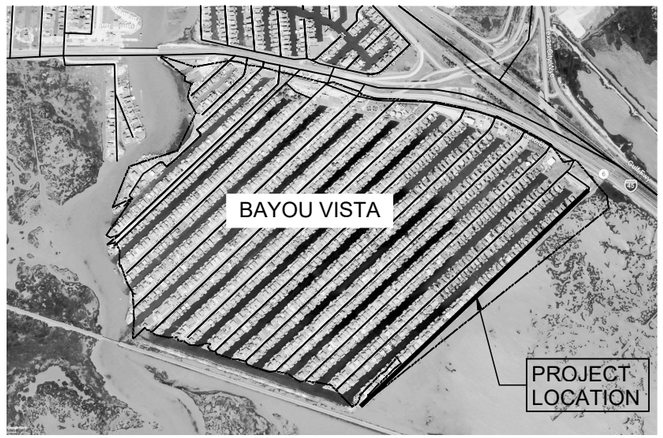
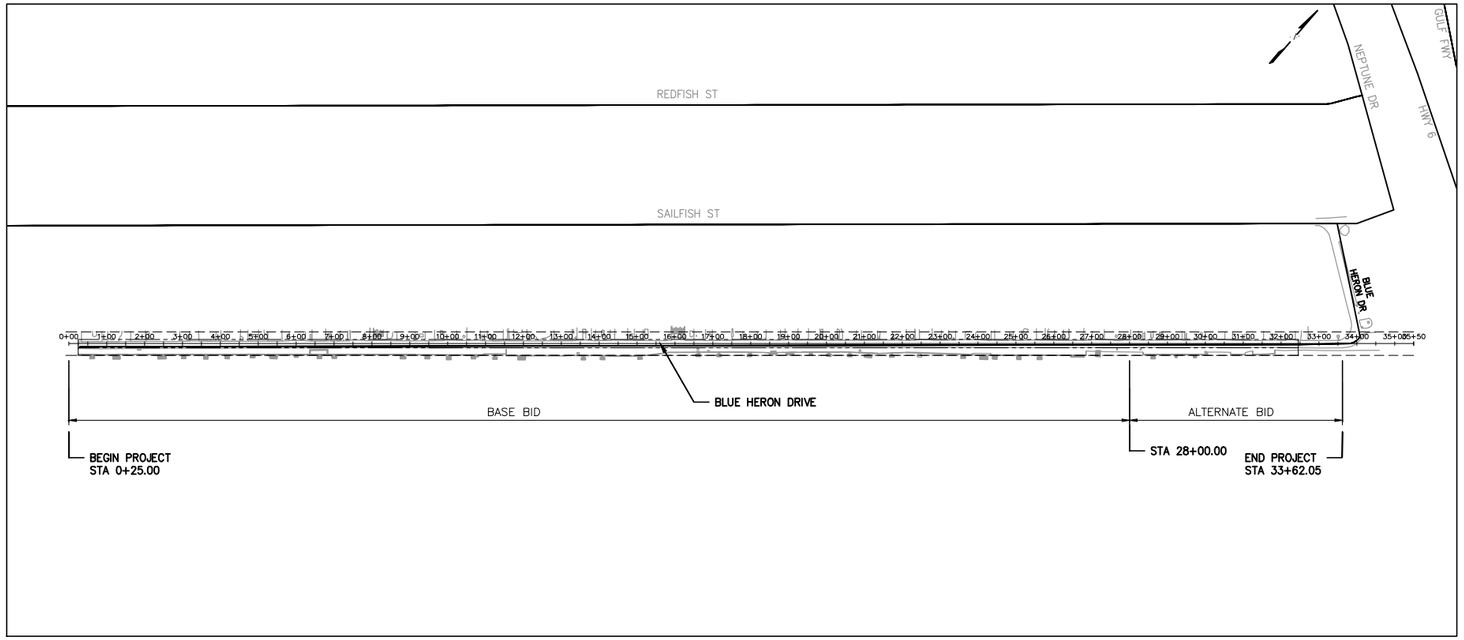
COUNTY OF GALVESTON, TEXAS

BLUE HERON DRIVE IMPROVEMENTS

PROJECT NO. BV01





THE STATE OF TEXAS
COUNTY OF GALVESTON

MARK HENRY
COUNTY JUDGE

DARRELL APFFEL
COMMISSIONER, PRECINCT NO. 1

JOE GIUSTI
COMMISSIONER, PRECINCT NO. 2

STEPHEN D. HOLMES
COMMISSIONER, PRECINCT NO. 3

KEN CLARK
COMMISSIONER, PRECINCT NO. 4

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ZARINKELK ENGINEERING SERVICES, INC.
617 CAROLINE ST
Houston, TX 77002
Phone (832) 242-2426 FAX (832) 242-2445
Firm Registration No: F-004270

GZK Zarinkelk 8-11-2020

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED PROFESSIONAL ENGINEER

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\01 Cover Sheet.dwg PLOTTED BY: James Galbort DATE: Sep 11, 2020 8:34am

GENERAL NOTES:

1. ALL EXISTING ROADWAY MATERIAL REMOVED AND EXCESS SOIL MATERIAL EXCAVATED FROM ROADWAY SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF OFF SITE.
2. THE CONTRACTOR WILL FURNISH AND MAINTAIN BARRICADES, WARNING SIGNS AND OTHER TRAFFIC CONTROL DEVICES AS PER LATEST TEXAS MUTCD AND TYPICAL CONSTRUCTION LAYOUTS OR AS DIRECTED BY THE ENGINEER.
3. ADVANCED WARNING SIGNS ARE TO BE SET TWO WEEKS PRIOR TO CONSTRUCTION ACTIVITIES AND REMAIN IN PLACE UNTIL ALL CONSTRUCTION ACTIVITIES ARE COMPLETE AND ACCEPTED.
4. THE CONTRACTOR WILL NOT BLOCK TRAFFIC WITHOUT PRIOR APPROVAL OF THE ENGINEER.
5. ACCESS TO BUSINESS AND PRIVATE PROPERTIES SHALL BE CONTINUOUSLY MAINTAINED EXCEPT FOR SHORT PERIODS DURING CONSTRUCTION OPERATIONS. INGRESS OR EGRESS SHALL BE PROVIDED AT DRIVEWAYS AS SOON AS PRACTICAL UPON COMPLETION OF WORK.
6. EQUIPMENT SHALL BE OFF STREETS BY DARK AND BEFORE DAWN.
7. POSITIVE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES.
8. FLAGMAN WILL BE PROVIDED BY CONTRACTOR AS REQUIRED TO MANTAIN TRAFFIC/PUBLIC SAFETY AT THE DISCRETION OF THE ENGINEER.
9. CONTRACTOR SHALL USE REASONABLE PRACTICAL METHODS TO CONTROL DUST AND TO REMOVE MATERIAL FROM EXISTING PAVED SURFACES.
10. THE LOCATION OF EXISTING UNDERGROUND UTILITIES AND SERVICE LINES AS INDICATED ON THE PLANS HAVE BEEN DETERMINED FROM AVAILABLE RECORDS ARE APPROXIMATE AND MAY BE INCOMPLETE. IT WILL BE UP TO CONTRACTOR TO LOCATE LINES AND OBSTACLES TO CONSTRUCTION AHEAD OF EXCAVATION.
11. CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND FACILITIES/UTILITIES DURING INSTALLATION OF PROPOSED WORK. ANY DAMAGE TO EXISTING FACILITIES/UTILITIES WILL BE THE CONTRACTOR'S RESPONSIBILITY.
12. PAVED SURFACES SHALL BE PROTECTED FROM DAMAGE BY CONSTRUCTION EQUIPMENTS.
13. IRON RODS OR CORNER MONUMENTS DISTURBED DURING CONSTRUCTION TO BE REPLACED BY REGISTERED PUBLIC LAND SURVEYOR TO ORIGINAL PROPERTY CORNER AT NO SEPARATE PAY.
14. CONTRACTOR SHALL CONTACT THE ENGINEER AND THE CITY OF BAYOU VISTA AT LEAST 48 HOURS PRIOR TO CONSTRUCTION FOR NOTICE OF COMMENCEMENT.
15. CONTRACTOR TO NOTIFY ALL PROPERTY OWNERS A MINIMUM OF 24 HOURS PRIOR TO STARTING CONSTRUCTION.
16. CONTRACTOR TO REMOVE AND REPLACE EXISTING FENCES, POSTS, PLANTERS, MAIL BOXES AND TRASH CONTAINERS AS REQUIRED TO COMPLETE THE WORK.
17. ANY TEMPORARY STREET CROSSOVERS REQUIRED BY CONTRACTOR, WILL BE AT CONTRACTORS EXPENSE. PRIOR APPROVAL BY ENGINEER IS REQUIRED.
18. ALL PROJECT WORK SCHEDULE AND CONSTRUCTION METHODS WILL NEED PRIOR APPROVAL BY ENGINEER.
19. CONTRACTOR SHALL BE EQUIPED WITH THE SPREADER, WHICH SHALL BE CAPABLE OF SPREADING AND FINISHING SURFACE COURSE OF 3" HMAC AND BASE COURSE OF 9" COLD-IN-PLACE IN FULL WIDTH OF THE PROPOSED PAVEMENT. CONTRCTOR SHALL SPREAD AND FINISH THE SURFACE COURSE AND BASE COURSE IN ONE FULL WIDTH OF THE PROPOSED PAVEMENT.

CENTERPOINT ENERGY FACILITIES

CAUTION: UNDERGROUND GAS FACILITIES

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

- WHEN CENTERPOINT ENERGY PIPELINE MARKERS ARE NOT VISIBLE, CALL (713) 207-5463 OR 713-945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF THE 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.

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

CENTERPOINT ENERGY FACILITIES (CON'T)

WARNING: OVERHEAD ELECTRICAL LINES

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

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

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

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY.

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

   THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF THE 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, CONTRACTOR TO 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 THE THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLE OR OTHER CABLES IN CONDUIT IN THE AREA.

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

OTHER NOTES

1. UNDERGROUND PIPELINES ARE SHOWN ACCORDING TO BEST AVAILABLE INFORMATION. CONTRACTOR TO PROCEED WITH CAUTION DURING EXCAVATION. CONTRACTOR TO COORDINATE WITH PIPELINE OWNER IN CASE OF CONFLICTS OR QUESTIONS. CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND UTILITIES BY CONTACTING THE UTILITY COORDINATING COMMITTEE FORTY-EIGHT (48) HOURS BEFORE BEGINNING WORK AT 1 (800) 545-6005 OR 811.

2. ALL EXISTING UNDERGROUND UTILITIES ARE NOT GUARANTEED TO BE COMPLETE OR DEFINITE. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE EXACT SIZE AND HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK.

3. ANY PERMANENT RELOCATION OF AN EXISTING UTILITY NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED BY THE ENGINEER PRIOR TO RELOCATION AND SHALL CONFORM TO THE APPLICABLE STANDARDS OF GOVERNING AUTHORITIES.

4. CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND FACILITIES DURING INSTALLATIONS OF PROPOSED WORK.

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\02 GENERAL NOTES.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:44pm

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

9-11-2020

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: GENERAL NOTES	
SCALE:		SHEET NO: 2 / 30
DATE: 9/10/2020	APPROVED BY:	

Utility Table

No.	Station From	Station TO	Utility Type	Owner	Does Utility Co. have an Easement Yes/No	Conflict Yes/No	Probed Yes/No	Contact Name	Address	Phone No. Email	Describe Conflict (if applicable)
1	Project Length		Gas Pipeline	One Gas Texas Gas Service	No	No	No	Nancy Stence	5613 Ave F, Austin TX 78751	512-370-8318 nancy.stence@onegas.com	Outside ROW Limits West of ROW Limits.
2	33+17.21		Gas Pipeline	One Gas Texas Gas Service	No	No	No	Nancy Stence	5613 Ave F, Austin TX 78751	512-370-8318 nancy.stence@onegas.com	Outside ROW Limits West of ROW Limits.
3	00+26.00	02+78.00	Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
4	03+99.00	06+39.00	Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
5	07+38.00	09+78.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
6	10+99.00	13+40.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
7	14+37.00	16+39.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
8	17+63.00	19+40.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
9	20+38.00	22+39.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
10	23+38.00	25+38.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
11	26+39.00	28+39.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
12	29+47.00	31+88.00	Two - Underground Electric Conduit with Electric Pedestal	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
13	01+59.00	32+96.00	Overhead Electric Powerline with Pole	CenterPoint Energy	No	Yes	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits West of ROW Limits.
14	33+07.00	34+60.00	Overhead Electric Powerline with Pole	CenterPoint Energy	No	No	No	Cynthia Martinez	1111 Louisiana, Suite 2258C, Houston TX 77002	713-207-6555 cindy.martinez@centerpointenergy.com	Outside ROW Limits East of ROW Limits.
15	**00+93.00**	**End Project**	**Underground Telephone Cable with Pedestal**	**AT & T**	**No**	**Yes***	**No**	**Kathy Tinney**	**CobbFendley, 1920 Country Pl Pkwy, Suite 310, Pearland, TX 77584**	**713-485-8128 Kt145j@att.com**	**Inside ROW Limits, Adjacent to West ROW Limits. Potential conflict with Proposed Asphalt Pavement**
16	06+61.00	End Project	8-inch Sanitary Sewer	GC MUD 12	No	No	No		2929 Highway 6, Suite 300, Bayou Vista, TX 77563	409-935-6111 mud12@comcast.net	Outside ROW Limits West of ROW Limits.
17	Begin Project	End Project	Water line, water meter, water valve and Fire Hydrant	GC MUD 12	No	No	No		2929 Highway 6, Suite 300, Bayou Vista, TX 77563	409-935-6111 mud12@comcast.net	Outside ROW Limits West of ROW Limits.

* WHEN WORKING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF UNDERGROUND UTILITY FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\03 UTILITY TABLE.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:44pm

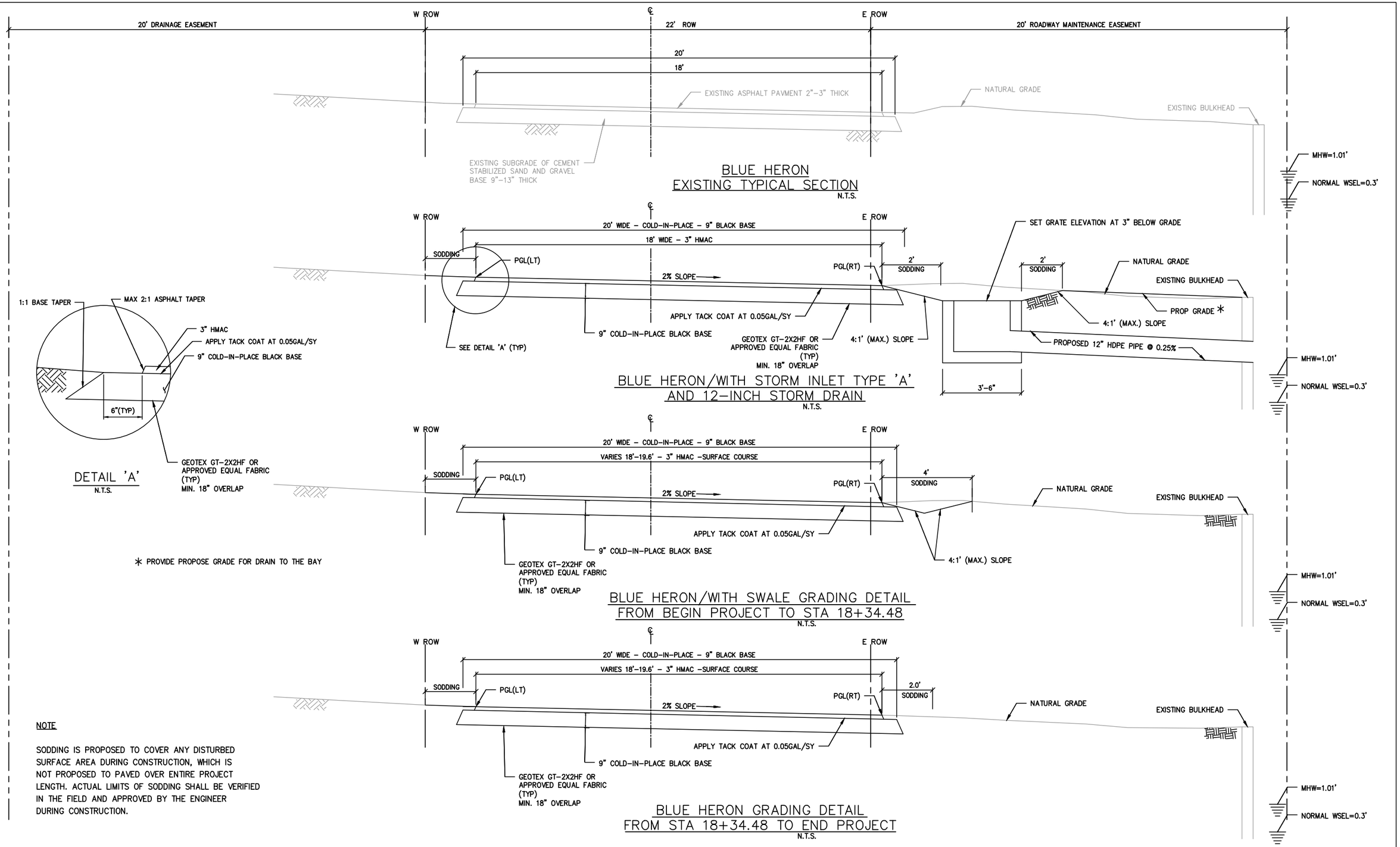
NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
8-11-2020

PROJECT TITLE: BLUE HERON DRIVE
DRAWN BY:
CK'D BY:
SCALE:
DATE: 9/10/2020
SHEET DESCRIPTION: UTILITY TABLE
APPROVED BY:
PROJECT ID: BV01
SHEET NO: 3 / 30



NO.	REVISIONS	DATE	NAME

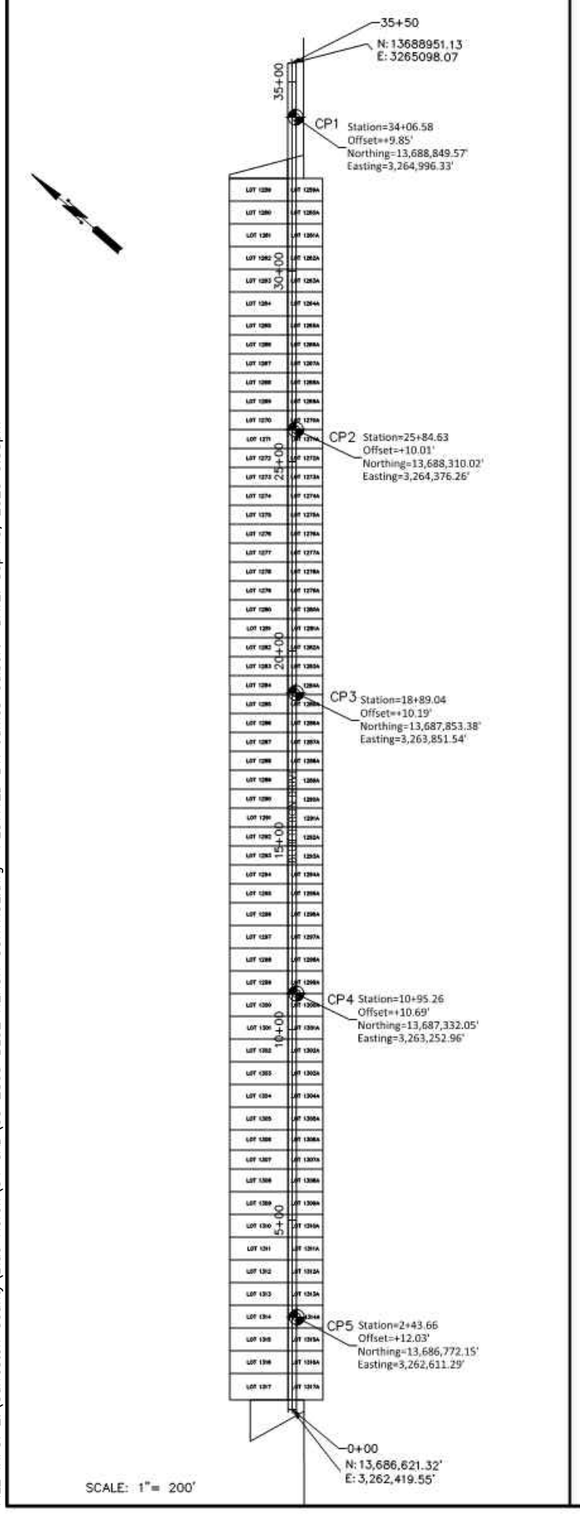
GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.,
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F–004270

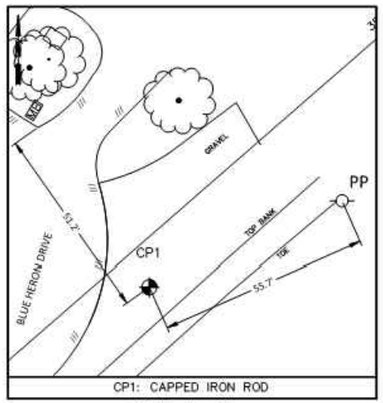
GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
9-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION:	
SCALE:	GRADING DETAIL	SHEET NO: 4 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\04 PAVEMENT TYPICAL SECTION DETAILS.dwg PLOTTED BY: James Galbert DATE: Sep 10, 2020 3:44pm

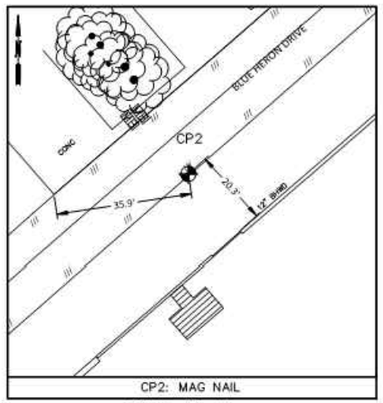


SCALE: 1"= 200'



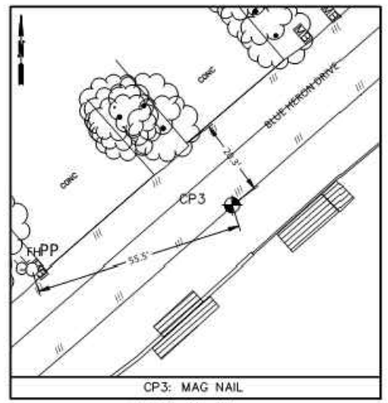
CP1: CAPPED IRON ROD

SCALE: 1"= 20'



CP2: MAG NAIL

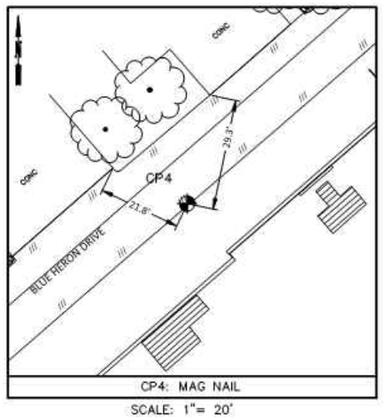
SCALE: 1"= 20'



CP3: MAG NAIL

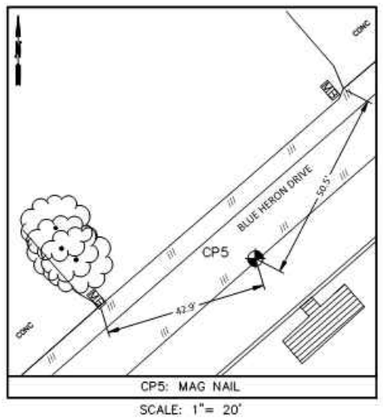
SCALE: 1"= 20'

VICINITY MAP N.T.S.



CP4: MAG NAIL

SCALE: 1"= 20'



CP5: MAG NAIL

SCALE: 1"= 20'

BENCHMARK

DESIGNATION - 877 1486 C
PID : DO9997
NAVD 88 GEOID 12A
ELEVATION: = 11.9 FEET

TO REACH FROM THE INTERSECTION OF 51ST STREET AND US HIGHWAY 45 IN GALVESTON, TEXAS, PROCEED WEST ON US HIGHWAY 45 FOR 4.9 MI (7.9 KM) TO EXIT NUMBER 4 TOWARDS THE VILLAGE OF TIKI ISLAND. PROCEED 0.3 MI (0.5KM) AND TURN RIGHT ONTO VIRGINIA POINT ROAD. CONTINUE 0.3 MI ON VIRGINIA POINT ROAD BEARING RIGHT WHEN IT DEVERTS TO CROSS UNDER TO OLD RAILROAD BRIDGE TO THE MARK ON YOUR LEFT. THE BENCH MARK IS LOCATED 26.41 FEET (8.0 M) SOUTHWEST OF THE WESTERN MOST CORNER OF A CONCRETE WALL. 45 FEET (13.7 M) NORTHEAST OF THE NORTHERN MOST RAIL OF A RAILROAD TRACK. 94 FEET (28.7 M) NORTHEAST OF OLD HIGHWAY 75.

