

**REVIEW BY FORT BEND COUNTY COMMISSIONERS COURT**

On this 6th day of September, 2016, Commissioners Court came on to be heard and reviewed the accompanying notice of Burnside Services, Inc. Job Location West Airport Boulevard, Richmond, TX 77407 Date 8/29/2016 Bond No. TX804810, Permit No. 2016-8899 to make use of certain Fort Bend County property subject to, "A Revised Order Regulating the Laying, Construction, Maintenance, and Repair of Buried Cables, Conduits, and Pole Lines, In, Under, Across or Along Roads, Streets, Highways, and Drainage Ditches in Fort Bend County, Texas, Under the Jurisdiction of the Commissioners Court of Fort Bend County, Texas," as passed by the Commissioners Court of Fort Bend County, Texas the 3rd day of August, 1987, recorded in Volume \_\_\_\_\_ of the Minutes of the Commissioners Court of Fort Bend County, Texas, to the extent that such order is not inconsistent with Article 1436a, Vernon's Texas Civil Statutes. Upon Motion of Commissioner Meyers, seconded by Commissioner Patterson, duly put and carried, it is ORDERED, ADJUDGED AND DECREED that said notice of said above purpose is hereby acknowledged by the Commissioners Court of Fort Bend County, Texas, and that said notice be placed on record according to the regulation order thereof.

Notes:

1. Evidence of review by the Commissioners Court must be kept on the job site and failure to do so constitutes grounds for job shutdown.
2. Written notices are required:
  - a. 48 hours in advance of construction start up, and
  - b. when construction is completed and ready for final inspection
 Mail notices to: Permit Administrator  
 Fort Bend County Engineering  
 301 Jackson Street  
 Richmond, Texas 77469  
 281-633-7500
3. This permit expires one (1) year from date of permit if construction has not commenced.

By: Charles O. Dy  
for County Engineer

By: Mark Vojer  
Drainage District Engineer/Manager

Presented to Commissioners Court and approved.  
Recorded in Volume 9/6/16 15L  
Minutes of Commissioners Court

Clerk of Commissioners Court  
By: [Signature]  
Deputy  
**RENEE MICHULKA**



**PERFORMANCE BOND COVERING ALL CABLE, CONDUIT AND/OR POLE LINE  
ACTIVITY IN, UNDER, ACROSS OR ALONG FORT BEND COUNTY ROAD  
AUTHORIZED**

BOND NO. TX 804810

THE STATE OF TEXAS                   §

KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF FORT BEND               §

THAT WE, Burnside Services, Inc. whose address is 1110 Navasota Ridge, Navasota, TX 77868 Texas, hereinafter called the Principal, And Merchants Bonding Company (Mutual), a Corporation existing under and by virtue of the laws of the state of Iowa and authorized to do an indemnifying business in the state of Texas, and whose principal office is located at P.O. Box 14498, Des Moines, IA 50306, whose officer residing in the State of Texas, authorized to accept service in all suits and actions brought whining said state is Troy Key and Whose address is 5057 Keller Springs Rd., Suite 400, Addison, TX 75001, hereinafter called the Surety, and held and firmly bound unto, Robert e. Hebert, County Judge of Fort Bend County, Texas, or his successors in office, in the full sum of Five Thousand and 00/100s Dollars (\$ 5,000.00 ) current, lawful money of the United States of America, to be paid to said Robert E. Hebert, County Judge of Fort Bend County, Texas, or his successors in office, to which payment well and truly to be made and done, we, the undersigned, bind ourselves and each of us, our heirs, executors, administrators, successors, assigns, and legal representatives, jointly and severally, by these presents.

THE CONDITION OF THIS BOND IS SUCH THAT, WHEREAS, the above bounden principal contemplates laying, constructing, maintaining and/or repairing one or more cables, conduits, and/or pole lines in, under, across and/or along roads, streets and highways, commercial driveway and median openings or modifications in the County of Fort Bend, and the State of Texas, under the jurisdiction of the Commissioners' Court of Fort Bend County, Texas, pursuant to the Commissioners' Court order adopted on the 1st day of December, A.D. 1980, recorded in Volume 13, of the Commissioners' Court Minutes of Fort Bend County, Texas, regulating same, which Commissioners' Court order is hereby referred to and made a part hereof for all purposes as though fully set out herein;

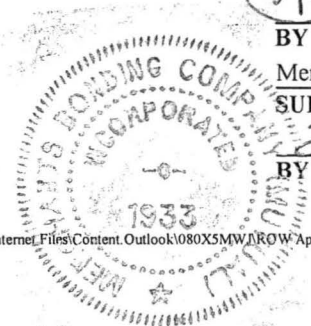
AND WHEREAS, the principal desires to provide Fort Bend County with a performance bond covering all such cable, conduit and/or pole line activity, commercial driveway and median openings or modifications;

NOW, THEREFORE, if the above bounden principal shall faithfully perform all its cable, conduit and/or pole line activity (including, but not limited to the laying, construction, maintenance and/or repair of cables, conduits and/or pole lines) in, under, across and/or along roads, streets and highways, commercial driveway and median openings or modifications in the County of Fort Bend and State of Texas, under the jurisdiction of the Commissioners Court of Fort Bend County, Texas, pursuant to and in accordance with minimum requirements and conditions of the above mentioned Commissioners' Court order set forth and specified to be by said principal done and performed, at the time and in the manner therein specified, and shall pay over and make good and reimburse Fort Bend County, all loss and damages which Fort Bend County may sustain by reason of any failure or default on the part of said principal, then this obligation shall be null and void, otherwise to remain in full force and effect.

This bond is payable at the County Courthouse in the County of Fort Bend and State of Texas.

It is understood that at any time Fort Bend County deems itself insecure under this bond, it may require further and/or additional bonds of the principal.

EXECUTED this 29th day of August, 2016.



Burnside Services, Inc.  
PRINCIPAL  
Rayle Burnside  
BY  
Merchants Bonding Company (Mutual)  
SURETY  
Sandra Lee Roney  
BY Sandra Lee Roney, Attorney in Fact

**MERCHANTS**  
**BONDING COMPANY™**  
**POWER OF ATTORNEY**

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

**Andrea Rose Crawford; Carolyn J Goodenough; Debra Lee Moon; John William Newby;  
Sammy Joe Mullis Jr; Sandra Lee Roney; Wilbert Raymond Watson**

their true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver on behalf of the Companies, as Surety, bonds, undertakings and other written obligations in the nature thereof, subject to the limitation that any such instrument shall not exceed the amount of:

**TEN MILLION (\$10,000,000.00) DOLLARS**

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 24, 2011.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 29th day of January, 2016.



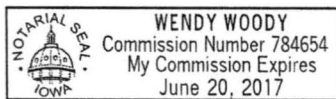
**MERCHANTS BONDING COMPANY (MUTUAL)  
MERCHANTS NATIONAL BONDING, INC.**

By *Larry Taylor*

President

STATE OF IOWA  
COUNTY OF Dallas ss.

On this 29th day of January, 2016, before me appeared Larry Taylor, to me personally known, who being by me sworn did say that he is President of the MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

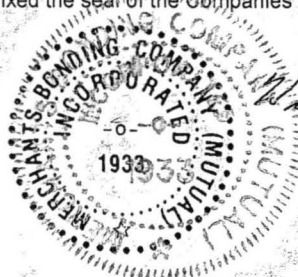


*Wendy Woody*  
Notary Public, Polk County, Iowa

(Expiration of notary's commission does not invalidate this instrument)

I, William Warner, Jr., Secretary of the MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 29th day of August, 2016.



*William Warner Jr.*  
Secretary

**MERCHANTS**   
**BONDING COMPANY™**

MERCHANTS BONDING COMPANY (MUTUAL) • MERCHANTS NATIONAL BONDING, INC.  
P.O. Box 14498, Des Moines IA 50306-3498 - (800) 678-8171 - (515) 243-3854 FAX

**IMPORTANT NOTICE**

To obtain information or make a complaint:

You may contact your insurance agent at the telephone number provided by your insurance agent.

You may call Merchants Bonding Company (Mutual) toll-free telephone number for information or to make a complaint at:

**1-800-678-8171**

You may contact the Texas Department of Insurance to obtain information on companies, coverages, rights or complaints at:

**1-800-252-3439**

You may write the Texas Department of Insurance at:

P. O. Box 149104  
Austin, TX 78714-9104  
Fax: (512) 475-1771  
Web: <http://www.tdi.state.tx.us>  
E-mail: [ConsumerProtection@tdi.state.tx.us](mailto:ConsumerProtection@tdi.state.tx.us)

**PREMIUM AND CLAIM DISPUTES:** Should you have a dispute concerning your premium or about a claim you should contact the agent first. If the dispute is not resolved, you may contact the Texas Department of Insurance.

**ATTACH THIS NOTICE TO YOUR POLICY:** This notice is for information only and does not become a part or condition of the attached document.

FORT BEND COUNTY MUNICIPAL UTILITY DISTRICT NO. 134B  
FORT BEND COUNTY, TEXAS

CONSTRUCTION PLANS FOR  
**BULLHEAD BAYOU PHASE II  
DRAINAGE IMPROVEMENTS**

CITY OF HOUSTON E.T.J.

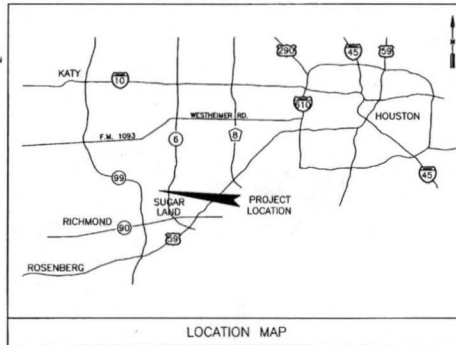


JOB NO. 1968-0627

DATE : MARCH 2016

NOTES

- THESE PLANS WERE PREPARED TO MEET OR EXCEED FORT BEND COUNTY AND CITY OF HOUSTON SUBDIVISION RULES AND REGULATIONS (AS APPLICABLE) AS CURRENTLY AMENDED.
- CONSTRUCTION WILL BE MONITORED BY A PROFESSIONAL ENGINEER TO INSURE COMPLIANCE WITH THE CONSTRUCTION PLANS AND SPECIFICATIONS.
- CONTRACTOR SHALL NOTIFY THE FOLLOWING ENTITIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION:  
CITY OF HOUSTON PUBLIC WORKS DEPARTMENT (713) 837-0050  
FORT BEND COUNTY DRAINAGE DISTRICT (DRAINAGE GRID#4) (281) 342-2863  
ASSISTANT TO THE FORT BEND COUNTY ENGINEER CONSTRUCTION@FORTBENDCOUNTYTX.GOV
- ONLY AUTHORIZED INDIVIDUALS FROM EITHER THE TESTING COMPANY OR A REPRESENTATIVE OF LJA ENGINEERING, INC. HAVE THE AUTHORITY TO ADD WATER TO A CONCRETE TRUCK.
- CONTRACTOR SHALL CONTACT ANY PERTINENT UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF EXCAVATION OR CONSTRUCTION IN THE VICINITY OF THEIR EASEMENTS AND/OR RIGHT-OF-WAYS.
- THE OPENING AND CLOSING OF ALL VALVES ON EXISTING WATER LINES MUST BE PERFORMED EXCLUSIVELY BY THE DISTRICT OPERATOR.
- THE DISTRICT OPERATOR MUST PERFORM ALL WATER LINE BACTERIOLOGICAL TESTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE DISTRICT.
- PRIOR TO CONSTRUCTION OF THIS FACILITY WITHIN OR BY THE DISTRICT THE DISTRICT OR THE ENGINEER WILL GIVE A WRITTEN NOTICE BY REGISTERED OR CERTIFIED MAIL TO THE DIRECTOR OF PUBLIC WORKS AND ENGINEERING, CITY OF HOUSTON, STATING THE DATE SUCH CONSTRUCTION WILL COMMENCE.
- CONTRACTOR SHALL NOTIFY THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING, OFFICE OF THE CITY ENGINEER, 48 HOURS BEFORE STARTING WORK ON THIS PROJECT. TELEPHONE NO. (832) 394-9089



ONE-CALL NOTIFICATION SYSTEM  
CALL BEFORE YOU DIG!!  
(713)222-4567 (IN HOUSTON)  
(NEW STATEWIDE NUMBER OUTSIDE HOUSTON)  
1-800-545-6005

FIRM  
FLOOD INSURANCE MAP  
PANEL 140 OF 575  
MAP# 4815702140L  
FLOOD ZONE "X"

ETJ DETENTION PLANS INFORMATION  
1) STORM WATER DETENTION PLANS  
2) PROVIDED IN: BELL CREEK LAKES PH. 1&2, ALIANA DETENTION/AMENITY PHASE 2, OYSTER CREEK DRAINAGE IMPROVEMENTS PHASE 3, AND OYSTER CREEK DRAINAGE IMPROVEMENTS PHASE 4.  
ENGINEERING FIRM LJA ENGINEERING & SURVEYING  
DATE SIGNED MAY 2007, JANUARY 2012, DECEMBER 2013, FEBRUARY 2014, APRIL 2015  
APPROVED BY FORT BEND COUNTY ENGINEERING DEPARTMENT  
2) STORM WATER DRAINAGE DESIGN REPORT  
REPORT TITLE MASTER DRAINAGE PLAN FOR ALIANA DEVELOPMENT  
DATE APRIL 2015 ENGINEERING FORM REPORT  
DATE OF ACKNOWLEDGEMENT BY FBC DRAINAGE DISTRICT JULY 2015  
3) INCREASED IMPERVIOUS COVER = 27.00 ACRES  
DETENTION RATE REQUIRED = 0.17 ACRE-FEET/ACRE  
DETENTION RATE PROVIDED = 0.17 ACRE-FEET/ACRE

FORT BEND COUNTY ENGINEER

ENGINEER: *Richard W. Stolarski, P.E.*  
RICHARD W. STOLARSKI, P.E.

