

CITY OF FRIENDSWOOD GENERAL CONSTRUCTION NOTES

GENERAL NOTES

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST REVISED CITY OF FRIENDSWOOD STANDARD DETAILS AND TECHNICAL SPECIFICATIONS.
- ELEVATION AND CONTOURS SHOWN ARE BASED ON NAVD88.
- TRENCH SAFETY SYSTEM TO MEET, AS A MINIMUM, THE REQUIREMENTS OF OSHA SAFETY AND HEALTH REGULATIONS PART 1926, SUBPART P.
- EXISTING UNDERGROUND UTILITIES ARE NOT SHOWN. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713-223-4567) FOR CENTERPOINT, TEXAS-NEW MEXICO POWER AND AT&T TELEPHONE AND TEXAS ONE-CALL SYSTEM (1-800-245-4545) FOR PIPELINES AND CABLE TV.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE DEPTH, LOCATION AND EXISTENCE OF ALL EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED CONSTRUCTION.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD BEFORE COMMENCING WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPORT ANY AND ALL DISCREPANCIES TO THE OWNER AND THE ENGINEER IN A TIMELY MANNER.
- CONTRACTOR SHALL ADEQUATELY PROTECT EXISTING STRUCTURES, UTILITIES, TREES, SHRUBS, OTHER PERMANENT OBJECTS AND ADJOINING PROPERTY.
- NO OPEN EXCAVATIONS SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED, AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AREAS; 3/4 INCH PLYWOOD, WOOD PLANKING WITH OSHA ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS, OR AS APPROVED BY THE CITY OF FRIENDSWOOD.
- EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION BY THE CONTRACTOR FOR THEIR CONVENIENCE SHALL BE REPLACED PER CURRENT TECHNICAL SPECIFICATIONS BY THE CONTRACTOR AT HIS EXPENSE.
- CONTRACTOR SHALL PLAN, SCHEDULE, AND PERFORM HIS WORK SO AS TO PROVIDE AND MAINTAIN SAFE PUBLIC TRAFFIC (INGRESS AND EGRESS) AS WELL AS NON-INCONVENIENCE TO ALL PROPERTY OWNERS ALONG THE PROJECT RIGHT OF WAYS DURING CONSTRUCTION PERIOD.
- CONTRACTOR SHALL NOTIFY THE CITY OF FRIENDSWOOD ENGINEERING DEPARTMENT AT (281) 993-3411 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR SHALL PREPARE AND IMPLEMENT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP), INCLUDING PREPARING A SWPPP MANUAL. A COPY OF THE SWPPP MANUAL SHALL BE ONSITE AT ALL TIMES. SWPPP MANUAL SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF THE PROJECT.
- DEWATERING, IF REQUIRED, IS SUBSIDIARY TO THE COST OF THE PROJECT.
- THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM THE CONSTRUCTION AT ALL TIMES.
- CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY FENCING THROUGHOUT THE PROJECT DURING ALL PHASES OF WORK. THE CONTRACTOR MAY USE ORANGE CONSTRUCTION FENCING OR EXISTING SALVAGED WIRE FENCE FOR TEMPORARY FENCING IN NON-PRIVACY FENCE AREAS. AT NO TIME SHALL A FENCE BE REMOVED AND NOT REPLACED. NEW FENCE CONSTRUCTION SHALL BE INSTALLED AT THE EASEMENT LINE AT THE COMPLETION OF THE PROJECT PER RIGHT OF WAY NEGOTIATIONS. FENCE SHALL BE SECURELY FASTENED TO DRIVEN T-POSTS.
- DISTURBED AREAS THAT ARE SEEDED SHALL BE CHECKED PERIODICALLY TO SEE THAT GRASS COVERAGE IS PROPERLY MAINTAINED. DISTURBED AREAS SHALL BE WATERED, FERTILIZED, AND RESEEDED OR RESEEDING, IF NECESSARY. REFER TO SPECIFICATION 02910 FOR PLANTING, ESTABLISHMENT, AND MAINTENANCE REQUIREMENTS.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN A NEAT AND ACCURATE RECORD OF CONSTRUCTION FOR THE CITY'S RECORDS. AT THE CONCLUSION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE THE CITY FULL SIZE MARKUPS THAT RECORD ALL CONSTRUCTION DEVIATING FROM THE PLANS.
- ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE DRAINAGE INCLUDES SURFACE AND GROUND WATER. ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE FINAL DRAFT OF STORM WATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES AS PREPARED BY HARRIS COUNTY AND HARRIS COUNTY FLOOD CONTROL DISTRICT (HCFCD) ALL IN COMPLIANCE WITH THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) REQUIREMENTS.
- ALL EFFORTS SHALL BE MADE TO AVOID DAMAGE TO EXISTING TREES THAT ARE TO REMAIN. TREES SHALL BE TRIMMED ONLY IF NECESSARY FOR THE SAFE MANEUVERING OF CONSTRUCTION EQUIPMENT. THE CONTRACTOR SHALL NOT SNAG OR TEAR TREE ROOTS. PRUNING OF TREES AND SHRUBS SHALL BE PERFORMED BY A CERTIFIED ARBORIST.
- DAMAGE BY THE PROPOSED CONSTRUCTION OUTSIDE OF THE CONSTRUCTION LIMITS SHALL BE RESTORED TO EQUAL OR BETTER CONDITION THAN WHICH IT WAS FOUND BEFORE SUCH WORK WAS UNDERTAKEN (NON-PAY ITEM).
- ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), FLOOD INSURANCE RATE MAP (FIRM) FOR GALVESTON COUNTY, TEXAS, MAP NO. 48167C0018G REVISED/DATED AUGUST 15, 2019, THE PROJECT SITE LIES WITHIN THE "AE" FLOOD ZONE, AND "AE" FLOODWAY OF CLEAR CREEK AND CHIGGER CREEK.
- CONTRACTOR SHALL MAKE WATER AND FORCE MAIN CONNECTIONS AT NIGHT BETWEEN THE HOURS OF 10:00 PM AND 1:00 AM. LIFT STATION #2 AND LIFT STATION #22 SHALL BE TAKEN OFFLINE AT THE SAME TIME AND SHALL NOT BE OFFLINE FOR MORE THAN THREE (3) HOURS. COORDINATE WITH CITY OF FRIENDSWOOD ENGINEERING AND PUBLIC WORKS TO SCHEDULE CONNECTION DATE. COORDINATE WITH CITY OF FRIENDSWOOD ENGINEERING AND PUBLIC WORKS A MINIMUM OF 48 HOURS TO PROVIDE ADVANCE NOTICE OF SCHEDULED DATE TO ENSURE LIFT STATION #2 AND LIFT STATION #22 CAN BE REMOVED FROM SERVICE DURING THE SCHEDULED TIME. NO SEPARATE PAYMENT OF CONTRACT DAY ADDITIONS WILL BE MADE FOR SCHEDULE DELAYS, MOBILIZATION, OR REMOBILIZATION TO COORDINATE CONNECTION EFFORTS WITH THE CITY.
- TEMPORARY SERVICES SHALL BE TESTED PRIOR TO USE PER CITY OF FRIENDSWOOD REQUIREMENTS.
- DISTURBED GRASS AREAS WITHIN THE CONSTRUCTION LIMITS SHALL BE RE-VEGETATED WITH COMMON BERMUDA SEED PER SPECIFICATION 02910 - HYDROMULCH SEEDING.

SANITARY SEWER/FORCE MAIN NOTES

- WATER LINES AND SANITARY SEWERS SHALL BE INSTALLED IN SEPARATE TRENCHES AND BE A MINIMUM SEPARATION OF NINE (9) FEET.
- ALL DUCTILE IRON (DI) PIPE SHALL BE THREE HUNDRED FIFTY (350) PSI WITH EIGHT (8) MIL, BLACK VIRGIN POLYETHYLENE WRAP AS SPECIFIED IN ANSI/AWWA A21.5
- ALL DUCTILE IRON FITTINGS AND OTHER METAL APPURTENANCES LOCATED BELOW GROUND SHALL BE WRAPPED WITH EIGHT (8) MIL, BLACK VIRGIN POLYETHYLENE WRAP AS SPECIFIED IN ANSI/AWWA A21.5. ALL DUCTILE IRON FITTINGS LOCATED BELOW GROUND SHALL BE MECHANICAL JOINT AND SHALL BE RESTRAINED WITH EEBA IRON SERIES MEGALUG, OR APPROVED EQUAL.
- ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE LINED WITH 40 MILS PROTECTO 401, CERAMIC EPOXY LINING.
- ALL STEEL PIPE SHALL CONFORM AT A MINIMUM OF A36, ASTM A1011 GRADE 36, ASTM A53 GRADE B, ASTM A135 GRADE B, OR ASTM A139 GRADE B.
- SANITARY SEWER MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF FRIENDSWOOD DESIGN STANDARDS. CONTRACTOR TO FURNISH TEST PLUGS AND RISERS. ALL SANITARY SEWER LINES TO BE AIR TESTED IN ACCORDANCE WITH THE CITY OF FRIENDSWOOD TECHNICAL SPECIFICATIONS.
- SANITARY SEWER TRENCHES UNDER OR WITHIN ONE (1) FOOT OF PROPOSED OR FUTURE PAVEMENT ARE TO BE BACKFILLED WITH CEMENT-STABILIZED SAND BACKFILL, AS SPECIFIED, TO WITHIN ONE (1) FOOT OF SUBGRADE. BEDDING WILL BE CEMENT-STABILIZED SAND BACKFILL (1.1 SACKS CEMENT PER TON OF SAND) FOR ALL SANITARY SEWERS.
- WATER LINE/NEW SEWER LINE SEPARATION. WHEN NEW SANITARY SEWERS ARE INSTALLED, THEY SHALL BE INSTALLED NO CLOSER TO WATER LINES THAN NINE (9) FEET IN ALL DIRECTIONS. SEWERS THAT PARALLEL TO WATER LINES MUST BE INSTALLED IN SEPARATE TRENCHES. WHEN NINE (9) FEET OF SEPARATION CANNOT BE MAINTAINED, THE FOLLOWING GUIDELINES APPLY:
 - WHEN THE SANITARY SEWER PARALLELS A WATER LINE, THE SANITARY SEWER SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON OR PVC MEETING ASTM SPECIFICATIONS WITH A PRESSURE RATING FOR BOTH THE PIPE AND JOINTS OF 150 PSI. THE VERTICAL SEPARATION SHALL BE A MINIMUM OF TWO (2) FEET BETWEEN OUTSIDE DIAMETERS AND THE HORIZONTAL SEPARATION SHALL BE A MINIMUM OF FOUR (4) FEET BETWEEN OUTSIDE DIAMETERS. THE SANITARY SEWER SHALL BE LOCATED BELOW THE WATER LINE.
 - WHEN A SANITARY SEWER CROSSES A WATER LINE AND THE SEWER IS CONSTRUCTED OF CAST IRON, DUCTILE IRON WHEN A SANITARY SEWER CROSSES A WATER LINE AND THE SEWER IS CONSTRUCTED OF CAST IRON, DUCTILE IRON OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI; AN ABSOLUTE MINIMUM OF SIX (6) INCHES BETWEEN OUTSIDE DIAMETERS SHALL BE MAINTAINED. THE SANITARY SEWER SHALL BE LOCATED BELOW THE WATER LINE WHEN POSSIBLE AND ONE (1) LENGTH OF THE SANITARY SEWER PIPE MUST BE CENTERED ON THE WATER LINE.
 - WHEN A SANITARY SEWER CROSSES UNDER A WATER LINE AND THE SEWER IS CONSTRUCTED OF ABS TRUSS PIPE, WHEN A SANITARY SEWER CROSSES UNDER A WATER LINE AND THE SEWER IS CONSTRUCTED OF ABS TRUSS PIPE, SIMILAR SEMI-RIGID PLASTIC COMPOSITE PIPE, CLAY PIPE OR CONCRETE PIPE WITH GASKETED JOINTS, A MINIMUM OF TWO (2) FEET OF SEPARATION SHALL BE MAINTAINED. THE INITIAL BACKFILL SHALL BE CEMENT-STABILIZED SAND (MINIMUM 1.1 SACKS OF CONCRETE PER TON OF SAND) FOR ALL SECTIONS OF SANITARY SEWER WITHIN NINE (9) FEET OF THE WATER LINE. THE INITIAL BACKFILL SHALL BE FROM DIAMETER BELOW THE CENTERLINE OF 14 DIAMETER BELOW THE CENTERLINE OF THE PIPE TO ONE PIPE DIAMETER (BUT NOT LESS THAN TWELVE (12) INCHES) ABOVE THE PIPE.
 - WHEN A SANITARY SEWER CROSSES OVER A WATER LINE, ALL PORTIONS OF THE SANITARY SEWER WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON OR PVC PIPE WITH A PRESSURE RATING OF AT LEAST 150 PSI USING APPROPRIATE ADAPTERS. IN LIEU OF THIS PROCEDURE THE NEW SANITARY SEWER MAY BE ENCASED IN A JOINT OF 150 PSI PRESSURE CLASS PIPE AT LEAST EIGHTEEN (18) FEET LONG AND TWO (2) NOMINAL SIZES LARGER THAN THE NEW SANITARY SEWER. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT INTERVALS OF FIVE (5) FEET WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHOULD BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH NON-SHRINK CEMENT GROUT OR WITH A MANUFACTURED SEAL.
- SANITARY SEWERS CROSSING UTILITIES OTHER THAN WATER LINES SHALL HAVE A MINIMUM CLEARANCE OF SIX (6) INCHES.
- SANITARY SEWER LINES IN PIPE ZONE INSIDE LOT EASEMENT SHALL BE BACKFILLED WITH CEMENT-STABILIZED SAND OR SELECT FILL MATERIAL WITH A PI BETWEEN 20 AND 40.
- IF WET SAND IS ENCOUNTERED IN TRENCH, USE SPECIAL BEDDING, UNDER NO CIRCUMSTANCES IS SAND TO BE ADDED TO A TRENCH UNDER WATER.

TESTING NOTES

- ALL TESTING SHALL CONFORM WITH THE CITY OF FRIENDSWOOD TECHNICAL SPECIFICATIONS SECTION 01470 - TESTING LABORATORY SERVICES AND SECTION 01475 - TESTING PROCEDURES.
- SECTION 02125 - EXCAVATION AND BACKFILL FOR UTILITIES:
 - BACKFILL SHALL BE PLACED IN MAXIMUM LIFTS OF EIGHT (8) INCHES AND COMPACTED TO A DENSITY OF NOT LESS THAN 95% STANDARD PROCTOR WITH OPTIMUM MOISTURE BETWEEN PLUS 3% AND MINUS 3% OR AS OTHERWISE SPECIFIED BY THE SOILS LABORATORY. TEST SHALL BE TAKEN EVERY LIFT, EVERY 500 LINEAR FEET, OR BETWEEN MANHOLES, WHICHEVER RESULTS IN THE GREATEST NUMBER OF DENSITY TESTS.
 - FIELD MOISTURE/DENSITY TEST SHALL BE PERFORMED AT A FREQUENCY OF AT LEAST ONE (1) TEST PER 500 SQUARE YARDS OF COMPACTED LIFT. THE DENSITY SHALL NOT BE LESS THAN 95% OF STANDARD PROCTOR WITH A MOISTURE CONTENT OF BETWEEN PLUS 3% AND MINUS 3% OPTIMUM MOISTURE, OR AS DETERMINED BY SOILS LABORATORY. MAXIMUM LIFT FOR TESTING COMPACTED FILL SHALL NOT EXCEED TWELVE (12) INCHES.
 - SECTION 02300 - CAST-IN-PLACE CONCRETE MANHOLES AND SECTION 02305 - PRECAST CONCRETE MANHOLES:
 - EXFILTRATION TEST SHALL BE REQUIRED ON EACH MANHOLE SYSTEM.
 - EACH MANHOLE IS TO BE PLUGGED AND FILLED TO THE TOP OF THE RIM WITH WATER FOR THIRTY (30) MINUTES WITH THE ALLOWABLE LEAKAGE OF NOT MORE THAN 1/2 INCH; OR
 - PLUG MANHOLE AND VACUUM TEST AT TEN (10) INCHES OF MERCURY WITH A LOSS OF NO MORE THAN ONE (1) INCH OF MERCURY FOR THE TIME TO BE DETERMINED BY THE WIDTH AND DEPTH OF THE MANHOLE.
 - SECTION 02510 - SANITARY SEWER FORCE MAIN:
 - HYDROSTATIC TEST
 - A TEST, TO BE SUCCESSFUL, SHALL BE WITNESSED BY THE CITY OF FRIENDSWOOD ENGINEERING DEPARTMENT FOR A FOUR (4) HOUR PERIOD, DURING REASONABLE HOURS. THE ALLOWABLE LEAKAGE SHALL BE NO GREATER THAN DETERMINED BY THE FOLLOWING FORMULA:

$$L = SD \cdot P / 133,200$$
 IN WHICH L IS THE ALLOWABLE LEAKAGE, IN GALLONS PER HOUR OF TESTING; S IS THE LENGTH OF PIPE BEING TESTED, IN FEET; D IS THE NOMINAL INSIDE DIAMETER OF THE PIPE, IN INCHES; AND P IS THE AVERAGE TEST PRESSURE DURING THIS TEST, IN POUNDS PER SQUARE INCH. THE TEST PRESSURE SHALL BE 150 PSI OR ONE AND ONE-HALF (1.5) TIMES DESIGN PRESSURE OF PIPE, WHICHEVER IS GREATER. TEST PIPE AT REQUIRED PRESSURE FOR MINIMUM OF FOUR (4) HOURS.
 - PIGGING TEST
 - AFTER COMPLETION OF HYDROSTATIC TESTING AND PRIOR TO FINAL ACCEPTANCE, TEST SANITARY SEWER FORCE MAINS LONGER THAN TWO HUNDRED (200) FEET BY PIGGING TO ENSURE PIPE IS FREE OF OBSTRUCTIONS.
 - PIGS: PROVIDE PIGS MANUFACTURED OF OPEN-CELL POLYURETHANE FOAM BODY, WITHOUT COATING OR ABRASIVES WHICH WOULD SCRATCH OR OTHERWISE DAMAGE INTERIOR PIPE WALL SURFACE OR LINING.
 - PIGGING TEST SHALL BE CONDUCTED IN FRONT OF THE PROJECT MANAGER, PROVIDE AT LEAST FORTY-EIGHT (48) HOURS NOTICE OF SCHEDULED PIGGING OF SANITARY SEWER FORCE MAIN PRIOR TO COMMENCING TEST.

LEGEND

PROPERTY BOUNDARY	
EXISTING 2" WATER LINE	
EXISTING 12" STORM LINE	
EXISTING 20" FORCE MAIN	
EXISTING 22" FORCE MAIN	
EXISTING OVERHEAD ELECTRIC	
EXISTING UNDERGROUND CABLE	
EXISTING GAS LINE	
EXISTING TOP OF BANK	
EXISTING FENCE	
EXISTING CONCRETE	
EXISTING ASPHALT	
EXISTING GRAVEL	

BENCHMARKS

- BENCHMARK "BM" - PUBLISHED ELEVATION - 26.02'
NATIONAL GEODETIC SURVEY MARKER, DESIGNATION: E 459, PID: AW1002, LOCATED 45' +/- NORTHWEST OF THE CENTERLINE OF BRIARMEADOW AVE AND 180' +/- SOUTHWEST OF THE CENTERLINE INTERSECTION OF SUNSET DRIVE AND BRIARMEADOW AVE. (NAVD88)
- TEMPORARY BENCHMARK "A" - ELEVATION - 16.09'
A BOX CUT ON THE SOUTHEAST END OF A STORM SEWER PIPE LOCATED ON THE NORTHEASTERLY SIDE OF DEEPWOOD DRIVE AT THE INTERSECTION OF DEEPWOOD DRIVE AND WOODVINE.
- TEMPORARY BENCHMARK "B" - ELEVATION - 23.76'
A BOX CUT ON THE TOP OF THE WESTERLY CORNER OF A CONCRETE PAD LOCATED 95' +/- SOUTHWEST OF THE CENTERLINE OF DEEPWOOD DRIVE AND 40' +/- SOUTHEAST OF THE CENTERLINE OF WOODVINE.