ALL COORDINATES ARE GRID VALUES BASED ON THE TEXAS STATE COORDINATE SYSTEM NAD83 EPOCH 2010 US SURVEY FEET.

CP No.	NORTHING	EASTING	ELEVATION IN FEET	DESCRIPTION
1	13688849.57	3264996.33	4.27	CAPPED IRON ROD
2	13688310.02	3264376.26	5.09	MAG NAIL
3	13687853.38	3263851.54	4.96	MAG NAIL
4	13687332.05	3263252.96	4.80	MAG NAIL
5	13686772.15	3262611.29	4.75	MAG NAIL

I, the undersigned, a Registered Professional Land Surveyor of the State of Texas, do hereby certify that this survey was made on the ground and is true and correct to the best of my knowledge and belief.

Robert D. Ellis
Registered Professional
Land Surveyor No. 4006

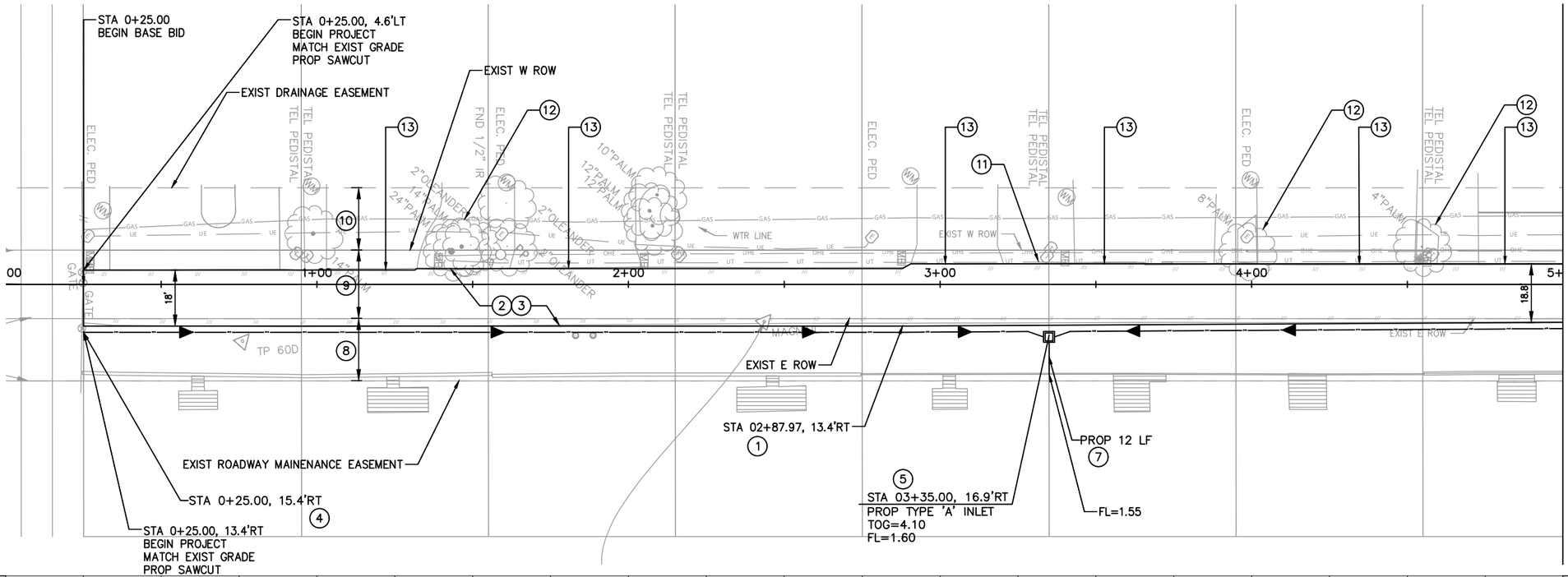
STATE OF TEXAS
REGISTERED
ROBERT D. ELLIS
4006
PROFESSIONAL
LAND SURVEYOR

CONTROL SHEET
FOR
BLUE HERON DRIVE
BAYOU VISTA
GALVESTON COUNTY, TEXAS

ELLIS SURVEYING SERVICES, LLC
2805 25th Avenue North
Texas City, Texas 77590
www.ellissurvey.com
Texas Firm Reg. No. 100340-00

SCALE: 1" = 200'	PROJ. NUMBER 2863	DATE: 1-2-2020
PHONE: (409)-938-8700		SHEET 05 OF 30

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\05 2863 BLUE HERON CONTROL.dwg PLOTTED BY: James Gaibort DATE: Sep 10, 2020 3:58pm



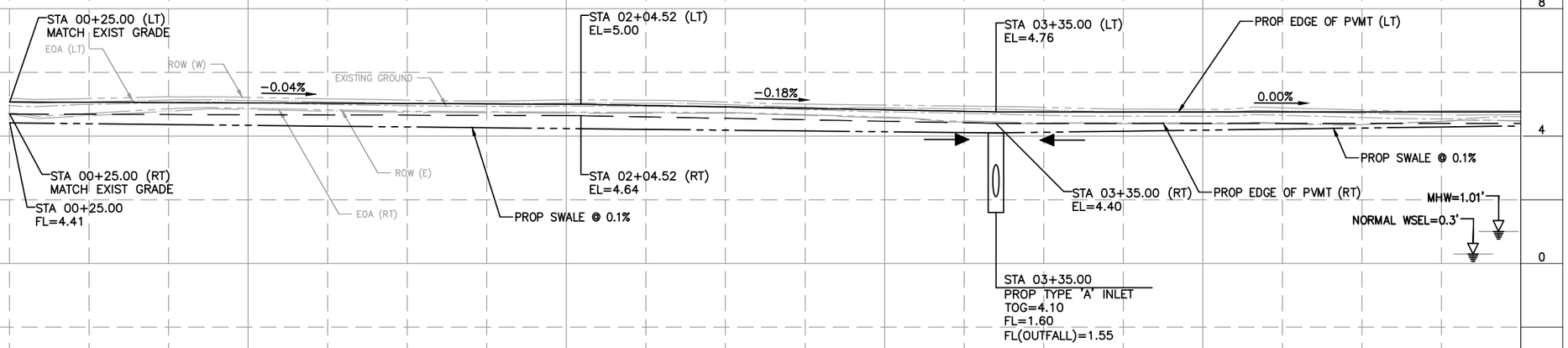
BENCHMARK

DESIGNATION – 877 1486 C
PID : DO9997
NAVD 88 GEOID 12A
ELEVATION: = 11.9 FEET

TO REACH FROM THE INTERSECTION OF 51ST STREET AND US HIGHWAY 45 IN GALVESTON, TEXAS, PROCEED WEST ON US HIGHWAY 45 FOR 4.9 MI (7.9 KM) TO EXIT NUMBER 4 TOWARDS THE VILLAGE OF TIKI ISLAND. PROCEED 0.3 MI (0.5KM) AND TURN RIGHT ONTO VIRGINIA POINT ROAD. CONTINUE 0.3 MI ON VIRGINIA POINT ROAD BEARING RIGHT WHEN IT DEVERTS TO CROSS UNDER TO OLD RAILROAD BRIDGE TO THE MARK ON YOUR LEFT. THE BENCH MARK IS LOCATED 26.41 FEET (8.0 M) SOUTHWEST OF THE WESTERN MOST CORNER OF A CONCRETE WALL. 45 FEET (13.7 M) NORTHEAST OF THE NORTHERN MOST RAIL OF A RAILROAD TRACK. 94 FEET (28.7 M) NORTHEAST OF OLD HIGHWAY 75.

NOTE:

1. PROPOSED EDGE OF PAVEMENT AT PGL.
2. SAWCUT, REMOVE AND DISPOSE/RECYCLE EXISTING PAVEMENT WITH SUBGRADE.
3. PROPOSED 3-INCH HMAC SURFACE COURSE OVER 9-INCH COLD-IN-PLACE RECYCLED BASE.
4. BEGIN PROPOSED SWALE.
5. PROPOSED TYPE 'A' INLET.
6. END PROPOSED SWALE.
7. 12" HDPE @ 0.25%.
8. 20' WIDE EXISTING ROAD MAINTENANCE EASEMENT.
9. 22' WIDE EXISING ROW.
10. 20' WIDE EXISTING DRAINAGE EASEMENT.
11. PUC – POTENTIAL UTILITY CONFLICT.
12. IMPLEMENT TREE PROTECTION.
13. FINISHED PROPOSED GRADE TO EDGE OF DRIVEWAY.



PROPOSED SWALE

LEGEND

EXISTING SANITARY SEWER	SAN SEW
EXISTING GAS LINE	GAS
UNDERGROUND ELECTRIC LINE	UE
UNDERGROUND TELEPHONE LINE	UT
OVERHEAD POWER LINE	OHE
WATER METER	WM
ELECTRIC BOX	E
TELEPHONE BOX	T
MAIL BOX	MB
FIRE HYDRANT	
SAN SWR CLEAN OUT	CO
POWER POLE	PP
REINFORCED FILTER FABRIC BARRIER	

SHEET 1 OF 7

NO.	REVISIONS	DATE	NAME

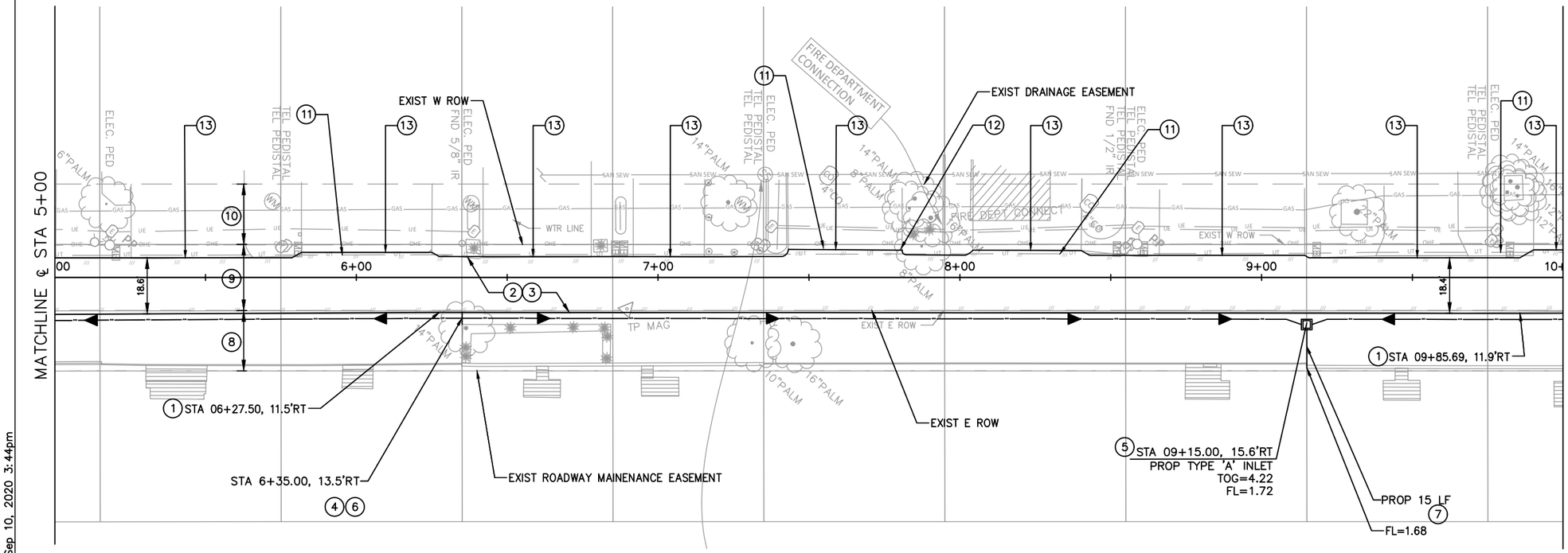
GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.,
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK
79509
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:	FROM STA 00+00 TO STA 05+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 6 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 - 12 C-001-001.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:45pm



BENCHMARK

DESIGNATION – 877 1486 C
PID : D09997
NAVD 88 GEOID 12A
ELEVATION: = 11.9 FEET

TO REACH FROM THE INTERSECTION OF 51ST STREET AND US HIGHWAY 45 IN GALVESTON, TEXAS, PROCEED WEST ON US HIGHWAY 45 FOR 4.9 MI (7.9 KM) TO EXIT NUMBER 4 TOWARDS THE VILLAGE OF TIKI ISLAND. PROCEED 0.3 MI (0.5KM) AND TURN RIGHT ONTO VIRGINIA POINT ROAD. CONTINUE 0.3 MI ON VIRGINIA POINT ROAD BEARING RIGHT WHEN IT DEVERTS TO CROSS UNDER TO OLD RAILROAD BRIDGE TO THE MARK ON YOUR LEFT. THE BENCH MARK IS LOCATED 26.41 FEET (8.0 M) SOUTHWEST OF THE WESTERN MOST CORNER OF A CONCRETE WALL. 45 FEET (13.7 M) NORTHEAST OF THE NORTHERN MOST RAIL OF A RAILROAD TRACK. 94 FEET (28.7 M) NORTHEAST OF OLD HIGHWAY 75.

NOTE:

1. PROPOSED EDGE OF PAVEMENT AT PGL.
2. SAWCUT, REMOVE AND DISPOSE/RECYCLE EXISTING PAVEMENT WITH SUBGRADE.
3. PROPOSED 3–INCH HMAC SURFACE COURSE OVER 9–INCH COLD–IN–PLACE RECYCLED BASE.
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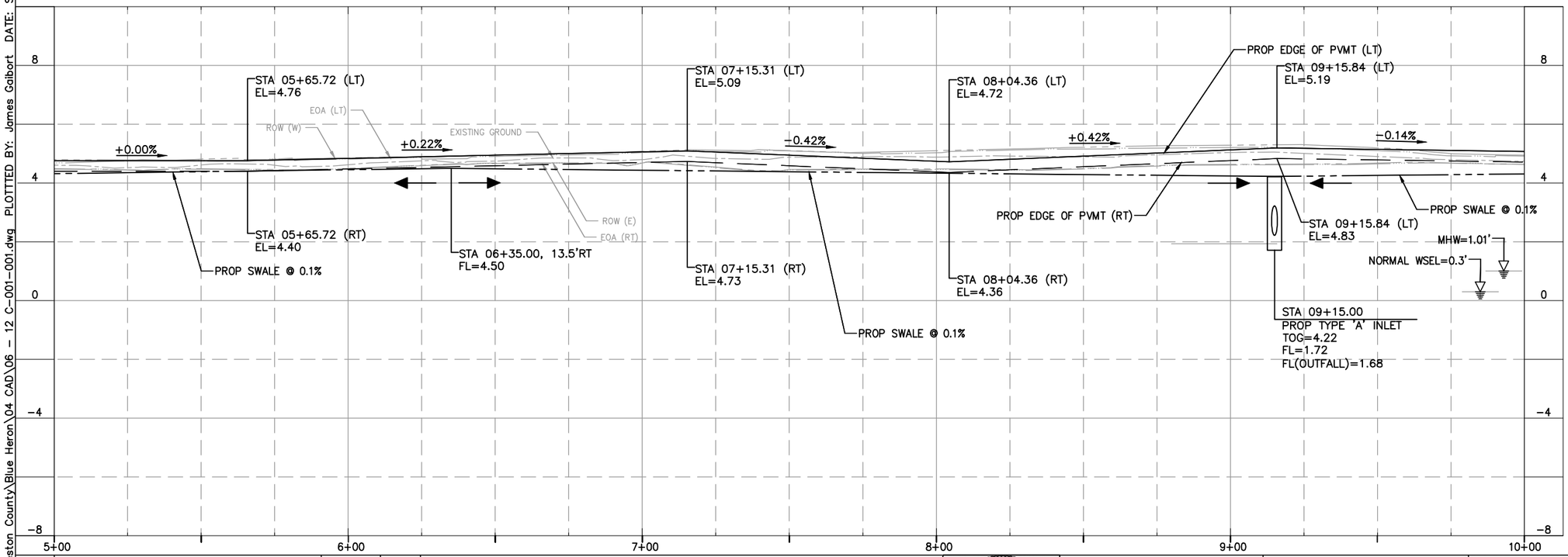
11. PUC – POTENTIAL UTILITY CONFLICT.
12. IMPLEMENT TREE PROTECTION.
13. FINISHED PROPOSED GRADE TO EDGE OF DRIVEWAY.

PROPOSED SWALE

LEGEND

- EXISTING SANITARY SEWER — SAN SEW
- EXISTING GAS LINE — GAS
- UNDERGROUND ELECTRIC LINE — UE
- UNDERGROUND TELEPHONE LINE — UT
- OVERHEAD POWER LINE — OHE
- WATER METER — WM
- ELECTRIC BOX — E
- TELEPHONE BOX — T
- MAIL BOX — MB
- FIRE HYDRANT
- SAN SWR CLEAN OUT — CO
- POWER POLE — PP
- REINFORCED FILTER FABRIC BARRIER



NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

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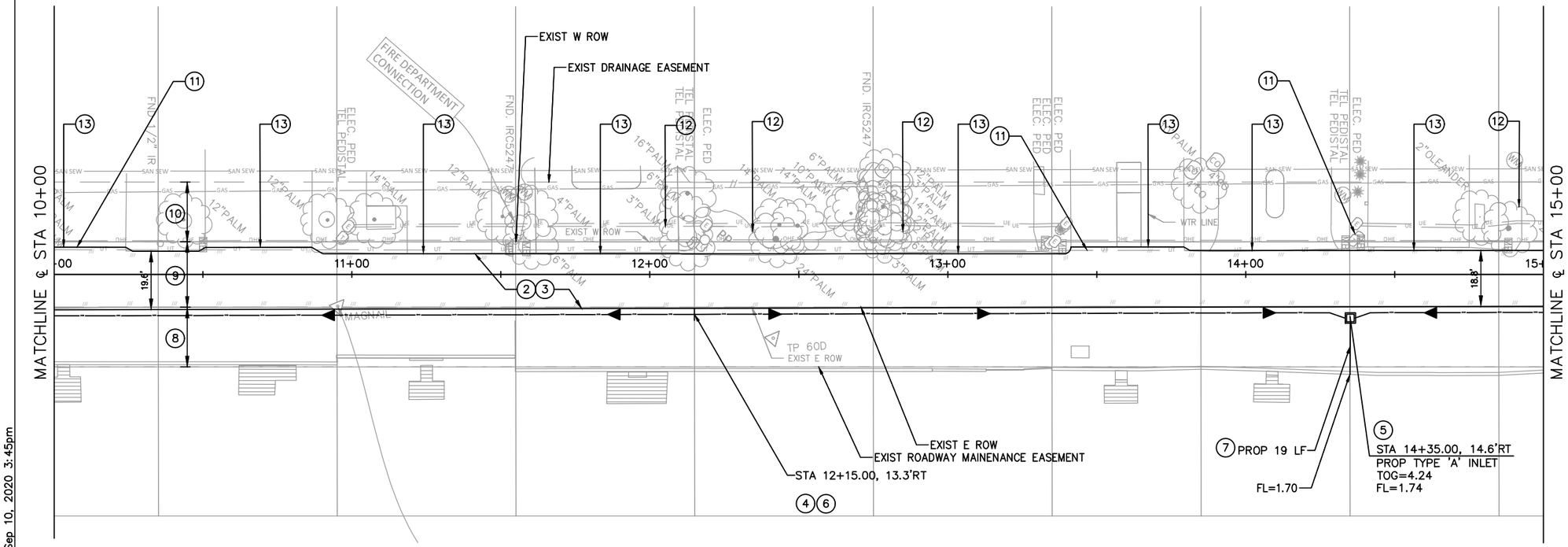
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F–004270

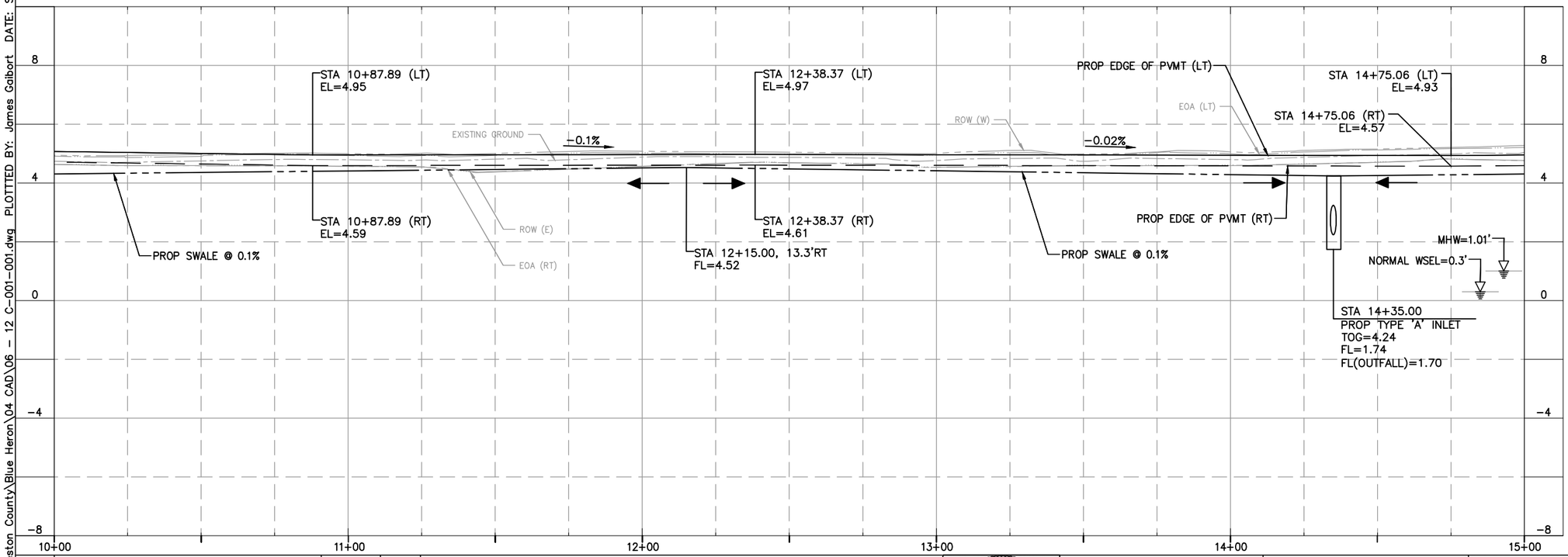
GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:	FROM STA 05+00 TO STA 10+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 7 / 30
DATE: 9/10/2020	APPROVED BY:	

SHEET 2 OF 7

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 – 12 C–001–001.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:44pm





BENCHMARK

DESIGNATION – 877 1486 C
PID : D09997
NAVD 88 GEOID 12A
ELEVATION: = 11.9 FEET

TO REACH FROM THE INTERSECTION OF 51ST STREET AND US HIGHWAY 45 IN GALVESTON, TEXAS, PROCEED WEST ON US HIGHWAY 45 FOR 4.9 MI (7.9 KM) TO EXIT NUMBER 4 TOWARDS THE VILLAGE OF TIKI ISLAND. PROCEED 0.3 MI (0.5KM) AND TURN RIGHT ONTO VIRGINIA POINT ROAD. CONTINUE 0.3 MI ON VIRGINIA POINT ROAD BEARING RIGHT WHEN IT DEVERTS TO CROSS UNDER TO OLD RAILROAD BRIDGE TO THE MARK ON YOUR LEFT. THE BENCH MARK IS LOCATED 26.41 FEET (8.0 M) SOUTHWEST OF THE WESTERN MOST CORNER OF A CONCRETE WALL. 45 FEET (13.7 M) NORTHEAST OF THE NORTHERN MOST RAIL OF A RAILROAD TRACK. 94 FEET (28.7 M) NORTHEAST OF OLD HIGHWAY 75.

NOTE:

1. PROPOSED EDGE OF PAVEMENT AT PGL.
2. SAWCUT, REMOVE AND DISPOSE/RECYCLE EXISTING PAVEMENT WITH SUBGRADE.
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12. IMPLEMENT TREE PROTECTION.
13. FINISHED PROPOSED GRADE TO EDGE OF DRIVEWAY.