DATE: 4/15/16

THESE SIGNATURES ARE VOID IF CONSTRUCTION HAS NOT COMMENCED IN ONE (1) YEAR FROM DATE OF APPROVAL  
APPROVED: *Theresa DeLoach*  
DISTRICT COORDINATOR

DATE: 4/12/16

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



SURVEYED BY:  
FB NO.:

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DATE: 3/3/16	STREET & BRIDGE
DATE: 3-3-16	TRAFFIC
DATE: 3/4/16	STORM WATER QUALITY
DATE:	OTHER

CITY ENGINEER: *Theresa DeLoach*  
FOR CITY OF HOUSTON USE ONLY  
COLLISION NO.:

DIRECTOR OF PUBLIC WORKS AND ENGINEERING: *Theresa DeLoach*  
55658  
SHEET No. 1 of 18

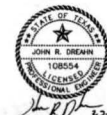
DEVELOPER:  
**ALIANA DEVELOPMENT  
COMPANY**  
11200 RICHMOND AVENUE SUITE 280  
HOUSTON, TEXAS 77082

RECORD DRAWING

I CERTIFY THAT THIS DRAWING REFLECTS THE IMPROVEMENTS CONSTRUCTED AS TO SIZE, LOCATION AND GRADE AND THAT THE CONSTRUCTION WAS IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

TITLE: \_\_\_\_\_



APPROVED FOR CONSTRUCTION

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

ENGINEER:

**LJA Engineering, Inc.**

2929 Braemar Drive  
Suite 600  
Houston, Texas 77042



Phone 713.953.5200  
Fax 713.953.5026  
FBN#-1586

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627

GENERAL CONSTRUCTION NOTES:

- 1. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE AND ALL INCLUDE ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF HIS CONSTRUCTION. ANY CONTACT OR DISCREPANCY DISCOVERED MUST BE IMMEDIATELY BROUGHT TO THE ENGINEER'S ATTENTION. ANY DAMAGE TO EXISTING FACILITIES DUE TO THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING PUBLIC OR PRIVATE UTILITY LINES...
3. TREES ARE TO BE PROTECTED DURING CONSTRUCTION. PROTECTIVE FENCING WILL BE PROVIDED AND PLACED BY THE UTILITY CONTRACTOR...

STRUCTURAL CONSTRUCTION NOTES:

- 1. CONCRETE FOR SLOPE PAVING SHALL BE TYPE "B" CONCRETE (3,000 PSI COMPRESSIVE STRENGTH). STRUCTURAL CONCRETE SHALL BE TYPE "A" CONCRETE (4,000 PSI COMPRESSIVE STRENGTH).
2. 4-INCH CONCRETE SLOPE PAVEMENT SHALL BE REINFORCED WITH #6@18" O.C. WELDED WIRE FABRIC OR #4 BARS, 24-INCH O.C. W. OR EQUIVALENT.
3. ALL TOE WALLS FOR SLOPE PAVING TO BE REINFORCED WITH #4 REBAR AT 18-INCH O.C.W.
4. ALL SLOPE PAVEMENT SHALL INCLUDE A 24-INCH TOE WALL AT THE TOP AND BOTTOM AND A 24-INCH TOE WALL AT THE SIDES OF CHANNEL AS PER DETAIL.
5. ALL SLOPE PAVEMENT SHALL INCLUDE CONTROL JOINTS 20-30 FEET ON CENTER (MAXIMUM). JOINTS SHALL BE SEALED WITH SEALING AGENT.
6. REBAR SLOPE PROTECTION SHALL BE AS FOLLOWS:
A. 18-INCH DIA. 30-INCH O.C.W. OR EQUIVALENT.
B. 80 TO 150 LB BLOCKS, EVENLY GRADED.
C. PLACED ON GEOTEXTILE.
D. EXPOSED STEEL.
E. MIN. 8-INCH THICKNESS PER BLOCK.

THE FOLLOWING ABBREVIATIONS USED IN THE PLAN ARE DEFINED AS FOLLOWS:

- 1. W.L.E. - WATER LINE CASINGMENT
2. S.E.C. - SANITARY SEWER CASINGMENT
3. C.G.M.P. - CORRUGATED GALVANIZED METAL PIPE
4. R.C.P. - REINFORCED CONCRETE PIPE
5. R.C.B. - REINFORCED CONCRETE BOX
6. S.M. SWR - STORM SEWER
7. F.V. - FURNISHING VALVE
8. F.B.C.A. - FORT BEND COUNTY OFFICIAL RECORDS
9. F.B.C.P.A. - FORT BEND COUNTY PUBLIC RECORDS
10. F.B.C.D.R. - FORT BEND COUNTY DEED RECORDS
11. SHT. NO. - SHEET NUMBER
12. R.O.W. - RIGHT OF WAY
13. P.I. - POINT OF INTERSECTION
14. RT. - RIGHT SIDE
15. LT. - LEFT SIDE
16. STA. - STATION
17. L.F. - LINEAR FEET
18. TO - TOP OF CURB

WARNING: OVERHEAD ELECTRICAL FACILITIES OVERHEAD LINES MAY EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THE LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO AVOIDANCE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTER POINT ENERGY H.E.A.P. AT 713-207-7777.

CAUTION: UNDERGROUND GAS FACILITIES LOCATION OF CENTER POINT ENERGY EXISTING MAIN LINES (TO INCLUDE UNITED GAS TRANSMISSION AND/OR INDUSTRIAL GAS SUPPLY FACILITIES WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 OR 1-800-669-8344 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

STORM DRAINAGE CONSTRUCTION NOTES:

- 1. All storm sewers shall be reinforced concrete pipe, ASTM C-76, Class B) and shall be installed and backfilled in accordance with the City of Houston zoning Ord. 02317-02, 02317-03, 02317-05, 02317-06, and 02317-07CEN. 02502 as applicable unless otherwise shown on the drawings.
2. All storm sewer construction in allee lot easement shall be R.C.P. (C-76, Class B) and shall be installed in accordance with the City of Houston zoning Ord. 02317-02, 02317-03, 02317-05, 02317-06 and 02317-07CEN. 02502 as applicable.
3. All sewer under proposed or future pavement and to a point (1) foot back of all proposed or future curbs shall be backfilled with 1-1/2 inch coarse sand per c.p. established and to within one (1) foot of sidewalk. The remaining depth of trench shall be backfilled with suitable earth material.
4. All trench backfills shall be 6" to 8" thick with areas less than 100 feet intervals on each side, and mechanically compacted to a density of not less than 90% of the maximum dry density as determined by the standard proctor compaction test (ASTM D-664/AASHTO 99).

FORT BEND COUNTY GENERAL NOTES:

- 1. Fort Bend County must be invited to the pre-construction meeting.
2. Contractor shall notify Fort Bend County Engineering Department 48 hours prior to commencing construction and 48 hours notice to any construction activity within the limits of the zoning of Construction@fortbend.com.
3. Contractor is responsible for obtaining all permits required from Fort Bend County prior to commencing construction of any improvements within County Road Right of Way.
4. All paving improvements shall be constructed in accordance with Fort Bend County "Rules, Regulations and Requirements relating to the Approval and Acceptance of Improvements in Subdivisions" as currently amended.
5. All road widths, curb radii and curb alignment shown indicates both of curb.
6. A continuous longitudinal reinforcing bar shall be used in the curbs.
7. All concrete paving shall be 3/4 inch compact with a minimum compressive strength of 3000 psi at 28 days. Transverse expansion joints shall be installed at each curb return and at a maximum spacing of 80 feet.
8. All weather access to all existing streets and alleyways shall be maintained at all times.
9. All 4" reinforced concrete curbs shall be placed in 200# of single family lots only. ALL OTHER AREAS SHALL BE OF REINFORCED CONCRETE CURB.
10. At all intersection locations, TYPE 7 BARRIS shall be placed in accordance with 33002 PED-12A standard detail sheet. A.D.A. - Handicap Ramps shall be installed with street paving at all intersections and comply with current A.D.A. regulations.
11. Curb features are required of curb connections to handicap ramps, with no construction joint within 5' of ramps.
12. All intersections utilizing Traffic Control measures shall have A.D.A. wheel chair ramps installed.
13. Guidelines are 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 flagmen, signing, striping, and warning devices, etc. during construction - both day and night.
14. All 8" to 14" pipe signs shall be 30"x30" with diamond grade sheeting. Street name signs shall be upper and lower case letters with diamond grade sheeting. Street name signs shall be mounted on stop sign posts.
15. Street name signage shall be on a 6" high sign flat blade w/reflective green background. Street names shall be upper and lowercase lettering with uppercase letters of 6" minimum and lowercase letters of 4.5" minimum. The letters shall be reflective white. Street name signs shall be mounted on stop sign posts.
16. A Blue Double Reflectorized button shall be placed at all Fire Hydrant locations. The Button shall be placed 12 inches off the centerline of the street on the same side as the hydrant.
NOTE: Fort Bend County "General Notes" Supersede ALL conflicting notes.

FILL CONSTRUCTION NOTES:

- 1. ALL AREAS PROPOSED FOR FILL SHALL BE STRIPPED A MINIMUM OF 8-INCHES AND PROOF ROLLED TO 90% PROCTOR DENSITY PRIOR TO THE PLACEMENT AND COMPACTION OF SUITABLE FILL MATERIAL.
2. CONTRACTOR SHALL COMPLETELY STRIP, PROOF ROLL AND FILL PROPOSED FILL AREAS ONE AT A TIME. CONTRACTOR SHALL NOT BEGIN STRIPPING THE SUBSEQUENT SITES UNTIL ALL PROPOSED FILL ELEVATIONS HAVE BEEN SATISFIED IN THE PRECEDING SITE.
3. ALL EXISTING DITCHES PROPOSED FOR FILL MUST BE DE-CULMATED PRIOR TO FILLING. ALL UNSTABLE MATERIAL SHALL BE REMOVED FROM THE BOTTOM AND SIDES OF THE DITCH.
4. CONTRACTOR SHALL NOT FILL ANY EXISTING DITCHES UNTIL THE PROPOSED DRAINAGE CHANNEL HAS BEEN CONSTRUCTED.
5. ALL FILL AREAS SHALL BE BROADCAST SEEDING FOLLOWING THE REPLACEMENT OF STRIPPING.

RESERVOIR MAINTENANCE NOTE:

- 1. UPON INSPECTION AND ACCEPTANCE OF THE RESERVOIR CONSTRUCTION BY FORT BEND COUNTY DRAINAGE DISTRICT AND FORT BEND COUNTY MUD 134B, MAINTENANCE OF THE RESERVOIR WILL BECOME THE RESPONSIBILITY OF FORT BEND COUNTY MUD 134B.

FORT BEND COUNTY DRAINAGE DISTRICT NOTES:

- 1. FORT BEND COUNTY DRAINAGE DISTRICT CONSTRUCTION DEPARTMENT SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION AT 1504 BLUMLE ROAD, HOUSTON, TEXAS 77071. ATTN: DEWANE GRAY PROPERTY MANAGEMENT DEPARTMENT. CONTACT INFORMATION: (713) 342-2883. A COPY OF THE APPROVED CONSTRUCTION DRAWINGS IS REQUIRED AT THIS TIME.
2. ENGINEER SHALL SUBMIT LETTER AND RECORD DRAWINGS TO THE FORT BEND COUNTY DRAINAGE DISTRICT, CONSTRUCTION DEPARTMENT, REQUESTING INSPECTION AND ACCEPTANCE OF ITEMS CONSTRUCTED IN FORT BEND COUNTY DRAINAGE DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FLAGGED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING BACKLOGGED DRAINAGE SYSTEM.
4. ALL DISTURBED AREAS WITHIN THE FORT BEND COUNTY DRAINAGE DISTRICT RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM SHALL BE FURROW-MULCH SEEDING AS PER FORT BEND COUNTY DRAINAGE DISTRICT SPECIFICATION ENTITLED "TURF ESTABLISHMENT" (DRY APPLICATION) OR APPROVED EQUAL.
5. BACKFILL TO BE COMPACTED IN NO GREATER THAN 8 INCH LIFTS TO THE DENSITY OF THE UNDISTURBED ADJACENT SOIL.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR EXCAVATING CHANNEL FLOWLINE TO DESIGN ELEVATIONS AS SHOWN ON PLANS AND CONTINUING AS NECESSARY TO INSURE NO WATER IN STORM SEWER DURING DRY CONDITIONS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORING CHANNEL TO ORIGINAL CONDITION.
8. ALL EXCAVATED MATERIAL IS TO BE REMOVED FROM FORT BEND COUNTY DRAINAGE DISTRICT RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT.
9. CONTRACTOR, WITH THE ASSISTANCE OF THE ENGINEER IF NECESSARY, SHALL BE RESPONSIBLE FOR OBTAINING ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS.

CLEARING AND GRUBBING CONSTRUCTION NOTES:

- 1. ALL BURNING ON-SITE SHALL BE DONE WITH THE APPROVAL OF THE OWNER AND ENGINEER.
2. UPON COMPLETION OF CLEARING, CONTRACTOR SHALL RAKE ALL REMAINING ROOTS FROM SITE.
3. COORDINATES PROVIDED ARE BASED ON SURFACE COORDINATES.
4. REMAINING GROUND FROM PDS CAN BE SPREAD OVER SITE, ONLY AT THE DIRECTION OF THE ENGINEER.