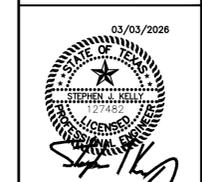


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KHA PROJECT	068913102
DATE	MARCH 2026
SCALE AS SHOWN	AS SHOWN
DESIGNED BY:	EMM
DRAWN BY:	NMT
CHECKED BY:	SJK

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

GENERAL NOTES

SHEET NUMBER
G-02

Plotted, By: 2026-03-03 09:08:34, Tooraen, Natalia
Last Saved: 2025-04-28 13:15:44 (GENERAL NOTES)
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LEGEND



NOTES

1. CONSTRUCTION SITE SHALL BE SECURED AT THE CONCLUSION OF EACH WORKING DAY. EQUIPMENT LEFT OVERNIGHT OR DURING NON-WORKING HOURS SHALL BE LOCKED, SECURED, AND TAMPER-PROOF.
2. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION SURVEYING AND STAKING AND SETTING HORIZONTAL/VERTICAL CONTROL. NO SEPARATE PAY ITEM.
3. LIFT STATION #2 IS LOCATED WITHIN PROPERTY OWNED AND OPERATED BY CITY OF FRIENDSWOOD PUBLIC WORKS. CONTRACTOR SHALL COORDINATE SITE ACCESS WITH CITY OF FRIENDSWOOD PUBLIC WORKS AND ENGINEERING. CONTRACTOR SHALL NOT IMPEDE INGRESS/EGRESS OR DAILY WORK BEING PERFORMED ON SITE BY PUBLIC WORKS. CONTRACTOR SHALL HAVE FULL ACCESS TO THE PROPERTY; HOWEVER, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR ANY DAMAGE TO THE SATISFACTION OF THE OWNER. NO SEPARATE PAY ITEM.
4. CONTRACTOR SHALL NOT OPERATE OR MOVE EQUIPMENT OR PROPERTY OWNED BY PUBLIC WORKS. CONTRACTOR SHALL COORDINATE WITH PUBLIC WORKS AND ENGINEERING TO REMOVE OR MOVE EQUIPMENT WITHIN THE SITE ACCESS LIMITS. NO SEPARATE PAY ITEM.

BENCHMARKS

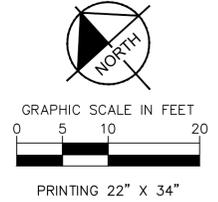
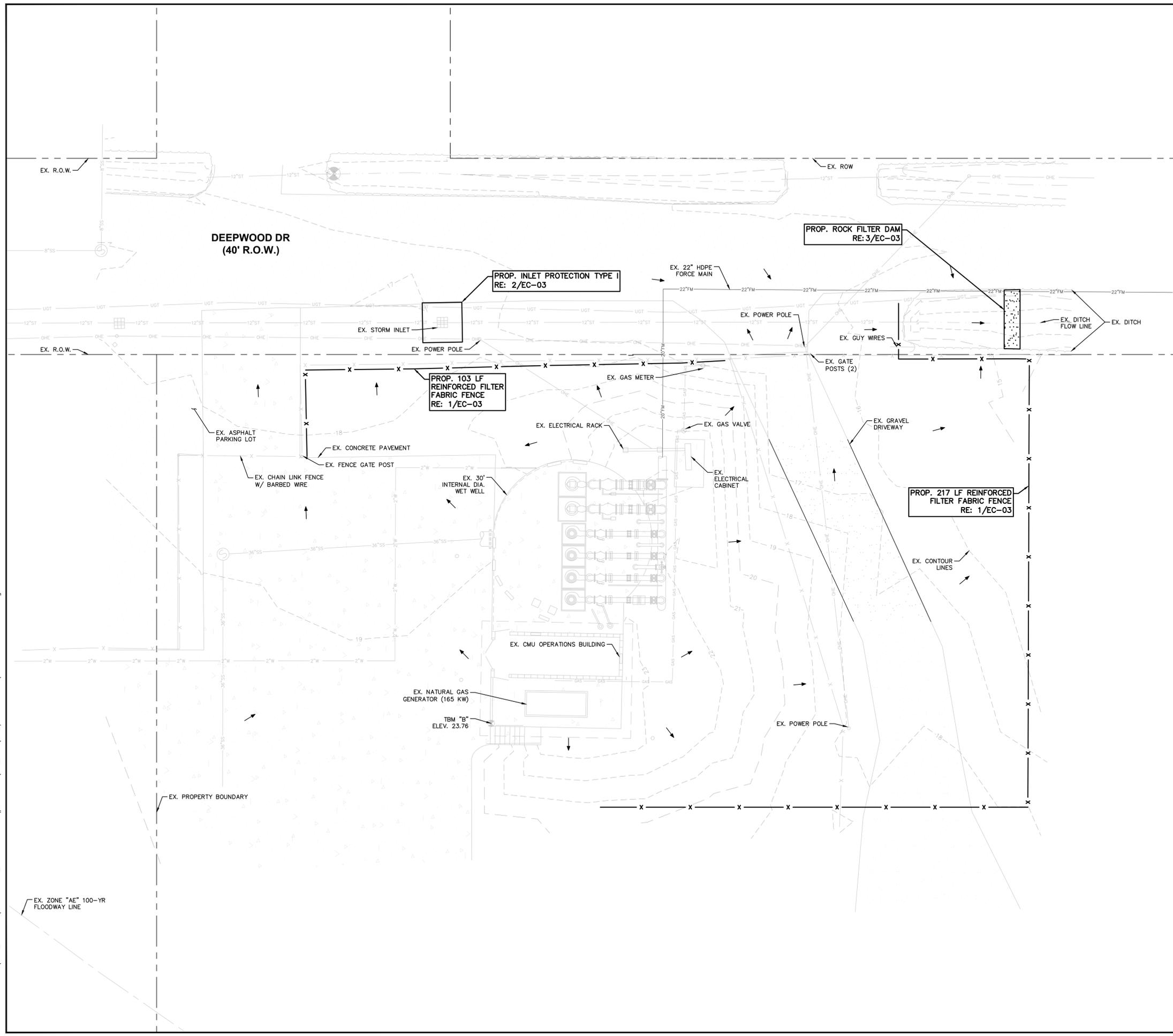
1. BENCHMARK "BM" - PUBLISHED ELEVATION - 26.02' NATIONAL GEODETIC SURVEY MARKER, DESIGNATION: E 459, PID: AW1002, LOCATED 45' +/- NORTHWEST OF THE CENTERLINE OF BRIARMEADOW AVE AND 180' +/- SOUTHWEST OF THE CENTERLINE INTERSECTION OF SUNSET DRIVE AND BRIARMEADOW AVE. (NAVD88)
2. TEMPORARY BENCHMARK "A" - ELEVATION - 16.09' A BOX CUT ON THE SOUTHEAST END OF A STORM SEWER PIPE LOCATED ON THE NORTHEASTERLY SIDE OF DEEPWOOD DRIVE AT THE INTERSECTION OF DEEPWOOD DRIVE AND WOODVINE.
3. TEMPORARY BENCHMARK "B" - ELEVATION - 23.76' A BOX CUT ON THE TOP OF THE WESTERLY CORNER OF A CONCRETE PAD LOCATED 95' +/- SOUTHWEST OF THE CENTERLINE OF DEEPWOOD DRIVE AND 40' +/- SOUTHEAST OF THE CENTERLINE OF WOODVINE.



	BY	DATE			
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KHA PROJECT	DATE	SCALE AS SHOWN	DESIGNED BY:	DRAWN BY:	CHECKED BY:
068913102	MARCH 2026	EIM	EIM	NMT	SJK
CITY OF FRIENDSWOOD					
LIFT STATION #2 REHABILITATION					
CONSTRUCTION ACCESS PLAN					
SHEET NUMBER					
EC-01					

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LEGEND

- EX. FLOW ARROW
- - - EX. MAJOR CONTOUR LINE
- - - EX. MINOR CONTOUR LINE

NOTES

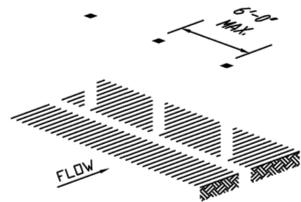
1. THE CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE ENTIRE PROJECT. THE CONTRACTOR WILL SUBMIT THE SWPPP TO THE OWNER AND THE ENGINEER PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONTROLS IDENTIFIED IN THE PLAN AND CHANGES TO THE PLAN ONCE CONSTRUCTION BEGINS.
2. ALL SUBCONTRACTORS WILL BE EDUCATED TO FOLLOW SWPPP REQUIREMENTS.
3. STRUCTURAL BEST MANAGEMENT PRACTICES WILL BE INSPECTED AND MAINTAINED AT LEAST EVERY 15 DAYS AND AFTER ANY RAIN OR RUNOFF EVENT THAT CAUSES SURFACE EROSION, SEDIMENT TRANSPORT, OR VEHICULAR TRACKING.
4. CONTRACTOR TO INSTALL BEST MANAGEMENT PRACTICES IN AREAS OF ACTIVE CONSTRUCTION AND IN AREAS WHERE ESTABLISHMENT OF TURF/SOD HAS NOT BEEN ACHIEVED TO PREVENT EROSION AND STORM WATER POLLUTION DURING RAIN EVENTS.
5. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO ADJACENT PROPERTIES OUTSIDE OF THE PROPERTY LIMITS TO THE SATISFACTION OF THE PROPERTY OWNER AT NO ADDITIONAL COST TO THE CITY.
6. POLLUTION TO CLEAR CREEK AND CHIGGER CREEK CAUSED BY FAILED EROSION CONTROL DEVICES SHALL BE IMMEDIATELY CLEANED AND RESTORED BY THE CONTRACTOR AT NO SEPARATE PAY.

BENCHMARKS

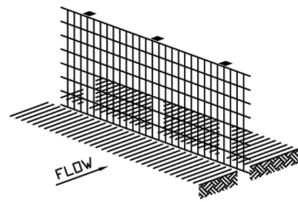
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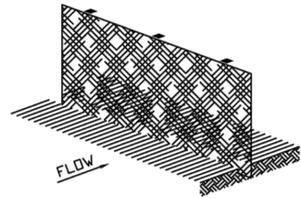
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CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION					
EROSION CONTROL PLAN					
SHEET NUMBER EC-02					



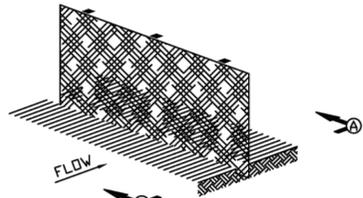
STEP 1:
SET POSTS AND EXCAVATE FOUR (4) INCH BY FOUR (4) INCH TRENCH UPSLOPE ALONG LINE OF POSTS (SEE NOTE 1).



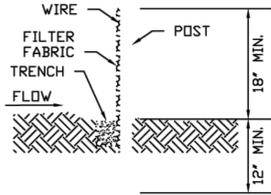
STEP 2:
SECURE WIRE FENCING TO POSTS (SEE NOTE 2).



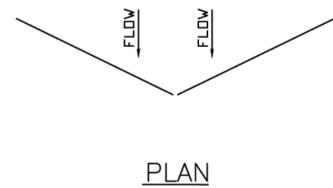
STEP 3:
ATTACH FILTER FABRIC MATERIAL TO WIRE FENCE AND EXTEND IT INTO TRENCH (SEE NOTE 3).



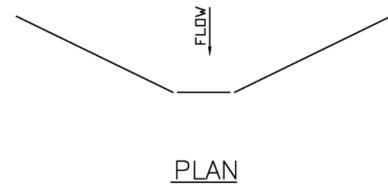
STEP 4:
BACKFILL AND COMPACT EXCAVATED SOIL (SEE NOTE 4).



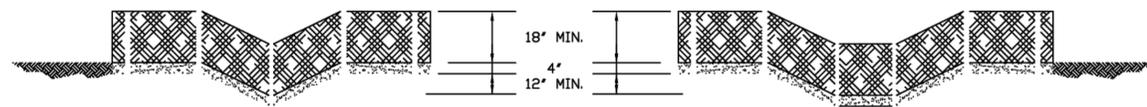
SECTION "A" - "A"



PLAN



PLAN



V-BOTTOM DITCH PROFILE

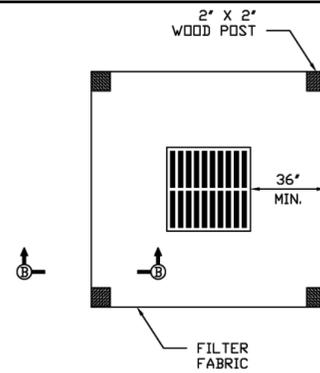
FLAT BOTTOM DITCH PROFILE

NOTES:

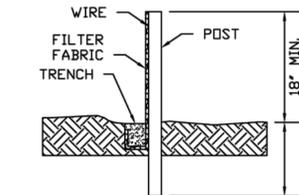
- SET TWO (2) INCH BY TWO (2) INCH WOODEN STAKES EMBEDDED TWELVE (12) INCHES INTO GROUND. SPACING SHALL BE A MAXIMUM OF SIX (6) FEET APART FOR REINFORCED FILTER FABRIC FENCE AND A MAXIMUM OF THREE (3) FEET APART FOR NON-REINFORCED FILTER FABRIC FENCE.
- REINFORCED FILTER FABRIC FENCE SHALL HAVE WOVEN WIRE FENCE WHICH SHALL BE FASTENED SECURELY TO FENCE POSTS.
- FASTEN FILTER FABRIC FENCE AS FOLLOWS:
 - REINFORCED FILTER FABRIC FENCE SHALL BE SECURELY FASTENED TO WOVEN WIRE FENCE WITH TIES SPACED EVERY TWENTY-FOUR (24) INCHES AT TOP AND MIDSECTION.
 - NON-REINFORCED FILTER FABRIC FENCE SHALL BE FASTENED AT EVERY WOOD POST AT TOP AND MIDSECTION.
- MINIMUM HEIGHT OF FILTER FABRIC SHALL BE EIGHTEEN (18) INCHES ABOVE NATURAL GROUND AND A MAXIMUM OF THIRTY-SIX (36) INCHES ABOVE NATURAL GROUND.
- FILTER FABRIC SHALL EXTEND INTO THE FOUR (4) INCH BY FOUR (4) INCH TRENCH DOWN THE SIDE CLOSEST TO THE WOODEN POSTS, ACROSS THE BOTTOM OF THE TRENCH AND HALF WAY UP THE OPPOSITE SIDE.
- ALL INSTALLATIONS OF SILT FENCE SHALL BE IN ACCORDANCE WITH THE CITY OF FRIENDSWOOD TECHNICAL SPECIFICATION SECTION 02005 - FILTER FABRIC SILT FENCE.
- METAL STAKES OR T-POSTS MAY BE USED IN LIEU OF WOOD POSTS.

1 REINFORCED FILTER FABRIC FENCE DETAIL

EC-03 SCALE: NOT TO SCALE



PLAN



SECTION "B" - "B"

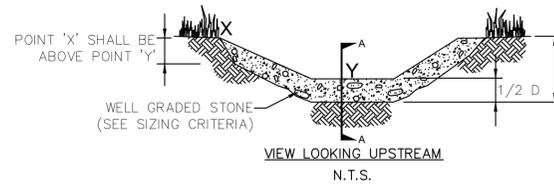
INLET PROTECTION TYPE I

NOTES:

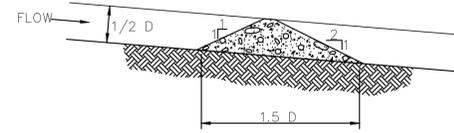
- MAXIMUM POST SPACING SHALL BE FOUR (4) FEET. ADDITIONAL POSTS SHALL BE PLACED A MINIMUM AT EACH CORNER AS SHOWN.
- PLACEMENT OF FILTER FABRIC BARRIER FROM INLET SHALL VARY ACCORDING TO SITE CONDITIONS. TYPICAL PLACEMENT SHALL BE A MINIMUM OF THIRTY-SIX (36) INCHES FROM INLET EDGE.

2 INLET PROTECTION TYPE I DETAIL

EC-03 SCALE: NOT TO SCALE

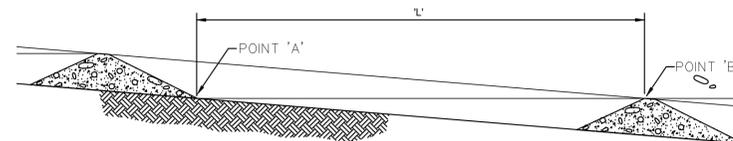


VIEW LOOKING UPSTREAM
N.T.S.



SECTION A-A
N.T.S.

'L' = THE DISTANCE SUCH THAT POINTS 'A' AND 'B' ARE OF EQUAL ELEVATION.



SPACING BETWEEN FILTER DAMS
N.T.S.

3 ROCK FILTER DAM DETAIL

EC-03 SCALE: NOT TO SCALE

ROCK FILTER DAM GENERAL NOTES

- ROCK FILTER DAMS SHOULD BE CONSTRUCTED DOWNSTREAM FROM DISTURBED AREAS TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF AND/OR CONCENTRATED FLOW. THE DAMS SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THROUGH RATE OF 60GPM/FT² OF CROSS SECTIONAL AREA. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE.
- ROCK FILTER DAM MAY BE USED AT THE TOE OF SLOPES, AROUND INLETS, IN SMALL DITCHES, AND AT DIKE OR SWALE OUTLETS. THIS TYPE OF DAM IS RECOMMENDED TO CONTROL EROSION FROM HIGH VELOCITY FLOWS (APPROXIMATELY 8 FT/SEC OR MORE) IN WHICH AGGREGATE WASH OUT MAY OCCUR. SANDBAGS MAY BE USED AT THE EMBEDDED FOUNDATION (4" DEEP MIN.) FOR BETTER FILTERING EFFICIENCY OF LOW FLOWS IF CALLED FOR ON PLANS OR DIRECTED BY ENGINEER.
- STONE SHALL BE WELL GRADED AND 1-1/2 INCHES IN DIAMETER.
- CONTRACTOR SHALL SPECIFY INSPECTION IN THE SWPPP AND SHALL REPLACE THE FILTER DAM WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
- WHEN SILT REACHES A DEPTH EQUAL TO 1/3 OF THE HEIGHT OF THE FILTER DAM OR SIX INCHES, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.
- WHEN THE SITE HAS ACHIEVED FINAL STABILIZATION OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED. THE FILTER DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

Kimley»Horn

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KHA PROJECT	068913102
DATE	MARCH 2026
SCALE AS SHOWN	
DESIGNED BY:	ENM
DRAWN BY:	NMT
CHECKED BY:	SKK

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

EROSION CONTROL
DETAILS (1 OF 2)

SHEET NUMBER
EC-03

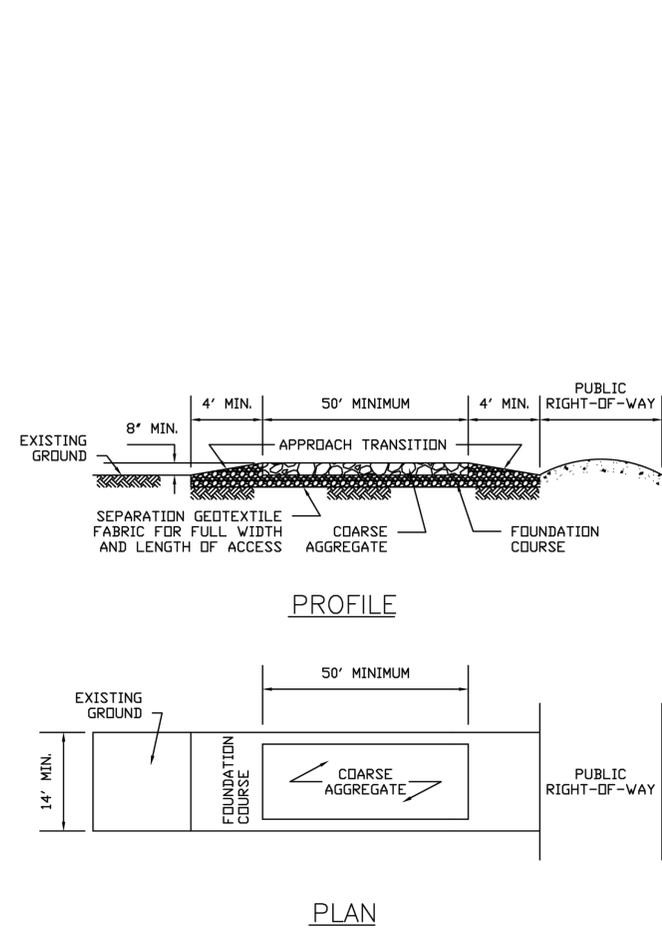
BY	
DATE	
REVISIONS	
No.	