PROPOSED SWALE

LEGEND

EXISTING SANITARY SEWER — SAN SEW
EXISTING GAS LINE — GAS
UNDERGROUND ELECTRIC LINE — UE
UNDERGROUND TELEPHONE LINE — UT
OVERHEAD POWER LINE — OHE
WATER METER — WM
ELECTRIC BOX — E
TELEPHONE BOX — T
MAIL BOX — MB
FIRE HYDRANT
SAN SWR CLEAN OUT — CO
POWER POLE — PP
REINFORCED FILTER FABRIC BARRIER

SHEET 3 OF 7

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

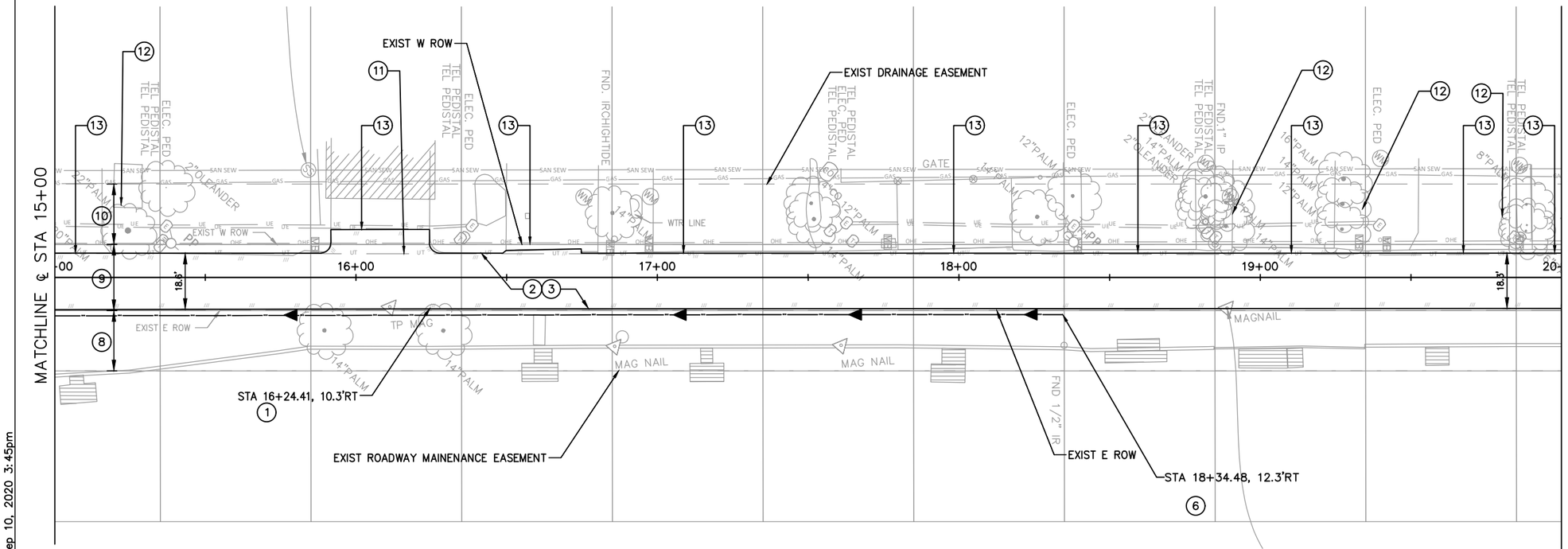
THE STATE OF TEXAS
COUNTY OF GALVESTON

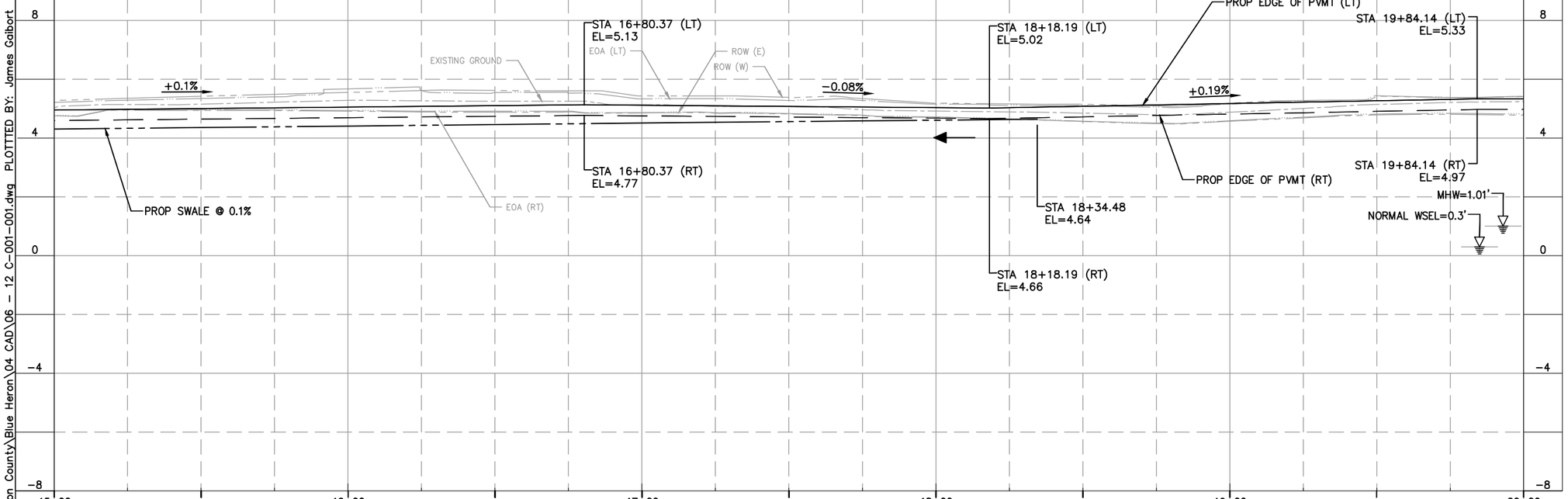
Zarinkelk Engineering Serivces, Inc.
617 Caroline St.,
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER
9-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:	FROM STA 10+00 TO STA 15+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 8 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 - 12 C-001-001.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:45pm





BENCHMARK

DESIGNATION – 877 1486 C
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PROPOSED SWALE

LEGEND

EXISTING SANITARY SEWER — SAN SEW
EXISTING GAS LINE — GAS
UNDERGROUND ELECTRIC LINE — UE
UNDERGROUND TELEPHONE LINE — UT
OVERHEAD POWER LINE — OHE
WATER METER — WM
ELECTRIC BOX — E
TELEPHONE BOX — T
MAIL BOX — MB
FIRE HYDRANT
SAN SWR CLEAN OUT — CO
POWER POLE — PP
REINFORCED FILTER FABRIC BARRIER

NO.	REVISIONS	DATE	NAME

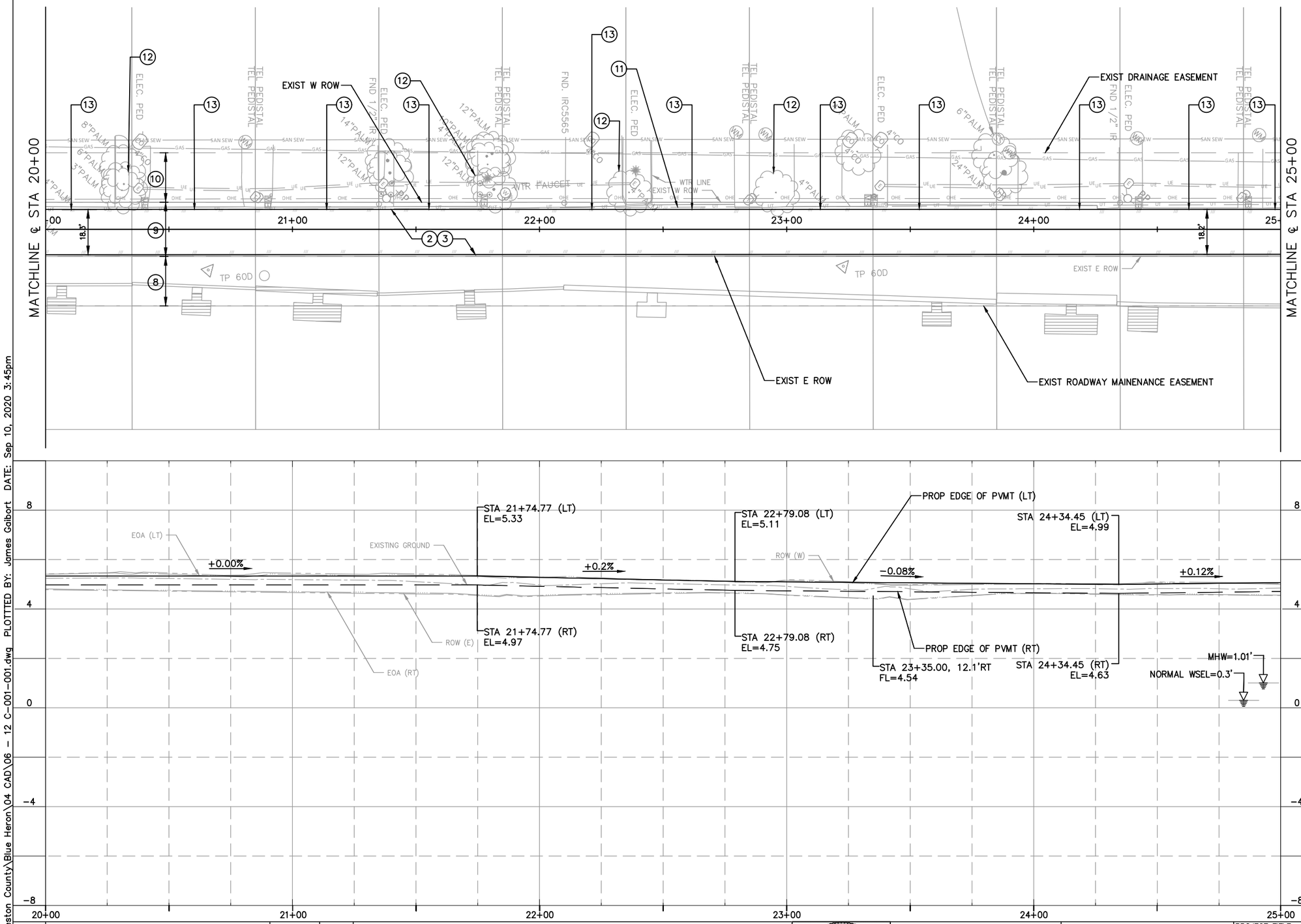
GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
8-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:	FROM STA 15+00 TO STA 20+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 9 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 - 12 C-001-001.dwg PLOTTED BY: James Gaibort DATE: Sep 10, 2020 3:45pm



0 5 10 20 40 60

HORZ: 1"=40'
VERT: 1"=4'

BENCHMARK

DESIGNATION – 877 1486 C
PID : DO9997
NAVD 88 GEOID 12A
ELEVATION: = 11.9 FEET

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12. IMPLEMENT TREE PROTECTION.
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PROPOSED SWALE

LEGEND

- EXISTING SANITARY SEWER — SAN SEW
- EXISTING GAS LINE — GAS
- UNDERGROUND ELECTRIC LINE — UE
- UNDERGROUND TELEPHONE LINE — UT
- OVERHEAD POWER LINE — OHE
- WATER METER — WM
- ELECTRIC BOX — E
- TELEPHONE BOX — T
- MAIL BOX — MB
- FIRE HYDRANT
- SAN SWR CLEAN OUT — CO
- POWER POLE — PP
- REINFORCED FILTER FABRIC BARRIER

SHEET 5 OF 7

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

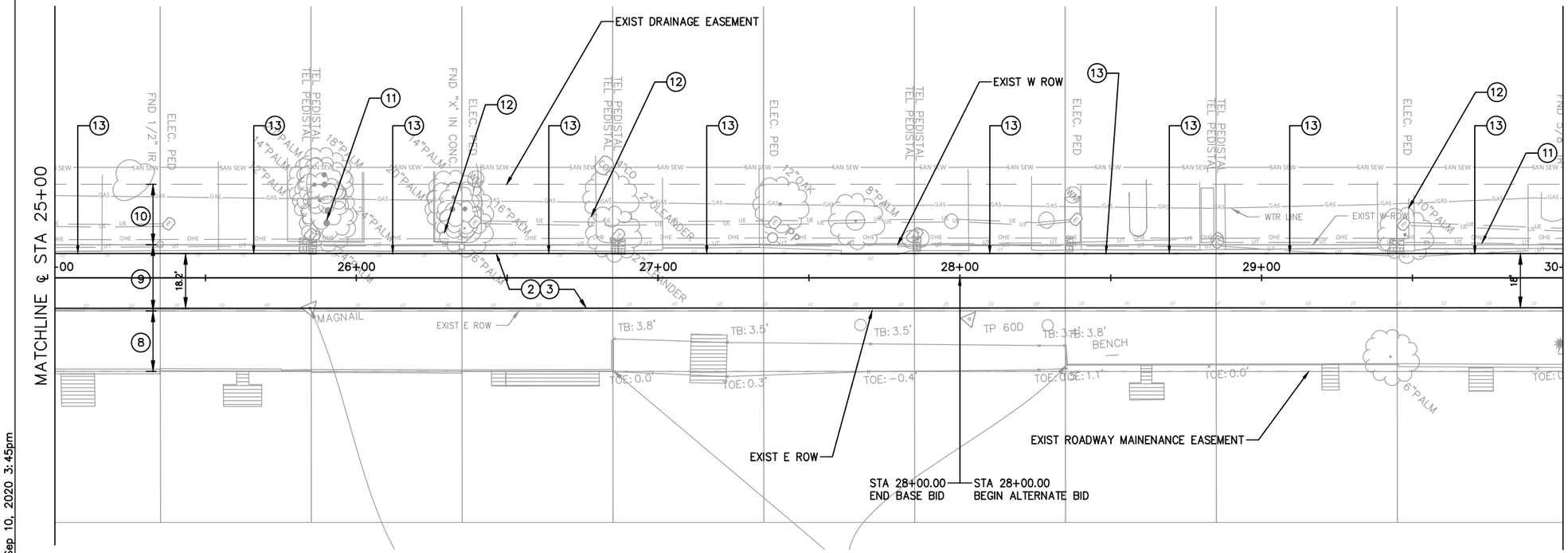
THE STATE OF TEXAS — COUNTY OF GALVESTON

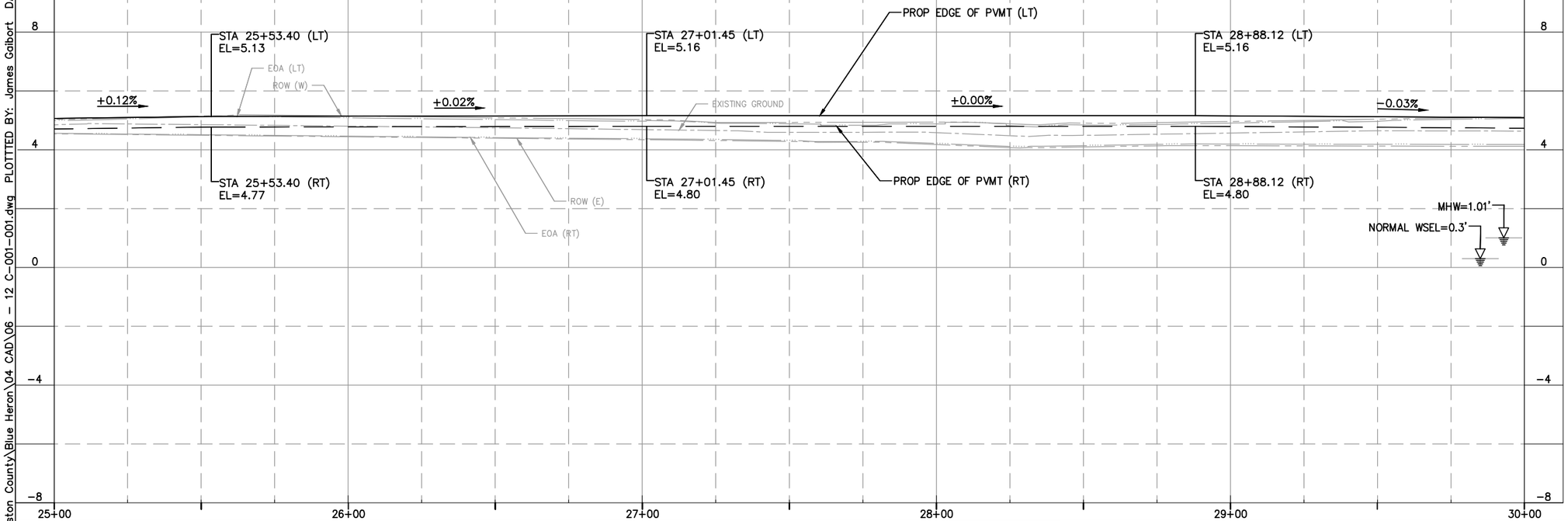
Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F–004270

STATE OF TEXAS — GITI ZARINKELK — 79509 — LICENSED PROFESSIONAL ENGINEER

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:	FROM STA 20+00 TO STA 25+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 10 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 – 12 C–001–001.dwg PLOTTED BY: James Gaibort DATE: Sep 10, 2020 3:45pm





BENCHMARK

DESIGNATION – 877 1486 C
PID : DO9997
NAVD 88 GEOID 12A
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TO REACH FROM THE INTERSECTION OF 51ST STREET AND US HIGHWAY 45 IN GALVESTON, TEXAS, PROCEED WEST ON US HIGHWAY 45 FOR 4.9 MI (7.9 KM) TO EXIT NUMBER 4 TOWARDS THE VILLAGE OF TIKI ISLAND. PROCEED 0.3 MI (0.5KM) AND TURN RIGHT ONTO VIRGINIA POINT ROAD. CONTINUE 0.3 MI ON VIRGINIA POINT ROAD BEARING RIGHT WHEN IT DEVERTS TO CROSS UNDER TO OLD RAILROAD BRIDGE TO THE MARK ON YOUR LEFT. THE BENCH MARK IS LOCATED 26.41 FEET (8.0 M) SOUTHWEST OF THE WESTERN MOST CORNER OF A CONCRETE WALL. 45 FEET (13.7 M) NORTHEAST OF THE NORTHERN MOST RAIL OF A RAILROAD TRACK. 94 FEET (28.7 M) NORTHEAST OF OLD HIGHWAY 75.

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PROPOSED SWALE

LEGEND

- EXISTING SANITARY SEWER — SAN SEW
- EXISTING GAS LINE — GAS
- UNDERGROUND ELECTRIC LINE — UE
- UNDERGROUND TELEPHONE LINE — UT
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- WATER METER — WM
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- TELEPHONE BOX — T
- MAIL BOX — MB
- FIRE HYDRANT
- SAN SWR CLEAN OUT — CO
- POWER POLE — PP
- REINFORCED FILTER FABRIC BARRIER

SHEET 6 OF 7

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
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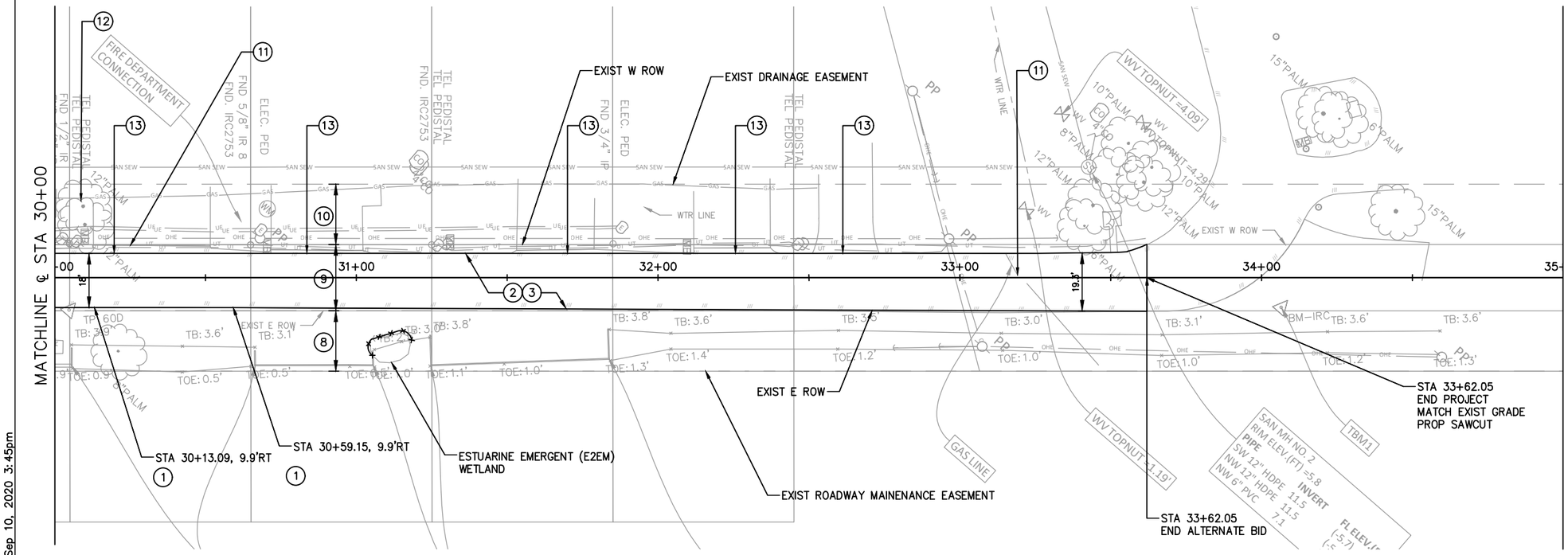
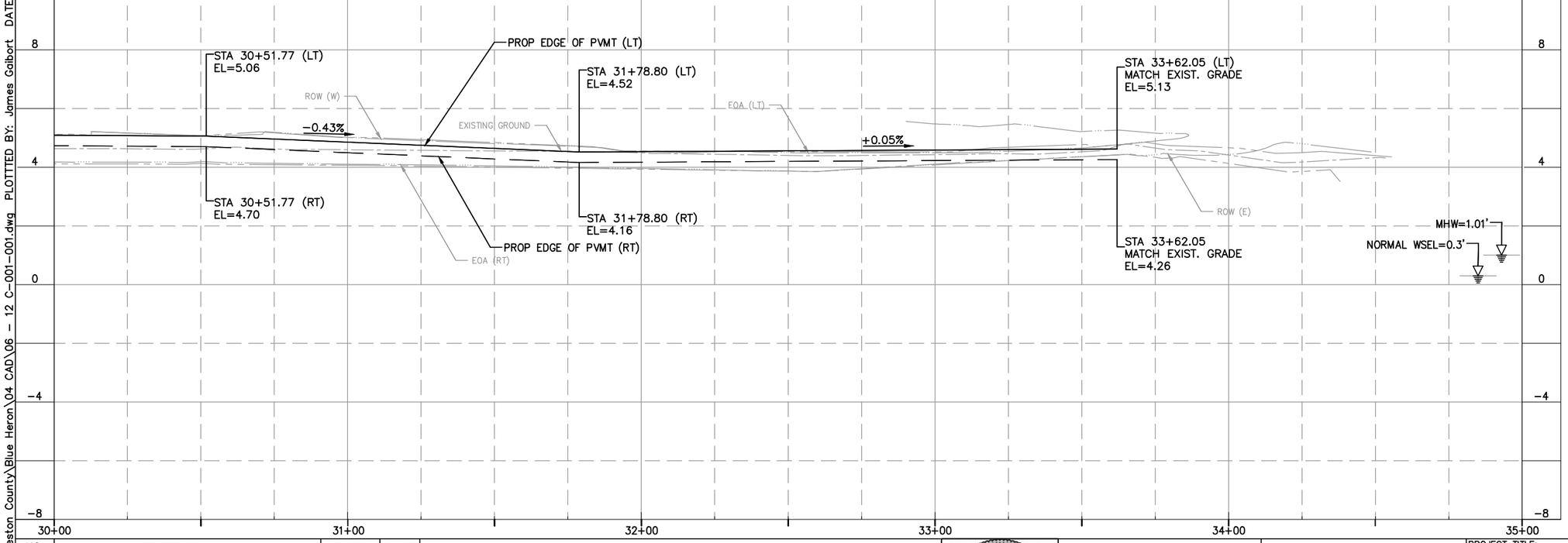
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
8-11-2020

PROJECT TITLE:	BLUE HERON DRIVE		
DRAWN BY:	FROM STA 25+00 TO STA 30+00	PROJECT ID:	BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN		
SCALE:		SHEET NO:	11 / 30
DATE: 9/10/2020	APPROVED BY:		

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 - 12 C-001-001.dwg PLOTTED BY: James Gaibort DATE: Sep 10, 2020 3:45pm





BENCHMARK

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13. FINISHED PROPOSED GRADE TO EDGE OF DRIVEWAY.