POLLUTION PREVENTION PLAN NOTES:

- 1. CONTRACTOR TO SEQUENCE CONSTRUCTION ACTIVITIES AND STORM WATER CONTROL MEASURES NECESSARY TO ACCOMPLISH HIS WORK.
2. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL INSTALL, AS A MINIMUM, EROSION AND SEDIMENTATION CONTROLS AT LOCATIONS SHOWN ON PLANS.
3. CONTRACTOR SHALL INSPECT ALL EXISTING OR PROPOSED EROSION AND SEDIMENTATION CONTROL SYSTEMS.
4. CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EXISTING OR PROPOSED EROSION AND SEDIMENTATION CONTROL SYSTEMS THROUGHOUT THE DURATION OF THE CONTRACT.
5. CONTRACTOR SHALL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
6. CONTRACTOR SHALL LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. CONTRACTOR SHALL USE A LINER UNDER ABOVE GROUND STORAGE TANKS. CONTRACTOR SHALL MAINTAIN AND MONITOR ALL FUEL/MATERIAL STORAGE AREAS.
7. CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TAKEN TO REMEDY THE PROBLEM.
8. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
9. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE ENVIRONMENTAL LAWS.
10. CONTRACTOR SHALL OBTAIN AND DEMONSTRATE COMPLIANCE WITH APPLICABLE STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.
11. CONTRACTOR IS PROHIBITED FROM DISCHARGING SOLID MATERIALS, INCLUDING BUILDING MATERIALS INTO WATERS OF THE UNITED STATES, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.
12. CONTRACTOR SHALL MAINTAIN THE OFF-SITE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST.
13. IF EROSION AND SEDIMENTATION CONTROL SYSTEMS ARE EXISTING FROM PREVIOUS CONSTRUCTION, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE THE EXISTING EROSION AND SEDIMENTATION CONTROL SYSTEMS FOR DAMAGE AND/OR APPLICABILITY PRIOR TO CONTRACTOR STARTING CONSTRUCTION OF THE CONTRACT. ANY DAMAGE NOTED AT THIS TIME SHALL BE REPAIRED AT OWNER'S EXPENSE.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR STREET CLEANING, ON A DAILY BASIS, ALL MUD AND DIRT DEPOSITED ON THE EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY.
15. DRAINAGE WATER COURSES OR DITCHES MUST BE PROTECTED FROM SEDIMENT RUNOFF DEVELOPED DURING THE CONSTRUCTION PROCESS. PROVISIONS SUCH AS Silt Fencing, GEOTEXTILE FABRIC PROTECTION OVER STORM DRAIN SYSTEMS, HAY BALES, OR ROCK BELMS MAY BE USED.
16. ALL DISTURBED AREAS MUST BE SEEDED OR LANDSCAPED WITHIN 14 DAYS OF THE LAST ACTIVITY FOR THAT AREA.
17. CHANNEL/RESERVOIR BOTTOM SHALL BE BROADCAST SEEDING.

REINFORCED CONCRETE BOX CULVERT CONSTRUCTION NOTES:

- 1. ALL REINFORCED CONCRETE BOX CULVERT SHALL CONFORM TO ASTM C 1433 REQUIREMENTS UNLESS SPECIFICALLY ESTABLISHED IN THE CONSTRUCTION PLANS.
2. R.C. BOX CULVERTS SHALL BE INSTALLED, BEDDED AND BACKFILLED IN ACCORDANCE WITH THE SPECIFICATIONS. BEDDING SHALL BE CEMENT STABILIZED SAND (1.5 GRADE). BEDDING AND BACKFILL SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE R.C.

BENCHMARK: 11-1112 - BRASS DISK, STAMPED A-1219 1973, SET IN THE TOP OF A CONCRETE FOUNDATION ON THE WEST SIDE OF THE ROAD, APPROX. 3.5 FEET WEST ALONG THE ROAD FROM THE JUNCTION OF HWY. 6 IN HOUSTON, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE FOUNDATION AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 19.0 FEET EAST OF THE ROAD. ELEV. = 78.65 FEET (MVD-29) 1973 ADJ. ILM.

1/4" IRON ROD W/ L.A. CAP LOCATED APPROX. 30 FEET SOUTH OF THE NORTHEAST CORNER OF THE ALMA PROPERTY AT THE INTERSECTION OF WALKEN ROAD AND HWY 1604. ELEV. = 83.19 FEET 1973 ADJ.

NOTES:

APPROVED: [Signature] DEVELOPMENT COORDINATOR DATE: 4/12/16

PLAT NAME: CPC 101 FILE NO. 15-1745 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

GENERAL NOTES

LJA Engineering, Inc. 2929 Blarney Drive Suite 600 Houston, Texas 77042 LJA PROJECT NO.: 1968-0627 DESIGNED BY: KDB DRAWN BY: KDB DATE: FEBRUARY 2016

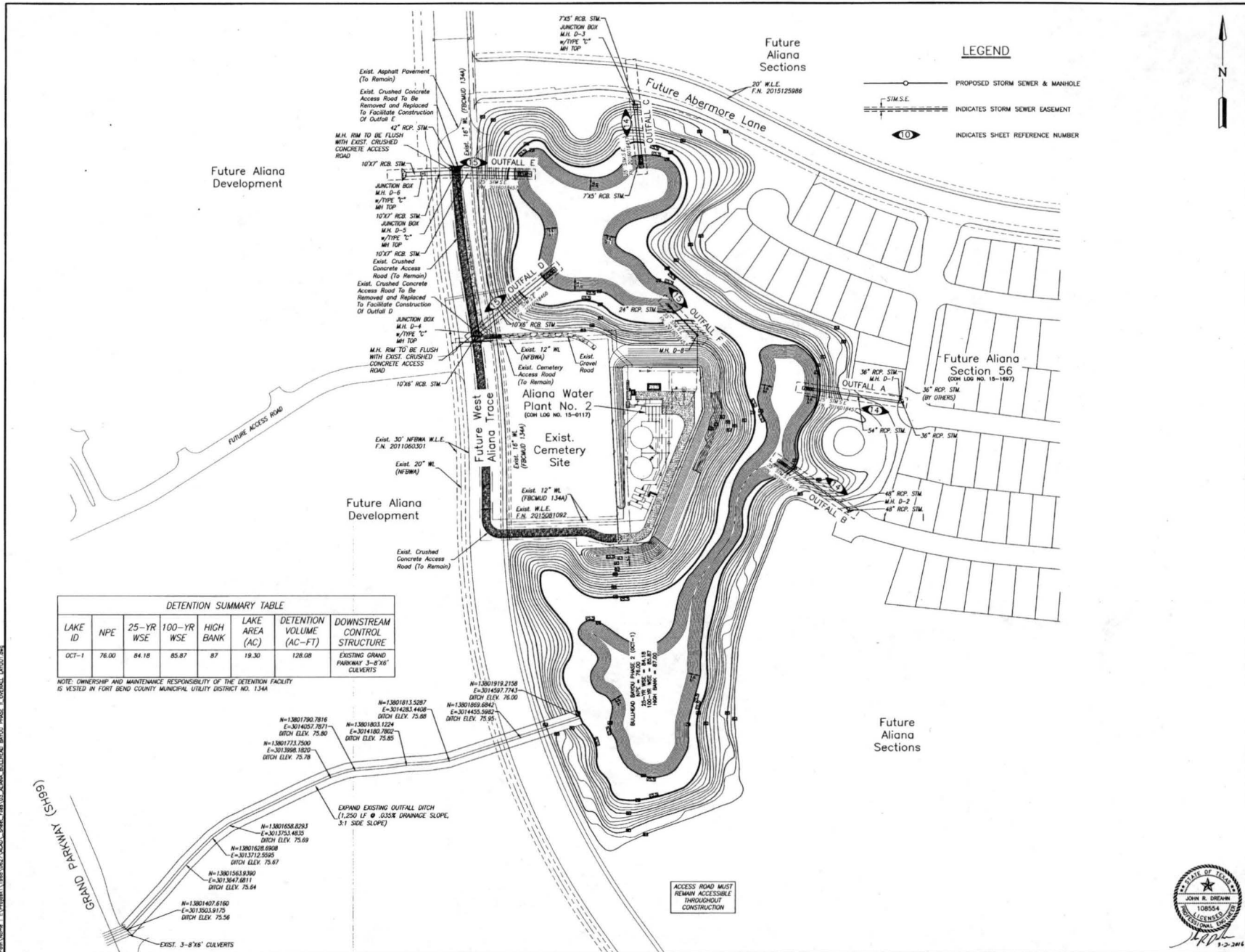
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CITY OF HOUSTON SHEET 2 OF 18

FILE NO. FOR CITY OF HOUSTON USE ONLY DRAWING SCALE: NONE SCALE: NONE SHEET NO. 2 OF 18



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



**BENCHMARK:**  
 A-1212 - BRASS DISK STAMPED A-1212 1921, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 50A APPROX. 4.1 MILES WEST ALONG HWY 50A FROM THE JUNCTION OF HWY 28 IN EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 37.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 14'00" LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ. TM.  
 1/4" IRON ROD W/ LJA CAP LOCATED APPROX. 50' WEST OF THE NORTHWEST CORNER OF THE ALIANA PROPERTY AT THE INTERSECTION OF WAGNER ROAD AND FM 1454.  
 ELEV. = 83.19 FEET 1973 ADJ.

**NOTES:**

APPROVED: *Maggid*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. 15-1745  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

OVERALL LAYOUT

**LJA Engineering, Inc.**  
 2929 Shaparak Drive Phone 713.853.5200  
 Suite 600 Houston, Texas 77042 Fax 713.853.5028  
 10000 Fwy. 1968-0627  
 LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB DRAWN BY: DATE: FEBRUARY 2016

NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY  
 WITHIN THE CITY OF HOUSTON

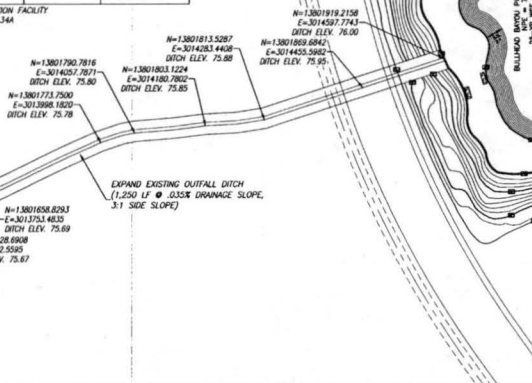
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 11111 WESTHELVEN STREET, SUITE 300  
 HOUSTON, TEXAS 77060  
 713.558.3200  
 713.558.3200  
 713.558.3200

FILE NO. FOR CITY OF HOUSTON USE ONLY  
 DRAWING SCALE: 1" = 100'  
 SCALE: 1" = 100'  
 SHEET NO. 3 OF 18

**DETENTION SUMMARY TABLE**

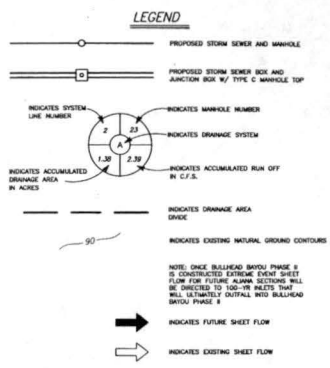
LAKE ID	NPE	25-YR WSE	100-YR WSE	HIGH BANK	LAKE AREA (AC)	DETENTION VOLUME (AC-FT)	DOWNSIDE CONTROL STRUCTURE
OCT-1	76.00	84.18	85.87	87	19.30	128.08	EXISTING GRAND PARKWAY 3'-8" DIA' CULVERTS

NOTE: OWNERSHIP AND MAINTENANCE RESPONSIBILITY OF THE DETENTION FACILITY IS VESTED IN FORT BEND COUNTY MUNICIPAL UTILITY DISTRICT NO. 134A



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627





**BENCHMARK:**  
 A-1212 - BRASS DICK STAMPED A-1212 1973 SET 10' TO TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 80A APPROX. 4.1 MILES WEST OF THE INTERSECTION OF HWY 80A AND HWY 151 IN SUGARLAND, TEXAS. THE TOP OF SET IS 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 27.0 FEET NORTH OF THE CONCRETE CENTERLINE OF THE WESTBOUND LANES, AND 10.0 FEET LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (MVD-29) 1973 ADJ. ZONE  
 1/4" IRON ROD W/ LIA CAP LOCATED APPROX. 30.6 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALLONA PROPERTY AT THE INTERSECTION OF MAUDEN ROAD AND FM 1404.  
 ELEV. = 83.19 FEET 1973 ADJ.

**NOTES:**

APPROVED: *Maggid*  
 DEVELOPING COORDINATOR  
 DATE: 4/12/16  
 REVISION BY

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. :  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II  
 DRAINAGE IMPROVEMENTS

DRAINAGE AREA MAP

**LJA Engineering, Inc.**  
 2529 Shurpark Drive  
 Suite 600  
 Houston, Texas 77042  
 Phone 713.963.5200  
 Fax 713.963.5026  
 FRN - F-1380

LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB  
 DRAWN BY: KDB  
 DATE: FEBRUARY 2016

ALL CITY SIGNATURES VALID FOR ONE YEAR ONLY  
 AFTER DATE OF SIGNATURES

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 DATE: 3/16  
 SHEET & BLOCK  
 PROJECT NO.: 15-1745  
 DRAWN BY: KDB  
 CHECKED BY: J. D. DODD  
 DATE: 3/16/16  
 SCALE: 1" = 200'

FILE NO. FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE  
 SCALE: 1" = 200'

SHEET NO. 5 OF 18



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627

**LJA Engineering, Inc.**

Project: **Alana Bullhead Bayou System**  
 LJA Job No. **1968-0627**  
 System: **Storm**  
 By: **KDB** Date: \_\_\_\_\_  
 Checked by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Design Frequency: **2** years

Normal POOL: **75.00**  
 25-YR W.S.E.: **84.18**

COH 2 YR  
 50" 75.01  
 48" 70.2  
 46" 65.315

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 1																																				
FUTURE	MH 1	5.64	5.64	28.56	3.18	0.55	1.75	0.00	9.96	8	36				0.110	22.18	3.1	8.30							84.21	84.21	87.50	3.29	88.50	Yes	54.33	0.00	Method 1	77.440	77.431	
	MH 1	8.06	13.70	30.66	3.05	0.55	1.68	0.00	23.39	228	54				0.066	48.30	3.0	0.00							84.21	84.18	87.50	3.29	88.50	Yes	54.33	0.00	Method 1	88.130	88.053	
FUTURE	MH 1	8.06	8.06	29.44	3.13	0.55	1.72	0.00	13.87	8	36				0.110	22.18	3.1	0.00							84.22	84.21	87.50	3.28	88.50	Yes	54.33	0.00	Method 1	77.100	77.091	