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Plotted By: 2026-03-03 09:09:20, Tooran, Natalia
Last Saved: 2025-04-28 13:29:25 (EC-03 EROSION CONTROL DETAILS (1 OF 2))
Filename: k:\you_utilities\068913102_friendswood lift#2_rehab\09_cad\03_plan_sheets\c-erosion-control-details.dwg

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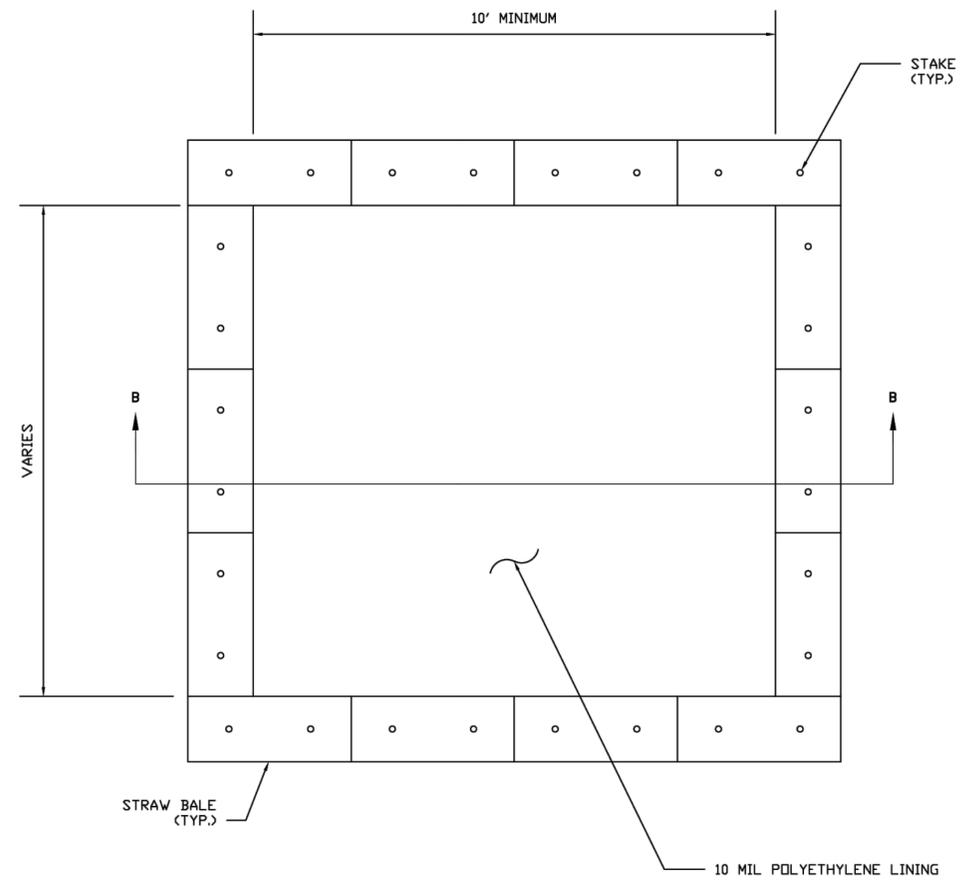
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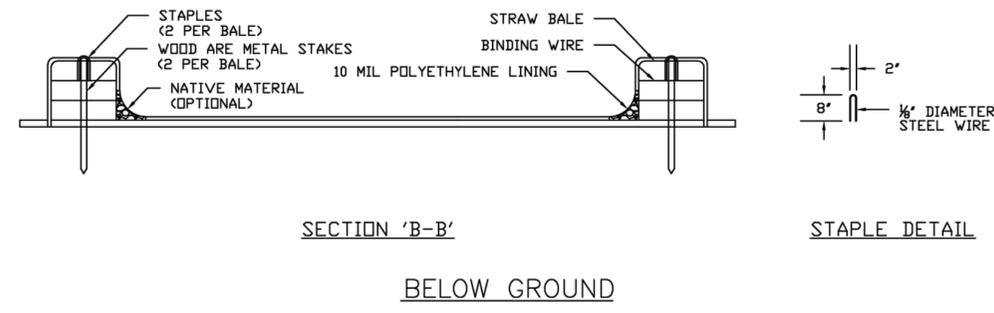
CONSTRUCTION ACCESS TYPE II

- NOTES:
1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN TWELVE (12) FEET.
 2. THICKNESS SHALL BE A MINIMUM OF EIGHT (8) INCHES.
 3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS AND EGRESS.
 4. APPROACH TRANSITION SHALL BE A MINIMUM OF EIGHT (8) INCHES IN DEPTH AND 6:1 SLOPE MINIMUM.
 5. FOUNDATION COURSE SHALL BE A MINIMUM OF SIX (6) INCHES. FOUNDATION COURSE MATERIAL SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL APPROVED BY THE CITY.
 6. ACCESS SHALL BE GRADED TO PREVENT RUN-OFF FROM LEAVING SITE.
 7. CONSTRUCTION ACCESS SHALL ADHERE TO CITY OF FRIENDSWOOD SPECIFICATION 02020 - STABILIZED CONSTRUCTION ACCESS, ROADS, PARKING AND WASH AREAS.
 8. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
 9. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE TRUCK WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR TRUCK WASHING AREA.
 10. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

1 **CONSTRUCTION ACCESS TYPE II**
 EC-04 SCALE: NOT TO SCALE



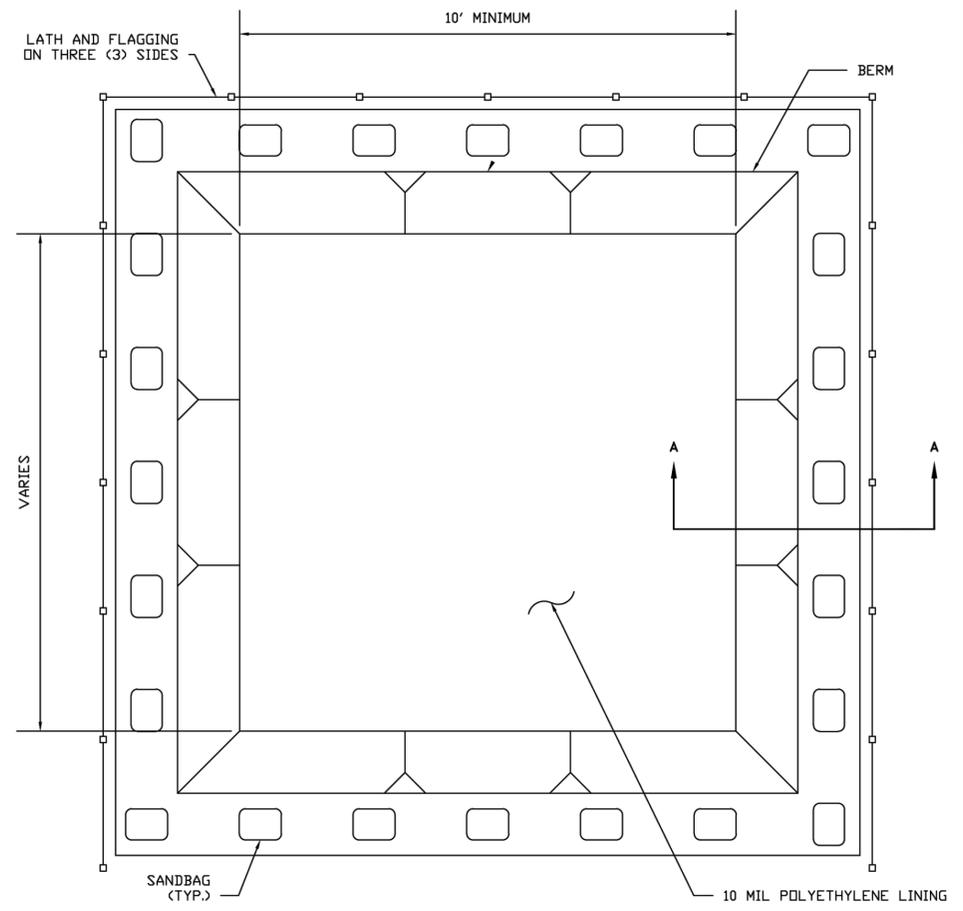
PLAN



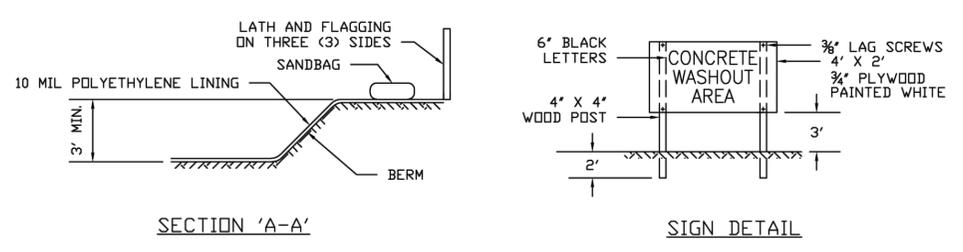
SECTION 'B-B'
 BELOW GROUND

- NOTES:
1. ACTUAL LAYOUT TO BE DETERMINED IN THE FIELD.
 2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN THREE (3) FEET OF THE CONCRETE WASHOUT FACILITY.

2 **CONCRETE WASHOUT AREA**
 EC-04 SCALE: NOT TO SCALE



PLAN VIEW

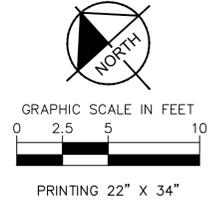
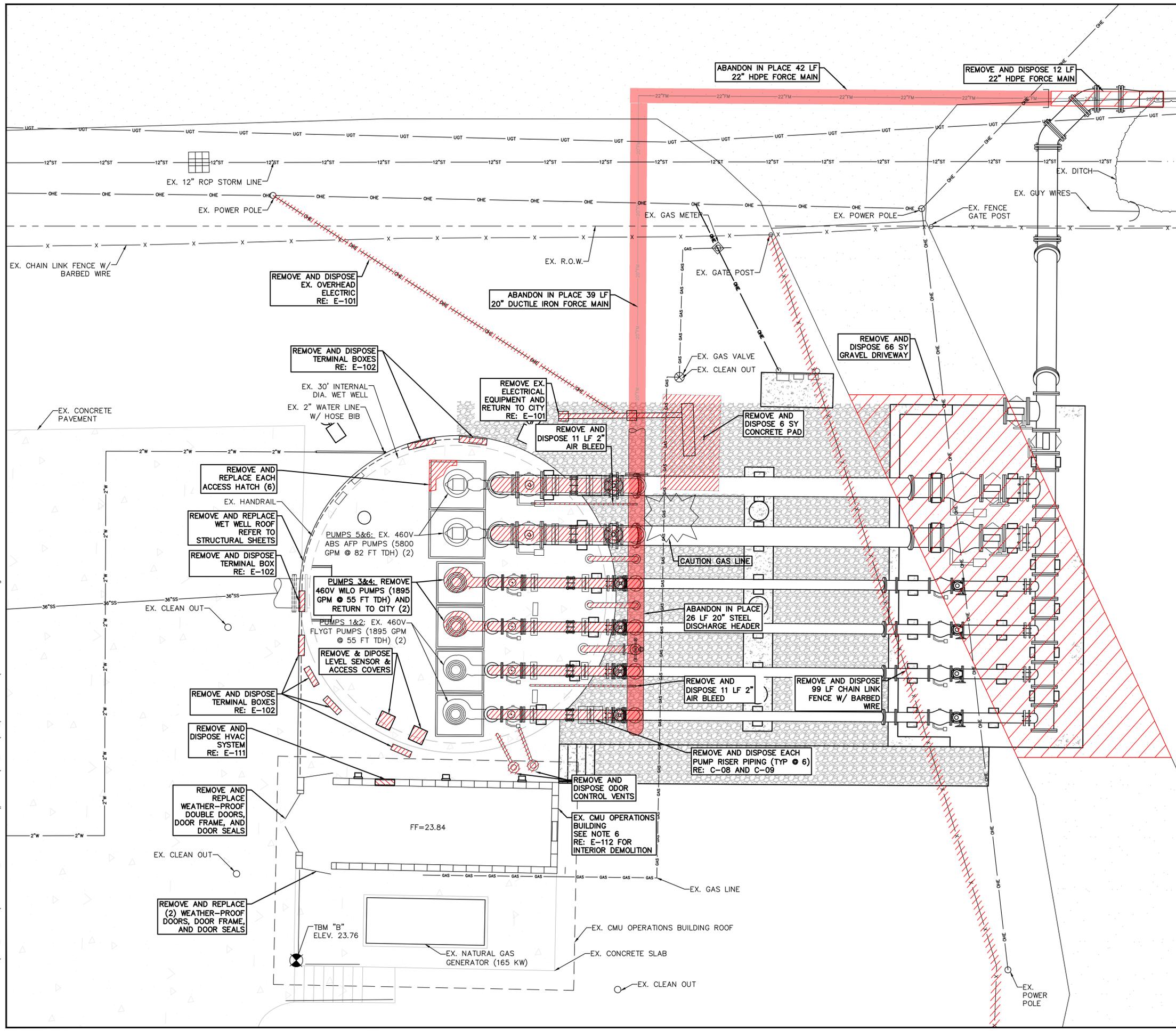


SECTION 'A-A'
 ABOVE GROUND

DATE	BY	 STATE OF TEXAS REGISTRATION NO. F-828 11700 KATY FREEMAN SUITE 800 HOUSTON, TX 77079 WWW.KIMLEY-HORN.COM © 2026 KIMLEY-HORN AND ASSOCIATES, INC.	REVISIONS		
No.	No.		No.	No.	No.
KHA PROJECT 068913102		DATE MARCH 2026		SCALE AS SHOWN	
DESIGNED BY: ENM		DRAWN BY: NMT		CHECKED BY: SJK	
CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION					
EROSION CONTROL DETAILS (2 OF 2)					
SHEET NUMBER EC-04					

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 Filename: k:\you_utilities\068913102_friendswood ls#2_rehab\09_cod\03_plan sheets\c-lift-station-demo.dwg



NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF LIFT STATION #2 PIPING, VALVES, PUMPS, ELECTRICAL EQUIPMENT, AND APPURTENANCES. THE CITY OF FRIENDSWOOD SHALL HAVE THE FIRST RIGHT OF REFUSAL FOR ANY EXISTING EQUIPMENT CALLED OUT TO BE REMOVED AND DISPOSED.
2. FOR ANY EQUIPMENT THAT THE CITY WISHES TO RETAIN, THE CONTRACTOR SHALL COORDINATE AND BE RESPONSIBLE FOR HANDLING AND DELIVERY TO CITY OF FRIENDSWOOD ENGINEERING DEPARTMENT.
3. EXISTING PUMPS SHALL REMAIN FOR THE DURATION OF THE BYPASS PUMPING BEFORE REMOVAL.
4. THE CONTRACTOR SHALL PROTECT ALL EXISTING INFRASTRUCTURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES AND SHALL REPAIR ANY DAMAGE TO ADJACENT PROPERTIES OUTSIDE OF THE PROPERTY LIMITS TO THE SATISFACTION OF THE PROPERTY OWNER AT NO ADDITIONAL COST TO THE CITY.
5. THE CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
6. THE EXTERIOR OF THE CMU OPERATIONS BUILDING SHALL BE CLEANED, PREPPED, AND PAINTED. THE PAINT COLOR SHALL MATCH THE EXTERIOR PAINTING COLOR OF THE ABOVE GROUND PIPING.

LEGEND



BENCHMARKS

1. BENCHMARK "BM" - PUBLISHED ELEVATION - 26.02' NATIONAL GEODETIC SURVEY MARKER, DESIGNATION: E 459, PID: AW1002, LOCATED 45' +/- NORTHWEST OF THE CENTERLINE OF BRIARMEADOW AVE AND 180' +/- SOUTHWEST OF THE CENTERLINE INTERSECTION OF SUNSET DRIVE AND BRIARMEADOW AVE. (NAVD88)
2. TEMPORARY BENCHMARK "A" - ELEVATION - 16.09' A BOX CUT ON THE SOUTHEAST END OF A STORM SEWER PIPE LOCATED ON THE NORTHEASTERLY SIDE OF DEEPWOOD DRIVE AT THE INTERSECTION OF DEEPWOOD DRIVE AND WOODVINE.
3. TEMPORARY BENCHMARK "B" - ELEVATION - 23.76' A BOX CUT ON THE TOP OF THE WESTERLY CORNER OF A CONCRETE PAD LOCATED 95' +/- SOUTHWEST OF THE CENTERLINE OF DEEPWOOD DRIVE AND 40' +/- SOUTHEAST OF THE CENTERLINE OF WOODVINE.



NO.	REVISIONS	DATE	BY

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03/03/2026

Signature: *Stephen J. Hill*

KHA PROJECT: 068913102
 DATE: MARCH 2026
 SCALE AS SHOWN
 DESIGNED BY: ENM
 DRAWN BY: NMT
 CHECKED BY: SJK

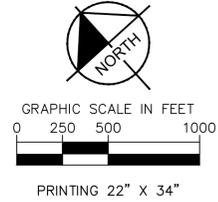
CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

EXISTING LIFT STATION DEMOLITION

SHEET NUMBER
C-01

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NOTES

- COORDINATE ANY LIFT STATION OPERATIONS FOR LIFT STATION #2 AND LIFT STATION #22 WITH CITY OF FRIENDSWOOD PUBLIC WORKS MINIMUM OF 30 CALENDAR DAYS PRIOR TO COMMENCING WORK TO ALLOW FOR AN OPERATIONAL CITY COORDINATION WITH LIFT STATION STAFF, CONTRACTOR, AND ENGINEER. AT LEAST ONE REPRESENTATIVE FROM THE CONTRACTOR SHALL BE PRESENT AT THE MEETING.
- CITY OF FRIENDSWOOD PUBLIC WORKS PERSONNEL MUST BE PRESENT WHEN WORKING AT THESE LIFT STATIONS. ONLY CITY OF FRIENDSWOOD PERSONNEL SHALL OPERATE THESE LIFT STATIONS.
- LIFT STATION #2 AND LIFT STATION #22 SHALL BE BROUGHT OFFLINE IN THE MIDDLE OF THE NIGHT AND SHALL NOT BE OFFLINE FOR MORE THAN 3 HOURS. BOTH LIFT STATIONS MUST BE TURNED OFFLINE AT THE SAME TIME AND RETURNED TO OPERATIONS AT THE SAME TIME.
- RE:C-03 FOR PROP. BYPASS PLAN.

NO.	REVISIONS	DATE	BY

Kimley»Horn

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03/03/2026

Signature: *Stephen J. Bell*

KHA PROJECT	068913102
DATE	MARCH 2026
SCALE AS SHOWN	SCALE AS SHOWN
DESIGNED BY:	ENM
DRAWN BY:	NMT
CHECKED BY:	SJK

CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

PROPOSED OVERALL BYPASS PLAN



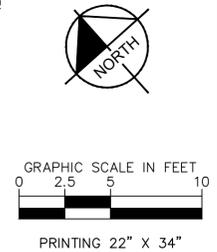
Know what's below.
 Call before you dig.

