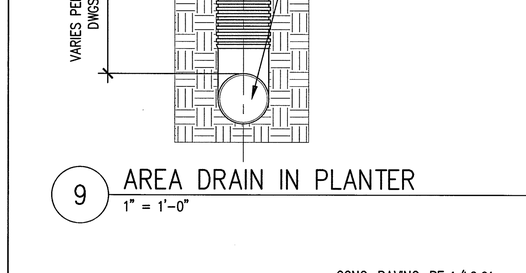
7 PEDESTRIAN LIGHT POLE
1/2" = 1'–0"



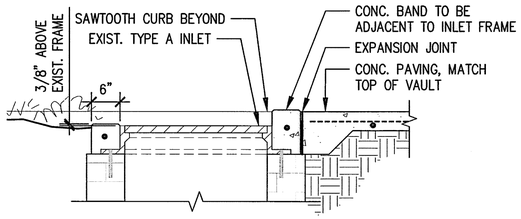
6 CONC. CURB – SECTION
1 1/2" = 1'–0"



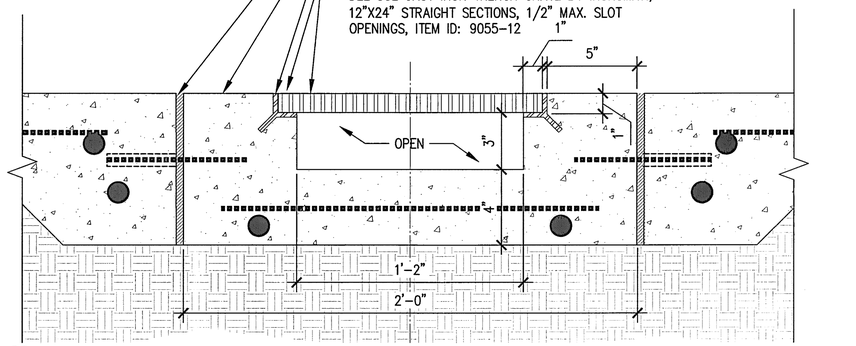
3 LIGHTPOLE IN CONCRETE PAVING
1/2" = 1'–0"



8 FLUSH CONC. BAND – SECTION
1" = 1'–0"



5 CONC. BAND @ EXIST. INLET
3/4" = 1'–0"



2 STEEL GRATE AT CONC. CHANNEL
3" = 1'–0"

MATERIAL & FURNISHING SCHEDULE

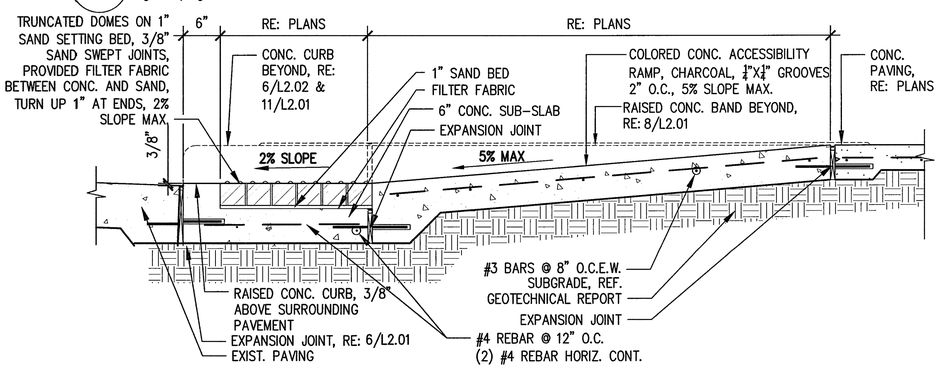
PAVING MATERIALS

SYMBOL	DESCRIPTION	MATERIAL	SUPPLIER	SIZE	COLOR	FINISH	REMARK	DETAIL
P1	TYPICAL CONC. PAVING	CONC.	--	VARIES	NATURAL	MED. BROOM	4" SMOOTH TROWEL BOARDER	1/L2.01
P2	PAVERS IN CONC.	CONC. PAVER	PAVESTONE	4X4 & 4X8	AUSTIN GOLD BLEND	--	BASKET WEAVE PATTERN	2/L2.01
P3	COLORED CONC.	CONC.	--	VARIES	CHARCOAL	GROOVED 2' O.C.	ADA COMPLIANT	
P4	DETECTABLE PAVER	CONC. PAVER	PAVESTONE	4X8	CHARCOAL	--	ADA COMPLIANT, STACKED	

SITE FURNISHINGS

SYMBOL	DESCRIPTION	MATERIAL	SUPPLIER	SIZE	COLOR	FINISH	REMARK	DETAIL
F1	BACKLESS BENCH	STEEL	LANDSCAPE FORMS	22 1/4"X16"X92"	TBD	POWDER COATED	SURFACE MOUNTED NO ARMS	2/L2.05
F2	TRASH RECEPACLE	STEEL	LANDSCAPE FORMS	27"X23"X47"	TBD	POWDER COATED	SURFACE MOUNTED	4/L2.05
F3	BICYCLE RACK	STEEL	LANDSCAPE FORMS	5'X43"X21 1/2"	TBD	POWDER COATED	SURFACE MOUNTED	1/L2.05

4 MATERIAL AND FURNISHING SCHEDULE



1 ACCESSIBLE RAMP – SECTION
1" = 1'–0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

NOTES:

REFER TO CIVIL FOR REPAIR OF DISTURBED AREAS.

ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

No.	DATE	REVISIONS	APP.

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
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ARCHITECT
10411

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HARDSCAPE DETAILS

L2.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

VERT:
HORZ: 1"=20'

SHEET: 178 OF 226

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\\HOUIFS801\DATA\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L2\L2.02 HARDSCAPE DETAILS.dwg

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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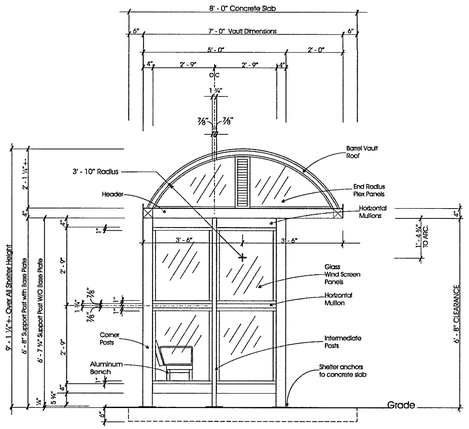
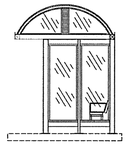
No.	DATE	REVISIONS	APP.



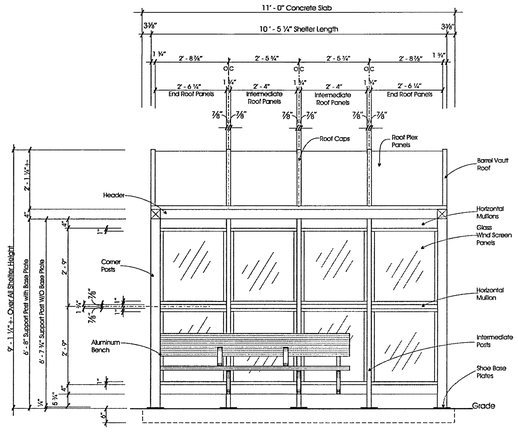
End Elevation A ¼"=1'-0"

Note: Opposite Elevation has [2] Full Length Glass Panes. See End Elevation B.



End Elevation B ¼"=1'-0"

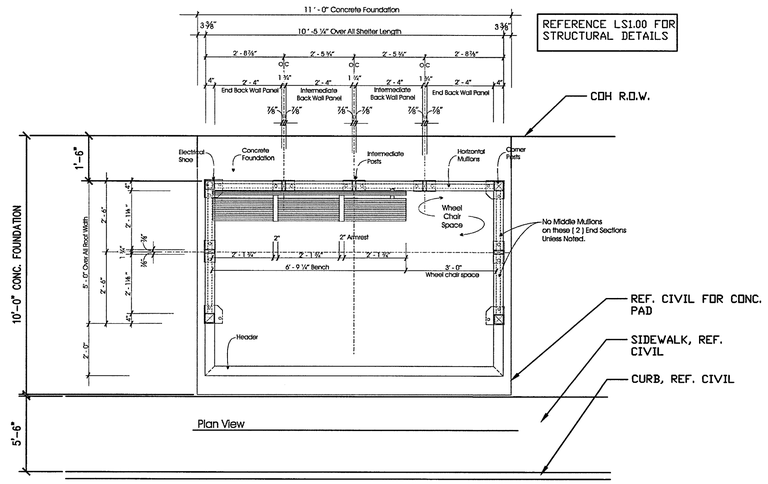
Elevation B has [2] Full Length Glass Panels.



Front Elevation

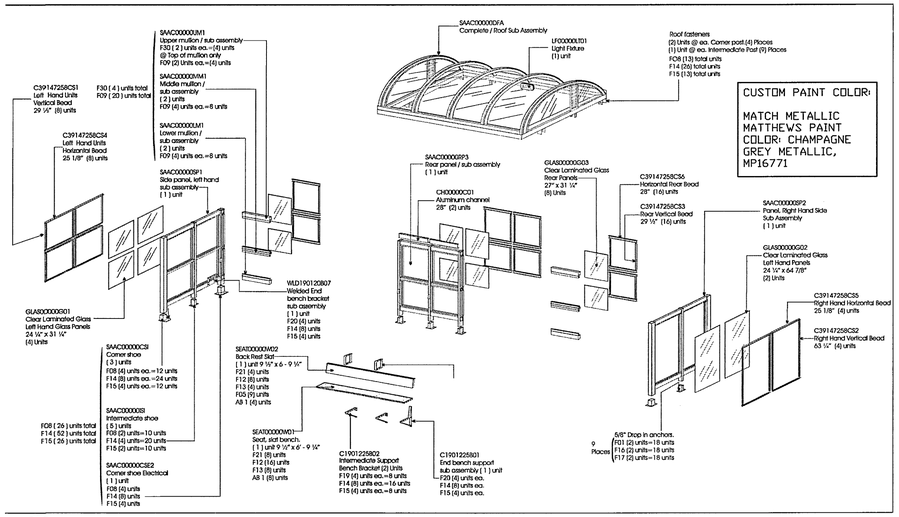
4 DOME SHELTER ELEVATION – SIDE

NTS



3 DOME SHELTER PLAN

NTS



2 DOME SHELTER ELEVATION – FRONT

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1 DOME SHELTER ASSEMBLY DRAWING

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SITE AMENITIY DETAILS

L2.03

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

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ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 179 OF 226	

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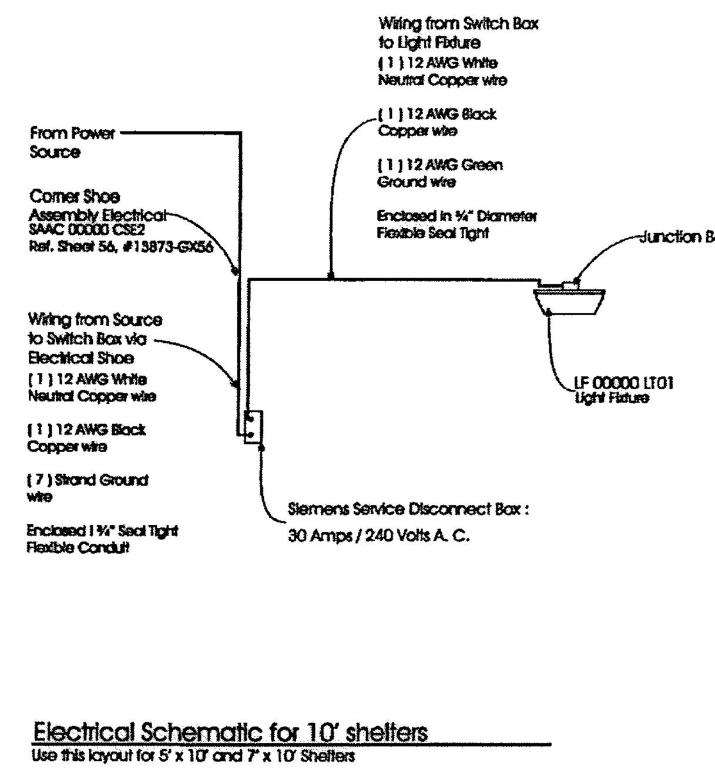
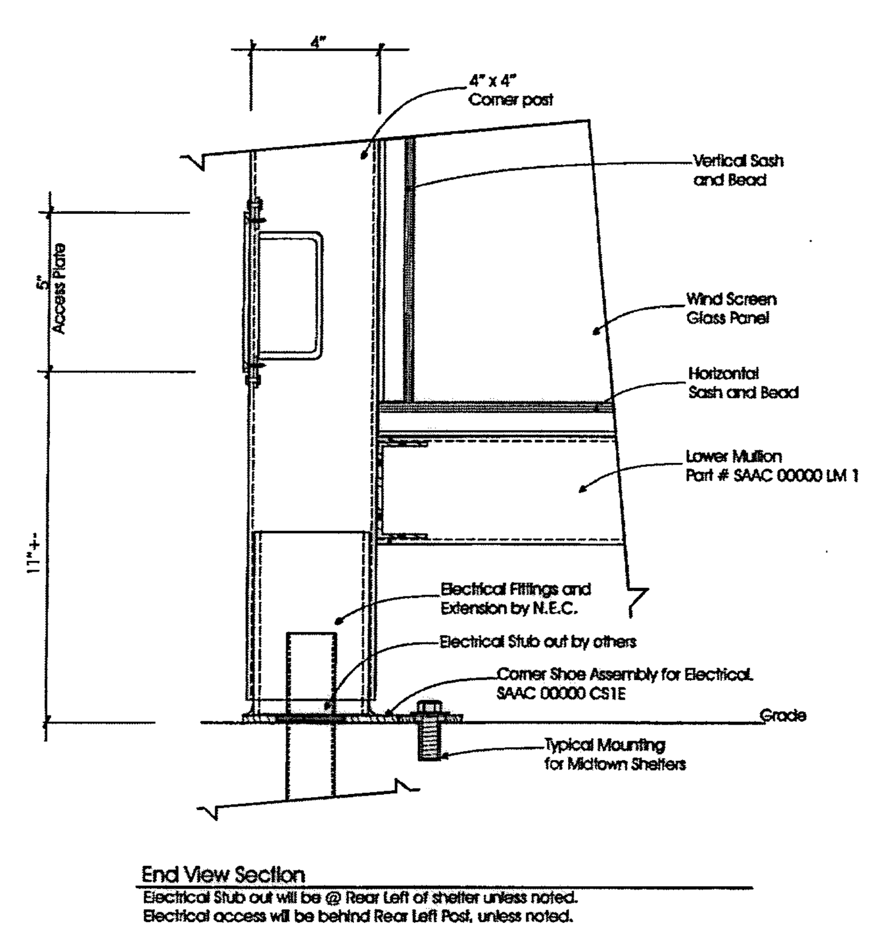
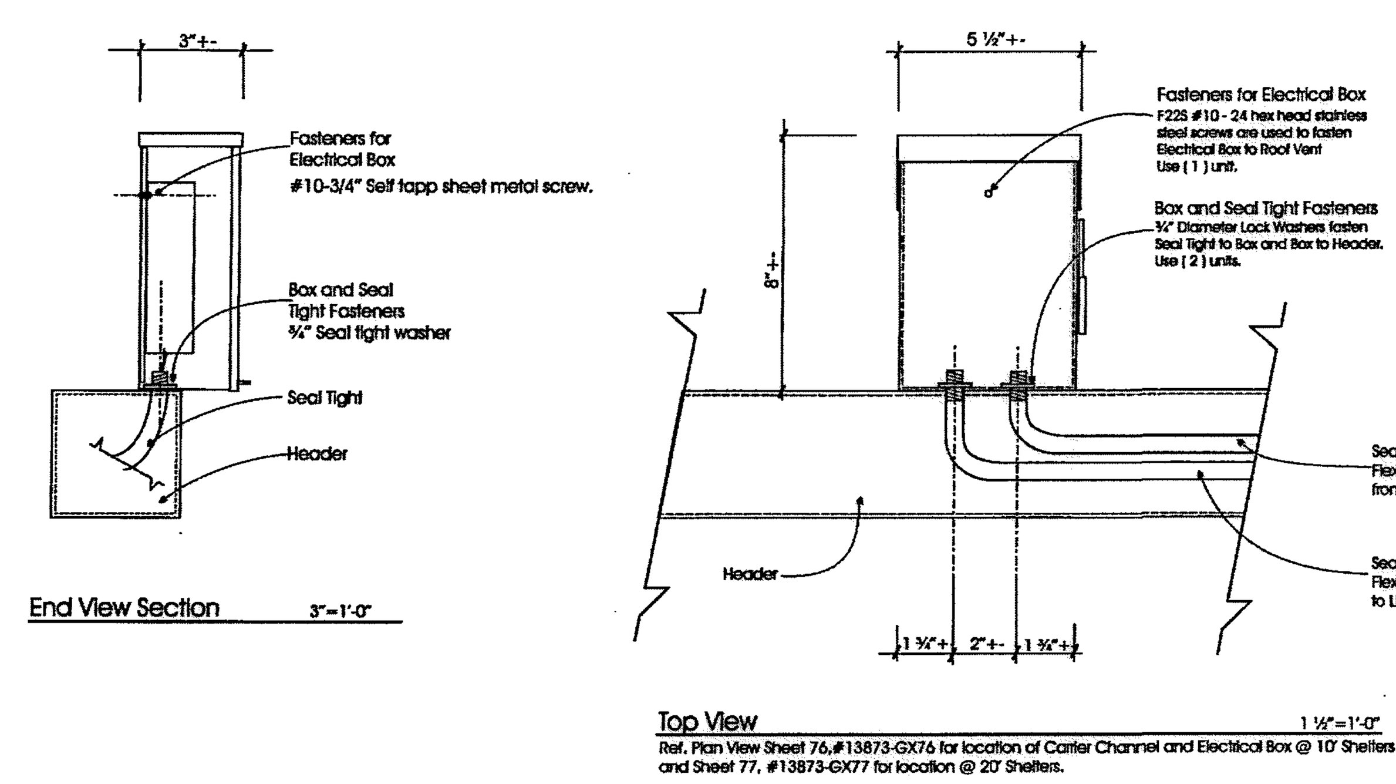


7 ELECTRICAL SCHEMATIC LAYOUT
NTS



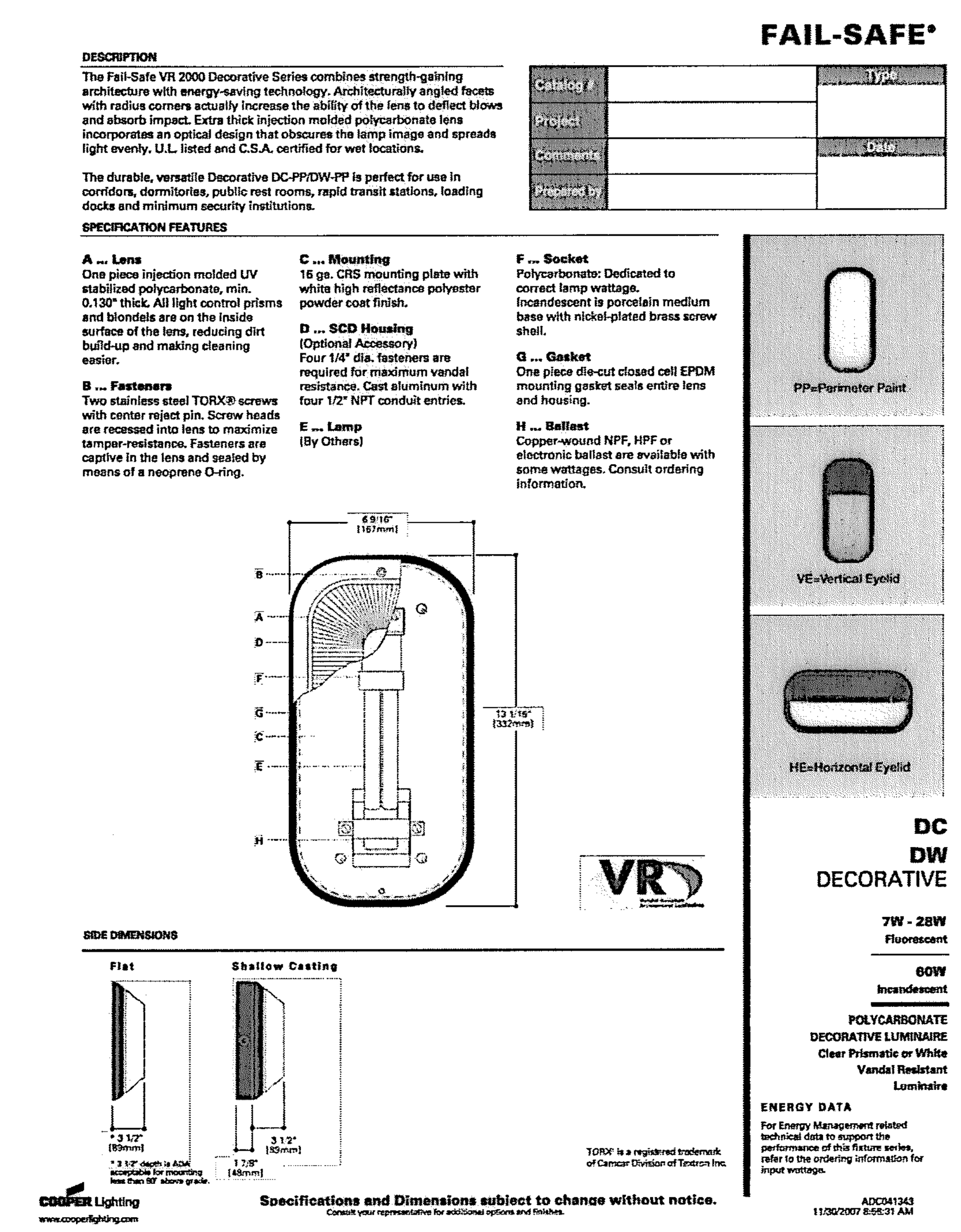
6 ELECTRICAL BOX AT SHELTER
NTS

Part Description	Part Number	Qty.	Dimensions	Shelter Type
Siemens Service Disconnect Box : 30 Amps / 240 Volts A. C.	ELEC SWTH BOX	1	5 ½"+- x 3" Deep x 8"+-	5 x 10 and 7 x 10
		1		5 x 20 and 7 x 20

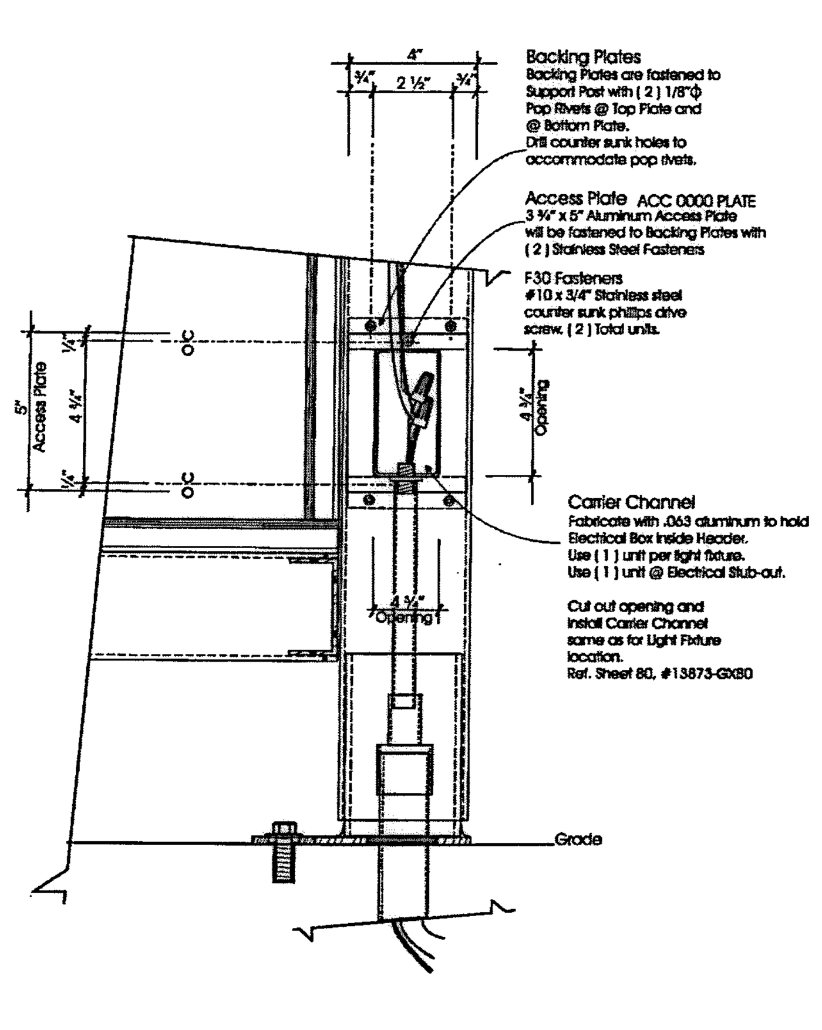


4 ELECTRICAL BOX CUT-OFF SWITCH
NTS

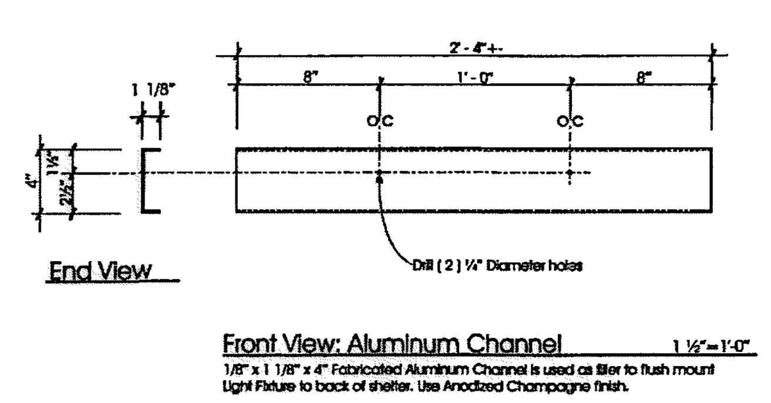
Part Description	Part Number	Qty.	Dimensions	Shelter Type
Light Fixture (Cooper Lighting QDC-PP-28N-120V-LL)	LF 00000 LT01	1	6 ½"+- x 1' - 1"+-	5 x 10 and 7 x 10
		2		5 x 20 and 7 x 20
28 Watt (PLC 15 MMType Lamp 120 V 0.97A 60 Hertz)	LAMP 0000 Lp1	1	6 ½"+- x 1' - 1"+-	5 x 10 and 7 x 10
		2		5 x 20 and 7 x 20

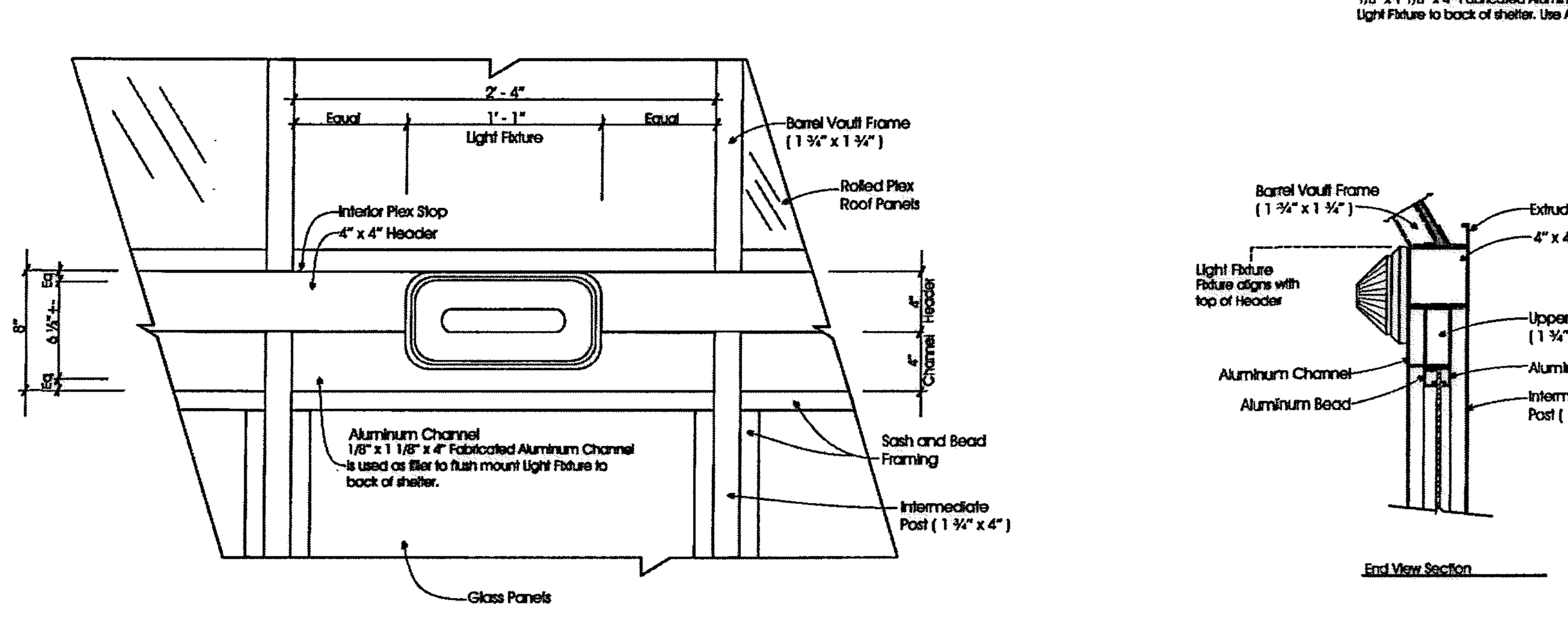


2 SHELTER LIGHT FIXTURE
NTS

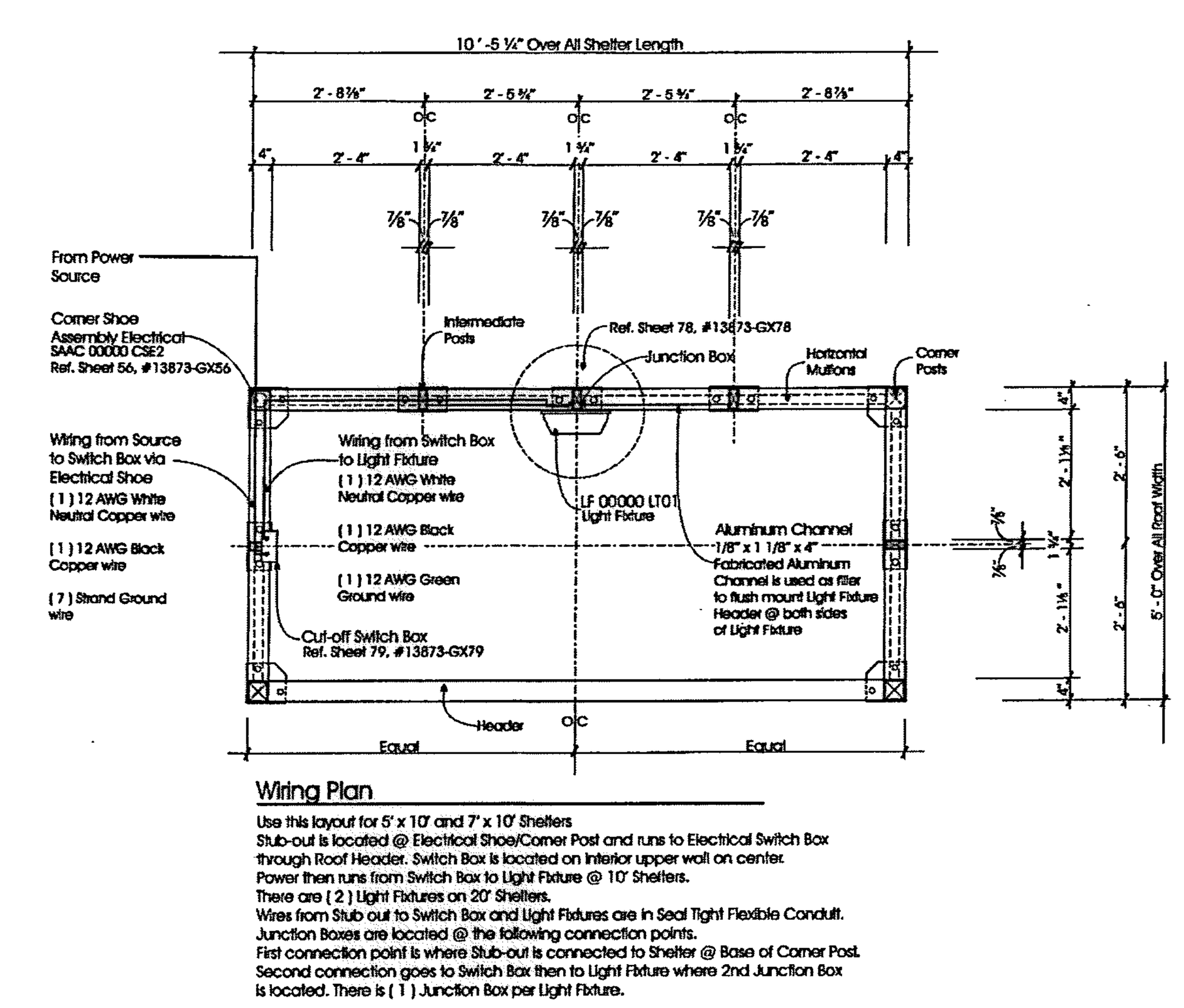


5 ELECTRICAL BOX AT SHELTER
NTS





3 INTERIOR ELEVATION
NTS



1 ELECTRICAL PLAN
NTS

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

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No.	DATE	REVISIONS	APP.

CGENTILE 04:35 14_10_01 \\Hou1fs801\data\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L2\L2.04 SITE AMENITY DETAILS.dwg

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SITE AMENITIY DETAILS

L2.04

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

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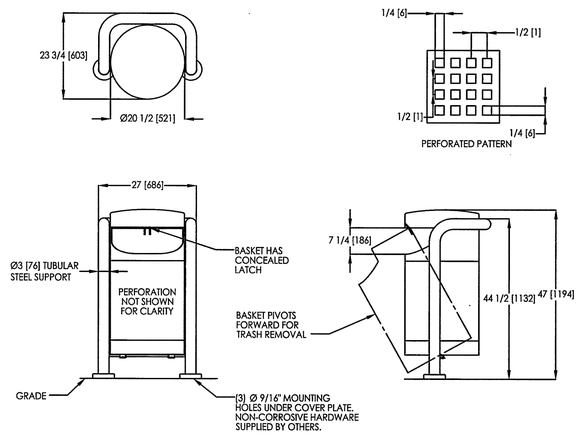

Drawing: PK167-03
Date: 6/21/2012
Dimensions are in Inches[mm]
U.S. Patent No.: D319,520

4 TRASH RECEPACLE

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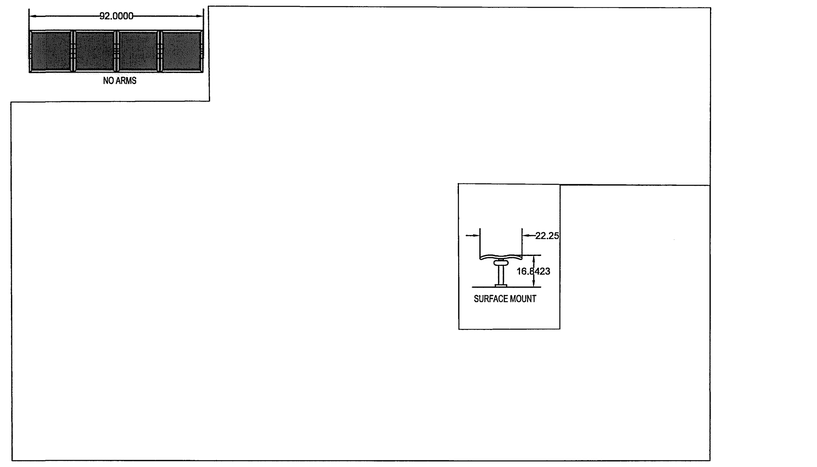

Drawing: PD0036
Date: 06/11/2012
Dimensions are in Inches[mm]
U.S. Patent Nos. D383,629

2 BACKLESS BENCH

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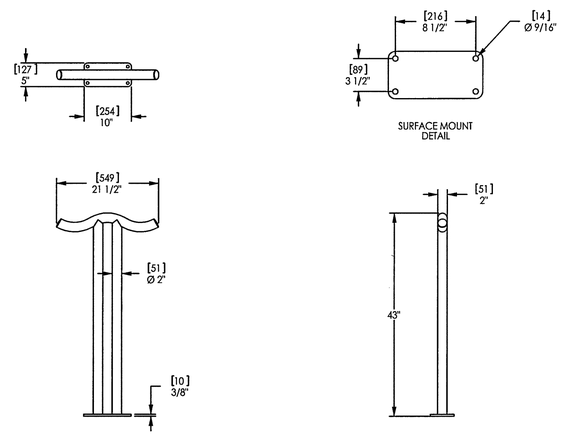

Drawing: PI195-01
Date: 12/2/2010
Dimensions are in Inches[mm]
U.S. Patent No. D374,849

1 BICYCLE RACK

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BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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No.	DATE	REVISIONS	APP.

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SITE FURNISHING DETAILS

L2.05

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 181 OF 226	

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No.	DATE	REVISIONS	APP.

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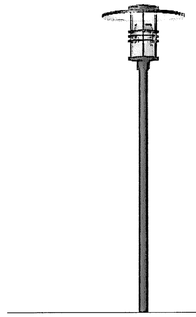
AVALON 650 LED Specification

The AVALON offers clean, functional styling to blend with a broad range of architecture. Two sizes meet diverse proportional requirements. The cast aluminum housing with integrated pole top fitter anchors stainless steel rods to support the flat spun aluminum shade and cast top cap. The cylindrical clear acrylic lens extends through the shade forming an aperture to subtly highlight the luminaire night form. External louvers mimic the shade profile, while functioning to reduce brightness. Signature stepped pole with flush handhole and double welded transition is available in steel or aluminum. Steel pole is hot-dip galvanized prior to being finished in finely textured paint. Base cover is spun aluminum. All hardware is stainless steel. Standard colors; matte silver grey metallic or black. Special colors available.



CUSTOM PAINT COLOR:

MATCH METALLIC
MATTHEWS PAINT
COLOR: CHAMPAGNE
GREY METALLIC,
MP16771

MAINTAIN REQUIRED
CLEARANCE FROM
OVERHEAD UTILITIES

Model	LED Module	Color Temperature	Volt	Mounting	Pole	Pole Mat	Finish
AV650	360L - Symmetric distribution	WW -3000K	UNV - 120-277V	A - Single Post Mount	10S - 10' Stepped	A - Aluminum	SG - Silver Grey
	270L - Asymmetric distribution	NW - 4000K		B - Twin Para Bracket	12S - 12' Stepped	S - Steel	BL - Black
		CW - 5000K			X - Other (specify)		CC - Custom Color

Ordering Information

AV650	WW-3000K	**UNV**	A-12S-S-CC

Specifications are subject to change without notification
HessAmerica › Products › Lighting Products › Pole Mounted Luminaire › AVALON
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Page 1

1 PEDESTRIAN LIGHT FIXTURE
NTS

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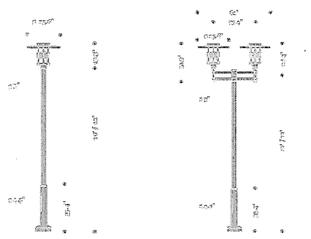
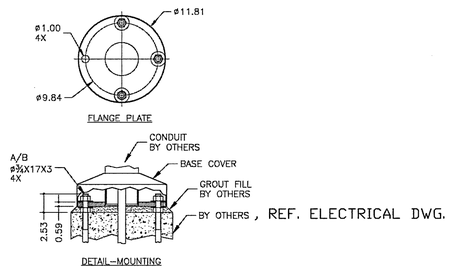
Additional information

Dimensions



Mounting Detail



Specifications are subject to change without notification
HessAmerica › Products › Lighting Products › Pole Mounted Luminaire › AVALON
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Page 4

2 PEDESTRIAN LIGHT FIXTURE MOUNTING
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SITE LIGHTING DETAILS

L2.06

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WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 182 OF 226	

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\\Hou1fs01\data\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 DrawingsGraphics\AutoCAD\Sheets\L2\L2.06 SITE LIGHTING DETAILS.dwg

NOTE A:
POINT OF CONNECTION #1 SHALL BE A 2" DOMESTIC WATER METER WITH A 2" SERVICE LINE. VERIFY THE ACTUAL LOCATION, SIZE AND WATER PRESSURE IN THE FIELD PRIOR TO STARTING WORK. IF ANY OF THE POC INFORMATION SHOWN ON THESE DRAWING IS FOUND TO BE DIFFERENT THAN THE ACTUAL POC INFORMATION GATHERED IN THE FIELD, IMMEDIATELY NOTIFY THE LANDSCAPE ARCHITECT AND IRRIGATION CONSULTANT. SHOULD THE CONTRACTOR FAIL TO VERIFY THE POC INFORMATION ANY CHANGES REQUIRED BY LOW PRESSURE OR VOLUME SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

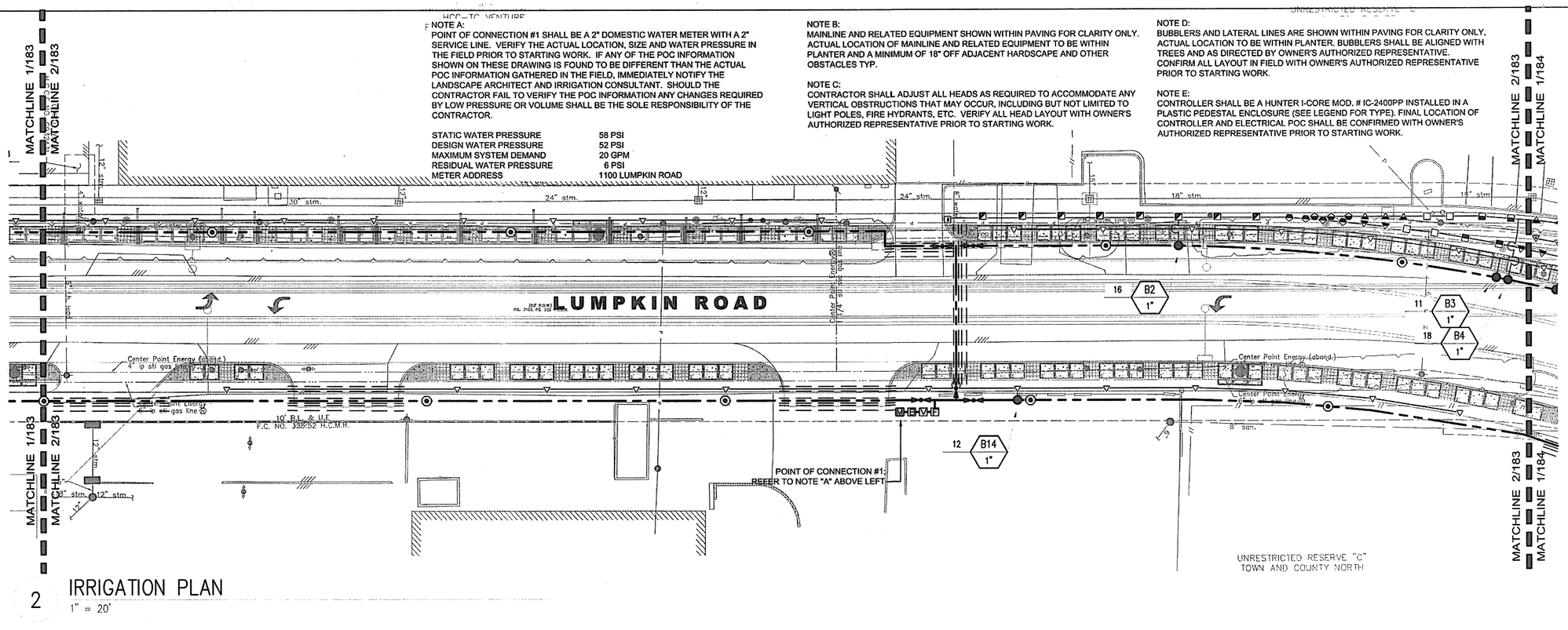
STATIC WATER PRESSURE	58 PSI
DESIGN WATER PRESSURE	52 PSI
MAXIMUM SYSTEM DEMAND	20 GPM
RESIDUAL WATER PRESSURE	6 PSI
METER ADDRESS	1100 LUMPKIN ROAD

NOTE B:
MAINLINE AND RELATED EQUIPMENT SHOWN WITHIN PAVING FOR CLARITY ONLY. ACTUAL LOCATION OF MAINLINE AND RELATED EQUIPMENT TO BE WITHIN PLANTER AND A MINIMUM OF 18" OFF ADJACENT HARDSCAPE AND OTHER OBSTACLES TYP.

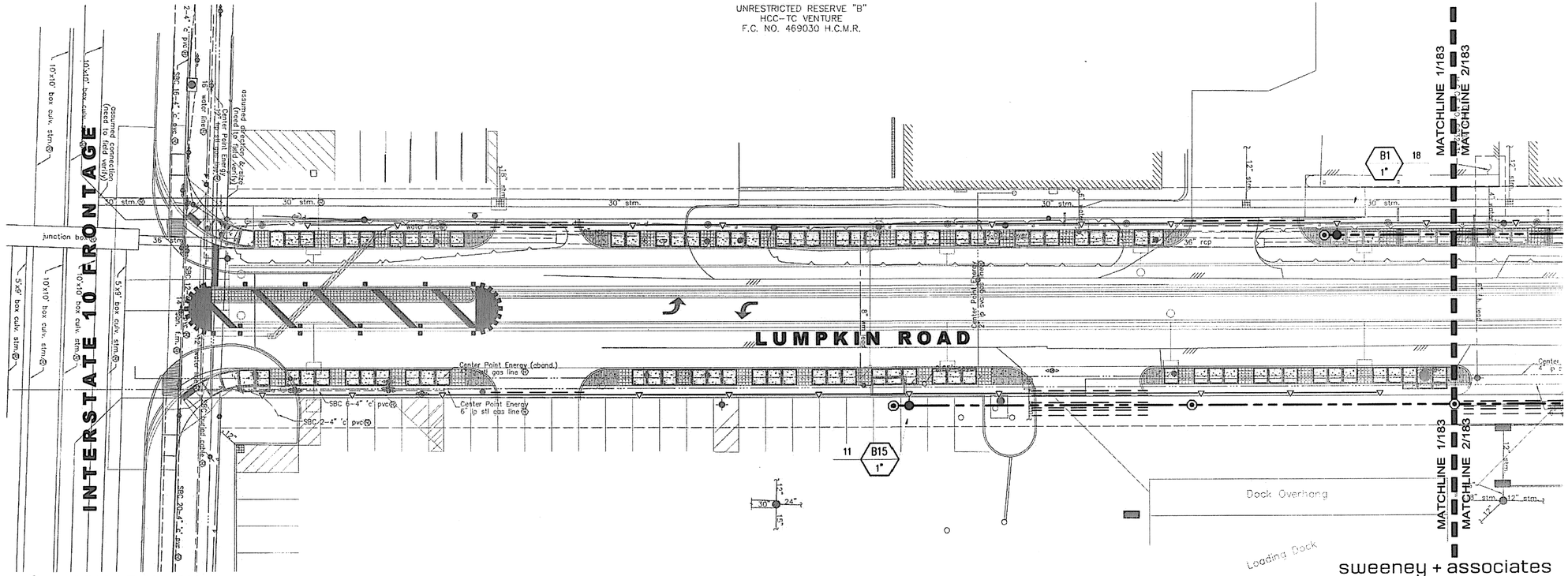
NOTE C:
CONTRACTOR SHALL ADJUST ALL HEADS AS REQUIRED TO ACCOMMODATE ANY VERTICAL OBSTRUCTIONS THAT MAY OCCUR, INCLUDING BUT NOT LIMITED TO LIGHT POLES, FIRE HYDRANTS, ETC. VERIFY ALL HEAD LAYOUT WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

NOTE D:
BUBBLERS AND LATERAL LINES ARE SHOWN WITHIN PAVING FOR CLARITY ONLY. ACTUAL LOCATION TO BE WITHIN PLANTER. BUBBLERS SHALL BE ALIGNED WITH TREES AND AS DIRECTED BY OWNER'S AUTHORIZED REPRESENTATIVE. CONFIRM ALL LAYOUT IN FIELD WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

NOTE E:
CONTROLLER SHALL BE A HUNTER I-CORE MOD. # IC-2400PP INSTALLED IN A PLASTIC PEDESTAL ENCLOSURE (SEE LEGEND FOR TYPE). FINAL LOCATION OF CONTROLLER AND ELECTRICAL POC SHALL BE CONFIRMED WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.