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 2																																				
FUTURE	MH 2	13.58	13.58	30.83	3.05	0.55	1.68	0.00	22.81	8	48				4.070	22.18	3.1	6.79							84.24	84.23	87.00	2.76	88.00	Yes	54.33	0.00	Method 1	75.840	75.831	
	MH 2	0.00	13.58	30.83	3.05	0.55	1.68	0.00	22.81	197	48				0.070	38.11	3.0	0.00							84.23	84.18	87.00	2.77	88.00	Yes	54.33	0.00	Method 1	89.140	89.022	

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 3																																				
JUNCTION MH 3	OUTFALL	43.72	43.72	34.45	2.87	0.55	1.58	0.00	88.99	138	7	5	0.050	115.04	3.3	0.00										84.20	84.18	85.00	0.80	86.00	Yes	54.33	0.00	Method 1	68.070	68.061
LINE 4																																				
FUTURE	JUNCTION MH 3	43.72	43.72	34.45	2.87	0.55	1.58	0.00	88.99	8	7	5	0.050	115.04	3.3	0.00										84.21	84.20	86.00	1.79	87.00	Yes	54.33	0.00	Method 1	74.500	74.496

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 5																																				
JUNCTION MH 4	OUTFALL	87.30	87.30	35.99	2.80	0.80	2.24	0.00	150.69	237	10	6	0.030	180.63	3.0	0.00										84.23	84.18	88.80	4.57	89.80	Yes	54.33	0.00	Method 1	66.070	66.060
LINE 6																																				
FUTURE	JUNCTION MH 4	87.30	87.30	35.99	2.80	0.80	2.24	0.00	150.69	8	10	6	0.030	180.63	3.0	0.00										84.23	84.23	88.80	4.57	89.80	Yes	54.33	0.00	Method 1	66.070	66.068

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 7																																				
FUTURE	JUNCTION MH 6	57.67	57.67	35.42	2.82	0.80	2.26	0.00	130.30	40	10	7	0.050	289.56	4.1	10.82										84.22	84.21	89.00	4.78	90.00	Yes	54.33	0.00	Method 1	77.880	77.830
	JUNCTION MH 6	0.00	57.67	35.42	2.82	0.80	2.26	0.00	130.30	80	10	7	0.050	289.56	4.1	1.91										84.21	84.20	89.00	4.79	90.00	Yes	54.33	0.00	Method 1	87.000	86.940
	JUNCTION MH 5	9.59	67.25	35.98	2.80	0.80	2.24	0.00	151.77	172	10	7	0.030	224.29	3.2	0.00										84.20	84.18	89.00	4.80	90.00	Yes	54.33	0.00	Method 1	66.050	66.048
LINE 8																																				
FUTURE	JUNCTION MH 5	9.59	9.59	28.89	3.10	0.80	2.48	0.00	23.81	8	42				0.096	30.26	3.1	0.00								84.21	84.20	89.00	4.79	90.00	Yes	54.33	0.00	Method 1	76.800	76.583

2 YR		25-YR W.S.E. 84.18																																		
FROM JUNCTION	TO JUNCTION	ADDED AREA	TOTAL AREA	TC	Intensity	C	CI	Additional Q	CUM Q2 YR	REACH	SIZE	LINE/BOX	WIDTH	HEIGHT	SLOPE	DESIGN Q	V	FALL	OTHER LOSSES	FLOWLINE UP	DOWN	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HD DST	Maximum Ponding	Method 1	Maximum Allowable	Actual	Method 2	FLOWLINE @ 3 DECIMAL		
		ac	ac	mm				cfs	cfs	#	in	in	ft	ft	%	cfs	lps	(ft)	#	UP	DOWN	UP	DOWN	GRAD (%)	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 9																																				
ENGINEERING	MH 2	1.61	1.61	25.87	3.35	0.55	1.84	0.00	2.96	86	24				0.180	9.82	3.1	5.66							84.21	84.20	87.00	2.78	88.00	Yes	54.33	0.00	Method 1	76.985	76.840	
	OUTFALL	0.00	1.61	25.87	3.35	0.55	1.84	0.00	2.96	99	24				0.180	9.82	3.1	0.00								84.20	84.18	87.00	2.80	88.00	Yes	54.33	0.00	Method 1	70.180	70.002

**BENCHMARK:**  
 A-1217 - BRASS DISK, STAMPED A-1217, 1921, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 29 APPROX. 4.1 MILES WEST ALONG HWY 29 FROM THE JUNCTION OF HWY 6 IN HOUSTON, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 3.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND NOTED LOWER THAN THE ROAD.  
 ELEV = 78.65 FEET (NGVD-29) 1973 ADJ. TBM.  
 1/4" IRON ROD W/ LJA CAP LOCATED APPROX. 25.8 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALANA PROPERTY AT THE INTERSECTION OF MADDOX ROAD AND FM 1464.  
 ELEV = 83.19 FEET 1973 ADJ.

NOTES:

APPROVED: *Maggie D...*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. 15-1745  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II  
 DRAINAGE IMPROVEMENTS

DRAINAGE CALCULATIONS  
 (2-YR CITY OF HOUSTON)

**LJA Engineering, Inc.**  
 2609 Briarpark Drive  
 Suite 600  
 Houston, Texas 77042  
 Phone 713.953.5200  
 Fax 713.953.9008  
 FRN - F-5386

LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB  
 DRAWN BY: KDB  
 DATE: FEBRUARY 2016

NOTE: CITY SCHEDULED WELD FOR ONE YEAR ONLY AFTER DATE OF SCHEDULE

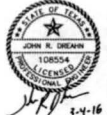
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 5/1/16  
 T. J. ...  
 T. J. ...  
 T. J. ...

FILE NO. \_\_\_\_\_ FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE \_\_\_\_\_

SCALE: NONE

SHEET NO. 6 of 18



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627

**LJA Engineering, Inc.**

Project: **Allen Bullhead Bayou System**  
 LJA Job No. **1968-0627**  
 System: **Storm**  
 By: **KDB** Date: \_\_\_\_\_  
 Checked by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Design Frequency: **100** years

Normal POOL **75.00**  
 25-YR W S E **84.18**

COH 100 YR  
 125.4  
 21.8  
 0.75

100 YR		25-YR W S E															84.18																
FROM	TO	ADDED	TOTAL	TC	Intensity	C	CI	Additional	CLM	REACH	LINE/BOX	HEIGHT	SLOPE	DESIGN	D S	OTHER	FLOWLINE	ACT V	SLOPE	delta H	ELEV HYD	GRAD	TC	HO DBT	Maximum	Method 1	Maximum	Actual	Method 2	FLOWLINE @ 3 DECIMAL			
JUNCTION	JUNCTION	AREA	AREA	min				Q	Q/100 YR	#	SIDE	WIDTH	HEIGHT	%	Q	V	UP	DOWN	UP	DOWN	HYD	UP	DOWN	UP	BELOW TC	Ponding	(Y/N)	Allowable	Sheetflow	(Y/N)	UP	DOWN	
SYSTEM A		ac	ac					cb	cb		in	FT	FT	%	cb	ft/s	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
LINE 1																																	
FUTURE	MH 1	5.54	5.54	28.96	6.63	0.55	3.65	0.00	20.58	8	36			0.110	22.18	3.1	0.00	77.44	77.43	2.91	0.064	0.308	84.33	84.32	87.50	3.17	88.50	Yes	54.33	0.00	Method 1	77.440	77.431
	MH 1	0.00	13.75	30.88	6.42	0.55	3.53	0.00	48.62	228	14			0.060	48.50	3.0	0.00	69.13	69.00	3.08	0.062	0.141	84.32	84.18	87.50	3.18	88.50	Yes	54.33	0.00	Method 1	69.130	69.002
FUTURE	MH 1	8.08	8.08	29.44	6.55	0.55	3.60	0.00	29.03	8	36			0.110	22.18	3.1	0.00	77.10	77.09	4.10	0.188	0.015	84.34	84.32	87.50	3.18	88.50	Yes	54.33	0.00	Method 1	77.100	77.091

**BENCHMARK:**  
 A-1212 - BRASS DISK, STAMPED A-1212, 1932, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 29 APPROX. 4.1 FEET WEST ALONG HWY 29 FROM THE JUNCTION OF HWY 6 IN HOUSTON, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 2.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND NOT LOWER THAN THE ROAD.  
 ELEV = 78.65 FEET (NGVD-29) 1973 ADJ.  
 ZONE:  
 3/4" IRON ROD W/ LJA CAP LOCATED APPROX. 50.8 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALMA PROPERTY AT THE INTERSECTION OF MADISON ROAD AND FM 1464.  
 ELEV = 83.19 FEET 1973 ADJ.

NOTES:

APPROVED: *Maggie*  
 DEVELOPMENT COORDINATOR  
 DATE: **4/12/16**  
 DATE: \_\_\_\_\_ REVISION: \_\_\_\_\_ BY: \_\_\_\_\_  
 PLAT NAME: CPC 101 FILE NO. 15-1745  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B  
 BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

DRAINAGE CALCULATIONS (100-YR CITY OF HOUSTON)

LJA Engineering, Inc.  
 2929 Blaupark Drive Suite 500 Houston, Texas 77042  
 LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB DRAWN BY: KDB DATE: FEBRUARY 2016

CITY OF HOUSTON  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 DIVISION OF STORMWATER  
 DATE: 3/9/16  
 PROJECT NO.: 1968-0627  
 SHEET NO.: 7 OF 18



FILE NO.: \_\_\_\_\_ FOR CITY OF HOUSTON USE ONLY  
 DRAWING SCALE: \_\_\_\_\_  
 SCALE: NONE  
 SHEET NO. 7 of 18

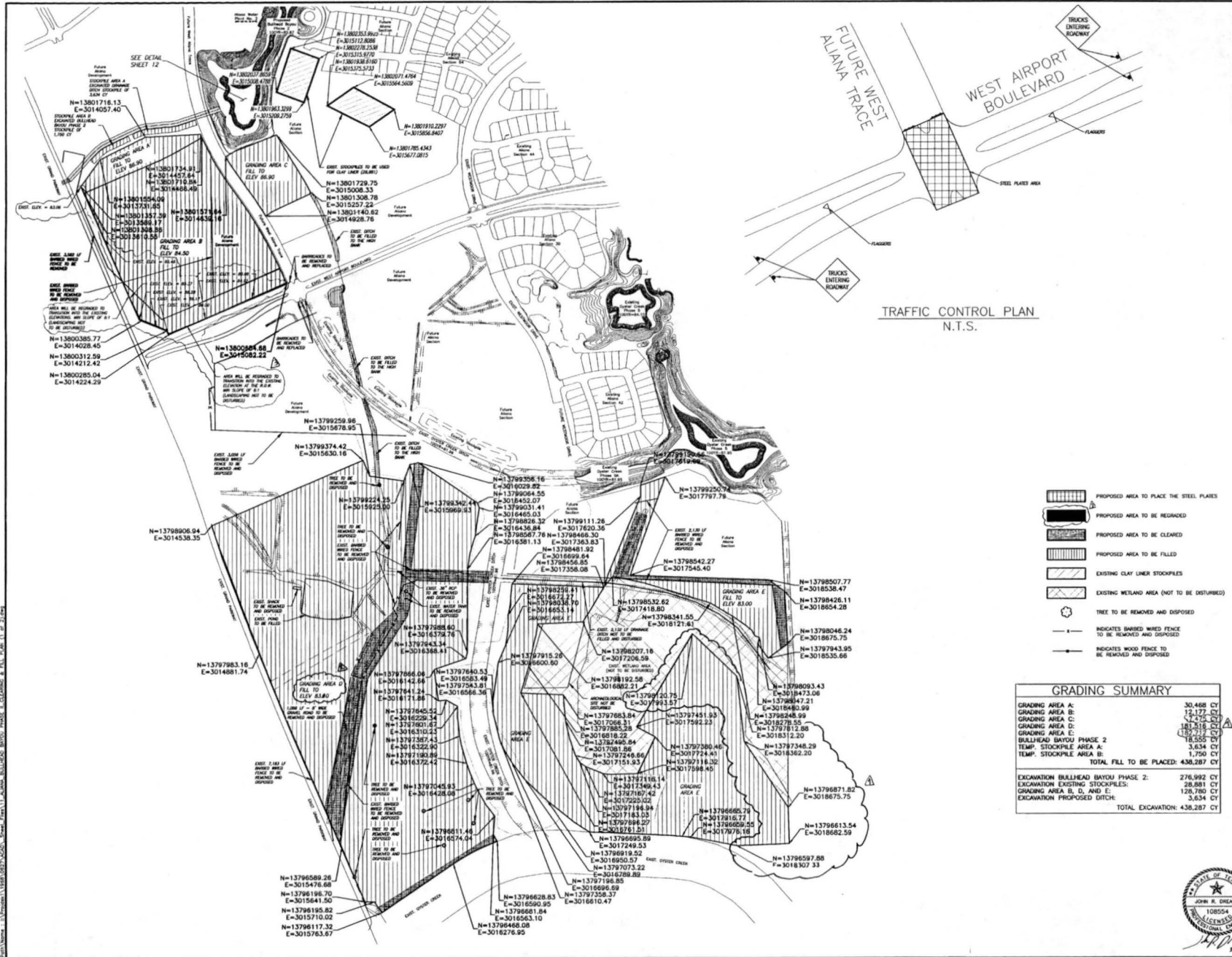
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BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627









**BENCHMARKS:**  
 A-1212 - BRASS DISK STAMPED A-1212 1973 SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST SIDE OF WEST AIRPORT BOULEVARD, 4.1 FEET WEST ALONG HWY 50A FROM THE JUNCTION OF HWY 5. IN HOUSTON, TEXAS. THE TOP OF SET POINT IS EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 2.0 FEET NORTH OF THE CENTERLINE OF THE EXISTING LANES, AND 9.000 FEET LOWER THAN THE B.M.  
 ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ. B.M.  
 W-1 IRON ROD W/ LAMP CAP LOCATED APPROX. 25.0 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALIANA PROPERTY AT THE INTERSECTION OF HANCOCK ROAD AND FM 1464.  
 ELEV. = 83.19 FEET 1973 ADJ.