PROPOSED SWALE

LEGEND

EXISTING SANITARY SEWER	SAN SEW
EXISTING GAS LINE	GAS
UNDERGROUND ELECTRIC LINE	UE
UNDERGROUND TELEPHONE LINE	UT
OVERHEAD POWER LINE	OHE
WATER METER	WM
ELECTRIC BOX	E
TELEPHONE BOX	T
MAIL BOX	MB
FIRE HYDRANT	
SAN SWR CLEAN OUT	CO
POWER POLE	PP
REINFORCED FILTER FABRIC BARRIER	x x x x

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

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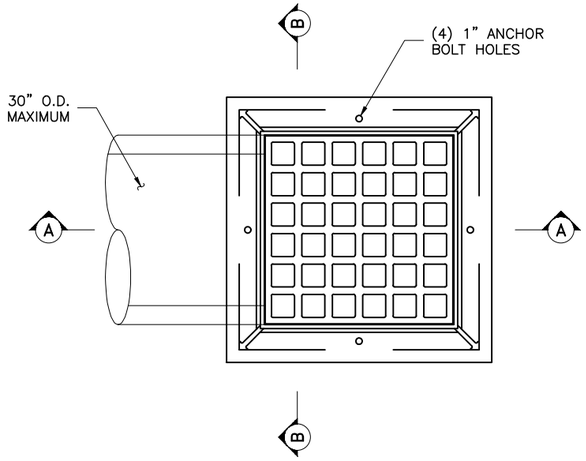
Firm Reg. # F-004270

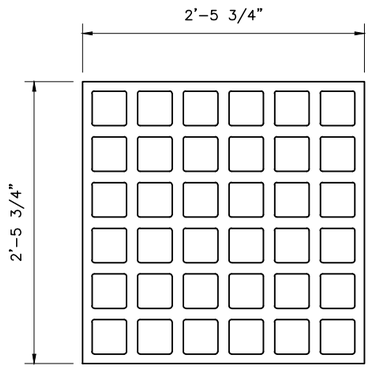
GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:	FROM STA 30+00 TO STA 35+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: ROADWAY SCHEMATICS PLAN	
SCALE:		SHEET NO: 12 / 30
DATE: 9/10/2020	APPROVED BY:	

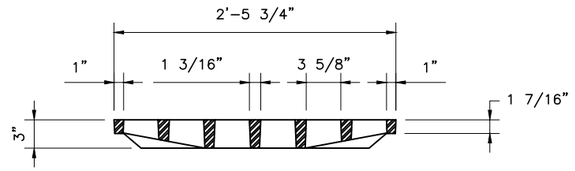
FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\06 - 12 C-001-001.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:45pm



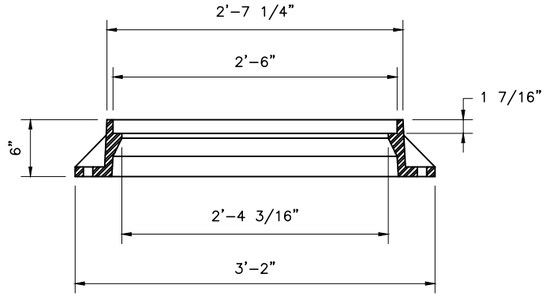
PLAN VIEW



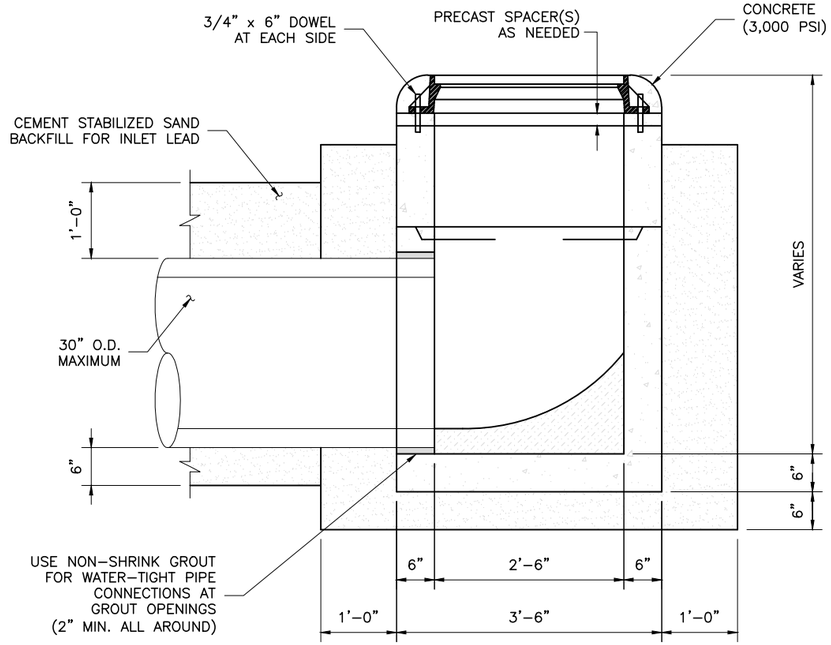
GRATE PLAN VIEW



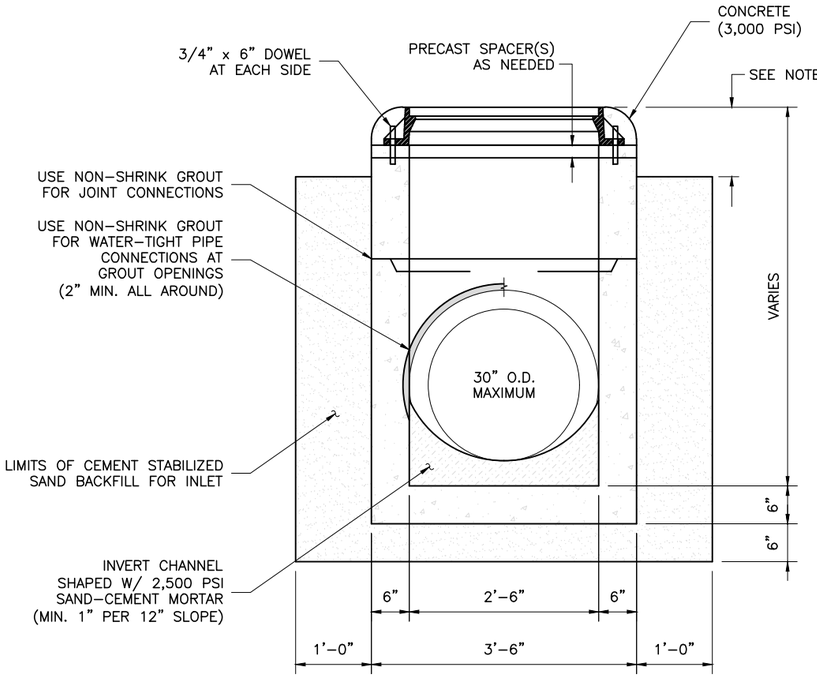
GRATE SECTION A-A



FRAME SECTION A-A



SECTION A-A



SECTION B-B

GENERAL NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 472 "INLETS".
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913
4. FRAME AND GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4880-1 (OPEN AREA 473 SQ. IN.) OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAIL DRAWING.
6. SHOP DRAWINGS SHALL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
8. CEMENT STABILIZED SAND SHALL EXTEND TO THE BOTTOM OF PAVEMENT OR SLOPE PAVING, OR 12 INCHES BELOW THE SURFACE IF INLET IS LOCATED IN AN UNPAVED AREA.

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

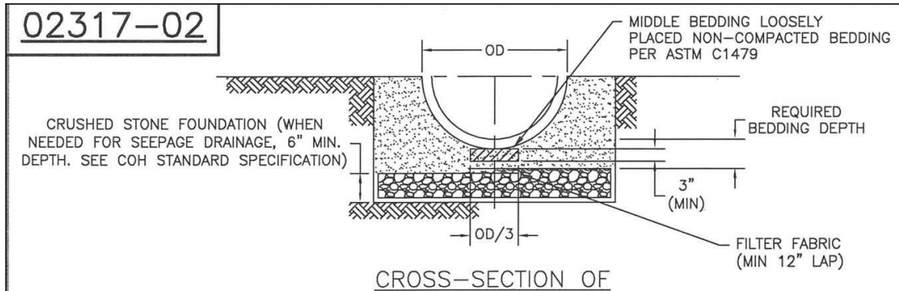
Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
8-11-2020

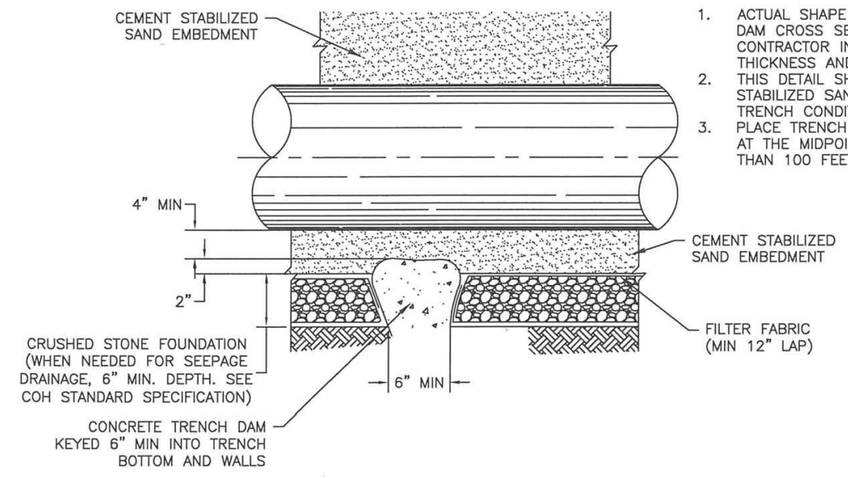
PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: TYPE "A" INLET DETAILS	
SCALE:	FOR MAXIMUN 30" O.D. PIPE	SHEET NO: 13 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\13 - TYPE A INLET DETAILS.dwg PLOTTTED BY: James Galbort DATE: Sep 10, 2020 3:45pm

02317-02



CROSS-SECTION OF
CRUSHED STONE FOUNDATION



LONGITUDINAL SECTION ALONG PIPE ℄
AT FOUNDATION TRENCH DAM

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, IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.

SANITARY OR STORM SEWER CRUSHED STONE FOUNDATION FOR WET STABLE TRENCH
NTS

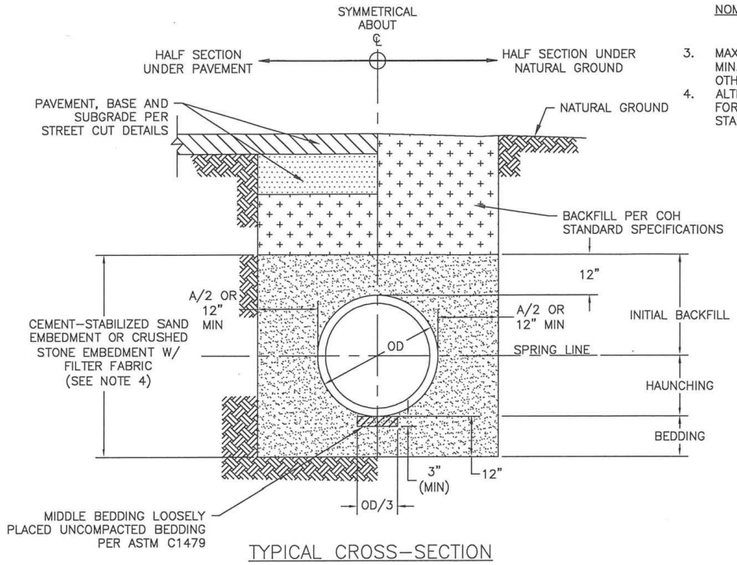
02317-03

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:

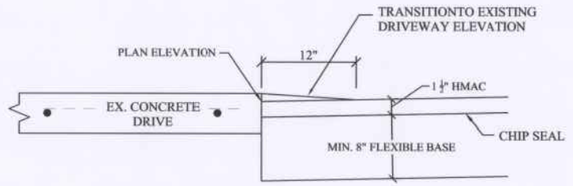
NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

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.

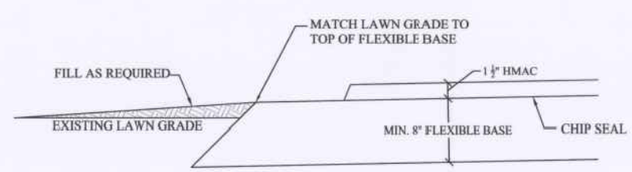


TYPICAL CROSS-SECTION

SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS



TYPICAL CONCRETE DRIVEWAY
APPROACH DETAIL
NOT TO SCALE



TYPICAL PAVEMENT
ADJACENT TO LAWN DETAIL
NOT TO SCALE

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.,
Houston, Texas 77002
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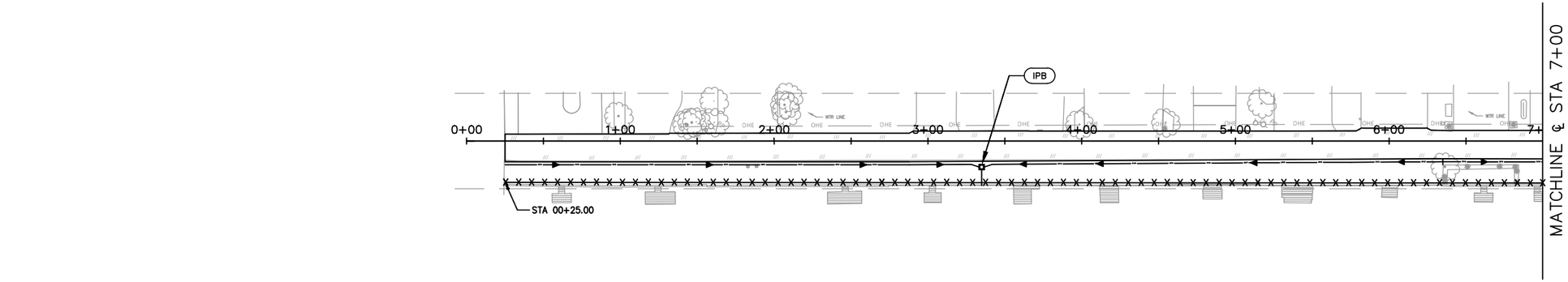
Fax: 832.242.2445
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
8-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: DRIVEWAY TIE-IN AND STORM SEWER DETAILS	
SCALE:		SHEET NO: 14 / 30
DATE: 9/11/2020	APPROVED BY:	



0 20 40 80 120

HORZ: 1"=80'

LEGEND

x-x-x-x	REINFORCED FILTER FABRIC BARRIER
(IPB)	INLET PROTECTION BARRIER

NOTES

1. DESIGNATED INLETS SHALL BE PROTECTED AT ALL TIMES DURING CONSTRUCTION. THERE IS NO SEPARATE PAY FOR REMOVING AND REINSTALLING PROTECTION AS CONSTRUCTION PROGRESSES
2. THE LOCATION OF CONSTRUCTION SUPPORT ACTIVITIES INCLUDING MATERIALS, WASTE, BORROW, FILL, AND EQUIPMENT STORAGE AREA WILL BE SHOWN ON THE PLAN SHEETS ONCE ESTABLISHED BY THE CONTRACTOR. THESE SITES WILL BE INCLUDED IN THE INSPECTION REPORT.
3. THE LOCATION OF STABILIZED CONSTRUCTION EXIT, VEHICLE WASH AREAS, INCLUDING CONCRETE WASHOUTS, WILL BE SHOWN ON THE PLANS ONCE ESTABLISHED BY THE CONTRACTOR. THIS SITE WILL BE INCLUDED IN THE INSPECTION REPORT.
4. THE FOLLOWING RECORDS WILL BE MAINTAINED BY THE CONTRACTOR AND WILL BE MADE READILY AVAILABLE UPON REQUEST OF PARTIES LISTED IN PART III.D.1 OF THE TPDES GENERAL PERMIT TXR150000:
   1. DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
   2. ALL DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND
   3. THE DATES WHEN STABILIZATION (BOTH TEMPORARY AND/OR PERMANENT) MEASURES ARE INITIATED.

SHEET 1 OF 1

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

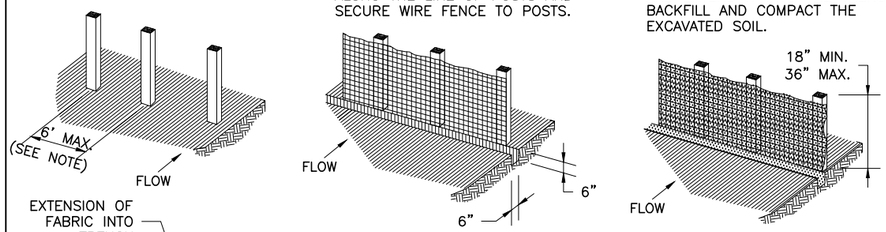
STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

9-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:	FROM STA 00+00 TO STA 34+00	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: STORM WATER POLLUTION	
SCALE:	PREVENTION PLAN	SHEET NO: 15 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\15 C-004-004 SWPPP.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:46pm

1. SET POSTS AT REQUIRED SPACING
2. EXCAVATE A 6"x6" TRENCH UPSLOPE ALONG THE LINE OF POSTS AND SECURE WIRE FENCE TO POSTS.
3. ATTACH FILTER FABRIC TO POSTS AND EXTEND IT INTO THE TRENCH. BACKFILL AND COMPACT THE EXCAVATED SOIL.

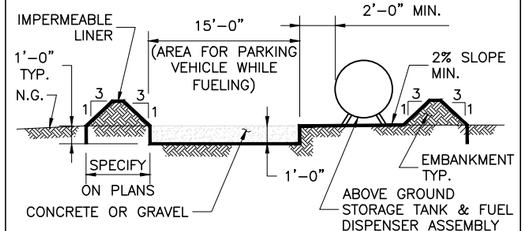


REINFORCED FILTER FABRIC BARRIER

RFB — SYMBOL

GENERAL NOTES:

1. SECURELY FASTEN MESH FENCING TO POSTS WITH STAPLES OR TIE WIRES.
2. SECURELY FASTEN FILTER FABRIC TO MESH FENCING.
3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER, OVERLAP 6 INCHES AT A POST, FOLD TOGETHER, AND ATTACH TO A POST.
4. REMOVE SEDIMENT DEPOSITS WHEN SILT REACHES ONE-THIRD OF THE HEIGHT OF THE FENCE IN DEPTH.

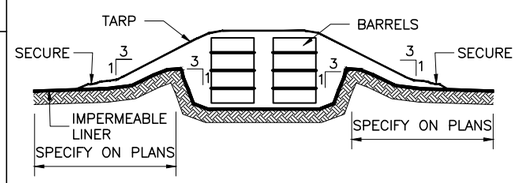


ABOVE GROUND TEMP. VEHICLE & EQUIPMENT FUELING AREA WITH TANK

TFA — SYMBOL

GENERAL NOTES:

1. THE SIZE OF TANK FOUNDATION AREA DEPENDS ON THE SIZE OF ABOVE GROUND STORAGE TANK AND DISPENSER ASSEMBLY.
2. PROVIDE A MINIMUM SLOPE OF 2 % TOWARD THE SUMP PIT.
3. INSTALL IMPERMEABLE LINER AS PER MANUFACTURER'S RECOMMENDATIONS.

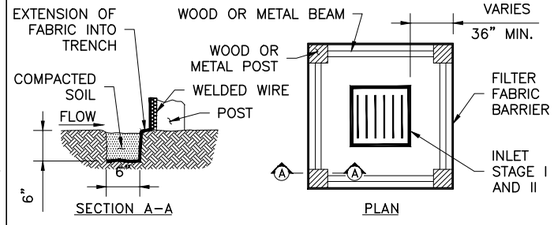


BARREL STORAGE AREA

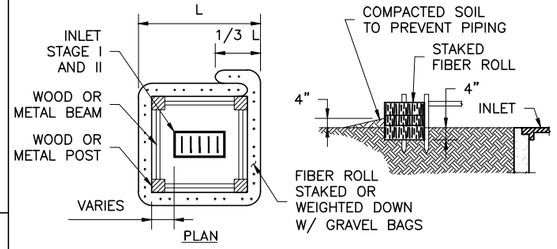
BSA — SYMBOL

GENERAL NOTES:

1. ALTERNATIVELY, STORE BARRELS IN AN ENCLOSED BUILDING OR SHED.
2. INSTALL IMPERMEABLE LINER AS PER MANUFACTURER'S RECOMMENDATIONS. 60 mil MINIMUM.
3. CONSTRUCT BERMED AREA WITH VOLUME GREATER THAN OR EQUAL TO 110% VOLUME OF BARRELS.



INLET PROTECTION BARRIER WITH REINFORCED FILTER FABRIC



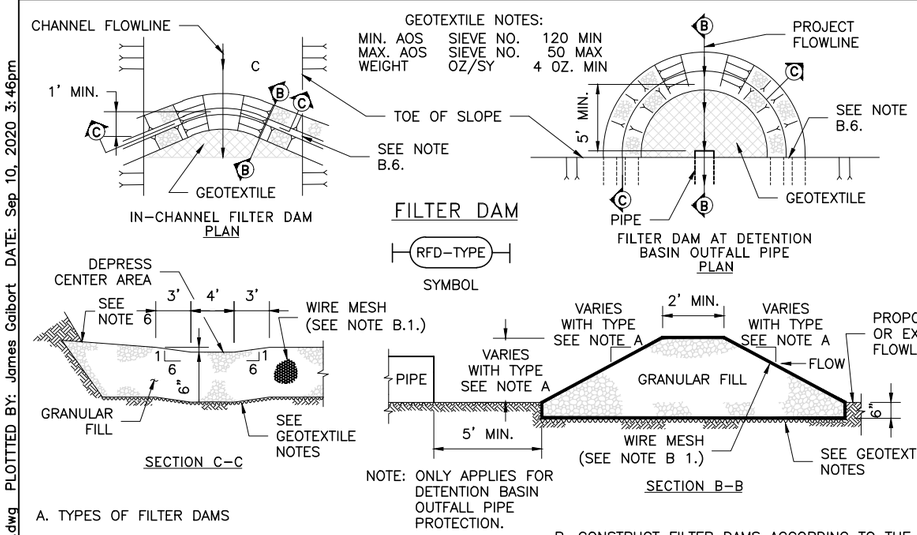
INLET PROTECTION BARRIER WITH FILTER ROLLS

GENERAL NOTES:

1. FIBER ROLLS WILL BE UTILIZED ONLY WHEN SITE CONDITIONS DO NOT PERMIT THE USE OF FILTER FABRIC BARRIER, AND AS APPROVED BY THE ENGINEER.

INLET PROTECTION BARRIERS FOR STAGE I INLETS

IPB — SYMBOL



FILTER DAM

RFD-TYPE — SYMBOL

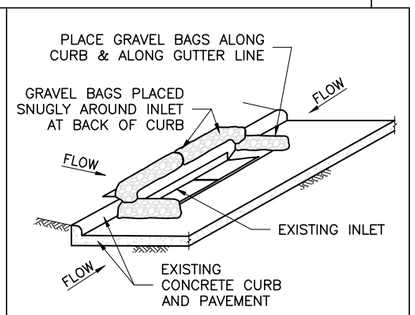
NOTE: ONLY APPLIES FOR DETENTION BASIN OUTFALL PIPE PROTECTION.

A. TYPES OF FILTER DAMS

1. TYPE 1 (NON-REINFORCED)
   a. HEIGHT – 18-24 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM)
   c. SLOPES – 2:1 (MAXIMUM).
2. TYPE 2 (REINFORCED).
   a. HEIGHT – 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
   c. SLOPES – 2:1 (MAXIMUM).
3. TYPE 3 (REINFORCED)
   a. HEIGHT – 36-48 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
   c. SLOPES – 3:1 (MAXIMUM).
4. TYPE 4 (GABION)
   a. HEIGHT – 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
5. TYPE 5. AS SHOWN ON THE PLANS.

B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.

1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
2. PLACE GRANULAR FILL ON THE WIRE MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
   a. 3-5 INCHES FOR ROCK FILTER DAM TYPES 1, 2 AND 4.
   b. 4-8 INCHES FOR ROCK FILTER DAM TYPE REFER TO GRANULAR FILL IN SPECIFICATION SECTION No. 02378 RIPRAP AND GRANULAR FILL.
3. FOLD WIRE MESH AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
5. SEE HCFCD SPECIFICATION SECTION NO. 02364-FILTER DAMS.
6. EMBED ONE FOOT MINIMUM INTO SLOPE AND RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA AT SLOPE.



INLET PROTECTION BARRIERS FOR STAGE II INLETS

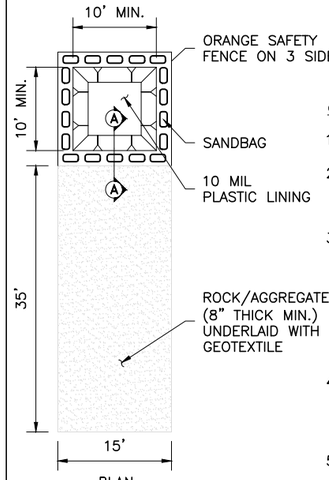
IPB-II — SYMBOL

GENERAL NOTES:

1. REMOVE SEDIMENT DEPOSIT WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-THIRD THE HEIGHT OF THE BARRIER.
2. GRAVEL BAGS SHALL NOT BLOCK THROAT OF INLET UNLESS DIRECTED BY ENGINEER.