2 IRRIGATION PLAN
1" = 20'



1 IRRIGATION PLAN
1" = 20'

BENCHMARK:

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REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
EDWARD J. KOCHANEK
20439
LICENSED IRRIGATOR
1 OCTOBER 2014

SWA Group
1245 W 18th Street
Houston, TX 77008
www.swagroup.com

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

sweeney + associates
IRRIGATION DESIGN AND CONSULTING
3000 Joe DiMaggio Blvd., Bldg. 1700, Suite 61
Round Rock, Tx 78665
e: info@sweeneyassoc.com t: (512) 306-9350
w: www.sweeneyassoc.com f: (512) 306-9055

LUMPKIN ROAD
N-T17000-0012-3

IRRIGATION PLAN
0+00 TO 12+00

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 183 OF 226	

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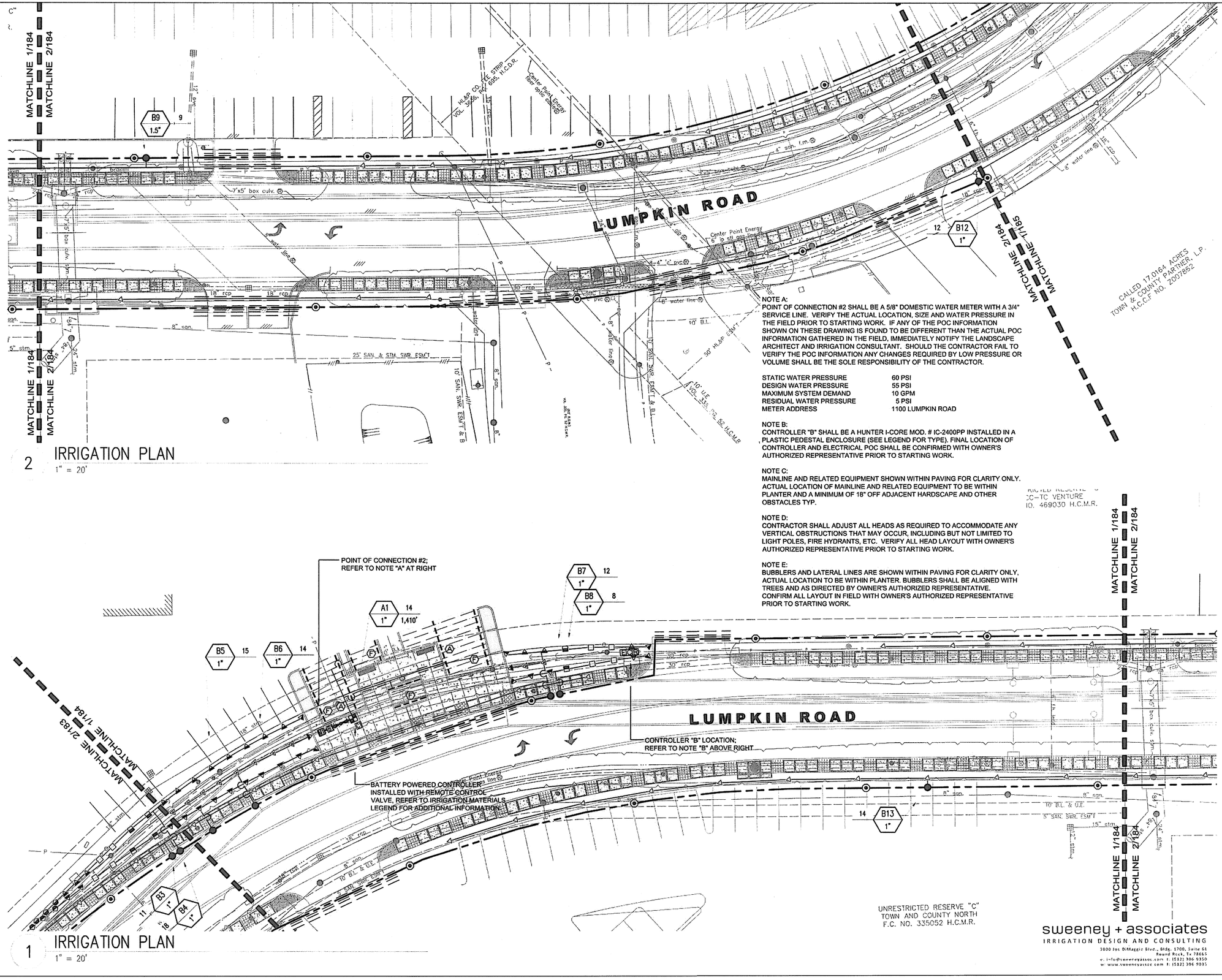

2 IRRIGATION PLAN
1" = 20'

1 IRRIGATION PLAN
1" = 20'

NOTE A:
POINT OF CONNECTION #2 SHALL BE A 5/8" DOMESTIC WATER METER WITH A 3/4" SERVICE LINE. VERIFY THE ACTUAL LOCATION, SIZE AND WATER PRESSURE IN THE FIELD PRIOR TO STARTING WORK. IF ANY OF THE POC INFORMATION SHOWN ON THESE DRAWING IS FOUND TO BE DIFFERENT THAN THE ACTUAL POC INFORMATION GATHERED IN THE FIELD, IMMEDIATELY NOTIFY THE LANDSCAPE ARCHITECT AND IRRIGATION CONSULTANT. SHOULD THE CONTRACTOR FAIL TO VERIFY THE POC INFORMATION ANY CHANGES REQUIRED BY LOW PRESSURE OR VOLUME SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

STATIC WATER PRESSURE	60 PSI
DESIGN WATER PRESSURE	55 PSI
MAXIMUM SYSTEM DEMAND	10 GPM
RESIDUAL WATER PRESSURE	5 PSI
METER ADDRESS	1100 LUMPKIN ROAD

NOTE B:
CONTROLLER "B" SHALL BE A HUNTER I-CORE MOD. # IC-2400PP INSTALLED IN A PLASTIC PEDESTAL ENCLOSURE (SEE LEGEND FOR TYPE). FINAL LOCATION OF CONTROLLER AND ELECTRICAL POC SHALL BE CONFIRMED WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

NOTE C:
MAINLINE AND RELATED EQUIPMENT SHOWN WITHIN PAVING FOR CLARITY ONLY. ACTUAL LOCATION OF MAINLINE AND RELATED EQUIPMENT TO BE WITHIN PLANTER AND A MINIMUM OF 18" OFF ADJACENT HARDSCAPE AND OTHER OBSTACLES TYP.

NOTE D:
CONTRACTOR SHALL ADJUST ALL HEADS AS REQUIRED TO ACCOMMODATE ANY VERTICAL OBSTRUCTIONS THAT MAY OCCUR, INCLUDING BUT NOT LIMITED TO LIGHT POLES, FIRE HYDRANTS, ETC. VERIFY ALL HEAD LAYOUT WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

NOTE E:
BUBBLERS AND LATERAL LINES ARE SHOWN WITHIN PAVING FOR CLARITY ONLY, ACTUAL LOCATION TO BE WITHIN PLANTER. BUBBLERS SHALL BE ALIGNED WITH TREES AND AS DIRECTED BY OWNER'S AUTHORIZED REPRESENTATIVE. CONFIRM ALL LAYOUT IN FIELD WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

NOTES:

REFER TO CIVIL FOR REPAIR OF DISTURBED AREAS.

ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

POINT OF CONNECTION #2; REFER TO NOTE "A" AT RIGHT

CONTROLLER "B" LOCATION; REFER TO NOTE "B" ABOVE RIGHT

BATTERY POWERED CONTROLLER INSTALLED WITH REMOTE CONTROL VALVE, REFER TO IRRIGATION MATERIALS LEGEND FOR ADDITIONAL INFORMATION.

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LUMPKIN ROAD
N-T17000-0012-3

IRRIGATION PLAN
12+00 TO 19+00

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 184 OF 226	

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14_10-01
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PROPOSED IRRIGATION NOTES

NOTE A:
MAINLINE AND RELATED EQUIPMENT SHOWN WITHIN PAVING FOR CLARITY ONLY. ACTUAL LOCATION OF MAINLINE AND RELATED EQUIPMENT TO BE WITHIN PLANTER AND A MINIMUM OF 18" OFF ADJACENT HARDSCAPE AND OTHER OBSTACLES TYP.

NOTE B:
CONTRACTOR SHALL ADJUST ALL HEADS AS REQUIRED TO ACCOMMODATE ANY VERTICAL OBSTRUCTIONS THAT MAY OCCUR, INCLUDING BUT NOT LIMITED TO LIGHT POLES, FIRE HYDRANTS, ETC. VERIFY ALL HEAD LAYOUT WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

NOTE C:
BUBBLERS AND LATERAL LINES ARE SHOWN WITHIN PAVING FOR CLARITY ONLY, ACTUAL LOCATION TO BE WITHIN PLANTER. BUBBLERS SHALL BE ALIGNED WITH TREES AND AS DIRECTED BY OWNER'S AUTHORIZED REPRESENTATIVE. CONFIRM ALL LAYOUT IN FIELD WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO STARTING WORK.

EXISTING IRRIGATION NOTES

NOTE 1:
CONTRACTOR SHALL MAINTAIN EXISTING MAINLINES IN WORKING ORDER. COORDINATE ALL INTERRUPTIONS OF OPERATION OF THE EXISTING IRRIGATION TO A MINIMUM. COORDINATE ALL INTERRUPTIONS WITH THE OWNER'S REPRESENTATIVE.

NOTE 2:
CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXISTING IRRIGATION EQUIPMENT DAMAGED DURING CONSTRUCTION AND IF DAMAGED, SHALL REPLACE WITH SAME MANUFACTURER AND MODEL.

NOTE 3:
ANY EXISTING IRRIGATION CONTROL VALVES CONNECTED TO EXISTING CONTROLLER SHALL BE RECONNECTED TO EXISTING CONTROLLER. CONFIRM PROPER CONTROLLER OPERATION AND INSTALLATION WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WORK AND UPON COMPLETION OF WORK.

NOTE 4:
CONTRACTOR SHALL CONFIRM THE EXISTING CONTROLLER MAKE AND MODEL AND SHALL CONFIRM THAT SAID CONTROLLER HAS ADEQUATE OPEN STATIONS TO OPERATE ANY ADJUSTED AND ALL PROPOSED IRRIGATION SYSTEM MODIFICATIONS. NOTIFY OWNER'S AUTHORIZED REPRESENTATIVE SHOULD ANY DISCREPANCIES BE NOTED.

NOTE 5:
CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR/MODIFICATION/REROUTING OF ALL ADJACENT IRRIGATION SYSTEM EQUIPMENT THAT IS AFFECTED BY NEW CONSTRUCTION IMPROVEMENTS. CONTRACTOR SHALL REPAIR SAID SYSTEMS TO A LIKE NEW MANNER, PROVIDING NO LESS THAN 100% OF HEAD RADIUS COVERAGE IN ALL AREAS WITH SYSTEM LAYOUT AS APPROVED BY OWNER'S AUTHORIZED REPRESENTATIVE. CONTRACTOR SHALL CONFIRM ALL AREAS REQUIRING MODIFICATION WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO BIDDING WORK AND PRIOR TO COMMENCING WORK.

NOTE 6:
CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE REMOVAL AND DISPOSAL OF ALL EXISTING IRRIGATION EQUIPMENT AFFECTED BY THE NEW CONSTRUCTION IMPROVEMENTS, IF NECESSARY. CONTRACTOR SHALL VERIFY ALL EQUIPMENT TO BE REMOVED AND DISPOSED OF IN FIELD PRIOR TO BIDDING WORK AND PRIOR TO COMMENCING WORK.

NOTE 7:
CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO BIDDING WORK AND AGAIN PRIOR TO COMMENCING WORK. VERIFICATION SHALL BE DOCUMENTED AND DELIVERED TO OWNER'S REPRESENTATIVE.

NOTE 8:
CONTRACTOR SHALL BE RESPONSIBLE FOR THE PLACEMENT OF ALL SCH. 40 PVC SLEEVING UNDER PAVING, WALLS AND CURBS AT NO LESS THAN 24" BELOW GRADE AND NO LESS THAN 2X DIAMETER OF IRRIGATION PIPE IN AREAS WHERE PIPE CROSSING WILL OCCUR. WHEN PIPE SIZE IS NOT AVAILABLE USE 6" SLEEVING MATERIAL. CONFIRM CROSSINGS WITH OWNER'S REPRESENTATIVE PRIOR TO PAVING AND HARDSCAPE CONSTRUCTION.

NOTE 9:
EXISTING IRRIGATION IN THIS AREA SHALL BE PROTECTED IN PLACE FOR CONTINUED USE. CONTRACTOR SHALL VERIFY THE EXTENT OF THE EXISTING SYSTEM AND MAKE ADJUSTMENTS TO CAP OFF OR MODIFY THE EXITING SYSTEM TO MEET THE NEW LANDSCAPE CONDITION IF NECESSARY.

NOTE 10:
CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING WITHIN THE DRIPLINE OF EXISTING TREES. NO MECHANICAL TRENCHING WITHIN THE DRIPLINE OF THE EXISTING TREE WILL BE ALLOWED. CONTRACTOR SHALL REFER TO ARBORIST REPORT FOR ADDITIONAL PRECAUTIONS REQUIRED FOR THE EXISTING TREES. VERIFY ALL LAYOUT IN FIELD WITH OWNER'S AUTHORIZED REPRESENTATIVE.

NOTE 11:
CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING BACKFLOW DEVICE AND TESTING FOR PROPER OPERATION. SHOULD BACKFLOW DEVICE BE INOPERABLE OR NOT IN PLACE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF SAID BACKFLOW DEVICE. CONFIRM ANY DISCREPANCIES WITH OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO BIDDING WORK AND PRIOR TO COMMENCING WORK.

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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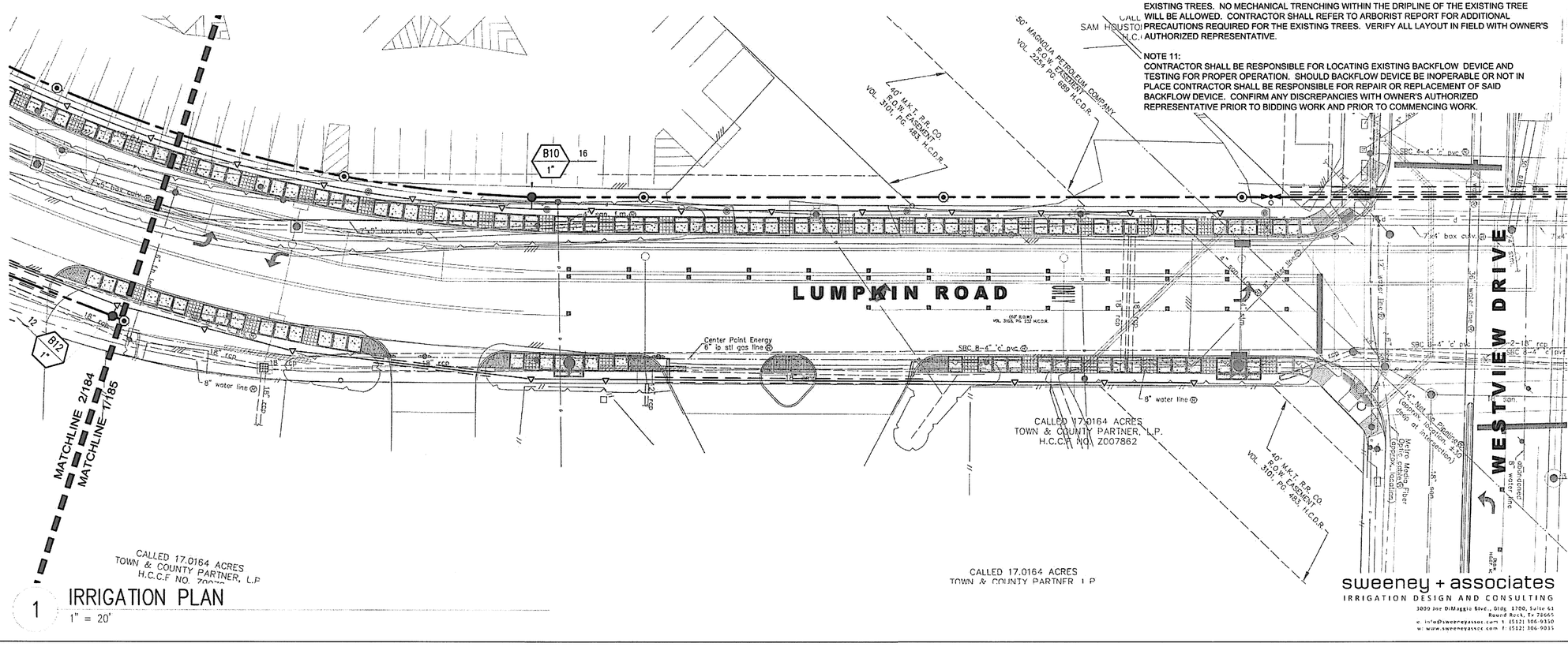
REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET



1 IRRIGATION PLAN
1" = 20'

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LUMPKIN ROAD
N-T17000-0012-3

IRRIGATION PLAN
19+00 TO 29+00

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 185 OF 226	

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IRRIGATION MATERIAL LEGEND FOR MEDIAN

SYMBOL	MANUFACT.	MODEL NO. / DESCRIPTION	DETAIL
SHRUB / G.C.	HUNTER	PLD-06-12 DRIP TUBING WITH 0.60 GPH EMITTERS INTERNALLY INSTALLED IN THE DRIP TUBING AT 12" O.C. SPACING. EMITTERS SHALL BE PRESSURE COMPENSATING AND EQUIPPED WITH AN INTERNAL CHECK VALVE. INSTALL 2" BELOW FINISHED SOIL GRADE AND AT A MAXIMUM TUBING SPACING OF 12" ON CENTER. INSTALL THE ROW ADJACENT TO PAVING OR CURB EDGE A MAXIMUM OF 4" OFF OF THE EDGE. INSTALL 9" PVC COATED WIRE STAPLE (GPH MODEL # GDTS140900), A MAXIMUM OF FIVE FEET ON CENTER ALONG THE LENGTH OF THE TUBING.	B,C,D
	HUNTER	PLD-050 17mm BARB X 1/2" MIPT MALE ADAPTERS WITH PVC TEE OR ELL FITTINGS FOR CONNECTION BETWEEN PVC LINES AND DRIP TUBING	B,C,D
NO SYMBOL	HUNTER	PLD 17mm BARBED FITTINGS FOR ALL CONNECTIONS BETWEEN DRIP TUBING	B,C,D
(F)	LASCO	1/2" SCH. 40 PVC BALL VALVE WITH THREADED ENDS AND A LASCO MHT-104 3/4" MHT X 1/2" MIPT ADAPTER WITH A LASCO FHT-301 HOSE THREAD CAP FOR USE AS A DRIP TUBING FLUSH VALVE. SEE PLANS FOR LOCATIONS. INSTALL INSIDE A 10" ROUND VALVE BOX	D,E
(A)	HUNTER	PLD-AVR AIR/VACUUM RELIEF VALVE INSTALLED WITH PLD075TBTEE BARB X 3/4" FIPT TEE FITTING AND A 3/4" X 1/2" PVC REDUCER BUSHING, INSTALL AIR RELIEF ASSEMBLY AT THE HIGH POINT OF EACH PLANTER. INSTALL A MINIMUM OF ONE (1) ARV FOR EVERY 500 FEET OF DRIP TUBING IN ANY GIVEN DRIP ZONE. USING AN AIR RELIEF LATERAL, CONNECT AIR RELIEF VALVE TO ALL DRIPLINE LATERALS WITHIN THE ELEVATED AREA. MULTIPLE ARV'S SHALL BE REQUIRED PER RCV WITHIN UNDULATING AREAS, VERIFY QUANTITY PRIOR TO STARTING WORK.	D,F
M	P.O.C.	POTABLE IRRIGATION 5/8" WATER METER. VERIFY ACTUAL LOCATION, SIZE, AND WATER PRESSURE IN THE FIELD	N/A
B	WILKINS	375-S SERIES, 1" REDUCED PRESSURE TYPE BACKFLOW PREVENTION ASSEMBLY WITH BRONZE WYE STRAINER, INSTALLED WITHIN ENCLOSURE. BACKFLOW ASSEMBLY SHALL BE INSTALLED NO FURTHER THAN 1'-6" FROM IRRIGATION WATER METER	G
NO SYMBOL	V.I.T.	STRONG BOX SBBC-30ALI INSULATED ALUMINUM BACKFLOW DEVICE ENCLOSURE	C
	NIBCO	T-113 GATE VALVE, LINE SIZE, WITH BRONZE WHEEL HANDLE	J
	HUNTER/ TORO/ SENNINGER	PGV-101G-DC SERIES PLASTIC PRESSURE REGULATING CONTROL VALVE, WITH DC-LATCHING SOLENOID. PROVIDE THE FOLLOWING EQUIPMENT FOR EACH ASSY.: TORO T-ALFD75150-L, 3/4" DISC FILTER AND SENNINGER PMR-MF-40 PRESSURE REGULATOR; FILTER AND REGULATOR SHALL BOTH BE INSTALLED ON THE DOWNSTREAM SIDE OF EACH DRIP RCV	M
C	HUNTER	XCH-400 CONTROLLER WITH XCHSPOLE (STEEL MOUNTING POLE), XCHSPB (STAINLESS STEEL MOUNTING BRACKET), AND SPXCH SOLAR PANEL KIT FOR XC HYBRID. ALL CONTROL VALVES SHALL BE INSTALLED WITH DC-LATCHING SOLENOID.	S
R	HUNTER	MINI-CLIK RAIN SENSOR, MOUNT TO REAR OF ENCLOSURE AND WIRE TO CONTROLLER	N/A
	AS APPROVED	PVC PIPE 3/4" - 1" CL. 200 AS LATERAL LINES 12" BELOW GRADE	O
	AS APPROVED	PVC PIPE 11/2" CL. 200 SOLVENT WELD AS MAINLINES 18" BELOW GRADE	O,P
	AS APPROVED	PVC PIPE SCH. 40 AS SLEEVING, 2.5 TIMES THE DIAMETER OF PIPE OR WIRE BUNDLE CARRIED PLACE BELOW ALL PAVING, HARDSCAPE ETC. AND AS DIRECTED BY OWNER'S AUTHORIZED REPRESENTATIVE.	Q
NO SYMBOL	LASCO	ALL FITTINGS USED WITH SOLVENT WELD MAINLINE PIPE SHALL BE SCH. 80 PVC FITTINGS, GRAY IN COLOR, AND SIZED TO MATCH THE MAINLINE PIPE. ALL FITTINGS USED WITH SOLVENT WELD LATERAL LINE PIPE SHALL BE SCH. 40 PVC, WHITE IN COLOR, AND SIZED TO MATCH THE LATERAL LINE PIPE. ALL THREADED PVC NIPPLES SHALL BE SCH. 80 PVC PIPE WITH MOLDED THREADS.	N/A
NO SYMBOL	CHRISTY'S	ALL SOLVENT WELD CONNECTIONS FOR BOTH MAINLINE AND LATERAL LINE SHALL BE MADE USING THE TWO-STEP PROCESS OF PRIMER AND SOLVENT CEMENT. PRIMER SHALL BE LOW VOC "PURPLE PRIMER". MAINLINE SOLVENT CEMENT SHALL BE LOW VOC, "GRAY-HEAVY BODY" CEMENT. LATERAL LINE SOLVENT CEMENT SHALL BE LOW VOC, "RED HOT BLUE GLUE" CEMENT. USE DAUBERS SIZED AT LEAST ONE HALF THE SIZE OF THE LARGEST SIZE PIPE BEING JOINED.	N/A
NO SYMBOL	AS APPROVED	IRRIGATION CONTROL WIRE #14UF AWG DIRECT BURIAL (U.L. APPROVED)	O,Q,R
NO SYMBOL	3M	DBR/Y-6 DIRECT BURIAL WATER-PROOF WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS (U.L. APPROVED)	R
NO SYMBOL	CARSON	VALVE BOXES, SIZE AND TYPE PER INSTALLATION DETAILS, WITH T-COVER LIDS AND CAPTIVE BOLT AND LOC-KIT. VALVE BOXES SHALL HAVE GREEN HDPE BODY AND GREEN LIDS IN TURF, GREEN LIDS IN SHRUB BEDS, AND TAN LIDS IN ROCK MULCH. FOR USE IN NON-VEHICULAR TRAFFIC SITUATIONS ONLY. DO NOT INSTALL IN CONCRETE OR ASPHALT.	N/A

SIZE / CONFIGURATION	MODEL NUMBER	SIZE / CONFIGURATION	MODEL NUMBER
6" ROUND VALVE BOX	MODEL 0809	12" JUMBO RECTANGULAR	MODEL 1220
10" ROUND VALVE BOX	MODEL 0910	SUPER JUMBO RECTANGULAR	MODEL 1324
12" STANDARD RECTANGULAR	MODEL 1419	SUPER JUMBO RECTANGULAR XL	MODEL 1730

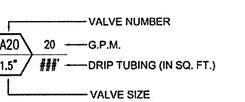
IRRIGATION NOTES

1. ALL LOCAL MUNICIPAL AND STATE LAWS, RULES AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR.
2. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES AND SERVICES BEFORE COMMENCING WORK. THE LOCATIONS OF UTILITIES, STRUCTURES AND SERVICES SHOWN IN THESE PLANS ARE APPROXIMATE ONLY. ANY DISCREPANCIES BETWEEN THESE PLANS AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE.
3. THE CONTRACTOR SHALL OBTAIN THE PERTINENT ENGINEERING OR ARCHITECTURAL PLANS BEFORE BEGINNING WORK.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS REQUIRED TO PERFORM THE WORK INDICATED HEREIN BEFORE BEGINNING WORK.
5. THIS DESIGN IS DIAGRAMMATIC. ALL EQUIPMENT SHOWN IN PAVED AREAS IS FOR DESIGN CLARITY ONLY AND IS TO BE INSTALLED WITHIN PLANTING AREAS.
6. THE CONTRACTOR SHALL NOT WILLFULLY INSTALL ANY EQUIPMENT AS SHOWN ON THE PLANS WHEN IT IS OBVIOUS IN THE FIELD THAT UNKNOWN CONDITIONS EXIST THAT WERE NOT EVIDENT AT THE TIME THESE PLANS WERE PREPARED. ANY SUCH CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO ANY WORK OR THE IRRIGATION CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY FIELD CHANGES DEEMED NECESSARY BY THE OWNER.
7. INSTALL ALL EQUIPMENT AS SHOWN IN THE DETAILS AND SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH LOCAL CITY, COUNTY AND STATE REQUIREMENTS FOR BOTH EQUIPMENT AND INSTALLATION.
8. ACTUAL LOCATION FOR THE INSTALLATION OF THE BACKFLOW PREVENTER AND THE AUTOMATIC CONTROLLER IS TO BE DETERMINED IN THE FIELD BY THE OWNER'S AUTHORIZED REPRESENTATIVE.
9. CONTRACTOR IS TO PROVIDE AN ADDITIONAL PILOT WIRE FROM CONTROLLER ALONG ENTIRETY OF MAIN LINE TO THE LAST RCV ON EACH AND EVERY LEG OF MAIN LINE. LABEL SPARE WIRES AT BOTH ENDS.
10. ALL PIPE UNDER PAVED AREAS TO BE INSTALLED IN SLEEVING TWICE THE DIAMETER OF THE PIPE CARRIED. SEE LEGEND FOR TYPE. ALL WIRE UNDER PAVED AREAS TO BE INSTALLED IN A SCH. 40 SLEEVE THE SIZE REQUIRED TO EASILY PULL WIRE THROUGH. ALL SLEEVES TO BE INSTALLED WITH A MINIMUM DEPTH AS SHOWN ON THE SLEEVING DETAILS. SLEEVES TO EXTEND AT LEAST 12" PAST THE EDGE OF THE PAVING.
11. ALL QUICK COUPLER AND REMOTE CONTROL VALVES TO BE INSTALLED IN SHRUB OR GROUND COVER AREAS WHERE POSSIBLE. ALL QUICK COUPLER AND REMOTE CONTROL VALVES TO BE INSTALLED AS SHOWN ON THE INSTALLATION DETAILS. INSTALL ALL QUICK COUPLER AND REMOTE CONTROL VALVES WITHIN 18" OF HARDSCAPE.
12. ALL HEADS ARE TO BE INSTALLED WITH THE NOZZLE, SCREEN AND ARCS SHOWN ON THE PLANS. ALL HEADS ARE TO BE ADJUSTED TO PREVENT OVERSPRAY ONTO BUILDINGS, WALLS, FENCES AND HARDSCAPE. THIS INCLUDES, BUT NOT LIMITED TO, ADJUSTMENT OF DIFFUSER PIN OR ADJUSTMENT SCREW, REPLACEMENT OF PRESSURE COMPENSATING SCREENS, REPLACEMENT OF NOZZLES WITH MORE APPROPRIATE RADIUS UNITS AND THE REPLACEMENT OF NOZZLES WITH ADJUSTABLE ARC UNITS.
13. CONTRACTOR SHALL INSTALL ADDITIONAL CHECK VALVES TO HEADS AND LATERALS AS REQUIRED TO PREVENT LOW HEAD DRAINAGE.
14. THE CONTRACTOR SHALL USE PROPER GROUNDING TECHNIQUES FOR GROUNDING THE CONTROLLER AND RELATED EQUIPMENT PER MANUFACTURERS SPECIFICATIONS. SWEENEY AND ASSOCIATES RECOMMENDS MEASURING FOR PROPER GROUND AT LEAST ONCE ANNUALLY, AND NECESSARY ADJUSTMENTS MADE TO COMPLY WITH MANUFACTURER SPECIFICATIONS.

IRRIGATION MATERIAL LEGEND FOR RIGHT OF WAY

SYMBOL Q	T	H	F	MANUFACT.	MODEL NO. / DESCRIPTION	GPM	PSI	RADIUS	PR (TRI.)	DETAIL
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ 5Q/5H NOZZLES	.12, .23	30	5 FT	2.05 IN./HR.	A
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ 8Q/8T/8H/8F NOZZLES	.24, .32, .47, .97	30	8 FT	1.69 IN./HR.	A
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ 10Q/10T/10H/10F NOZZLES	.42, .57, .88, 1.59	30	10 FT	1.77 IN./HR.	A
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ 12Q/12T/12H/12F NOZZLES	.67, .89, 1.30, 2.70	30	12 FT	2.09 IN./HR.	A
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ 15Q/15T/15H/15F NOZZLES	.97, 1.30, 1.86, 3.75	30	15 FT	1.85 IN./HR.	A
				HUNTER	PROS-06-PRS30-CV POP-UP TURF HEAD W/ LCS/RCS/SS530 NOZZLES	.65, 1.30	30	4X15 FT	2.41 IN./HR.	A
				HUNTER	PROS-06/12-CV POP-UP TURF HEAD W/ MP1000 NOZZLE	.19, .37, .75	30	12 FT	0.39 IN./HR.	A
				HUNTER	PROS-06/12-CV POP-UP TURF HEAD W/ MP2000 NOZZLE	.40, .74, 1.47	30	17 FT	0.39 IN./HR.	A
				HUNTER	PROS-06/12-CV POP-UP TURF HEAD W/ MP3000 NOZZLE	.86, 1.82, 3.64	30	27 FT	0.39 IN./HR.	A
					PROS-06/12 6" POP-UPS WITHIN BERMUDA GRASS AREAS, 12" POP-UPS IN NATIVE GRASS AREAS			4X30 FT		
		▽		HUNTER	PROS-06 POP-UP BUBBLER HEAD W/ PCN-25 BUBBLE NOZZLE, EACH SYMBOL REPRESENTS TWO BUBBLERS PER TREE LOCATE BUBBLERS ON OPPOSITE SIDES OF TREE ROOTBALL	.25 (.50)	30	N/A	N/A	A
SHRUB / G.C.				HUNTER	PLD-06-12 DRIP TUBING WITH 0.60 GPH EMITTERS INTERNALLY INSTALLED IN THE DRIP TUBING AT 12" O.C. SPACING. EMITTERS SHALL BE PRESSURE COMPENSATING AND EQUIPPED WITH AN INTERNAL CHECK VALVE. INSTALL 2" BELOW FINISHED SOIL GRADE AND AT A MAXIMUM TUBING SPACING OF 12" ON CENTER. INSTALL THE ROW ADJACENT TO PAVING OR CURB EDGE A MAXIMUM OF 4" OFF OF THE EDGE. INSTALL 9" PVC COATED WIRE STAPLE (GPH MODEL # GDTS140900), A MAXIMUM OF FIVE FEET ON CENTER ALONG THE LENGTH OF THE TUBING.					B,C,D
				HUNTER	PLD-050 17mm BARB X 1/2" MIPT MALE ADAPTERS WITH PVC TEE OR ELL FITTINGS FOR CONNECTION BETWEEN PVC LINES AND DRIP TUBING					B,C,D
NO SYMBOL				HUNTER	PLD 17mm BARBED FITTINGS FOR ALL CONNECTIONS BETWEEN DRIP TUBING					B,C,D
			(F)	LASCO	1/2" SCH. 40 PVC BALL VALVE WITH THREADED ENDS AND A LASCO MHT-104 3/4" MHT X 1/2" MIPT ADAPTER WITH A LASCO FHT-301 HOSE THREAD CAP FOR USE AS A DRIP TUBING FLUSH VALVE. SEE PLANS FOR LOCATIONS. INSTALL INSIDE A 10" ROUND VALVE BOX					D,E
			(A)	HUNTER	PLD-AVR AIR/VACUUM RELIEF VALVE INSTALLED WITH PLD075TBTEE BARB X 3/4" FIPT TEE FITTING AND A 3/4" X 1/2" PVC REDUCER BUSHING, INSTALL AIR RELIEF ASSEMBLY AT THE HIGH POINT OF EACH PLANTER. INSTALL A MINIMUM OF ONE (1) ARV FOR EVERY 500 FEET OF DRIP TUBING IN ANY GIVEN DRIP ZONE. USING AN AIR RELIEF LATERAL, CONNECT AIR RELIEF VALVE TO ALL DRIPLINE LATERALS WITHIN THE ELEVATED AREA. MULTIPLE ARV'S SHALL BE REQUIRED PER RCV WITHIN UNDULATING AREAS, VERIFY QUANTITY PRIOR TO STARTING WORK. INSTALL INSIDE A 6" ROUND VALVE BOX					D,F
			M	P.O.C.	2" DOMESTIC METER WITH 2" SERVICE LINE, VERIFY SIZE, LOCATION AND STATIC WATER PRESSURE IN FIELD					N/A
			B	WILKINS	375-S SERIES, 2" REDUCED PRESSURE TYPE BACKFLOW PREVENTION ASSEMBLY WITH BRONZE WYE STRAINER, INSTALLED WITHIN ENCLOSURE					G
			M	P.O.C.	2" DOMESTIC METER WITH 2" SERVICE LINE, VERIFY SIZE, LOCATION AND STATIC WATER PRESSURE IN FIELD					N/A
			B	WILKINS	375-S SERIES, 2" REDUCED PRESSURE TYPE BACKFLOW PREVENTION ASSEMBLY WITH BRONZE WYE STRAINER, INSTALLED WITHIN ENCLOSURE					G
NO SYMBOL				V.I.T.	STRONG BOX SBBC-30AL ALUMINUM BACKFLOW DEVICE ENCLOSURE					C
NO SYMBOL				V.I.T.	PBB-30 "POLAR BEARIER" INSULATED BACKFLOW DEVICE COVER, FOR INFORMATION CONTACT V.I.T. PRODUCTS (800) 729-1314					C
			V	HUNTER	ICV-201G-AS 2" NORMALLY CLOSED, PLASTIC MASTER CONTROL VALVE					H
			F	HUNTER	HFS SERIES FLOW SENSOR WITH FCT-150 SCH. 80 PVC TEE, WIRE TO CONTROLLER, INSTALL PER MANUFACTURER'S RECOMMENDATIONS.					I
				NIBCO	T-113 GATE VALVE, LINE SIZE, WITH BRONZE WHEEL HANDLE UP TO 2" AND BRONZE CROSS HANDLE OVER 2" IN SIZE					J
				HUNTER	HQ-33DLRC QUICK COUPLER VALVE, INSTALL WITHIN RECTANGULAR VALVE BOX WITH ISOLATION VALVE IMMEDIATELY UPSTREAM OF QUICK COUPLER					K
				HUNTER	ICV-1X1G-AS (1", 1 1/2") SERIES PRESSURE REGULATED, PLASTIC REMOTE CONTROL VALVE, SIZE AS SHOWN					L
				HUNTER/ TORO/ SENNINGER	ICV-1X1G-FS (1", 1 1/2") SERIES DRIP REMOTE CONTROL VALVE ASSEMBLY, SIZE AS SHOWN. PROVIDE THE FOLLOWING EQUIPMENT FOR EACH ASSY.: FOR DEMANDS LESS THAN 18 GPM, TORO T-ALFD75150-L, 3/4" DISC FILTER AND SENNINGER PMR-MF-40 PRESSURE REGULATOR; FOR DEMANDS GREATER THAN 18 GPM, TORO T-ALFD10150-L 1" DISC FILTER AND SENNINGER PR-HF-40 PRESSURE REGULATOR; FILTER AND REGULATOR SHALL BOTH BE INSTALLED ON THE DOWNSTREAM SIDE OF EACH DRIP RCV					M
			C	HUNTER	IC-3600-PP SERIES I-CORE CONTROLLER WITH 36 STATIONS, INSTALLED WITHIN PLASTIC PEDESTAL ENCLOSURE AS PART OF MODEL					N
			R	HUNTER	SOLAR-SYNC-SEN ET SENSOR, MOUNT TO REAR OF ENCLOSURE AND WIRE TO CONTROLLER					N
			E	N/A	120 VOLT ELECTRICAL POWER, PROVIDED BY ELECTRICIAN, VERIFY ACTUAL LOCATION IN FIELD					N/A
				AS APPROVED	PVC PIPE 3/4" - 2" CL. 200 AS LATERAL LINES 12" BELOW GRADE					O
				AS APPROVED	PVC PIPE 21/2" CL. 200 SOLVENT WELD AS MAINLINES 18" BELOW GRADE					O,P
				AS APPROVED	PVC PIPE SCH. 40 AS SLEEVING, 2.5 TIMES THE DIAMETER OF PIPE OR WIRE BUNDLE CARRIED PLACE BELOW ALL PAVING, HARDSCAPE ETC. AND AS DIRECTED BY OWNER'S AUTHORIZED REPRESENTATIVE.					Q
NO SYMBOL				LASCO	ALL FITTINGS USED WITH SOLVENT WELD MAINLINE PIPE SHALL BE SCH. 80 PVC FITTINGS, GRAY IN COLOR, AND SIZED TO MATCH THE MAINLINE PIPE. ALL FITTINGS USED WITH SOLVENT WELD LATERAL LINE PIPE SHALL BE SCH. 40 PVC, WHITE IN COLOR, AND SIZED TO MATCH THE LATERAL LINE PIPE. ALL THREADED PVC NIPPLES SHALL BE SCH. 80 PVC PIPE WITH MOLDED THREADS.					N/A
NO SYMBOL				CHRISTY'S	ALL SOLVENT WELD CONNECTIONS FOR BOTH MAINLINE AND LATERAL LINE SHALL BE MADE USING THE TWO-STEP PROCESS OF PRIMER AND SOLVENT CEMENT. PRIMER SHALL BE LOW VOC "PURPLE PRIMER". MAINLINE SOLVENT CEMENT SHALL BE LOW VOC, "GRAY-HEAVY BODY" CEMENT. LATERAL LINE SOLVENT CEMENT SHALL BE LOW VOC, "RED HOT BLUE GLUE" CEMENT. USE DAUBERS SIZED AT LEAST ONE HALF THE SIZE OF THE LARGEST SIZE PIPE BEING JOINED.					N/A
NO SYMBOL				AS APPROVED	IRRIGATION CONTROL WIRE #14UF AWG DIRECT BURIAL (U.L. APPROVED)					O,Q,R
NO SYMBOL				3M	DBR/Y-6 DIRECT BURIAL WATER-PROOF WIRE CONNECTORS FOR USE ON ALL WIRE CONNECTIONS (U.L. APPROVED)					R
NO SYMBOL				K.B.I.	KSC-XXX-S SWING CHECK VALVE, LINE SIZE, 1 DOWNSTREAM OF EACH RCV WHEN RCV IS LOWER THAN THE SPRINKLERS INSTALL WITHIN SPRINKER/DRIP ZONES AS REQUIRED TO PREVENT LOW HEAD/EMITTER DRAINAGE.					N/A
NO SYMBOL				K.B.I.	KC-XXX-S SPRING CHECK VALVE, LINE SIZE, 1 DOWNSTREAM OF EACH RCV IMMEDIATELY ABOVE FIRST LATERAL LINE TEE WHEN RCV IS HIGHER THAN THE SPRINKLERS, INSTALL WITHIN SPRINKER/DRIP ZONES AS REQUIRED TO PREVENT LOW HEAD/EMITTER DRAINAGE.					N/A
NO SYMBOL				CARSON	VALVE BOXES, SIZE AND TYPE PER INSTALLATION DETAILS, WITH T-COVER LIDS AND CAPTIVE BOLT AND LOC-KIT. VALVE BOXES SHALL HAVE GREEN HDPE BODY AND GREEN LIDS IN TURF, GREEN LIDS IN SHRUB BEDS, AND TAN LIDS IN ROCK MULCH. FOR USE IN NON-VEHICULAR TRAFFIC SITUATIONS ONLY. DO NOT INSTALL IN CONCRETE OR ASPHALT.					N/A

SIZE / CONFIGURATION	MODEL NUMBER	SIZE / CONFIGURATION	MODEL NUMBER
6" ROUND VALVE BOX	MODEL 0809	12" JUMBO RECTANGULAR	MODEL 1220
10" ROUND VALVE BOX	MODEL 0910	SUPER JUMBO RECTANGULAR	MODEL 1324
12" STANDARD RECTANGULAR	MODEL 1419	SUPER JUMBO RECTANGULAR XL	MODEL 1730



BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

NOTES:

REFER TO CIVIL FOR REPAIR OF DISTURBED AREAS.

ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
EDWARD J. KOCHANEY
20439
LICENSED IRRIGATOR

1 OCTOBER 2014

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IRRIGATION LEGEND & NOTES

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ: 1"=20'
SHEET: 186 OF 226

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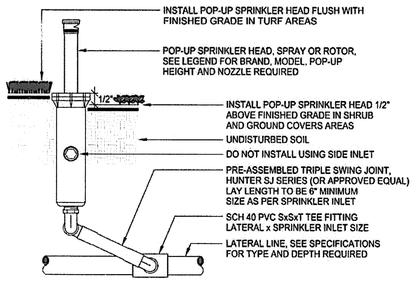
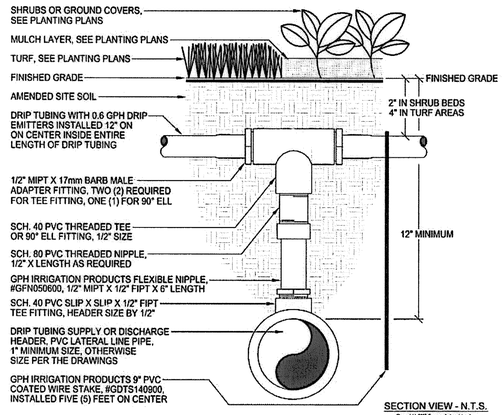


NOTE:
INSTALL SPRINKLER HEADS 6" FROM PAVING EDGE IN SHRUB AND GROUND COVER AREAS.
INSTALL SPRINKLER HEADS 12" FROM THE FACE OF BUILDING WALLS OR WINDOWS.
INSTALL SPRINKLER HEADS 4" FROM PAVING EDGE IN TURF AREAS.

INSTALL SPRINKLER HEADS PLUMB. ADJUST SPRAYS OR NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

SECTION VIEW - N.T.S.

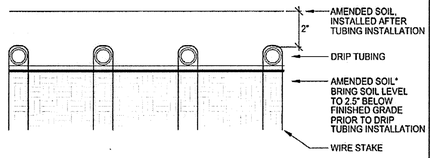


SECTION VIEW - N.T.S.

NOTE:
DRIP TUBING CONNECTION REQUIRED FOR ALL CONNECTIONS BETWEEN DRIP TUBING AND PVC HEADERS.

FOR CONNECTIONS AT END RUNS OF TUBING, USE A 90° ELL FITTING AND ONE ADAPTER FITTING FOR CONNECTION.

FOR CONNECTIONS IN THE MIDDLE OF RUNS OF TUBING, USE A TEE FITTING AND TWO ADAPTER FITTINGS FOR THE CONNECTION.



RECOMMENDED INSTALLATION: * AS PER LANDSCAPE DRAWINGS

TO INSURE EVEN PARALLEL AND LEVEL TUBING ROWS IT IS RECOMMENDED THAT THE SOIL LEVEL IN THE PLANTER AREAS BE BROUGHT TO 1 1/2" BELOW FINISHED GRADE AND PROPERLY COMPACTED AS PER THE LANDSCAPED DRAWINGS PRIOR TO THE INSTALLATION OF THE TUBING.

INSTALL TUBING AS INDICATED ON THESE DRAWINGS AND SECURE TO GRADE USING WIRE HOOP STAKES AT 5 FEET ON CENTER SPACING.

BACKFILL FINAL 2" OF SOIL OVER THE TUBING AFTER INSTALLATION OF THE TUBING

SECTION VIEW - N.T.S.

BENCHMARK:

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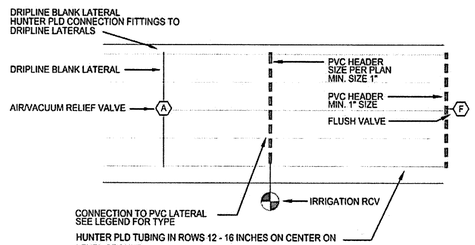
REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

No.	DATE	REVISIONS	APP.

(A) POP-UP SPRINKLER

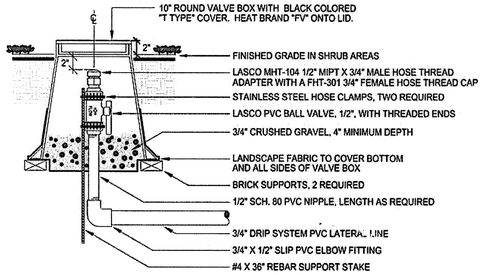


HUNTER PLD TUBING IN ROWS 12 - 16 INCHES ON CENTER ON LEVEL GROUND.

INSTALL DRIP FLUSH VALVE PER DETAIL AT THE END OF EACH TUBING SECTION PER PLAN.
INSTALL AIR RELIEF VALVES PER DETAIL, AT HIGH POINTS OF EACH TUBING SECTION PER PLAN.
RUN AIR/VACUUM RELIEF BLANK TUBING LATERAL ALONG HIGH POINT OF MOUND OR BERM.
ATTACH ALL IN-LINE DRIP TUBING TO BLANK LATERAL.
MORE THAN TWO RELIEF VALVES MAY NEED TO BE INSTALLED PER SECTION

SECTION VIEW - N.T.S.

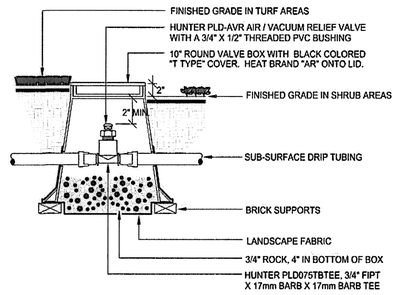
(B) DRIPLINE CONNECTION TO PVC



NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

USE AN APPROVED, NON-HARDENING, TEFLON ASSEMBLY PASTE ON ALL THREADED FITTINGS.

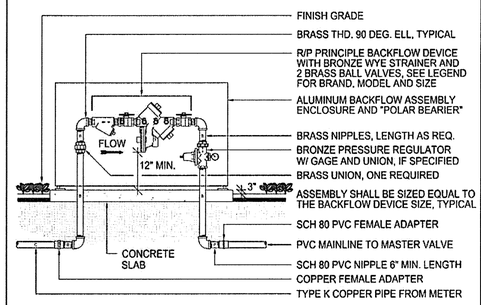
SECTION VIEW - N.T.S.



NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

SECTION VIEW - N.T.S.

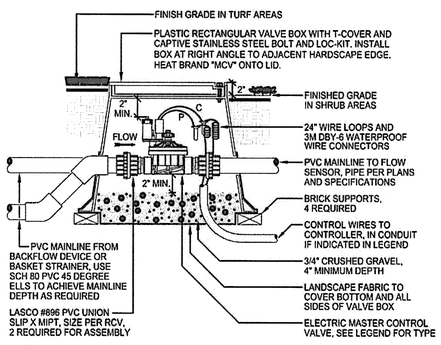
(C) DRIPLINE LAYOUT



NOTE:
CONCRETE SLAB SHALL BE MINIMUM 4" THICK, 18" WIDE AND EXTEND AT LEAST 8" PAST THE BACKFLOW ASSEMBLY PIPING. IF BACKFLOW ENCLOSURE IS SPECIFIED, THE CONCRETE SLAB SHALL BE THE SIZE REQUIRED BY THE MANUFACTURER.

SECTION VIEW - N.T.S.

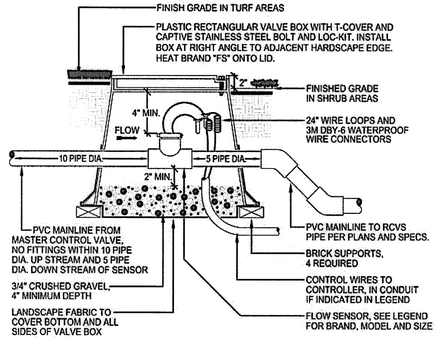
(D) DRIPLINE LAYOUT



NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

SECTION VIEW - N.T.S.

(E) DRIP MANUAL FLUSH VALVE

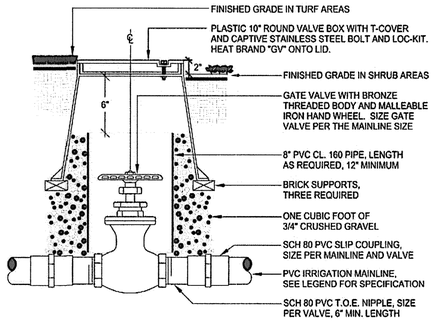


NOTE:
USE STANDARD OPENINGS PROVIDED IN VALVE BOX FOR PIPE, DO NOT CUT BOX.

USE SCH 80 PVC 45 DEGREE ELLS TO ACHIEVE MAINLINE DEPTH AS REQUIRED.

SECTION VIEW - N.T.S.

(F) DRIP AIR RELIEF VALVE



SECTION VIEW - N.T.S.

(G) R/P TYPE BACKFLOW

(H) MASTER CONTROL VALVE

(I) FLOW SENSOR

(J) ISOLATION VALVE

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IRRIGATION DETAILS

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE: CITY DWG NO.

VERT:
HORZ: 1"=20'

SHEET: 187 OF 226

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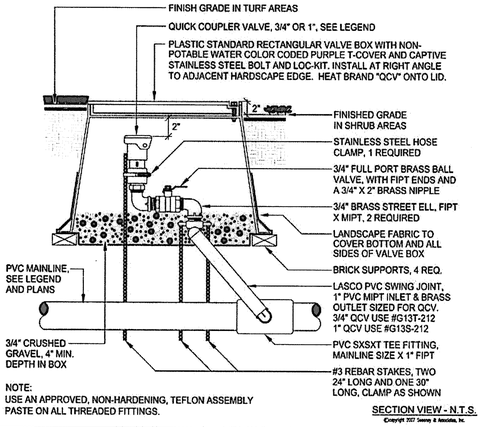
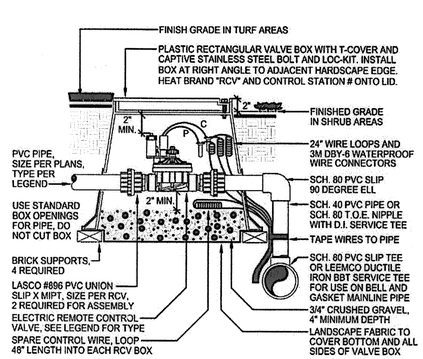


SECTION VIEW - N.T.S.