NOTES

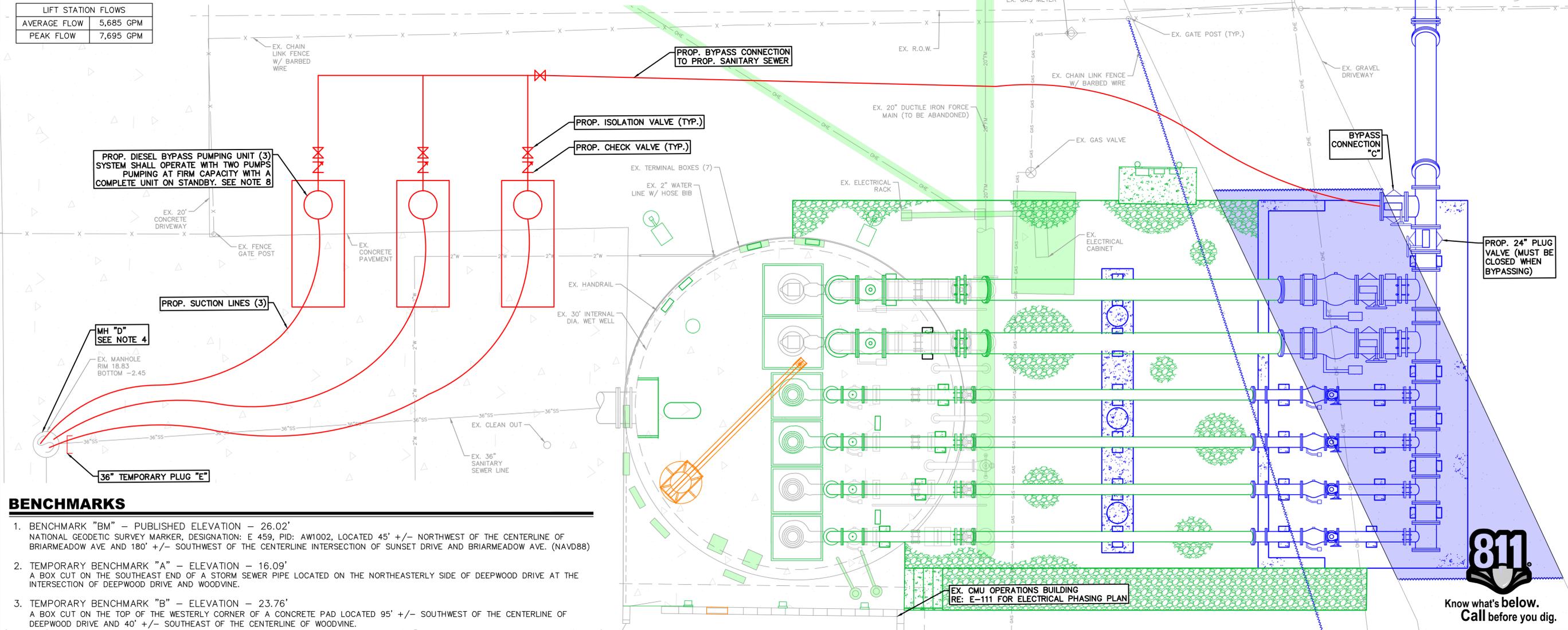
- COORDINATE ANY LIFT STATION OPERATIONS FOR LIFT STATION #2 AND LIFT STATION #22 WITH CITY OF FRIENDSWOOD PUBLIC WORKS MINIMUM OF 30 CALENDAR DAYS PRIOR TO COMMENCING WORK TO ALLOW FOR AN OPERATIONAL CITY COORDINATION WITH LIFT STATION STAFF, CONTRACTOR, AND ENGINEERING. AT LEAST ONE REPRESENTATIVE FROM THE CONTRACTOR SHALL BE PRESENT AT THE MEETING.
- CITY OF FRIENDSWOOD PUBLIC WORKS PERSONNEL MUST BE PRESENT WHEN WORKING AT THESE LIFT STATIONS. ONLY CITY OF FRIENDSWOOD PERSONNEL SHALL OPERATE THESE LIFT STATIONS.
- CONTRACTOR SHALL FURNISH AND INSTALL A TEMPORARY BYPASS SYSTEM CAPABLE OF HANDLING PEAK FLOWS FOR THE DURATION OF OPERATIONS. REFER TO SPECIFICATION 02555.
- RING, COVER, AND CONE SECTION OF THE MANHOLE MAY NEED TO BE REMOVED FOR ADEQUATE SUCTION LINE AND TRANSDUCER SPACING. CONTRACTOR SHALL REINSTALL CONE, RING, AND FRAME AFTER BYPASS PUMPING IS COMPLETE. COST OF MANHOLE REPAIR, BACKFILL, AND PAVEMENT REPLACEMENT SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF THE BYPASS PUMPING.
- LOCATION FOR LIFT STATION #22 CAN BE FOUND ON PAGE C-02.
- SUGGESTED BYPASS PHASING IS ANTICIPATED TO BE PERFORMED IN SEQUENTIAL ORDER.
- PROVIDE ADEQUATE DIVERSION EQUIPMENT, FORCE MAINS, AND OTHER NECESSARY APPURTENANCES IN ORDER TO MAINTAIN RELIABLE SANITARY SEWER SERVICE IN ALL SANITARY SEWER LINES AS REQUIRED FOR CONSTRUCTION. THE CONTRACTOR SHALL ESTABLISH ADEQUATE BYPASSING AS REQUIRED, REGARDLESS OF THE FLOW CONDITIONS.
- CONTRACTOR SHALL PROVIDE A COMPLETE BYPASS PUMPING UNIT ON STANDBY AS A BACKUP. BACKUP UNIT SHALL BE THE SAME SIZE AS THE LARGEST MAIN PUMPING UNIT. UNIT SHALL BE UTILIZED IMMEDIATELY IN THE EVENT OF A PUMP FAILURE. NO SEPARATE PAY ITEM.
- ANY SPILLAGE, BACKUPS, AND/OR OVERFLOWS, ETC. ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL NOTIFY THE CITY OF FRIENDSWOOD PUBLIC WORKS DEPARTMENT OF ANY SPILLS THAT OCCUR DURING CONSTRUCTION.
- THE CITY OF FRIENDSWOOD SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO THE BYPASS SYSTEM SUSTAINED BY THE CONTRACTOR DIRECTLY OR INDIRECTLY AS RESULT OF SITE FLOODING, STORM WATER RUNOFF WITHIN STREETS, DITCHES, AND/OR STORM SEWER SYSTEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE THAT RESULTS DIRECTLY OR INDIRECTLY FROM THE INTERFERENCE OF STORM WATER RUNOFF TO BYPASS EQUIPMENT, PIPING, AND/OR APPURTENANCES.
- THE CONTRACTOR SHALL DEMONSTRATE THAT THE PUMPING SYSTEM IS IN GOOD WORKING ORDER AND IS SUFFICIENTLY SIZED TO SUCCESSFULLY HANDLE FLOWS BY PERFORMING A TEST RUN FOR A PERIOD OF 24 HOURS PRIOR TO BEGINNING THE WORK. TESTING IS NOT TO BE SCHEDULED DURING WEEKEND HOURS.
- THE CONTRACTOR SHALL BE REQUIRED TO HAVE ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY TO COMPLETE THE REPAIR OR REPLACEMENT ON THE JOB SITE PRIOR TO ISOLATING THE SEWER MANHOLE OR LINE SEGMENT AND BEGINNING BYPASS OPERATIONS.
- PROVIDE IN WRITING A SEQUENCE OF BYPASS FOR REVIEW AND APPROVAL BY THE ENGINEER. THE CONTRACTOR SHALL ALSO PROVIDE THE ENGINEER A SKETCH SHOWING THE LOCATION OF THE BYPASS EQUIPMENT FOR EACH LINE SEGMENT(S) AROUND WHICH FLOWS ARE DIVERTED.
- ONCE THE LIFT STATION REHABILITATION HAS BEEN COMPLETED, TESTED, AND ACCEPTED, THE CONTRACTOR SHALL CEASE BYPASS OPERATIONS AND RETURN FLOWS TO THE LIFT STATION WHEN DIRECTED BY THE CITY.
- ALL PIPING(S), JOINTS, AND ACCESSORIES OF THE BYPASS SYSTEM SHALL BE DESIGNED TO WITHSTAND AT LEAST TWICE THE MAXIMUM SYSTEM PRESSURE, OR A MINIMUM OF 50 PSI, WHICHEVER IS GREATER.
- DURING FLOW DIVERSION, NO SEWAGE SHALL BE LEAKED, DUMPED, OR SPILLED IN OR UNTO, ANY AREA OUTSIDE OF THE EXISTING SANITARY SEWER SYSTEM AND TEMPORARY BYPASS SYSTEM. WHEN BYPASS OPERATIONS ARE COMPLETE, ALL BYPASS LINES SHALL BE DRAINED INTO THE SANITARY SEWER PRIOR TO DISASSEMBLY. PROVIDE AN EMERGENCY SPILL AND CLEAN UP PLAN. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY SHOULD A SURCHARGE OCCUR THAT RESULTS IN AN OVERFLOW OF SEWAGE. IF THE CONTRACTOR IS UNABLE TO REMEDY THE SITUATION, THEN HE SHOULD SUSPEND OR TERMINATE THE WORK UNTIL SUCH TIME AS THE OVERFLOWS HAVE BEEN CONTROLLED. SHOULD SUCH SURCHARGE DAMAGE THE MATERIALS AND/OR EQUIPMENT THAT ARE USED ON THE JOB AND/OR ADJACENT PROPERTY, IT SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE CITY.
- IN THE EVENT THAT SEWAGE ACCIDENTALLY DRAINS INTO THE DRAINAGE SYSTEM OR STREET, THE CONTRACTOR SHALL IMMEDIATELY STOP THE OVERFLOW, NOTIFY THE CITY, AND TAKE THE NECESSARY ACTION TO CLEAN UP AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE CITY. IF SEWAGE IS SPILLED ONTO PUBLIC OR PRIVATE PROPERTY, THE CONTRACTOR SHALL WASH DOWN, CLEAN UP AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE CITY.
- THE CONTRACTOR SHALL PLUG OFF AND PUMP DOWN THE SEWER MANHOLE IN THE IMMEDIATE WORK AREA AND SHALL MAINTAIN THE SANITARY SEWER SYSTEM SO THAT SURCHARGING DOES NOT OCCUR. WHERE WORK REQUIRES THE LINE TO BE BLOCKED BEYOND WORKING HOURS, CONTRACTOR SHALL HAVE AN AUTODIALER AND FLOAT TRANSDUCERS SET UP TO WHERE THE CONTRACTOR CAN RESPOND AND BE ON SITE WITHIN 30 MINUTES OF RECEIVING A CALL.
- NO DAMAGE WILL BE CAUSED TO PRIVATE PROPERTY AS A RESULT OF BYPASS OPERATIONS. INGRESS AND EGRESS TO ADJACENT PROPERTIES SHALL BE MAINTAINED AT ALL TIMES. (NO SEPARATE PAY ITEM).
- THE CONTRACTOR SHALL NOT INTENTIONALLY DAMAGE OR REMOVE PORTIONS OF EXISTING SANITARY SEWER STRUCTURES FOR THE PURPOSE OF INSTALLING THE BYPASS SYSTEM WITHOUT SPECIFIC APPROVAL FROM THE CITY. IF A STRUCTURE IS DAMAGED, IT SHALL BE RECONSTRUCTED OR REPLACED TO THE SATISFACTION OF THE CITY AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBSERVING WEATHER FORECASTS AND NOTIFYING CITY OF ANY SEVERE WEATHER POSSIBILITIES DURING CONSTRUCTION. IN THE EVENT OF INCLEMENT WEATHER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUSPENDING ALL BYPASS ACTIVITIES, INCLUDING THE COST OF ANY MOBILIZATION, DE-MOBILIZATION, AND RE-MOBILIZATION.

SUGGESTED BYPASS PHASING

- PROP. SITE WORK: PRE-BYPASS**
- PREPARE SITE INCLUDING BUT NOT LIMITED TO GRAVEL DRIVEWAY REMOVAL, CHAIN-LINK FENCE REMOVAL, AND CONCRETE PAD REMOVAL.
 - CONSTRUCT CONCRETE BEAM, CONCRETE PILES, CONCRETE VALVE PAD, AND CONCRETE PIPE SUPPORTS.
 - INSTALL THE PRE-BYPASS PHASE 24", 20", AND 12" VALVE PIPING AND VALVES AS SHOWN.
- BYPASS PHASE 1:**
- BYPASS PHASE 1 SHALL OCCUR DURING THE MIDDLE OF THE NIGHT AND SHALL NOT EXCEED A TOTAL DURATION OF 3 HOURS FROM BRINGING THE LIFT STATIONS OFFLINE TO ESTABLISHING BYPASS PUMPING.
 - BRING LIFT STATION #2 AND LIFT STATION #22 (RE: C-02) OFFLINE AND DEWATER FORCE MAIN.
 - MAKE FORCE MAIN CONNECTION "A" AND INSTALL FORCE MAIN PERMANENT PLUG "B" AND 36" TEMPORARY PLUG "E".
 - HYDROSTATIC TEST PIPING.
 - ESTABLISH BYPASS PUMPING FROM MH "D" TO BYPASS CONNECTION "C". ENSURE ALL DISCHARGE HEADER PLUG VALVES ARE CLOSED. THE LIFT STATION IS NOW OFFLINE AND ON BYPASS PUMPING.
- BYPASS PHASE 2:**
- ABANDON AND FILL EX. DISCHARGE PIPING IN PLACE. REMOVE AND DISPOSE PIPING ON WET WELL SLAB AND RISER PIPING IN WET WELL.
 - CONSTRUCT 24" AND 12" DISCHARGE PIPING AND RISER PIPING AS SHOWN.
 - COMPLETE LIFT STATION STRUCTURAL AND ELECTRICAL IMPROVEMENTS.
 - PERFORM TESTING AND QUALITY CONTROL.
- BYPASS PHASE 3:**
- LIFT STATION, FORCE MAIN, AND ELECTRICAL EQUIPMENT SHALL BE SUBSTANTIALLY COMPLETE AND TESTED PRIOR TO BEGINNING BYPASS REMOVAL OPERATIONS AND COMMENCING SYSTEM START-UP.
 - STOP BYPASS OPERATIONS (LIFT STATION WILL TEMPORARILY BE OFFLINE) AND REMOVE 36" TEMPORARY PLUG "E". LEAVE BYPASS EQUIPMENT AT SITE IN CASE OF EMERGENCY.
 - PERFORM START-UP OPERATIONS.
 - BYPASS PUMPING MAY BE REMOVED FROM SITE ONCE LIFT STATION AND START-UP HAS BEEN COMPLETED.
 - INSTALLATION OF JIB CRANE ON WET WELL ROOF AND INSTALLATION OF NEW HVAC SYSTEM IN CMU BUILDING MAY BE COMPLETED AFTER RE-ESTABLISHING LIFT STATION OPERATIONS.



LIFT STATION FLOWS	
AVERAGE FLOW	5,685 GPM
PEAK FLOW	7,695 GPM



BENCHMARKS

- BENCHMARK "BM" - PUBLISHED ELEVATION - 26.02' NATIONAL GEODETIC SURVEY MARKER, DESIGNATION: E 459, PID: AW1002, LOCATED 45' +/- NORTHWEST OF THE CENTERLINE OF BRIARMEADOW AVE AND 180' +/- SOUTHWEST OF THE CENTERLINE INTERSECTION OF SUNSET DRIVE AND BRIARMEADOW AVE. (NAVDB88)
- TEMPORARY BENCHMARK "A" - ELEVATION - 16.09' A BOX CUT ON THE SOUTHEAST END OF A STORM SEWER PIPE LOCATED ON THE NORTHEASTERLY SIDE OF DEEPWOOD DRIVE AT THE INTERSECTION OF DEEPWOOD DRIVE AND WOODVINE.
- TEMPORARY BENCHMARK "B" - ELEVATION - 23.76' A BOX CUT ON THE TOP OF THE WESTERLY CORNER OF A CONCRETE PAD LOCATED 95' +/- SOUTHWEST OF THE CENTERLINE OF DEEPWOOD DRIVE AND 40' +/- SOUTHEAST OF THE CENTERLINE OF WOODVINE.

DATE

REVISIONS

No.

BY

KHA PROJECT

068913102

DATE

MARCH 2026

SCALE AS SHOWN

DESIGNED BY: EJM

DRAWN BY: NMT

CHECKED BY: SJK

CITY OF FRIENDSWOOD

LIFT STATION #2 REHABILITATION

PROPOSED BYPASS PLAN

SHEET NUMBER

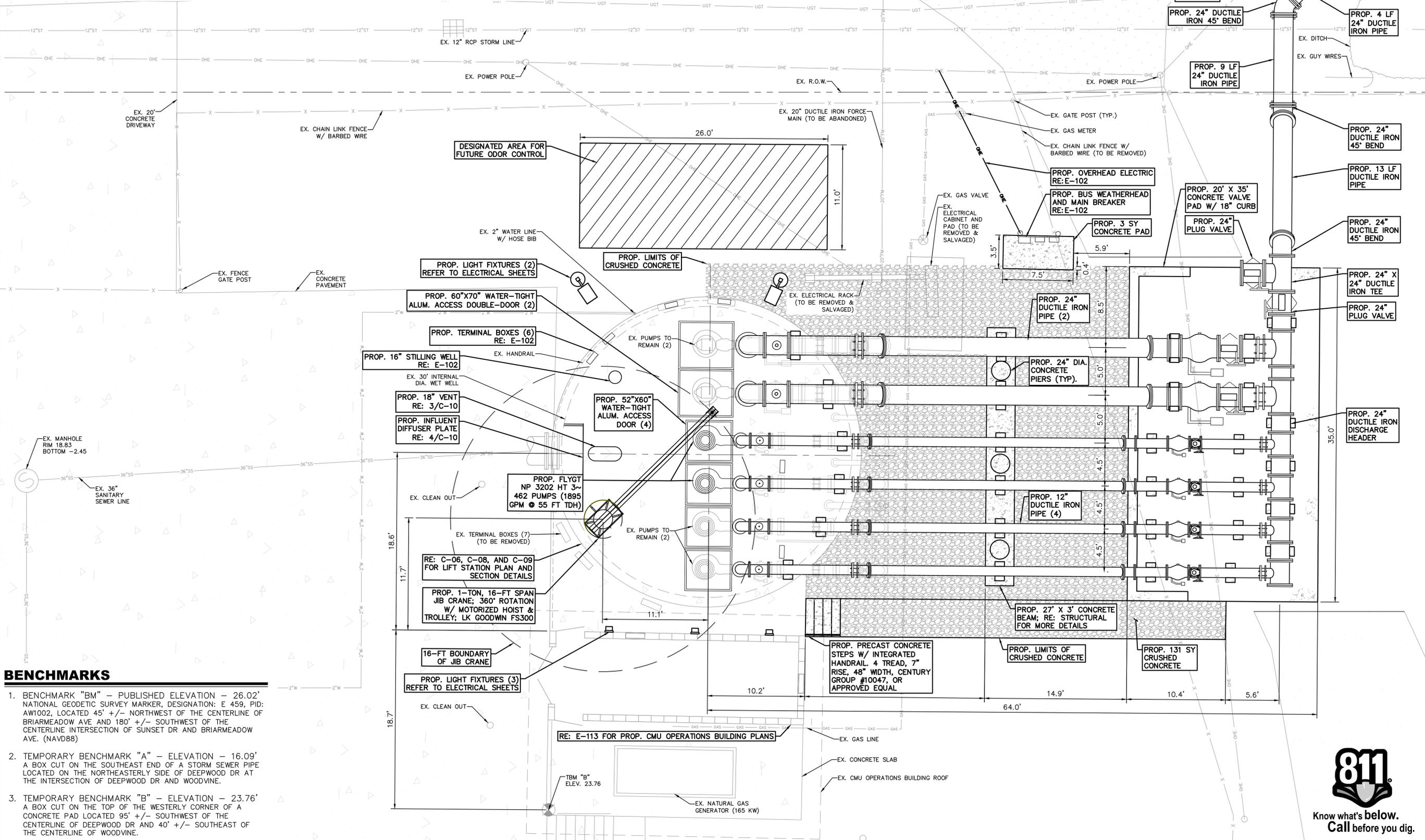
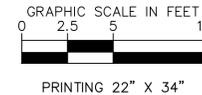
C-03

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NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES, WHETHER PRIVATE OR PUBLIC, PRIOR TO EXCAVATION. THE INFORMATION AND DATA SHOWN WITH RESPECT TO EXISTING UNDERGROUND FACILITIES AT OR CONTIGUOUS TO THE SITE IS APPROXIMATE AND BASED ON INFORMATION AND DATA FURNISHED BY THE OWNERS OF SUCH UNDERGROUND FACILITIES OR ON COMPLETENESS OF ANY SUCH INFORMATION OR DATA; AND, THE CONTRACTOR SHALL HAVE FULL RESPONSIBILITY FOR REVIEWING AND VERIFYING ALL SUCH INFORMATION AND DATA, FOR LOCATING ALL UNDERGROUND FACILITIES DURING CONSTRUCTION, FOR COORDINATING THE PROTECTION THEREOF, AND REPAIRING ANY DAMAGE THERETO RESULTING FROM THE WORK, THE COST OF ALL OF WHICH WILL BE CONSIDERED AS HAVING BEEN INCLUDED IN THE CONTRACT PRICE.
2. THE CONTRACTOR SHALL NOTIFY ANY AFFECT UTILITY COMPANIES OR AGENCIES IN WRITING AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
3. MIN. 6" THICK CRUSHED CONCRETE WITH MIRAFI RS380i GEOTEXTILE LINER, OR APPROVED EQUAL, SHALL BE PLACED AS SHOWN ON PLANS. REMAINING SITE SHALL BE FILLED WITH COMPACTED SELECT FILL, COMPACTED IN 8" LIFTS TO 95% STANDARD PROCTOR DENSITY.
4. THE CONTRACTOR SHALL FOLLOW PROPOSED BYPASS PLAN ON C-02 AND C-03. ANY DEVIATIONS FROM THIS BYPASS PLAN MUST BE APPROVED BY THE ENGINEER AND CITY OF FRIENDSWOOD ENGINEERING DEPARTMENT.
5. RE: C-01 FOR EXISTING LIFT STATION #2 FOR DEMOLITION PLAN.