- NOTES:**
- 1) CONTRACTOR SHALL USE EXISTING WEST ALIANA TRACE CROSSING AS CROSSING TO TRANSPORT EXCAVATED MATERIAL. CONTRACTOR SHALL PLACE STEEL PLATES ACROSS PAVEMENT TO FACILITATE USE OF OFF-ROAD TRUCKS FOR THE PROJECT.
  - 2) CONTRACTOR SHALL ONLY UTILIZE THE WEST ALIANA TRACE CROSSING DURING THE OFF-PEAK TRAFFIC HOURS OF 9A.M.-4P.M. ONLY. CONTRACTOR SHALL ALSO STAGE WARNING SIGNS FOR "TRUCKS ENTERING ROADWAY" AS SHOWN ON THIS SHEET FOR TRAFFIC CONTROL. CONTRACTOR SHALL ALSO USE FLAGGERS DURING THIS WORK TO WARN ONCOMING MOTORISTS OF TRUCK ENTERING ROADWAY.

**APPROVED:** *Maggie D. ...*  
 DEVELOPER OF PROPOSAL  
**DATE:** 4/12/16

DATE	REVISION	BY
4/12/16	Revised 2D Elevation	JRB
4/12/16	Revised 2D Elevation	JRB
4/12/16	Revised 2D Elevation	JRB

**PLAT NAME:**  
 CPC 101 FILE NO. 15-1745  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

**BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS**

**CLEARING, FILL, AND TRAFFIC CONTROL PLANS (SHEET 11 OF 2)**

LJA Engineering, Inc.	
2929 Briarpark Drive	Phone 713.953.5200
Suite 600	Fax 713.953.5008
Houston, Texas 77042	FRN - F-1388
LJA PROJECT NO.: 1968-0527	
DESIGNED BY: KDB	DRAWN BY: KDB
DATE: FEBRUARY 2016	

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 DATE: 3/3/16  
 DRAWN BY: KDB  
 CHECKED BY: JRB  
 IN CHARGE: JRB

FILE NO. FOR CITY OF HOUSTON USE ONLY  
 DRAWING SCALE  
 SCALE: 1" = 300'  
 SHEET NO. 11 of 18

- PROPOSED AREA TO PLACE THE STEEL PLATES
- PROPOSED AREA TO BE REDGRADED
- PROPOSED AREA TO BE CLEARED
- PROPOSED AREA TO BE FILLED
- EXISTING CLAY LINER STOCKPILES
- EXISTING WETLAND AREA (NOT TO BE DISTURBED)
- TREE TO BE REMOVED AND DISPOSED
- INDICATES BARBED WIRE FENCE TO BE REMOVED AND DISPOSED
- INDICATES WOOD FENCE TO BE REMOVED AND DISPOSED

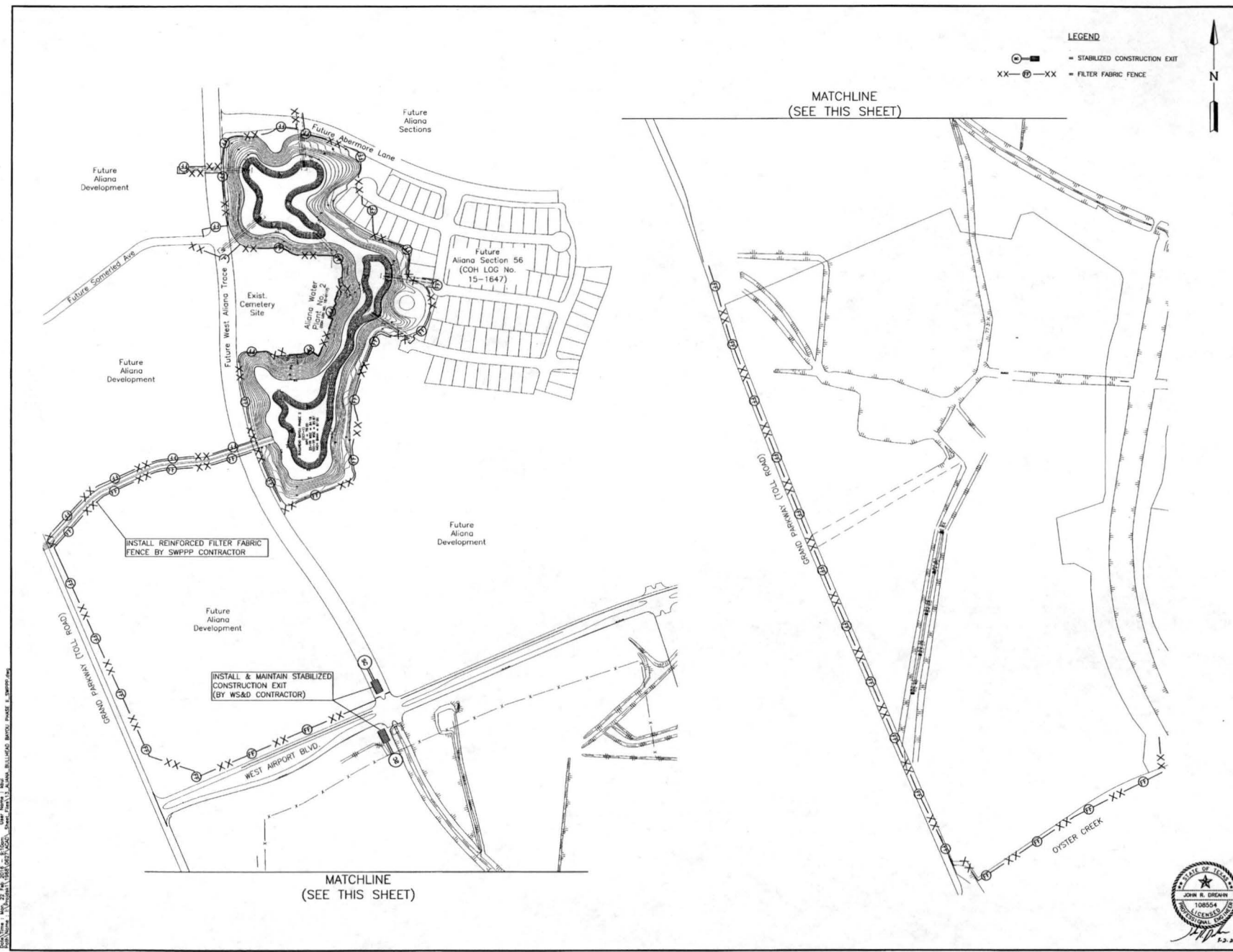
GRADING SUMMARY	
GRADING AREA A:	30,468 CY
GRADING AREA B:	12,177 CY
GRADING AREA C:	4,725 CY
GRADING AREA D:	101,516 CY
GRADING AREA E:	15,555 CY
BULLHEAD BAYOU PHASE 2 TEMP. STOCKPILE AREA 2:	3,634 CY
TEMP. STOCKPILE AREA B:	1,750 CY
TOTAL FILL TO BE PLACED:	436,287 CY
EXCAVATION BULLHEAD BAYOU PHASE 2:	276,992 CY
EXCAVATION EXISTING STOCKPILES:	28,881 CY
GRADING AREA B, D, AND E:	128,780 CY
EXCAVATION PROPOSED DITCH:	3,634 CY
TOTAL EXCAVATION:	438,287 CY



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS JOB NO. 1968-0627



17



**BENCHMARK:**  
 4-1212 - BRASS DISK, STAMPED 4-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LINES OF HWY 50A, APPROX. 4.5 MILES WEST ALONG HWY 50A FROM THE JUNCTION OF HWY 5. IN SUGARLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 5.0 FEET LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (NOVD-29) 1973 ADJ. IGM.  
 1/4" IRON ROD W/ LIA CAP LOCATED APPROX. 25.0 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALIANA PROSPERITY AT THE INTERSECTION OF MADISON ROAD AND FM 1464.  
 ELEV. = 83.19 FEET 1973 ADJ. IGM.

**NOTES:**

APPROVED: *Magnus*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. :  
 C.O.H. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

STORM WATER POLLUTION PREVENTION PLAN

**LJA Engineering, Inc.**  
 2929 Briarpark Drive Phone 713.953.5200  
 Suite 500 Fax 713.953.5208  
 Houston, Texas 77042 FRN-F-1386

LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB DRAWN BY: KDB DATE: FEBRUARY 2016

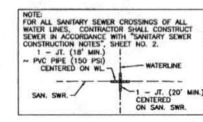
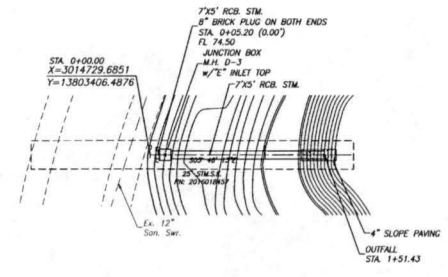
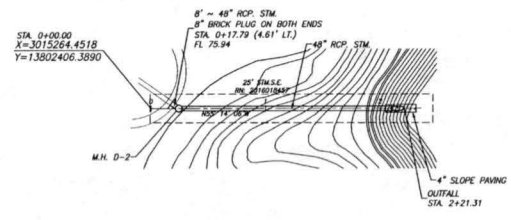
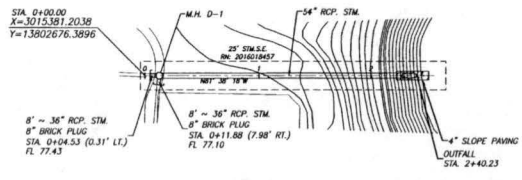
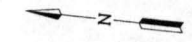
NOTE: CITY SCHEDULES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURE

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 3/3/16 SHEET & BOOK  
 3-16  
 Program Director 3/2/16 STORM WATER QUALITY FACILITIES

FILE NO. FOR CITY OF HOUSTON USE ONLY  
 DRAWING SCALE  
 SCALE: 1" = 200'  
 SHEET NO. 13 OF 18



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



**BENCHMARK:**  
 4-1212 - BRASS DISK, STAMPED 4-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 55A APPROX. 4.1 MILES WEST ALONG HWY 55A FROM THE JUNCTION OF HWY 5. IN SICKLAND, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 19.0 FEET LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (NGVD-29) 1973 ADJ.  
 ILM:  
 1/4" IRON ROD W/ LIA CAP LOCATED APPROX. 50.0 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALMA PROPERTY AT THE INTERSECTION OF MADISON ROAD AND FM 1464.  
 ELEV. = 83.19 FEET 1973 ADJ.

**NOTES:**

APPROVED: *Magid D...*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. 15-1745  
 C.O.H. LOG NO. 15-1745  
 F.B.C.M.U.D. NO. 134B  
 BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS  
 OUTFALLS A, B & C  
 STA. 0+00.00 TO END

**LJA Engineering, Inc.**  
 2529 Briarpark Drive  
 Suite 600  
 Houston, Texas 77042  
 Phone 713.963.5200  
 Fax 713.963.5028  
 FRN-F-1386  
 LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: KDB  
 DRAWN BY: KDB  
 DATE: FEBRUARY 2016

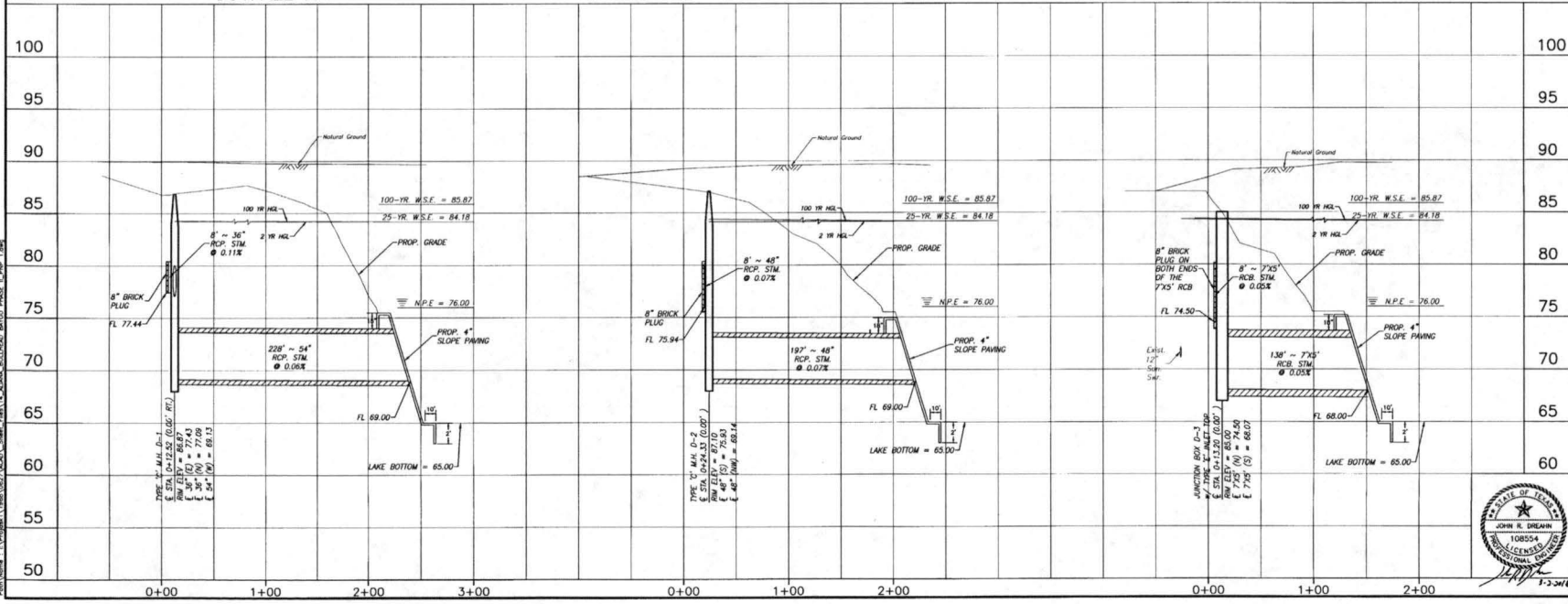
NOTE: CITY SIGNATURES VALID FOR ONE YEAR ONLY AFTER DATE OF SIGNATURES.  
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 SHEET 3 OF 3  
 DATE: 3/17/16  
 DRAWN BY: *[Signature]*  
 CHECKED BY: *[Signature]*  
 DATE: 3/11/16  
 DRAWING QUALITY FACILITIES