(K) QUICK COUPLER VALVE

DIMENSION	A	B	C
1/2" TO 2-1/2" IN SIZE	18"	12"	4"
3" TO 6" IN SIZE	24"	X	4"

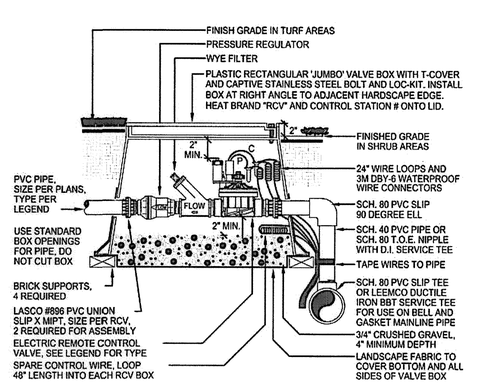
SECTION VIEW - N.T.S.



SECTION VIEW - N.T.S.

(L) REMOTE CONTROL VALVE

PLAN VIEW - N.T.S.

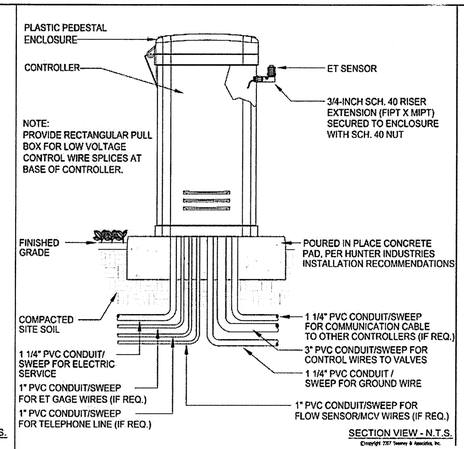


SECTION VIEW - N.T.S.

(M) DRIP R.C.V. ASSEMBLY

DIMENSION	A	B	C	D
1 1/2" TO 6" IN SIZE	36"	24"	24"	4"

SECTION VIEW - N.T.S.



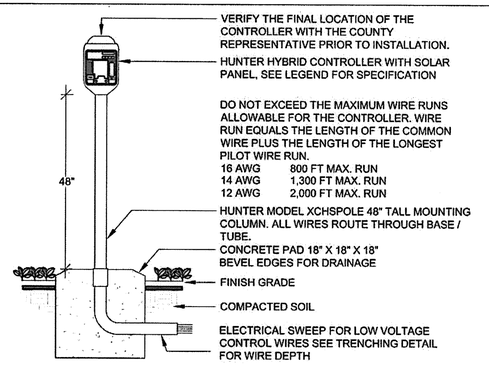
SECTION VIEW - N.T.S.

(N) CONTROLLER WITH ENCL.

NOTE:
WIRE CONNECTOR SHALL BE A 3M DBY-6 DIRECT BURY SPLICE KIT.
KIT SHALL INCLUDE A SCOTCHLOK Y SPRING CONNECTOR, A POLYPROPYLENE TUBE AND A WATERPROOF SEALING GEL. TUBE SHALL BE SUPPLIED PREFILLED WITH GEL.
DIRECT BURY SPLICE KIT SHALL BE USED TO ELECTRICALLY CONNECT 2 - 3 #14 OR 2 #12 PRE-STRIPPED COPPER WIRES. LARGER WIRES OR GREATER QUANTITIES OF WIRES SHALL REQUIRE A LARGER APPROVED WIRE CONNECTION.

SECTION VIEW - N.T.S.

(O) PIPE INSTALLATION



NOTE:
ALL REMOTE CONTROL VALVES USED WITH THE SOLAR-POWERED CONTROLLER SHALL HAVE THE SOLENOIDS REPLACED WITH THE APPROPRIATE DC LATCHING SOLENOIDS. REFER TO IRRIGATION LEGEND FOR TYPE.

SECTION VIEW - N.T.S.

(S) SOLAR POWERED CONTROLLER

(P) MAINLINE THRUST BLOCKS

(Q) PIPE UNDER HARDSCAPE

(R) WIRE CONNECTORS

BENCHMARK:

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REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

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ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

No.	DATE	REVISIONS	APP.

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02.06

14_10-01

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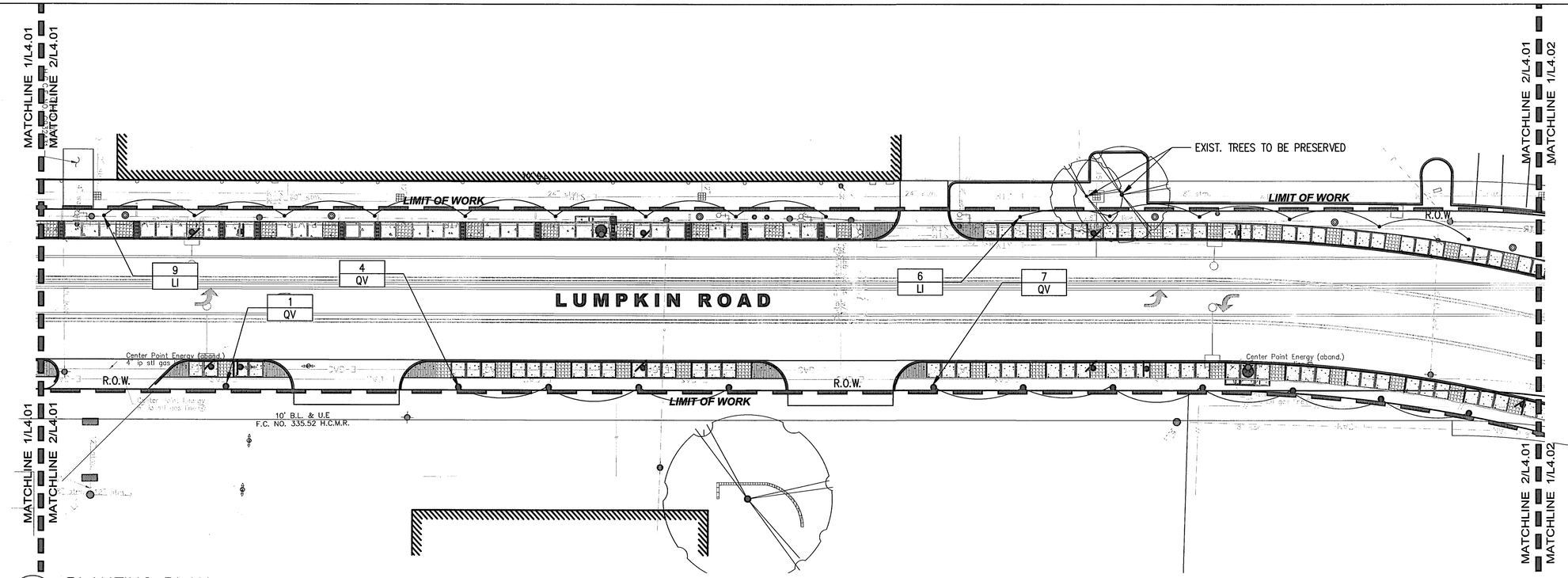
CITY DWG NO.

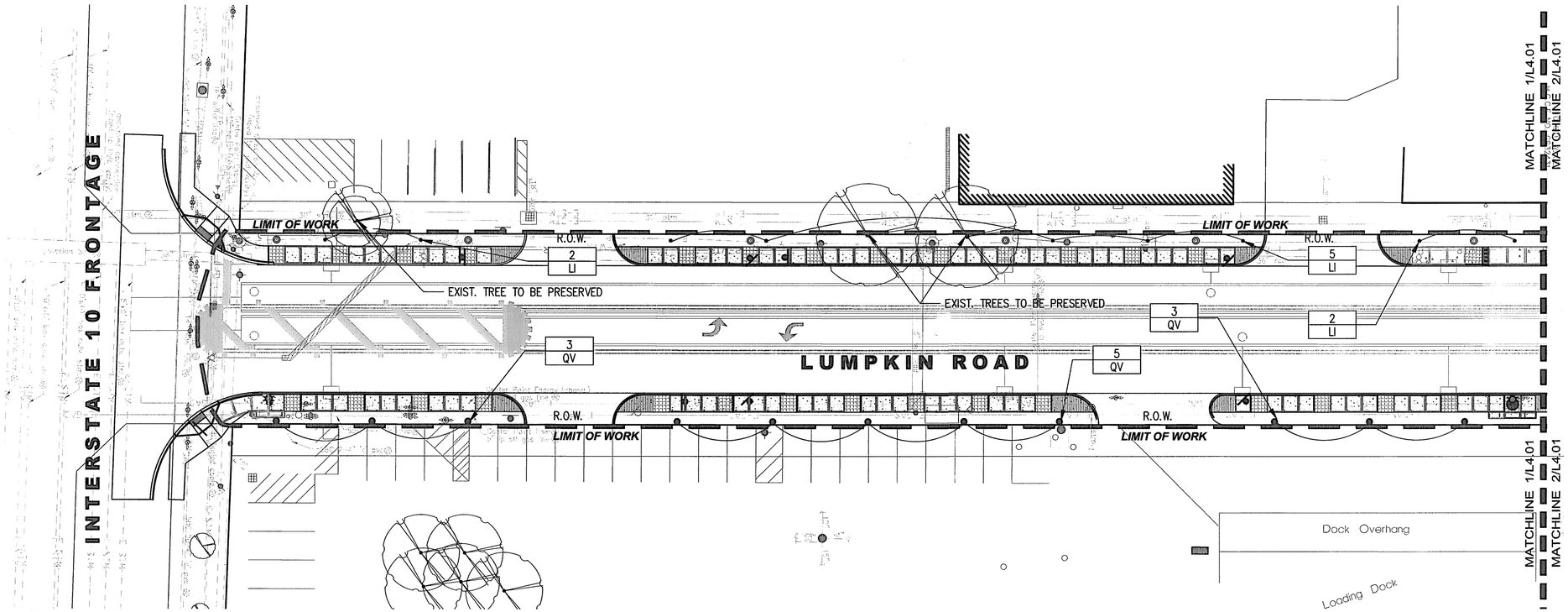
VERT:
HORZ: 1"=20'

SHEET:
188 OF 226

Z:\SWA-Houston\Lumpkin Road\L3.06 IRRIGATION DETAILS.dwg



2 PLANTING PLAN
1" = 20'



1 PLANTING PLAN
1" = 20'

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ONLY SIDEWALK CONC. TO RECEIVE 4" SMOOTH TROWEL BOARDER, ALL OTHER CONC. SHALL RECEIVE MED. BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

REF. 4/L2.02 FOR MATERIAL AND FURNISHING SCHEDULE

REF. 4/L5.02 FOR PLANTING SCHEDULE

ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT # 10477

1 OCTOBER 2014

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LUMPKIN ROAD
N-T17000-0012-3

PLANTING PLAN
1+00 TO 12+00
L4.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 189 OF 226	

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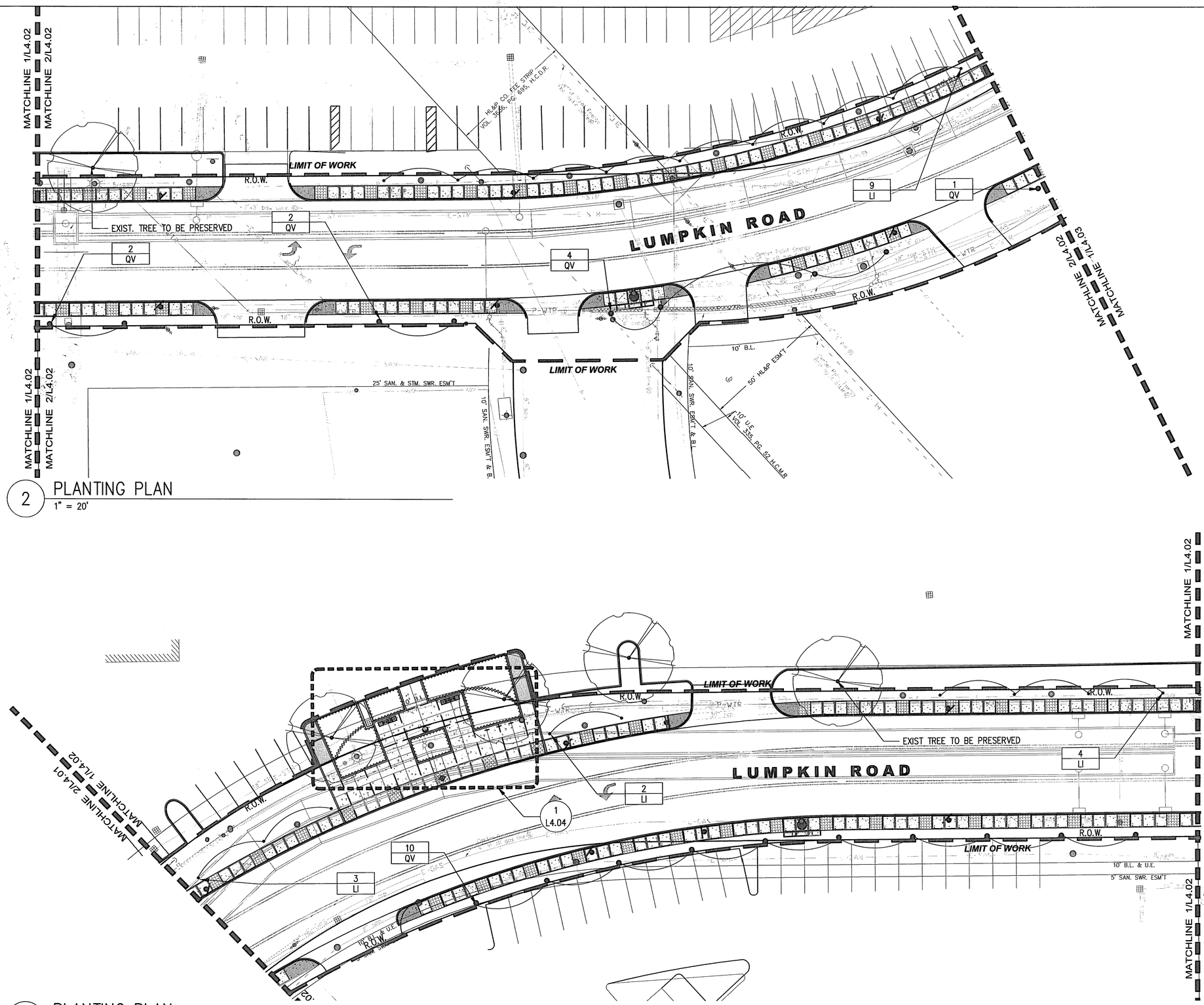
14_10_01

\\Houlfs801\data\Project\RHT\RHTS401 Memorial WO4 Lumkin CD\4 Drawings\Graphics\AutoCAD\Sheets\L4\L4.01 PLANTING PLAN.dwg



2 PLANTING PLAN
1" = 20'

1 PLANTING PLAN
1" = 20'

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

STATE OF TEXAS BOARD OF ARCHITECTURAL EXAMINERS JAMES W. VICK ARCHITECT
1 OCTOBER 2014

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PLANTING PLAN
12+00 TO 19+00
L4.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 190 OF 226	

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BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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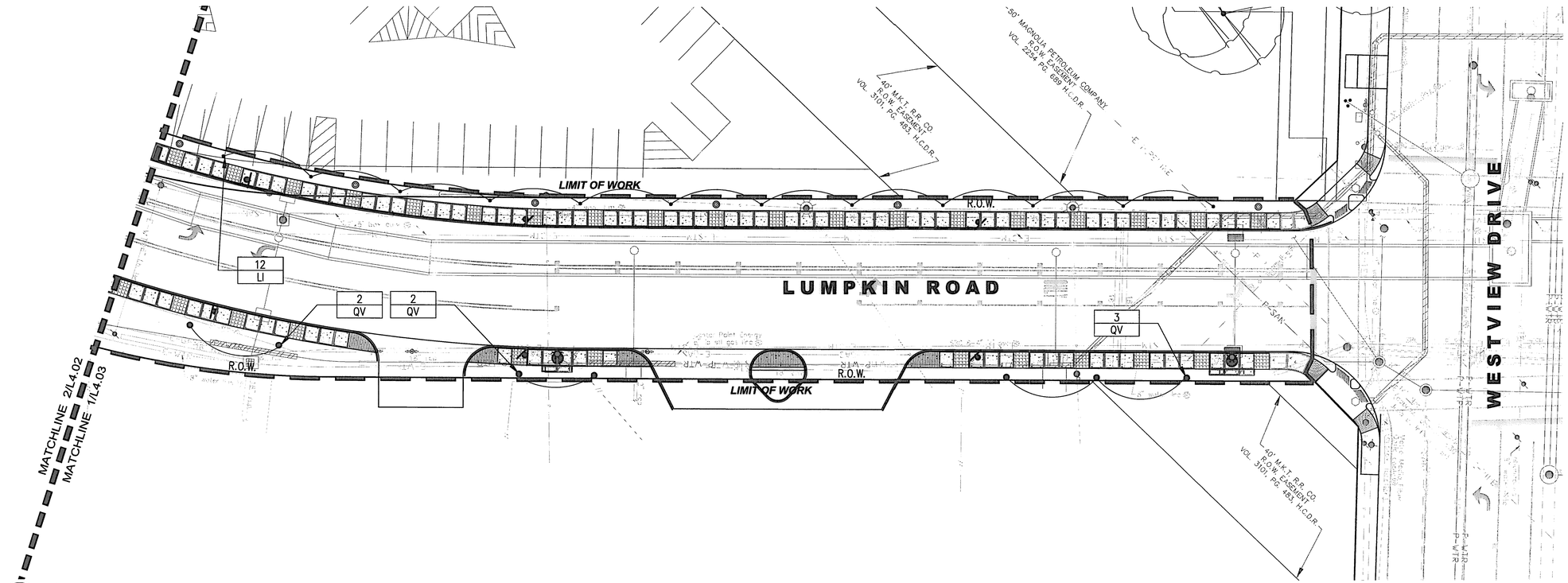
ALIGN PAVING JOINTS TO EDGE OF PAVEMENT, RAISED CONC. BAND, EXIST. JOINTS, AND PAVERS

EXIST. POWER POLES TO BE COORDINATED WITH CENTERPOINT ENERGY AND CIVIL

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

No.	DATE	REVISIONS	APP.



1 PLANTING PLAN
1" = 20'

1 OCTOBER 2014

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LUMPKIN ROAD
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PLANTING PLAN
19+00 TO 29+00
L4.03

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 191 OF 226	

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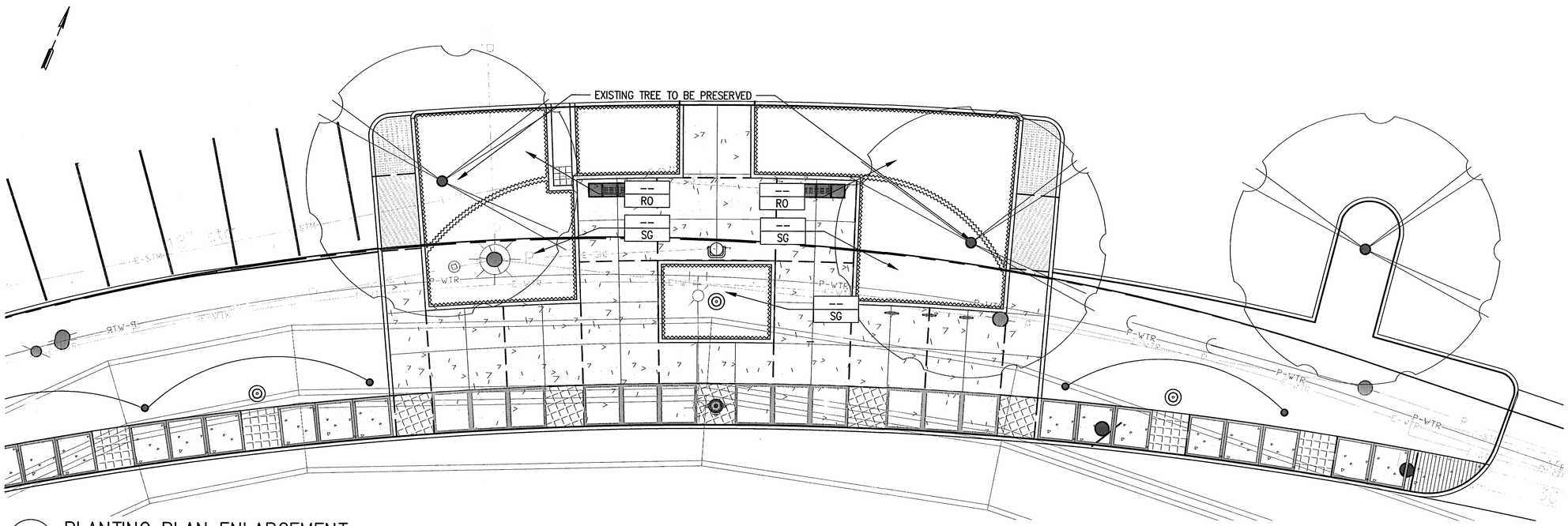

1 PLANTING PLAN ENLARGEMENT
1/8" = 1'-0"

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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TEXAS BOARD OF ARCHITECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT # 10477

1 OCTOBER 2014

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PLANTING PLAN
ENLARGEMENT
12+00
L4.04

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 194 OF 226	

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BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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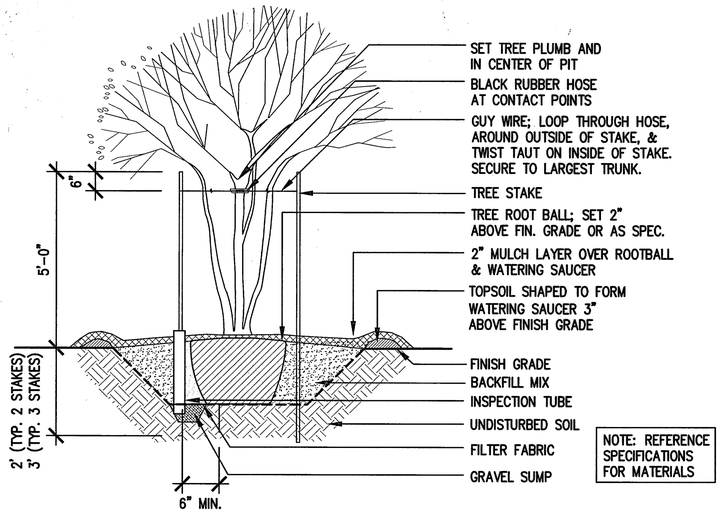
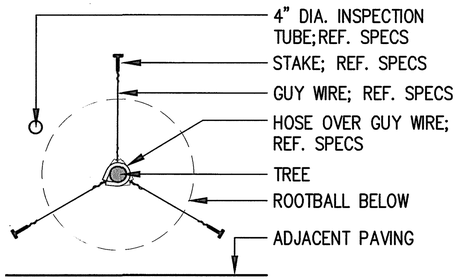
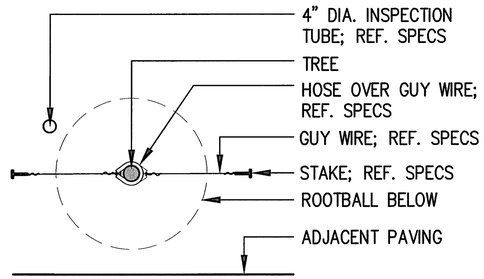
No.	DATE	REVISIONS	APP.

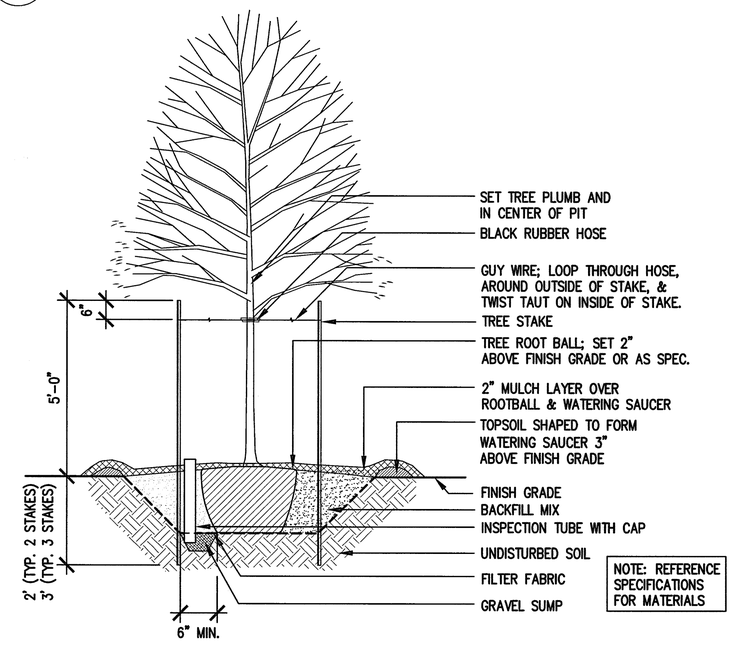


4 STANDARD TREE PLANTING – MULTI-TRUNK
NTS

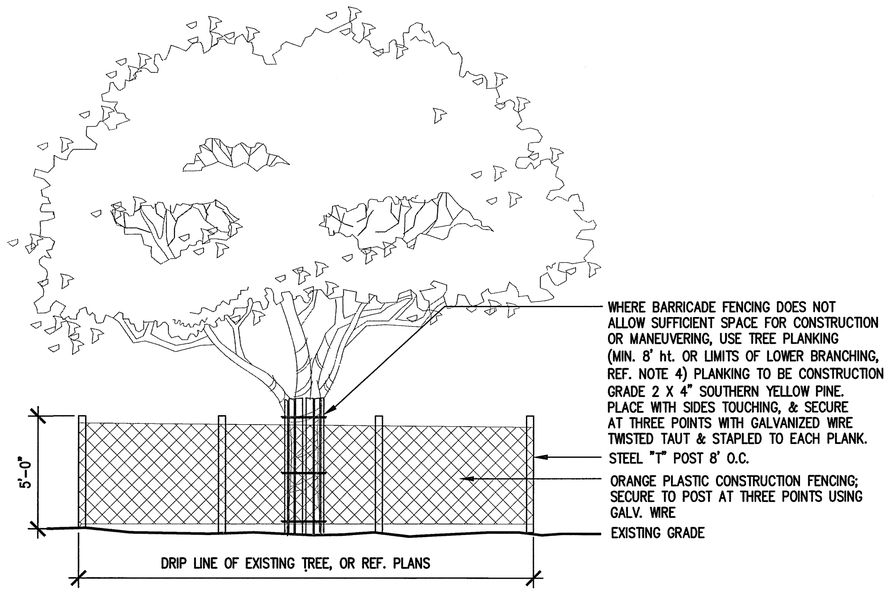




2 STANDARD TREE STAKING
NTS



3 STANDARD TREE PLANTING
NTS



1 TREE PROTECTION FENCING
NTS

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
JAMES W. VICK
ARCHITECT # 10471
1 OCTOBER 2014

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PLANTING DETAILS

L5.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 193 OF 226	

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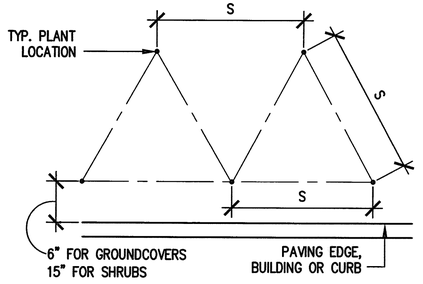
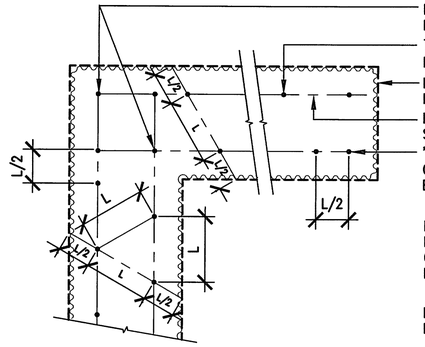
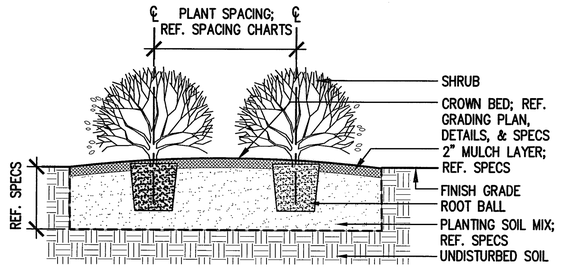
NOTE: DIMENSION 'S' DENOTES PLANT SPACING AS CALLED OUT ON PLANT LIST.



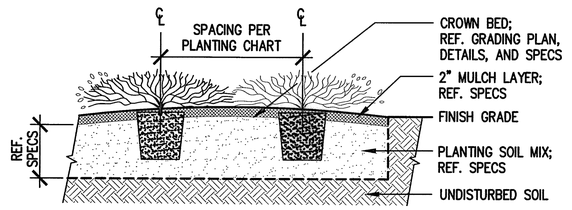
SPACING	PLANTS / SF
6" O.C.	4.61
8" O.C.	2.60
9" O.C.	1.78
10" O.C.	1.66
12" O.C.	1.15
15" O.C.	.738
18" O.C.	.50
24" O.C.	.28
30" O.C.	.18
36" O.C.	.12
48" O.C.	.07
60" O.C.	.04
72" O.C.	.03



3 PLANT SPACING CHART
3" = 1'–0"



2 SHRUB PLANTING
3/4" = 1'–0"



1 GROUNDCOVER PLANTING
3/4" = 1'–0"

PLANTING SCHEDULE

SHADE TREES

SYM.	Botanical Name	Common Name		Quantity	Units	Size	Cal.	Height	Spread	Remarks
QV	*Quercus virginiana*	Live Oak	-	49	EA	65 Gal.	3" - 3 1/2"	12' - 14'	6' - 7'	Central Leader
LI	*Lagerstroemia indica*	Crape Myrtle	-	54	EA	45 Gal.	2" - 2 1/2"	10' - 12'	5' - 6'	Full, well branched

PERENNIAL PLANTINGS

SYM.	Botanical Name	Common Name		Quantity	Units	Size	Height	Spread	Spacing	Remarks
SG	*Salvia greggii 'Alba'*	Texas Wedding Sage	-	–	EA	1 Gal.	2' - 4'	2' - 3'	30" o.c.	Full plants rooted to container
RO	*Rosmarinus officinalis*	Rosemary	-	–	EA	1 Gal.	1' - 2'	2' - 4'	30" o.c.	Full plants rooted to container
HM	*Hemerocallis minor*	Dwarf Day Lily	-	–	EA	1 Gal.	8" - 1'	1'	30" o.c.	Full plants rooted to container

4 PLANTING SCHEDULE

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03)

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TEXAS BOARD OF ARCHITECTURAL EXAMINERS — JAMES W. VICK — ARCHITECT — LICENSED

1 OCTOBER 2014

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LUMPKIN ROAD
N–T17000–0012–3

PLANTING DETAILS

L5.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY

DRAWING SCALE: CITY DWG NO.

VERT:
HORZ: 1"=20'

SHEET: 163 OF 226

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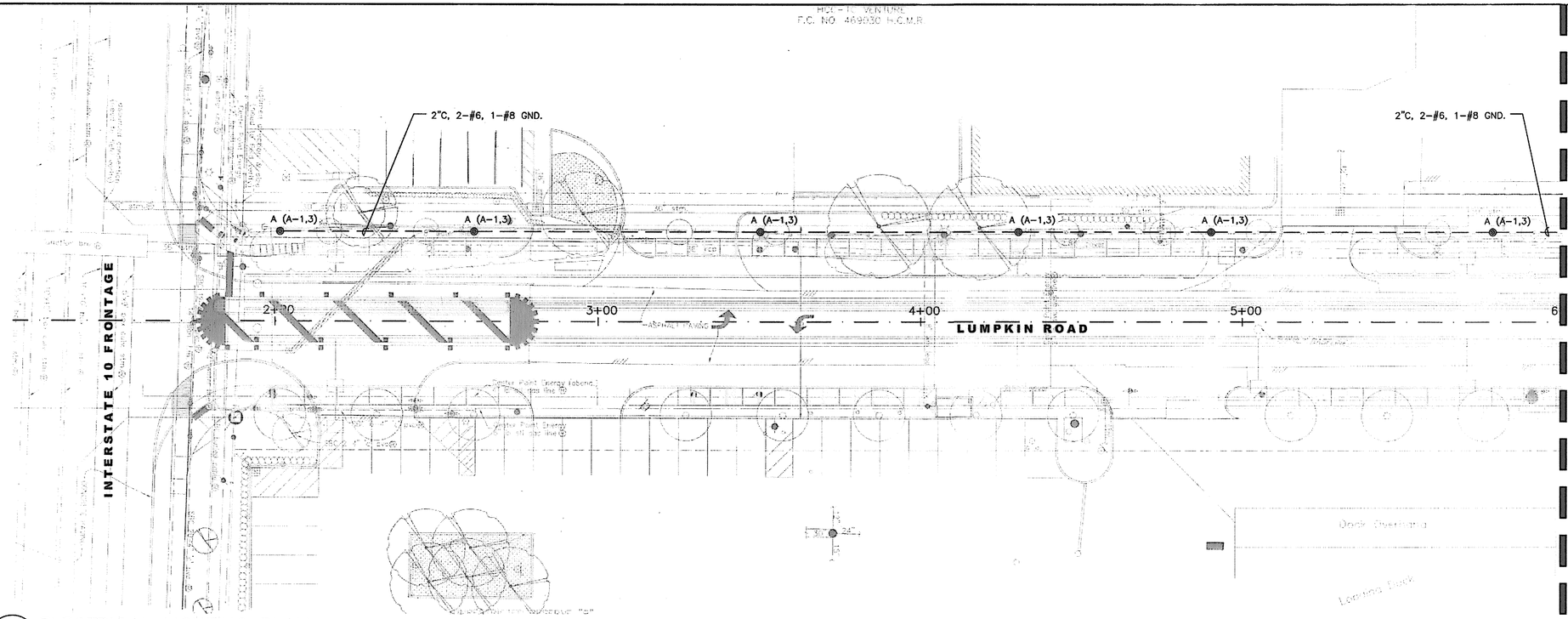
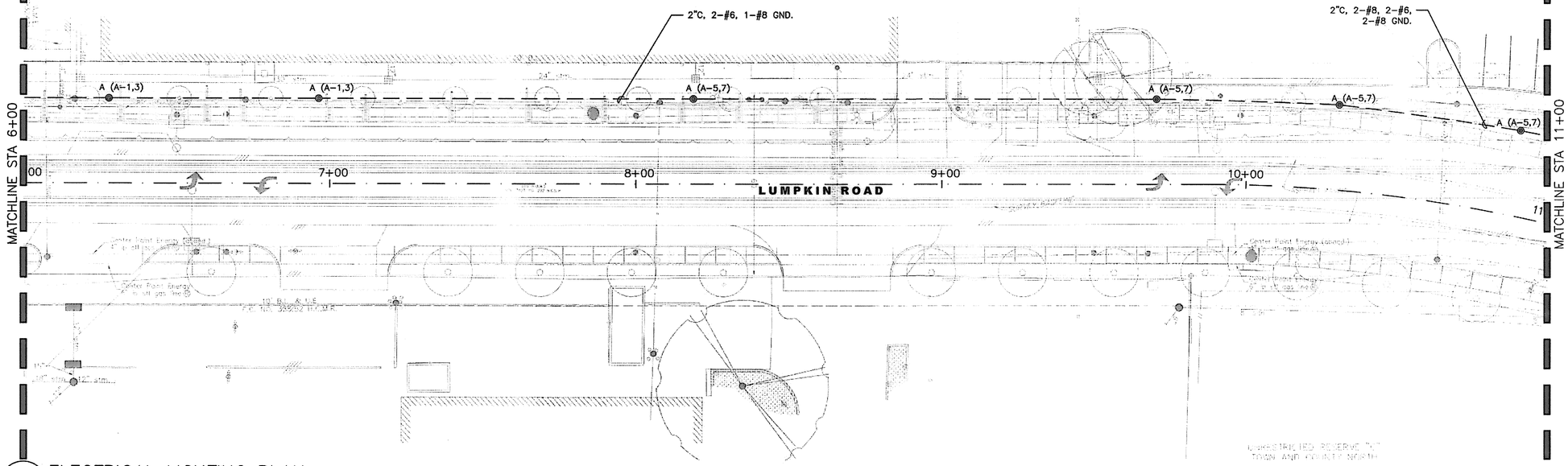


1 ELECTRICAL LIGHTING PLAN
SCALE: 1" = 20'-0"



2 ELECTRICAL LIGHTING PLAN
SCALE: 1" = 20'-0"

LEGEND:

A (A-1,3)	TYPE "A" PEDESTRIAN LIGHT STANDARD (CIRCUIT NUMBER)
	SERVICE METER AND CONTROLS FOR LIGHTING; SEE DETAIL AND KEYED NOTES
	SCHEDULE 80 PVC WHERE UNDERGROUND
	SCHEDULE 80 PVC, BORE
	SCHEDULE 80 PVC, IN EXISTING SLEEVE
J	JUNCTION BOX

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

GOLDMAN BUTLER, III
49855
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
1 OCTOBER 2014
TBPE FIRM NO. F-3446

HUNT & HUNT ENGINEERING CORP.
HOUSTON, TEXAS 77215
TBPE FIRM NO. F-3446

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
ELECTRICAL LIGHTING PLAN
1+00 TO 11+00

LE1.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 195 OF 226	

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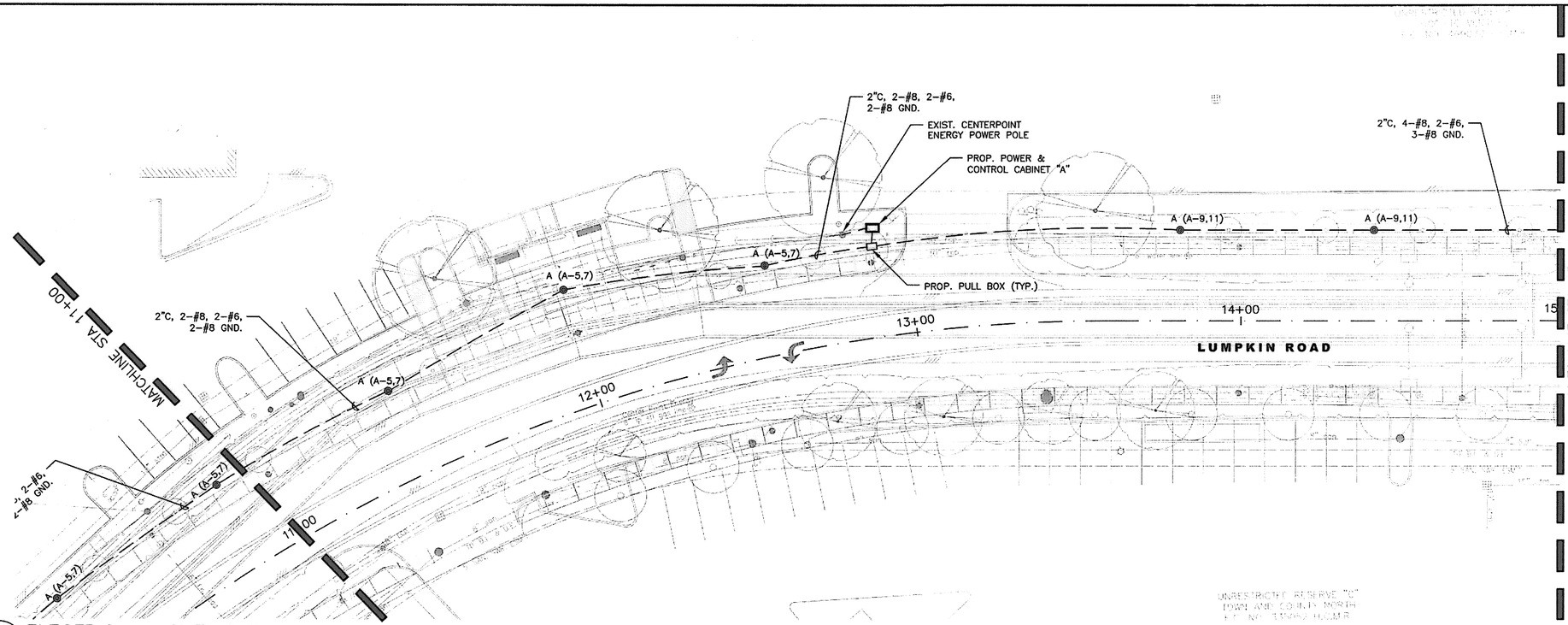
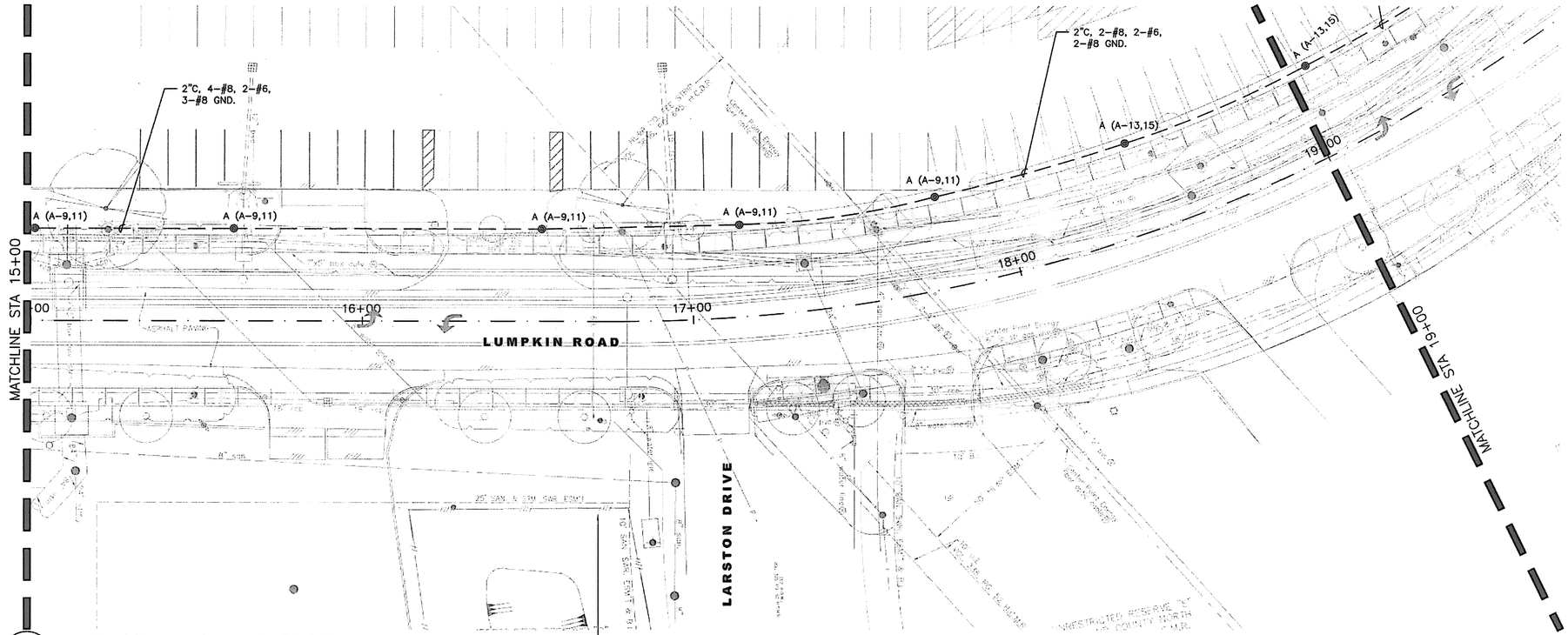


1 ELECTRICAL LIGHTING PLAN
SCALE: 1" = 20'-0"



2 ELECTRICAL LIGHTING PLAN
SCALE: 1" = 20'-0"

LEGEND:

A (A-1,3)	TYPE "A" PEDESTRIAN LIGHT STANDARD (CIRCUIT NUMBER)
	SERVICE METER AND CONTROLS FOR LIGHTING; SEE DETAIL AND KEYED NOTES
	SCHEDULE 80 PVC WHERE UNDERGROUND
	SCHEDULE 80 PVC, BORE
	SCHEDULE 80 PVC, IN EXISTING SLEEVE
(J)	JUNCTION BOX

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET

STATE OF TEXAS
GOLDMAN BUTLER, III
49855
REGISTERED
PROFESSIONAL ENGINEER
1 OCTOBER 2014
TBPE FIRM NO. F-3446

HUNT & HUNT ENGINEERING CORP.
HOUSTON, TEXAS 77215
TBPE FIRM NO. F-3446

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
ELECTRICAL LIGHTING PLAN
11+00 TO 19+00

LE1.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ: 1"=20'
SHEET: 196 OF 226

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KEYED NOTES:

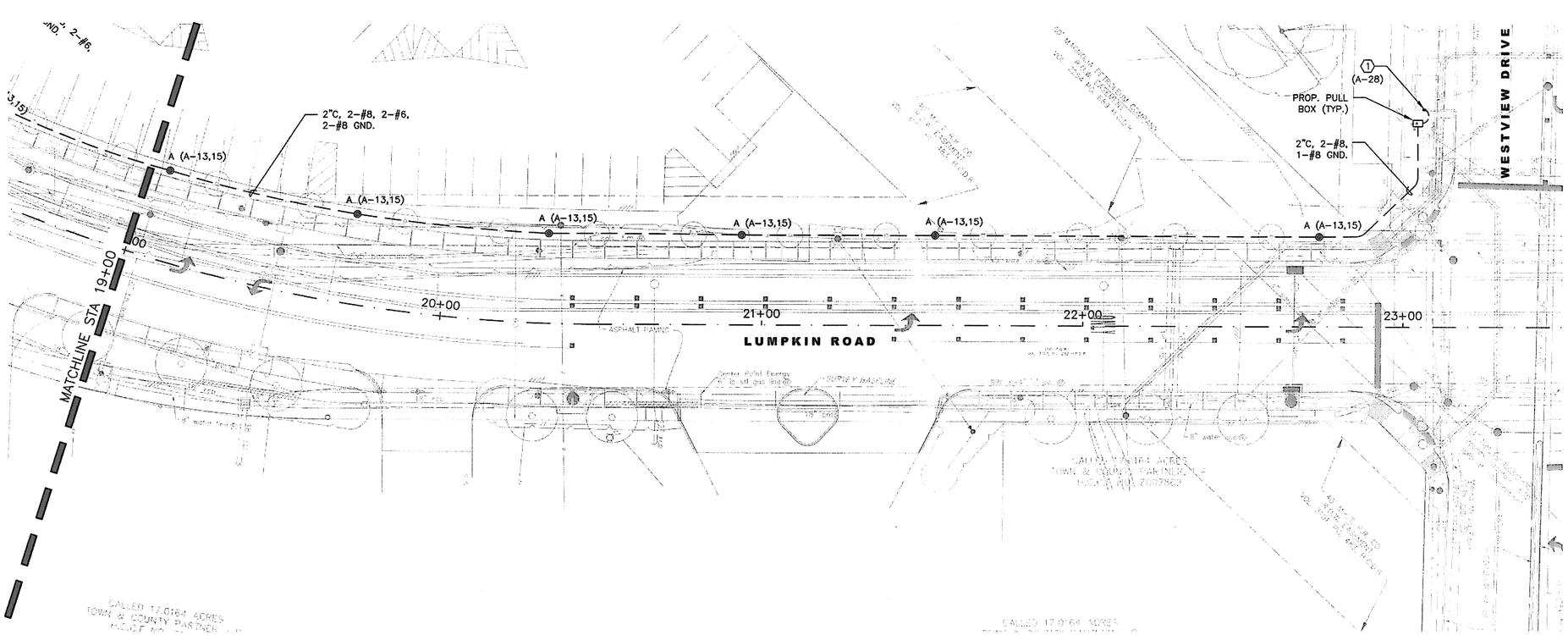
1. VERIFY EXACT LOCATION OF BUS SHELTER SWITCH BOX IN FIELD AND MAKE FINAL TERMINATION.

LEGEND:

A (A-1,3)	TYPE "A" PEDESTRIAN LIGHT STANDARD (CIRCUIT NUMBER)
	SERVICE METER AND CONTROLS FOR LIGHTING; SEE DETAIL AND KEYED NOTES
— — —	SCHEDULE 80 PVC WHERE UNDERGROUND
	SCHEDULE 80 PVC, BORE
— — —	SCHEDULE 80 PVC, IN EXISTING SLEEVE
J	JUNCTION BOX

No.	DATE	REVISIONS	APP.