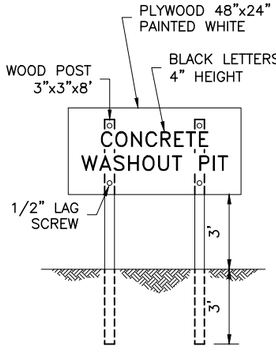
CONCRETE TRUCK WASHOUT AREA

CTW — SYMBOL

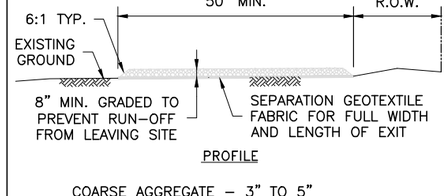


GENERAL NOTES:

1. POST A SIGN READING "CONCRETE WASHOUT PIT" NEXT TO THE PIT.
2. VERBALLY INSTRUCT THE CONCRETE TRUCK DRIVERS WHERE THE PIT IS AND TO WASHOUT THEIR TRUCKS IN THE PIT AND NOWHERE ELSE.
3. UPON THE CONCRETE SETTING UP (CURING, DRYING OUT), THE CONCRETE WASTE SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF PROPERLY BY THE CONTRACTOR. AFTER REMOVAL OF THE CONCRETE WASTE, THE WASHOUT PIT SHALL BE FILLED WITH CLEAN FILL MATERIAL AND COMPACTED TO IN-SITU CONDITIONS, OR AS DIRECTED BY THE PROJECT SPECIFICATIONS.
4. CONCRETE WASHOUT PITS SHALL NOT BE LOCATED DIRECTLY ADJACENT TO, NOR AT ANY TIME DRAIN INTO THE STORM SEWER SYSTEM OR ANY OTHER SWALE, DITCH, OR WATERWAY.
5. CONSTRUCT ENTRY ROAD AND BOTTOM OF WASHOUT AREA TO SUPPORT EXPECTED LOADINGS FROM TRUCKS EQUIPMENT.



SIGN DETAIL (OR EQUIVALENT)



STABILIZED CONSTRUCTION ACCESS

SC-1 — SYMBOL

GENERAL NOTES:

1. MINIMUM LENGTH IS AS SHOWN ON CONSTRUCTION DRAWINGS OR 50 FEET, WHICHEVER IS MORE.
2. CONSTRUCT AND MAINTAIN CONSTRUCTION EXIT WITH CONSTANT WIDTH ACROSS ITS LENGTH, INCLUDING ALL POINTS OF INGRESS OR EGRESS.
3. UNLESS SHOWN ON THE CONSTRUCTION DRAWINGS, STABILIZATION FOR OTHER AREAS WILL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT.
4. WHEN SHOWN ON THE CONSTRUCTION DRAWINGS, WIDEN OR LENGTHEN STABILIZED AREA TO ACCOMMODATE A TRUCK WASHING AREA. PROVIDE OUTLET SEDIMENT TRAP FOR THE TRUCK WASHING AREA.
5. PROVIDE PERIODIC TOP DRESSING WITH ADDITIONAL COARSE AGGREGATE TO MAINTAIN THE REQUIRED DEPTH OR WHEN SURFACE BECOMES PACKED WITH MUD.
6. PERIODICALLY TURN AGGREGATE TO EXPOSE A CLEAN DRIVING SURFACE.
7. MINIMUM 14' WIDTH FOR ONE WAY TRAFFIC AND 20' WIDTH FOR TWO WAY TRAFFIC.

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
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Firm Reg. # F-004270

8-11-2020

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: STORM WATER POLLUTION PREVENTION	
SCALE:	PLAN DETAIL	SHEET NO: 16 / 30
DATE: 9/10/2020	APPROVED BY:	

SIGNS

Ⓐ OBSERVE WARNING SIGNS / STATE LAW — R20-3

Ⓑ ROAD WORK / NEXT XX MILES — G20-1

Ⓒ END / ROAD WORK — G20-2a

Ⓓ NAME / ADDRESS / CITY / STATE / CONTRACTOR — G20-6

Ⓔ ROAD WORK AHEAD — CW20-1D

NOTES

1. ALL ADVANCED WARNING SIGNS TO BE SET PRIOR TO START OF CONSTRUCTION ACTIVITIES AND TO REMAIN IN PLACE UNTIL ALL CONSTRUCTION ACTIVITIES ARE COMPLETE AND ACCEPTED BY GALVESTON COUNTY.
2. MAX. PAVEMENT DROP-OFF SHALL NOT EXCEED 2'.
3. ALL FLAGGERS SHALL BE IN RADIO CONTACT WITH EACH OTHER AT ALL TIMES.
4. ADVANCE SIGNING SHALL BE PLACED A MINIMUM OF TWO WEEKS IN ADVANCE TO INFORM OF POSSIBLE DELAY. CONTRACTOR SHALL NOTIFY THE GALVESTON COUNTY ENGINEERING DEPARTMENT AT LEAST TWO WEEKS PRIOR TO ANY CONSTRUCTION.
5. ALL PORTABLE SIGNING, DRUMS AND CONES SHALL BE REMOVED AT THE END OF EACH DAY.
6. ACCESS TO EXISTING BUSINESSES OR RESIDENCES SHALL BE MAINTAINED AT ALL TIMES.

LEGEND

- CONSTRUCTION AREA
- OPEN TO TRAFFIC
- HEAVY WORK VEHICLE
- FLASHING ARROW BOARD (OPTIONAL)
- SIGN POST
- TUBULAR MARKERS ,CONES OR DRUMS
- FLAGGER
- X SIGN SPACING
- L TAPER LENGTH
- YY DISTANCE TO BE DETERMINED BY ENGINEER
- PROJECT SIGN

EXISTING POSTED SPEED LIMIT = 20

CONSTRUCTION ZONE DESIGN SPEED LIMIT = 20

CONSTRUCTION WARNING SIGN SPACING

Posted Speed or 85% Speed (MPH)	X Min. Distance (feet)
30 or less	120
35	160
40	240
45	320
50	400
55	500
65	750

X=SIGN SPACING
L=TAPER
2XL=TANGENT

TYPICAL TRANSITION LENGTHS AND SUGGESTED MAXIMUM SPACING OF DEVICES

Posted * Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-175'

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit.
** Taper lengths have been rounded off.

NO.	REVISIONS	DATE	NAME

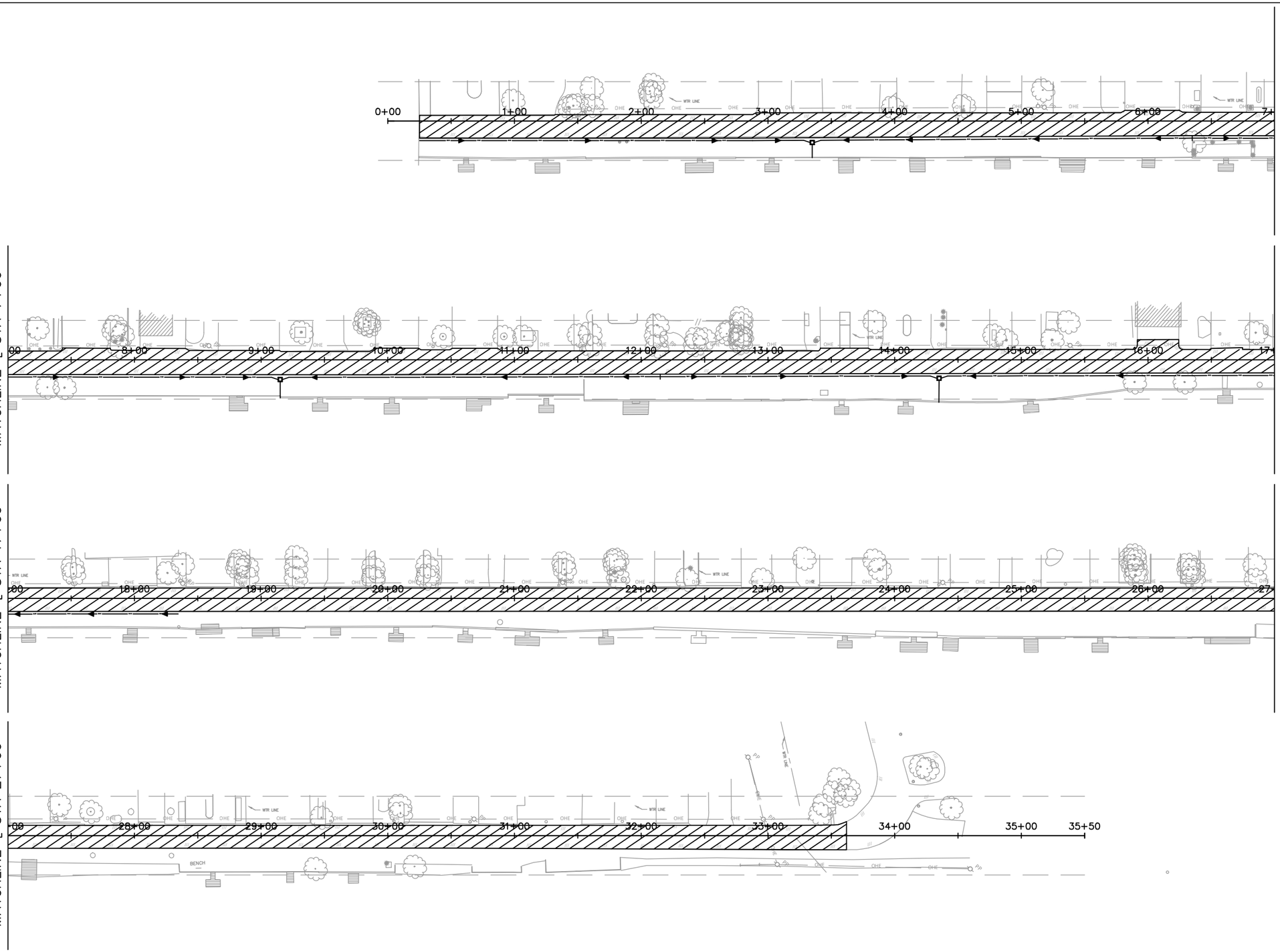
GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
817 Caroline St.
Houston, Texas 77002
Ph: 832.242.2426
Fax: 832.242.2445
Firm Reg. # F-004270

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER
9-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: TRAFFIC CONTROL GUIDELINES	
SCALE:	PROJECT APPROACH SIGNING	SHEET NO: 17 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\17 C005-001 ADVANCED WARNING SIGN.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm



0 20 40 80 120

HORZ: 1"=80'

1. SET UP ADVANCED WARNING SIGNS.
2. INSTALL SWPPP AS PER PLANS
3. LOCAL TRAFFIC INGRESS AND EGRESS FOR DRIVEWAYS AND PEDESTRIAN ACCESS FACILITIES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION
4. CONTRACTOR SHALL CONSTRUCT ENTIRE WIDTH OF THE PROPOSED PAVEMENT IN ONE SPREAD.
5. THE LENGTH OF THE CONSTRUCTION AREA SHALL BE DETERMINED PRIOR TO CONSTRUCTION AS DIRECTED BY THE FIELD ENGINEER.
6. INSTALL SIGN B AT BEGIN OF THE CONSTRUCTION AREA, AND MOVE WITH EACH CONSTRUCTION STAGES.
7. REMOVE AND DISPOSE EXISTING ASPHALT PAVEMENT.
8. CONSTRUCT PROPOSED 3-INCH HMAC SURFACE COURSE OVER 9-INCH COLD-IN-PLACE BASE COURSE SUBGRADE.
9. PROVIDE ACCESS TO RESIDENT DURING CONSTRUCTION.
10. CONSTRUCT PROPOSED DRAINAGE FACILITIES.
11. INSTALL SODDING OVER UNPAVED DISTURBED AREA DURING CONSTRUCTION.
12. RESTORE UNPAVED AREA TO PRIOR TO CONSTRUCTION CONDITION
13. ROAD SHALL KEEP OPEN AND MAINTAIN ROADWAY SURFACE TO BE ABLE TO DRIVE ON DURING NON CONSTRUCTION PERIOD AND OVERNIGHT.

LEGEND

CONSTRUCTION AREA

TYPE III BARRICADE
WITH 2 TYPE "A" WARNING LIGHTS

NOTE:

CONTRACTOR WILL NEED TO PROVIDE ALL RESIDENTS AN UPDATE ON THE TRAFFIC PATTERNS SUCH THAT RESIDENTS WILL BE ABLE TO ACCESS THEIR PROPERTY DURING CONSTRUCTION.

SHEET 1 OF 1

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

THE STATE OF TEXAS
COUNTY OF GALVESTON

Zarinkelk
Engineering Serivces, Inc.
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Firm Reg. # F-004270

Giti Zarinkelk 9-11-2020

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:	FROM BEGIN PROJECT	PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: TO END PROJECT	
SCALE:	TRAFFIC CONTROL PLAN	SHEET NO: 18 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\18 C-005-001 TCP.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm

	Cross Sectional Areas		Average Cross Sectional Areas		Distance Between Stations	Volumes		
Station	Total Roadway Excavation [SF]	Embankment Area [SF]	Average Total Roadway Excavation [SF]	Average Embankment Area [SF]	Distance Between Stations [FT]	ITEM 110 ROADWAY EXCAVATION [CY] - *PAY*	REUSEABLE ROADWAY EXCAVATION *[CY]	ROADWAY EMBANKMENT [CY]
	AR	***BR***	***FR***	***GR***	***KR***	***LR***	***PR***	***QR***
000+25	0.31	0						
			0.745	0	75	2	2	0
001+00	1.18	0						
			1.09	0	100	4	4	0
002+00	1	0						
			1.075	0	100	4	4	0
003+00	1.15	0						
			0.795	0	100	3	3	0
004+00	0.44	0						
			0.47	0	100	2	2	0
005+00	0.5	0						
			0.27	0	100	1	1	0
006+00	0.04	0						
			0.345	0	100	1	1	0
007+00	0.65	0						
			0.4	0	100	1	1	0
008+00	0.15	0						
			0.21	0.015	100	1	1	0
009+00	0.27	0.03						
			0.295	0.03	100	1	1	0
010+00	0.32	0.03						
			0.36	0.015	100	1	1	0
011+00	0.4	0						
			0.215	0	100	1	1	0
012+00	0.03	0						
			0.17	0.005	100	1	1	0
013+00	0.31	0.01						
			0.56	0.005	100	2	2	0
014+00	0.81	0						
			1.085	0	100	4	4	0
015+00	1.36	0						
			1.425	0	100	5	5	0
016+00	1.49	0						
			1.26	0	100	5	5	0

	Cross Sectional Areas		Average Cross Sectional Areas		Distance Between Stations	Volumes		
Station	Total Roadway Excavation [SF]	Embankment Area [SF]	Average Total Roadway Excavation [SF]	Average Embankment Area [SF]	Distance Between Stations [FT]	ITEM 110 ROADWAY EXCAVATION [CY] - *PAY*	REUSEABLE ROADWAY EXCAVATION *[CY]	ROADWAY EMBANKMENT [CY]
	AR	***BR***	***FR***	***GR***	***KR***	***LR***	***PR***	***QR***
017+00	1.03	0						
			0.83	0	100	3	3	0
018+00	0.63	0						
			0.315	0.0525	100	1	1	0
019+00	0	0.105						
			0	0.08	100	0	0	0
020+00	0	0.055						
			0	0.10625	100	0	0	0
021+00	0	0.1575						
			0	0.19875	100	0	0	1
022+00	0	0.24						
			0	0.14375	100	0	0	1
023+00	0	0.0475						
			0	0.02375	100	0	0	0
024+00	0	0						
			0	0.02125	100	0	0	0
025+00	0	0.0425						
			0	0.11025	100	0	0	0
026+00	0	0.178						
			0	0.239	100	0	0	1
027+00	0	0.3						
			0	0.43	100	0	0	2
028+00	0	0.56						
			0	0.6025	100	0	0	2
029+00	0	0.645						
			0	0.884	100	0	0	3
030+00	0	1.123						
			0	0.6965	100	0	0	3
031+00	0	0.27						
			0	0.18875	100	0	0	1
032+00	0	0.1075						
			0	0.07125	100	0	0	0
033+00	0	0.035						
					Roadway Totals:	**43**	**43**	**15**

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\19 SUMMARY OF EARTHWORK QTY.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
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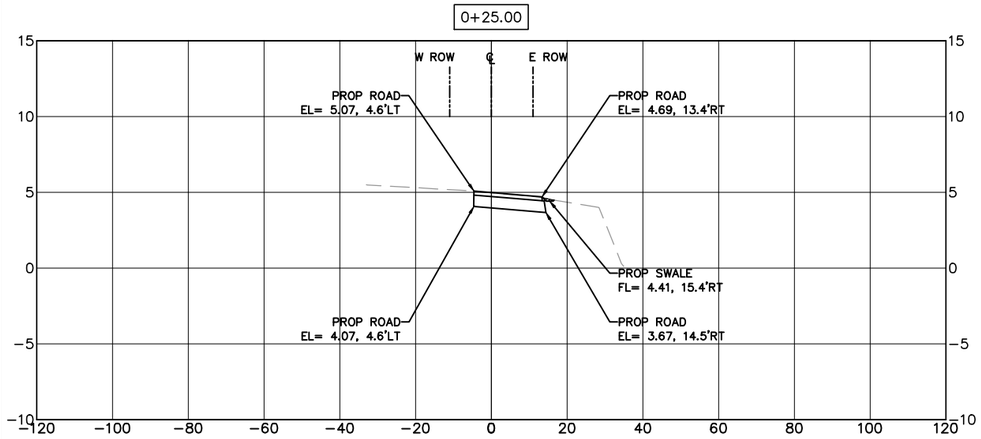
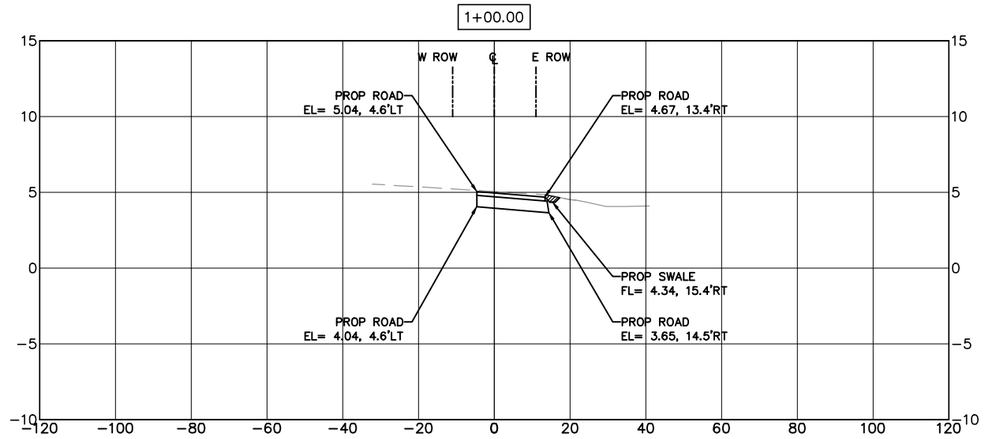
Fax: 832.242.2445
Firm Reg. # F-004270

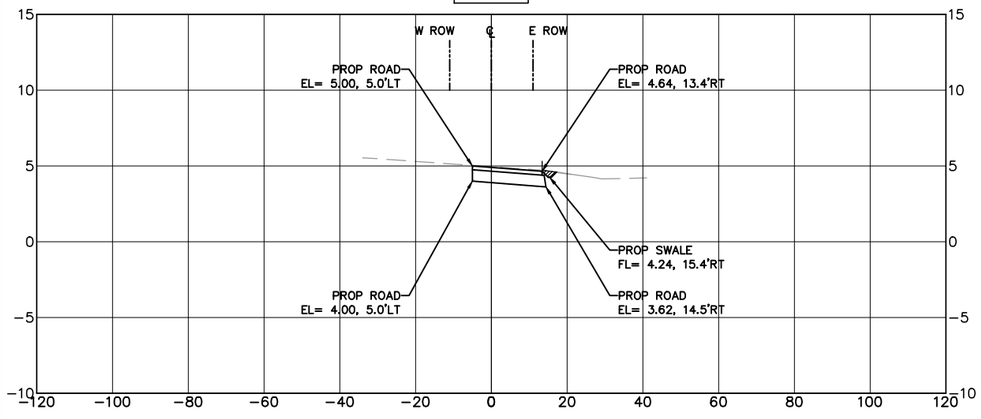
8-11-2020

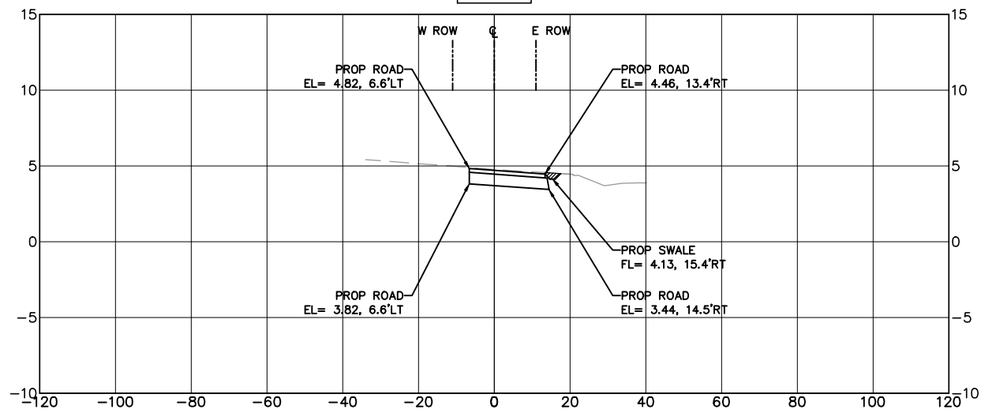
GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER

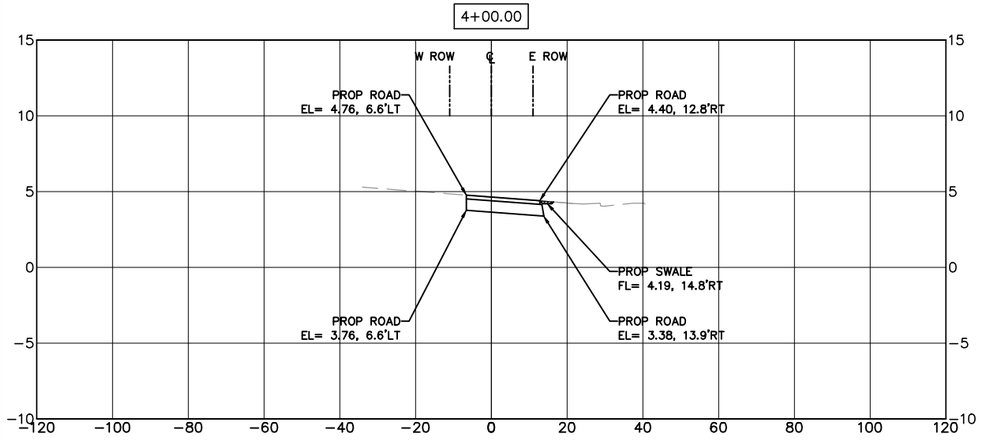
PROJECT TITLE: BLUE HERON DRIVE
DRAWN BY:
CK'D BY:
SCALE:
DATE: 9/10/2020
APPROVED BY:
SHEET DESCRIPTION: SUMMARY OF EARTHWORK QUANTITIES
PROJECT ID: BV01
SHEET NO: 19 / 30

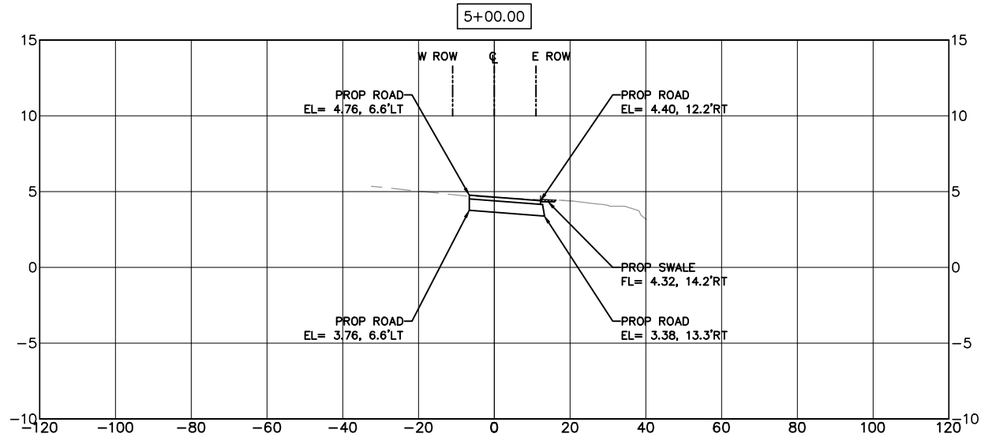












LEGEND:

CUT

FILL

SHEET 1 OF 6

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
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Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS	
SCALE:		SHEET NO: 20 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\20 - 25 C-005-001 CROSS SECTIONS.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:48pm

LEGEND:

CUT

FILL

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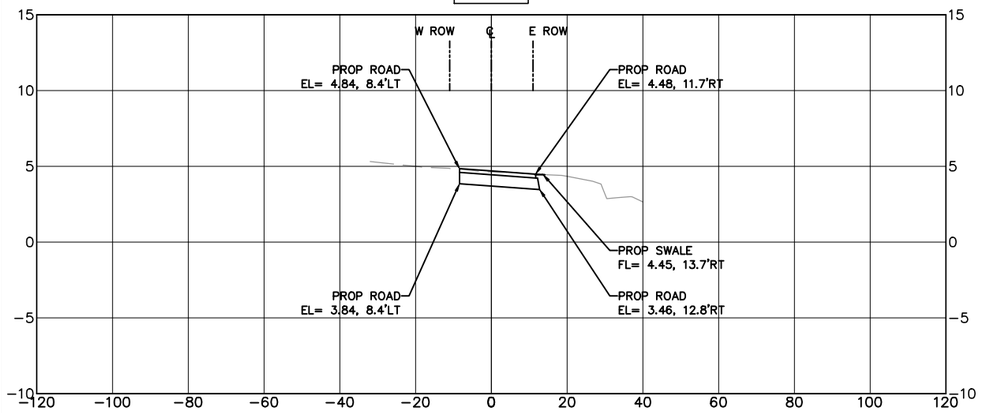