FILE NO. \_\_\_\_\_ FOR CITY OF HOUSTON USE ONLY  
 DRAWING SCALE \_\_\_\_\_  
 HORZ: 1" = 50'  
 VERT: 1" = 5'  
 SHEET NO. 14 OF 18  
 55658

OUTFALL A

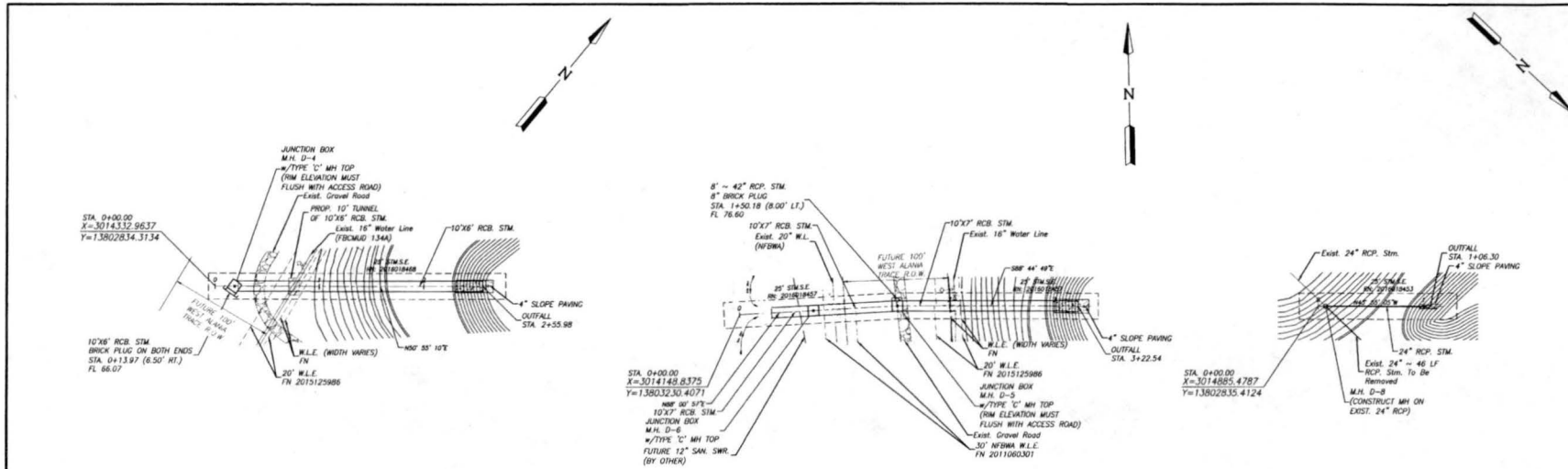
OUTFALL B

OUTFALL C



14

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627

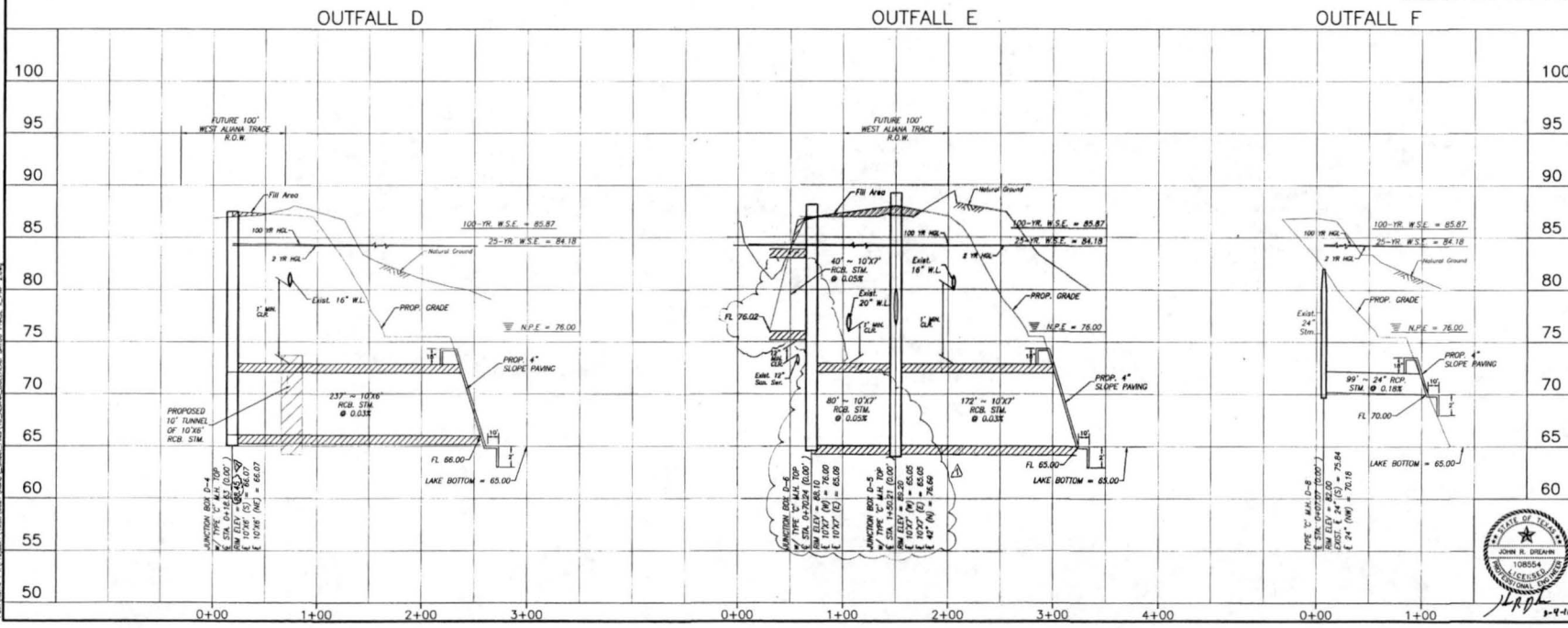


**BENCHMARKS:**  
 A-1212 - BRASS DISK, STAMPED A-1212, 1923, SET IN THE TOP OF A CONCRETE PADWALL ON THE WEST SIDE OF THE WEST LANE OF HWY 50A APPROX. 4.1 MILES WEST ALONG HWY 50A FROM THE JUNCTION OF HWY 5. IN SICHAMANG, LEADS THE CORNER OF SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE PADWALL, AND 22.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 10'00" LOWER THAN THE BENCH.  
 ELEV. = 78.65 FEET (NOVD-29) 1973 ADJ. I.B.M.  
 W- IRON ROD W/ LJA CAP LOCATED APPROX. 25.0 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALAMA PROPERTY AT THE INTERSECTION OF MADISON ROAD AND FM 1464.  
 ELEV. = 93.19 FEET 1973 ADJ.

**NOTES:**  
 FOR ALL SANITARY SEWER CROSSINGS OF ALL WATER LINES, CONTRACTOR SHALL CONSTRUCT TRENCH IN ACCORDANCE WITH SANITARY SEWER CONSTRUCTION NOTES, SHEET NO. 2.  
 1 - J. (18" MIN.)  
 - PVC PIPE (150 P.S.I.) CENTERED ON W.L.  
 WATERLINE  
 SAN. SWR. 1 - J. (20" MIN.) CENTERED ON SAN. SWR.

APPROVED: *Maggie Deas*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY
4/12/16	Rev'd 4.4, Fl. & R.C.M. Elevations	JRH



PLAT NAME:  
 CPC 101 FILE NO. 15-1745  
 C.O.M. LOG NO. 15-1745

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

OUTFALLS D, E, & F STA. 0+00.00 TO END

**LJA Engineering, Inc.**  
 2023 Briarwood Drive Phone 713.953.0200  
 Suite 600 Houston, Texas 77042 Fax 713.953.0208  
 FRN-F-1386

LJA PROJECT NO.: 1968-0627  
 DESIGNED BY: DRAWN BY: DATE: FEBRUARY 2016  
 REVISIONS: KCB  
 CHECKED BY: KCB  
 IN CHARGE: KCB

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 SHEET # 37/76  
 DATE: 2/17/16  
 DRAWN BY: JRH  
 CHECKED BY: JRH  
 IN CHARGE: JRH

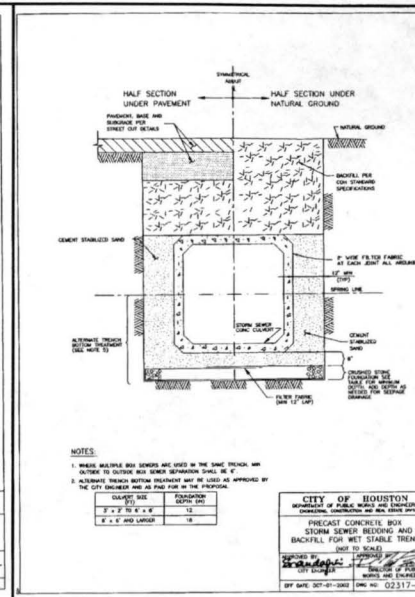
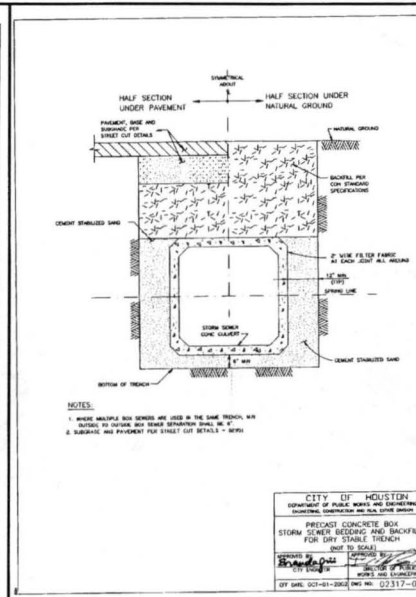
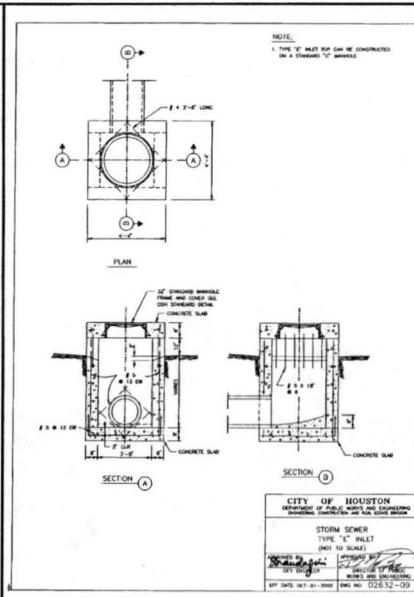
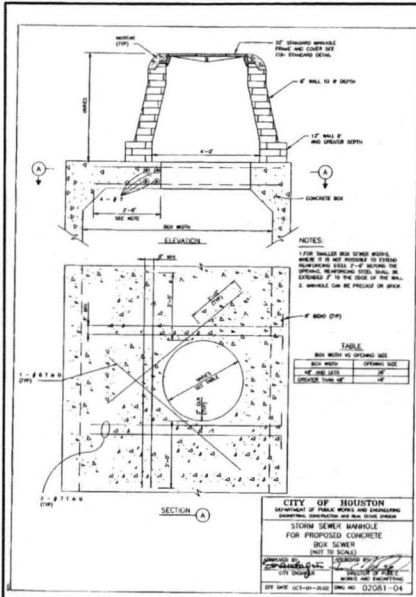
FILE NO. FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE  
 HORIZ: 1" = 50'  
 VERT: 1" = 5'

SHEET 15 OF 18

55688

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



**BENCHMARK:**  
A-1212 - BRASS DISK, STAMPED A-1212, 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BOUND LANE OF HWY 29 APPROX. 4.1 MILES WEST ALONG HWY 29 FROM THE INTERSECTION OF HWY 6 IN HOUSTON, TEXAS. THE DISK IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 27.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND HIGHER LOWER THAN THE ROAD.  
ELEV. = 78.65 FEET (MVD-29) 1973 ADJ.  
ELEV. = 83.19 FEET 1973 ADJ.