0 20 40 80
(IN FEET)
1 INCH = 20 FEET



1 ELECTRICAL LIGHTING PLAN
SCALE: 1" = 20'-0"

STATE OF TEXAS
GOLDMAN BUTLER, III
49855
REGISTERED
PROFESSIONAL
ENGINEER
1 OCTOBER 2014
TBPE FIRM NO. F-3446

HUNT & HUNT ENGINEERING CORP.
HOUSTON, TEXAS 77215
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Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
ELECTRICAL LIGHTING PLAN
19+00 TO 23+50

LE1.03

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: HORZ: 1"=20'	
SHEET: 197 OF 226	

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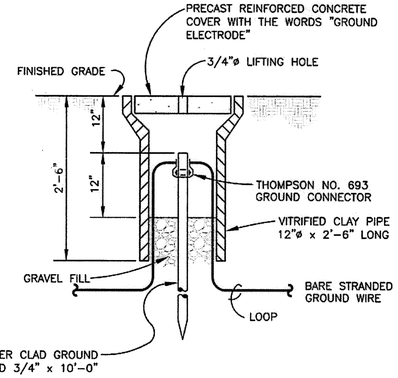
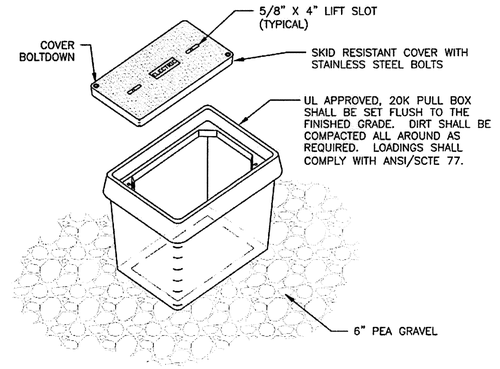
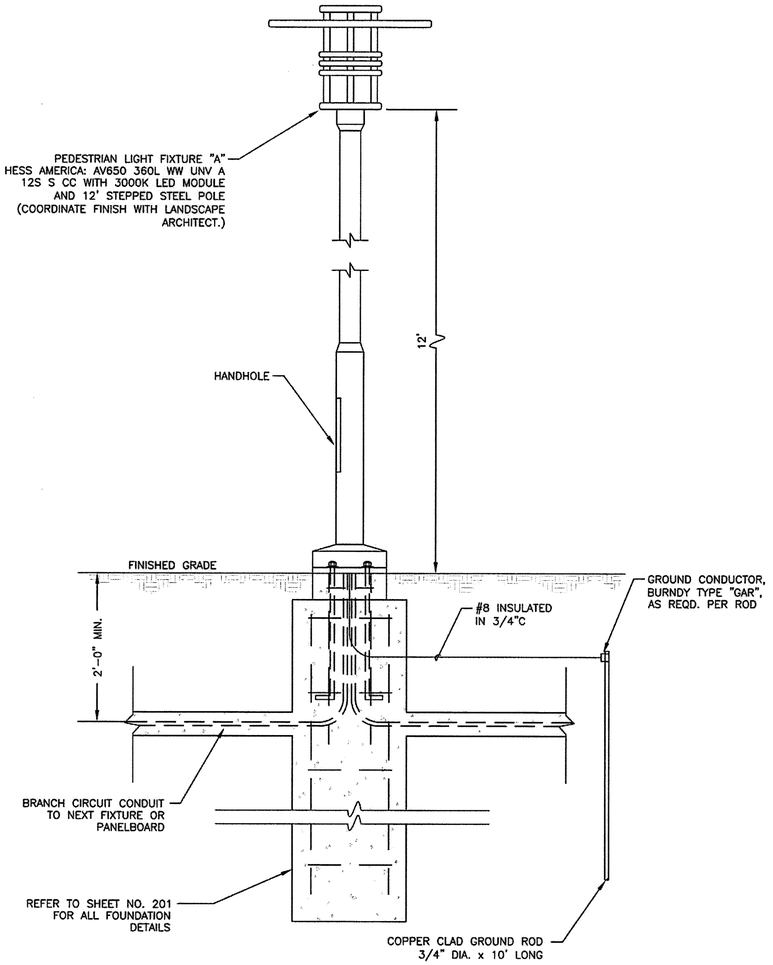


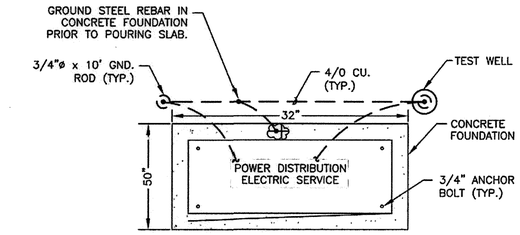
1 GROUND ROD & TEST WELL DETAIL
SCALE: N.T.S.



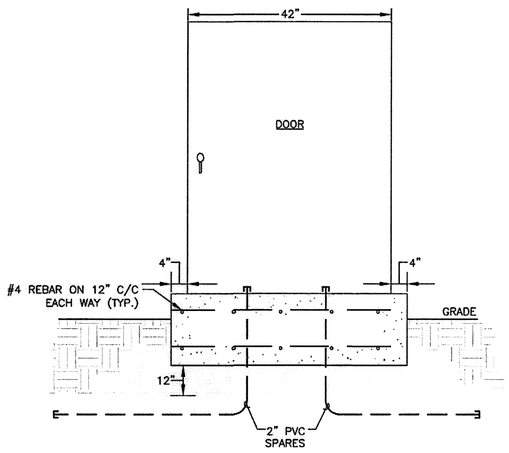
2 TYPICAL CONCRETE POLYMER PULL BOX DETAIL
SCALE: N.T.S.



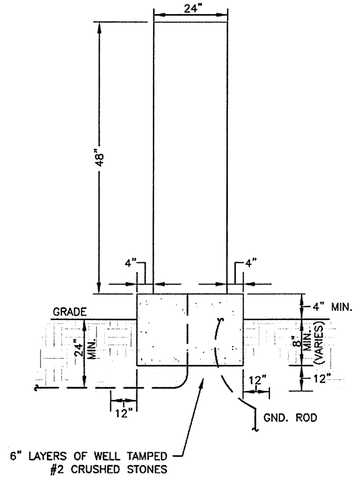
3 TYPICAL POLE MOUNTING DETAIL
SCALE: N.T.S.



TOP VIEW



FRONT VIEW



SIDE VIEW

4 ELECTRICAL CABINET FOUNDATION DETAIL
SCALE: N.T.S.

CABINET NOTES:

1. MATERIAL: CABINET SHALL BE 12 GAUGE MINIMUM, TYPE 304 STAINLESS STEEL, NEMA 4X CONSTRUCTION, WITH FULL-LENGTH STAINLESS STEEL PIANO HINGE DOORS. EQUIP EXTERIOR DOOR WITH PADLOCK, HEAVY-DUTY LOCKING PISTOLGRIP HANDLES AND 3-POINT LATCHING MECHANISM OF THE DRAW ROLLER TYPE (0.750 INCH MINIMUM DIA. ROLLERS). HANDLES SHALL BE STAINLESS STEEL. EQUIP DOORS WITH NEOPRENE GASKETS.
2. INSIDE AND OUTSIDE OF CABINET SHALL BE GROUND SMOOTH AND FREE FROM DEFECTS.
3. OVERALL DIMENSIONS SHALL BE MINIMUM AS INDICATED. CONTRACTOR SHALL PROVIDE SUBMITTAL DRAWINGS WITH ACTUAL EQUIPMENT LAYOUT AND FINAL DIMENSIONS.
4. ALL EXPOSED BOXES SHALL BE PROVIDED WITH TAMPER PROOF SCREWS AND BOLTS.
5. TEST CABINETS IN ACCORDANCE WITH UL 50, SO UNIT QUALIFIES FOR A UL LABEL.

No.	DATE	REVISIONS	APP.

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STATE OF TEXAS — GOLDMAN BUTLER, III — 49855 — REGISTERED PROFESSIONAL ENGINEER

1 OCTOBER 2014

TBPE FIRM NO. F-3446

HUNT & HUNT ENGINEERING CORP.
HOUSTON, TEXAS 77215
TBPE FIRM NO. F-3446

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

ELECTRICAL DETAILS

LE2.01

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

VERT:
HORZ:

SHEET: 198 OF 226

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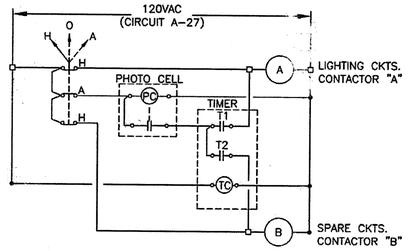
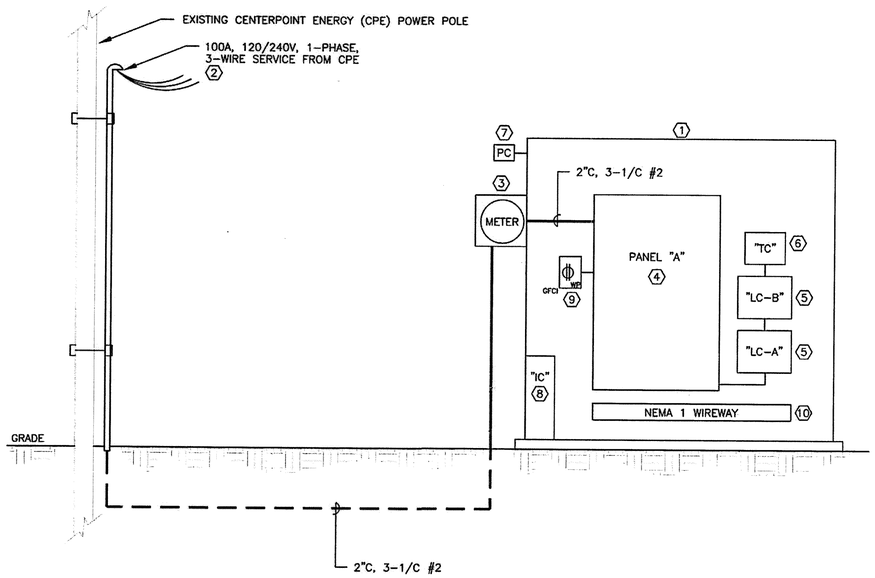


A-C1	PED. LIGHTS	B-C1	SPARE
A-C2	PED. LIGHTS	B-C2	SPARE
A-C3	PED. LIGHTS	B-C3	SPARE
A-C4	PED. LIGHTS	B-C4	SPARE
A-C5	PED. LIGHTS	B-C5	SPARE
A-C6	PED. LIGHTS	B-C6	SPARE
A-C7	PED. LIGHTS	B-C7	SPARE
A-C8	PED. LIGHTS	B-C8	SPARE
A-C9	SPARE	B-C9	SPARE
A-C10	SPARE	B-C10	SPARE
A-C11	SPARE	B-C11	SPARE
A-C12	SPARE	B-C12	SPARE
LIGHTING CKTS.		SPARE CKTS.	

1 LIGHTING CONTACTOR DETAIL
SCALE: N.T.S.



2 ELECTRICAL ONE-LINE DIAGRAM
SCALE: N.T.S.

KEYED NOTES:

1. PROVIDE ELECTRIC SERVICE ENCLOSURE WITH FOUNDATION, ELECTRICAL EQUIPMENT AND GROUNDING FOR ALL COMPONENTS IN ACCORDANCE WITH NEC.
2. PROVIDE WEATHERHEAD, 2" RCS RISER AND STANDOFF BRACKETS. INSTALL CONDUIT AND WIRING IN ACCORDANCE WITH CENTERPOINT ENERGY (CPE) STANDARDS AND COORDINATE ALL WORK WITH CPE.
3. PROVIDE A 320A COMMERCIAL METER CAN, 240V, 1-PHASE, 3-WIRE AND 300A.
4. PROVIDE A 100A, 1-PHASE, 3-WIRE, 120/240V, NEMA 1, COPPER MAIN BUS, RATED SERVICE ENTRANCE PANELBOARD. GENERAL ELECTRIC TYPE AQ OR EQUAL.
5. PROVIDE A 12-POLE, 30A, 600VAC LIGHTING CONTACTOR WITH 120V CONTROL AND HOA SWITCH. SQUARE "D" MODEL 8903 LG1200V02 OR EQUAL.
6. PROVIDE AN ASTRONOMIC TIMER. INTERMATIC MODEL ET70415C OR EQUAL.
7. PROVIDE A PHOTO CELL. INTERMATIC MODEL K1221 OR EQUAL.
8. IRRIGATION CONTROLLER TO BE CONNECTED TO CIRCUIT A-29.
9. PROVIDE 20A WEATHERPROOF GFCI DUPLEX RECEPTACLE WITH IVORY COLOR. LEVITON MODEL W7599 OR EQUAL.
10. PROVIDE A 6"x6" NEMA 1, STEEL WIREWAY, AS REQUIRED, FOR WIRING TRANSITION.

PANEL SCHEDULE

LIGHTING PANEL: "A"

MAINS: 100A MCB, 1-PHASE, 3-WIRE
AIC: 22,000
VOLTAGE: 120/240V

BRANCHES: 20A/1P UNLESS OTHERWISE NOTED
MOUNTING: SURFACE

CKT	SERVES	WATTS/ VA	BREAKER POLE	BREAKER AMP	THWN COPPER WIRE	THWN COPPER COND	L1	L2	THWN COPPER COND	THWN COPPER WIRE	BREAKER AMP	BREAKER POLE	WATTS/ VA	SERVES	CKT
1	PEDESTRIAN LIGHTS, WEST SIDE OF LUMPKIN ROAD-SOUTH (8)	750	2	20	6	2"					20	2		SPARE	2
3		750													4
5	PEDESTRIAN LIGHTS, WEST SIDE OF LUMPKIN ROAD-SOUTH (7)	660	2	20	8	2"					20	2		SPARE	6
7		660													8
9	PEDESTRIAN LIGHTS, WEST SIDE OF LUMPKIN ROAD-NORTH (7)	660	2	20	8	2"					20	2		SPARE	10
11		660													12
13	PEDESTRIAN LIGHTS, WEST SIDE OF LUMPKIN ROAD-NORTH (7)	660	2	20	6	2"					20	2		SPARE	14
15		660													16
17	SPARE		1	20							20	1		SPARE	18
19	SPARE		1	20							20	1		SPARE	20
21	SPARE		1	20							20	1		SPARE	22
23	SPARE		1	20							20	1		SPARE	24
25	SPARE		1	20							20	1		SPARE	26
27	LIGHTING CONTROLS	600	1	20	12	3/4"			2"	8	20	1	120	BUS SHELTER LIGHT	28
29	IRRIGATION CONTROLLER	200	1	20	12	3/4"			3/4"	12	20	1	600	CABINET RECEPTACLE	30

L1: 3,530 WATTS
L2: 3,450 WATTS
TOTAL: 6,980 WATTS

No.	DATE	REVISIONS	APP.

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STATE OF TEXAS
GOLDMAN BUTLER, III
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REGISTERED
PROFESSIONAL ENGINEER

1 OCTOBER 2014

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Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3
ELECTRICAL
ONE-LINE DIAGRAM & PANEL SCHEDULE

LE2.02

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET: 199 OF 226

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ELECTRICAL SPECIFICATIONS

1. SCOPE: SCOPE OF WORK INCLUDES INSTALLATION OF ONE (1) NEW ELECTRICAL SERVICE TO SERVE NEW PEDESTRIAN LIGHTS AND METRO BUS SHELTER LIGHTING. CONTRACTOR FOR THIS DIVISION SHALL PROVIDE AND INSTALL A COMPLETE AND FUNCTIONING ELECTRICAL SYSTEM CONSISTING OF REQUIRED ELECTRICAL COMPONENTS, SHALL INCLUDE BUT NOT NECESSARILY LIMITED TO, POWER CABINET, PANELBOARD, LIGHTING CONTACTORS, CONDUITS, RACEWAYS, CONDUIT BODIES, WIRES, CABLES, FITTINGS, TESTING OF INSTALLED SYSTEMS, EXCAVATION AND COORDINATION WITH POWER COMPANY AND OTHER TRADES. CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL LIGHTS WITH THE ARCHITECT. BEFORE ROUGH-IN, RELOCATE EQUIPMENT CONNECTIONS AS DIRECTED BY OWNER/ARCHITECT AT NO CHANGE IN CONTRACT PRICE.

2. SITE VISIT AND FAMILIARIZATION: CONTRACTORS PROPOSING TO UNDERTAKE WORK UNDER THIS DIVISION SHALL VISIT THE SITE OF THE WORK, AND FULLY INFORM THEMSELVES OF ALL CONDITIONS THAT AFFECT THE WORK, OR COST THEREOF. CONTRACTOR SHALL EXAMINE THE DRAWINGS AND SPECIFICATIONS AS RELATED TO THE SITE CONDITIONS. CONTRACTOR SHALL VERIFY THE CONDITION OF THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM AND COMPARE WITH WHAT IS SHOWN ON THE CONSTRUCTION DOCUMENT. ANY DISCREPANCY SHALL BE REPORTED TO OWNER/ARCHITECT. FAILURE TO DO SO WILL NOT BE AN ACCEPTABLE CAUSE FOR A CHANGE IN CONTRACT PRICE AFTER AWARD OF CONTRACT. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING WORK.

3. NOTICE: CONSIDERATION WILL NOT BE GRANTED FOR ANY ALLEGED MISUNDERSTANDING OF THE AMOUNT OF WORK TO BE PERFORMED. TENDER OF A PROPOSAL SHALL CONVEY FULL AGREEMENT TO ALL ITEMS AND CONDITIONS SPECIFIED, INDICATED ON THE DRAWINGS AND/OR REQUIRED BY NATURE OF THE SITE.

4. DISCREPANCIES: SHOULD CONTRACTOR FIND DISCREPANCIES OR OMISSIONS IN THE CONTRACT DOCUMENTS, OR BE IT DOUBT AS TO THE INTENT THEREOF, HE/SHE SHALL IMMEDIATELY OBTAIN CLARIFICATION FROM THE ENGINEER BEFORE SUBMITTING PROPOSAL FOR WORK IN THIS DIVISION.

5. TIMELY PLACING OF MATERIALS AND EQUIPMENT: ALL ELECTRICAL APPARATUS SHALL BE INSTALLED AT THE PROPER TIME DURING PROGRESS OF CONSTRUCTION. COORDINATE WORK OPERATIONS WITH OTHER TRADES.

6. SPACE REQUIREMENTS: CONTRACTOR FOR WORK UNDER THIS DIVISION SHALL BE FULLY RESPONSIBLE FOR DETERMINING IN ADVANCE OF PURCHASE THAT EQUIPMENT AND MATERIALS PROPOSED FOR INSTALLATION SHALL FIT INTO THE CONFINES INDICATED.

7. MANUFACTURER'S LITERATURE: DELIVER ALL PRINTED TAGS, INSTRUCTIONS, CERTIFIED DRAWINGS, PARTS LISTS, CERTIFICATES, ETC., SUPPLIED WITH EQUIPMENT ITEMS, TO THE OWNER REPRESENTATIVE.

8. CODES, PERMITS AND FEES: WORK UNDER THIS DIVISION SHALL BE CONSTRUCTED IN STRICT CONFORMANCE WITH THE REQUIREMENTS OF CITY OF HOUSTON AND STATE BUILDING CODES.
   A. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION STANDARD OF INSTALLATIONS AND NEMA PB-1.
   B. OBTAIN ALL REQUIRED PERMITS. PAY ALL LEGAL FEES FOR PERMITS AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.

9. PROTECTION OF APPARATUS: TAKE ALL PRECAUTIONS NECESSARY FOR PROPER PROTECTION OF NEW AND EXISTING EQUIPMENT, APPARATUS AND MATERIALS FROM DAMAGE. FAILURE TO DO SO WILL BE CAUSE FOR REJECTION OF ANY ITEM COMING UNDER QUESTION.

10. SHOP DRAWINGS: CONTRACTOR FOR THIS DIVISION SHALL SUBMIT SHOP DRAWINGS AND CATALOGUE DATA ON ALL MAJOR ITEMS OF EQUIPMENT, SYSTEMS AND OTHER MATERIAL REQUESTED BY OWNER. SUBMIT SIX (6) COPIES WITHIN THIRTY (30) DAYS AFTER CONTRACT AWARD, AND IN NOT MORE THAN TWO (2) GROUPS OF SUBMITTALS. SUBMITTALS SHALL CONSIST OF CUT SHEETS AND OPERATING AND PERFORMANCE DATA. ALLOW FIVE (5) DAYS FOR REVIEW AND APPROVAL OF THE SHOP DRAWINGS BY ENGINEER.

11. WORK IN OTHER DIVISIONS: SEE CIVIL AND LANDSCAPE DRAWINGS FOR RELATED WORK.

12. MATERIALS AND WORKMANSHIP: ALL MATERIALS AND EQUIPMENT SHALL BE NEW, OF BEST GRADE OF STANDARD MANUFACTURE AND APPROVED BY UL, AND BE SO LABELED, FOR WIRE AND CABLE, MARKED AS REQUIRED BY ART. 310, NEC, AND INSTALLED BY SKILLED ELECTRICIANS, WORKING UNDER THE DIRECT SUPERVISION OF COMPETENT AND EXPERIENCED FOREMAN AND/OR SUPERINTENDENT. PRODUCTS SHALL BE INSTALLED IN A THOROUGH WORKMANLIKE MANNER, PRESENTING A NEAT, CLEAN-CUT APPEARANCE WHEN COMPLETED. ANY PART OR PARTS NOT MEETING THIS REQUIREMENT SHALL BE REPLACED OR REBUILT WITHOUT EXTRA EXPENSE TO OWNER.

13. WIRING METHODS: THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE GENERAL LOCATIONS OF EQUIPMENT AND ARRANGEMENT OF CIRCUITS ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY ACTUAL MEASUREMENT AT THE SITE. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL RISES, DROPS, OFFSETS, ETC. NECESSARY TO AVOID CONFLICT WITH EXISTING UTILITY LINES AND SIMILAR ITEMS, WHEN INSTALLING ELECTRICAL CONDUITS. INSTALL EXPOSED CONDUIT AS SHOWN OR NOTED, PARALLEL TO HORIZONTAL AND VERTICAL LINES OF SITE. MAKE BENDS WITH 90 DEGREE TURN MAXIMUM, OR WITH APPROVED FITTINGS.

14. CONDUIT: FURNISH A COMPLETE RACEWAY SYSTEM FOR, BUT NOT LIMITED TO, FEEDER, BRANCH CIRCUITS, CONTROL WIRING AND AUXILIARY SYSTEM WIRING. RACEWAY SYSTEMS INSTALLED SHALL BE APPROVED FOR OUTDOOR.
   A. USE LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS WHERE THE EQUIPMENT IS SUBJECT TO MOVEMENT OR LOCATED OUTDOORS.
   B. USE OF EMT IS NOT PERMITTED. USE PVC COVERED RIGID GALVANIZED CONDUIT FOR ALL EXPOSED OUTDOOR LOCATIONS.
   C. WHERE ENTERING THE PANELS, PULL BOXES, J-BOXES OR OUTLET BOXES, RACEWAY SHALL BE SECURED IN PLACE WITH LOCK-NUTS INSIDE AND OUTSIDE, AND INSULATED BUSHING INSIDE.
   D. BENDS AND OFFSETS MADE WITH APPROVED TOOLS ONLY. BENDS OR OFFSETS IN WHICH THE PIPE IS CRUSHED OR DEFORMED SHALL NOT BE INSTALLED.
   E. WHERE NOT EMBEDDED IN CONCRETE OR MASONRY, RACEWAY SHALL BE FIRMLY SECURED BY APPROVED CLAMPS, STRAPS OR HANGERS.
   F. USE COMPRESSION TYPE FITTINGS. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
   G. USE PVC CONDUIT FOR INSTALLATION UNDERGROUND.

15. OUTLET AND JUNCTION BOXES: FURNISH AND INSTALL ALL JUNCTION BOXES REQUIRED TO FACILITATE INSTALLATION OF VARIOUS CONDUIT SYSTEMS. BOXES SHALL BE APPROVED FOR INTENDED USE AND APPLICATIONS. BOXES SHALL BE 2-1/2" MINIMUM DEPTH. SWITCH BOXES ARE NOT ALLOWED.

16. WIRE AND CABLE:
   A. ALL WIRE AND CABLE SHALL BE OF SOFT DRAWN, ANNEALED, COPPER HAVING A CONDUCTIVITY OF NOT LESS THAN 98% OF THAT OF PURE COPPER; UNIFORM IN CROSS SECTION AND FREE FROM FLAWS, SCALES AND OTHER IMPERFECTIONS.
   B. ACCEPTABLE MANUFACTURERS: AMERICAN INSULATED WIRE CORP., TRIANGLE, GENERAL ELECTRIC, OKONITE OR ANACONDA.
   C. DO NOT USE SOLID CONDUCTORS.
   D. ALL WIRE AND CABLE SHALL NOT BE PULLED INTO A CONDUIT UNTIL ALL WORK WHICH MAY CAUSE INJURY IS COMPLETE. WHERE TWO (2) OR MORE CIRCUITS RUN TO A SINGLE OUTLET BOX, TAG EACH CIRCUIT.
   E. ALL WIRE AND CABLE SHALL HAVE ALL STRANDED CONDUCTORS FURNISHED WITH COPPER CONNECTING LUGS, SIZED FOR THE FULL DIAMETER OF THE BARE CONDUCTORS. MAINS AND FEEDERS SHALL BE RUN THEIR ENTIRE LENGTH IN CONTINUOUS PIECES WITHOUT JOINTS OR SPLICES.
   F. PROVIDE CABLE DESIGNATED AS THWN/THHN OR XHHW SINGLE CONDUCTOR TYPE AND UL 83 AND UL 1063 LISTED, RATED 600 VOLTS AND CERTIFIED FOR CONTINUOUS OPERATION AT MAXIMUM CONDUCTOR TEMPERATURE OF 90°C IN DRY LOCATIONS AND 75°C IN WET LOCATIONS WHILE INSTALLED IN UNDERGROUND DUCT, CONDUIT OR IN CONTROL PANELS (MTW).
   G. PROVIDE CONDUCTORS WHICH ARE CLASS B, CONCENTRIC STRANDED, ANNEALED UNCOATED COPPER WITH PHYSICAL AND ELECTRICAL PROPERTIES COMPLYING WITH ASTM B3 AND B8 AND OF ICEA S-95-658/NEMA WC70.
   H. EACH CONDUCTOR SHALL BE PVC INSULATED AND NYLON JACKETED TO MEET THE REQUIREMENTS OF ICEA S-95-658/NEMA WC70. THE INSULATION THICKNESS SHALL MATCH THE DIMENSIONS LISTED IN NEC TABLE 310.13 FOR TYPE THHN AND THWN WIRE.
   I. TERMINAL LUGS AND CONNECTORS ON BUSBARS FOR ALL SIZES OF CONDUCTORS SHALL BE COMPRESSION CRIMP-ON TYPE.
   J. FOR SIZE 1/0 AWG AND LARGER, CRIMP-ON LUGS SHALL HAVE THE LONG BARREL WITH 2-HOLE COMPRESSION CRIMP-ON TYPE EXCEPT IN PLACES WHERE TERMINATION SPACE IS LIMITED.

17. IDENTIFICATION OF CONDUCTORS AND PANELBOARD ELEMENTS:
   A. EACH AND EVERY MAIN AND FEEDER CONDUCTOR SHALL BE IDENTIFIED AT EACH OUTLET POINT WHERE SUCH CONDUCTOR TERMINATES. FEEDER BUNDLES PASSING THROUGH A JUNCTION OR SUPPORT BOX SHALL ALSO BE IDENTIFIED WITHIN SUCH ENCLOSURE, BUT MAY BE IDENTIFIED IN SUCH LOCATIONS AS A GROUP.
   B. IDENTIFY BY USE OF PERMANENT TYPE BANDS, BRADY OR T AND B. A DEFINITE NUMBER AND/OR LETTER CODE SHALL BE EMPLOYED AND BE UNIFORM THROUGHOUT EACH CONDUCTOR.
   C. IDENTIFY EACH SWITCH, INCLUDING MAIN DISCONNECT WITH WHITE-ON-BLACK NAMEPLATE, EACH HAVING 1/4" HIGH LETTERS. NEATLY AND SECURELY ADHERE NAMEPLATES TO THE UNIT.

18. SWITCHES: FURNISH AND INSTALL ALL FUSIBLE AND NON-FUSIBLE SWITCHES AS REQUIRED BY CODES, WHETHER OR NOT SHOWN AND/OR NOTED. SWITCHES SHALL BE:
   A. HEAVY DUTY WITH NEMA 1 OR 3R ENCLOSURE, AS REQUIRED, AND BE PROVIDED WITH PAD-LOCKING FEATURE.
   B. SWITCH MANUFACTURER SHALL BE GE, CUTLER-HAMMER OR SQUARE D.
   C. CIRCUIT BREAKER: MOLDED CASE, BOLTED TYPE QUICK MAKE, QUICK BRAKE. CIRCUIT BREAKERS SHALL BE MANUFACTURED BY THE SAME MANUFACTURER AS THE PANELBOARD.
   D. IDENTIFY EACH DEVICE WITH NAMEPLATE SHOWING THE SOURCE TAG NUMBER, MATCHING THE EXISTING NAMEPLATES,

19. WIRING DEVICES: FURNISH AND INSTALL ALL WIRING DEVICES AS INDICATED ON THE DRAWINGS. DEVICES FURNISHED SHALL IN ALL CASES BE SUITABLE FOR THE USE INTENDED AND SHALL HAVE VOLTAGE AND CURRENT RATINGS ADEQUATE FOR THE LOADS TO BE SERVED.
   A. MOUNTING: HEIGHTS OF ALL DEVICES ARE FROM FINISH SURFACE TO BOTTOM OF DEVICE.
   B. CONVENIENCE OUTLETS: SHALL BE GROUNDING TYPE, 20 AMP, 125 VOLT, LEVITON IVORY COLOR. WEATHERPROOF DUPLEX OUTLETS SHALL BE AS SPECIFIED ON THE DRAWINGS. PROVIDE NEMA 5-20R DEVICES UNLESS OTHERWISE NOTED.
   C. ACCEPTABLE MANUFACTURERS: SHALL BE HUBBELL, P&S LEVITON AND BRYANT. ONE (1) MANUFACTURER SHALL BE USED THROUGHOUT THE WORK.
   D. INSTALL WIRING DEVICES AND ACCESSORIES PLUMB AND LEVEL, IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, APPLICABLE REQUIREMENTS OF NEC AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO FULFILL PROJECT REQUIREMENTS,
   E. TIGHTEN CONNECTORS AND TERMINALS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S PUBLISHED TORQUE VALVES FOR WIRING DEVICES.
   F. COORDINATE AS NECESSARY TO INTERFACE INSTALLATION OF WIRING DEVICES WITH OTHER WORK.
   G. INSTALL WIRING DEVICES AFTER WORK IS COMPLETED. INSTALL ONLY IN ELECTRICAL BOXES THAT ARE CLEAN, FREE FROM EXCESS BUILDING MATERIALS, DIRT AND DEBRIS. INSTALL COVER PLATES AFTER ALL TESTING IS COMPLETED.
   H. INSTALL RECEPTACLES WITH GROUND PIN DOWN.
   I. ALL EXTERIOR DEVICES TO BE WEATHERPROOF AND ALL RECEPTACLES SHALL BE GFCI TYPE DEVICES.

20. PANELBOARDS: PANELBOARDS SHALL BE GE TYPE AQ, OR APPROVED EQUAL. REFER TO CONSTRUCTION DOCUMENTS FOR THE SIZE AND NUMBER OF BRANCH CIRCUIT BREAKERS. ALL PANELBOARD BUSSING SHALL BE COPPER. PANELBOARDS SHALL BE IN OUTDOOR ENCLOSURE WHERE INSTALLED OUTDOOR. MINIMUM INTERRUPTING RATING FOR PANELS SHALL BE 22,000A. PANELBOARDS SHALL HAVE PRINTED DIRECTORY CARDS IN A METALLIC HOLDER TACK WELDED TO THE INSIDE FACE OF THE PANELBOARD DOOR. PANELBOARD DOORS SHALL BE LOCKING TYPE. DIRECTORY CARDS SHALL SHOW ACTUAL LOAD AND LOCATION.

21. GROUNDING: ALL CONDUIT WORK, LIGHTING AND OTHER ELECTRICAL EQUIPMENT WIRED AND CONNECTED BY THIS CONTRACTOR SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN FULL ACCORDANCE WITH NEC 250. USE THE EXOTHERMIC WELDING PROCESS FOR BELOW-GRADE GROUNDING CONNECTIONS, EXCEPT AT GROUND RODS. USE MECHANICAL CONNECTORS OR THERMAL CONNECTIONS FOR ABOVE-GRADE GROUNDING CONNECTIONS AS SHOWN ON THE DRAWINGS.

22. OTHER MATERIALS: FURNISH AND INSTALL ALL OTHER MATERIALS SUCH AS HARDWARE, TAPE, CLAMPS, CONNECTORS, FITTINGS, SUPPORTS AND ALL OTHER APPURTENANCES REQUIRED TO COMPLETE THE WORK TO THE FULL INTENT OF THE CONTRACT. TERMINAL LUGS SHALL BE FURNISHED BY ELECTRICAL CONTRACTOR.

23. LUMINARIES: FURNISH AND INSTALL NEW LUMINARIES AS SHOWN ON PLANS. REFER TO LANDSCAPE ARCHITECT DRAWINGS FOR EXACT LOCATION OF LUMINARIES.

24. TESTS:
   A. TESTS SHALL BE CONDUCTED IN ACCORDANCE WITH NETA ACCEPTANCE TESTING SPECIFICATIONS, ICEA AND NEMA PB-1.
   B. OWNER AND ENGINEER SHALL BE GIVEN REASONABLE ADVANCE NOTICE TO WITNESS AT HIS/HER DISCRETION ALL INSPECTIONS, CHECKS, ADJUSTMENTS, CALIBRATIONS AND TESTS REQUIRED BY THIS SPECIFICATION. THE RESULTS, READINGS, SETTINGS, MEASUREMENTS AND DATA OF ALL INSPECTIONS, CHECKS, ADJUSTMENTS, CALIBRATIONS AND TESTS SHALL BE RECORDED BY THE CONTRACTOR AND SUBMITTED TO ENGINEER.
   C. SUBMIT FOUR (4) COPIES OF CERTIFIED TEST RESULTS FOR APPROVAL.
   D. CONDUCT A THERMOGRAPHIC TEST OF THE PANELBOARD(S) AND ALL OTHER ELECTRICAL POWER DISTRIBUTION APPARATUS USING AN INFRARED TEMPERATURE-SCANNING DEVICE. THE TEST SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY. CONNECTIONS INDICATING HIGHER TEMPERATURE LEVELS THAN ARE ACCEPTABLE SHALL BE TIGHTENED OR CORRECTED AS REQUIRED TO ELIMINATE THE ABNORMAL CONDITION.
   E. CONDUCT AND DOCUMENT THE THERMOGRAPHIC TEST BETWEEN FOUR (4) AND SIX (6) MONTHS OF BENEFICIAL OCCUPANCY OF THE PROJECT AND COMPLETE ALL CORRECTIONS OF ABNORMAL CONDITIONS PRIOR TO COMPLETION OF THE FIRST YEAR OF THE WARRANTY PERIOD.

25. AT COMPLETION OF WORK, PROVIDE OWNER WITH A SET OF RECORD DRAWINGS PER CITY OF HOUSTON REQUIREMENTS.

No.	DATE	REVISIONS	APP.

14_10-01

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STATE OF TEXAS
GOLDMAN BUTLER, III
49855
REGISTERED
PROFESSIONAL
ENGINEER

1 OCTOBER 2014

TBPE FIRM NO. F-3446

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HOUSTON, TEXAS 77215
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Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

ELECTRICAL SPECIFICATIONS

LE2.03

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT:	
HORZ:	
SHEET: 200 OF 226	

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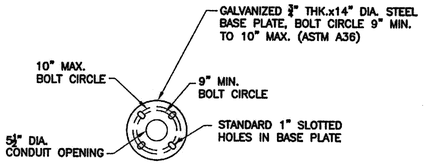
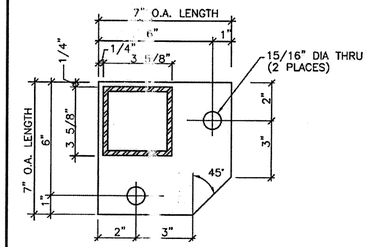
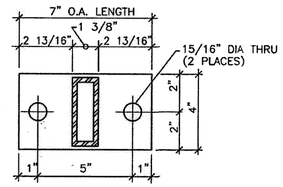


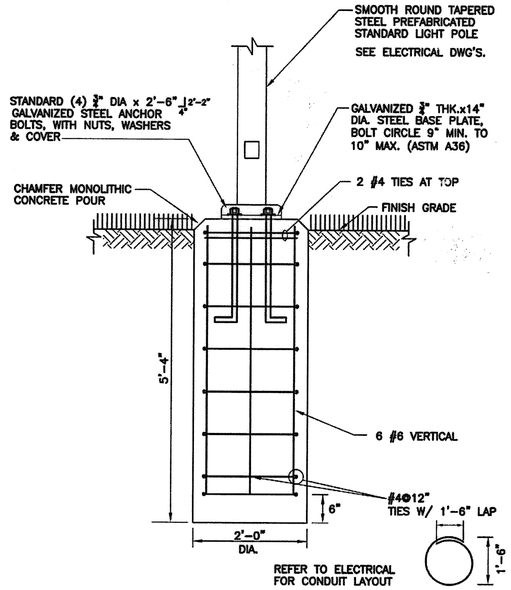
2 / 201 **BASE PLATE DETAIL**
SCALE: 3/4"=1'-0"



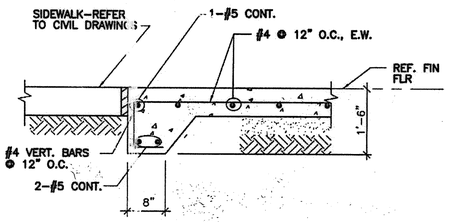
6 / 201 **ALUMININUM PLATE**
SCALE: 3"=1'-0"



7 / 201 **ALUMININUM PLATE**
SCALE: 3"=1'-0"



1 / 201 **LIGHT POLE DETAIL**
SCALE: 3/4"=1'-0"



5 / 201 **SECTION**
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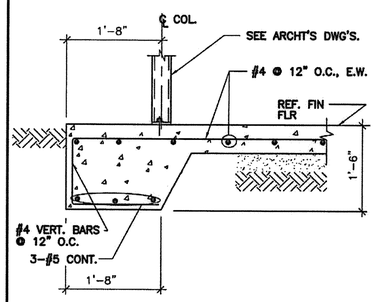
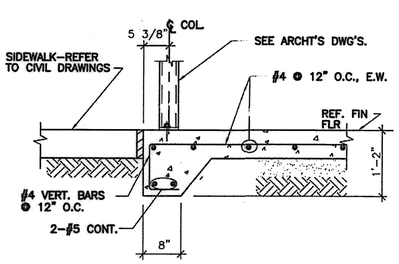


3 / 201 **SECTION**
SCALE: 3/4"=1'-0"



4 / 201 **SECTION**
SCALE: 3/4"=1'-0"

GENERAL NOTES:

THE CONTRACT DOCUMENTS ARE BASED ON THE REQUIREMENTS OF 2012 INTERNATIONAL BUILDING CODE (IBC) WITH CITY OF HOUSTON ADDENDA AND AMENDMENTS IN FORCE AT THE DATE OF THESE DOCUMENTS UNLESS NOTED OTHERWISE.

DESIGN LIVE LOADS

WIND ..... 110 M.P.H. @ 3 SEC GUST

UPLIFT ..... 25 P.S.F.

CONCRETE

THE 28 DAY CONCRETE COMPRESSIVE STRENGTH SHALL BE 3000 P.S.I.

FOOTINGS – 3000 P.S.I.
SLAB–ON–GRADE – 3000 P.S.I.
GRADE BEAMS – 3000 P.S.I.

THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS. ALL CONSTRUCTION JOINTS SHALL BE MADE IN THE CENTER OF SPANS WITH VERTICAL BULKHEADS. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS SHALL BE SPECIFIED BY THE ENGINEER.

REINFORCING STEEL

ALL REINFORCING STEEL SHALL BE GRADE 60 AND SHALL CONFORM TO THE ASTM SPECIFICATIONS A 615. DETAILING OF REINFORCING STEEL SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE DETAILING MANUAL. PROVIDE 1–# 4 x 3'–0"Γ TOP AND BOTTOM IN EXTERIOR FACE OF GRADE BEAMS AT CORNERS. WELDED WIRE FABRIC SHALL CONFORM TO ASTM SPECIFICATION A185, (FLAT SHEETS ONLY). PROVIDE PLASTIC BAR CHAIRS AT 3' – 0" MAXIMUM CTRS. EACH WAY FOR ALL TOP REINFORCING FOR SLABS–ON–GRADE. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS AS FOLLOWS: @ MID SPAN ONLY. HORIZONTAL WALL STEEL SHALL BE CONTINUOUS WITH 90° BENDS AND 12" RETURNS ALONG EACH WALL AT CORNERS, OR PROVIDE 4'–0"Γ CORNER BARS EACH FACE.

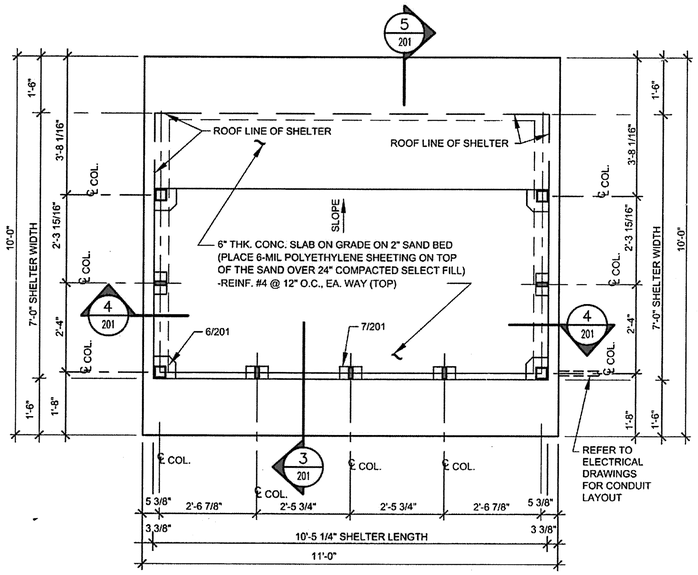
GRADE BEAMS – 1 1/2" TOP, 3" BOTTOM, 2" SIDES
SLAB–ON–GRADE – 1 1/2" (TOP)

REPRODUCTION NOTE

THE USE OF ELECTRONIC FILES OR REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREON AS CORRECT, AND OBLIGATES HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HEREON.

FOUNDATION NOTES:

1. THE SUBSURFACE INFORMATION AND FOUNDATION DESIGN ARE PARTIALLY BASED ON GEOTECHNICAL INVESTIGATION AND FOUNDATION RECOMMENDATIONS REPORT NO. G153–10 FINAL, PREPARED BY AVILES ENGR'G CORP, 5790 WINDFERN, HOUSTON, TEXAS 77041 DATED FEBRUARY 2, 2013. THE CONTRACTOR SHALL PERFORM BACKFILL AND EXCAVATIONS, SLAB CONSTRUCTION AND PREPARATION OF THE SUBGRADE UNDER THE SLAB–ON–GRADE IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE PROJECT SPECIFICATIONS.
2. THE FOUNDATION HAD BEEN DESIGNED FOR THE FOLLOWING ALLOWABLE SOIL BEARING PRESSURES AT A DEPTH OF APPROXIMATELY 4'–0" BELOW EXISTING GROUND SURFACE.
3. LIGHT POLE FOUNDATION 5'–0" BELOW EXISTING GRADE=.....2,000 P.S.F.
   WELL COMPACTED SELECT FILL 2'–0" BELOW EXISTING GRADE=.....1,000 P.S.F.
4. FOUNDATION CONDITIONS NOTED DURING CONSTRUCTION WHICH DIFFER FROM THOSE DESCRIBED IN THE GEOTECHNICAL INVESTIGATION SHALL BE REPORTED TO THE ENGINEER BEFORE FURTHER CONSTRUCTION IS ATTEMPTED.
5. ALL EXCAVATIONS SHALL BE CARRIED OUT WHEN DRY, AND PROVISIONS SHALL BE MADE TO PREVENT THE BOTTOM OF ALL EXCAVATIONS FROM FREEZING OR FLOODING AT ALL TIMES.
6. ALL FOUNDATIONS SHALL BE CONSTRUCTED IN EXCAVATIONS FREE OF STANDING WATER.
7. BACKFILL MATERIAL, PLACING AND COMPACTION OF BACKFILL SHALL BE IN ACCORDANCE WITH THE DRAWINGS AND THE CONTRACT SPECIFICATIONS.



SHELTER FOUNDATION FRAMING PLAN

SCALE: 1/2" = 1'-0"

NOTE:
REFER TO ARCHT'S AND MANUFACTURER'S DRAWINGS FOR BARREL VAULT SHELTER AND LOCATION.

N

BENCHMARK:

CITY OF HOUSTON SURVEY MARKER STAMPED 4958/7710 LOCATED AT EAST SIDE OF LUMPKIN RD., 110 FEET SOUTHWEST OF LARSTON DR. INTERSECTION IN KEYMAP 449Z ELEV.=82.18 FEET (NAVD 88\GEOID03).

No.	DATE	REVISIONS	APP.

N

14_10_01 10:38:39 AM

CHARLES D. GOODEN 35488 REGISTERED PROFESSIONAL ENGINEER

1 OCTOBER 2014

CHARLES D. GOODEN CONSULTING ENGINEERS, INC.
TEXAS BOARD OF PROFESSIONAL ENGINEERS F-4176
2320 HOLMES ROAD, SUITE A
HOUSTON, TEXAS 77051
(713) 650-6905

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-TI7000-0012-3
SHELTER FOUNDATION
FRAMING PLAN AND DETAILS

LS1.00

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ: AS-NOTED
SHEET: 201 OF 226

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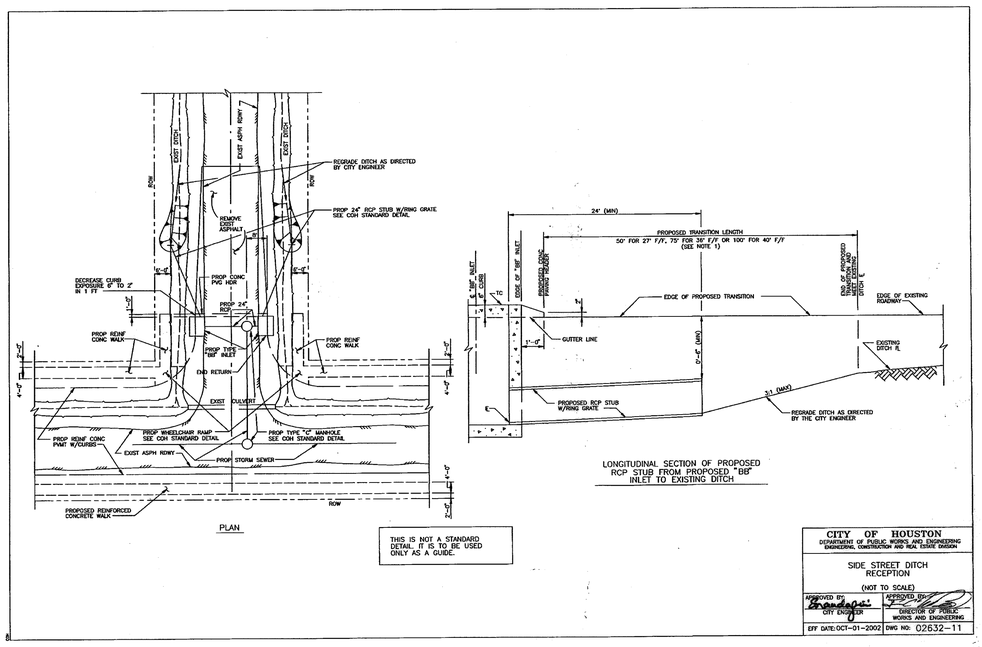
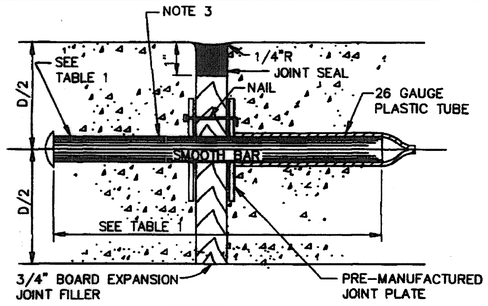


THIS IS NOT A STANDARD DETAIL. IT IS TO BE USED ONLY AS A GUIDE.

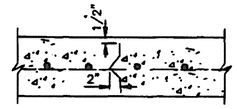
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SIDE STREET DITCH RECEPTION
(NOT TO SCALE)

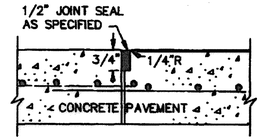
APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02632-11



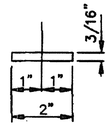
SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S



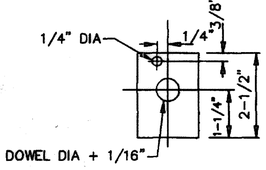
SECTION
DEFORMED METAL STRIP
N.T.S.



SECTION
CONSTRUCTION JOINT SEAL
N.T.S.



PLAN – JOINT PLATE



ELEVATION – JOINT PLATE
N.T.S.

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS. UNITS TO BE SPACED ON 12" CENTERS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE BASE. EXTEND THICKENED CONCRETE AS NEEDED TO MAINTAIN 3" MIN. COVER.
5. CITY OF HOUSTON APPROVED PRODUCTS MAY BE USED AS JOINT PLATE ALTERNATIVE

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
6	3/4	18	12
7	1	18	12
8	1	18	12
9	1 1/4	18	12
10	1 1/4	18	12
11	1 1/4	18	12
12	1 1/4	18	12

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

PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)

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

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PAVEMENT DETAILS

SHEET 1 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET: 202 OF 226

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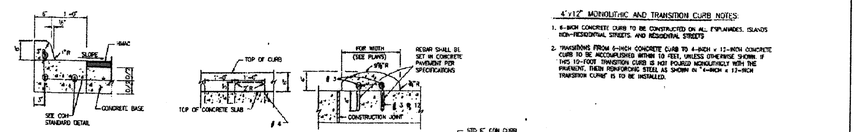


ESPLANADE CURB CONNECTED TO CONCRETE BASE

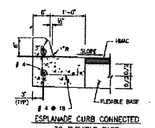
ALTERNATE CONCRETE CURB REINFORCEMENT

MOUNTABLE CURB

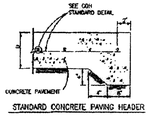
4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS NON-HORIZONTAL STREETS, AND RESIDENTIAL STREETS.

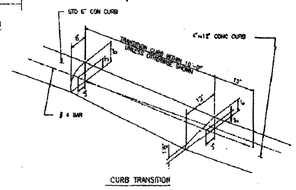
2. TRANSITIONS FROM 6-INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FOOT TRANSITION CURB IS NOT POURED MONOLITHICALLY WITH THE PAVEMENT, THEIN REINFORCING STEEL AS SHOWN IN "4-INCH x 12-INCH TRANSITION CURB" IS TO BE INSTALLED.



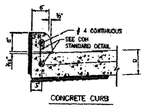
ESPLANADE CURB CONNECTED TO FLEXIBLE BASE



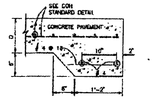
STANDARD CONCRETE PAVING HEADER



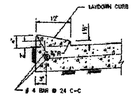
CURB TRANSITION



CONCRETE CURB

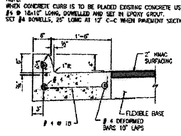


STANDARD RAILROAD HEADER

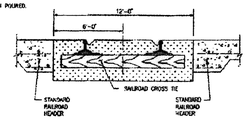


4-INCH x 12-INCH MONOLITHIC CURB

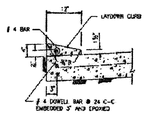
NOTE:
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE
#5 @ 16±1/2" LONG, DOWELLED AND SET IN EPOXY GROUT.
SET #4 DOWELS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



MONOLITHIC CURB AND GUTTER

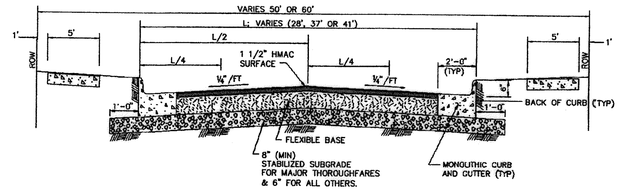


STANDARD RAILROAD CROSSING - SINGLE TRACK



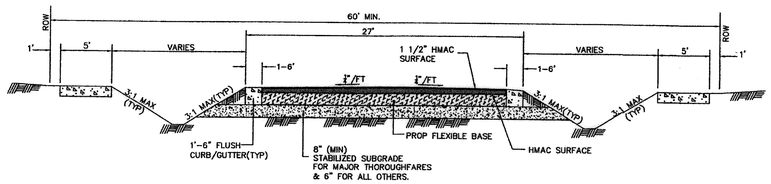
4-INCH x 12-INCH LAYDOWN CURB

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
CURB, CURB AND GUTTER AND HEADER DETAILS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE:JULY-01-2009	DWG NO: 02771-01



FLEXIBLE BASE PAVEMENT - CURB & GUTTER SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

NOTE:
FLEXIBLE BASE SHALL BE:
ALTERNATES: 1. 6" (MIN) HOT MIX ASPHALTIC CONCRETE.
2. 8" (MIN) CRUSHED CONCRETE.