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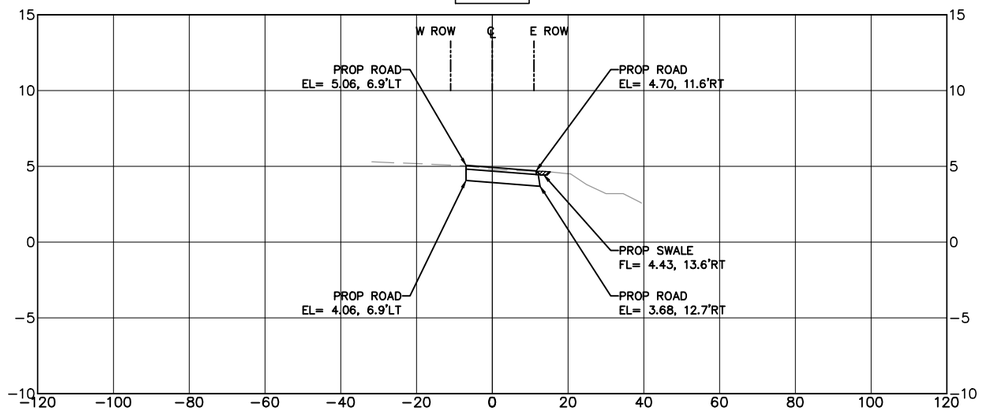

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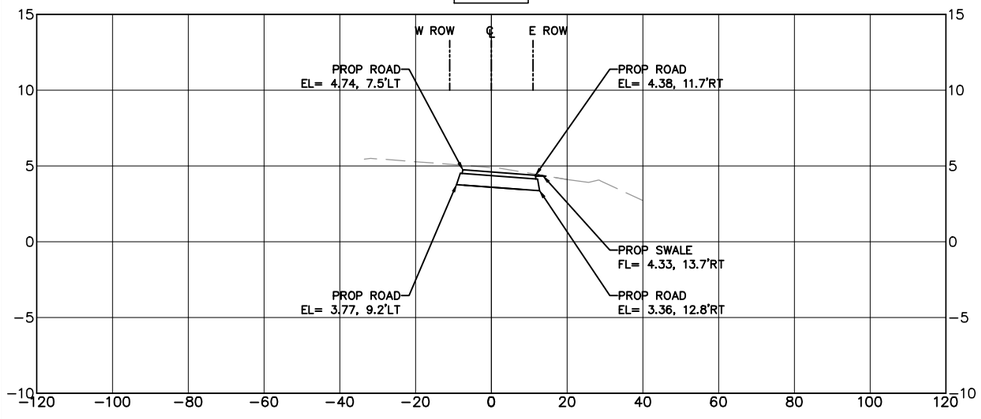

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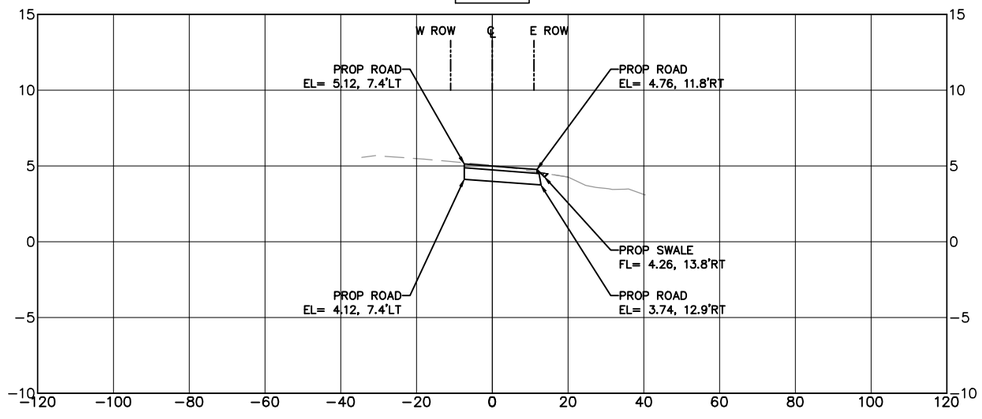

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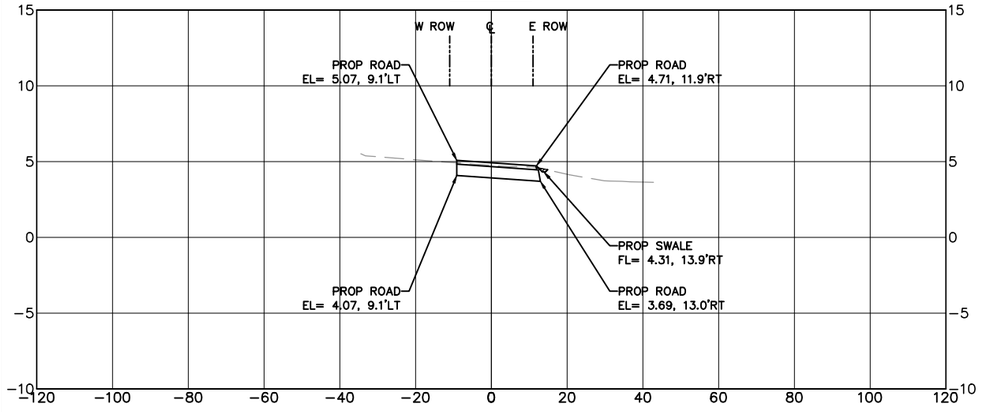

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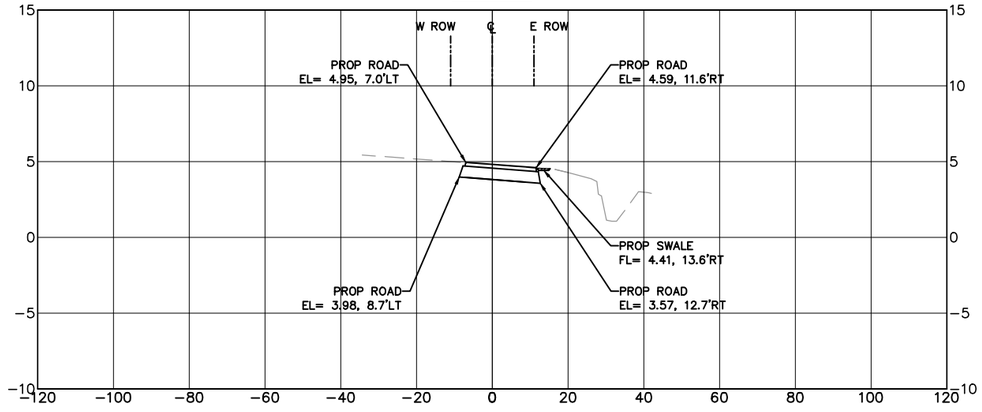

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\20 - 25 C-005-001 CROSS SECTIONS.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
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GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS	
SCALE:		SHEET NO: 21 / 30
DATE: 9/10/2020	APPROVED BY:	

LEGEND:

CUT

FILL

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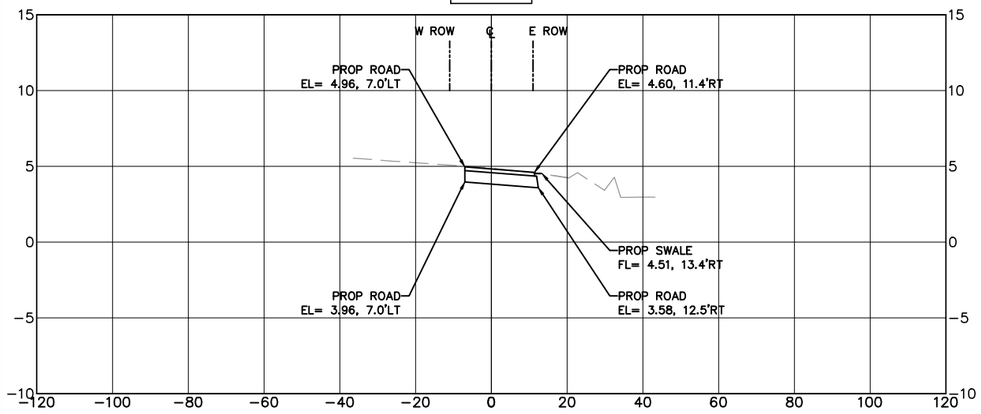

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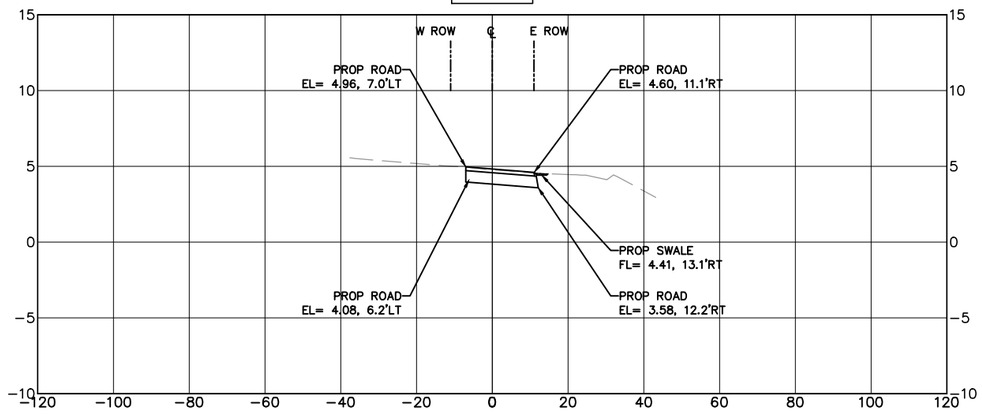

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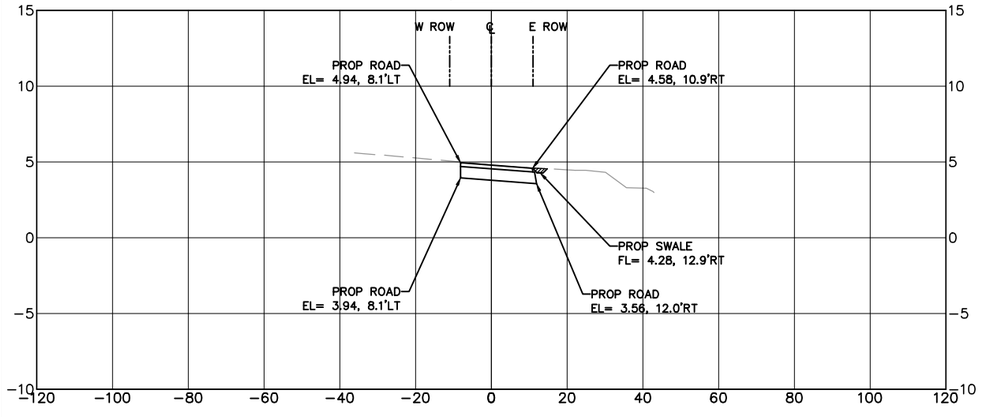

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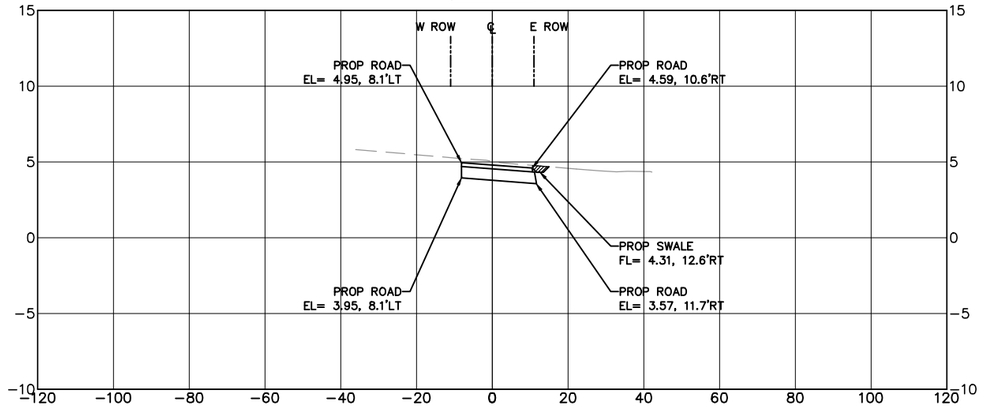

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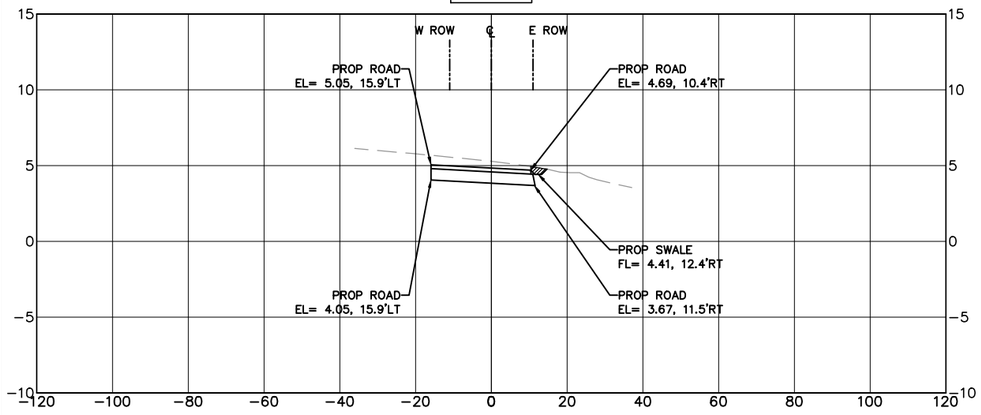

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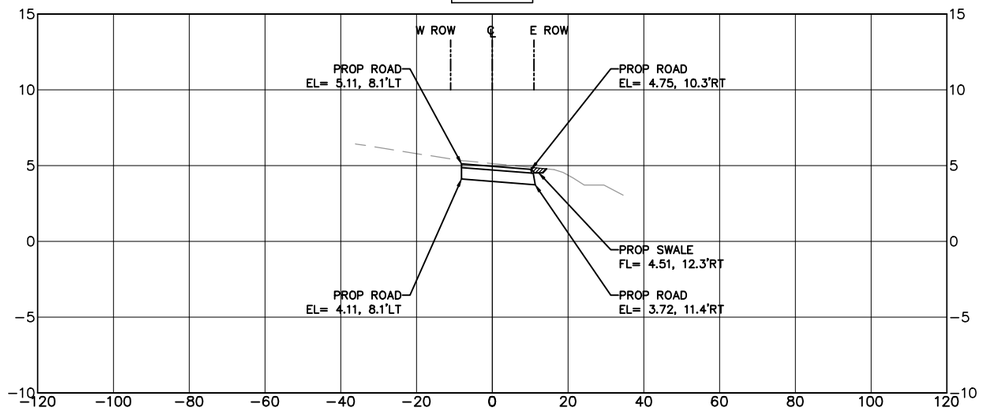

SHEET 3 OF 6

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
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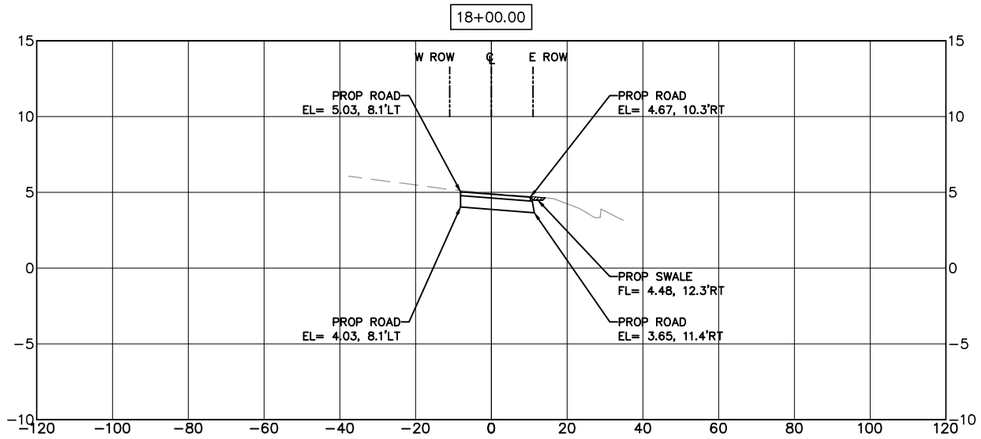
Firm Reg. # F-004270

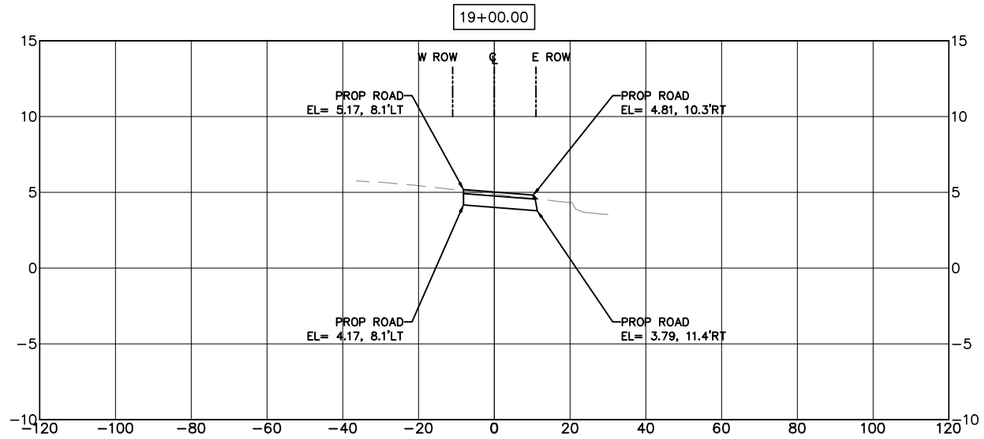
STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

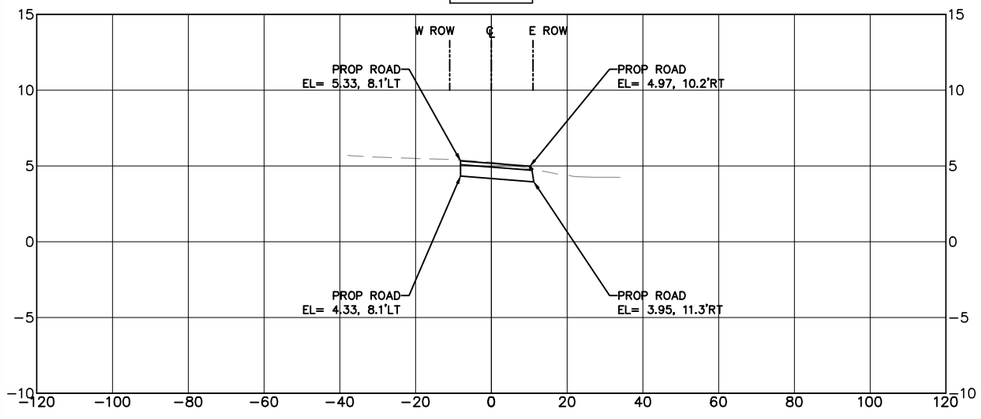
8-11-2020

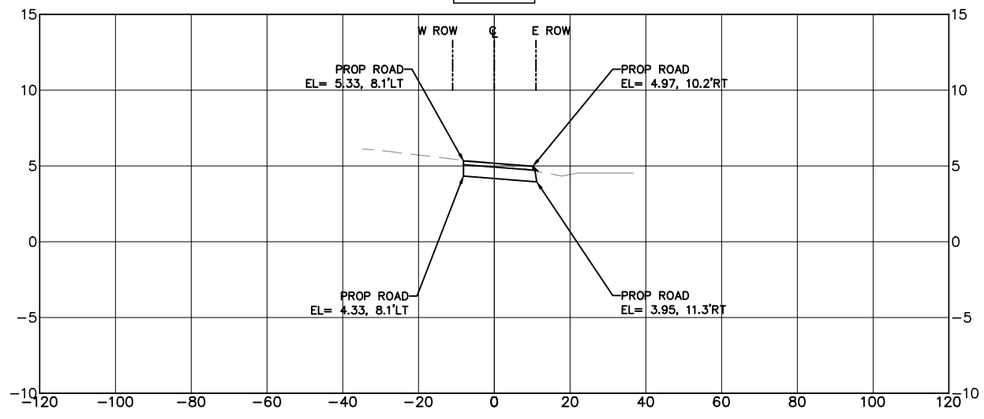
PROJECT TITLE: BLUE HERON DRIVE			
DRAWN BY:		PROJECT ID: BV01	
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS		
SCALE:		SHEET NO: 22 / 30	
DATE: 9/10/2020	APPROVED BY:		

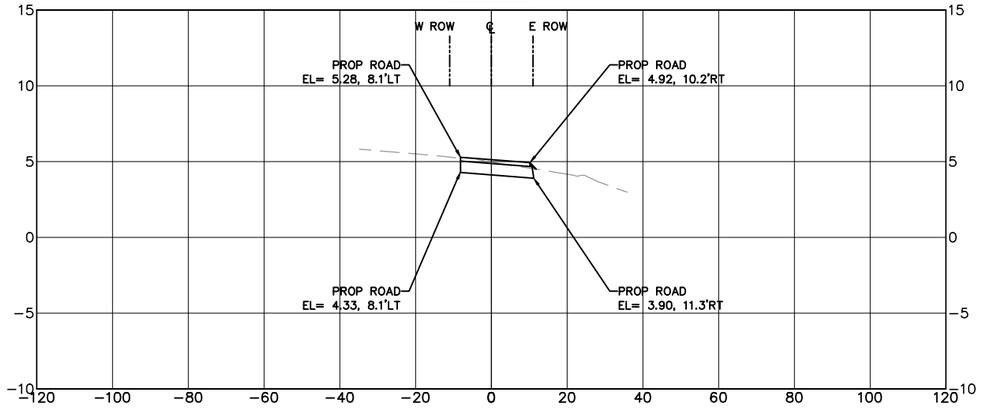
FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\20 - 25 C-005-001 CROSS SECTIONS.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm

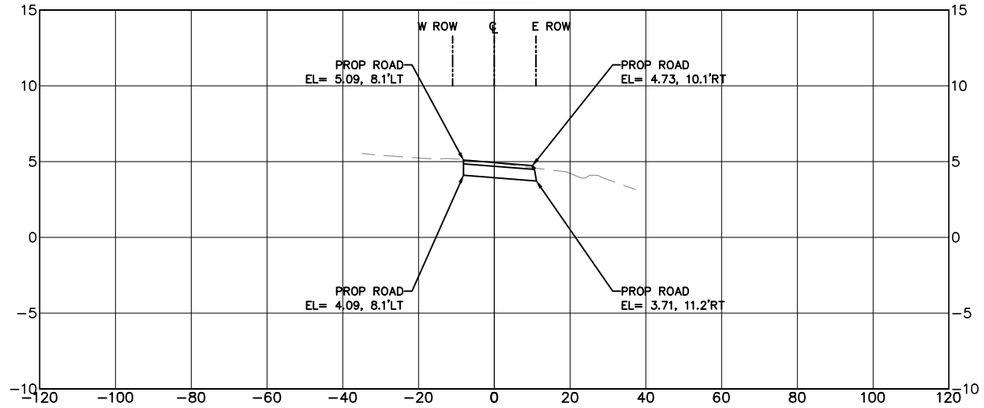












LEGEND:

CUT

FILL

SHEET 4 OF 6

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\20 - 25 C-005-001 CROSS SECTIONS.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:47pm