BENCHMARKS

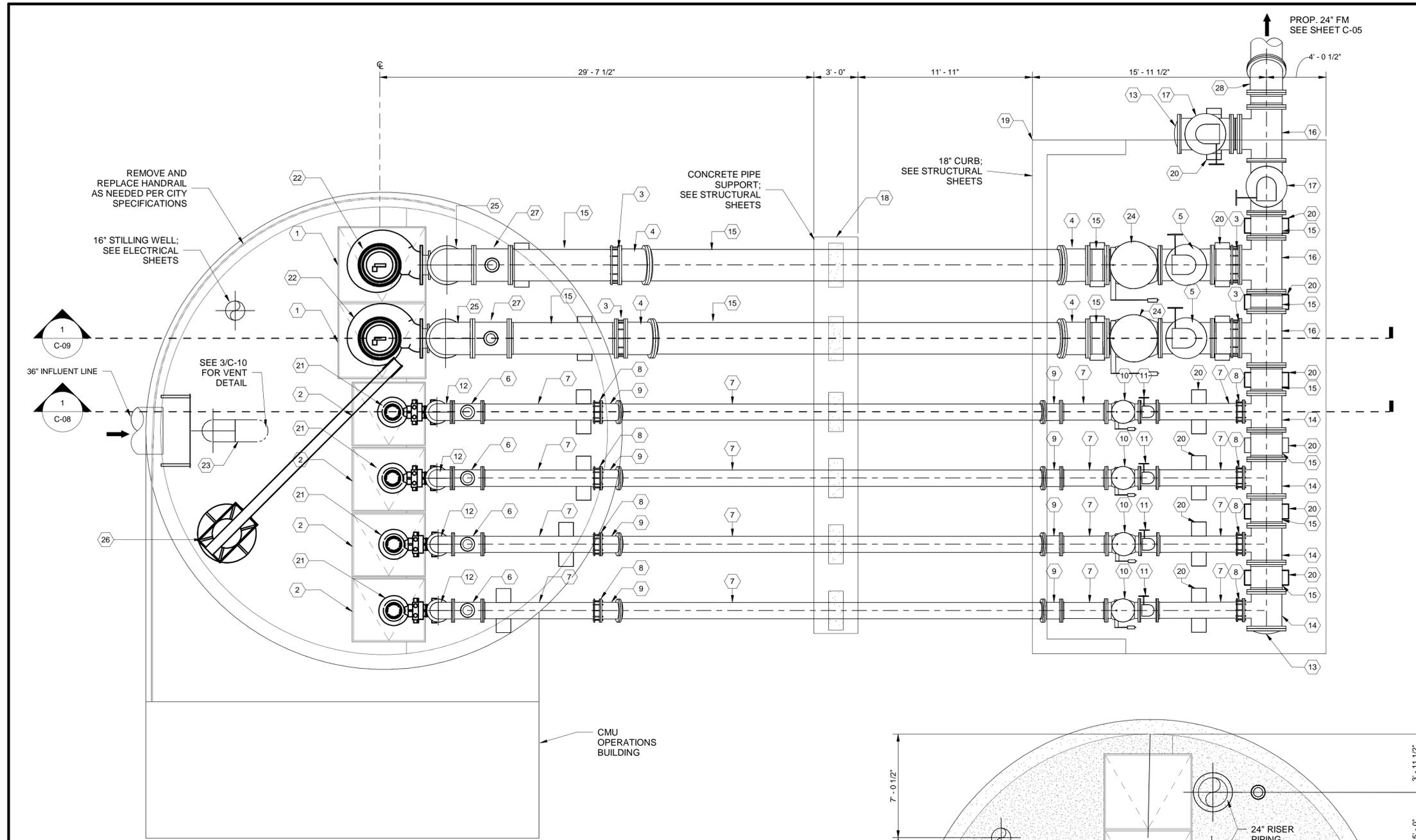
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<h3 style="margin: 0;">CITY OF FRIENDSWOOD</h3> <h4 style="margin: 0;">LIFT STATION #2 REHABILITATION</h4>				
<h3 style="margin: 0;">PROPOSED LIFT STATION SITE PLAN</h3>				
				SHEET NUMBER C-05



Know what's below.
Call before you dig.

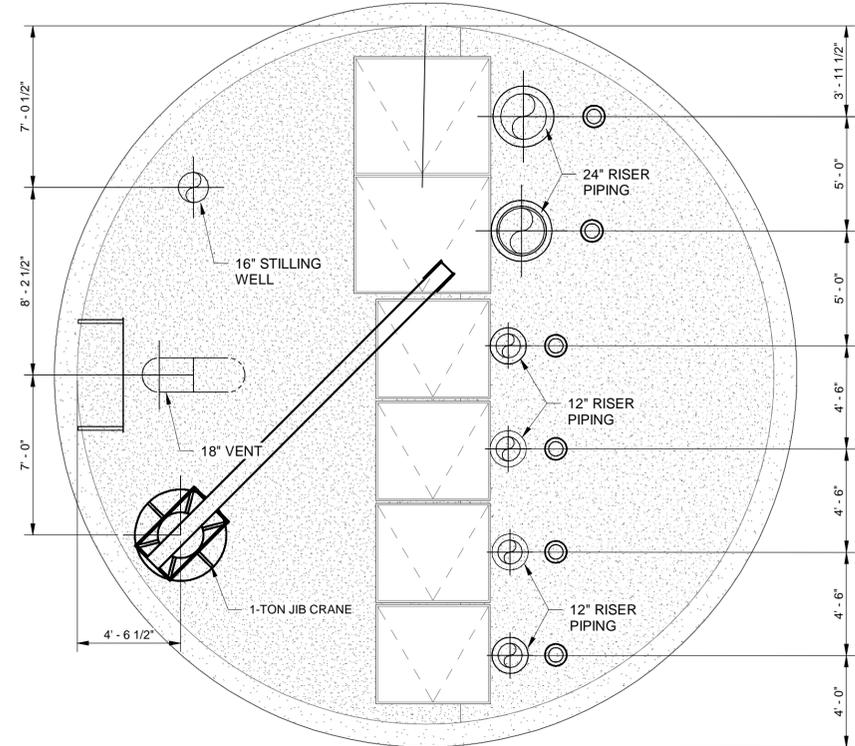


KEYNOTE LEGEND	
KEYNOTE	DESCRIPTION
1	60" X 70" WATER-TIGHT ALUM. ACCESS DOOR
2	52" X 60" WATER-TIGHT ALUM. ACCESS DOOR
3	24" FLANGE COUPLING ADAPTER W/ INTEGRATED RESTRAINT
4	24" DUCTILE IRON 11.25" BEND (FLXFL)
5	24" PLUG VALVE (FLXFL)
6	12" X 4" FLXFL TEE, 4" BLIND FLANGE W/ 2" THREADED OUTLET, AND 2" VENT-O-MAT RGX SERIES ARV
7	12" DUCTILE IRON PIPE W/ 40 MILS PROTECTO 401 EPOXY LINING
8	12" FLANGE COUPLING ADAPTER W/ INTEGRATED RESTRAINT
9	12" DUCTILE IRON 11.25" BEND (FLXFL)
10	12" SWING CHECK VALVE (FLXFL)
11	12" PLUG VALVE (FLXFL)
12	12" DUCTILE IRON 90° BEND (FLXFL)
13	24" BLIND FLANGE
14	24" X 12" DUCTILE IRON TEE (FLXFL)
15	24" DUCTILE IRON PIPE W/ 40 MILS PROTECTO 401 EPOXY LINING
16	24" X 24" DUCTILE IRON TEE (FLXFL)
17	24" PLUG VALVE (FLXFL)
18	27" X 3" CONCRETE BEAM (SEE STRUCTURAL)
19	20" X 35" CONCRETE VALVE PAD (SEE STRUCTURAL)
20	CONCRETE PIPE SUPPORT (SEE STRUCTURAL)
21	460V FLYGT MODEL # NP3202 PUMP (1895 GPM @ 55 FT TDH)
22	460V ABS AFP PUMP (5800 GPM @ 82 FT TDH)
23	18" GALVANIZED STEEL VENT
24	24" SWING CHECK VALVE (FLXFL)
25	24" STEEL 90° BEND (FLXFL)
26	1 TON FREE STANDING JIB CRANE W/ 360 DEG MOTORIZED MOVEMENT, 16-FT SPAN W/ 10-FT HEIGHT UNDER BOOM
27	24" X 4" FLXFL TEE, 4" BLIND FLANGE W/ 3" THREADED OUTLET, AND 3" VENT-O-MAT RGX SERIES ARV
28	24" DUCTILE IRON 45° BEND (FLXFL)

1 LIFT STATION PLAN VIEW
C-06 1/4" = 1'-0"

LIFT STATION NOTES:

- ACCESS HATCH SHALL BE FLUSH MOUNTED, ALUMINUM (BILCO, USF FAB, OR APPROVED EQUAL), 300 PSF LIVE LOAD CAPACITY, DRAINS, AND HYDRAULIC OPENERS PER TECHNICAL SPECIFIC SECTION 05 54 63.
- CONFIGURATIONS AND DIMENSIONS SHOWN ARE BASED ON THE EQUIPMENT SPECIFIED. THE CONTRACTOR SHALL VERIFY THE LAYOUT AND ALL DIMENSIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT, TO THE ENGINEER, SHOP DRAWINGS SHOWING THE FINAL LAYOUT AND DIMENSIONS PRIOR TO CONSTRUCTION.
- REFERENCE SPECIFICATIONS FOR LIFT STATION EQUIPMENT.
- ABOVE DISCHARGE PIPING SHALL COMPLY WITH COATING AND LINING PER TECHNICAL SPECIFIC SECTION 02215.
- ALL FLANGES SHALL BE CAPABLE OF A WORKING PRESSURE OF 250 PSI.
- INSTALL ISOLATION KITS BETWEEN DISSIMILAR METAL PIPING.
- CONTRACTOR SHALL SUBMIT DESIGN FOR GROUT CONE UNDER PUMP SUCTIONS, INCLUDING MEANS OF ATTACHMENT, TO THE ENGINEER PRIOR TO CONSTRUCTION.
- PUMP MANUFACTURER SHALL PROVIDE SHOP DRAWING OF LAYOUT OF GUIDE RAIL SYSTEM. SUPPORT GUIDE RAILS PER MANUFACTURER RECOMMENDATIONS. ALL GUIDE RAIL PIPING IN WET WELL SHALL BE STAINLESS STEEL.
- ALL PIPE AND FITTINGS ABOVE GROUND SHALL BE DUCTILE IRON UNLESS OTHERWISE NOTED.
- ALL PIPE AND FITTINGS IN WET WELL SHALL BE STAINLESS STEEL.
- ALL DUCTILE IRON PIPING SHALL BE LINED WITH PROTECTO 401 CERAMIC EPOXY OR APPROVED EQUAL.
- ALL OPENINGS AND CONNECTIONS THROUGH THE ROOF SHALL BE SEALED TO PREVENT LEAKAGE AND INFILTRATION.
- ALL RESTRAINING RODS SHALL BE 316 STAINLESS STEEL.



2 WET WELL PENETRATIONS
C-06 1/4" = 1'-0"



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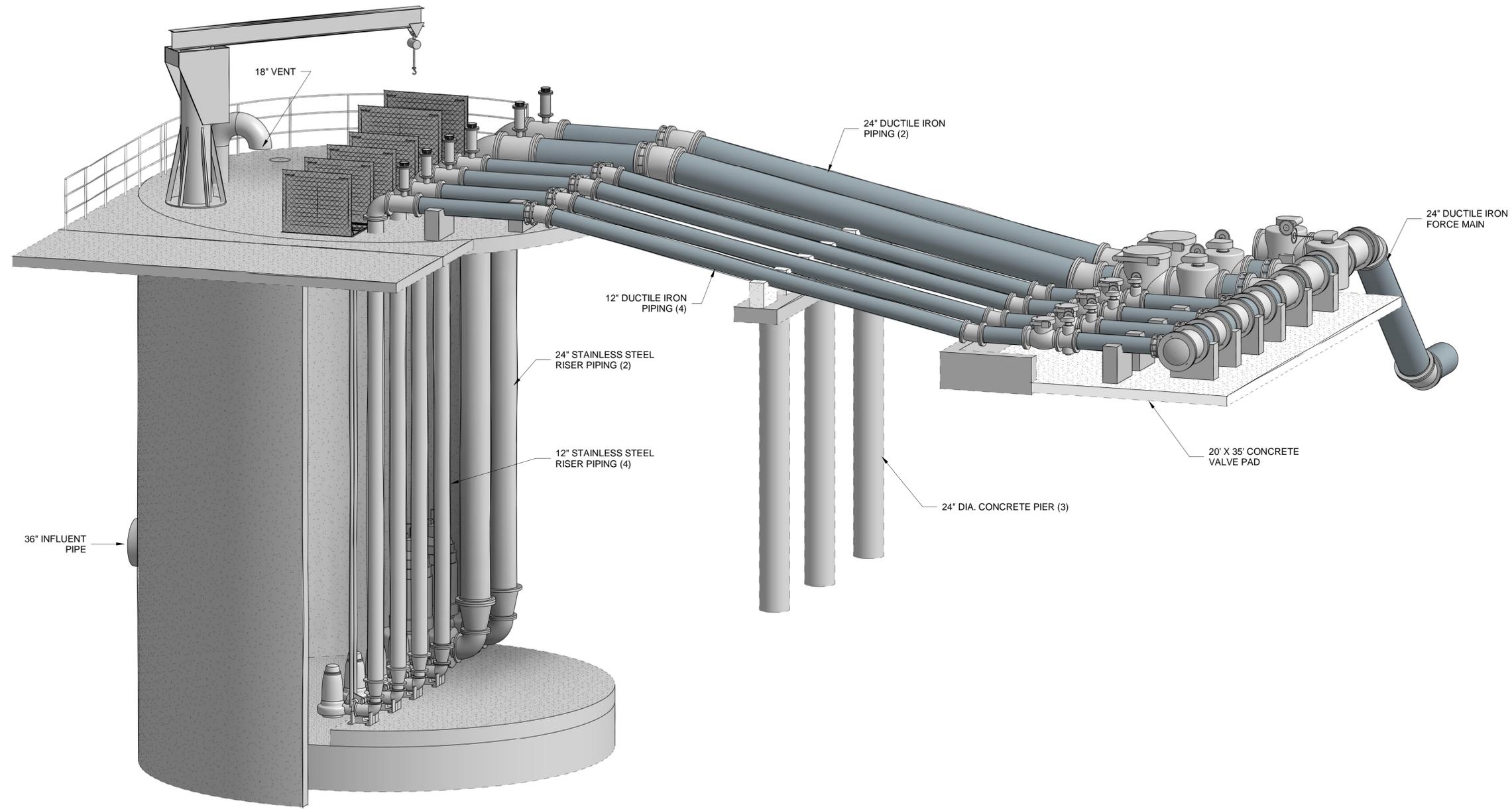
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CITY OF FRIENDSWOOD
 LIFT STATION #2 REHABILITATION

LIFT STATION PLAN VIEW



1 LIFT STATION 3D VIEW
C-07

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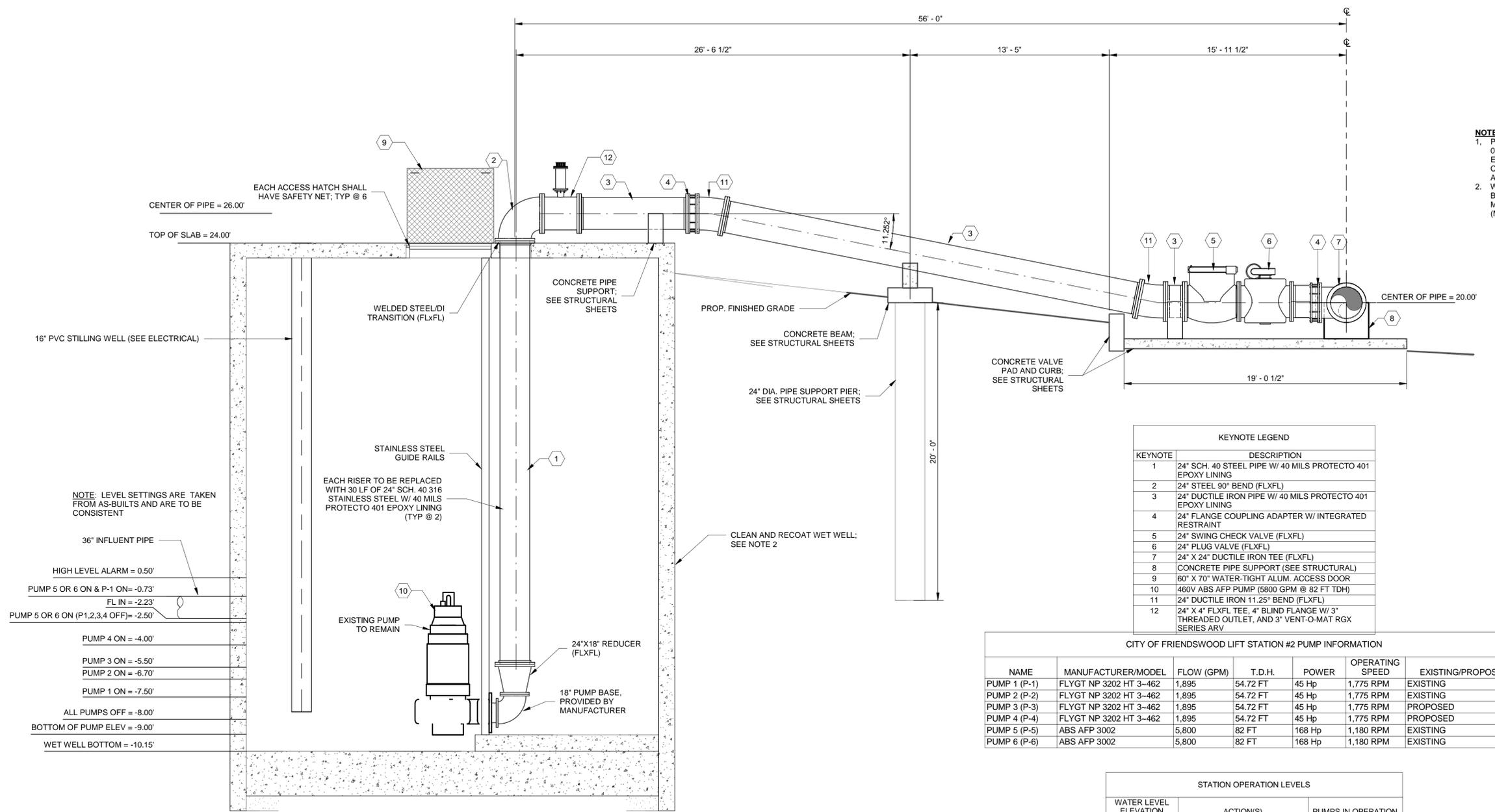
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CITY OF FRIENDSWOOD
 LIFT STATION #2
 REHABILITATION

LIFT STATION
 ISOMETRIC VIEW



- NOTES:**
- PER GEOTECHNICAL REPORT NUMBER S24-0053 DATED 07/10/2025, GROUNDWATER IS ANTICIPATED AT ELEVATIONS BELOW APPROXIMATELY 6.60'. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH DEWATERING.
 - WET WELL LINING SHALL BE 1005 SOLIDS, ULTRA-HIGH BUILD EPOXY SYSTEM, RAVEN 405. APPLY PRODUCT PER MANUFACTURER'S RECOMMENDATIONS (MIN. 125 MILS DFT.)