FLEXIBLE BASE PAVEMENT - DITCH SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

NOTE:
FLEXIBLE BASE SHALL BE:
ALTERNATES: 1. 6" (MIN) HOT MIX ASPHALTIC CONCRETE.
2. 8" (MIN) CRUSHED CONCRETE.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
HOT-MIX ASPHALTIC CONRETE PAVEMENT DETAILS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02741-01

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
9-5-2019

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PAVEMENT DETAILS

SHEET 2 OF 3

CITY OF HOUSTON -
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 203 OF 226	

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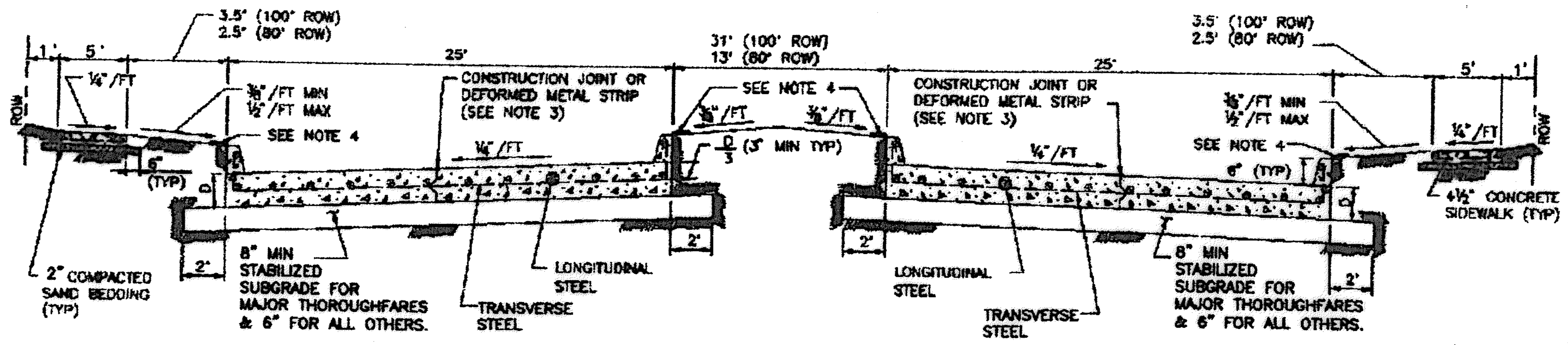

TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".

2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.

3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.

4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.

5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.

6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FEET WIDE SIDEWALK.

TABLE 1

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

PAVEMENT THICKNESS D (IN)	PAVEMENT WIDTH (FT)	LONGITUDINAL STEEL # 4 BARS NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	# 5 BARS NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	# 6 BARS NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	TRANSVERSE STEEL # 4 BARS SPACING (IN)	# 5 BARS SPACING (IN)	# 6 BARS SPACING (IN)
6	28	17	20.50	4	–	–	–	–	–	–	38	–	–
7	25	17	18.25	4	–	–	–	–	–	–	38	–	–
7	35	24	18.00	3	–	–	–	–	–	–	38	–	–
7	36	25	17.75	3	–	–	–	–	–	–	38	–	–
7	37	25	18.25	3	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3	–	–	–	–	–	–	38	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	38	–	–
8	25	20	15.50	2.75	13	24.50	3	–	–	–	38	36	–
8	34	27	15.50	2.5	17	25.00	4	–	–	–	38	38	–
8	35	27	16.00	2	18	24.25	4	–	–	–	38	38	–
8	38	28	15.75	3.25	18	25.00	3	–	–	–	30	38	–
8	44	34	15.75	4	22	24.75	4	–	–	–	30	38	–
8	45	35	15.75	2.25	23	24.25	3	–	–	–	30	36	–
9	25	22	14.00	3	14	22.50	4	–	–	–	38	38	–
9	34	31	13.50	2	19	22.25	3.5	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.5	–	–	–	30	38	–
9	38	32	13.75	3	21	21.25	3.5	–	–	–	30	36	–
9	44	38	13.75	2.75	25	21.75	3	–	–	–	24	38	–
9	45	39	14.00	4	26	21.25	4.5	–	–	–	24	38	–
10	25	24	12.75	3.5	17	18.25	4	–	–	–	38	38	38
10	34	33	12.50	4	21	20.00	4	–	–	–	30	38	38
10	35	34	12.50	3.75	23	18.75	4	–	–	–	30	38	38
10	38	38	12.50	3.5	24	18.50	3	–	–	–	30	38	36
10	44	44	12.00	4	28	18.50	4.5	–	–	–	24	38	38
10	45	44	12.50	3	28	19.00	3	–	–	–	24	36	38
11	25	27	11.25	3	17	18.25	4	12	26.75	3	38	36	36
11	34	36	11.50	2.75	24	17.50	2.5	17	25.00	4	24	38	38
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11	38	40	11.00	2	25	17.75	3	17	26.50	4	24	36	38
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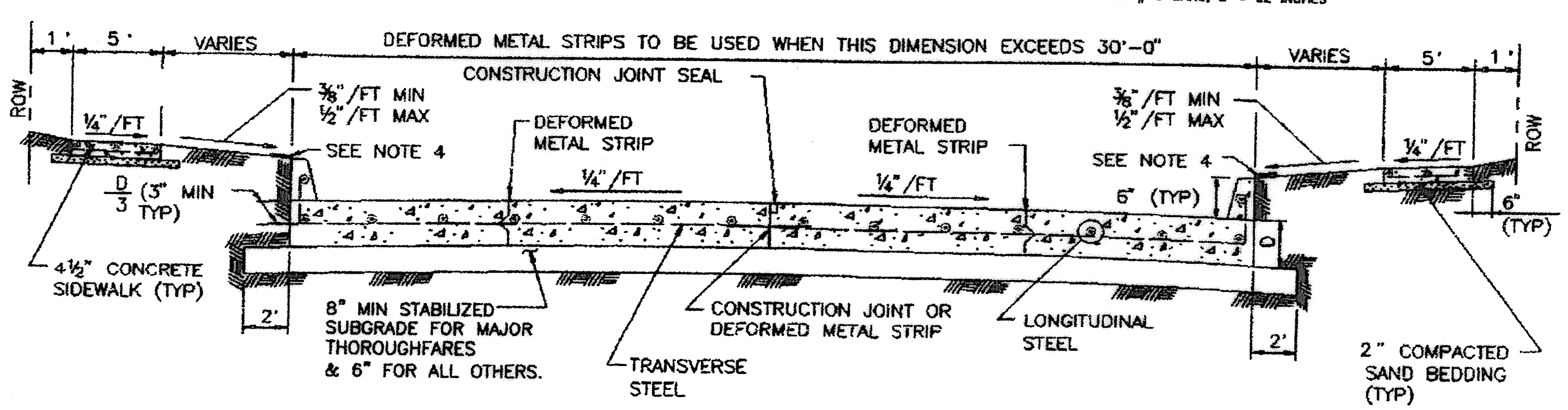
11	45	49	11.125	3	31	17.75	4	22	25.50	3	24	38	38
12	25	–	–	–	19	18.25	4	13	24.50	3	36	36	36
12	34	–	–	–	26	18.00	4	18	23.50	4	24	38	38
12	35	–	–	–	28	18.50	4	19	23.00	3	24	38	38
12	38	–	–	–	27	18.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	18.25	4	24	22.50	5	24	30	38
12	45	–	–	–	35	15.75	3	25	22.25	3	24	30	36

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



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONCRETE PAVEMENT DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

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

STATE OF TEXAS MUHAMMAD M ALI, P.E. 98146 LICENSED PROFESSIONAL ENGINEER 9-15-2014
Lockwood, Andrews & Newnam, Inc. Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PAVEMENT DETAILS

SHEET 3 OF 3

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET: 204 OF 226

No.	DATE	REVISIONS	APP.

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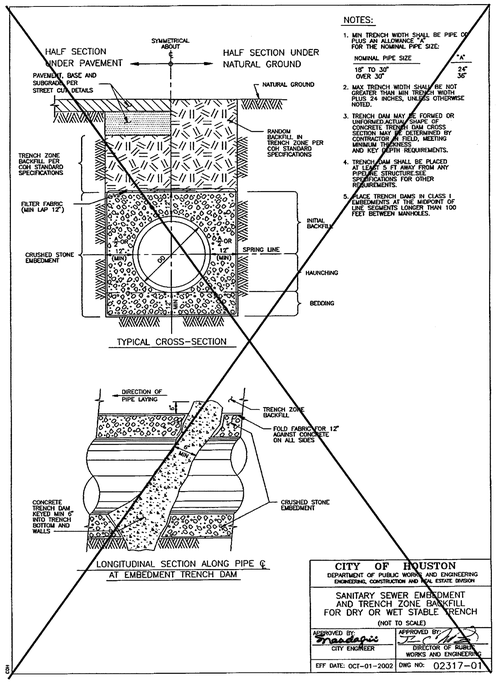


NOTES:

1. MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

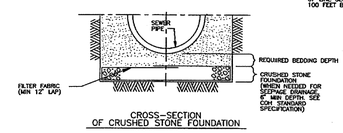
NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

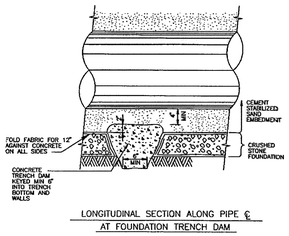
2. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
3. TRENCH DAM MAY BE FORMED OR UNFORMED ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
4. TRENCH DAM SHALL BE PLACED AS CLOSE AS 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.

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

SANITARY SEWER EMBEDMENT AND TRENCH ZONE BACKFILL FOR DRY OR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002
DWG NO: 02317-01





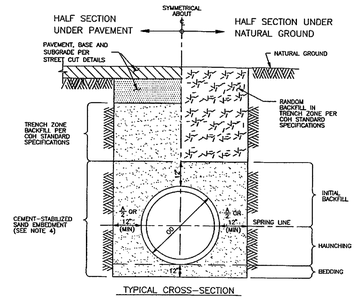
NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, OR OTHER CLASS I EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.

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

SANITARY OR STORM SEWER CRUSHED STONE FOUNDATION FOR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002
DWG NO: 02317-02



NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

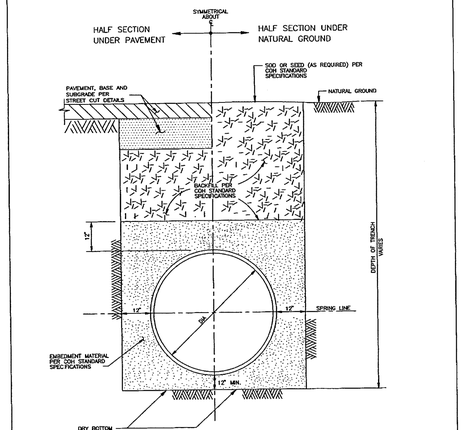
NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

3. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS.

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

SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
(NOT TO SCALE)

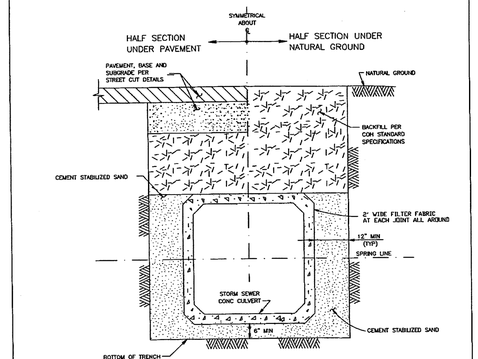
APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002
DWG NO: 02317-03



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

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: OCT-01-2002
DWG NO: 02317-04



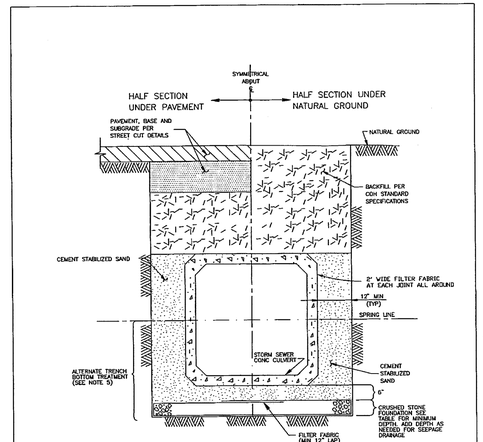
NOTES:

1. WHERE MULTIPLE BOX SEWERS ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPARATION SHALL BE 6".
2. SUBGRADE AND PAVEMENT PER STREET CUT DETAILS - 02951

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

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002
DWG NO: 02317-05



NOTES:

1. WHERE MULTIPLE BOX SEWERS ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPARATION SHALL BE 6".
2. ALTERNATE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY ENGINEER AND AS PAID FOR IN THE PROPOSAL.

CULVERT SIZE (FT)	FOUNDATION DEPTH (IN)
3' x 2' TO 6' x 6'	12
6' x 6' AND LARGER	18

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

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002
DWG NO: 02317-06

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

EXCAVATION, BEDDING, AND BACKFILL DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET: 205 OF 226

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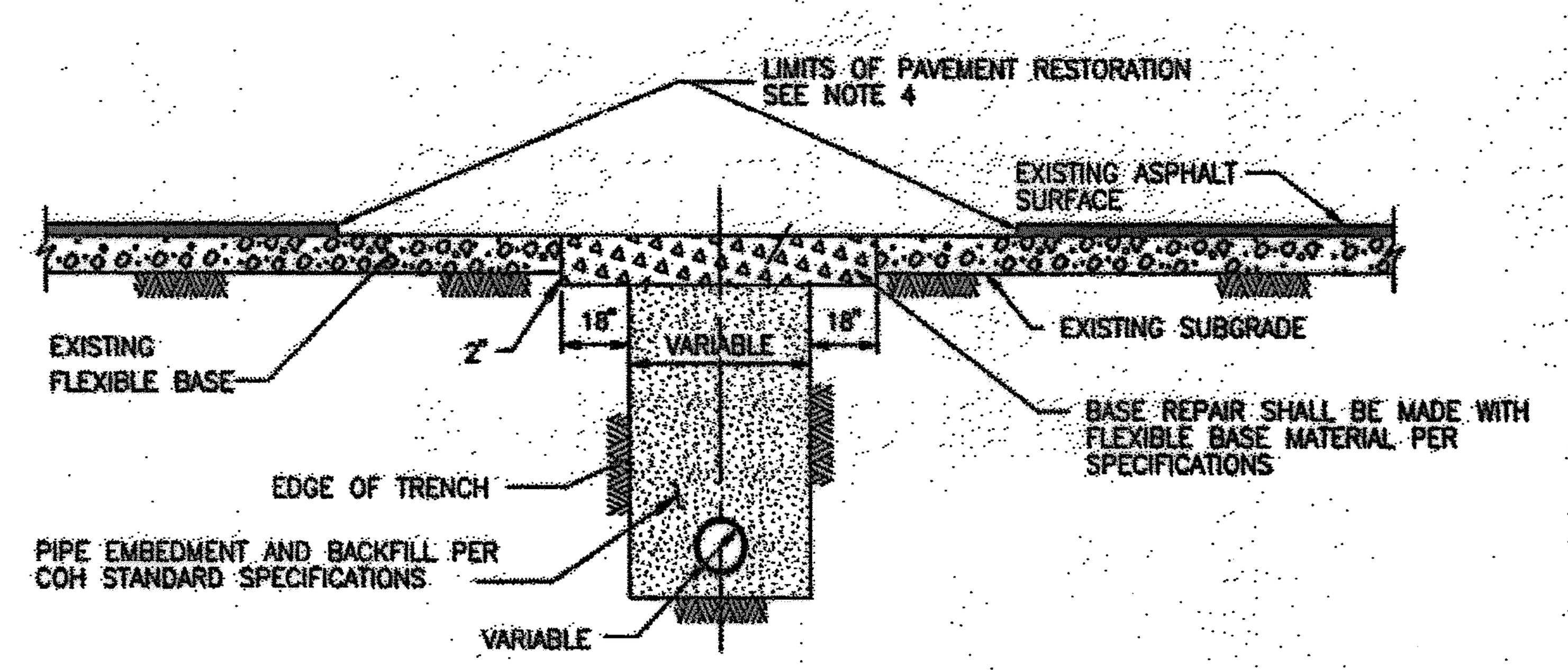
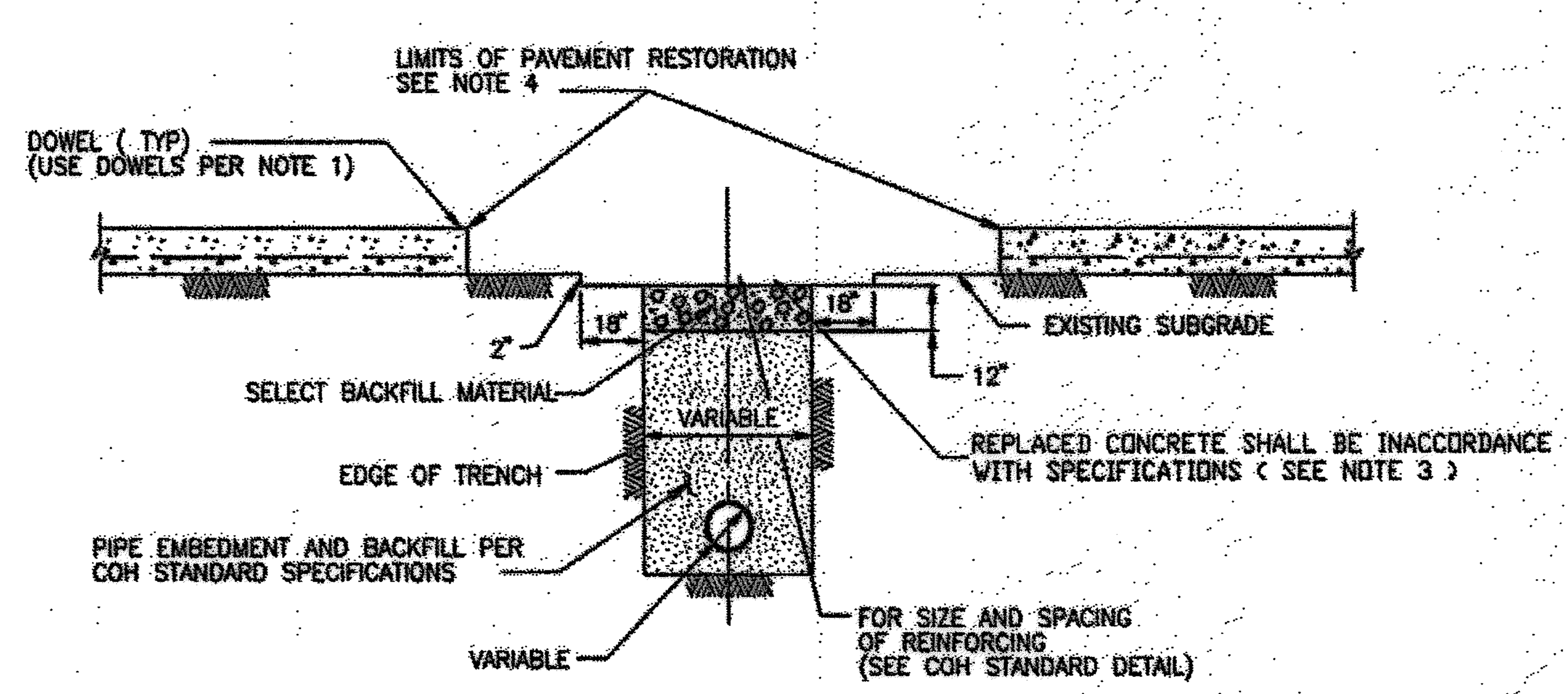


SECTION (A)

REPAIR OF FLEXIBLE BASE PAVEMENT



SECTION (B)

REPAIR OF REINFORCED CONCRETE PAVEMENT

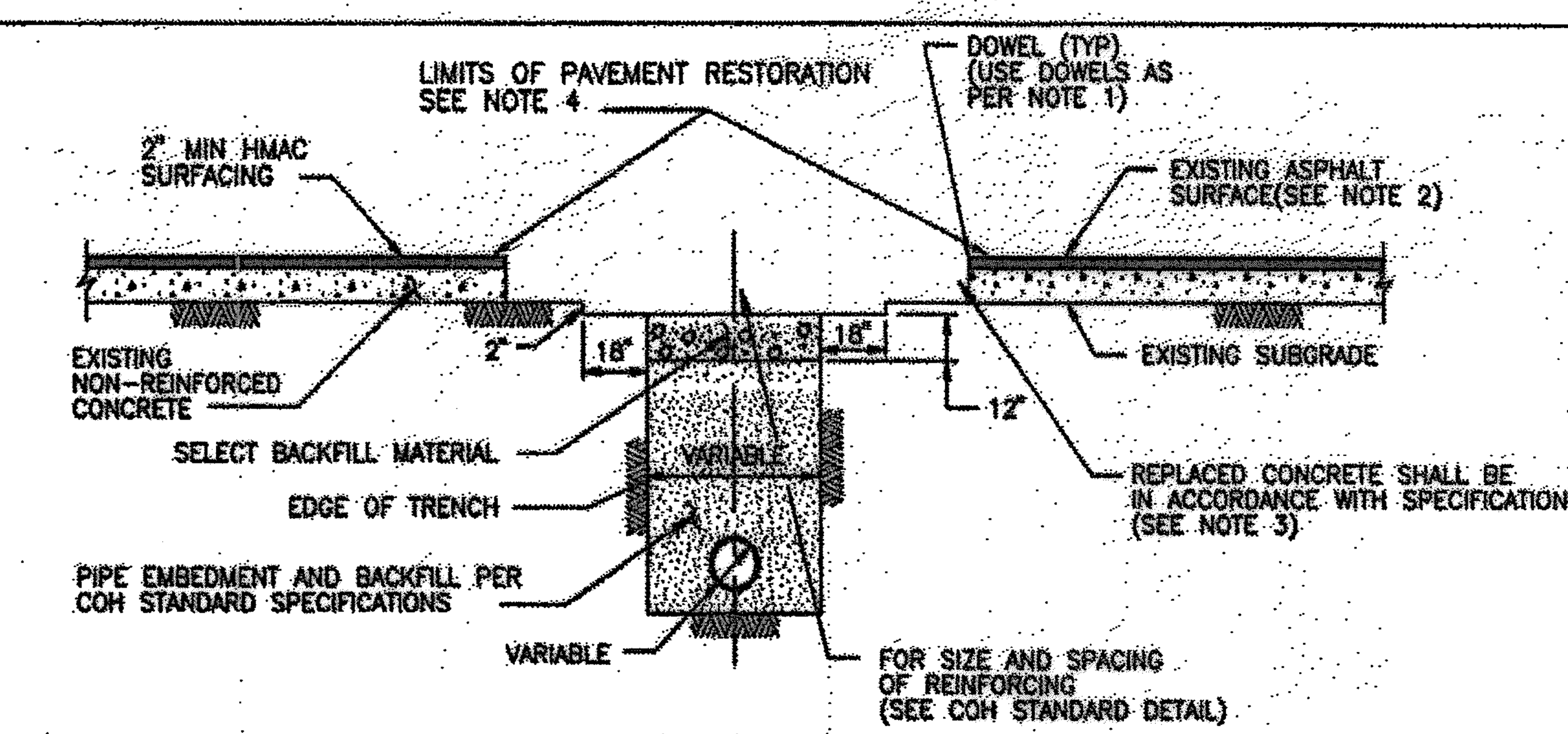
NOTE:

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

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

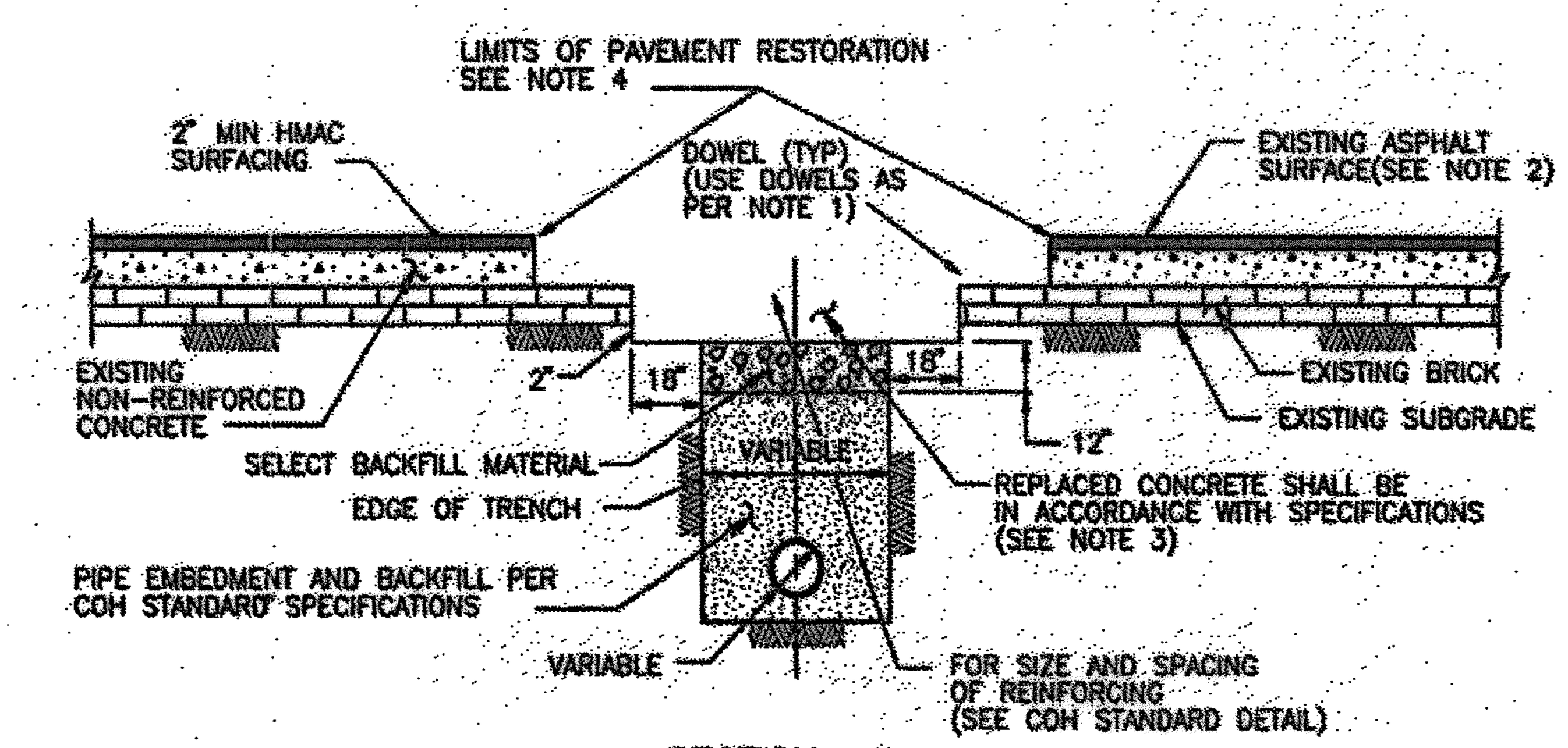
PAVEMENT REPAIR DETAILS FOR STREET CUTS
(NOT TO SCALE)

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



SECTION (C)

REPAIR OF NON-REINFORCED CONCRETE PAVEMENT



SECTION (D)

REPAIR OF NON-REINFORCED CONCRETE PAVEMENT WITH BRICK

NOTE:

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

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

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

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

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

PAVEMENT REPAIR DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 206 OF 226	

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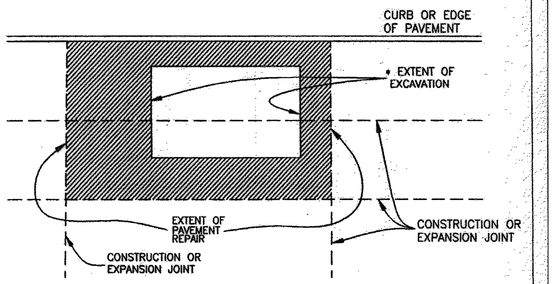
CONCRETE PAVEMENT RESTORATION

AGE OF PAVEMENT LESS THAN OR EQUAL TO 5 YEARS



NOTES:

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

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

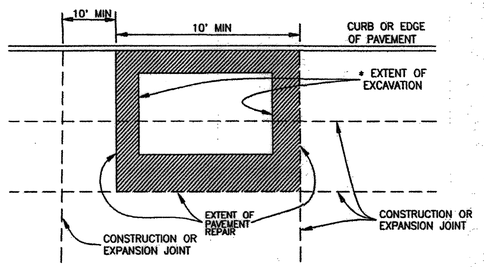
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

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

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUNE 2002	DWG NO: 02951-01

CONCRETE PAVEMENT RESTORATION

AGE OF PAVEMENT GREATER THAN 5 YEARS



NOTES:

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

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

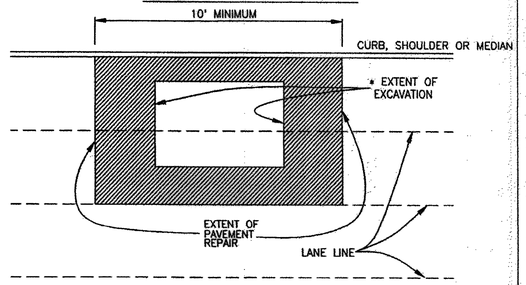
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

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

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUNE 2002	DWG NO: 02951-02

ASPHALT PAVEMENT RESTORATION

FOR PAVEMENT OF ALL AGES



NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.

2. FLEXIBLE BASE:

   REPLACE BASE TO SAME THICKNESS PLUS TWO INCHES (2") FOR EXTENT OF EXCAVATION. USE APPROVED BASE MATERIAL TYPE. *

3. SURFACE COURSE:

   A. WIDTH: SURFACE MILL AND OVERLAY FULL WIDTH OF LANE(S) TO NEAREST LANE DIVIDER BEYOND EDGE OF EXCAVATION.

   B. LENGTH: MINIMUM LENGTH OF SURFACE MILL ALONG TRAVEL WAY IS 10'.

   C. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY SPECIFICATIONS 02764 & 02767.

ADDITIONAL REQUIREMENTS FOR ASPHALT OVERLAY ON CONCRETE PAVEMENT:

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

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

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

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

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUNE 2002	DWG NO: 02951-03

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STREET CUT DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET: 207 OF 226

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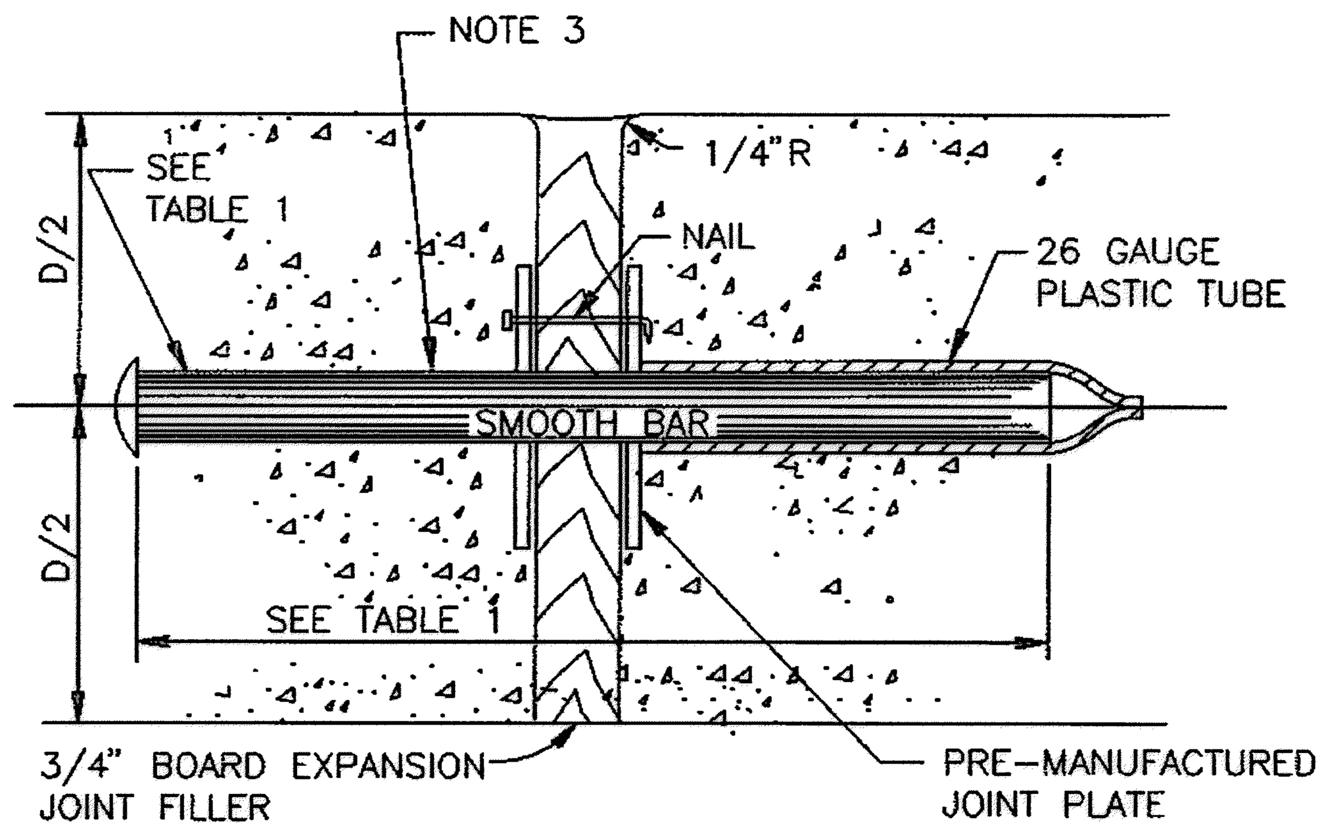
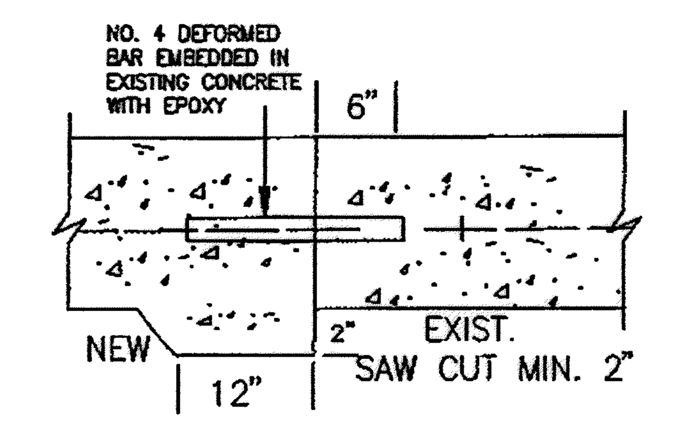
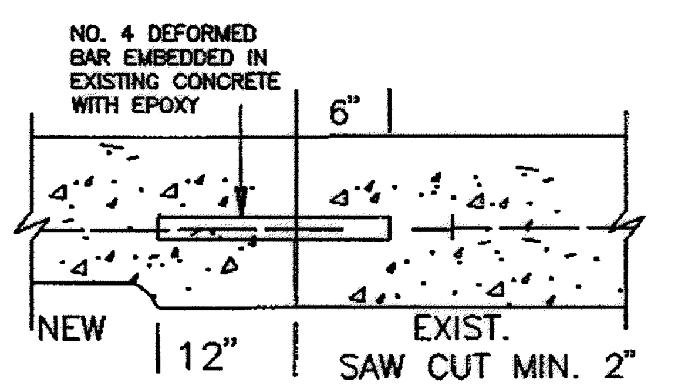


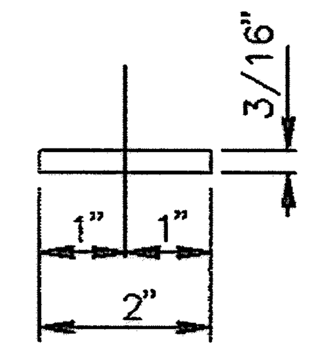
SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S



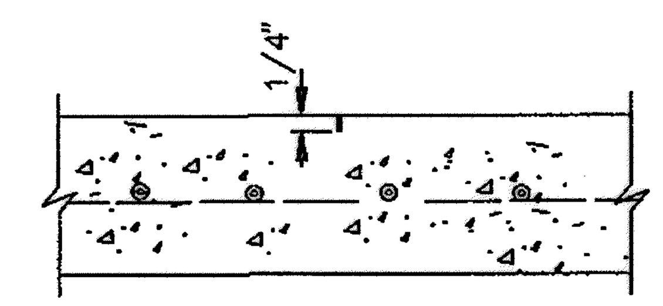
SECTION
SIDEWALK TO EXISTING SIDEWALK



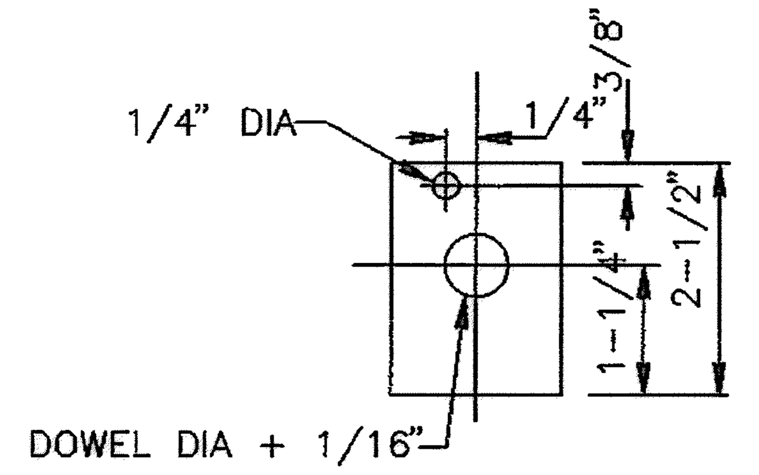
SECTION
SIDEWALK TO EXISTING DRIVEWAY



PLAN – JOINT PLATE



SECTION
CONTROL JOINT
N.T.S.



ELEVATION – JOINT PLATE
N.T.S.

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 36' FEET. MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5' FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN 2" MIN. COVER.

TABLE 1

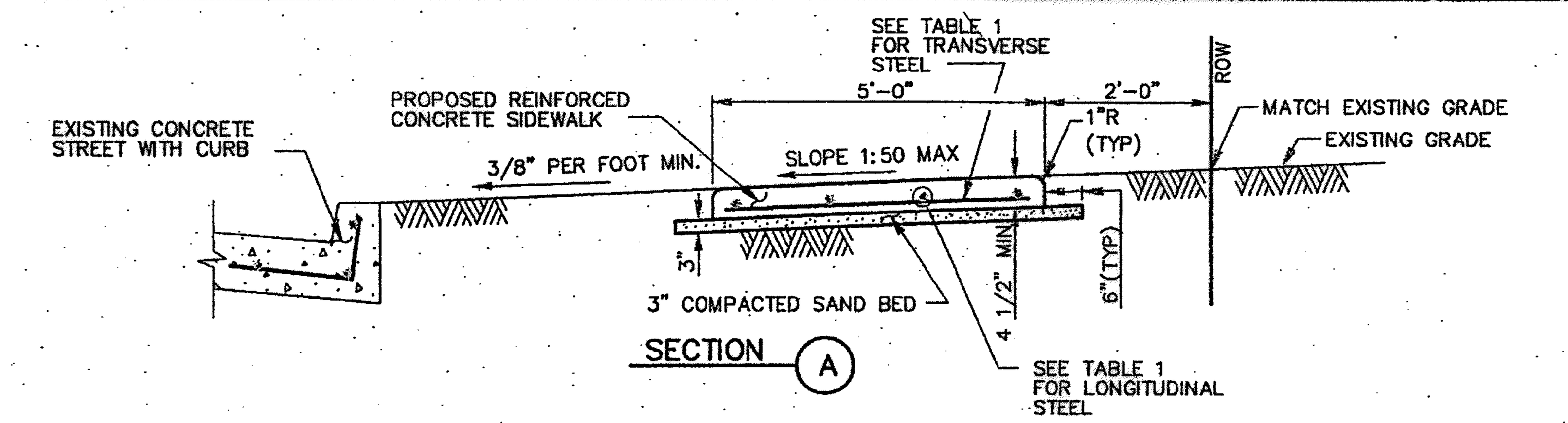
PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

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

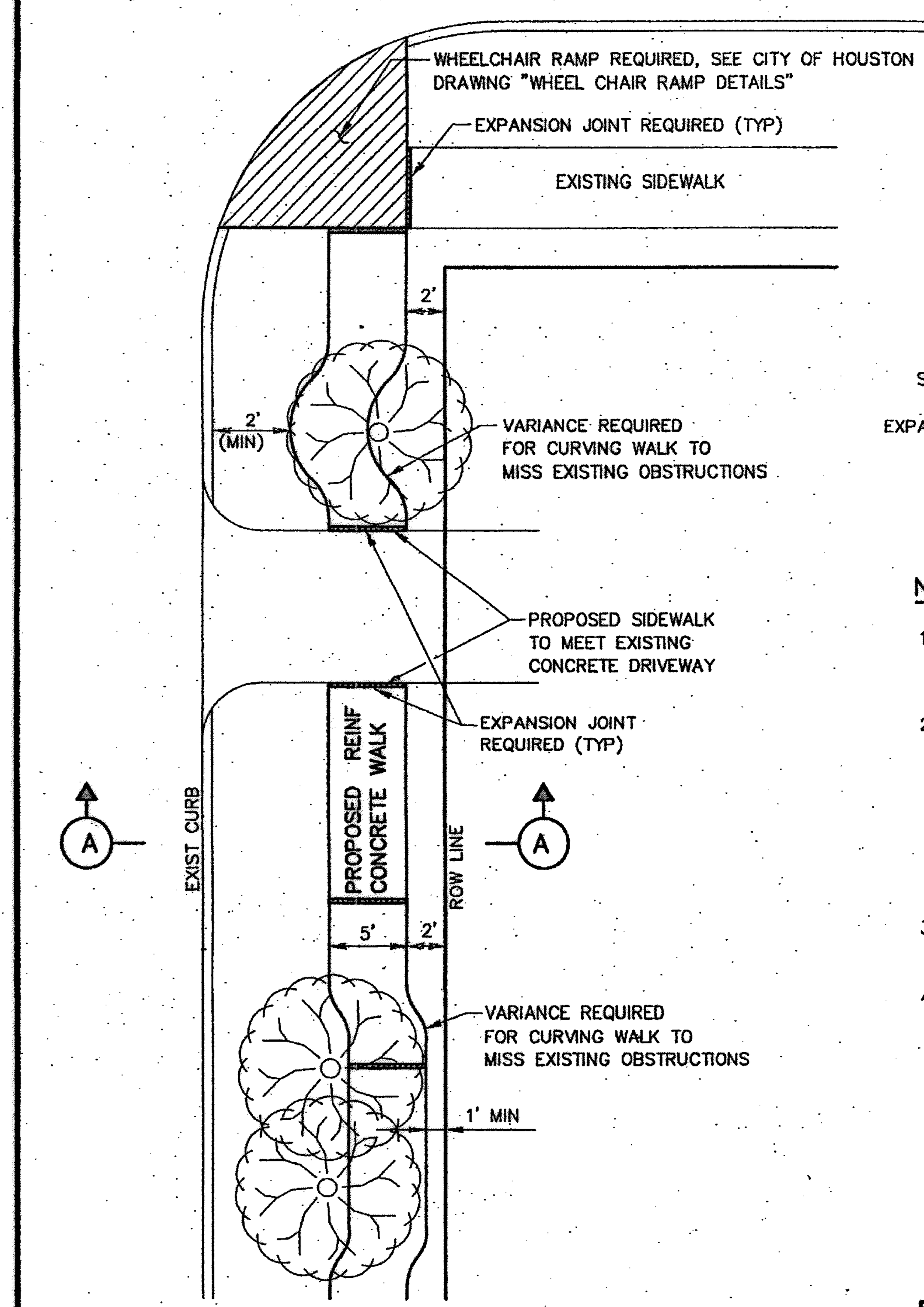
SIDEWALK
EXPANSION AND CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)

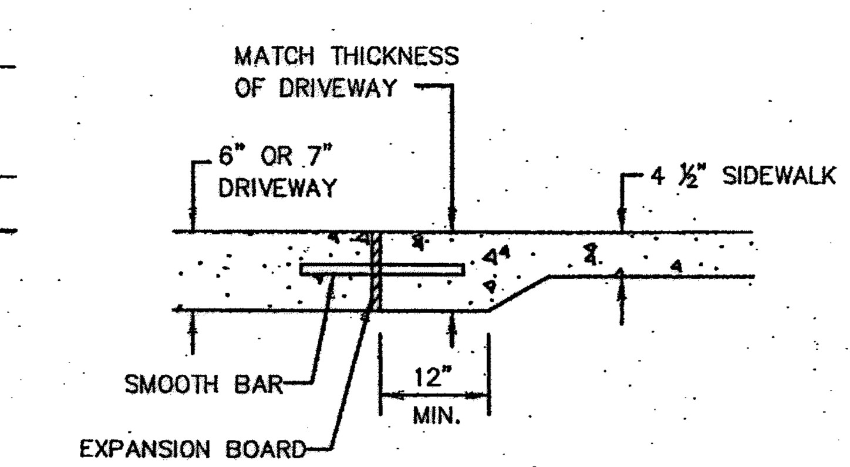
APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 | DWG NO: 02752-02



SECTION (A)





DRIVEWAY/SIDEWALK
HEADER DETAIL

NOTES:

1. 6X6 – W2.9XW2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL GIVEN IN TABLE 1.
2. REINFORCED CONCRETE SIDEWALKS THRU DRIVEWAYS OPENINGS SHALL BE EITHER 6" THICK OR 7" THICK AS SPECIFIED ON 6" STABILIZED SUBGRADE. FOR THE REINFORCING STEEL REQUIREMENTS, SEE CITY OF HOUSTON DRAWING "REINFORCED CONCRETE DRIVEWAY DETAILS ON CURB TYPE STREETS".
3. MAXIMUM SPACING FOR EXPANSION JOINTS SHALL BE 40 FEET.
4. CONTRACTOR SHALL CONSTRUCT SIDEWALK IN A MANNER NOT TO BLOCK THE NATURAL DRAINAGE FROM ADJACENT PROPERTY.

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
fc' = 3,000 PSI AND fy = 60,000 PSI

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL # 3 BARS			TRANSVERSE STEEL # 3 BARS SPACING (IN)
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48

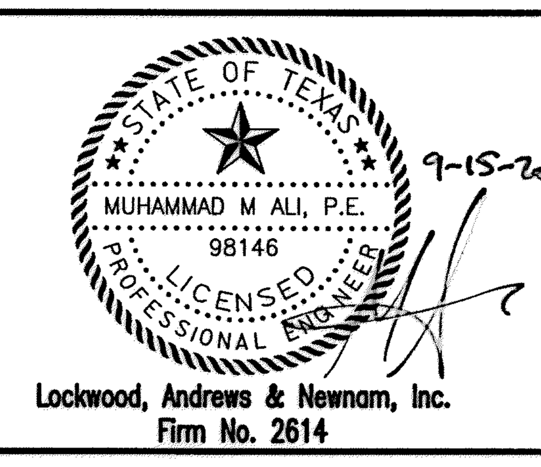
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONCRETE SIDEWALK DETAILS
FOR STREETS WITH CURBS
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 | DWG NO: 02775-01

No.	DATE	REVISIONS	APP.



Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

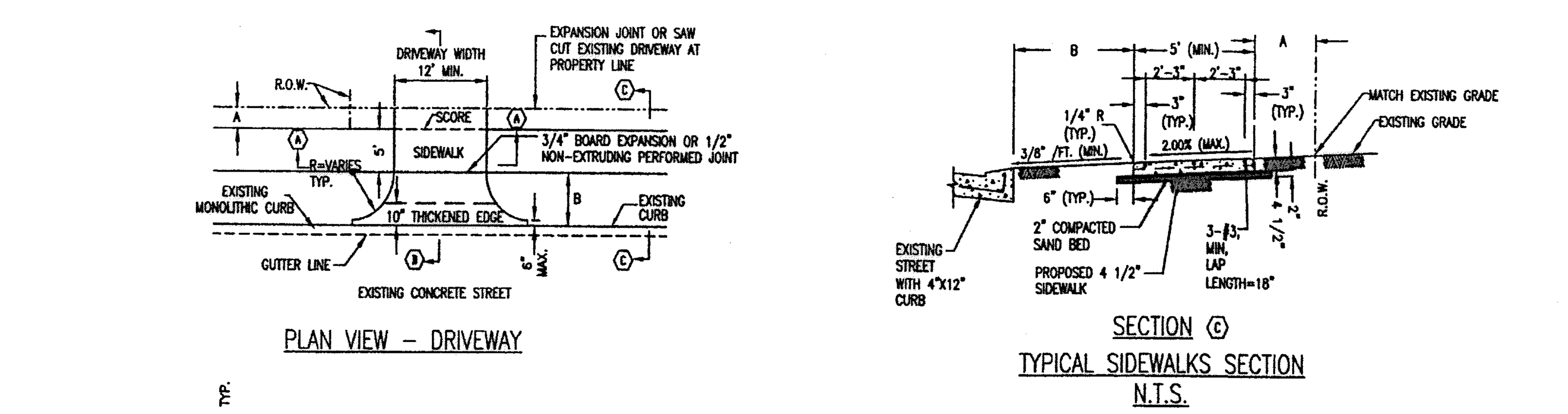
LUMPKIN ROAD
N-T17000-0012-3

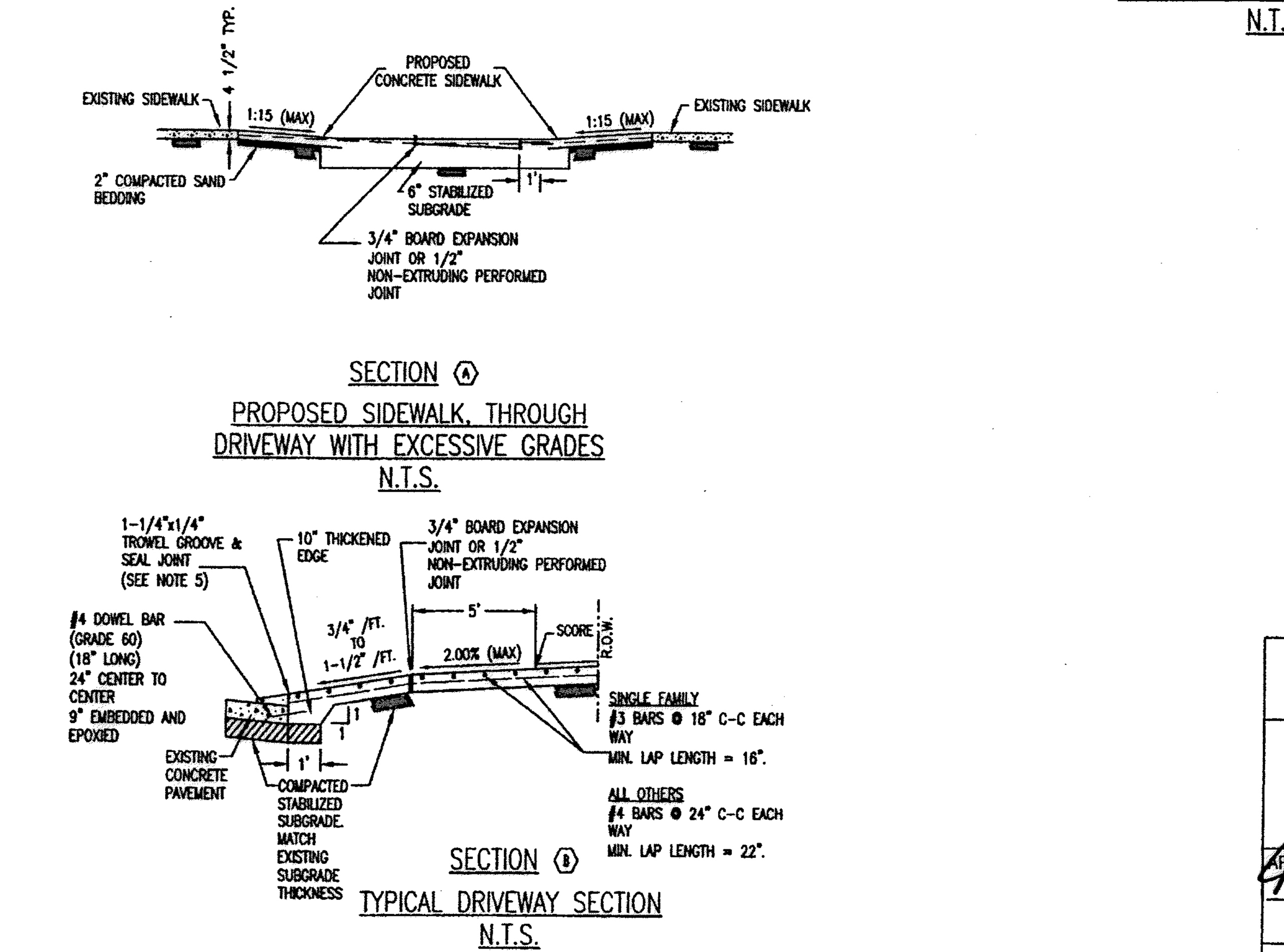
CONCRETE SIDEWALK AND DRIVEWAY DETAILS
SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET:
208 OF 226





NOTES

1. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FEET WIDE SIDEWALK.
2. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY
3. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5 1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. THE OUTER DOWEL BARS ARE TO BE LOCATED 12" FROM END OF PROPOSED EDGE OF DRIVEWAY RETURN. EXTEND DOWEL 3" INCHES INTO PROPOSED DRIVEWAY AND BEND REMAINING BAR TO EXTEND TO RADIUS RETURN BOTH SIDES.
5. TROWEL GROOVE SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE SEALANT.
6. EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALK SHALL BE ACCORDING TO DRAWING No. 02752-02.
7. REFER CHAPTER 10 DESIGN REQUIREMENTS FOR A AND B.

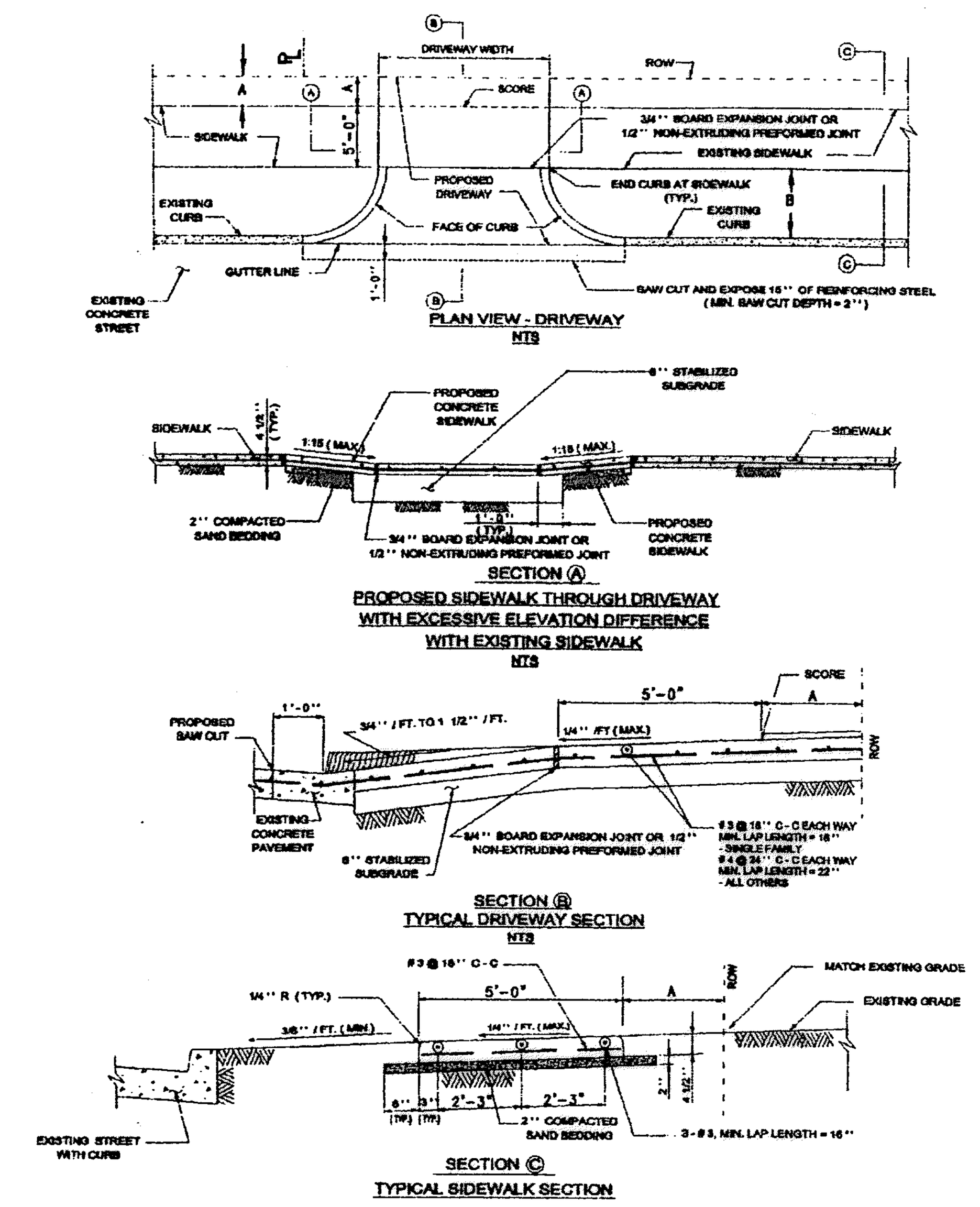
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DRIVEWAY / LOCAL RESIDENTIAL STREETS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2009 | DWG NO: 02754-01A



NOTES

1. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FEET WIDE SIDEWALK.
2. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" THICK FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)
3. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5-1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. 6X6-W2.9 X W2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL.
5. EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALKS SHALL BE ACCORDING TO DRAWING NO. 02752-02.
6. REFER CHAPTER 10 DESIGN REQUIREMENTS FOR A AND B.

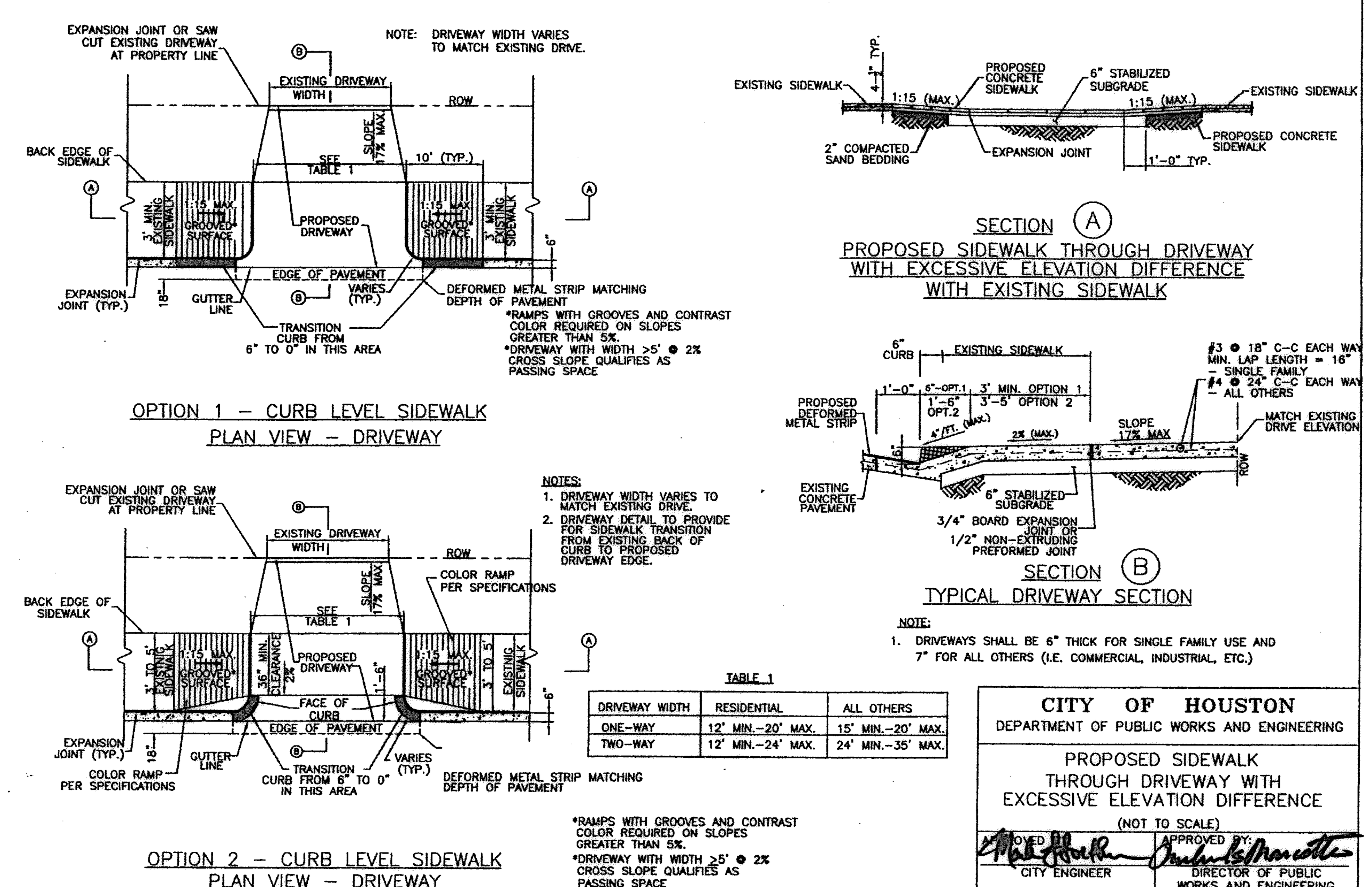
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DRIVEWAY DETAIL WITH 6" CURBED STREETS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2009 | DWG NO: 02754-01B



NOTES:
1. DRIVEWAY WIDTH VARIES TO MATCH EXISTING DRIVE.
2. DRIVEWAY DETAIL TO PROVIDE FOR SIDEWALK TRANSITION FROM EXISTING BACK OF CURB TO PROPOSED DRIVEWAY EDGE.

TABLE 1

DRIVEWAY WIDTH	RESIDENTIAL	ALL OTHERS
ONE-WAY	12' MIN.-20' MAX.	15' MIN.-20' MAX.
TWO-WAY	12' MIN.-24' MAX.	24' MIN.-35' MAX.

*RAMPS WITH GROOVES AND CONTRAST COLOR REQUIRED ON SLOPES GREATER THAN 5%.
*DRIVEWAY WITH WIDTH >5' @ 2% CROSS SLOPE QUALIFIES AS PASSING SPACE

NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

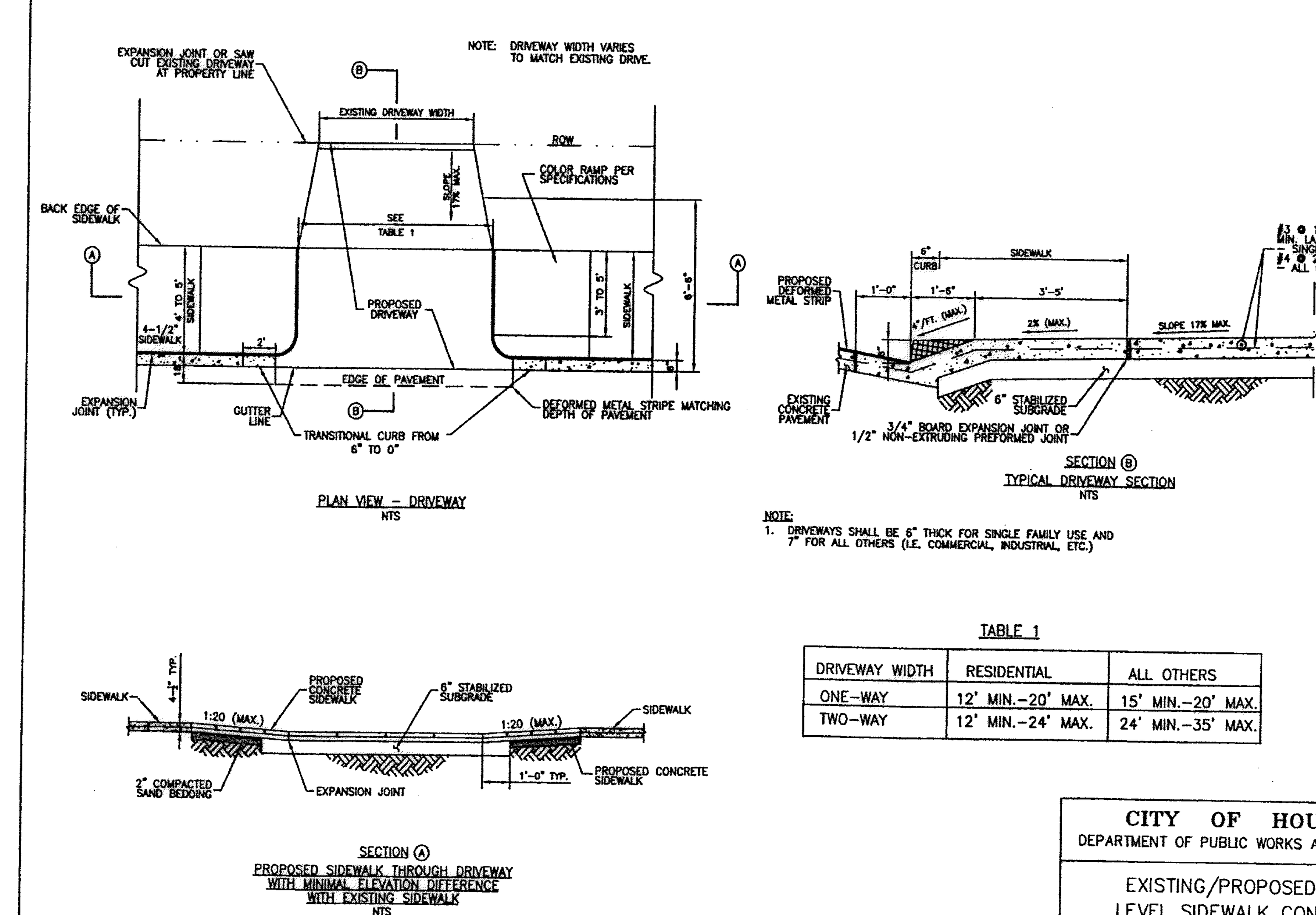
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2009 | DWG NO: 02754-03



NOTE:
1. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)

TABLE 1

DRIVEWAY WIDTH	RESIDENTIAL	ALL OTHERS
ONE-WAY	12' MIN.-20' MAX.	15' MIN.-20' MAX.
TWO-WAY	12' MIN.-24' MAX.	24' MIN.-35' MAX.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

EXISTING/PROPOSED CURB LEVEL SIDEWALK CONDITIONS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER | APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2009 | DWG NO: 02754-04

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CONCRETE SIDEWALK AND DRIVEWAY DETAILS
SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: | CITY DWG NO.

NOT TO SCALE

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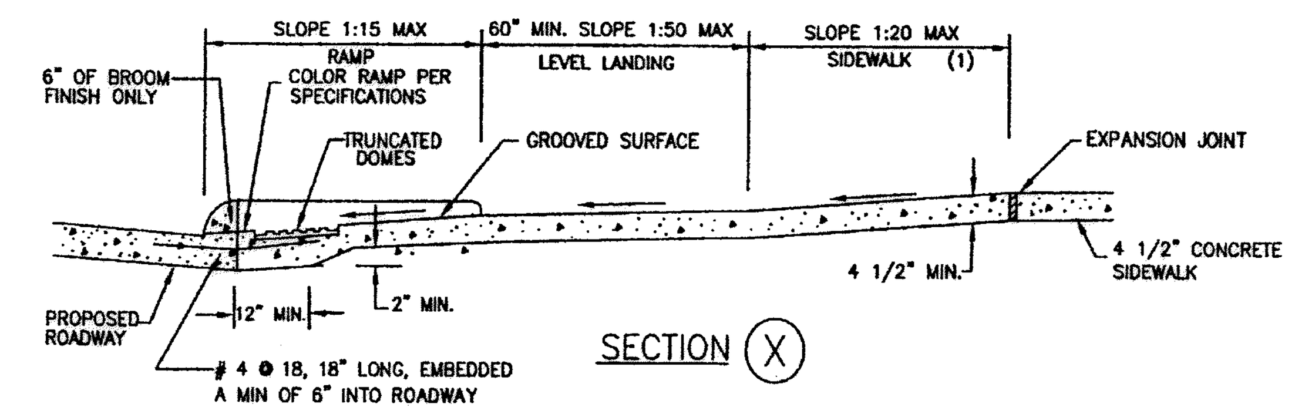
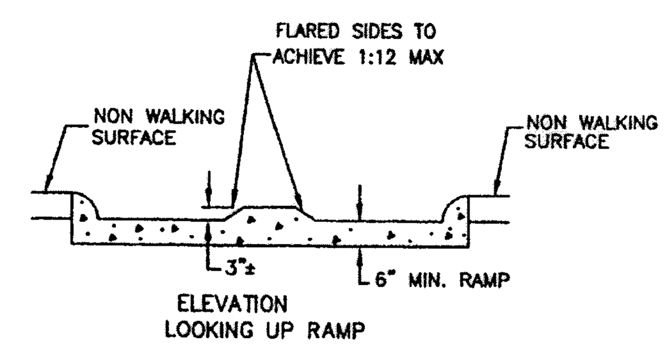
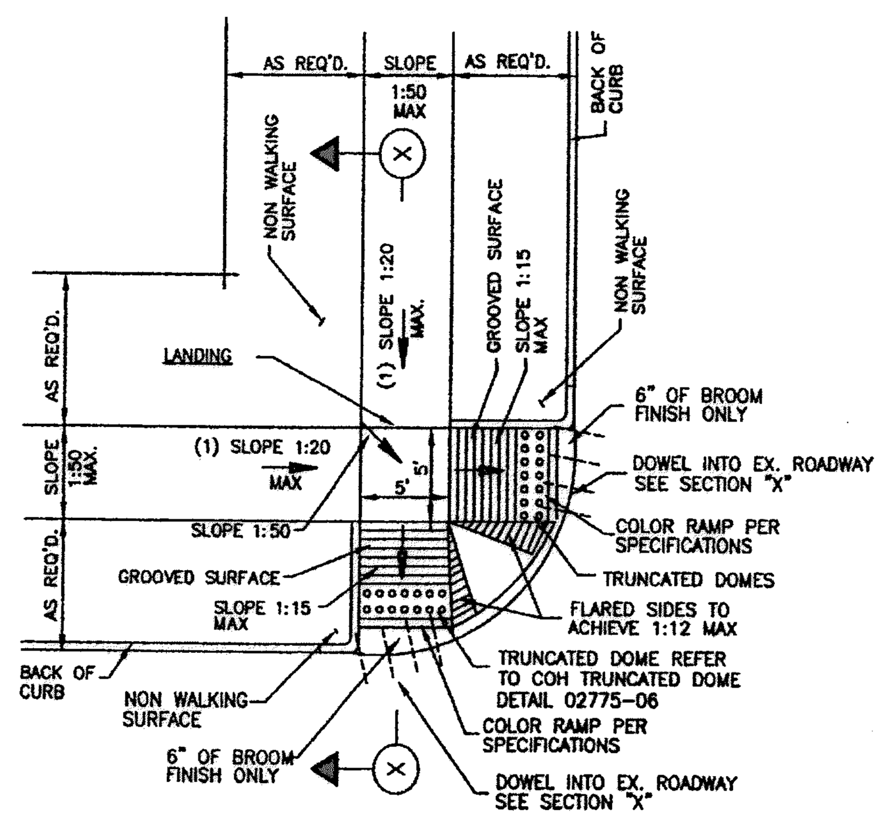
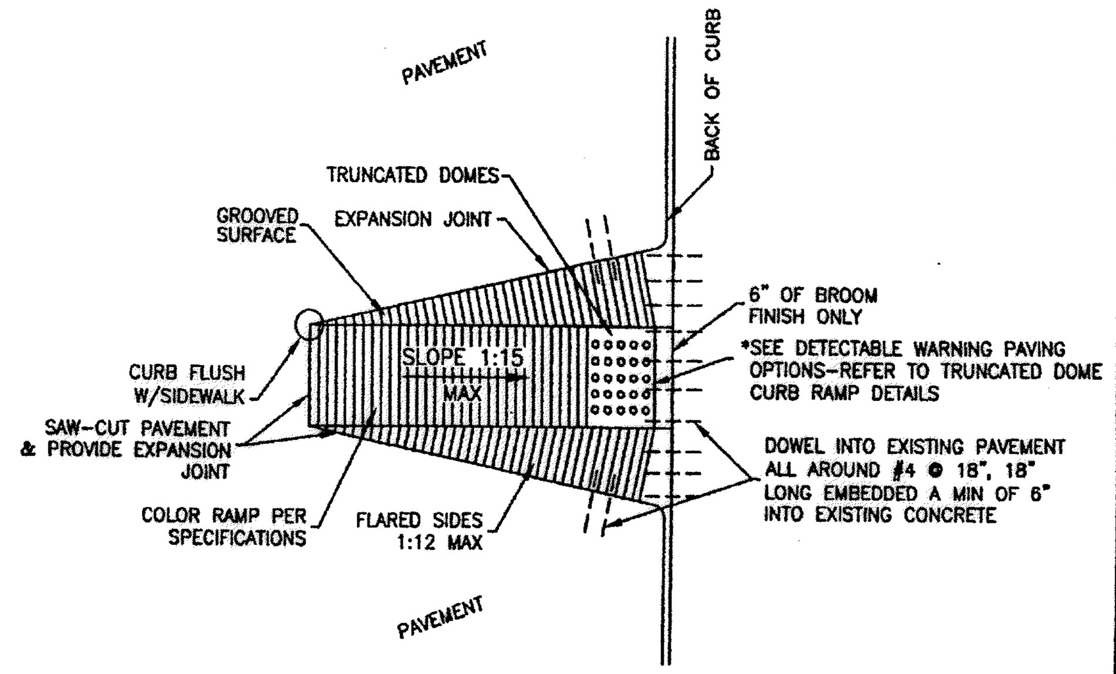






STREETS WITH NON-WALKING SURFACE BEHIND CURB

N.T.S.



RAMP CONSTRUCTION FOR EXISTING PAVEMENT

NOTES:

1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE
2. SLOPES GREATER THAN 1:20 BUT LESS THAN 1:15 (MAX) REQUIRE GROOVES AND COLORING

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
WHEEL CHAIR RAMP DETAILS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02775-02

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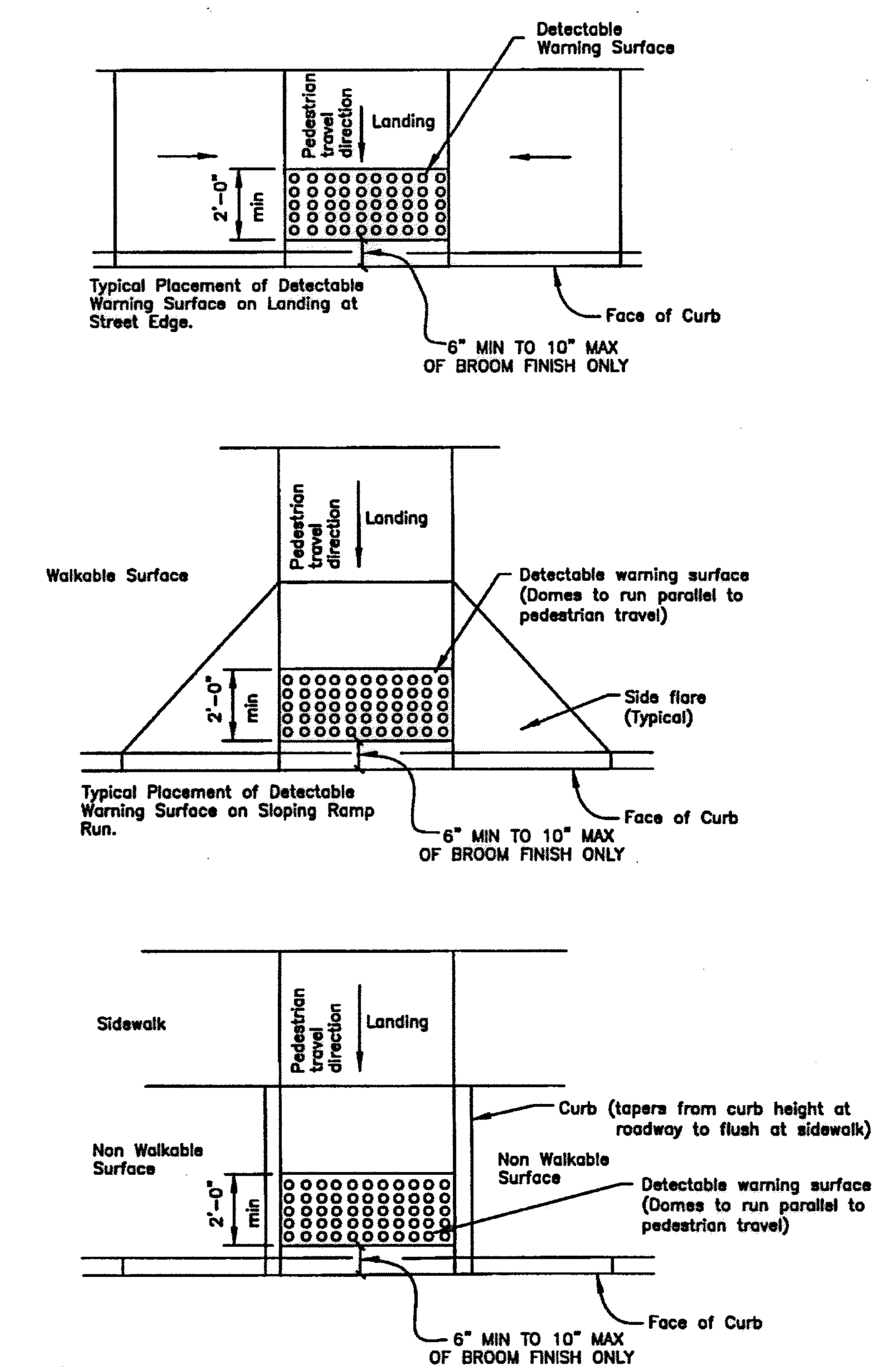
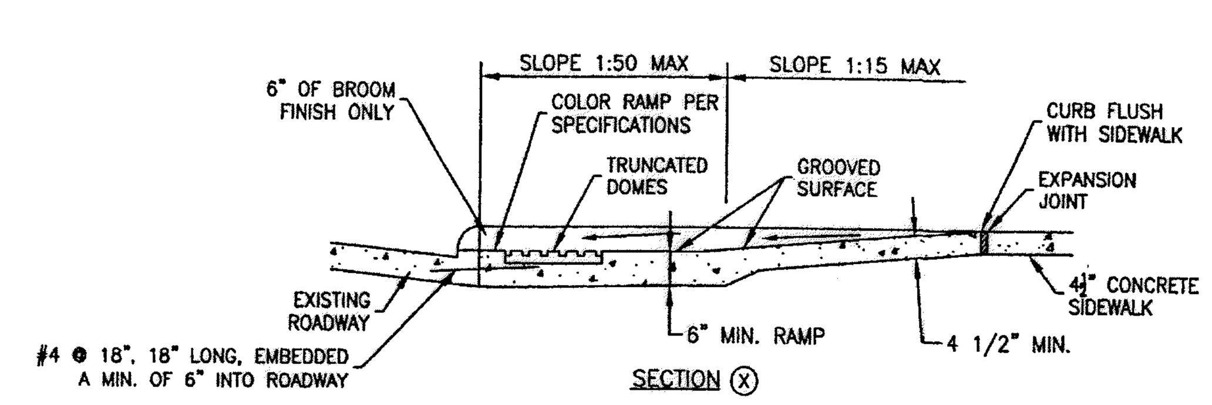
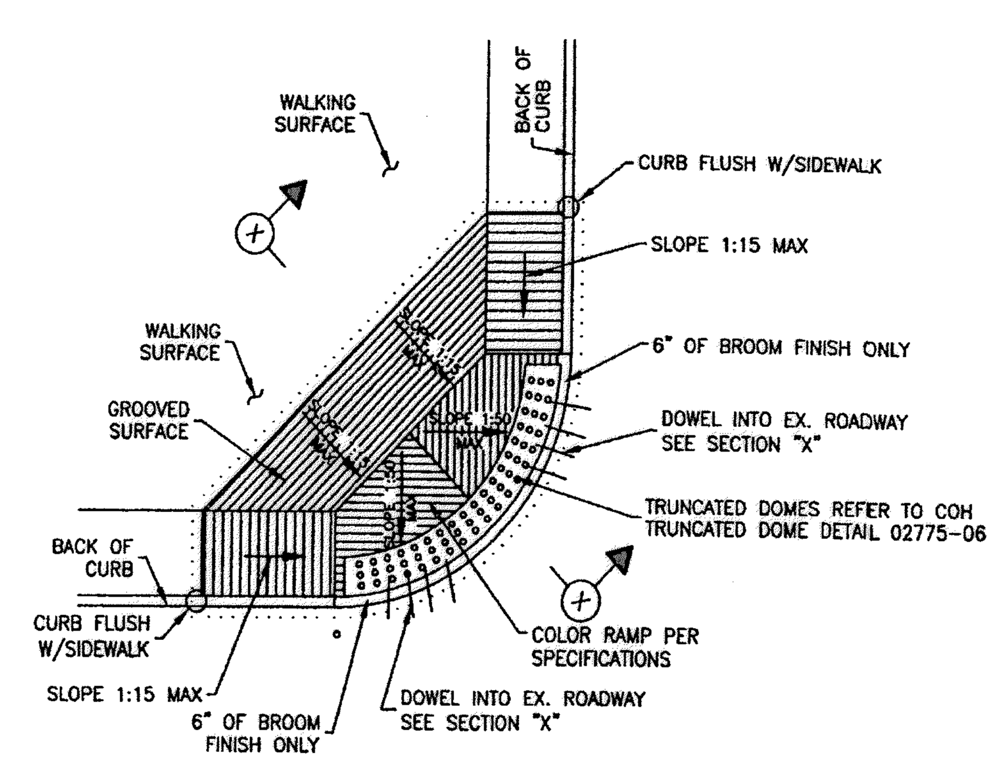


GENERAL NOTES FOR DETECTABLE WARNINGS

1. 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.
2. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
3. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
4. OMIT
5. 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.
6. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6" MIN TO 10" MAX FROM THE EXTENSION OF THE FACE OF CURB. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.
7. REFERENCE CURB RAMP DETAILS FOR RAMP GROOVED SURFACE.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
DETECTABLE WARNING CURB RAMP DETAILS (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2012	DWG NO: 02775-06



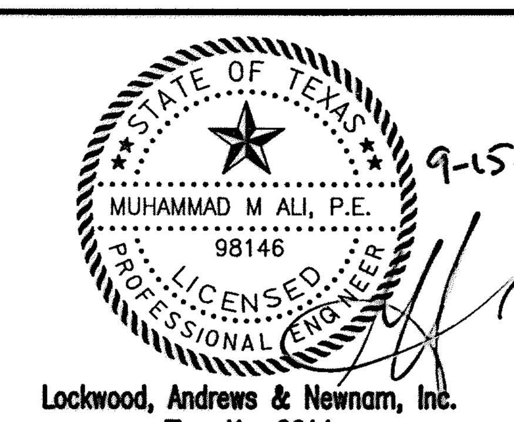


COMMERCIAL & HIGH DENSITY CONDITIONS

NTS

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
COMMERCIAL CURB RAMP DETAIL (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02775-05

No.	DATE	REVISIONS	APP.



Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WHEELCHAIR RAMP DETAILS

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

CITY DWG NO.

NOT TO SCALE

SHEET:
210 OF 226

MJGuthrie

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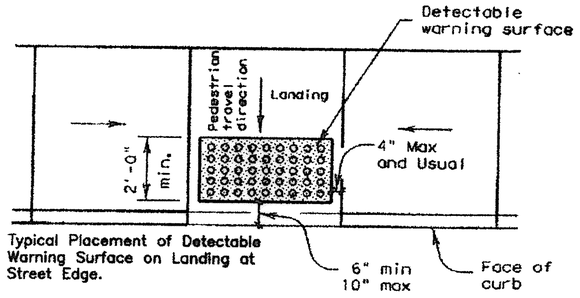
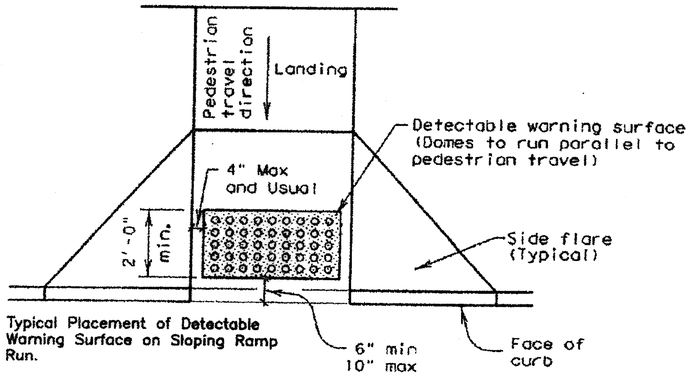


Typical Placement of Detectable Warning Surface on Landing at Street Edge.



Typical Placement of Detectable Warning Surface on Sloping Ramp Run.

GENERAL NOTES FOR DETECTABLE WARNINGS

1. CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 4.29 OF THE TEXAS ACCESSIBILITY STANDARDS (TAS). THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACE, INCLUDING SIDE FLOORS. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.

2. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.

3. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.

4. OMIT

5. 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.

6. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS A MINIMUM OF 6" AND A MAXIMUM OF 10" FROM THE EXTENSION OF THE FACE OF CURB. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.

7. REFERENCE CURB RAMP DETAILS FOR RAMP GROOVED SURFACE.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DETECTABLE WARNING
CURB RAMP DETAILS

(NOT TO SCALE)

APPROVED: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02775-06

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

WHEELCHAIR RAMP DETAILS

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE: NOT TO SCALE
CITY DWG NO.
SHEET: 211 OF 226

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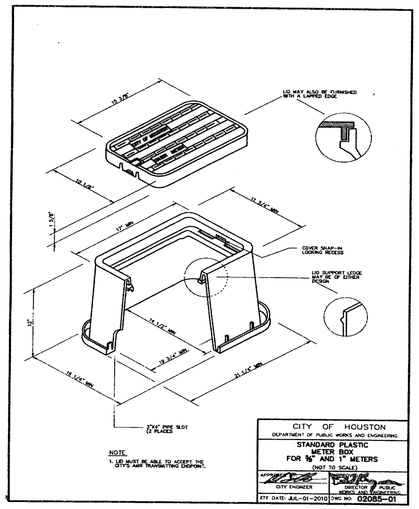


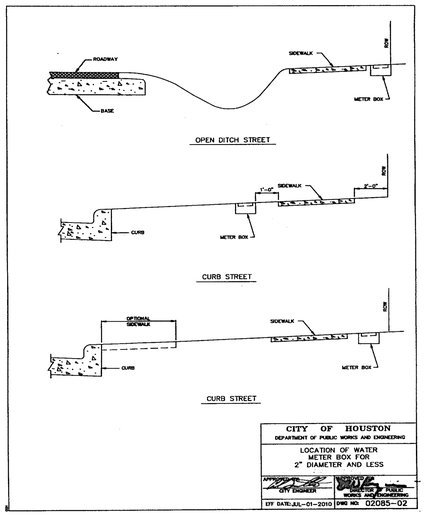
NOTE
1. LID MUST BE ABLE TO ACCEPT THE CITY'S AMR TRANSMITTING EQUIPMENT.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD PLASTIC METER BOX FOR ¾" AND 1" METERS
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

CITY DATE: JUL-01-2010 | DWG NO. 02085-01

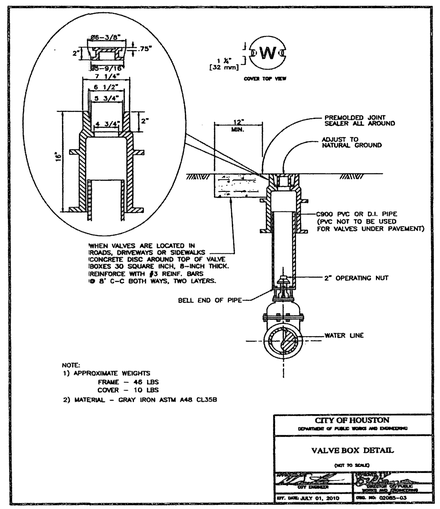


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

LOCATION OF WATER METER BOX FOR 2" DIAMETER AND LESS

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

CITY DATE: JUL-01-2010 | DWG NO. 02085-02



*WHEN VALVES ARE LOCATED IN ROADS, DRIVEWAYS OR SIDEWALKS CONCRETE DISC AROUND TOP OF VALVE BOXES 30 SQUARE INCH, 6-INCH THICK. REINFORCE WITH #3 REINF. BARS @ 8" C-C BOTH WAYS, TWO LAYERS.

NOTE:
1) APPROXIMATE WEIGHTS
FRAME – 46 LBS
COVER – 10 LBS
2) MATERIAL – GRAY IRON ASTM A48 CL35B

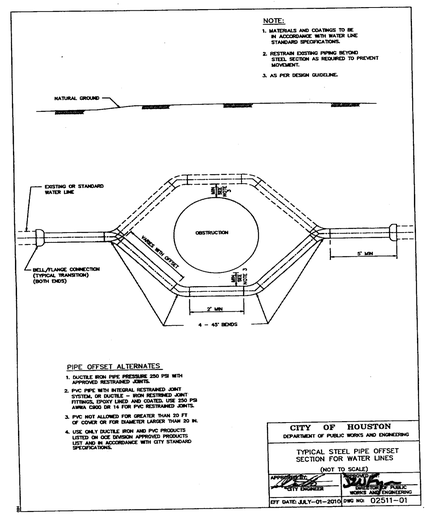
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

VALVE BOX DETAIL
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF. DATE: JULY 01, 2010 | DWG. NO. 02085-03

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

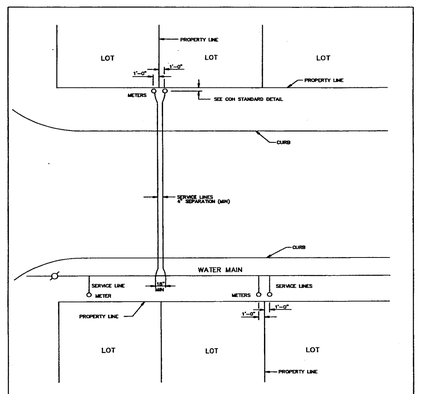
1. DUCTILE IRON PIPE PRESSURE 350 PSI WITH APPROVED RESTRAINED JOINTS.
2. PVC PIPE WITH INTEGRAL RESTRAINED JOINT SYSTEM, OR DUCTILE – IRON RESTRAINED JOINT FITTINGS, EPOXY LINED AND COATED, USE 350 PSI AWWA C900 OR 14 FOR PVC RESTRAINED JOINTS.
3. PVC NOT ALLOWED FOR GREATER THAN DO FT OF COVER OR FOR DIAMETER LARGER THAN 30 IN.
4. USE ONLY DUCTILE IRON AND PVC PRODUCTS LISTED ON DCE 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)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

CITY DATE: JULY-01-2010 | DWG NO. 02511-01



GENERAL NOTES:
1. TWO SERVICE LINES MAY BE INSTALLED IN SAME TRENCH PROVIDED 3' CLEARANCE IS MAINTAINED.
2. ONE METER PER SERVICE LINE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

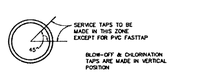
TYPICAL 3/4" THROUGH 2" SERVICE ARRANGEMENTS
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 | DWG NO. 02512-01

PIPE TAPPING SCHEDULE				
WATER MAIN TYPE AND DIAMETER	SERVICE SIZE			
	3/4"	1"	1 1/2"	2"
4" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
4" ASBESTOS (EXISTING) CEMENT	WSSS	WSSS	DSS, WSSS	DSS, WSSS
4" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" ASBESTOS (EXISTING) CEMENT	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
6" AND 8" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
4" AND 8" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" CAST IRON OR DUCTILE IRON	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" ASBESTOS (EXISTING) CEMENT	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
12" PVC (AWWA C900)	DSS, WSSS	DSS, WSSS	DSS, WSSS	DSS, WSSS
18" AND UP CAST IRON OR DUCTILE IRON	DWSSS	DWSSS	DWSSS	DWSSS
16" AND UP ASBESTOS (EXISTING) CEMENT	DWSSS	DWSSS	DWSSS	DWSSS
16" AND UP PVC (AWWA C900)	DWSSS	DWSSS	DWSSS	DWSSS

DSS – DUAL STRAP SADDLES
WSSS – WIDE BAND STRAP SADDLES
DWSSS – DUAL WIDE BAND STRAP SADDLES



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

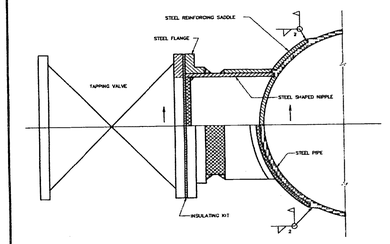
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SERVICE TAPS
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

CITY DATE: JUL-01-2010 | DWG NO. 02512-02

GENERAL NOTES:
1. ENCIRCLE STEEL TAPPING SLEEVE AS PER WATER MAIN SPECIFICATIONS.
2. WELDING SHALL BE AS NOTED IN WELD SYMBOLS.
3. INSULATING KIT IN ACCORDANCE WITH WATER MAIN SPECIFICATIONS.
4. REPAIR COATING AS PER WATER MAIN STANDARD SPECIFICATIONS.



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD TAP TO EXISTING STEEL MAIN
(NOT TO SCALE)

CITY ENGINEER | DIRECTOR OF PUBLIC WORKS AND ENGINEERING

CITY DATE: JULY-01-2010 | DWG NO. 02512-04

No.	DATE	REVISIONS	APP.

CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD WATER LINE DETAILS

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 212 OF 226	

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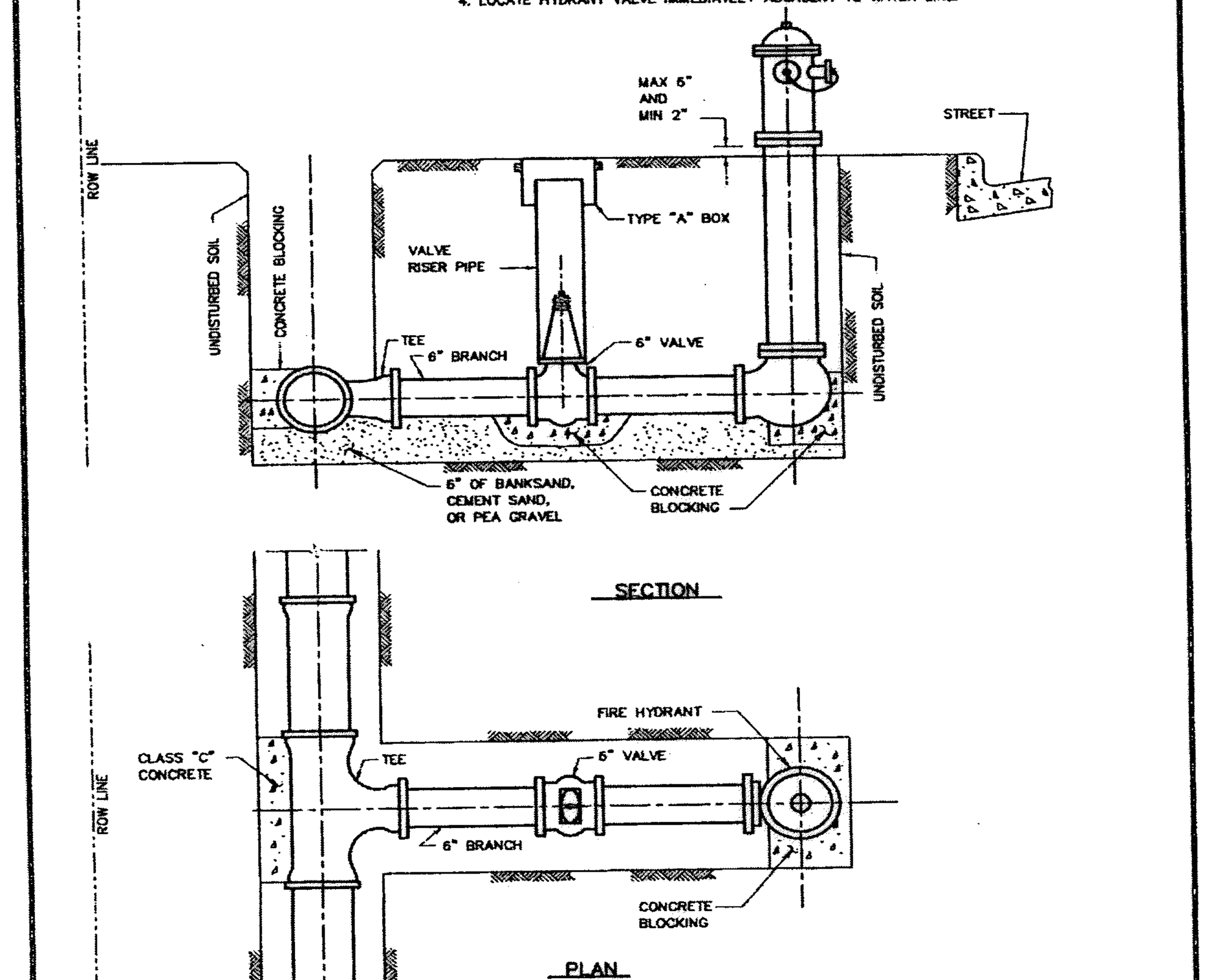
NOTES:

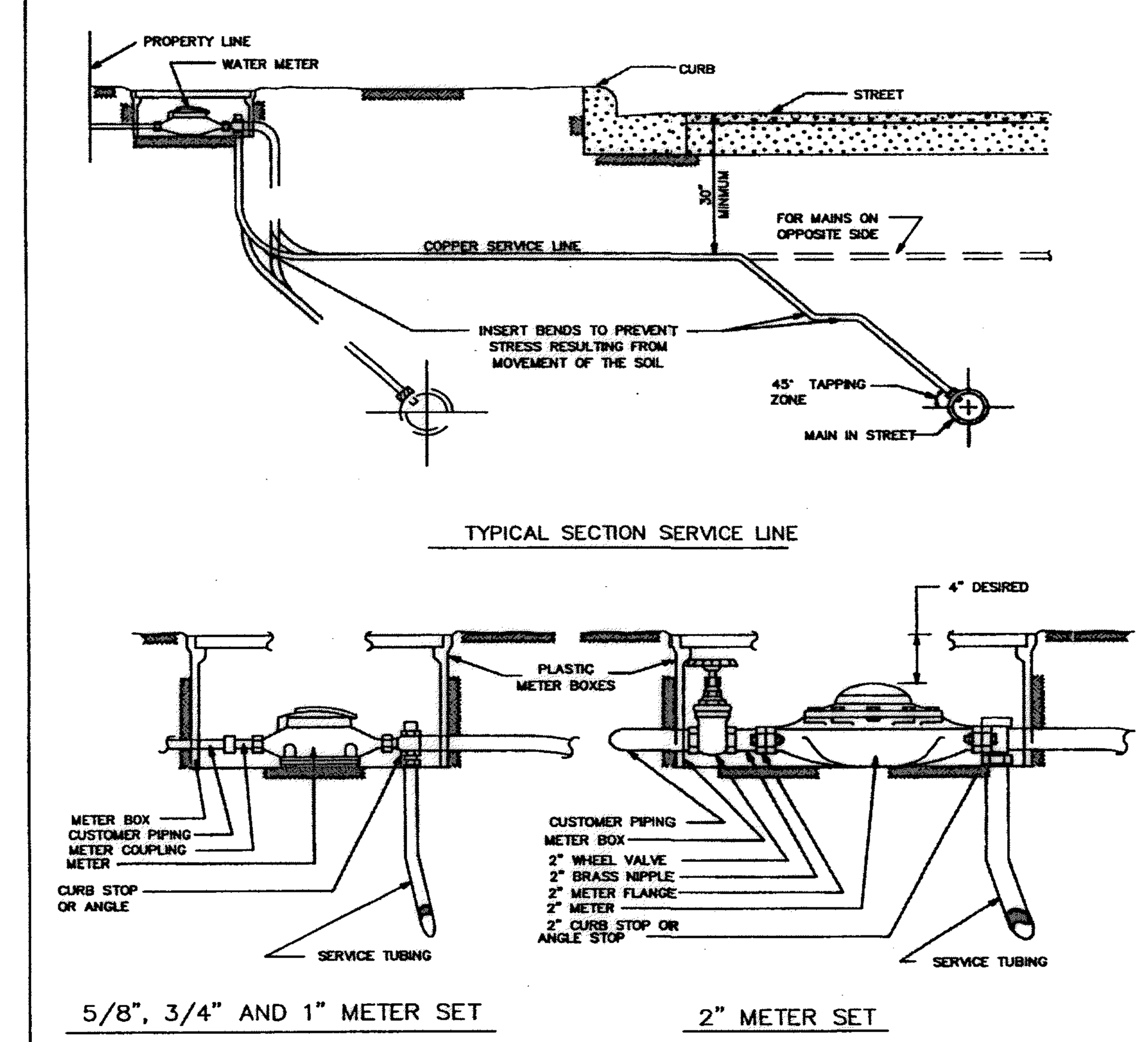
1. LOCATE FIRE HYDRANTS AT PCs OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITH IN 5 FEET OF RIGHTS-OF-WAY LINES.
3. FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET.
4. LOCATE HYDRANT VALVE IMMEDIATELY ADJACENT TO WATER LINE.