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

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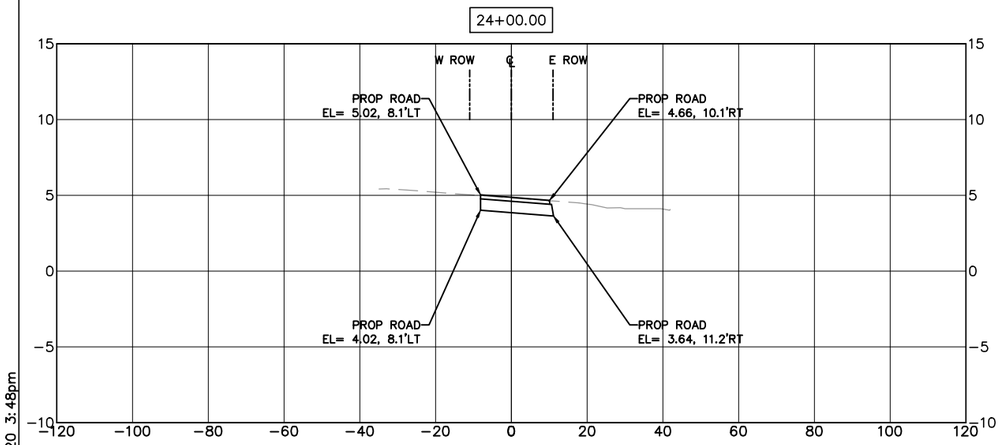
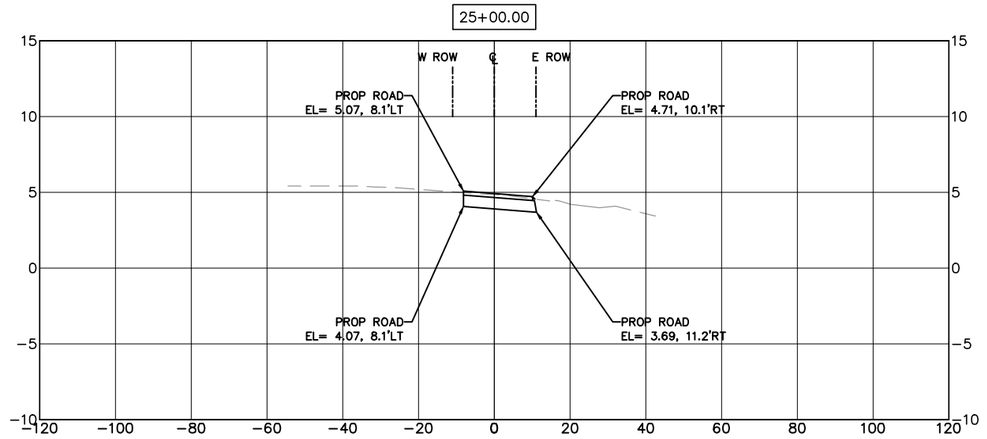
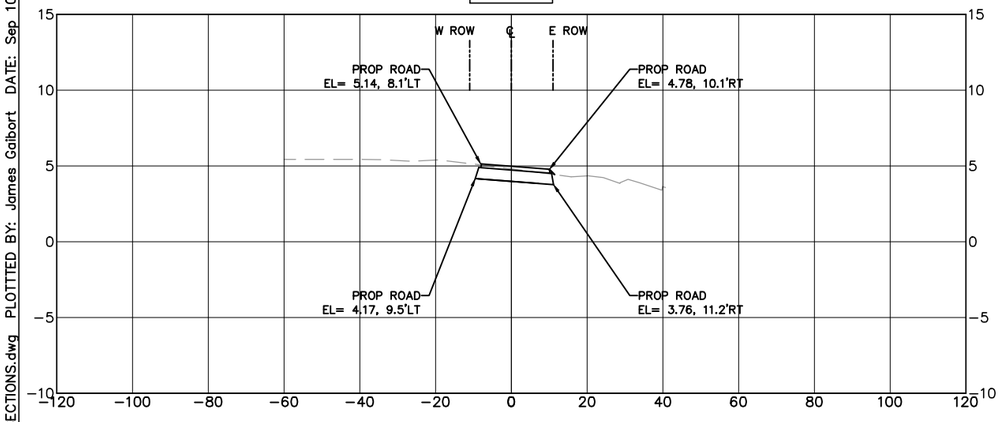
Fax: 832.242.2445
Firm Reg. # F-004270

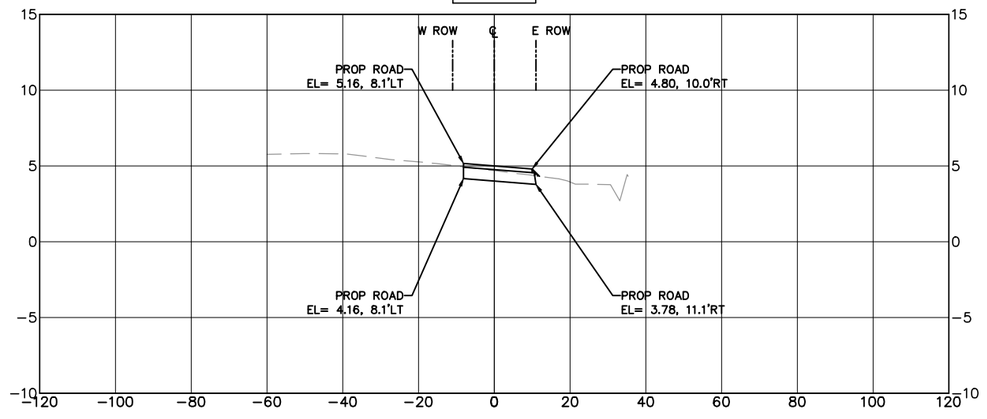
GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
9-11-2020

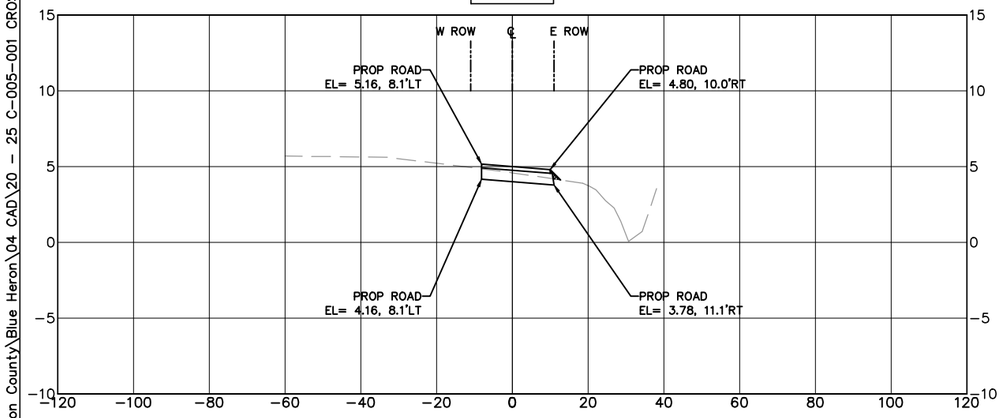
PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS	
SCALE:		SHEET NO: 23 / 30
DATE: 9/10/2020	APPROVED BY:	

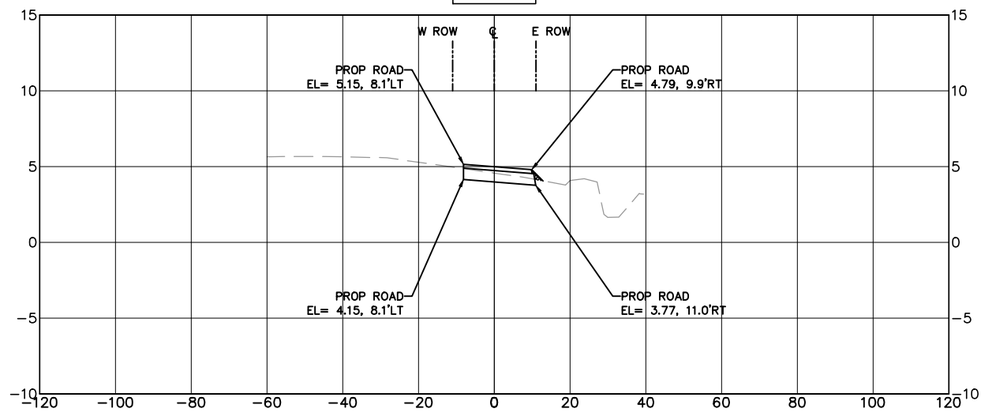












LEGEND:

CUT

FILL

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

Zarinkelk Engineering Serivces, Inc.
617 Carolipe St.
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Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS	
SCALE:		SHEET NO: 24 / 30
DATE: 9/10/2020	APPROVED BY:	

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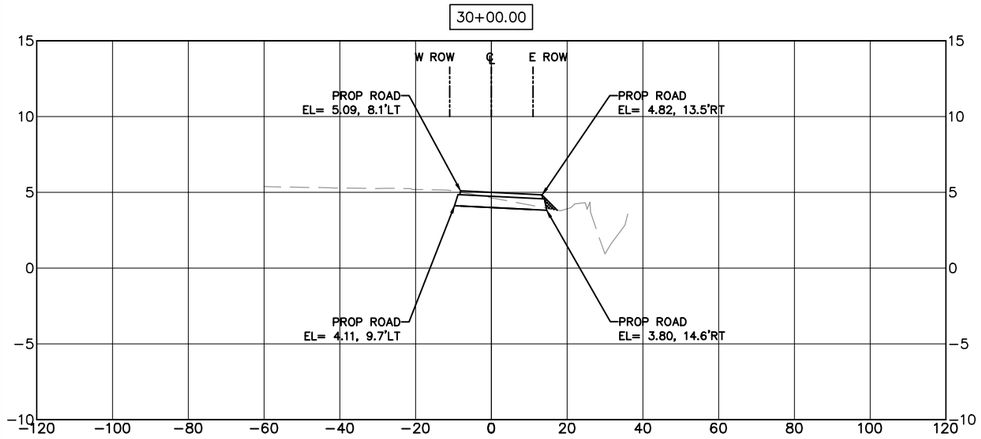

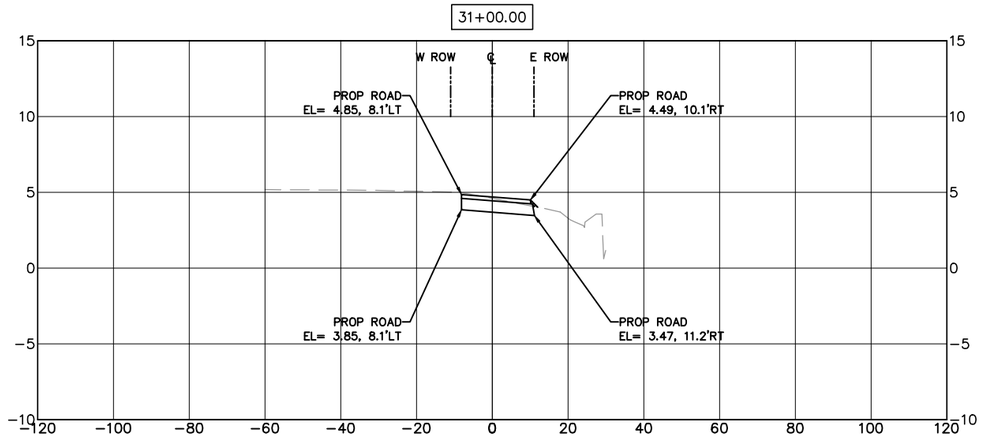

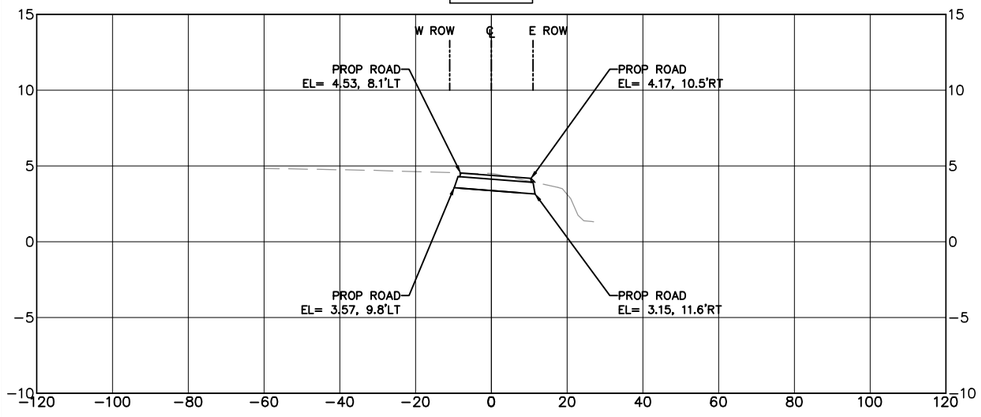

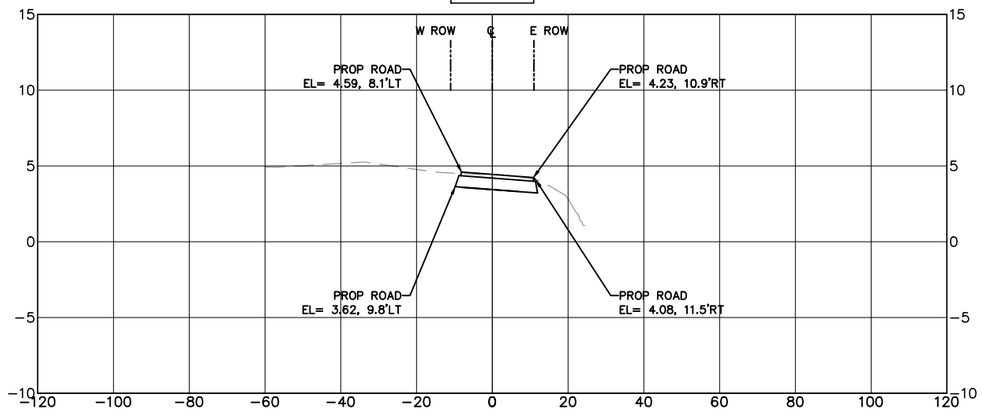

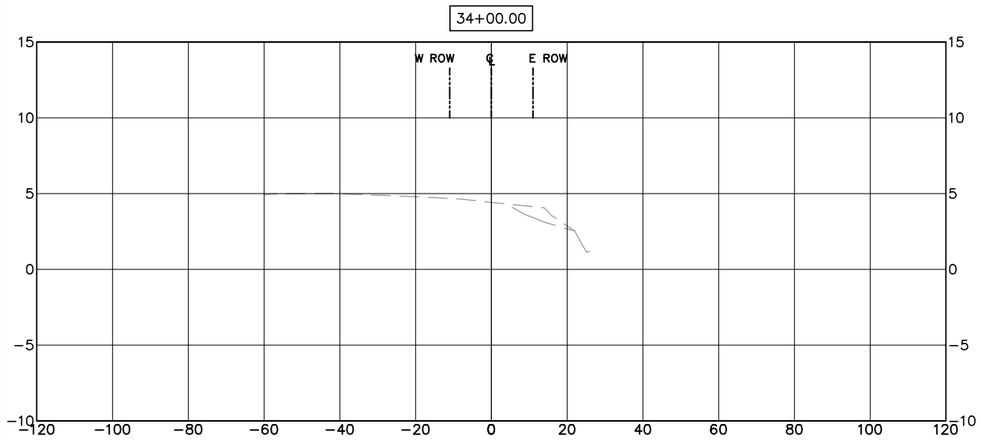

LEGEND:

CUT

FILL

SHEET 6 OF 6

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
DEPARTMENT

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Firm Reg. # F-004270

Giti Zarinkelk 9-11-2020

STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: CROSS SECTIONS	
SCALE:		SHEET NO: 25 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\20 - 25 C-005-001 CROSS SECTIONS.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:48pm

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 1
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s): Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft. or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS LL	PL	PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 3/4 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 10 1/4 inches.
1		P = 0.75	24.0		50	19	31						FILL: Gray and brown, fat clay with ferrous stains.
2		P = 0.25	43.8										FAT CLAY (CH): Very soft, light brown and gray with ferrous stains.
3													- with root fibers, 2 to 6 ft.
4		P = 0	58.0		87	27	60						
5													
6		P = 0	48.9					67	240	14.3	8	Bulge, Vertical Fracture, Slickensided	
7													
8		P = 0	42.2		58	23	35						
9													
10													Borehole terminated at 10-ft depth

Remarks:

Paradigm Consultants, Inc.

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 2
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s): Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered — 5.0 ft
After elapsed — 4.0 ft

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft. or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS LL	PL	PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 1/2 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 10 1/2 inches.
1		P = 0.25	34.8										FILL: Light brown and dark brown, fat clay with ferrous stains.
2		P = 0.25	40.7		63	27	36						FAT CLAY (CH): Very soft, brown an gray with ferrous stains.
3													
4		P = 0	37.2					82	370	11.1	6	Bulge, Vertical Fracture, Slickensided	
5													
6		P = 0	49.1		70	25	45						
7													
8		P = 0	49.1										
9													
10													Borehole terminated at 10-ft depth

Remarks:

Paradigm Consultants, Inc.

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
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GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
8-11-2020

SHEET 1 OF 4

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: BORING LOGS	
SCALE:		SHEET NO: 26 / 30
DATE: 9/10/2020	APPROVED BY:	

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 3
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 4.0 ft
After elapsed 3.5 ft

Depth, ft	Soil Symbol	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft. or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 4 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 9 inches.
1			P = 0	42.1		78	27	51						FILL: Light brown and gray, fat clay with sand seams.
2			P = 0.25	33.4										FAT CLAY (CH): Very soft, light brown and gray.
3														- with sand seams, 2 to 4 ft.
4			P = 0	40.5		59	24	35	79	430	10.3	6	Bulge, Vertical Fracture	- with root fibers, 2 to 8 ft.
5														
6			P = 0	54.6										
7														
8			P = 0	61.2		92	34	58	64	230	13.3	10	Bulge, Slickensided	
9														
10														

Remarks: Borehole terminated at 10-ft depth

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 4
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 5.0 ft

Depth, ft	Soil Symbol	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft. or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 1/2 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 12 1/2 inches.
1			P = 0.25	31.1										FILL: Light brown and gray, fat clay.
2			P = 0	41.5		75	28	47						FAT CLAY (CH): Very soft, dark brown.
3														
4			P = 0	48.9										- with sand pockets, 4 to 6 ft.
5														
6			P = 0	42.2		55	19	36	73	240	15.0	8	Bulge, Slickensided	- with ferrous stains, 6 to 8 ft.
7														
8			P = 0	57.7										
9														
10														

Remarks: Borehole terminated at 10-ft depth

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
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Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: BORING LOGS	
SCALE:		SHEET NO: 27 / 30
DATE: 9/10/2020	APPROVED BY:	

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 5
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s): Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 5.0 ft

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS LL	PL	PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 9 inches.
1		P = 0	24.9										FAT CLAY (CH): Very soft, gray and brown.
2		P = 0	43.4										
3													
4		P = 0	53.4		75	29	46						- with ferrous stains, 4 to 8 ft.
5													
6		P = 0.25	46.3										
7													
8		P = 0	54.4					70	230	14.8	10	Bulge, Vertical Fracture, Slickensided	
9													
10													

Remarks: Borehole terminated at 10-ft depth

Paradigm Consultants, Inc.

- 5 -

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 6
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s): Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 9.5 ft

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS LL	PL	PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 13 inches.
1		P = 1.0	32.0		58	21	37						FILL: Dark brown, fat clay with ferrous stains.
2		P = 0.50	41.3										FAT CLAY (CH): Very soft, dark brown and gray with ferrous stains.
3													
4		P = 0	46.9					74	310	14.8	6	Bulge, Vertical Fracture, Slickensided	- with sand pockets, 4 to 6 ft.
5													
6		P = 0	41.7		69	23	46						
7													
8		P = 0	51.1										
9													
10													

Remarks: Borehole terminated at 10-ft depth

Paradigm Consultants, Inc.

- 6 -

SHEET 3 OF 4

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
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STATE OF TEXAS
GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER

9-11-2020

PROJECT TITLE:	BLUE HERON DRIVE	
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: BORING LOGS	
SCALE:		SHEET NO: 28 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\28 BORING LOGS SHEET 3 OF 4.dwg PLOTTED BY: James Galbert DATE: Sep 10, 2020 3:48pm

03GEOTECH1 19-1088 BORING LOG GP.I HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 7
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 6.0 ft
After elapsed 5.0 ft

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS LL	PL	PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 3/4 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 12 1/4 inches.
1		P = 0	11.5										FILL: Light brown and dark brown, fat clay with sand layer.
2		P = 1.25	23.8		58	19	39						
3													
4		P = 0.50	42.4										FAT CLAY (CH): Very soft, light brown and dark brown with ferrous stains.
5													
6		P = 0	45.6		68	24	44						
7													
8		P = 0.50	38.4					81	590	11.6	10	Bulge, Vertical Fracture, Slickensided	
9													
10													

Remarks:

Borehole terminated at 10-ft depth

Paradigm Consultants, Inc.

- 7 -

SHEET 4 OF 4

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
ENGINEERING
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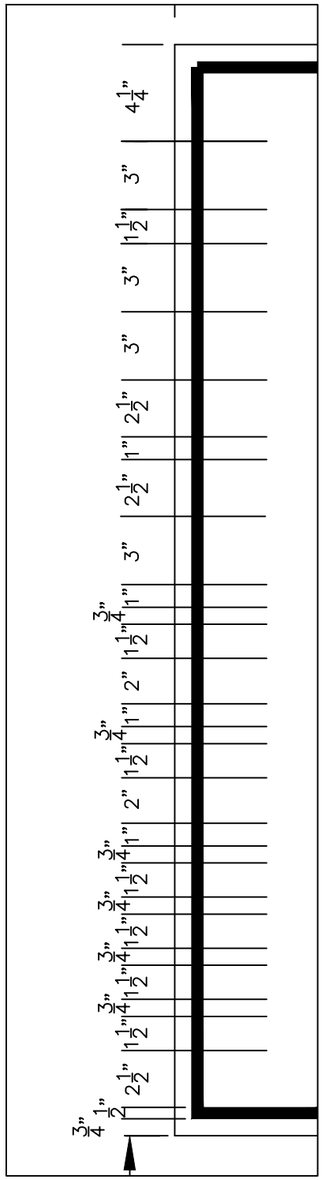
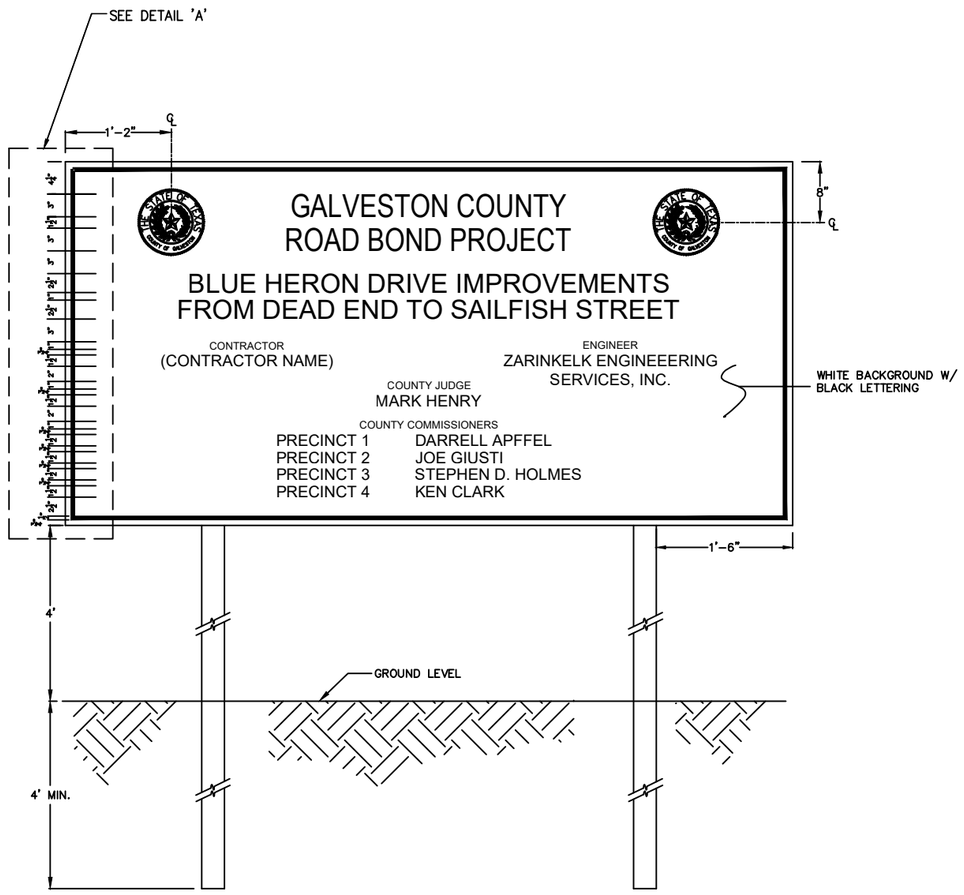
Firm Reg. # F-004270

GITI ZARINKELK 79509 LICENSED PROFESSIONAL ENGINEER
9-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: BORING LOGS	
SCALE:		SHEET NO: 29 / 30
DATE: 9/10/2020	APPROVED BY:	

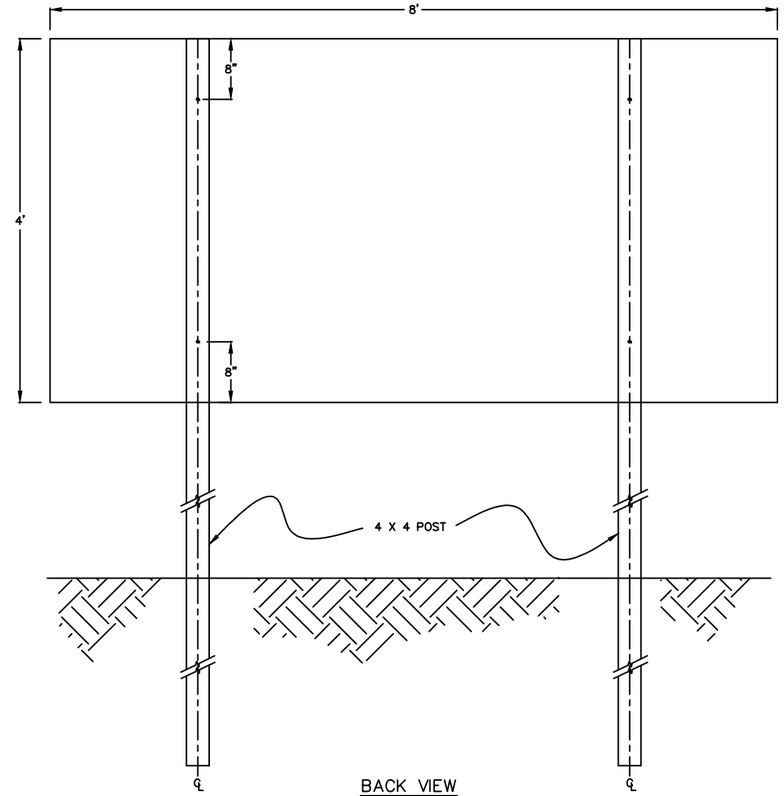


DETAIL 'A'



FRONT VIEW

WHITE BACKGROUND W/ BLACK LETTERING



BACK VIEW

NO.	REVISIONS	DATE	NAME

GALVESTON COUNTY
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GITI ZARINKELK
79509
LICENSED
PROFESSIONAL ENGINEER
8-11-2020

PROJECT TITLE: BLUE HERON DRIVE		
DRAWN BY:		PROJECT ID: BV01
CK'D BY:	SHEET DESCRIPTION: PROJECT SIGN	
SCALE:		SHEET NO: 30 / 30
DATE: 9/10/2020	APPROVED BY:	

FILE INFO: Z:\Galveston County\Blue Heron\04 CAD\30 PROJECT SIGN.dwg PLOTTED BY: James Galbort DATE: Sep 10, 2020 3:48pm

Geotechnical Engineering Study
Blue Heron Drive
Bayou Vista
Galveston County, Texas

Prepared For

Zarinkelk Engineering Services, Inc.
Houston, Texas

Prepared By

Paradigm Consultants, Inc.
9980 W. Sam Houston Pkwy. South, Suite 500
Houston, Texas 77099
TBPE Reg. No. F-001478

March 2020

March 2, 2020
Paradigm Project No.: 19-1088

Paradigm
Consultants, Inc.