**APPROVED:** *Maggie*  
DEVELOPMENT COORDINATOR  
DATE: 4/12/16

**PLAT NAME:**  
CPC 101 FILE NO. 15-1745  
C.O.H. LOG NO. 15-1745

**F.B.C.M.U.D. NO. 134B**

**BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS**

**STORM SEWER CONSTRUCTION DETAILS (SHEET 1 OF 2)**

**LJA Engineering, Inc.**  
2929 Blinnpark Drive  
Suite 500  
Houston, Texas 77042  
Phone 713-953-5200  
Fax 713-953-5028  
FRN-F-1385

LJA PROJECT NO: 1968-0627  
DESIGNED BY: KDB  
DRAWN BY: KDB  
DATE: FEBRUARY 2016

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
DATE: 3/3/16  
SHEET & TAGS

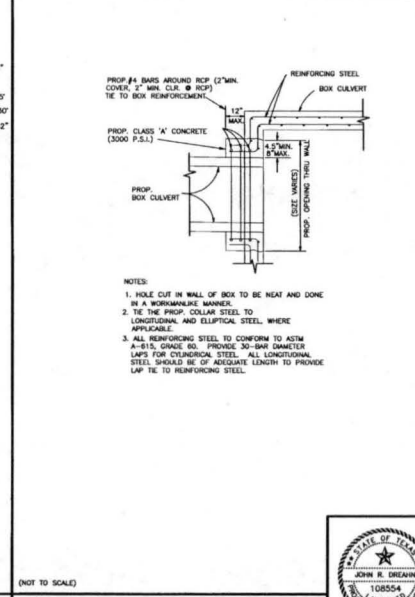
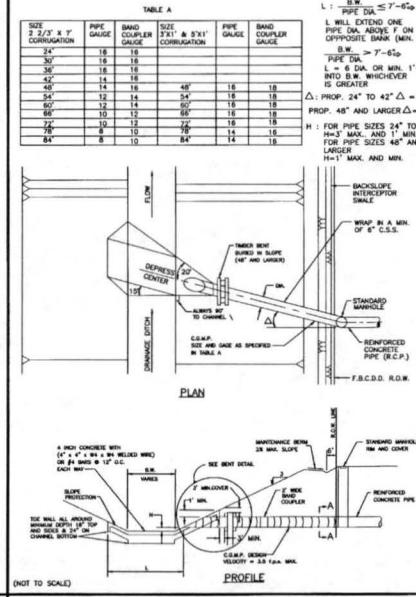
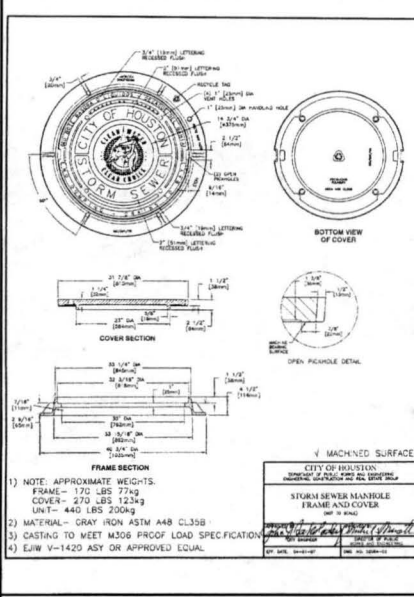
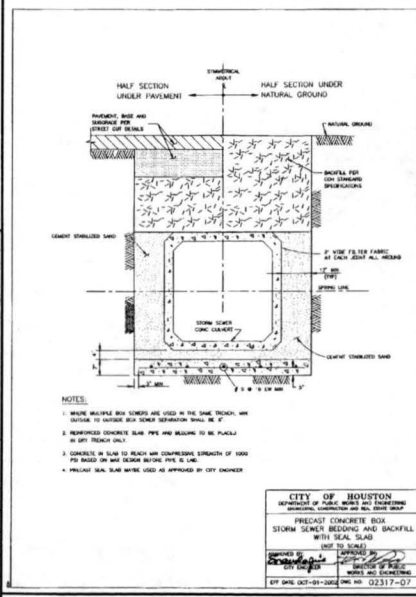
**FILE NO.:** FOR CITY OF HOUSTON USE ONLY  
**DRAWING SCALE:**  
**SCALE:** NONE  
**SHEET NO. 16 of 18**

STORM SEWER MANHOLE FOR PROPOSED CONCRETE BOX SEWER

STORM SEWER TYPE "E" INLET

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR WET STABLE TRENCH



**APPROVED:** *Maggie*  
DEVELOPMENT COORDINATOR  
DATE: 4/12/16

**PLAT NAME:**  
CPC 101 FILE NO. 15-1745  
C.O.H. LOG NO. 15-1745

**F.B.C.M.U.D. NO. 134B**

**BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS**

**STORM SEWER CONSTRUCTION DETAILS (SHEET 1 OF 2)**

**LJA Engineering, Inc.**  
2929 Blinnpark Drive  
Suite 500  
Houston, Texas 77042  
Phone 713-953-5200  
Fax 713-953-5028  
FRN-F-1385

LJA PROJECT NO: 1968-0627  
DESIGNED BY: KDB  
DRAWN BY: KDB  
DATE: FEBRUARY 2016

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
DATE: 3/3/16  
SHEET & TAGS

**FILE NO.:** FOR CITY OF HOUSTON USE ONLY  
**DRAWING SCALE:**  
**SCALE:** NONE  
**SHEET NO. 16 of 18**

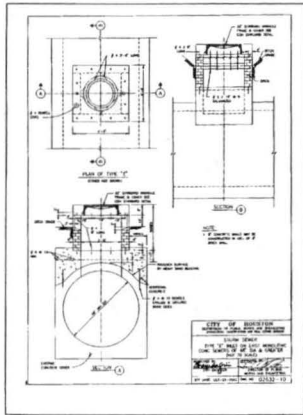
PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL WITH SEAL SLAB

STORM SEWER MANHOLE FRAME AND COVER

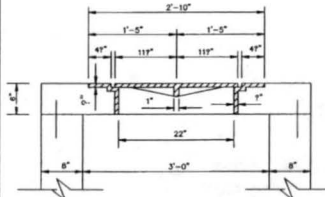
STORM SEWER OUTFALL

STORM SEWER / BOX CULVERT CONCRETE COLLAR

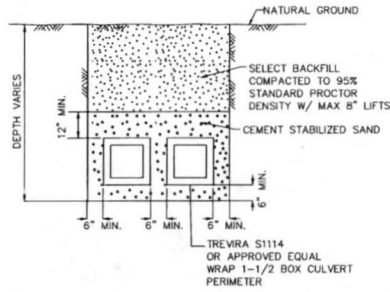
BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



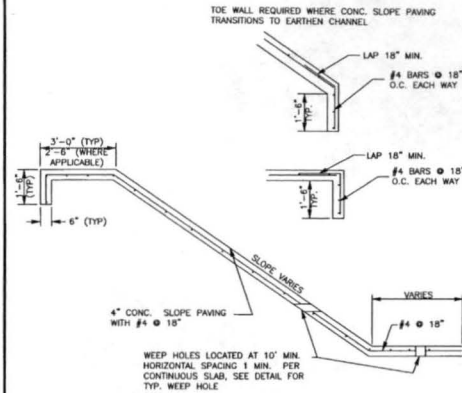
TYPE 'E' INLET CONNECTED TO EXIST STRUCTURE



FRAME AND COVER SECTION FOR JUNCTION BOX



MULTIPLE BOX CULVERT BEDDING AND BACKFILL DETAIL



1. EXPANSION JOINTS TO BE PLACED AT A MAXIMUM DISTANCE OF 80 FEET.
2. CENTER DOMEL HORIZONTALLY ON JOINT.
3. CENTER DOMEL HORIZONTALLY IN CONCRETE BASE. EXTEND THICKENED CONCRETE AS NEEDED TO MAINTAIN 3" MIN COVER.

SLOPE PAVING

**BENCHMARK:**  
 A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST BRIDGE LANE OF HWY 288 APPROX. 4.1 MILES WEST ALONG HWY 288 FROM THE JUNCTION OF HWY 8 IN COCKSHAM, TEXAS. THE TOP OF SET IS 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL AND 23.0 FEET NORTH OF CONCRETE CENTERLINE OF THE WESTBOUND LANES, AND 10.0 FEET LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (NOVD-28) 1973 ADJ. IBM  
 1/4" HIGH 300 W/ LIA CAP LOCATED APPROX. 25.8 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALIANT PROPERTY OF THE INTERSECTION OF MADDEN ROAD AND FM 1464.  
 ELEV. = 83.19 FEET 1973 ADJ.

**NOTES:**

APPROVED: *Meguid*  
 DEVELOPMENT COORDINATOR  
 DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
 CPC 101 FILE NO. 15-1745  
 C.O.M. LOG NO.

F.B.C.M.U.D. NO. 134B

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS

STORM SEWER CONSTRUCTION DETAILS (SHEET 2 OF 2)

**LJA Engineering, Inc.**  
 7303 Riverchase Drive, Suite 600, Houston, Texas 77042  
 Phone 713.963.9000, Fax 713.963.9000, FRN - F-1388

LJA PROJECT NO.: 1958-0627  
 DESIGNED BY: HOB, DRAWN BY: HOB, DATE: FEBRUARY 2016

NOTE: CITY SCHEDULES MUST BE FOR THE YEAR ONLY AFTER DATE OF SCHEDULES  
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
 STREET & BRIDGE DIVISION  
 DATE: 2/16/16  
 DRAWN: HOB  
 CHECKED: J. L. C. (JLC)  
 PROJECT: STORM WATER QUALITY

FILE NO. FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE: NONE

SCALE: NONE

SHEET NO. 17 OF 18

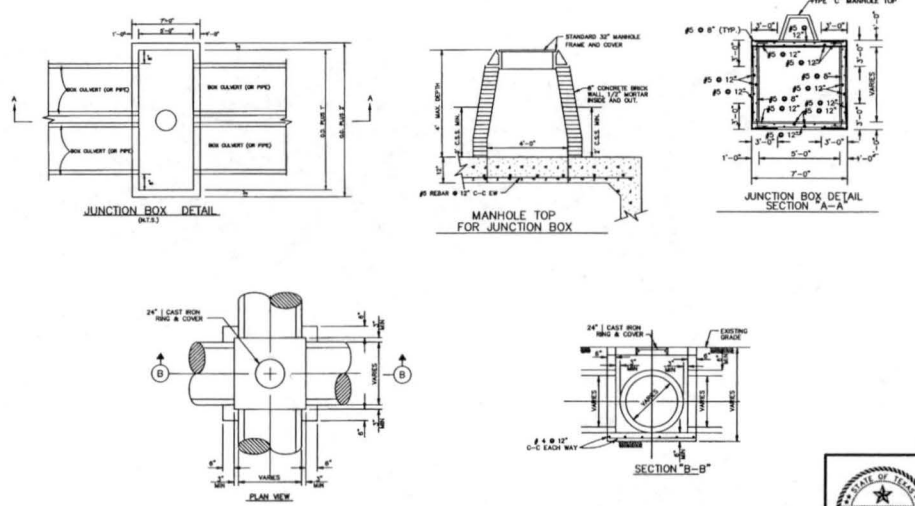


TABLE OF DIMENSIONS & REINFORCING STEEL	TABLE OF MATERIALS	REINFORCEMENT CALCULATIONS																														
<table border="1"> <tr> <th>ITEM</th> <th>DESCRIPTION</th> <th>QTY</th> <th>UNIT</th> <th>REMARKS</th> </tr> <tr> <td>1</td> <td>CONCRETE</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>2</td> <td>STEEL</td> <td>...</td> <td>...</td> <td>...</td> </tr> </table>	ITEM	DESCRIPTION	QTY	UNIT	REMARKS	1	CONCRETE	...	...	...	2	STEEL	...	...	...	<table border="1"> <tr> <th>ITEM</th> <th>DESCRIPTION</th> <th>QTY</th> <th>UNIT</th> <th>REMARKS</th> </tr> <tr> <td>1</td> <td>CONCRETE</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>2</td> <td>STEEL</td> <td>...</td> <td>...</td> <td>...</td> </tr> </table>	ITEM	DESCRIPTION	QTY	UNIT	REMARKS	1	CONCRETE	...	...	...	2	STEEL	...	...	...	<p>REINFORCEMENT CALCULATIONS</p> <p>1. DESIGN STRENGTH OF CONCRETE: <math>f'_c = 4000</math> psi</p> <p>2. DESIGN STRENGTH OF STEEL: <math>f_y = 60000</math> psi</p> <p>3. DESIGN STRENGTH OF JOINT: <math>f'_c = 4000</math> psi</p> <p>4. DESIGN STRENGTH OF CURB: <math>f'_c = 4000</math> psi</p> <p>5. DESIGN STRENGTH OF WING: <math>f'_c = 4000</math> psi</p> <p>6. DESIGN STRENGTH OF BASE: <math>f'_c = 4000</math> psi</p> <p>7. DESIGN STRENGTH OF SLOPE: <math>f'_c = 4000</math> psi</p> <p>8. DESIGN STRENGTH OF COVER: <math>f'_c = 4000</math> psi</p> <p>9. DESIGN STRENGTH OF CURB: <math>f'_c = 4000</math> psi</p> <p>10. DESIGN STRENGTH OF WING: <math>f'_c = 4000</math> psi</p> <p>11. DESIGN STRENGTH OF BASE: <math>f'_c = 4000</math> psi</p> <p>12. DESIGN STRENGTH OF SLOPE: <math>f'_c = 4000</math> psi</p> <p>13. DESIGN STRENGTH OF COVER: <math>f'_c = 4000</math> psi</p>
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2	STEEL	...	...	...																												