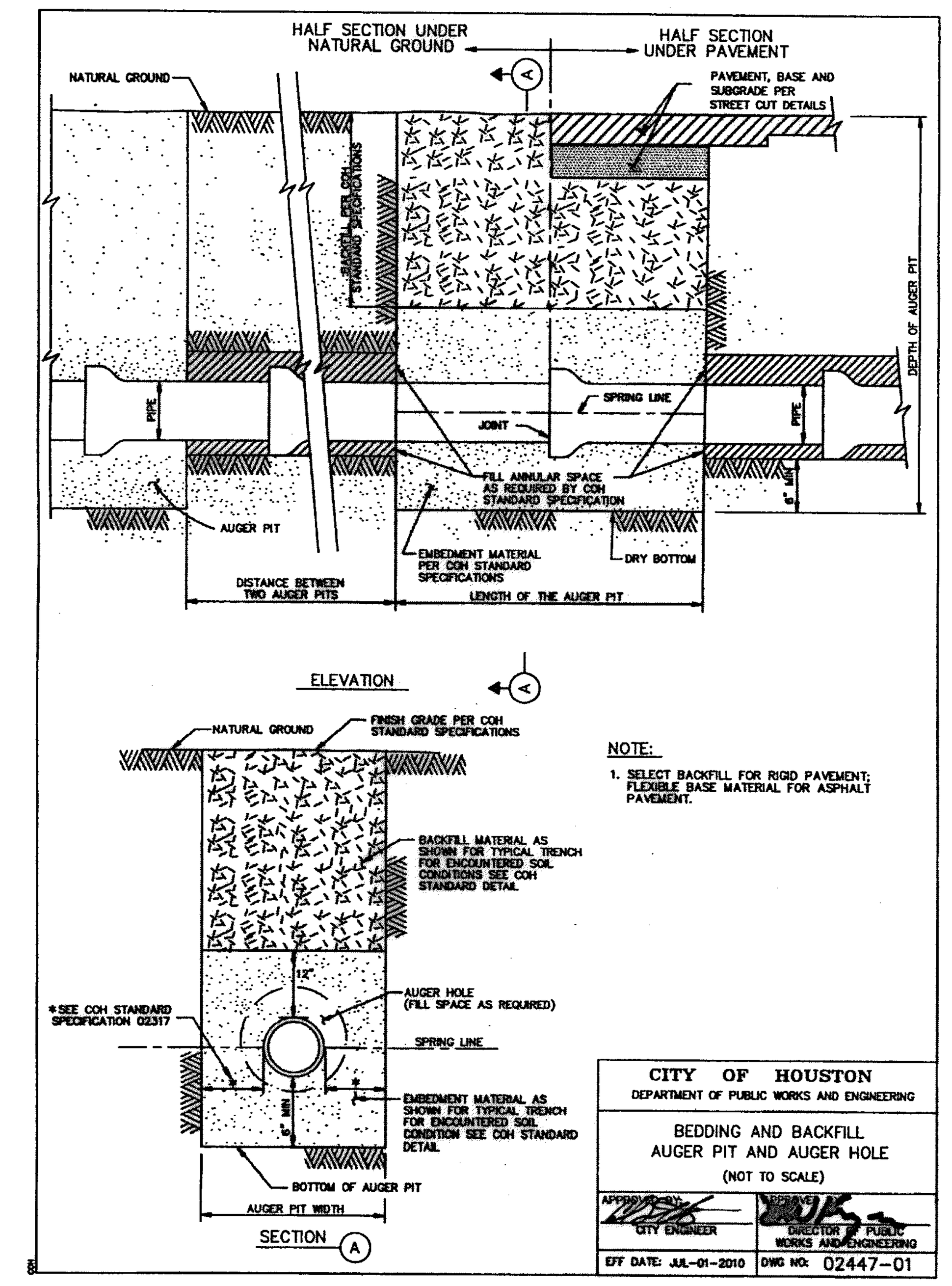
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
STANDARD FIRE HYDRANT DETAIL
(NOT TO SCALE)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO. 02520-01

NOTES:

1 1/2" METER SET IS SAME AS 2" EXCEPT WHEEL VALVE IS NOT REQUIRED.



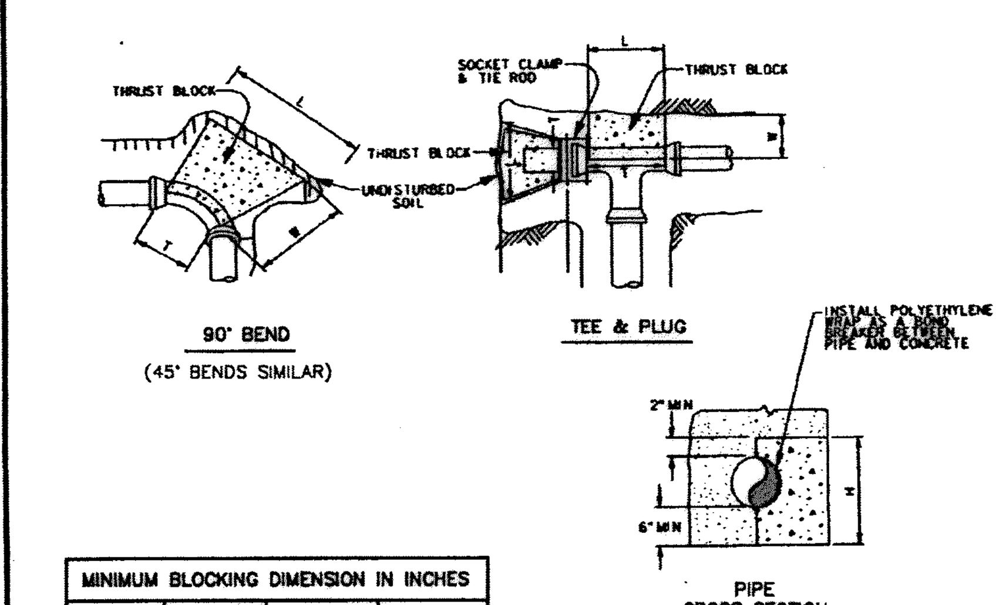
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
TYPICAL METER SETTINGS
(NOT TO SCALE)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO. 02526-01



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)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 DWG NO. 02447-01



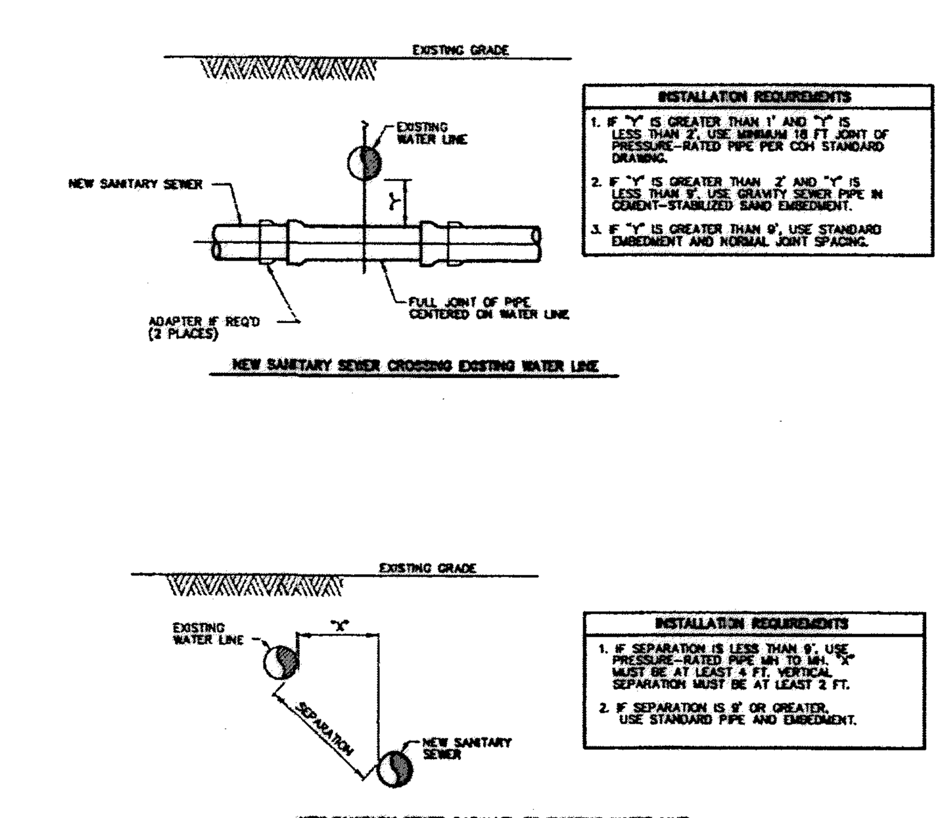
MINIMUM BLOCKING DIMENSION IN INCHES												
PIPE SIZE	90° BEND				45° BEND				TEE/PLUG			
	W	H	L	T	W	H	L	T	W	H	L	T
4"	6	12	14	10	6	8	11	8	6	10	12	12
6"	8	14	26	12	8	14	14	12	8	14	19	19
8"	10	16	40	16	10	18	20	16	10	18	26	26
10"	12	24	42	18	12	22	25	18	12	24	30	30
12"	14	36	40	30	14	26	30	22	14	26	40	40

CORRECTION FACTORS		
SOIL TYPE	SOIL BEARING STRENGTH $S_b (lb/ft^2)$	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)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO. 02511-02



INSTALLING SANITARY SEWERS CROSSING OR PARALLEL TO WATER LINES

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.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
SANITARY SEWER INSTALLING SANITARY SEWERS CROSSING OR PARALLEL TO WATER LINES
(NOT TO SCALE)
CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010 DWG NO. 02531-05

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD WATER LINE DETAILS

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE

SHEET:
213 OF 226

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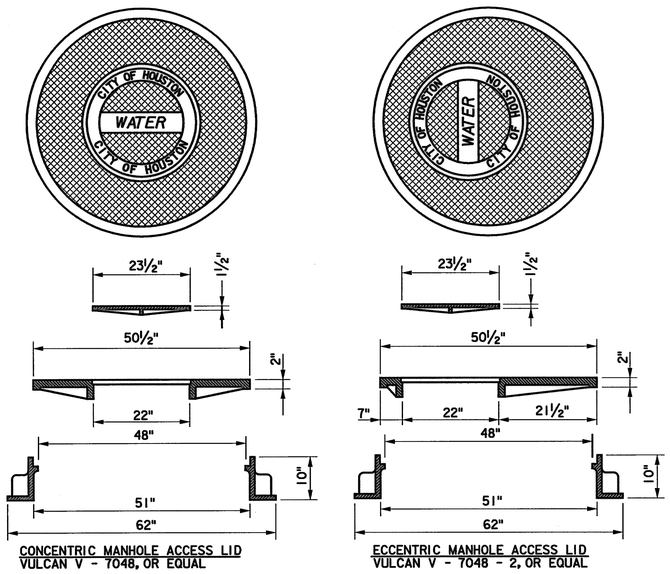
NOTE:

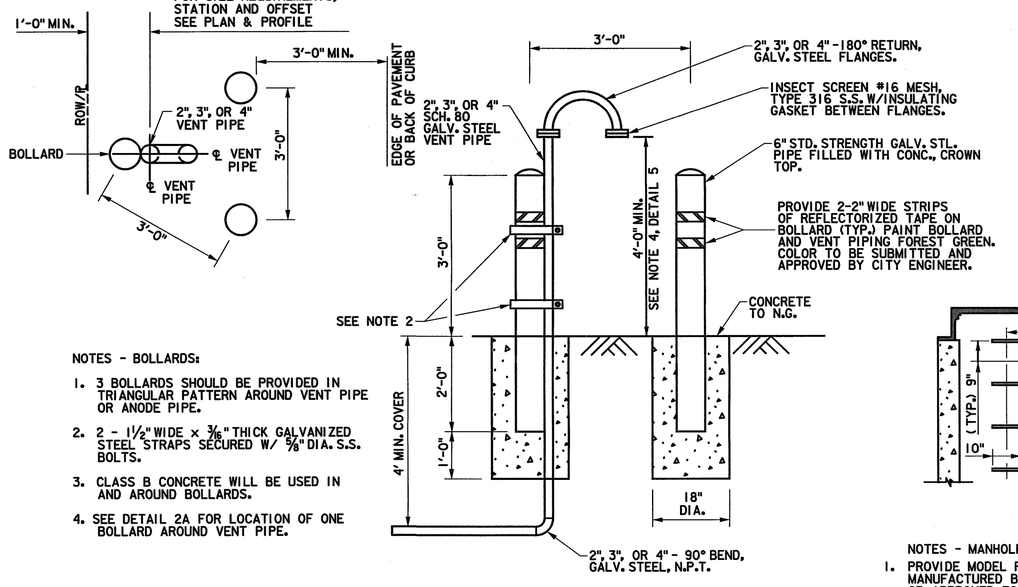
PROVIDE THREE (3) EXTRA CENTER LIDS FOR ECCENTRIC MANHOLE ACCESS LID. THE OTHER LIDS ARE TO BE DELIVERED TO C.O.H. UTILITY OPERATIONS



CONCENTRIC MANHOLE ACCESS LID
VULCAN V - 7048, OR EQUAL

ECCENTRIC MANHOLE ACCESS LID
VULCAN V - 7048 - 2, OR EQUAL

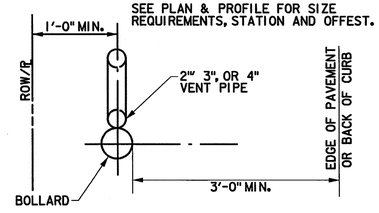
1 HEAVY DUTY MANHOLE RING AND COVER



NOTES - BOLLARDS:

1. 3 BOLLARDS SHOULD BE PROVIDED IN TRIANGULAR PATTERN AROUND VENT PIPE OR ANODE PIPE.
2. 2 - 1½" WIDE x 3/16" THICK GALVANIZED STEEL STRAPS SECURED W/ 5/8" DIA. S.S. BOLTS.
3. CLASS B CONCRETE WILL BE USED IN AND AROUND BOLLARDS.
4. SEE DETAIL 2A FOR LOCATION OF ONE BOLLARD AROUND VENT PIPE.

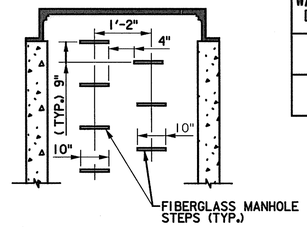
2 VENT PIPE WITH 3 BOLLARDS DETAIL



2A VENT PIPE WITH 1 BOLLARD DETAIL

AIR VALVE AND TYPES				
WATER MAIN DIAMETER	APCO® SERIES	AIR VALVE SIZE	APCO® MODEL	MH SIZE
<36"	140C	2"	145C	60"
		3"	147C	60"
>=36"	1500C	3"	1503C	72"
		4"	1504C	72"

® OR APPROVED EQUAL



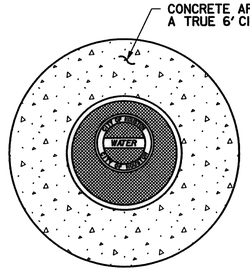
NOTES - MANHOLE STEPS:

1. PROVIDE MODEL PSI-PF STEPS AS MANUFACTURED BY M.A. INDUSTRIES INC. OR APPROVED EQUAL.
2. BOTTOM MANHOLE STEP SHALL BE NO HIGHER THAN 12" ABOVE MANHOLE INVERT.

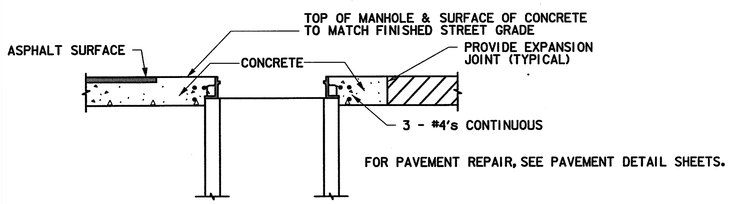
3 MANHOLE STEP DETAIL

NOTES - DETAIL 6:

1. PROVIDE RAM-NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FOR MANHOLES DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF-T-CLIMB OR APPROVED EQUAL).
3. PIPING AND APPURTENANCES OF THE SAME DIAMETER AND CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
4. VERIFY THAT LOCATION OF VENT PIPE SCREEN IS 1 FOOT ABOVE 100-YEAR FLOOD PLAIN ELEVATION OR 4 FEET ABOVE NATURAL GROUND WHICHEVER IS HIGHER.
5. REFER TO PLAN AND PROFILE SHEETS FOR LOCATIONS OF AIR VALVES.
6. FOR PAVEMENT REPAIR, SEE PAVEMENT DETAIL SHEETS.
7. PROVIDE AN APPROVED PETROLEUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.



PLAN

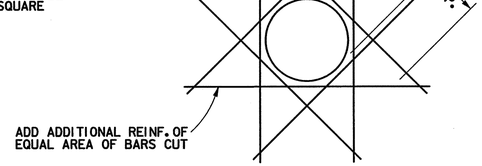


SECTION

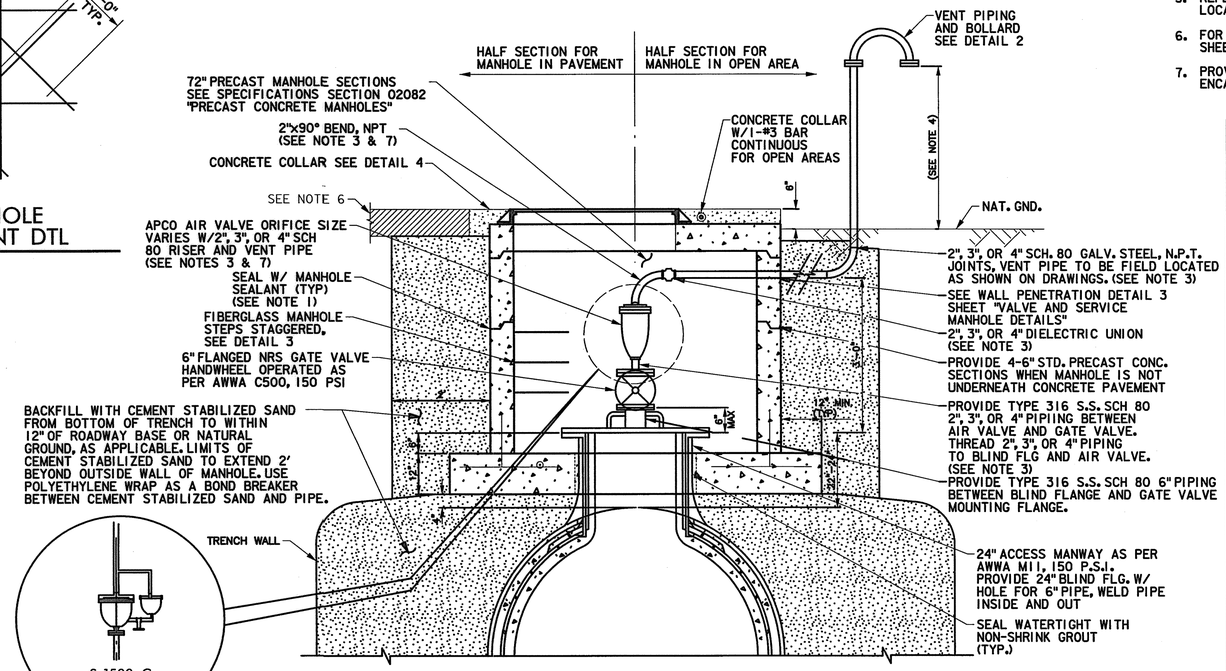
NOTES:

1. CONSTRUCT THE FINAL TWO FEET OF THE MANHOLE AND PLACE CONCRETE WITHIN BLOCKOUT AFTER THE STREET PAVEMENT HAS BEEN INSTALLED.
2. FOR HEAVY DUTY MANHOLE RING, SEE DTL 1
3. FOR MANHOLE STEP DETAIL, SEE DTL 3

4 MANHOLE COLLAR DETAIL



5 SERVICE MANHOLE REINFORCEMENT DTL



6 AI/VR VALVE ASSEMBLY IN SERVICE MANHOLE

(FOR WATER LINES 36-INCH IN DIAMETER AND LARGER)

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
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4/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

AIR VALVE ASSEMBLY DETAILS

SHEET 1 OF 1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: NOT TO SCALE	CITY DWG NO.
SHEET: 214 OF 226	

No.	DATE	REVISIONS	APP.

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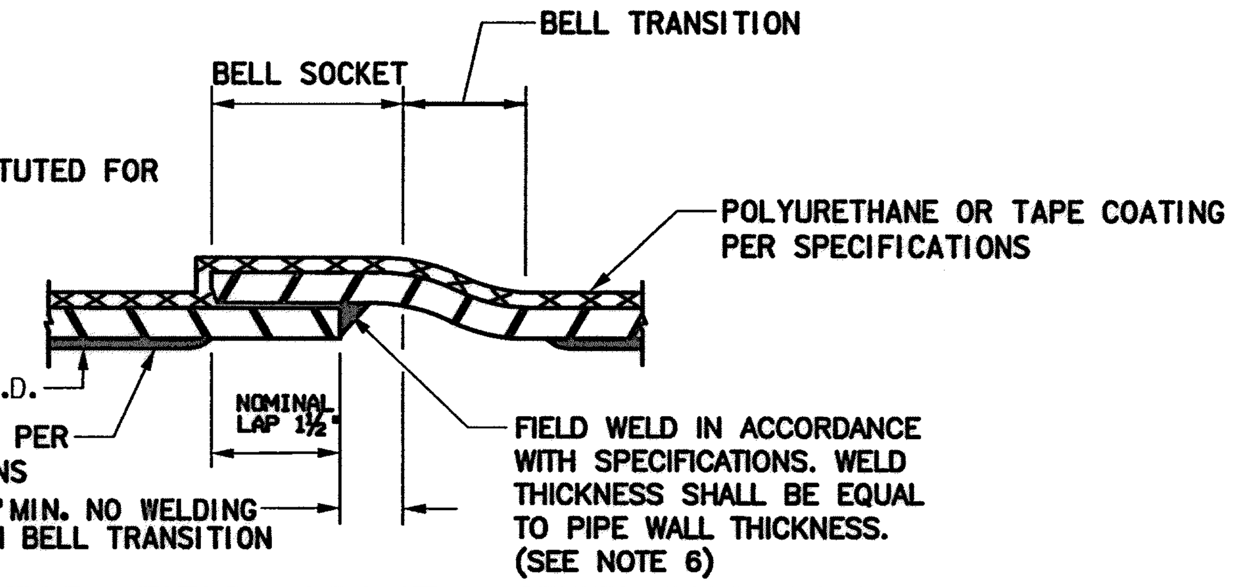
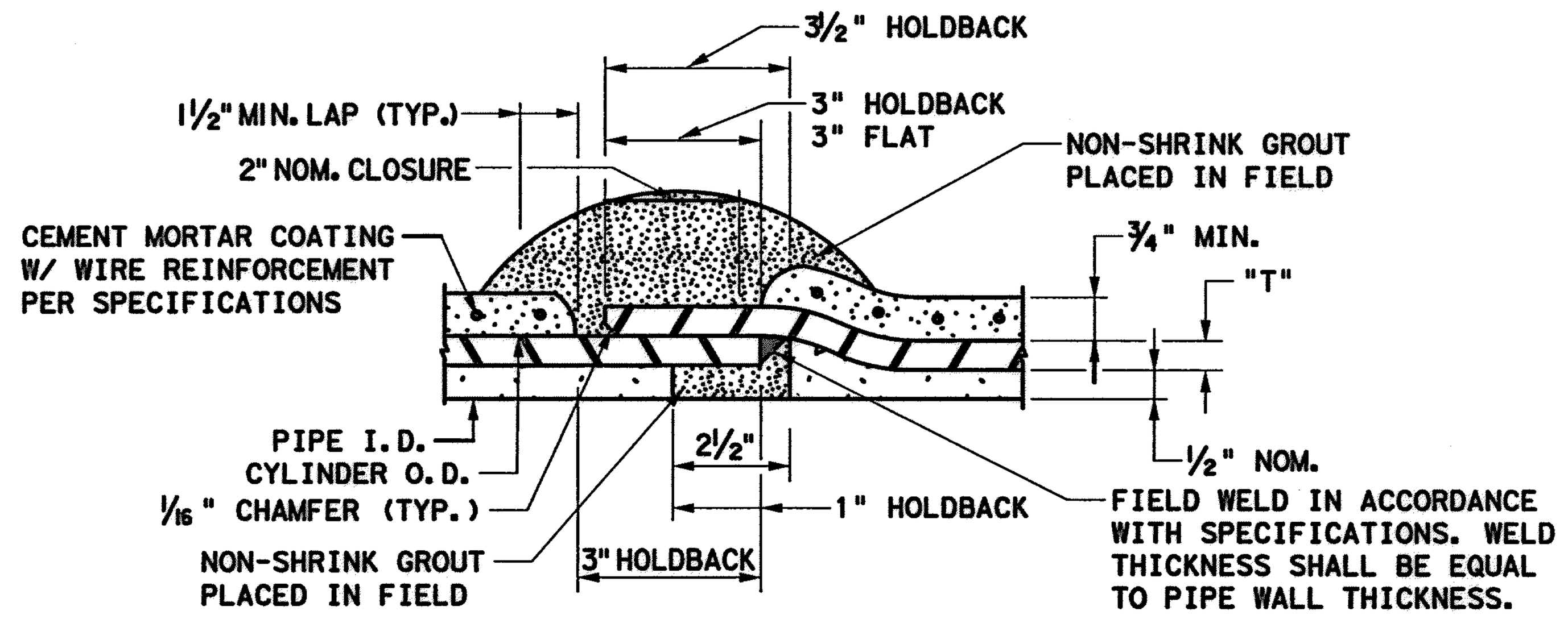
NOTES:

1. OUTSIDE WELD MAY BE SUBSTITUTED FOR INSIDE WELD



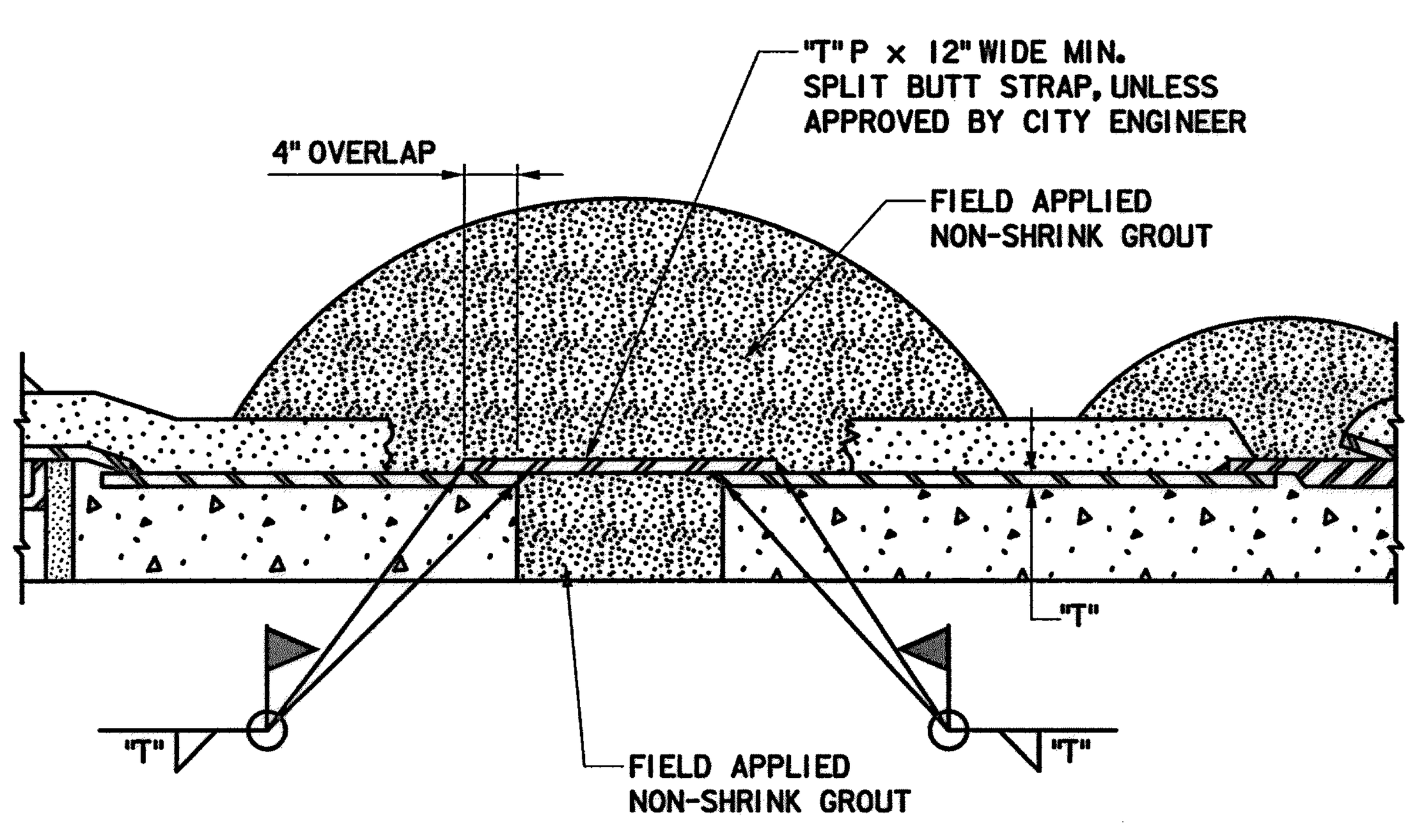
(1) LAP-WELD FIELD JOINT – STEEL PIPE JOINT

FLEXIBLE COATING AND LINING



(2) LAP-WELD FIELD JOINT – STEEL PIPE JOINT

CEMENT MORTAR LINED & CEMENT MORTAR COATED



NOTES:

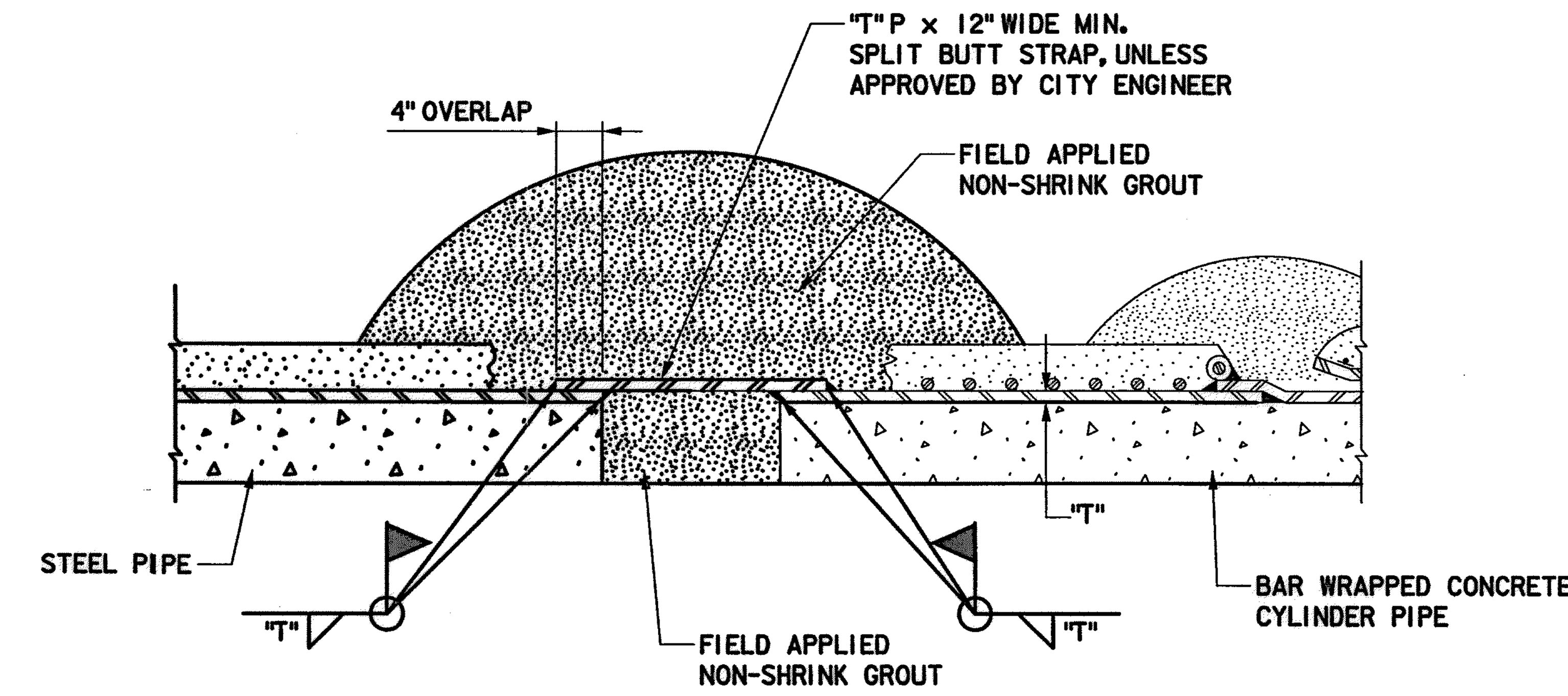
1. WELD SIZE SHALL MATCH THICKNESS OF BUTT STRAP AND CARRIER PIPE, AS RECOMMENDED BY THE PIPE MANUFACTURER.
2. INTERNAL WELD NOT REQUIRED FOR 30" DIAMETER PIPE AND SMALLER.
3. NO ANGULAR DEFLECTION ALLOWED.

(3) CLOSURE PIECE

FOR STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED
(SIMILAR FOR FLEXIBLE COATING AND LINING)

NOTES:

1. T = STEEL PIPE WALL THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
2. ALL REFERENCES TO PIPE DIAMETER FOR THIS PROJECT SHALL SIGNIFY SIZE MEASURED TO INSIDE DIAMETER OF THE LINED PIPE.
3. REFER TO SPECIFICATIONS FOR POLYURETHANE ALTERNATIVE TO TAPE OR CEMENT MORTAR COATING.
4. DETAILS 1, 2, 4 AND 7 SHOW EPOXY LINING. CEMENT MORTAR LINING TO BE SIMILAR TO DETAILS ON THIS SHEET SHOWING CEMENT MORTAR LINED PIPE, AS APPROVED BY CITY ENGINEER.
5. DETAILS 3, 5, 6, AND 9 SHOW CEMENT MORTAR COATING.
6. SEE SPECIFICATIONS FOR REPAIR OF EPOXY LINING.
7. WHEN CEMENT MORTAR COATING IS USED FOR STEEL PIPE, FLEXIBLE MASTIC SEALER SHALL BE APPLIED TO THE EXTERIOR OF THE JOINT PRIOR TO JOINT ENGAGEMENT WHEN PIPE IS INSTALLED IN A TUNNEL OR ENCASEMENT PIPE.

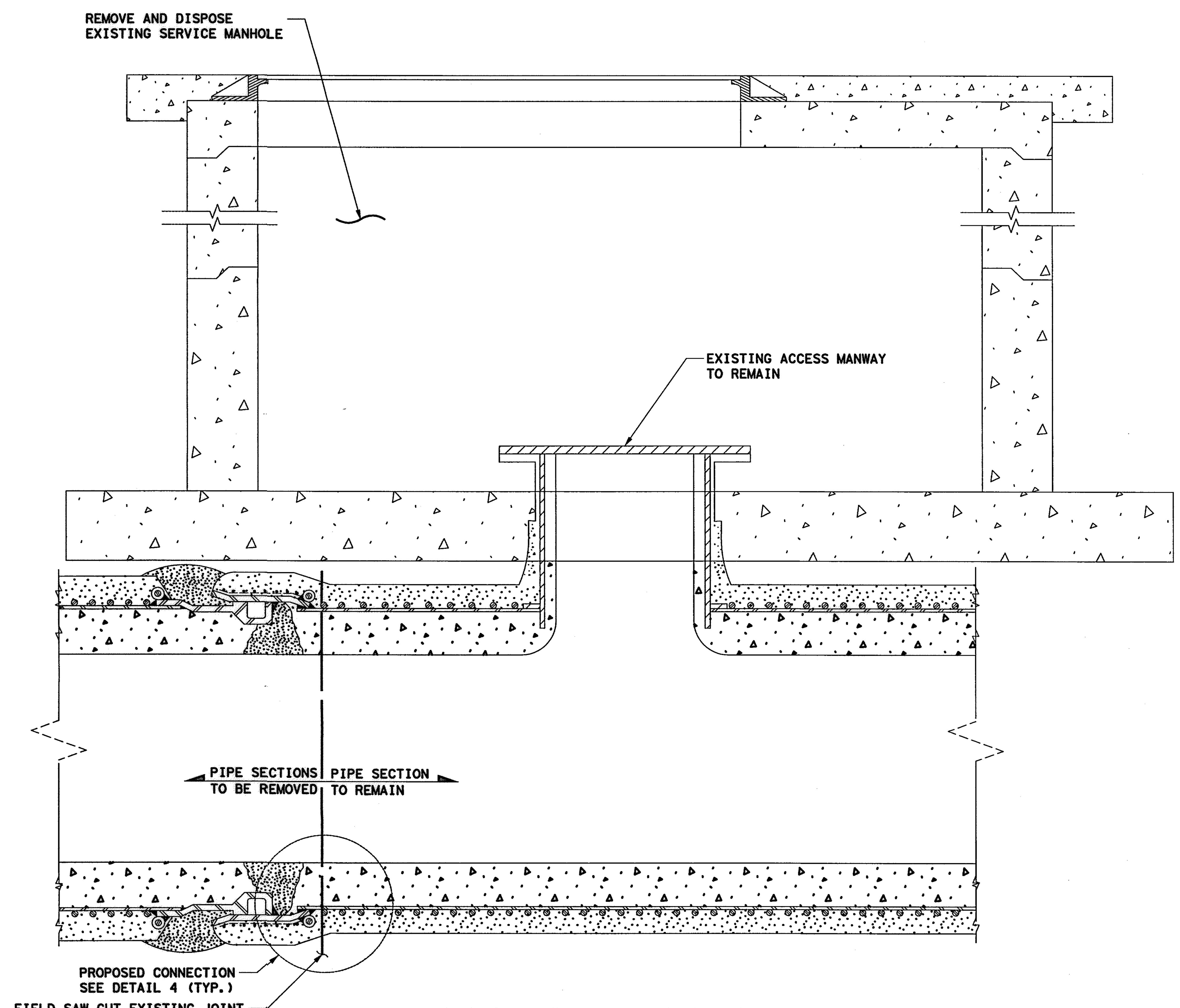


NOTES:

1. WELD SIZE SHALL MATCH THICKNESS OF BUTT STRAP AND CARRIER PIPE, AS RECOMMENDED BY THE PIPE MANUFACTURER.
2. INTERNAL WELD NOT REQUIRED FOR 30" DIAMETER PIPE AND SMALLER.
3. NO ANGULAR DEFLECTION ALLOWED.

(4) CLOSURE PIECE

FOR PROPOSED STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED AND EXISTING BAR WRAPPED CONCRETE CYLINDER PIPE
(SIMILAR FOR FLEXIBLE COATING STEEL PIPE)



(5) EXISTING 48" WL PIPE SECTION AT 3+74.50

SCALE: NTS

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
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LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

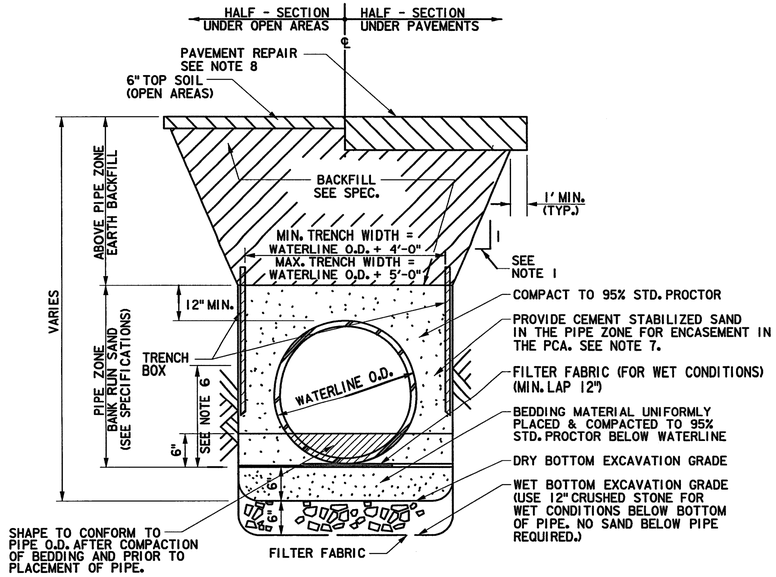
LARGE DIAMETER STANDARD WATER CONNECTION DETAILS

SHEET 1 OF 1

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

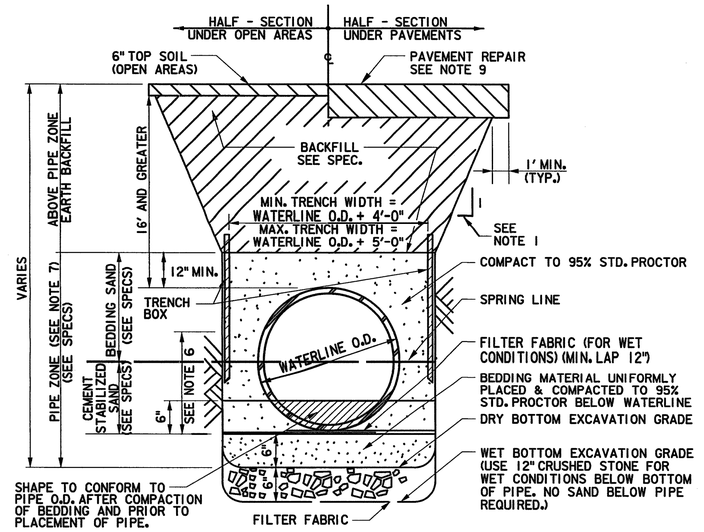
FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET:
215 OF 226



1 EXCAVATION & BACKFILL DETAIL (FOR LARGE DIAMETER WATER MAIN)

NOTES:

1. SEE TRENCH SAFETY SYSTEM SPECIFICATIONS FOR MAXIMUM ALLOWABLE SLOPES.
2. FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
3. KEY CONCRETE TRENCH DAM MINIMUM OF 6 INCHES INTO TRENCH BOTTOM AND WALLS.
4. TRENCH DAM MAY BE FORMED OR UNFORMED. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 6-INCH MINIMUM THICKNESS AND 6-INCH KEY DEPTH REQUIREMENTS.
5. TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SECTION 02317 FOR OTHER REQUIREMENTS.
6. THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
7. USE FILTER FABRIC AS A BOND BREAKER BETWEEN CEMENT STABILIZED SAND AND PIPE.
8. FOR PAVEMENT REPAIR SEE DETAILS IN PAVEMENT SHEETS.

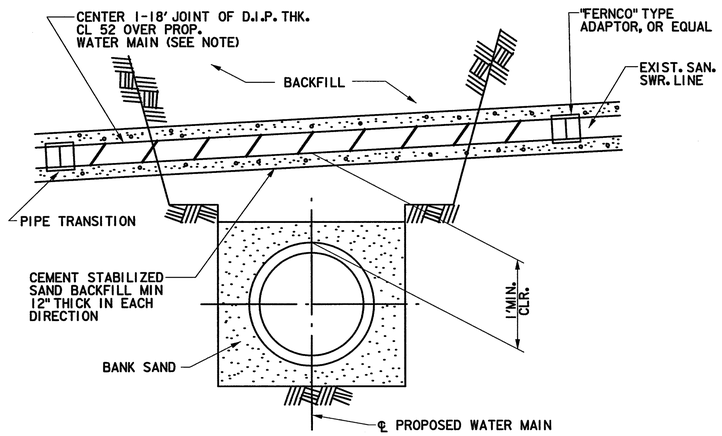


2 EXCAVATION & BACKFILL DETAIL (FOR LARGE DIAMETER WATER MAIN WITH HEIGHT OF EARTH COVER GREATER THAN 16')

NTS

NOTES:

1. SEE TRENCH SAFETY SYSTEM SPECIFICATIONS FOR MAXIMUM ALLOWABLE SLOPES.
2. FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
3. KEY CONCRETE TRENCH DAM MINIMUM OF 6 INCHES INTO TRENCH BOTTOM AND WALLS.
4. TRENCH DAM MAY BE FORMED OR UNFORMED. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 6-INCH MINIMUM THICKNESS AND 6-INCH KEY DEPTH REQUIREMENTS.
5. TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SECTION 02317 FOR OTHER REQUIREMENTS.
6. THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
7. USE POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN CEMENT STABILIZED SAND AND PIPE.
8. ONLY REQUIRED FOR PCCP OR BAR-WRAPPED PIPE UNLESS OTHERWISE NOTED.
9. FOR PAVEMENT REPAIR SEE DETAILS IN PAVEMENT SHEETS.

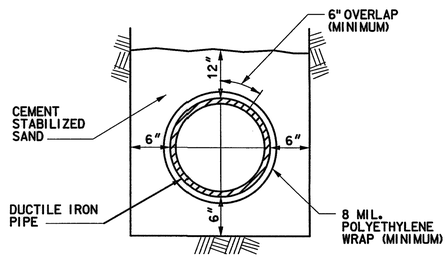


4 D.I.P. OVER PROPOSED WATER LINE

NTS

NOTE:
IF PERMITTED BY CITY ENGINEER, P.V.C. PIPE WITH PRESSURE RATING OF 250, DR18 MAY BE USED.

*NOTE:
DETAIL ALSO APPLIES IN CASES WHERE EXIST SAN SWR IS LOCATED BELOW PROPOSED WATER MAIN



6 EMBEDMENT AND CORROSION PROTECTION FOR SANITARY SEWER DUCTILE IRON PIPE

N.T.S.

NOTES:

1. FOLLOWING EXCAVATION OF TRENCH, PLACE A 6" LAYER OF CEMENT STAB. SAND AT BOTTOM OF TRENCH. LAY POLYETHYLENE WRAP IN TRENCH, AND LAY PIPE ON TOP OF WRAP. FOLD WRAP AROUND PIPE WITH A 6" OVERLAP (MIN.) AND TIE AROUND PIPE WITH HEAVY BINDER TWINE, OR EQUAL, ON 6" CENTERS. PROVIDE A 12" OVERLAP (MIN.) AND TIE WITH HEAVY BINDER TWINE END LAPS. PLACE ADDITIONAL CEMENT SAND UP TO 12" ABOVE
2. ALL DUCTILE IRON PIPE SHALL HAVE A POLYETHYLENE "WRAP" OF 8 MIL. THICKNESS (MINIMUM) EXCEPT AS NOTED BELOW.
3. WHERE PIPE IS PLACED IN AN AUGER OR TUNNEL OR IN A CASING, PIPE IS TO HAVE A DOUBLE WRAP OF 16 MIL POLYEHTYLENE AND SHALL BE BONDED ON 12" CENTERS WITH ½" STAINLESS STEEL BANDS. END LAPS TO BE AS SPECIFIED FOR TRENCH SECTIONS.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

LARGE DIAMETER WATERLINE EXCAVATION, BEDDING, AND BACKFILL DETAILS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
NOT TO SCALE
SHEET: 216 OF 226

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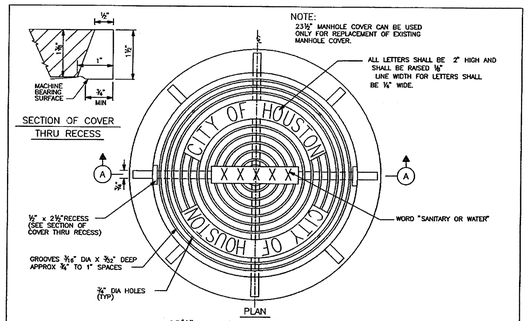


1) NOTE APPROXIMATE WEIGHTS.
FRAME- 170 LBS 77KG
COVER – 270 LBS 123 KG
UNIT 440 LBS 200 KG

2) MATERIAL – GRAY IRON ASTM A48 CL35B

3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION.