- NOTE:** LEVEL SETTINGS ARE TAKEN FROM AS-BUILTS AND ARE TO BE CONSISTENT
- 36" INFLUENT PIPE
 - HIGH LEVEL ALARM = 0.50'
 - PUMP 5 OR 6 ON & P-1 ON = -0.73'
 - FL IN = -2.23'
 - PUMP 5 OR 6 ON (P1,2,3,4 OFF) = -2.50'
 - PUMP 4 ON = -4.00'
 - PUMP 3 ON = -5.50'
 - PUMP 2 ON = -6.70'
 - PUMP 1 ON = -7.50'
 - ALL PUMPS OFF = -8.00'
 - BOTTOM OF PUMP ELEV = -9.00'
 - WET WELL BOTTOM = -10.15'

KEYNOTE	DESCRIPTION
1	24" SCH. 40 STEEL PIPE W/ 40 MILS PROTECTO 401 EPOXY LINING
2	24" STEEL 90° BEND (FLXFL)
3	24" DUCTILE IRON PIPE W/ 40 MILS PROTECTO 401 EPOXY LINING
4	24" FLANGE COUPLING ADAPTER W/ INTEGRATED RESTRAINT
5	24" SWING CHECK VALVE (FLXFL)
6	24" PLUG VALVE (FLXFL)
7	24" X 24" DUCTILE IRON TEE (FLXFL)
8	CONCRETE PIPE SUPPORT (SEE STRUCTURAL)
9	60" X 70" WATER-TIGHT ALUM. ACCESS DOOR
10	460V ABS AFP PUMP (5800 GPM @ 82 FT TDH)
11	24" DUCTILE IRON 11.25° BEND (FLXFL)
12	24" X 4" FLXFL TEE, 4" BLIND FLANGE W/ 3" THREADED OUTLET, AND 3" VENT-O-MAT RGX SERIES ARV

CITY OF FRIENDSWOOD LIFT STATION #2 PUMP INFORMATION						
NAME	MANUFACTURER/MODEL	FLOW (GPM)	T.D.H.	POWER	OPERATING SPEED	EXISTING/PROPOSED
PUMP 1 (P-1)	FLYGT NP 3202 HT 3-462	1,895	54.72 FT	45 Hp	1,775 RPM	EXISTING
PUMP 2 (P-2)	FLYGT NP 3202 HT 3-462	1,895	54.72 FT	45 Hp	1,775 RPM	EXISTING
PUMP 3 (P-3)	FLYGT NP 3202 HT 3-462	1,895	54.72 FT	45 Hp	1,775 RPM	PROPOSED
PUMP 4 (P-4)	FLYGT NP 3202 HT 3-462	1,895	54.72 FT	45 Hp	1,775 RPM	PROPOSED
PUMP 5 (P-5)	ABS AFP 3002	5,800	82 FT	168 Hp	1,180 RPM	EXISTING
PUMP 6 (P-6)	ABS AFP 3002	5,800	82 FT	168 Hp	1,180 RPM	EXISTING

STATION OPERATION LEVELS		
WATER LEVEL ELEVATION	ACTION(S)	PUMPS IN OPERATION
	RISING LEVEL CYCLE	
-8.00	LOW-LEVEL ALARM TURNS "OFF"	NONE
-7.50	PUMP 1 TURNS "ON"	PUMP 1
-6.50	PUMP 2 TURNS "ON"	PUMPS 1 & 2
-5.50	PUMP 3 TURNS "ON"	PUMPS 1, 2 & 3
-4.00	PUMP 4 TURNS "ON"	PUMPS 1, 2, 3 & 4
-2.50	PUMPS 1, 2, 3 & 4 TURN "OFF" PUMP 5 TURNS "ON"	PUMP 5
-0.73	PUMP 1 TURNS "ON"	PUMPS 5 & 1
0.50	HIGH ALARM TURNS "ON"	PUMPS 5 & 1
	FALLING LEVEL CYCLE	
-0.75	HIGH ALARM TURNS "OFF"	PUMPS 5 & 1
-2.50	PUMP 1 TURNS "OFF"	PUMP 5
-4.00	PUMP 5 TURNS "OFF" PUMPS 1, 2, 3 & 4 TURN "ON"	PUMPS 1, 2, 3 & 4
-5.50	PUMP 4 TURNS "OFF"	PUMPS 1, 2 & 3
-6.50	PUMP 3 TURNS "OFF"	PUMPS 1 & 2
-7.50	PUMP 2 TURNS "OFF"	PUMP 1
-8.00	PUMP 1 TURNS "OFF"	NONE
-8.50	LOW-LEVEL ALARM TURNS "ON"	NONE
PUMPS 1, 2, 3 & 4	ALTERNATE STATUS	
PUMPS 5 & 6	ALTERNATE STATUS	

1 PUMP 5 SECTION VIEW
C-09 1/4" = 1'-0"

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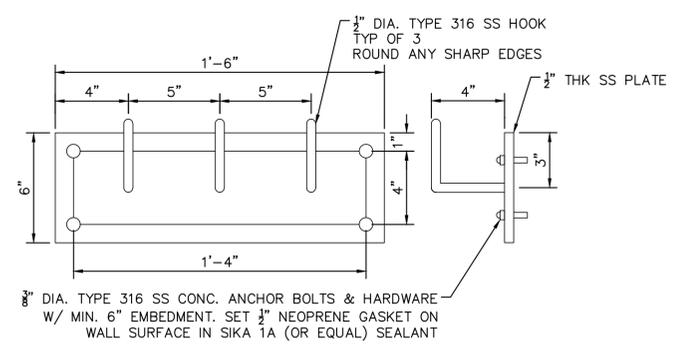
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CITY OF FRIENDSWOOD
 LIFT STATION #2
 REHABILITATION

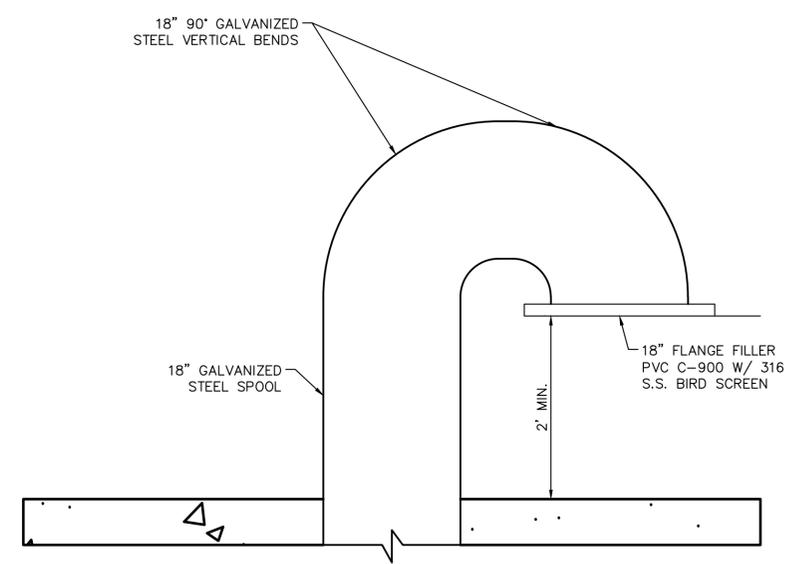
LIFT STATION SECTION VIEW -
 PUMP 5
 CENTERLINE

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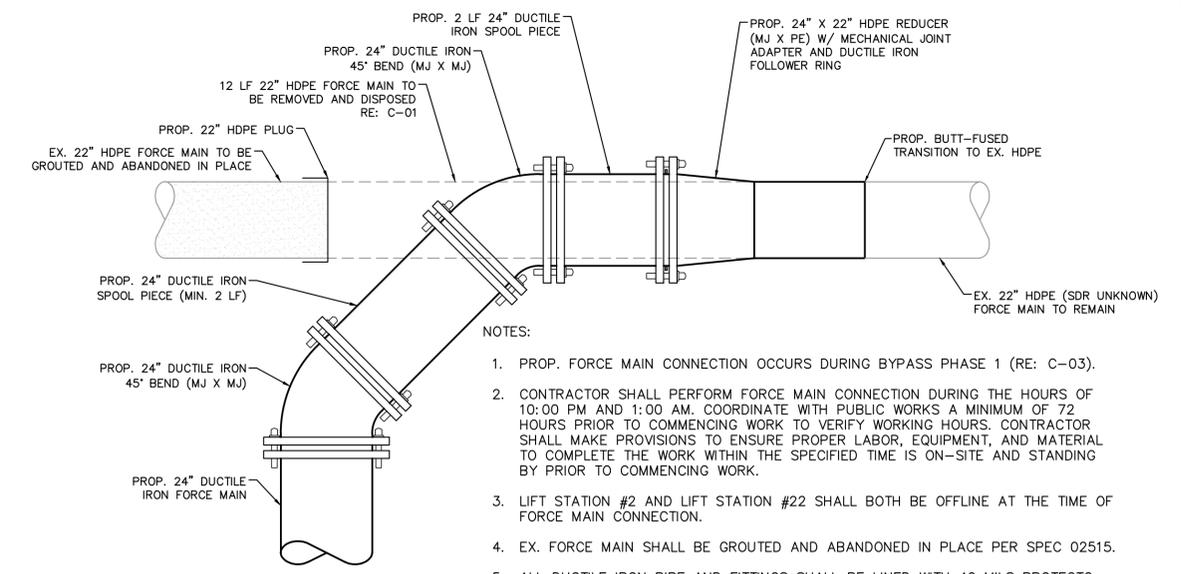
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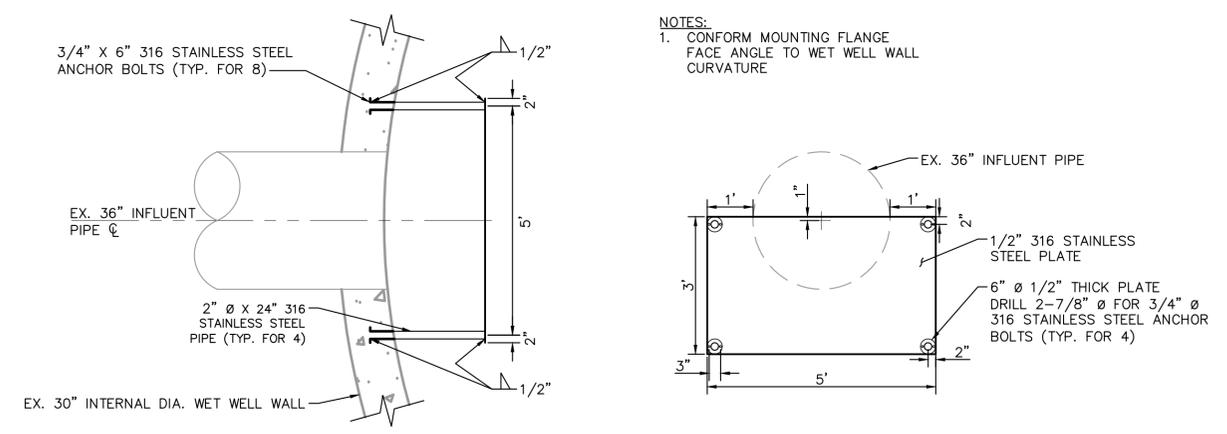
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3 18" VENT DETAIL
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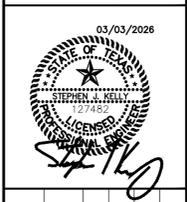
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 C-10 SCALE: NOT TO SCALE



4 DEFLECTOR PLATE DETAIL
 C-10 SCALE: NOT TO SCALE

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CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

PROPOSED LIFT STATION
 CONSTRUCTION DETAILS

SHEET NUMBER
C-10



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PLAN LEGEND	
	EQUIPMENT CONNECTION
	JUNCTION OR CONNECTION BOX
	STARTER OR LIGHTING CONTACTOR
	DISCONNECT SWITCH
	MANHOLE
	HANDHOLE
	KEYED NOTE. NUMBER MATCHES NOTE NUMBER
	TOGGLE SWITCH, WALL MOUNTED, SINGLE POLE SINGLE THROW. MOUNTED 54 IN. AFF. UNLESS OTHERWISE NOTED.
	TOGGLE SWITCH, WALL MOUNTED, FOUR WAY. MOUNTED 54 IN. AFF. UNLESS OTHERWISE NOTED.
	SWITCH MOTOR RATED WITH TERMINAL OVERLOADS
	OCCUPANCY SENSOR
	TERMINAL BOARD
	TELEPHONE OUTLET, PRIVATE. MOUNTED 12 IN. AFF.
	DATA OUTLET, SURFACED MOUNTED
	MOTOR LOAD, NUMBER INDICATES HORSEPOWER
	POLE
	TRANSFORMER, DRY TYPE, KVA RATING MAY BE DISPLAYED NEXT TO SYMBOL
	ANTENNA
	HOMERUN, LETTERS INDICATE PANELBOARD, NUMBERS INDICATE CIRCUIT NUMBER IN PANELBOARD
	CONDUIT CAPPED FOR FUTURE USE
	CONDUIT GOING DOWN
	CONDUIT GOING UP
	CONDUIT ABOVE GROUND
	CONDUIT RUN UNDERGROUND OR CONCEALED
	CONDUIT RUN BELOW CONCRETE
	LIQUID TIGHT FLEXIBLE CONDUIT
	SURFACE MOUNT
	120V RECEPTACLE FLUSH MOUNTED
	120V RECEPTACLE SURFACE MOUNTED
	120V QUAD RECEPTACLE FLUSH MOUNTED
	120V QUAD RECEPTACLE SURFACE MOUNTED
	208V RECEPTACLE FLUSH MOUNTED
	208V RECEPTACLE SURFACE MOUNTED
	WELDING OUTLET
	THERMOSTAT
	PANELBOARD FLUSH MOUNTED
	PANELBOARD SURFACE MOUNTED
	NORTH ARROW
	TORQUE SWITCH
	SOLENOID SWITCH
	LIMIT SWITCH
	AMMETER SWITCH
	VOLTMETER SWITCH
	PRESSURE SWITCH
	LIGHTING CONTACTOR
	PHOTOCELL

GROUNDING LEGEND	
	A=GROUNDING RECEPTACLE; B=GROUND TEST WELL
	BARE COPPER GROUNDING CONDUCTOR
	GROUNDING CONNECTION
	COPPER CLAD GROUND ROD

ONE-LINE AND CONTROL SCHEMATIC LEGEND	
	GROUND CONNECTION
	NORMALLY OPEN RELAY OR CONTACTOR CONTACTS
	NORMALLY CLOSED RELAY OR CONTACTOR CONTACTS
	CONDUCTOR CONNECTION
	CIRCUIT BREAKER, MOLDED CASE, TRIP CURRENT AND QUANTITY OF POLES (P) SHOWN NEXT TO SYMBOL
	DISCONNECT SWITCH NON-FUSED, LOAD BREAK. CONTINUOUS CURRENT RATING, QUANTITY OF POLES (P) SHOWN NEXT TO SYMBOL
	DISCONNECT SWITCH FUSED, LOAD BREAK. CONTINUOUS CURRENT RATING, QUANTITY OF POLES (P), AND FUSE RATING SHOWN NEXT TO SYMBOL
	FUSE. RATING SHOWN NEXT TO SYMBOL
	MOTOR STARTER THERMAL OVERLOAD PROTECTOR
	CONTACTOR OR RELAY COIL. LETTERS AND NUMBERS MATCH CONTACTS CONTROLLED
	LIMIT SWITCH NORMALLY CLOSED
	LIMIT SWITCH NORMALLY OPEN
	MOTOR OPERATED VALVE GEARED LIMIT SWITCH
	PRESSURE SWITCH NORMALLY CLOSED OPEN ON INCREASING PRESSURE
	PRESSURE SWITCH NORMALLY OPEN CLOSURES ON INCREASING PRESSURE
	LEVEL SWITCH NORMALLY CLOSED OPEN ON INCREASING LEVEL
	LEVEL SWITCH NORMALLY OPEN CLOSURES ON INCREASING LEVEL
	FLOW SWITCH NORMALLY CLOSED OPENS WITH FLOW
	FLOW SWITCH NORMALLY OPEN CLOSURES ON PRESENCE OF FLOW
	SPACEHEATER
	PHASE FAILURE RELAY
	MAINTAINED CONTACT START/STOP PUSHBUTTON
	MAINTAINED CONTACT HAND-OFF-AUTO SELECTOR SWITCH
	NORMALLY CLOSED MOMENTARY CONTACT PUSHBUTTON
	NORMALLY OPEN MOMENTARY CONTACT PUSHBUTTON

LIGHTING FIXTURE LEGEND	
	LED STRIP LIGHT; LETTER IN OR BESIDE FIXTURE IDENTIFIES IN FIXTURE SCHEDULE
	LED STRIP LIGHT WITH BATTERY BACKUP; LETTER IN OR BESIDE FIXTURE IDENTIFIES IN FIXTURE SCHEDULE
	LED FIXTURE, SURFACE OR SUSPENDED, CEILING MOUNTED
	LED FIXTURE, STANCHION MOUNTED
	LED FIXTURE, WALL MOUNTED
	LED LIGHTED EXIT SIGN; LETTER IN OR BESIDE FIXTURE IDENTIFIES IN FIXTURE SCHEDULE
	REMOTE EMERGENCY LIGHTS

ONE-LINE AND CONTROL SCHEMATIC LEGEND	
	WYE TRANSFORMER CONNECTION
	DELTA TRANSFORMER CONNECTION
	CURRENT TRANSFORMER WITH RATIO SHOWN
	ANALYTICAL TRANSMITTER
	FLOW OR FLOAT SWITCH
	LEVEL TRANSMITTER
	PRESSURE TRANSMITTER
	SOLENOID VALVE
	MOTOR OPERATED VALVE
	TIME DELAY RELAY. TIMES OUT AFTER ENERGIZATION. ADJUSTABLE TIME DELAY TIME INDICATED NEXT TO SYMBOL.
	TIME DELAY RELAY. TIMES OUT AFTER DE-ENERGIZATION. ADJUSTABLE TIME DELAY TIME INDICATED NEXT TO SYMBOL.
	CONDUIT TAG
	PILOT LIGHT. R=RED, B=BLUE, G=GREEN, A=AMBER, Y=YELLOW
	CONTROL POWER TRANSFORMER. PRIMARY AND SECONDARY VOLTAGE INDICATED
	CPT = CONTROLS POWER/INSTRUMENT TRANSFORMER
	PT = POWER TRANSFORMER. VOLTAGE AND KVA RATING AS SHOWN
	TELEVISION CAMERA
	TORQUE SWITCH
	AMMETER
	VOLTMETER
	LIGHTING ARRESTOR
	SURGE CAPACITOR
	INSTALLED OUTSIDE OF PANEL
	MOUNTED ON INNER PANEL
	CONTROL PANEL TERMINAL STRIP
	MOTOR STARTER FVNR = FULL VOLTAGE NON-REVERSING FVR = FULL VOLTAGE REVERSING MCP = MOTOR CIRCUIT PROTECTOR RVNR = REDUCED VOLTAGE NON-REVERSING RVSS = REDUCED VOLTAGE SOFT START SIZE = NEMA STARTER SIZE