CONCRETE HEADWALLS WITH FLARED WINGS FOR 9" SKW BOX CULVERTS

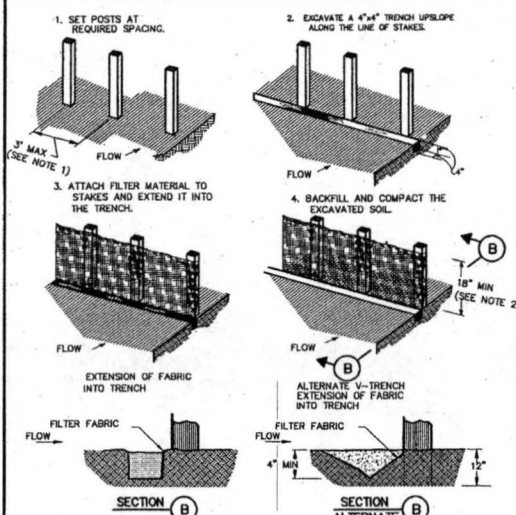
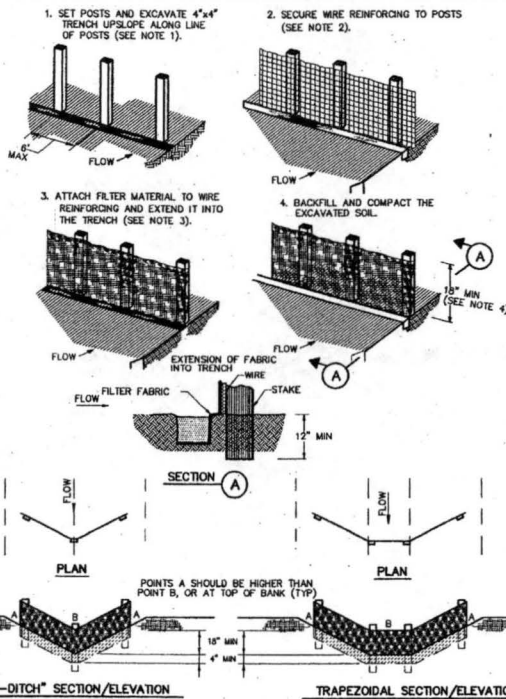
SECTION A-A, INSIDE ELEVATION, PLAN, SECTION B-B, CORNER DETAILS, SECTION C-C, PLAN VIEW

CONCRETE HEADWALL WITH FLARED WINGS



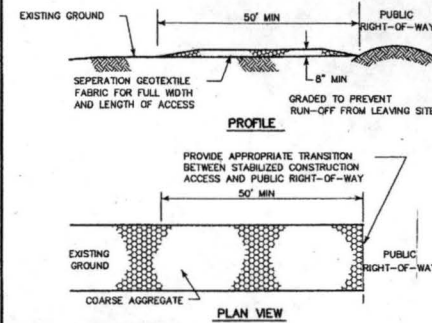
(REVISION NO. 1)  
 REVISED STANDARD JUNCTION BOX DETAIL

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



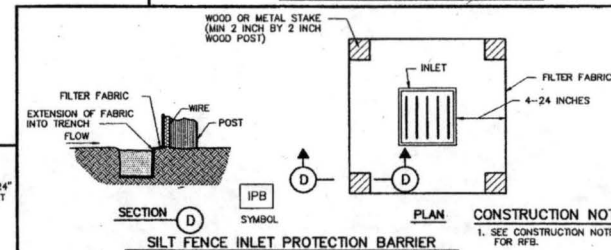
- CONSTRUCTION NOTES:**
- 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 6 FEET MAX.
  - ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
  - WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
  - SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

**FILTER FABRIC BARRIER**



- CONSTRUCTION NOTES:**
- LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
  - THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
  - WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
  - 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.
  - STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
  - COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
  - STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

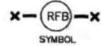
**STABILIZED CONSTRUCTION ACCESS**



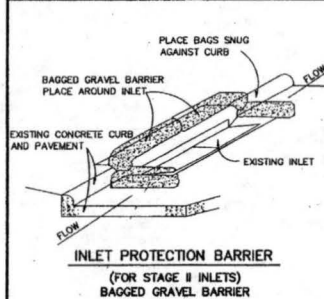
**SILT FENCE INLET PROTECTION BARRIER**

- CONSTRUCTION NOTE:**
- SEE CONSTRUCTION NOTES FOR RFB.

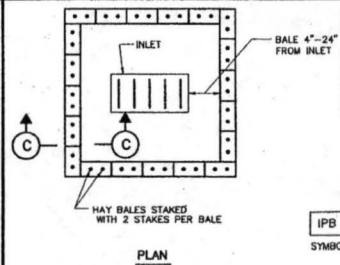
- CONSTRUCTION NOTES:**
- SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
  - WOVEN WIRE REINFORING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
  - FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
  - MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
  - WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
  - SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.



**REINFORCED FILTER FABRIC BARRIER**



**INLET PROTECTION BARRIER  
(FOR STAGE II INLETS)  
BAGGED GRAVEL BARRIER**



**HAY BALE INLET PROTECTION BARRIER**

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

**STORM WATER POLLUTION PREVENTION PLAN DETAILS**  
(NOT TO SCALE)

DESIGNED BY: [Signature] DATE: FEBRUARY 2016  
CHECKED BY: [Signature] DATE: FEBRUARY 2016

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

EFF DATE: JULY-01-2010 DWG NO: 01571-01

BENCHMARK:  
A-1212 - BRASS DISK, STAMPED A-1212 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST SIDE OF THE JUNCTION OF HWY 60A APPROX 4.1 MILES WEST OF HWY 60A FROM THE JUNCTION OF HWY 6. IN THE CENTERLINE AND 10.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 10.0 FEET LOWER THAN THE ROAD.  
ELEV. = 78.65 FEET (NOV-29) 1973 ADJ. TBM.  
A 1/2" IRON ROD W/ LIA CAP LOCATED APPROX 50.0 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALAMA PROPERTY AT THE INTERSECTION OF MADISON ROAD AND FM 1464.  
ELEV. = 83.19 FEET 1973 ADJ.

APPROVED: [Signature]  
DEVELOPMENT COORDINATOR

DATE: 4/12/16

DATE	REVISION	BY

PLAT NAME:  
CPC 101 FILE NO. 15-1745  
C.O.H. LOG NO.

F.B.C.M.U.D. NO. 134B

**BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS**

**STORM WATER POLLUTION PREVENTION PLAN DETAILS**

LJA Engineering, Inc.  
2502 Westpark Drive  
Suite 600  
Houston, Texas 77042  
Phone 713.953.5200  
Fax 713.953.9020  
FRR - F-1385

LJA PROJECT NO.: 1968-0627

DESIGNED BY: [Signature] DATE: FEBRUARY 2016  
CHECKED BY: [Signature] DATE: FEBRUARY 2016

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DESIGNED BY: [Signature] DATE: FEBRUARY 2016  
CHECKED BY: [Signature] DATE: FEBRUARY 2016

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

EFF DATE: JULY-01-2010 DWG NO: 01571-01



FILE NO. \_\_\_\_\_ FOR CITY OF HOUSTON USE ONLY

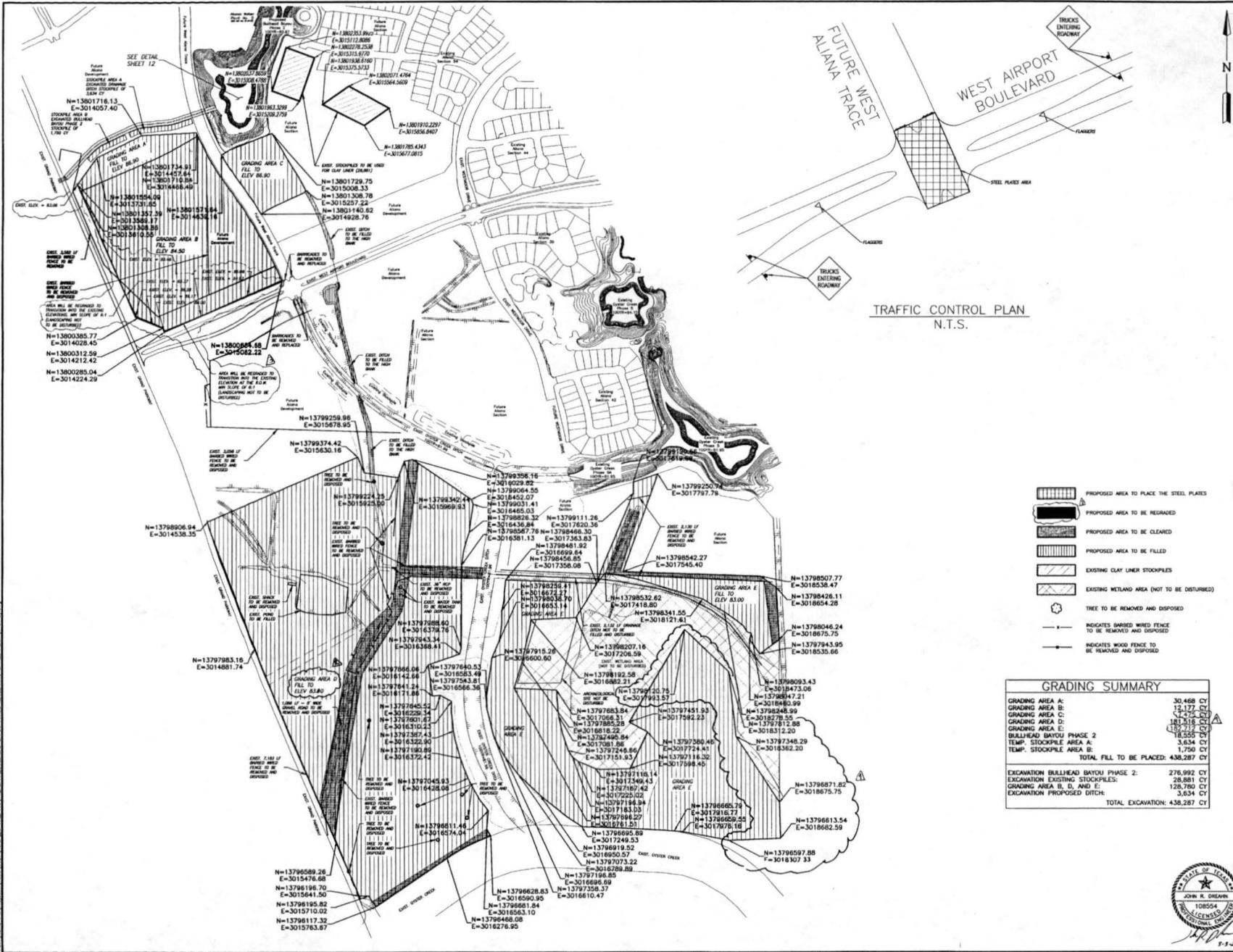
DRAWING SCALE: \_\_\_\_\_

SCALE: NONE

SHEET NO. 18 OF 18

55658

BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1968-0627



**BENCHMARKS:**  
 #1212 - BRASS DISK, STAMPED A-1212, 1973, SET IN THE TOP OF A CONCRETE HEADWALL ON THE WEST SIDE OF THE WEST ALIANA TRACE APPROX. 4.1 MILES WEST OF THE INTERSECTION OF HWY 6 AND HWY 101. THE BENCH IS SET 2.0 FEET EAST OF THE WEST END OF THE NORTH CONCRETE HEADWALL OF 17.0 FEET NORTH OF THE CENTERLINE OF THE WESTBOUND LANES, AND 19.00 FEET LOWER THAN THE ROAD.  
 ELEV. = 78.65 FEET (MVD-28) 1973 ADJ.  
 #1 - IRON ROD W/ L.H. CAP LOCATED APPROX. 50.6 FEET SOUTHWEST OF THE NORTHEAST CORNER OF THE ALIANA PROPERTY AT THE INTERSECTION OF HANLEY ROAD AND FM 1484.  
 ELEV. = 83.19 FEET 1973 ADJ.

- NOTES:**
- 1) CONTRACTOR SHALL USE EXISTING WEST ALIANA TRACE INTERSECTION AS CROSSING TO TRANSPORT EXCAVATED MATERIAL. CONTRACTOR SHALL PLACE STEEL PLATES ACROSS PAVEMENT TO FACILITATE USE OF OFF-ROAD TRUCKS FOR THE PROJECT.
  - 2) CONTRACTOR SHALL ONLY UTILIZE THE WEST ALIANA TRACE CROSSING DURING THE OFF-PEAK TRAFFIC HOURS OF 9A.M. - 4P.M. DAILY. CONTRACTOR SHALL ALSO STAGE WARNING SIGNS FOR "TRUCKS ENTERING ROADWAY" AS SHOWN ON THIS SHEET FOR TRAFFIC CONTROL. CONTRACTOR SHALL ALSO USE FLAGGERS DURING THIS WORK TO WARN ONCOMING MOTORISTS OF TRUCK ENTERING ROADWAY.

**APPROVED:** *Maggie Dea*  
 DEVELOPMENT COORDINATOR

**DATE:** 4/12/16

DATE	REVISION	BY
4-12-16	Revised Plot Area & Contour Lines	JCB
4-28-16	Revised Fill Elevation	JCB
4-28-16	Revised Proposed Area	JCB

**PLAT NAME:** CPC 101 FILE NO. 15-1745  
**C.O.H. LOG NO.:** 15-1745

**F.B.C.M.U.D. NO.:** 134B

**BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS**

**CLEARING, FILL, AND TRAFFIC CONTROL PLANS (SHEET 1 OF 2)**

- PROPOSED AREA TO PLACE THE STEEL PLATES
- PROPOSED AREA TO BE REGRADED
- PROPOSED AREA TO BE CLEARED
- PROPOSED AREA TO BE FILLED
- EXISTING CLAY LINER STOCKPILES
- EXISTING WETLAND AREA (NOT TO BE DISTURBED)
- TREE TO BE REMOVED AND DISPOSSED
- INDICATES BARBED WIRE FENCE TO BE REMOVED AND DISPOSSED
- INDICATES WOOD PILES TO BE REMOVED AND DISPOSSED

GRADING SUMMARY	
GRADING AREA A:	30,468 CY
GRADING AREA B:	12,177 CY
GRADING AREA C:	7,250 CY
GRADING AREA D:	181,516 CY
GRADING AREA E:	18,225 CY
BULLHEAD BAYOU PHASE 2	18,225 CY
TEMP. STOCKPILE AREA A:	3,634 CY
TEMP. STOCKPILE AREA B:	1,750 CY
<b>TOTAL FILL TO BE PLACED:</b>	<b>438,287 CY</b>
EXCAVATION BULLHEAD BAYOU PHASE 2:	276,992 CY
EXCAVATION EXISTING STOCKPILES:	28,881 CY
GRADING AREA B, D, AND E:	128,780 CY
EXCAVATION PROPOSED DITCH:	3,634 CY
<b>TOTAL EXCAVATION:</b>	<b>438,287 CY</b>

**LJA Engineering, Inc.**  
 2529 Starbuck Drive  
 Suite 500  
 Houston, Texas 77042  
 Phone: 713.933.5200  
 Fax: 713.933.5028  
 FRN: F-1388

LJA PROJECT NO.: 1958-0627  
 DESIGNED BY: KDB  
 DRAWN BY: KDB  
 DATE: FEBRUARY 2016

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DATE: 2/16  
 SHEET: 11 OF 18

FILE NO.:  
 DRAWING SCALE:  
 SCALE: 1" = 300'  
 SHEET NO. 11 OF 18



BULLHEAD BAYOU PHASE II DRAINAGE IMPROVEMENTS - JOB NO. 1958-0627