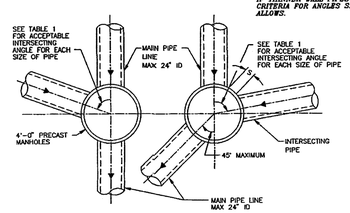
4) MODEL V-1420 ASV OR APPROVED EQUAL

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER AND WATER MANHOLE FRAME AND COVER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02084-01

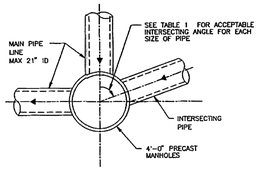
NOTES ON USE OF STANDARD DETAIL 02082-02

NOTES TO SPECIFIER:

1. *"L" 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



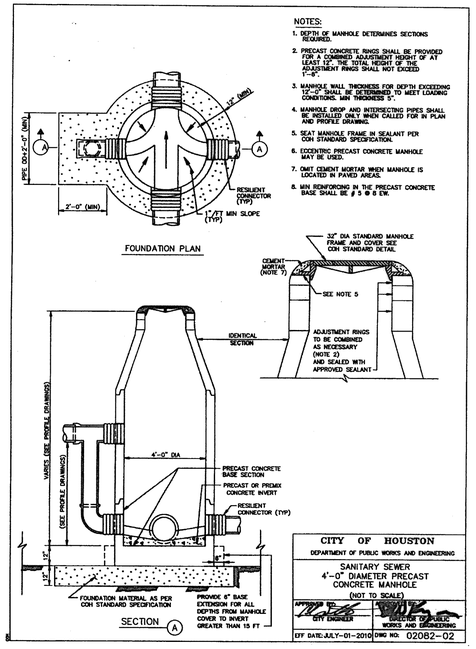
MAX 21" ID MAIN PIPE ALLOWED FOR 45° TO 90° DEFLECTION

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	NOT APPLICABLE UNLESS HYDRAULICS DICTATE (INTERSECTING PIPE > MAIN PIPE)					–	–	–
21							–	–
24								–

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER 4'-0" DIAMETER PRECAST CONCRETE MANHOLE NOTES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02082N-02



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

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
94776
LICENSED PROFESSIONAL ENGINEER
9/11/14
Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD SANITARY SEWER DETAILS

SHEET 1 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 217 OF 226	

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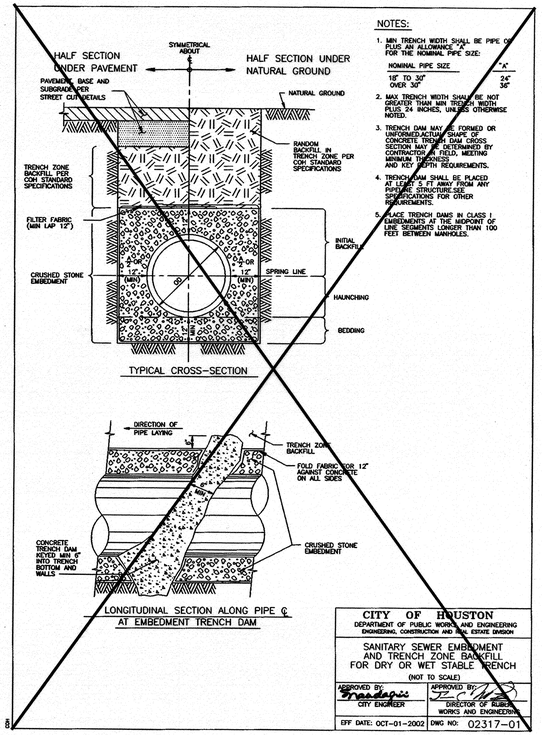


NOTES:

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.

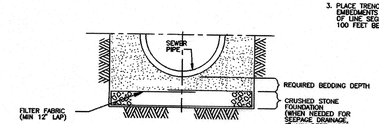
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER EMBEDMENT AND TRENCH ZONE BACKFILL FOR DRY OR WET STABLE TRENCH
(NOT TO SCALE)

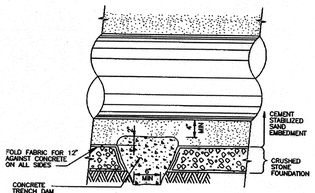
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02317-01

NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, OR OTHER CLASS II 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.



CROSS-SECTION OF CRUSHED STONE FOUNDATION



LONGITUDINAL SECTION ALONG PIPE ℄
AT FOUNDATION TRENCH DAM

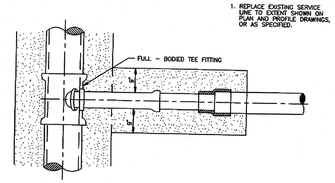
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY OR STORM SEWER
CRUSHED STONE FOUNDATION
FOR WET STABLE TRENCH
(NOT TO SCALE)

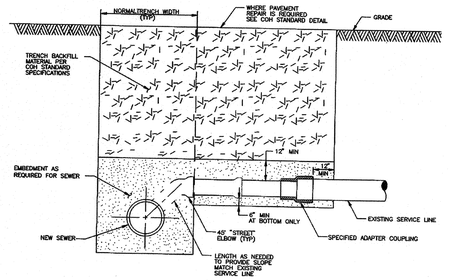
APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002 DWG NO: 02317-02

NOTE:

1. REPLACE EXISTING SERVICE LINE TO EXTENT SHOWN ON PLAN AND PROFILE DRAWINGS, OR AS SPECIFIED.



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
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: 02534-04

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
CHRISTINE H. KIRBY, P.E.
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Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

STANDARD SANITARY SEWER DETAILS

SHEET 2 OF 2

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: — FACILITY
DRAWING SCALE: NOT TO SCALE — CITY DWG NO.
SHEET: 218 OF 226

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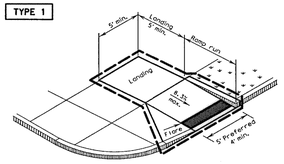
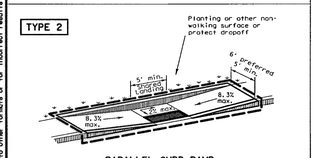
TYPE 1



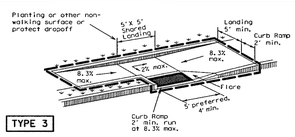
PERPENDICULAR CURB RAMP

TYPE 2

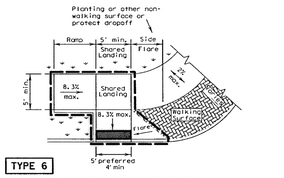


PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 3

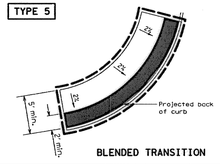


TYPE 6



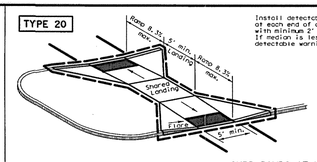
COMBINATION CURB RAMPS

TYPE 5



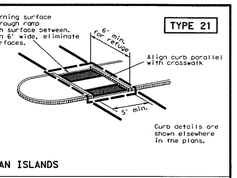
BLENDED TRANSITION

TYPE 20



Install detectable warning surface at each end of curb through ramp. If median is wide enough between. If median is less than 6' wide, eliminate detectable warning surfaces.

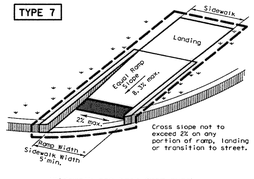
TYPE 21



Curb details are shown elsewhere in the plans.

CURB RAMPS AT MEDIAN ISLANDS

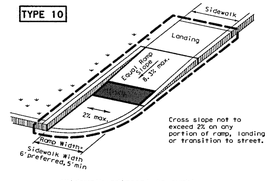
TYPE 7



Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk set back from curb)

TYPE 10

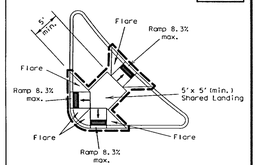


Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk adjacent to curb)

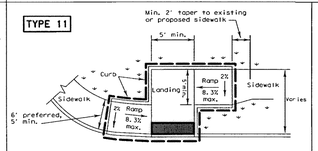
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 22



COMBINATION ISLAND RAMPS

TYPE 11



OFFSET PARALLEL CURB RAMP

NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RN	DW: TxDOT	CK: VP
©TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.

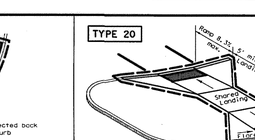
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever an accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is a concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4358 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. 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.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



PERPENDICULAR CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

DIRECTIONAL CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

SECTION: CURB RAMP AT DETECTABLE WARNING

PARALLEL CURB RAMP

Typical placement of detectable warning surface on landing at street edge.

DETECTABLE WARNINGS

Detectable Warning Pavers

24. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a contanuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

SHEET 2 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12b.dgn	DN: TxDOT	CK: RN	DW: TxDOT	CK: VP
©TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. — 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TxDOT STANDARDS

SHEET 1 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY

DRAWING SCALE: NOT TO SCALE | CITY DWG NO.

SHEET: 219 OF 226

No.	DATE	REVISIONS	APP.

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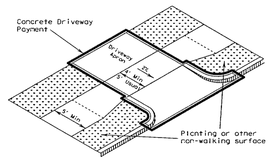
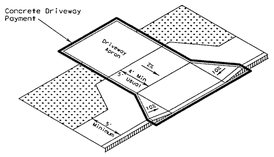
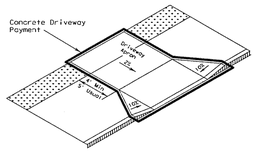


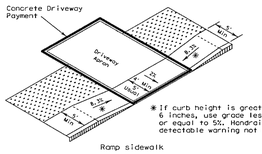
Setback sidewalk



Apron offset sidewalk



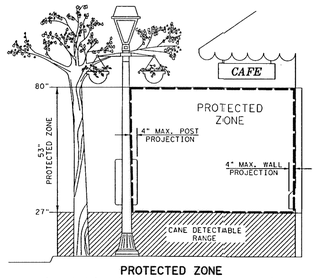
Wide sidewalk



*If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

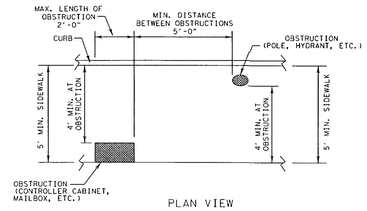
Ramp sidewalk

SIDEWALK TREATMENT AT DRIVEWAYS



PROTECTED ZONE

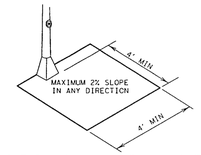
In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27"and 80" above the surface.



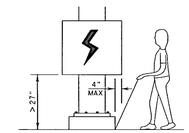
PLAN VIEW

PLACEMENT OF STREET FIXTURES

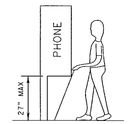
(ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' x 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.)



CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



When an obstruction of a height greater than 27" from the surface would create a protrusion of more than 4" into the pedestrian circulation area, construct additional curb or foundation at the bottom to provide a maximum 4" overhang.



Protruding objects of a height ≤ 27" are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
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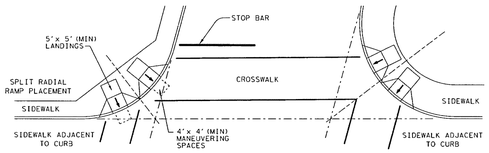
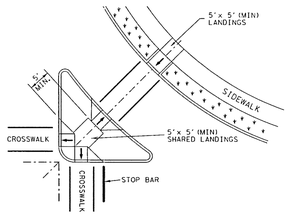
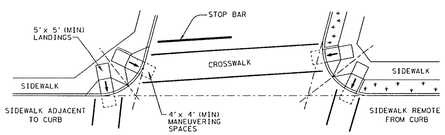
REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.



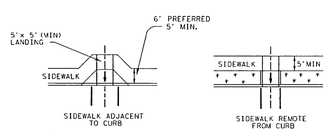
SKEWED INTERSECTION WITH "LARGE" RADIUS



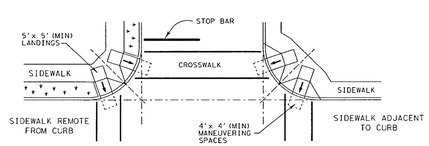
AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

TYPICAL CROSSING LAYOUTS

SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
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REVISIONS				
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No.	DATE	REVISIONS	APP.

9-15-2014

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TxDOT STANDARDS

SHEET 2 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 220 OF 226	

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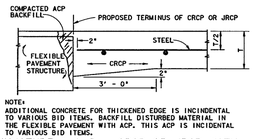
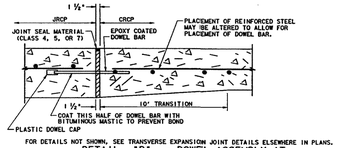


NOTE:
ADDITIONAL CONCRETE FOR THICKENED EDGE IS INCIDENTAL TO VARIOUS BID ITEMS. BACKFILL DISTURBED MATERIAL IN THE FLEXIBLE PAVEMENT WITH ACP. THIS ACP IS INCIDENTAL TO VARIOUS BID ITEMS.

JUNCTURE A & B - CRCP OR JRCP WITH FLEXIBLE TYPE PAVEMENT STRUCTURE

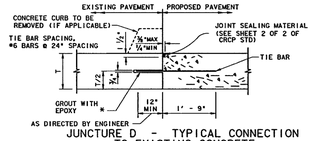


FOR DETAILS NOT SHOWN, SEE TRANSVERSE EXPANSION JOINT DETAILS ELSEWHERE IN PLANS.

DETAIL "B" - DOWEL ASSEMBLY AT EXPANSION JOINT

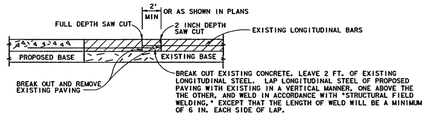
DOWEL BAR DATA			
SLAB THICKNESS(T)	6"-7.5"	8"-10"	10.5"-15"
DOWEL SIZE	1"	1 ¼"	1 ½"
DOWEL LENGTH	18"	20"	22"
DOWEL BAR SPACING	12"	12"	12"

TABLE A - DOWEL BAR DATA



JUNCTURE D - TYPICAL CONNECTION TO EXISTING CONCRETE

*FOR EPOXY TYPE SEE ITEM 361.



JUNCTURE F - "BREAK BACK" CONCRETE CRCP WITH CRCP OR JRCP WITH JRCP

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING PLACING CONCRETE AND REINFORCEMENT, REFER TO THE GOVERNING SPECIFICATION FOR CONCRETE PAVEMENT.
2. THE DESIGN REQUIREMENTS FOR THE PAVEMENT STRUCTURE, I.E. BAR SPACING, BAR SIZE LAP REQUIREMENTS, ETC., ARE SHOWN ON THE APPROPRIATE PAVEMENT DESIGN DETAIL.
3. SLEEPER SLAB AND ADDITIONAL REINFORCING REQUIRED ON THIS DRAWING ARE INCIDENTAL TO THE VARIOUS BID ITEMS.
4. USE THE SIZE, SPACING, AND LENGTH OF DOWEL BARS SHOWN IN TABLE "A".
5. WHERE THERE WILL BE A JUNCTURE AND ADDITIONAL JRCP PAVING WILL BE PLACED AT A FUTURE DATE, MULTIPLE PIECE DOWEL BARS WILL BE PERMITTED AT THE JUNCTURE. PROVIDE MULTIPLE PIECE DOWEL BAR ASSEMBLIES WITH A MINIMUM ULTIMATE TENSILE STRENGTH OF 60.0 KIPS AND THAT HAVE SMOOTH EPOXY COATED BARS. ENSURE THE MULTIPLE PIECE DOWEL BAR ASSEMBLIES HAVE STOP TYPE COUPLINGS AND HAVE HAVE ROLLED THREADS ON THE BARS. DISMANTLE THE BAR AND FIT THE COUPLING PORTION USED IN CONSTRUCTION, WITH A PLASTIC CAP. FURNISH THE REMAINING PORTION OF THE BAR TO THE ENGINEER.
6. WHERE THE PAVING IS CRCP AND A RAMP COMPOSED OF A FLEXIBLE PAVEMENT WILL BE USED AT THE JUNCTURE UNTIL FUTURE PAVING IS CONSTRUCTED, MULTIPLE PIECE TIE BARS MAY BE USED IF PERMITTED BY THE ENGINEER. IF USED, ENSURE THE MULTIPLE PIECE TIE BAR ASSEMBLIES HAVE STOP TYPE COUPLINGS AND ROLLED THREADS ON THE BARS. FURNISH MULTIPLE PIECE TIE BAR ASSEMBLIES THAT DEVELOP A MINIMUM ULTIMATE TENSILE STRENGTH EQUAL TO 1.25 TIMES THE YIELD STRENGTH OF THE TRANSVERSE BARS BEING JOINED. FOR TIE BARS, USE DEFORMED REINFORCING BARS. TIE BAR ASSEMBLIES MADE FROM STEELS OTHER THAN ASTM GRADE 60 AND WITH DEFORMATIONS OTHER THAN ASTM STD. MAY BE USED PROVIDED THEY PROVE SATISFACTORY TO THE ENGINEER AND ARE IN EVERY RESPECT THE EQUAL TO THE ASSEMBLIES SPECIFIED. LABORATORY TESTING OF THE PROPOSED ASSEMBLIES, AT THE CONTRACTOR'S EXPENSE, MAY BE REQUIRED. LAP AND WELD ONE PORTION OF THE TIE BAR ASSEMBLY TO EACH LOGITUDINAL BAR IN ACCORDANCE WITH THE ITEM "STRUCTURAL FIELD WELDING "AND THE OTHER PORTION INTO THE COUPLING PRIOR TO PAVING. ENSURE MULTIPLE PIECE TIE BAR LENTHS CONFORM TO THE TIE BAR LENGTHS SHOWN ELSEWHERE IN THE PLANS. ADDITIONAL "SHEAR STEEL" WILL ALSO BE REQUIRED AND MAY BE USED WITH MULTIPLE PIECE ASSEMBLIES AS PREVIOUSLY DESCRIBED. USE ADDITIONAL STEEL BARS OF EQUAL DIAMETER AT A SPACING DOUBLE THAT OF THE LOGITUDINAL STEEL AND ENSURE THE LENGTH IS 66 TIMES THE TIE BAR DIAMETER.
7. DO NOT SHEAR CUT DOWEL BARS.
8. ENSURE DOWEL BAR EPOXY COATING CONFORMS TO ARTICLE 440.2.F., "EPOXY COATING".
9. REPLACE ANY BENT LONGITUDINAL REINFORCING. IF THERE IS NOT SUFFICIENT EXPOSED REINFORCING TO PROVIDE A MINIMUM OF A 33 TIMES BAR DIAMETER LAP, REMOVE THE EXISTING PAVEMENT AND SUFFICIENTLY EXPOSE THE EXISTING REINFORCING TO PROVIDE A 33 TIMES BAR DIAMETER LAP. REPLACE ANY SHEAR BARS THAT ARE DISTURBED, BY DRILLING AND GROUTING AS REQUIRED BY NOTE 12 BELOW. PERFORM THIS CORRECTIVE ACTION AT NO EXPENSE TO THE DEPARTMENT.
10. TIE BARS AND DOWEL BARS OMITTED, LOST, OR DAMAGED SHALL BE REPAIRED BY DRILLING AND EPOXY GROUTING AT NO EXPENSE TO THE DEPARTMENT.
11. JUNCTURES A & B ARE ONLY SUITABLE FOR MINOR STREETS WITH LOW TRAFFIC VOLUMES.
12. FURNISH ADDITIONAL SHEAR BARS (DIAMETER "D") OF THE SAME SIZE AS LONGITUDINAL BARS AND SPACE THEM MIDWAY BETWEEN ALTERNATE LONGITUDINAL BARS ALONG THE TRANSVERSE CONSTRUCTION JOINT FORMED AT THE LEAVE-OUT.

LEGEND

ACP - ASPHALT CONCRETE PAVEMENT
CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
T - THICKNESS

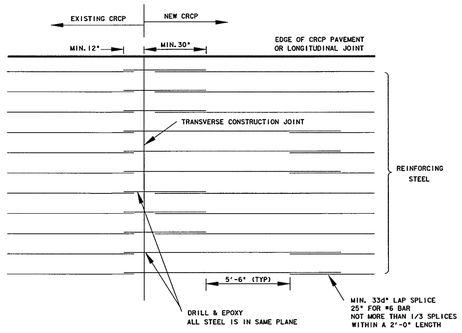
SHEET 1 OF 2

Texas Department of Transportation
Houston District

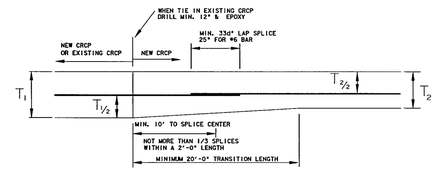
CONCRETE PAVEMENT JUNCTURES

CPJ

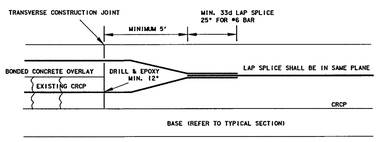
FILE: STDB-5.dgn	DN:	CK:	DW:	CK:
©TxDOT DEC. 2009	DIST	FED RD	PROJECT NO.	SHEET
REVISIONS 5/05 2004 SPECS REVISED 4/2008	HOU	6		
	COUNTY	CONTROL	SECT	JOB	HIGHWAY



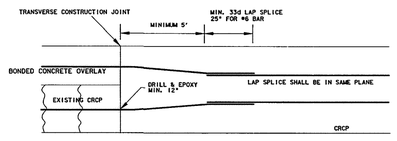
EXISTING CRCP TO NEW CRCP



CRCP THICKNESS TRANSITION



CRCP BONDED OVERLAY TO CRCP TRANSITION
(ONE LAYER STEEL)



CRCP BONDED OVERLAY TO CRCP TRANSITION
(TWO LAYER STEEL)

SHEET 2 OF 2

Texas Department of Transportation
Houston District

CONCRETE PAVEMENT JUNCTURES

CPJ

FILE: STDB-5.dgn	DN:	CK:	DW:	CK:
©TxDOT DEC. 2009	DIST	FED RD	PROJECT NO.	SHEET
REVISIONS 5/05 2004 SPECS REVISED 4/2008	HOU	6		
	COUNTY	CONTROL	SECT	JOB	HIGHWAY

No.	DATE	REVISIONS	APP.

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
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TxDOT STANDARDS

SHEET 3 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 221 OF 226	

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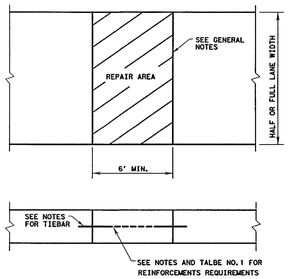
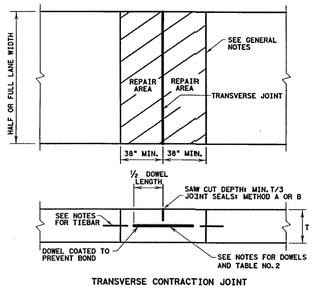
DATE:
FILE:

FULL DEPTH REPAIR



FULL DEPTH TRANSVERSE JOINT REPAIR



TRANSVERSE CONTRACTION JOINT

GENERAL NOTES:

1. ITEM 361, "FULL-DEPTH REPAIR OF CONCRETE PAVEMENT," SHALL GOVERN FOR THIS WORK. THE FOLLOWING SPECIFICATIONS ARE REFERENCED IN ITEM 361:
   - ITEM 360, " CONCRETE PAVEMENT "
   - ITEM 421, " HYDRAULIC CEMENT CONCRETE "
   - ITEM 438, " CLEANING AND SEALING JOINTS AND CRACKS (REPAIR OF PAVEMENT AND BRIDGE DECKS) "
   - ITEM 440, " REINFORCING STEEL"
   - DMS-4650, " HYDRAULIC CEMENT CONCRETE CURING MATERIALS AND EVAPORATION RETARDANTS"
   - DMS-6100, " EPOXIES AND ADHESIVES "
   - DMS-6310, " JOINT SEALANTS AND FILLERS"
2. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
3. LONGITUDINAL FULL DEPTH SAW CUTS SHALL BE AT EXISTING LONGITUDINAL JOINTS.
4. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
5. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A GROUT APPROVED BY THE ENGINEER.
6. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

REINFORCEMENTS REQUIREMENTS

REINFORCING STEEL SHALL BE #6 DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60).

R1. THE STEEL SPACING FOR CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (CRCP) AND JOINTED REINFORCED CONCRETE PAVEMENT (JRCP) SHALL BE REINFORCED AS SHOWN IN TABLE NO.1.

R2 REINFORCING BARS SHALL BE PLACED IN ONE LAYER AND SHALL BE TIED TO THE TIEBARS.

R3. THE LENGTH OF THE REINFORCING BAR SHALL BE THE LENGTH OR WIDTH OF THE REPAIR AREA MINUS 2 INCHES. THE END OF THE BAR SHALL BE PLACED WITHIN 1 INCH FROM THE REPAIR EDGE.

TIEBARS FOR REPAIR AREAS

T1. TIEBARS SHALL BE PLACED AT APPROXIMATELY THE MID-DEPTH OF SLAB. THE BOTTOM OF THE HOLE DRILLED FOR THE LONGITUDINAL BARS SHALL BE AT MID-DEPTH AND THE TOP OF THE HOLES DRILLED FOR THE TRANSVERSE BARS SHALL BE AT MID-DEPTH. MID-DEPTH WILL BE ESTABLISHED BY MEASURING FROM THE TOP OF THE SLAB DOWN. THE THICKNESS OF THE CONCRETE SLAB WILL BE DEFINED BY THE PLANS OR THE ENGINEER.

T2. THE BAR SIZE AND SPACING OF TIEBARS ARE SHOWN IN TABLE NO. 1.

T3. THE MINIMUM LENGTH OF TIEBARS EXTENDED INTO THE REPAIR AREA SHOULD BE 25 INCHES FOR A #6 BAR.

T4. THE TIEBAR SHALL BE GROUTED INTO THE EXISTING CONCRETE A MINIMUM OF 12 INCHES. BEFORE REPAIR WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIEBARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.

T5. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.

DOWELS FOR TRANSVERSE JOINT REPAIRS

D1. SMOOTH DOWEL BARS SHALL BE DELIVERED TO THE JOBS SITE IN PREFABRICATED DOWEL ASSEMBLIES. THE ENTIRE DOWEL BAR SHALL BE COATED WITH A MATERIAL WHICH WILL PREVENT BONDING TO THE CONCRETE.

D2. THE SIZE AND SPACING OF DOWEL BARS SHALL BE AS SHOWN IN TABLE NO.2.

D3. PLACEMENT OF TIEBARS AND OTHER REINFORCING STEEL SHALL BE STOPPED APPROXIMATELY 4" FROM THE DOWEL BAR ASSEMBLY.

D4. DOWEL BAR PLACEMENT SHALL MEET THE REQUIREMENTS OF ITEM 360, "CONCRETE PAVEMENT."

TABLE NO. 2 DOWELS (SMOOTH BARS)			
PAVEMENT THICKNESS (INCHES)	SIZE AND DIA.	LENGTH (INCHES)	SPACING (INCHES)
8	#8 (1 IN.)	18	12
9	#9 (1⅛ IN.)		
≥10	#10 (1¼ IN.)		

TABLE NO. 1 STEEL BARS SIZE AND SPACING

TYPE OF REINFORCEMENTS	TYPE PAVEMENT	PAVEMENT THICKNESS (INCHES)	TIEBARS		REGULAR REBARS		ALL BARS
			SIZE BAR (BAR NO.)	BAR SPACING (INCHES)	SIZE BAR (BAR NO.)	SPACING (INCHES)	FIRST & LAST SPACING AT END OR SIDE (INCHES)
TRANSVERSE BARS	CRCP JRCP	ALL	#6	24	#6	24	12
	JCP (CPCD)	ALL	#6	24	NONE	NONE	12
LONGITUDINAL BARS	CRCP	8	#6	9	#6	9	12
		9	#6	8	#6	8	12
		10	#6	7	#6	7	12
		11	#6	6.5	#6	6.5	12
		≥12	#6	6	#6	6	12
	JRCP	ALL	#6	12	#6	24	12
	JCP (CPCD)	ALL	#6	12	NONE	NONE	12

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FULL DEPTH REPAIR FOR CONCRETE PAVEMENT

FDR(CP)-05

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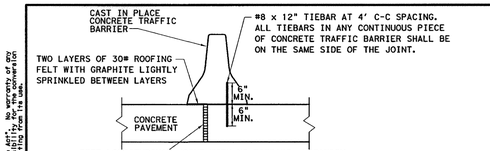
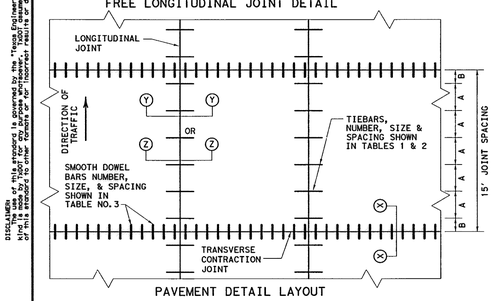


FREE LONGITUDINAL JOINT DETAIL

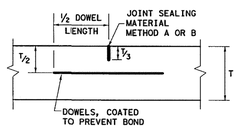


PAVEMENT DETAIL LAYOUT

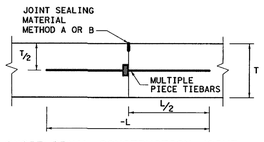
TABLE NO.1 TIEBARS REQUIRED FOR LONGITUDINAL JOINT JOINTS FOR EACH 15' SLAB

ASTM A-616 OR A-615 (GRADE 60) STRAIGHT OR MULIPLE PIECE REINFORCING TIEBARS		CONCRETE SLAB THICKNESS	DISTANCE FROM THE LONGITUDINAL JOINT TO THE NEAREST LONGITUDINAL FREE EDGE			
			< OR =16'	< OR =24'	< OR =34'	< OR =50'
BAR LENGTH, "L" INCHES	BAR SIZE	"T" INCHES	REQUIRED NO.OF BARS	REQUIRED NO.OF BARS	REQUIRED NO.OF BARS	REQUIRED NO.OF BARS
42	#5 (⅝")	8	5	5	6	9
		9	5	5	7	10
		10	5	5	7	11
		11	5	6	8	12
		12	5	6	9	13
		13	5	7	9	13
		14	6	7	10	NA
		15	6	8	11	NA
50	#6 (¾")	8	5	5	5	6
		9	5	5	5	7
		10	5	5	5	8
		11	5	5	6	8
		12	5	5	6	9
		13	5	5	7	10
		14	5	5	7	10
		15	5	6	8	11

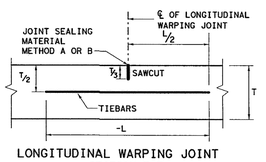
THE DISTANCE TO THE FREE EDGE WILL BE DETERMINED BY THE ENGINEER AND THE DISTANCE WILL BE BASED ON THE NOMINAL WIDTHS OF THE LANES AND SHOULDERS PLUS ANY TIED RAMPS OR CONNECTING ROADWAYS.



TRANSVERSE CONTRACTION JOINT SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT SECTION Y-Y



LONGITUDINAL WARPING JOINT SECTION Z-Z

TABLE NO.2 TIEBAR SPACINGS

SPACING REQUIREMENT FOR 15'SLAB FOR REQUIRED NUMBER OF BARS		
REQUIRED NO.OF BARS	REGULAR SPACING INCHES	FIRST AT JOINT SPACING INCHES
5	36	18
6	30	15
7	25	15
8	21	16.5
9	18	18
10	16	18
11	15	15
12	13	18.5
13	12	18

TABLE NO.3 DOWELS REQUIEMENTS

T, IN.	DOWELS (SMOOTH BARS)	
	SIZE AND LENGTH	AVERAGE SPACING (INCHES)
8	1" X 18"	12
9	1 ⅛" X 18"	12
10	1 ¼" X 18"	12
11	1 ⅜" X 18"	12
12	1 ½" X 18"	12
13	1 ⅝" X 18"	12
14	1 ¾" X 18"	12
15	1 ⅞" X 18"	12

GENERAL NOTES

1. CONCRETE SLABS WIDER THAN 100' WITHOUT A FREE JOINT, ARE NOT COVERED BY THIS STANDARD.
2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
3. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS, AND CROWN CROSS SLOPE SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
4. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR WILL BE SHOWN IN CONCRETE PAVEMENT DETAIL, JOINT SEALANT STANDARD (JS-94).
5. PAVEMENT WIDTHS IN EXCESS OF 16' SHALL BE PROVIDED WITH A LONGITUDINAL JOINT (SECTION Z-Z OR Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6" OF THE LANE LINES UNLESS SHOWN ELSEWHERE ON THE PLANS.
6. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL WARPING JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS.
7. THE SPACING BETWEEN TRANSVERSE JOINTS SHALL BE 15 FEET UNLESS OTHERWISE SHOWN IN THE PLANS.
8. WHERE A MONOLITHIC CURB IS SPECIFIED, THE JOINT IN THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.
9. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE NOMINAL DEPTH OF THE PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.
10. THE ENGINEER WILL ADJUST THE REQUIRED NUMBER OF TIEBARS FOR SLABS SHORTER OR LONGER THAN 15'. SPACING "B" WILL BE ADJUSTED TO MAINTAIN A MINIMUM CLEARANCE OF 2" BETWEEN THE TIEBAR AND THE DOWEL BARS AT THE TRANSVERSE JOINT AND THE "A" SPACING WILL REMAIN AS REQUIRED FOR THE PAVEMENT SLAB WIDTH.
11. MULTIPLE PIECE TIEBARS SHALL BE USED AT LONGITUDINAL CONSTRUCTION JOINTS UNLESS OTHERWISE SPECIFIED IN THE PLANS.
12. THE SAW CUT FOR LONGITUDINAL WARPING AND THE TRANSVERSE CONSTRUCTION JOINTS MAY BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.

Texas Department of Transportation — Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-8 THRUGH 15 INCHES

CPCD-94

FILE: cpcd94.dgn	DN: TxDOT	CK: LJS	DW: BD	CK: CLC
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TxDOT STANDARDS

SHEET 4 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
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SHEET:
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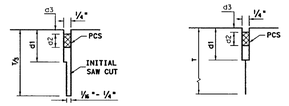
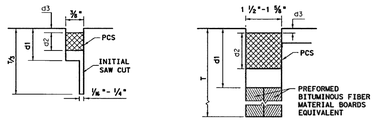


SAWED LONGITUDINAL JOINT

LONGITUDINAL CONSTRUCTION JOINT

LONGITUDINAL JOINT SEALS



SAWED CONTRACTION JOINT

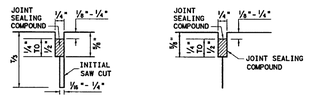
FORMED FORMED EXPANSION JOINT

TRANSVERSE JOINT SEALS

METHOD A: PREFORMED COMPRESSION SEALS (PCS)
(CLASS 6 PREFORMED JOINT SEALANT)

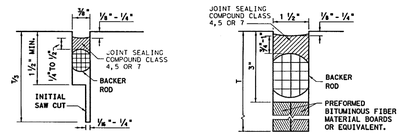
GENERAL NOTES FOR METHOD "A"

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. DIMENSIONS d1, d2, AND d3 SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURES RECOMMENDATION.
4. THE JOINT RESERVOIR FOR SEALANT SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION AND THE TWO SAWED JOINTS.
5. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 AND PRIOR TO BEGINNING OPERATIONS, THE CONTRACTOR SHALL SUBMIT A STATEMENT FROM THE SEALANT MANUFACTURER SHOWING THE RECOMMENDED EQUIPMENT AND INSTALLATION PROCEDURES TO BE USED.
6. THE SAW CUT FOR THE LONGITUDINAL JOINT SHALL BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.



SAWED LONGITUDINAL JOINT

LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

TRANSVERSE FORMED EXPANSION JOINT

METHOD B: JOINT SEALING COMPOUND

GENERAL NOTES FOR METHOD "B"

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE ENGINEER SHALL SELECT A TARGET PLACEMENT THICKNESS FOR THE SEALANT DETAILS WHICH SHOW RANGES IN THICKNESS. THE TARGET THICKNESS WILL NORMALLY BE THE MIDPOINT OF THE RANGE.
4. THE JOINT RESERVOIR FOR SEALANT SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION AND THE TWO SAWED JOINTS.
5. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 AND PRIOR TO BEGINNING OPERATIONS, THE CONTRACTOR SHALL SUBMIT A STATEMENT FROM THE SEALANT MANUFACTURER SHOWING THE RECOMMENDED EQUIPMENT AND INSTALLATION PROCEDURES TO BE USED.
6. THE SAW CUT FOR THE LONGITUDINAL JOINT SHALL BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.

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CONCRETE PAVING DETAILS JOINT SEALS

JS-94

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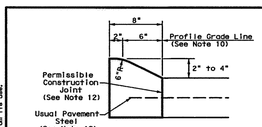
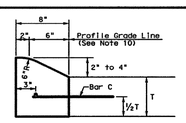


TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



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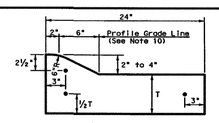
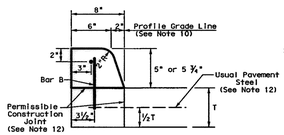


TYPE I CURB AND GUTTER
2" - 4" HEIGHT



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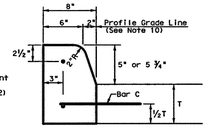

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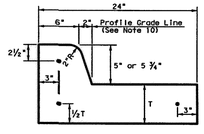

TYPE II CURB AND GUTTER
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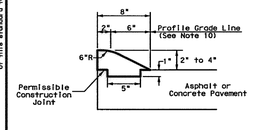

TYPE III CURB (KEYED)
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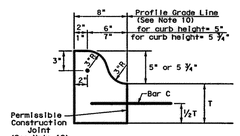
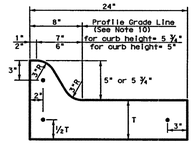


TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
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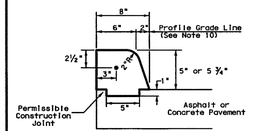

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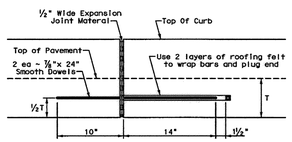
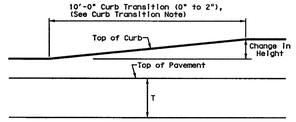


EXPANSION JOINT DETAIL

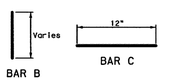
Curb Transition Note:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

General Notes

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (WPL), maintained by TxDOT, Construction Division.
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ½inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.



BAR B

BAR C

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CONCRETE CURB AND CURB AND GUTTER

CCCG-12

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MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER
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TxDOT STANDARDS

SHEET 5 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:

FACILITY

DRAWING SCALE:

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CITY DWG NO.

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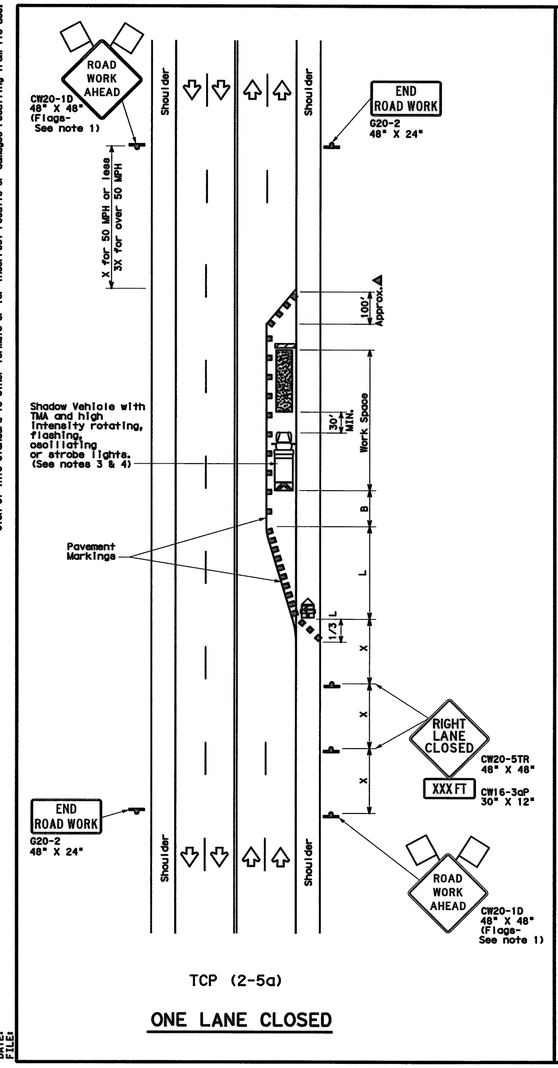
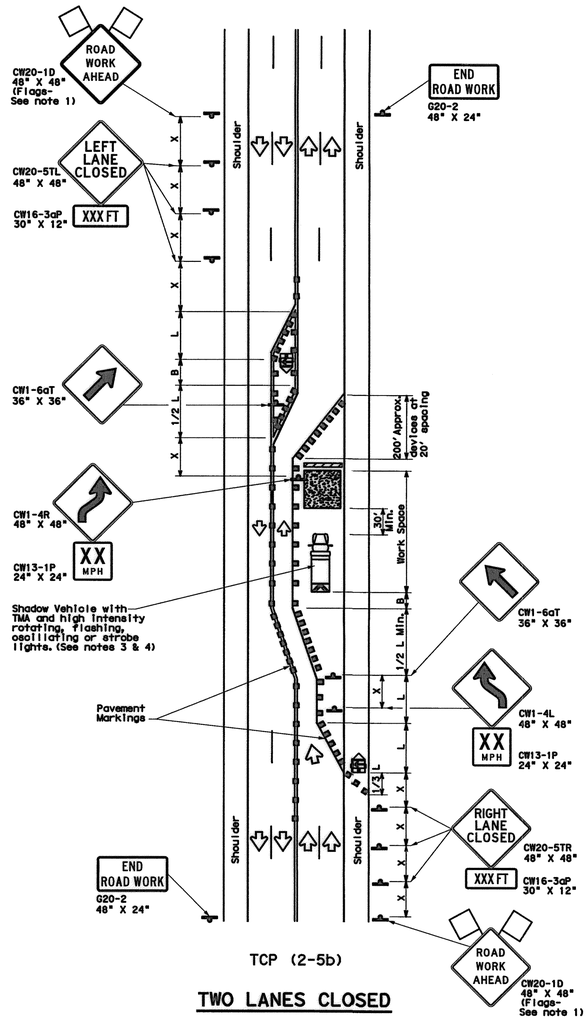


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

DATE:
FILE:

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50	L=WS	500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-12

REVISIONS		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
8-95	2-12	CONT	SECT	JOB	HIGHWAY
1-97					
4-98		DIST	COUNTY		SHEET NO.
3-03					

165

No.	DATE	REVISIONS	APP.

9-15-2014
STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED PROFESSIONAL ENGINEER

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TxDOT STANDARDS

SHEET 6 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
NOT TO SCALE
SHEET:
224 OF 226

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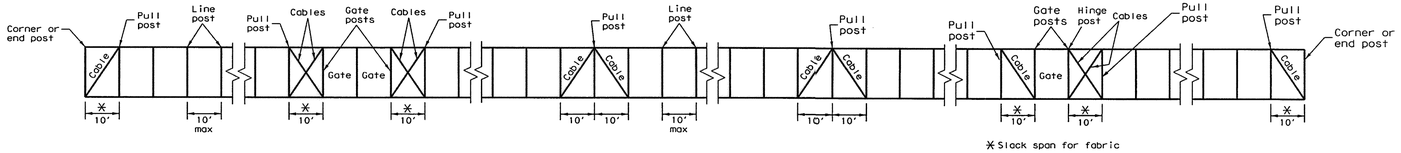
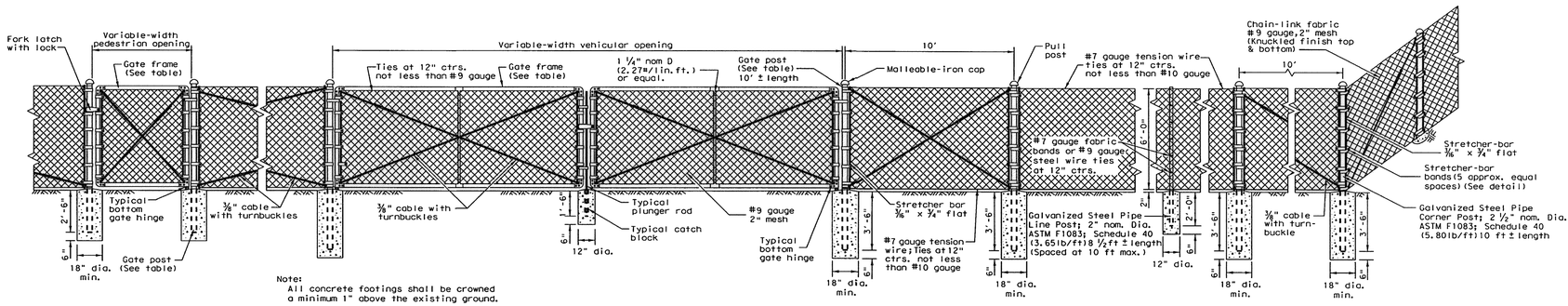
DATE:
FILE:



TYPICAL CABLE AND POST ARRANGEMENT

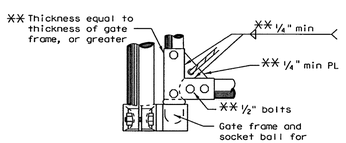
✳ Stock span for fabric



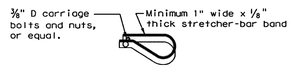
Note:
All concrete footings shall be crowned a minimum 1" above the existing ground.

CHAIN-LINK BARRIER FENCE (6 FT.)

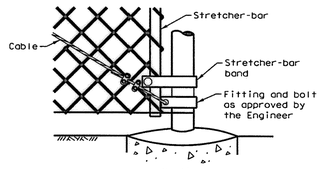
Foundation designs shown are "minimums" for a 6 ft. fence. Taller fences may require larger foundation designs.



TYPICAL BOTTOM GATE HINGE



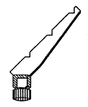
TYPICAL STRETCHER-BAR BAND



TERMINAL POST DETAIL

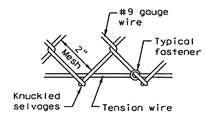
GATE (TYPES AND SIZES)	
Single Inclusive Up to 6' Over 6' to 12' Over 12' to 18' Over 18'	Double Inclusive Up to 12' Over 12' to 26' Over 26' to 36' Over 36'

GATE FRAME (WEIGHT)		GATE POST (WEIGHT)	
SIZE	WT./LIN. FT.	SIZE	WT./LIN. FT.
1 ½" nom dia. or equal	2.72 Lbs.	2 ½" nom dia. or equal	5.79 Lbs.
		3 ½" nom dia. or equal	9.11 Lbs.
		6" nom dia.	18.97 Lbs.
		8" nom dia.	24.70 Lbs.



"OPTIONAL" 3 WIRE 45° BARBED WIRE ARM

Barbed wire arm related items shall conform to Item 550, "Chain Link Fence."



FABRIC & TENSION WIRE DETAIL, TOP & BOTTOM

GENERAL NOTES

1. Items hereon shall conform to Item 550, "Chain Link Fence."
2. Typical installation plan may vary as shown elsewhere on the plans or as directed by the Engineer. Location of gates shown elsewhere on plans.
3. Gate-frame members shall be bolted, at frame corners, to joint fittings with four ½" bolts per joint.
4. All cable connections are to be made with two ⅜" cable clamps.
5. All pull posts and end posts and their foundations shall have the same respective dimensions as those shown for corner post.
6. All pull post shall be furnished with two stretcher bars.
7. One end of each turnbuckle may be attached directly to fittings with a clevis.
8. Concrete footings are to be crowned at the top to shed water.

Texas Department of Transportation — Design Division Standard

CHAIN LINK FENCE

CLF-10

FILE: clf10.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
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REVISIONS	DIST	COUNTY		SHEET NO.

No.	DATE	REVISIONS	APP.

STATE OF TEXAS — MUHAMMAD M ALI, P.E. 98146 — LICENSED PROFESSIONAL ENGINEER — 9-15-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

TxDOT STANDARDS

SHEET 7 OF 7

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE:	CITY DWG NO.
NOT TO SCALE	
SHEET: 225 OF 226	

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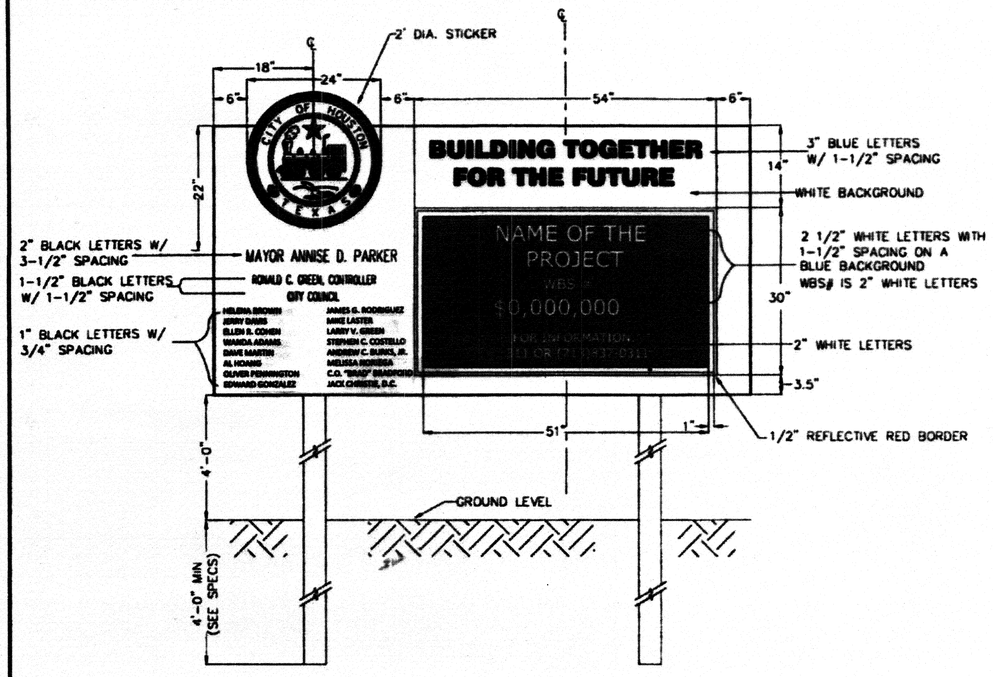

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
CONSTRUCTION SIGN (NOT TO SCALE)	
APPROVED CITY ENGINEER	APPROVED DIRECTOR, PUBLIC WORKS AND ENGINEERING
EFF DATE JAN-25-2012	DWG NO: 01580-03

COH

STATE OF TEXAS
MUHAMMAD M ALI, P.E.
98146
LICENSED
PROFESSIONAL ENGINEER
10-21-2014

Lockwood, Andrews & Newnam, Inc.
Firm No. 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

LUMPKIN ROAD
N-T17000-0012-3

CONSTRUCTION SIGN

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: VERT: 1"=2' HORZ: 1"=20'	CITY DWG NO.
SHEET: 226 OF 226	

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