ABBREVIATIONS			
1/C	ONE CONDUCTOR	MCC	MOTOR CONTROL CENTER
3/C	THREE CONDUCTOR	MFR	MANUFACTURER
A	AMPERES OR TRIP AMPERES	MIN.	MINIMUM
AC	ALTERNATING CURRENT	MPR	MOTOR PROTECTION RELAY
A/C	AIR CONDITIONING	MTD	MOUNTED
AFF	ABOVE FINISHED FLOOR	MTG	MOUNTING
AFG	ABOVE FINISHED GRADE	MRCT	MULTI-RATIO CURRENT TRANSFORMER
AIC	ASYMMETRICAL AMPERES INTERRUPTING CAPACITY	MV	MERCURY VAPOR
BLDG	BUILDING	N.C.	NORMALLY CLOSED
BKR	BREAKER	NEC	NATIONAL ELECTRICAL CODE
C	CONDUIT	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
CAP	CAPACITOR	NEUT.	NEUTRAL
CKT	CIRCUIT	N.O.	NORMALLY OPEN
CONT'D	CONTINUED	N.T.S.	NOT TO SCALE
CPT	CONTROL POWER TRANSFORMER	OC	ON CENTER
CT	CURRENT TRANSFORMER	OH	OVERHEAD
CU	COPPER	P	POLE
DBL	DOUBLE	PC	PHOTOCELL
DISC SW.	DISCONNECT SWITCH	PH	PHASE
DC	DIRECT CURRENT	PNL	PANEL
EMER.	EMERGENCY	PRI	PRIMARY
EMT	ELECTRICAL METALLIC TUBING	PVC	POLYVINYL CHLORIDE
ENCL.	ENCLOSURE	REQ'D	REQUIRED
EP	EXPLOSION PROOF	SCH	SCHEDULE
EQUIP.	EQUIPMENT	SEC	SECONDARY
FS	FLOAT SWITCH	S/N	SOLID NEUTRAL
G	GROUND WIRE	SPACE	SPACE(S) ONLY - NO BREAKER OR DEVICE
GALV.	GALVANIZED	SPARE	SPARE BREAKER OR DEVICE
GEN	GENERATOR	SPECS	SPECIFICATIONS
GFI	GROUND FAULT INTERRUPTER CIRCUIT	S.D. BARE	SOFT DRAWN BARE
GND	GROUND	SS HDWE	STAINLESS STEEL HARDWARE
HDG	HOT DIPPED GALVANIZED	SWBD	SWITCHBOARD
HPS	HIGH PRESSURE SODIUM	SWGR	SWITCHGEAR
HT	HEIGHT	TB	TERMINAL BLOCK
HZ	HERTZ	TYP.	TYPICAL
INST.	INSTRUMENT	UL	UNDERWRITERS LABORATORIES
KV	KILOVOLTS	V	VOLTS
KVA	KILOVOLTS AMPERES	VA	VOLT AMPERES
KWH	KILOWATT HOURS	W	WATTS
LA	LIGHTNING ARRESTOR	W/	WITH
LPR	LIGHTNING PROTECTION RELAY	W/O	WITHOUT
L-L	LINE TO LINE	WP	WEATHERPROOF
L-N	LINE TO NEUTRAL	XFMR	TRANSFORMER

- LEGEND & GENERAL NOTES:**
- BRANCH CIRCUIT NUMBERS MAY BE SHOWN NEXT TO SYMBOLS IN MULTIWIRED CIRCUITS.
 - SYMBOL SIZE DOES NOT IMPLY EQUIPMENT SIZE UNLESS OTHERWISE NOTED.
 - LOWER CASE LETTERS NEXT TO SYMBOLS INDICATE FIXTURE(S) CONTROLLED BY THE SWITCH DISPLAYING THE SAME LETTER.
 - THIS IS A STANDARD LEGEND LIST ALL SYMBOLS MAY NOT BE USED.
 - INSTALLATION SHALL BE PER LATEST VERSION OF NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL CODES, ORDINANCES. NOT ALL CODE AND STANDARD REQUIREMENTS MAY BE SHOWN ON PLANS. CONTRACTOR SHALL ADHERE TO CODES AND STANDARDS REGARDLESS OF BEING SHOWN ON PLANS OR SPECIFICATIONS IN DETAILED FASHION.

KHA PROJECT 068913102	DATE	JULY 2025	DESIGNED BY: SK DRAWN BY: JA CHECKED BY: RG
	SCALE AS SHOWN		
CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION		Kimley»Horn STATE OF TEXAS REGISTRATION NO. F-928 11700 KATY FREEMAN SUITE 800 HOUSTON, TX 77079 WWW.KIMLEY-HORN.COM © 2025 KIMLEY-HORN AND ASSOCIATES, INC.	
ELECTRICAL ABBREVIATIONS, LEGENDS, AND GENERAL NOTES		SHEET NUMBER 01	

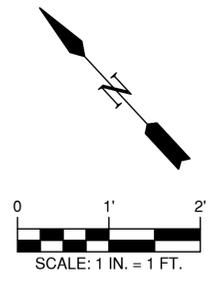
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PHASING PLAN NO. 1 (NOTE 7)

PHASE ONE - NEW SERVICE AND PROPOSED ELECTRICAL EQUIPMENT

1. CONTRACTOR SHALL COORDINATE WITH UTILITY FOR SECOND SERVICE AND PHASING PLAN TO DEMOLISH EXISTING EQUIPMENT. SECOND SERVICE SHALL BE INSTALLED TO FEED NEW MCC AND SWAP OVER LOADS PRIOR TO REMOVAL OF EXISTING MCC, TRANSFORMER, LVP, AND SERVICE NO.1 UTILITY EQUIPMENT.
2. CONTRACTOR SHALL INSTALL NEW TRANSFORMER AND LVP. RE-FEED ALL LOW VOLTAGE LOADS INTO NEW LOW VOLTAGE PANEL. FEED NEW TRANSFORMER FROM EXISTING MCC BUCKET. IF NO BUCKET IS AVAILABLE, REMOVE LIFT PUMP 6 FROM ROTATION, AND FEED TRANSFORMER FROM THIS BUCKET. COORDINATE WITH OPERATIONS PRIOR TO BEGINNING WORK. OPERATIONS MAY HAVE PREFERENCE OVER SEPARATE LIFT PUMP CIRCUIT BREAKER USED FOR NEW LOW VOLTAGE PAD MOUNTED TRANSFORMER. PATCH EXISTING AIR CONDITIONING PUNCH OUT.
3. PROPOSED EQUIPMENT SHALL BE TESTED FOR OPERABILITY PRIOR TO SWITCH OVER OF LOADS. ONCE COMPLETE, SWAP OVER ALL LOW VOLTAGE LOADS AND CONNECT NEW LIGHTING LOADS. WHERE FAILURE OCCURS, CONTRACTOR TO RECONNECT ANCILLARY LOADS TO EXISTING LVP UNTIL SOLUTION IS FOUND. CONTRACTOR TO DEVELOP TESTING CHECKLIST AS SUBMITTAL FOR ENGINEER/OWNER TO REVIEW DOCUMENTS OF SITE FUNCTIONALITY PRIOR TO END OF EACH DAYS WORK. CHECKLIST SHALL BE VERIFIED WITH OPERATIONS TO ENSURE FUNCTIONAL SYSTEM BEFORE END OF WORK DAY. CONTRACTOR TO INCLUDE REQUIRED IN BID.



- GENERAL NOTES:**
1. EQUIPMENT SHOWN MAY NOT BE TO SCALE. REFER TO ALL PLAN SHEETS AND ELECTRICAL DETAILS FOR ADDITIONAL INFORMATION. REFER TO CIVIL DRAWINGS FOR SITE DIMENSIONS.
 2. REFER TO PHASING SCHEDULE FOR DEMOLITION PLANS.
 3. INSTALL NEW TRANSFORMER AND LOW VOLTAGE PANEL. SWAP OVER ALL EXISTING LOW VOLTAGE LOADS TO PROPOSED LOW VOLTAGE PANEL.
 4. AUXILIARY MOTOR FEEDER PANEL TO REMAIN, DO NOT DEMOLISH.
 5. EXISTING MCC, ETM PANEL, LOW VOLTAGE PANEL, AND TRANSFORMER TO BE DEMOLISHED IN ITS ENTIRETY. REFER TO PHASING SCHEDULE FOR ORDER OF OPERATIONS.
 6. CONTRACTOR SHALL ATTEND PRE-BID MEETING PRIOR TO SUBMITTING BID.
 7. PHASING PLAN IS INCLUDED FOR CONTRACTOR REVIEW OF DESIGN INTENT AND PROJECT BOUNDARIES DUE TO OUTAGE LIMITATIONS. ALTERNATE MEANS AND METHODS ARE ACCEPTABLE WHERE COMPLIANT WITH DESIGN INTENT. OPERATIONS/OWNER SIGN OFF, AND DETAILED DOCUMENTATION/NOTIFICATION OF WORK PERFORMED. OWNER PROJECT BOUNDARIES INCLUDE SITE CANNOT BE OFFLINE FOR MORE THAN 4 HOURS AT A TIME.

NO.	REVISIONS	DATE	BY

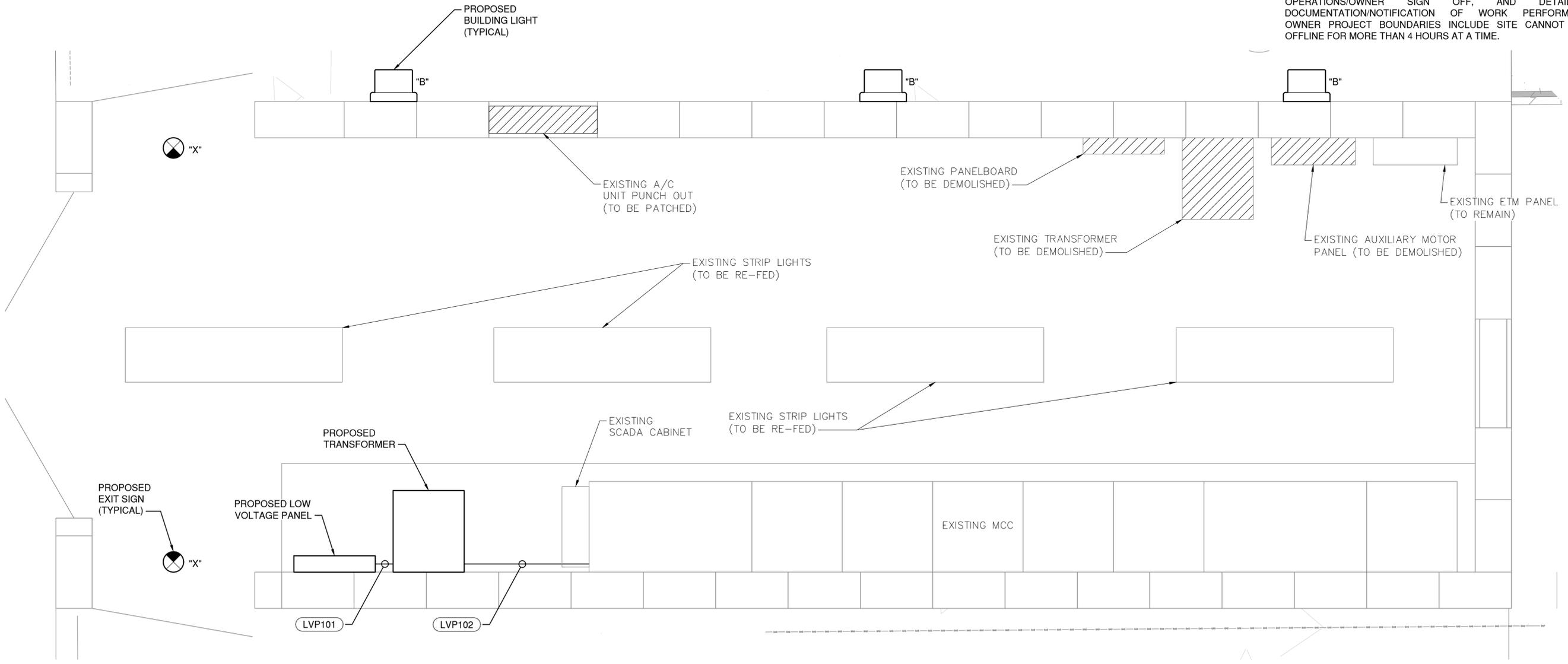
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DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

ELECTRICAL ENLARGED PLAN - PHASING PLAN NO. 1
 SHEET NUMBER 05



ENLARGED BUILDING PLAN - PHASING PLAN NO. 1
SCALE: 1 IN. = 1 FT.

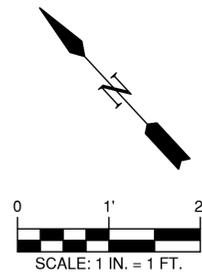
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E-111

PHASING PLAN NO. 2 - ELECTRICAL CONSTRUCTION NOTES

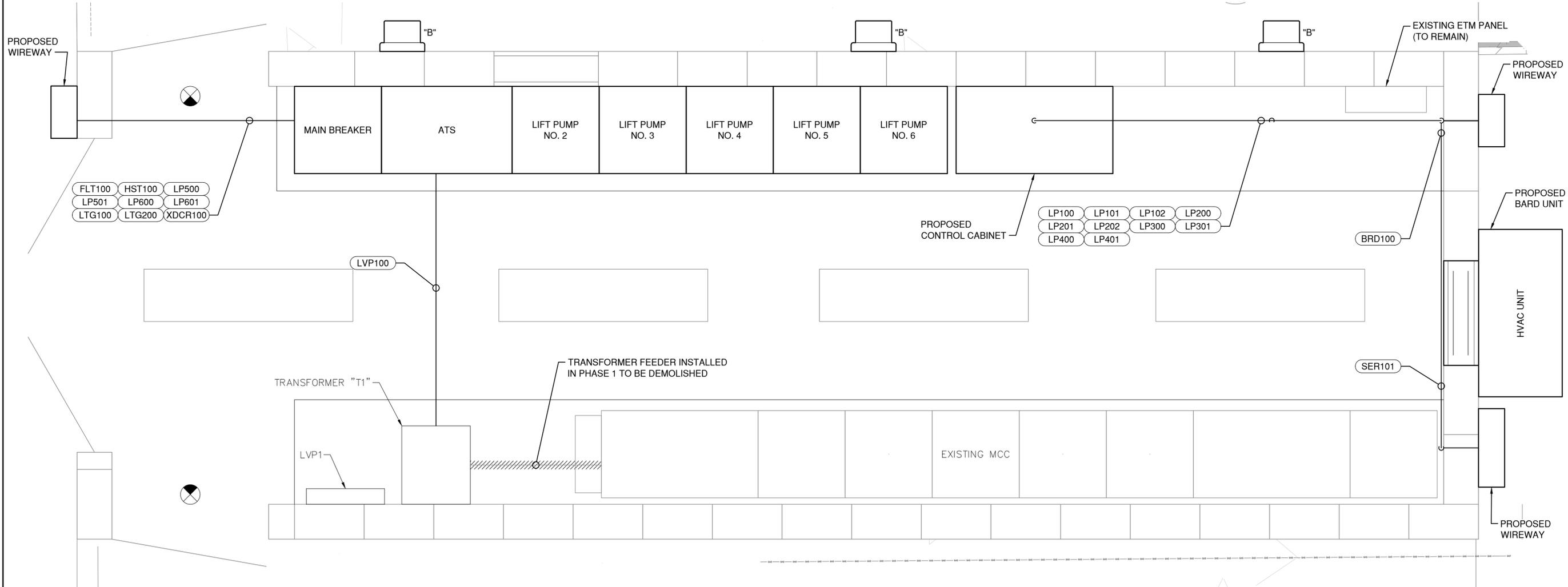
PHASE TWO - MCC INSTALLATION

1. POUR PROPOSED MCC HOUSEKEEPING PAD AND INSTALL NEW MCC. INSTALL NEW TERMINAL BOXES, FLOATS, TRANSDUCER, STILLING WELL, CONDUIT CORING, BARD UNIT, FEEDERS TO MCC, AND CONNECTION TO SECOND SERVICE.
2. COORDINATE WITH OWNER OPERATIONS FOR MCC AND MOTOR LOAD SWAP OVER PREFERENCE.
3. SWAP OVER LOADS WITH CONTROL, TESTING AND OPERABILITY OF EACH LOAD PRIOR TO BEGINNING NEXT IN LINE LOAD SWAP.



GENERAL NOTES:

1. REFER TO CONDUIT SCHEDULE FOR FULL CONDUIT AND CABLE REQUIREMENTS.
2. CONDUITS SHALL NOT BE INSTALLED UNDERNEATH CONCRETE STRUCTURES, MEANS OF EGRESS, OR WALKWAYS. ROUTE AROUND EQUIPMENT AND AVOID CONFLICT WITH OTHER UNDERGROUND EQUIPMENT. ROUTE DUCTBANK 24 INCHES BELOW UTILITY LINES.
3. EQUIPMENT SHALL NOT BE INSTALLED WITHIN ELECTRICAL EASEMENTS, WHERE EASEMENT CONFLICT EXISTS, CONTACT ENGINEER PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ANY AND ALL EASEMENTS.
4. DO NOT INSTALL CONCRETE FOR EQUIPMENT OR DUCTBANK OVER WATER OR SEWER LINES. FIELD VERIFY AND MARK ALL UNDERGROUND LINES.
5. EQUIPMENT SHOWN MAY NOT BE TO SCALE. REFER TO ALL PLAN SHEETS AND ELECTRICAL DETAILS FOR ADDITIONAL INFORMATION. REFER TO CIVIL DRAWINGS FOR SITE DIMENSIONS.
6. CONCRETE SPOILS SHALL NOT BE DUMPED ON SITE. DO NOT OVER POUR DUCTBANKS. PROVIDE ADEQUATE FORMS PRIOR TO POUR.
7. PROVIDE ADEQUATE WORKING SPACE FOR ALL ELECTRICAL EQUIPMENT AND GENERATOR ENCLOSURE DOORS.
8. PROVIDE GROUND CONNECTION AT SERVICE, MCC, PANELS, METALLIC EQUIPMENT AT RACK, PIPING AND ALL METALLIC PARTS WITHIN PROJECT SITE.
9. INSTALLATION SHALL BE PER LATEST VERSION OF NATIONAL ELECTRIC CODE, AND ALL APPLICABLE LOCAL CODES/ORDINANCES. NOT ALL CODE AND STANDARD REQUIREMENTS MAY BE SHOWN ON PLANS. CONTRACTOR SHALL ADHERE TO CODES AND STANDARDS REGARDLESS OF BEING SHOWN ON PLANS OR SPECIFICATIONS IN DETAILED FASHION.
10. ALL EQUIPMENT SHOWN IS NEW UNLESS STATED OTHERWISE.
11. ALL ELECTRICAL EQUIPMENT CONCRETE FOUNDATIONS ARE TO BE INSTALLED ABOVE FINISHED GRADE. ADDITIONAL ELEVATION DUE TO FLOOD PLAIN REQUIREMENTS ARE NOT SHOWN. REFER TO CIVIL SHEETS FOR FLOOD PLAIN LEVEL AND MINIMUM FOUNDATION HEIGHT REQUIREMENTS.
12. REFER TO MCC ELEVATION DETAIL ON PAGE E-301 FOR ADDITIONAL INFORMATION.
13. ALL CONDUIT TO BE MOUNTED HIGH ON WALL OR CEILING IN CONTROL / MCC ROOM.
14. CONTRACTOR TO PROTECT ALL EXISTING EQUIPMENT IN MCC ROOM DURING INSTALLATION OF CONCRETE PAD.



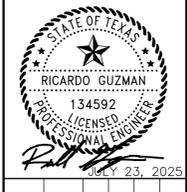
ENLARGED BUILDING PLAN - PHASING PLAN NO. 2

SCALE: 1 IN. = 1 FT.