9980 W. Sam Houston Pkwy S.
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Main: 713.686.6771
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paradigmconsultants.com
TBPE Reg. No. F-001478

Mr. Michael J. Bagstad, P. E.
Zarinkelk Engineering Services, Inc.
617 Caroline Street
Houston, TX 77002

Geotechnical Engineering Study
Blue Heron Drive
Bayou Vista
Galveston County, Texas

Mr. Bagstad:

Paradigm Consultants, Inc., presents this report of our geotechnical study for the above referenced project. This study was authorized with a notice to proceed email from Mr. PK Patel on November 8, 2019. The scope of service was in accordance with Paradigm Proposal No. P19-174, dated September 12, 2019.

We appreciate the opportunity to work with you during the design phase of this project. If we may be of further assistance, please call us at your convenience.

Sincerely,

Frank S. Ong, P.E.
Engineering Manager

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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Important Information about your Geotechnical Engineering Report

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INTRODUCTION

Paradigm Consultants, Inc., (Paradigm) presents this report of our geotechnical study and design recommendations for the proposed Blue Heron Drive reconstruction in Bayou Vista, Texas. This study was authorized with a notice to proceed email from Mr. PK Patel on November 8, 2019. The scope of service was in accordance with Paradigm Proposal No. P19-174, dated September 12, 2019.

The objectives of this study were to develop design recommendations and construction considerations for the proposed street improvements. To accomplish these objectives, our study included the following tasks:

- Drilling and sampling seven soil borings to explore the subsurface and groundwater conditions;
- Performing geotechnical laboratory tests to aid in the classification and determine engineering properties of the soils encountered at the site;
- Analyzing the field and laboratory test data to develop geotechnical engineering design and construction recommendations; and
- Preparing this report presenting our findings and recommendations.

FIELD EXPLORATION AND LABORATORY TESTING

Our field exploration included drilling and sampling seven exploratory soil borings. The approximate boring locations are shown on Figure 1.

Drilling Operations

ACE Drilling, a subcontractor to Paradigm, drilled and sampled the borings on November 18, 2019 using truck-mounted drilling equipment. The existing paving was cored through prior to drilling and sampling. Our field operations were performed in general accordance with American Society for Testing and Materials (ASTM D 1452[1] and ASTM D 5783[2]).

Soil Sampling

Soil was sampled continuously at 2-ft intervals to the completion depth of the borings. Soils interpreted to be cohesive soils (clay) during field operations were sampled by hydraulically pushing a 3-in. diameter, thin-walled steel tube a distance of about 24 in. Our field sampling procedures were in general accordance with ASTM D 1587. For each recovered sample, our representative extruded the sample in the field, visually classified the soil, and measured the penetration resistance using a pocket penetrometer. A representative portion of the

recovered sample was wrapped in aluminum foil and placed into a plastic bag for transport to our laboratory.

Water-Level Measurements

Drilling protocol included dry augering from ground surface to the depth where water or borehole sidewall instability occurred. If neither water nor instability was encountered, dry-auger drilling technique was used to the full depth of the boring. If water was encountered, the water level within the borehole was measured at 5-minute intervals for 15 minutes before drilling resumed using wet rotary methods.

Laboratory Testing

Paradigm performed geotechnical laboratory tests in general accordance with ASTM methods on selected soil samples to aid in soil classification and to test engineering properties. The test methods performed are presented in Table 1.

Table 1: Laboratory Test Methods

Test Name	Test Method
Moisture Content	ASTM D 2216[3]
Liquid and Plastic Limits and Plasticity Index	ASTM D 4318[4]
Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soil	ASTM D 2850[5]

Boring Logs

Paradigm's field representative logged each soil boring recording the drilling method, sampling method and interval, and penetration resistance. Details of the stratigraphic conditions encountered at each boring location were recorded on the field log in general accordance with ASTM D 5434.[6] Identification and descriptions of the soils were based on visual-manual procedures described in ASTM D 2488.[7]

The boring logs were developed using the stratigraphic and soil property data obtained during our field exploration and laboratory testing programs. Each log represents our interpretation of general soil and water conditions at the boring location. The boring log includes the type and interval depth for each sample, the corresponding penetration resistance and SPT data, and the results of the index properties and strength testing. Soil classifications were based on the Unified Soil Classification System (ASTM D 2487[8]). The boring logs and a key to the terms and symbols used on the logs are included in the Appendix.

Unified Soil Classification System. ASTM D 2487 classifies soil as either fine-grained or coarse-grained with the percentage of soil particles finer than the No. 200 sieve size used to differentiate between coarse-grained and fine-grained soil. Clay and silt are fine-grained soils and have 50% or more of their particles finer than the No. 200 sieve size. Gravel and sand are coarse-grained soils and have less than 50% of their particles finer than the No. 200 sieve size.

Clay has a plasticity index (PI) of 4 or greater and the plot of plasticity index versus liquid limit (LL) falls on or above the "A" line of the plasticity chart. Silt typically has a PI less than 4 and the plot of plasticity index versus liquid limit falls below the "A" line of the plasticity chart. For clay and silt, the descriptor "with sand" is used if 15% to 30% of the particles are sand size. If more than 30% of the particles within a clay or silt sample are sand size, the descriptor "sandy" is used. Fat clay has a liquid limit greater than or equal to 50, and lean clay has a liquid limit less than 50. Silty clay (CL-ML) has a PI between 4 and 7.

SURFACE AND SUBSURFACE CONDITIONS

General surface conditions were noted during our field exploration program. Subsurface and groundwater conditions were evaluated by drilling seven exploratory soil borings, designated as B-1 through B-7, within the project site. Discussions of the site, soil, and groundwater conditions encountered during our field exploration are presented in the following sections.

Surface Conditions

The street is currently covered with asphalt paving.

Existing Asphalt Paving Section

The existing pavement section consists of about 2 in. to 4 in. of asphalt paving over cement stabilized base (9 to 13 in.) Thicknesses of each paving layer are included in Appendix.

Subsurface Soil Conditions

The subsurface soil conditions, based on intercepted soils from seven exploratory borings, generally consist of clay, lean clay, and sand within the 10-ft explored depth. Additional details of encountered soils with laboratory test results are presented on boring logs in the Appendix.

Groundwater Conditions

During our field exploration, groundwater was encountered at depths ranging from approximately 4 to 10 ft below the grade. Short-term water level observations should not be interpreted to represent long-term conditions. Water levels vary seasonally and with climatic conditions.

ROADWAY

Plans are to reconstruct Blue Heron Drive reconstruction in Bayou Vista, Texas. We understand that concrete paving will be considered for pavement replacement. The results of our study indicated that the existing paving subgrade are very soft. The constructability of new concrete paving over this very soft subgrade should be field verified at the time of the construction. As an alternative, we recommended new asphalt paving supported on cold-in-place recycled existing base be considered for this project. Our pavement design recommendations were presented in the following report section.

New Concrete Paving Section

Paradigm recommends that 7-in. thick portland cement concrete be used for proposed street improvement. We recommend that streets be constructed on 8-in. stabilized subgrade. During the pavement performance, maintenance to seal surface cracks and reseal joints should be undertaken to achieve the desired paving life. Subgrade preparation for concrete pavement is explained in the following section.

The reinforcing steel (fy = 60,000 lb/in.^{2}) should use No. 4 bars spaced at 18-in. for longitudinal reinforcement, and No. 4 bars spaced at 24 in. for lateral reinforcement. The maximum spacing for contraction joints should be 15 ft. The concrete paving mixture should be proportioned to achieve a compressive strength of at least 3500 lb/in^2.

Pavement Subgrade

The appropriateness of stabilizer and application rate for the subgrade should be determined at the time of construction. The paving subgrade should be lime stabilized to an 8-in. depth. An application rate of 48 lb/yd² of hydrated lime may be used for planning purposes. This application rate corresponds to 8% hydrated lime. Texas Department of Transportation (TxDOT) Specifications, Item 260, can be used as procedural guide for placing, mixing, and compacting the stabilizer and the soils.

It is essential that adequate water be added before final mixing to ensure complete hydration and to bring the soil moisture content 3% above optimum before compaction. Additional water may be needed during final mix to meet the moisture requirement. Stabilized soils should be compacted to at least 95% of the maximum dry density determined by standard effort (ASTM D 698[9]). Paving should be placed within 14 days to prevent deterioration of the prepared subgrade, or the subgrade should be sealed with an emulsion-based sealer.

Construction Considerations

Subgrade preparation will be needed before construction of the new roadway section. Earthwork should extend at least 2 ft beyond the limits of the paved section. By preparing the subgrade beyond the paving limits, paving edge preparation is assured. Subgrade preparation recommendations are as follows:

1. Adequate drainage is paramount for the performance of pavements. We recommend provision of adequate drainage for the proposed pavement.

2. After removing existing asphalt paving and base course, the exposed paving subgrade should be proofrolled using a rubber-tired vehicle weighing about 20 tons, such as a loaded dump truck or loaded water truck. The geotechnical engineer or a field representative of the engineer should observe proofrolling operations to delineate soft or weak areas that may require remediation.

3. Once the finished subgrade elevation has been achieved, the roadway subgrade should be stabilized to an 8-in depth, as presented in a previous section.

4. Paving should be placed within 14 days or the subgrade should be sealed with an emulsion-based sealer to prevent degradation of the prepared paving subgrade.

5. Pavement should be maintained to reduce infiltration of water into the subgrade soils. Periodic maintenance should be performed to seal surface cracks.

New Asphalt Paving Section

New asphalt paving section should consist of 3-in. HMAC surface course over 9-in. cold-in-place recycled base. The cold-in-place recycle can be done using specially designed recycling machines (milling drum, grader, and roller). The material in the existing road pavement should be pulverized using a milling machine, and simultaneously mixed with asphalt emulsion. Additional black base may be added to the recycled mix to meet the pavement base requirement. The recycled mix should be compacted to produce a smooth base course for the new asphalt surface. Harris County Specification No. 252, The In-Place Full Depth Cold Flexible Pavement Recycling, can be used as a procedural guide for placing, mixing, and compacting the recycled base.

CONSTRUCTION OBSERVATION

As dictated by common practice, our geotechnical engineering analysis and recommendations are based on the information on the subsurface conditions obtained from small diameter, widely-spaced borings and our judgment based on our education and experience. Because the borings indicate subsurface conditions only at the specific locations and time and only to the depths penetrated, they do not necessarily reflect strata variations that may exist between boring locations. Therefore, the validity of the recommendations in this report is based in part on assumptions about the stratigraphy made by the geotechnical engineer. Because variations may not be evident until construction begins, Paradigm should be retained to perform construction materials monitoring and test, particularly earthwork construction, during the construction phase of the project.

Our involvement enables Paradigm's geotechnical engineer or his/her representative to monitor the foundation and earthwork activities and be available to personally evaluate unanticipated conditions, conduct additional tests, if necessary, and to provide alternative recommendations where appropriate.

LIMITATIONS

Opinions, conclusions, and recommendations presented in this geotechnical engineering report are based on the data obtained from the field and laboratory programs, our interpretation of the data, and information received from our client and construction professionals associated with the project. If changes in the nature, design, or location of the project are made, the opinions, conclusions, and recommendations contained in this report are not valid unless the changes are reviewed by Paradigm and the recommendations included within this report are modified or verified in writing by Paradigm. If subsurface conditions different from those described are noted during construction, recommendations in this report must be reevaluated.

The scope of our services did not include environmental assessment, compliance with applicable laws, geologic faults, and wetlands. Our scope did not include the investigation, detection, or design related to the presence of any biological pollutants. The term "biological pollutants" include, and is not limited to, mold, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Design Review

Paradigm should review the design drawings and specifications before being released for construction. Our review will confirm that the geotechnical recommendations and construction criteria presented in this report have been correctly interpreted and implemented. Paradigm is not responsible for any claims, damages, or liability associated with non-compliance with or misinterpretation of the recommendations and construction criteria presented in our geotechnical report. Design review is not within the scope of services authorized in this study. We would be pleased to submit a budget for this activity.

Standard of Care

This study was performed in a manner consistent with the level of care and skill ordinarily exercised by reputable geotechnical engineers practicing contemporaneously in the local area. No warranty or guarantee, express or implied, is made or intended.

Report Reproduction

Paradigm's report was prepared exclusively for Zarinkelk Engineering Services, Inc. and its project team for use in preparing design and construction documents. This report shall not be reproduced or used for any other purpose without Paradigm's express written authorization. If included in construction documents, the report should be provided in its entirety with the caveat that it is included as a construction reference. Specific project requirements including options selected from this report must be obtained from the design drawings and specifications.

REFERENCES

1. ASTM D 1452-16 “Standard Practice for Soil Investigation and Sampling by Auger Borings,” Annual Book of ASTM Standards, Part 04.08, ASTM International, West Conshohocken, PA.

2. ASTM D 5783-18 “Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geotechnical Exploration and the Installation of Subsurface Water-Quality Monitoring Devices,” Annual Book of ASTM Standards, Part 04.08, ASTM International, West Conshohocken, PA.

3. ASTM D 2216-19 "Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," Annual Book of ASTM Standards, Part 04.08, ASTM, West Conshohocken, PA.

4. ASTM D 4318-17e1 "Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soil," Annual Book of ASTM Standards, Part 04.08, ASTM, West Conshohocken, PA.

5. ASTM D 2850-15 "Standard Test Method for Unconsolidated-Undrained Traixial Compression Test on Cohesive Soils," Annual Book of ASTM Standards, Part 04.08, ASTM International, West Conshohocken, PA.

6. ASTM D 5434-12 "Standard Guide for Field Logging of Subsurface Explorations of Soil and Rock," Annual Book of ASTM Standards, Part 04.08, ASTM, West Conshohocken, PA.

7. ASTM D 2488-17e1 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)," Annual Book of ASTM Standards, Part 04.08, ASTM, West Conshohocken, PA.

8. ASTM D 2487-17 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)," Annual Book of ASTM Standards, Part 04.08, ASTM, West Conshohocken, PA.

9. ASTM D 698-12e2 “Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3)),” *Annual Book of ASTM Standards,* Part 04.08, ASTM, West Conshohocken, PA.

Appendix

SOIL BORING LOGS

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 1
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered — No water encountered
After elapsed

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 3/4 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 10 1/4 inches.
	1		P = 0.75	24.0		50	19	31						FILL: Gray and brown, fat clay with ferrous stains.
	2		P = 0.25	43.8										FAT CLAY (CH): Very soft, light brown and gray with ferrous stains.
	3													- with root fibers, 2 to 6 ft.
	4		P = 0	58.0		87	27	60						
	5													
	6		P = 0	48.9					67	240	14.3	8	Bulge, Vertical Fracture, Slickensided	
	7													
	8		P = 0	42.2		58	23	35						
	9													
	10													

Remarks: Borehole terminated at 10-ft depth

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 2
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 5.0 ft
After elapsed 4.0 ft

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	ATTERBERG LIMITS Plastic Limit PL	ATTERBERG LIMITS Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 1/2 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 10 1/2 inches.
	1		P = 0.25	34.8										FILL: Light brown and dark brown, fat clay with ferrous stains.
	2		P = 0.25	40.7		63	27	36						FAT CLAY (CH): Very soft, brown an gray with ferrous stains.
	3													
	4		P = 0	37.2					82	370	11.1	6	Bulge, Vertical Fracture, Slickensided	
	5													
	6		P = 0	49.1		70	25	45						
	7													
	8		P = 0	49.1										
	9													
	10													

Remarks:

Borehole terminated at 10-ft depth

03GEOTECH1 19-1088 BORING LOG.GPJ HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 3
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 4.0 ft
After elapsed 3.5 ft

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 4 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 9 inches.
	1		P = 0	42.1		78	27	51						FILL: Light brown and gray, fat clay with sand seams.
	2		P = 0.25	33.4										FAT CLAY (CH): Very soft, light brown and gray.
	3													- with sand seams, 2 to 4 ft.
	4		P = 0	40.5		59	24	35	79	430	10.3	6	Bulge, Vertical Fracture	- with root fibers, 2 to 8 ft.
	5													
	6		P = 0	54.6										
	7													
	8		P = 0	61.2		92	34	58	64	230	13.3	10	Bulge, Slickensided	
	9													
	10													

Remarks:

Borehole terminated at 10-ft depth

03GEOTECH1 19-1088 BORING LOG.GPJ HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 4
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 5.0 ft

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 1/2 inches.
	1													CEMENT STABILIZED SAND AND GRAVEL BASE: 12 1/2 inches.
			P = 0.25	31.1										FILL: Light brown and gray, fat clay.
	2		P = 0	41.5		75	28	47						FAT CLAY (CH): Very soft, dark brown.
	3													
	4		P = 0	48.9										- with sand pockets, 4 to 6 ft.
	5													
	6		P = 0	42.2		55	19	36	73	240	15.0	8	Bulge, Slickensided	- with ferrous stains, 6 to 8 ft.
	7													
	8		P = 0	57.7										
	9													
	10													

Remarks:

Borehole terminated at 10-ft depth

03GEOTECH1 19-1088 BORING LOG.GPJ HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 5
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 5.0 ft

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	ATTERBERG LIMITS Plastic Limit PL	ATTERBERG LIMITS Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 inches.
														CEMENT STABILIZED SAND AND GRAVEL BASE: 9 inches.
	1		P = 0	24.9										FAT CLAY (CH): Very soft, gray and brown.
	2		P = 0	43.4										
	3													
	4		P = 0	53.4		75	29	46						- with ferrous stains, 4 to 8 ft.
	5													
	6		P = 0.25	46.3										
	7													
	8		P = 0	54.4					70	230	14.8	10	Bulge, Vertical Fracture, Slickensided	
	9													
	10													

Remarks:

Borehole terminated at 10-ft depth

03GEOTECH1 19-1088 BORING LOG.GPJ HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 6
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 10.0 ft
After elapsed 9.5 ft

Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf / Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS: Liquid Limit LL	Plastic Limit PL	Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
													ASPHALT PAVING: 2 inches.
													CEMENT STABILIZED SAND AND GRAVEL BASE: 13 inches.
1		P = 1.0	32.0		58	21	37						FILL: Dark brown, fat clay with ferrous stains.
2		P = 0.50	41.3										FAT CLAY (CH): Very soft, dark brown and gray with ferrous stains.
3													
4		P = 0	46.9					74	310	14.8	6	Bulge, Vertical Fracture, Slickensided	- with sand pockets, 4 to 6 ft.
5													
6		P = 0	41.7		69	23	46						
7													
8		P = 0	51.1										
9													
10													Borehole terminated at 10-ft depth

Remarks:

03GEOTECH1 19-1088 BORING LOG.GPJ HARRIS COUNTY FLOOD CONTROL DISTRICT TEMPLATE - UPDATED.GDT 1/2/20

LOG OF BORINGS

Project: Blue Heron Drive
Bayou Vista
Galveston County, Texas
Client: Zarinkelk Engineering Services, Inc.
Houston, Texas

Project No.: 19-1088
Boring Number: 7
Surface Elevation:
Drilled: 11/18/19
Sheet 1 of 1

Drilling Method(s):
Dry-auger drilling: 0 ft to 10 ft

Borehole Water Levels:
First encountered 6.0 ft
After elapsed 5.0 ft

Soil Symbol	Depth, ft	Sample Interval, Sampler Type	Penetration Resistance, P, tsf Standard Penetration Test N, blows/ft or blows/interval	Moisture Content, %	Finer than No. 200 sieve, %	ATTERBERG LIMITS Liquid Limit LL	ATTERBERG LIMITS Plastic Limit PL	ATTERBERG LIMITS Plasticity Index PI	Dry Density, lb/ft³	Undrained Shear Strength, c_u, lb/ft²	Failure Strain, %	Confining Pressure, lb/in²	Comment	DESCRIPTION OF STRATUM
														ASPHALT PAVING: 2 3/4 inches.
	1													CEMENT STABILIZED SAND AND GRAVEL BASE: 12 1/4 inches.
			P = 0	11.5										FILL: Light brown and dark brown, fat clay with sand layer.
	2		P = 1.25	23.8		58	19	39						
	3													
	4		P = 0.50	42.4										FAT CLAY (CH): Very soft, light brown and dark brown with ferrous stains.
	5													
	6		P = 0	45.6		68	24	44						
	7													
	8		P = 0.50	38.4					81	590	11.6	10	Bulge, Vertical Fracture, Slickensided	
	9													
	10													

Remarks:

Borehole terminated at 10-ft depth

KEY TO BORING LOG TERMS AND SYMBOLS

MATERIAL SYMBOLS


Fat Clay (CH)


Lean Clay (CL)


Sandy Lean Clay (CL)


Silty Clay (CL-ML)


Silt (ML)


Sandy Silt (ML)


Elastic Silt (MH)


Organic Clay or Silt (OH) High Plasticity


Organic Clay or Silt (OL) Low Plasticity


Peat (PT)


Well Graded Sand (SW)


Poorly Graded Sand (SP)


Silty Sand (SM)


Clayey Sand (SC)


Well Graded Gravel (GW)


Poorly Graded Gravel (GP)


Silty Gravel (GM)


Clayey Gravel (GC)


Fill


Asphalt


Base


Concrete

SAMPLER SYMBOLS


Auger


Thin-walled tube


Split barrel


Core


No recovery

STANDARD PENETRATION TEST (SPT)

N = 25	The sampler was seated 6 in. with blows from a 140-lb hammer then 25 blows were required to advance the sampler through the two 6-in. intervals of the test. The "N" value is the sum of the blows needed to penetrate the final 12 in.
12, 26, 50/3"	The sampler was seated 6 in. by 12 blows from a 140-lb hammer then 76 blows were required to advance the sampler a distance of 9 in. Full penetration of 12 in. below the seating interval could not be achieved before the 50 blow limit was recorded in one interval.
50/4"	Sampler was driven 4 in. of the 6-in. seating interval by blows of a 140-lb hammer before the 50 blow limit was reached.

WATER SYMBOLS


Depth where water was first encountered during drilling

Depth where water was encountered within the open borehole after completion of drilling (see log for elapsed time)

DESCRIPTIVE TERMS

Fine-Grained
(Major portion passing No. 200 sieve)
Silt and Clay

Consistency	Undrained Shear Strength, ksf	SPT "N" Value
Very soft	Less than 0.25	Less than 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	9 to 15
Very stiff	2.00 to 4.00	15 to 30
Hard	Greater than 4.00	Greater than 31

Coarse-Grained
(Major portion retained on No. 200 sieve)
Gravel and Sand

Description	Relative Density	SPT "N" Value
Very loose	0 to 15%	Less than 4
Loose	15% to 35%	4 to 10
Medium dense	35% to 65%	10 to 30
Dense	65% to 85%	30 to 50
Very dense	85% to 100%	Greater than 50

PCI's geotechnical engineer reviewed and compiled the field and laboratory data to develop each boring log. Each log represents our interpretation of general soil and water conditions at the boring location. Strata lines on the log may be transitional and are approximate in nature. Water levels refer only to those conditions observed at the time and location indicated.