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DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

ELECTRICAL ENLARGED PLAN - PHASING PLAN NO. 2

SHEET NUMBER
06

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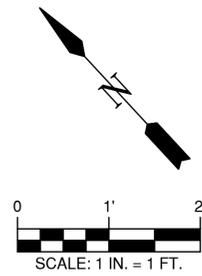
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PHASING PLAN NO. 2 - ELECTRICAL CONSTRUCTION NOTES (ALTERNATE BID ITEM)

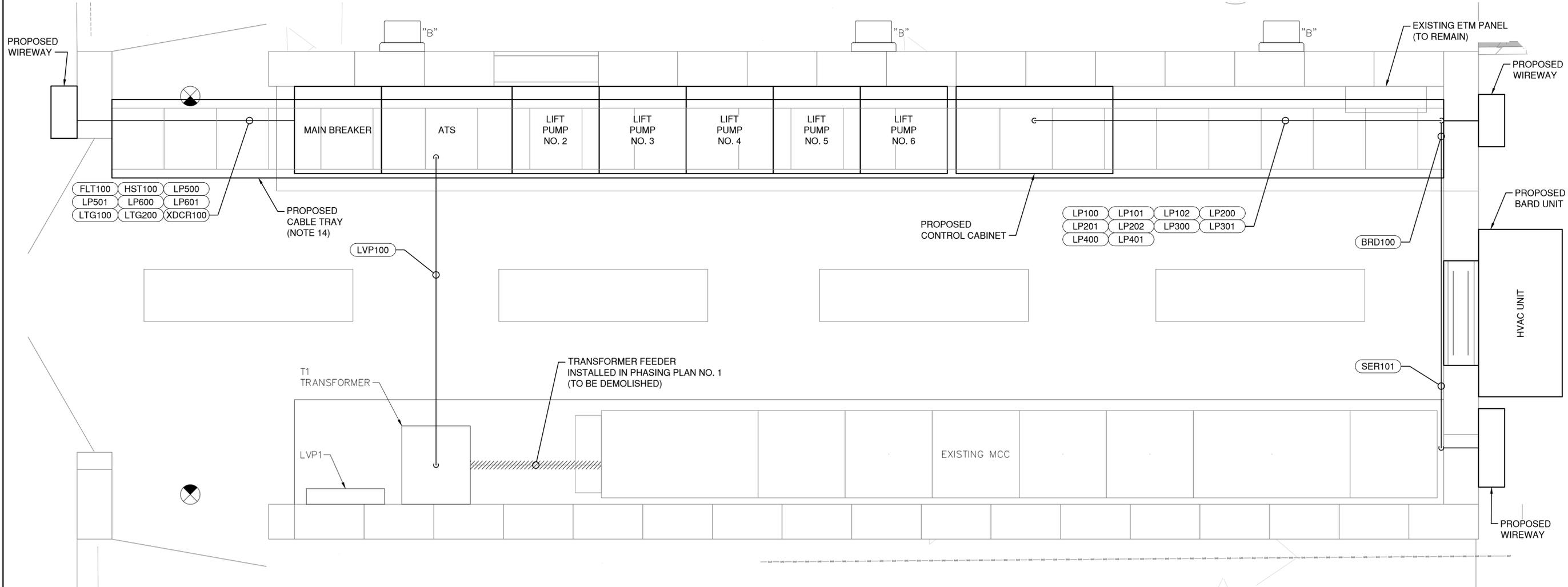
PHASE TWO - MCC INSTALLATION

1. POUR PROPOSED MCC HOUSEKEEPING PAD AND INSTALL NEW MCC. INSTALL NEW TERMINAL BOXES, FLOATS, TRANSDUCER, STILLING WELL, CONDUIT CORING, BARD UNIT, FEEDERS TO MCC, AND CONNECTION TO SECOND SERVICE.
2. COORDINATE WITH OWNER OPERATIONS FOR MCC AND MOTOR LOAD SWAP OVER PREFERENCE.
3. SWAP OVER LOADS WITH CONTROL, TESTING AND OPERABILITY OF EACH LOAD PRIOR TO BEGINNING NEXT IN LINE LOAD SWAP.



GENERAL NOTES:

1. REFER TO CONDUIT SCHEDULE FOR FULL CONDUIT AND CABLE REQUIREMENTS.
2. CONDUITS SHALL NOT BE INSTALLED UNDERNEATH CONCRETE STRUCTURES, MEANS OF EGRESS, OR WALKWAYS. ROUTE AROUND EQUIPMENT AND AVOID CONFLICT WITH OTHER UNDERGROUND EQUIPMENT. ROUTE DUCTBANK 24 INCHES BELOW UTILITY LINES.
3. EQUIPMENT SHALL NOT BE INSTALLED WITHIN ELECTRICAL EASEMENTS, WHERE EASEMENT CONFLICT EXISTS, CONTACT ENGINEER PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ANY AND ALL EASEMENTS.
4. DO NOT INSTALL CONCRETE FOR EQUIPMENT OR DUCTBANK OVER WATER OR SEWER LINES. FIELD VERIFY AND MARK ALL UNDERGROUND LINES.
5. EQUIPMENT SHOWN MAY NOT BE TO SCALE. REFER TO ALL PLAN SHEETS AND ELECTRICAL DETAILS FOR ADDITIONAL INFORMATION. REFER TO CIVIL DRAWINGS FOR SITE DIMENSIONS.
6. CONCRETE SPOILS SHALL NOT BE DUMPED ON SITE. DO NOT OVER POUR DUCTBANKS. PROVIDE ADEQUATE FORMS PRIOR TO POUR.
7. PROVIDE ADEQUATE WORKING SPACE FOR ALL ELECTRICAL EQUIPMENT AND GENERATOR ENCLOSURE DOORS.
8. PROVIDE GROUND CONNECTION AT SERVICE, MCC, PANELS, METALLIC EQUIPMENT AT RACK, PIPING AND ALL METALLIC PARTS WITHIN PROJECT SITE.
9. INSTALLATION SHALL BE PER LATEST VERSION OF NATIONAL ELECTRIC CODE, AND ALL APPLICABLE LOCAL CODES/ORDINANCES. NOT ALL CODE AND STANDARD REQUIREMENTS MAY BE SHOWN ON PLANS. CONTRACTOR SHALL ADHERE TO CODES AND STANDARDS REGARDLESS OF BEING SHOWN ON PLANS OR SPECIFICATIONS IN DETAILED FASHION.
10. ALL EQUIPMENT SHOWN IS NEW UNLESS STATED OTHERWISE.
11. ALL ELECTRICAL EQUIPMENT CONCRETE FOUNDATIONS ARE TO BE INSTALLED ABOVE FINISHED GRADE. ADDITIONAL ELEVATION DUE TO FLOOD PLAIN REQUIREMENTS ARE NOT SHOWN. REFER TO CIVIL SHEETS FOR FLOOD PLAIN LEVEL AND MINIMUM FOUNDATION HEIGHT REQUIREMENTS.
12. REFER TO MCC ELEVATION DETAIL ON PAGE E-502 FOR ADDITIONAL INFORMATION.
13. ALL CONDUIT TO BE MOUNTED HIGH ON WALL OR CEILING IN CONTROL / MCC ROOM.
14. CONTRACTOR SHALL SUPPLY CABLE TRAY INSIDE OF MCC ROOM. REFER TO SHEET E-605 FOR ADDITIONAL DETAILS.



ENLARGED BUILDING PLAN - PHASING PLAN NO. 2

SCALE: 1 IN. = 1 FT. // (ALTERNATE BID ITEM)

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RICHARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 MECHANICAL
 JULY 23, 2025

KHA PROJECT	088913102
DATE	JULY 2025
SCALE AS SHOWN	SCALE AS SHOWN
DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

ELECTRICAL ENLARGED PLAN - PHASING PLAN NO. 2 - ALTERNATE BID

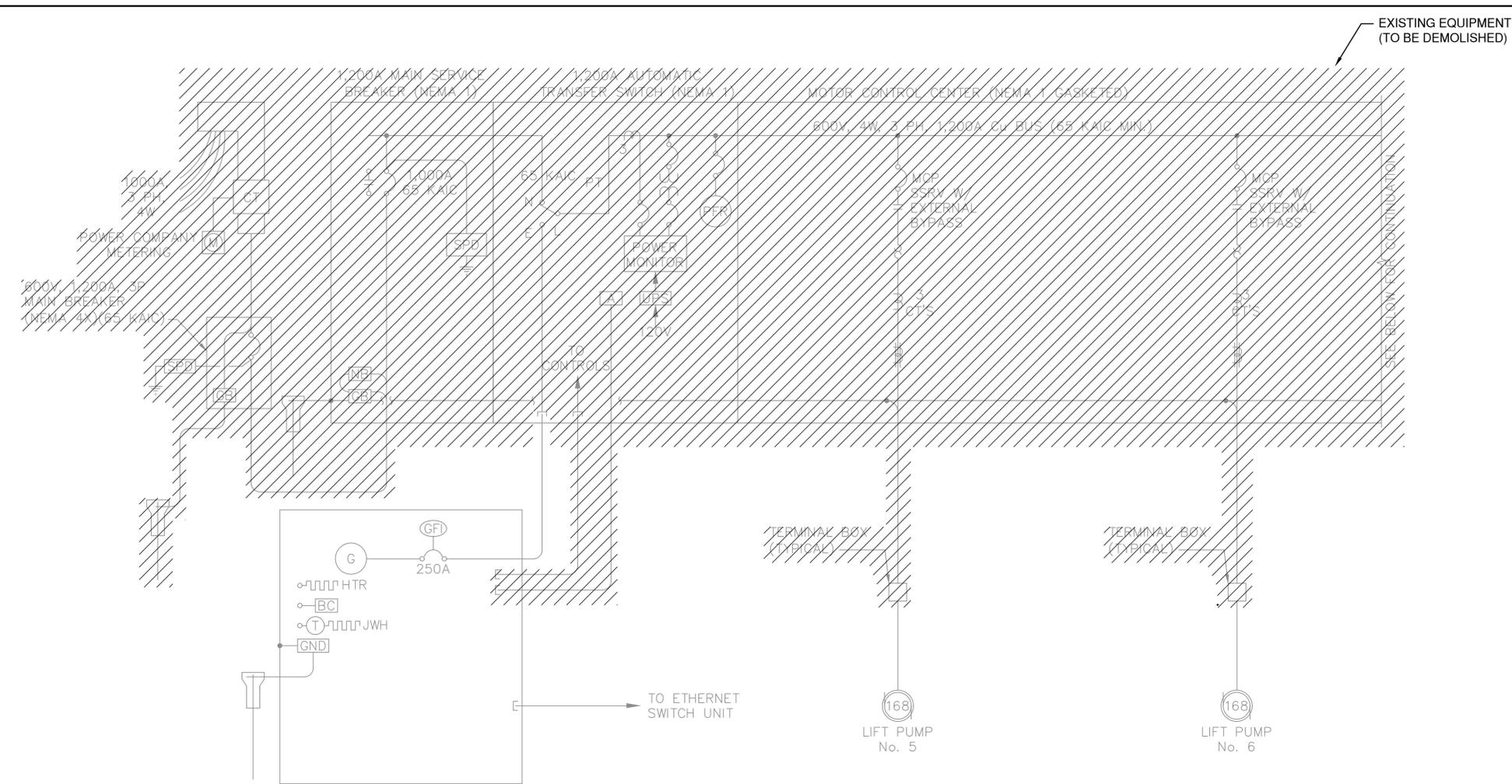
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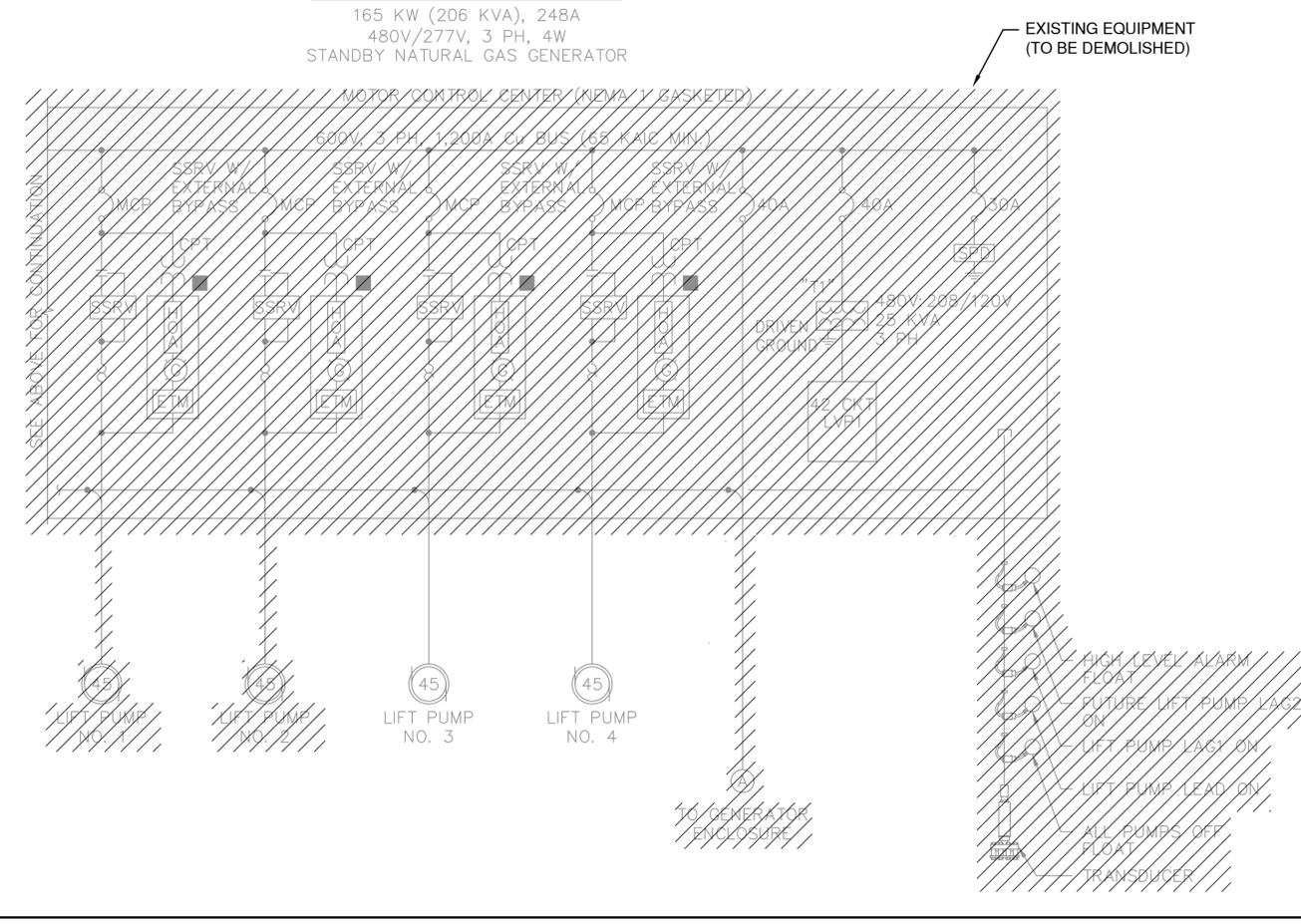
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EXISTING EQUIPMENT
(TO BE DEMOLISHED)



EXISTING EQUIPMENT
(TO BE DEMOLISHED)

- NOTES:**
1. ALL CONDUITS, CONDUCTORS AND DEVICES MAY NOT BE SHOWN ON THIS SHEET.
 2. DEMOLISH MCC IN ITS ENTIRETY. REFER TO PHASING PLAN FOR ADDITIONAL INFORMATION.
 3. CONTRACTOR SHALL COORDINATE WITH OPERATIONS PRIOR TO DEMOLISHING OR SWITCHOVER OF LOADS.
 4. REFER TO PHASING PLAN FOR ADDITIONAL INFORMATION.

ELECTRICAL LOAD ANALYSIS				
LOAD		AMPS		
		PH A	PH B	PH C
LIFT PUMP NO. 1	45HP	58	58	58
LIFT PUMP NO. 2	45HP	58	58	58
LIFT PUMP NO. 3	45HP	58	58	58
LIFT PUMP NO. 4	45HP	58	58	58
LIFT PUMP NO. 5	168HP	214	214	214
LIFT PUMP NO. 6	168HP	214	214	214
"T1" TRANSFORMER	25KVA	53	0	53
25% OF LARGEST MOTOR		54	54	54
TOTAL LOAD		767	714	767
SERVICE AMPACITY @ 480V, 3PH, 4W		1000	1000	1000
SPARE AMPACITY		233	286	233
GENERATOR LOAD		169	116	169
GENERATOR AMPACITY (165KW)		248	248	248
GENERATOR SPARE		79	132	79



E-201

KHA PROJECT 068913102	DATE	JULY 2025	SCALE AS SHOWN	DESIGNED BY: SK	DRAWN BY: JA	CHECKED BY: RG
	DATE					
CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION						
ELECTRICAL ONE-LINE DIAGRAM - DEMOLITION						
SHEET NUMBER						09

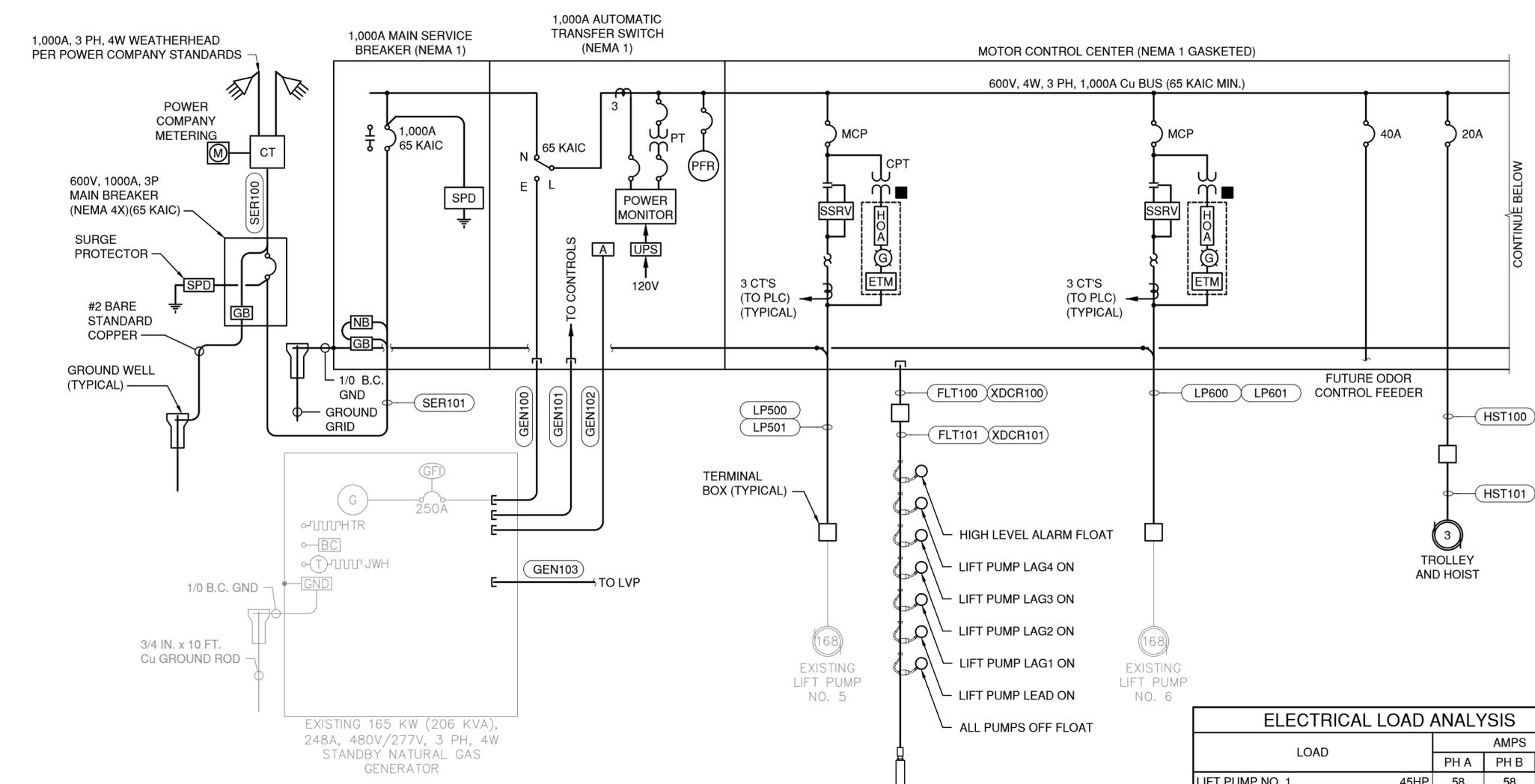
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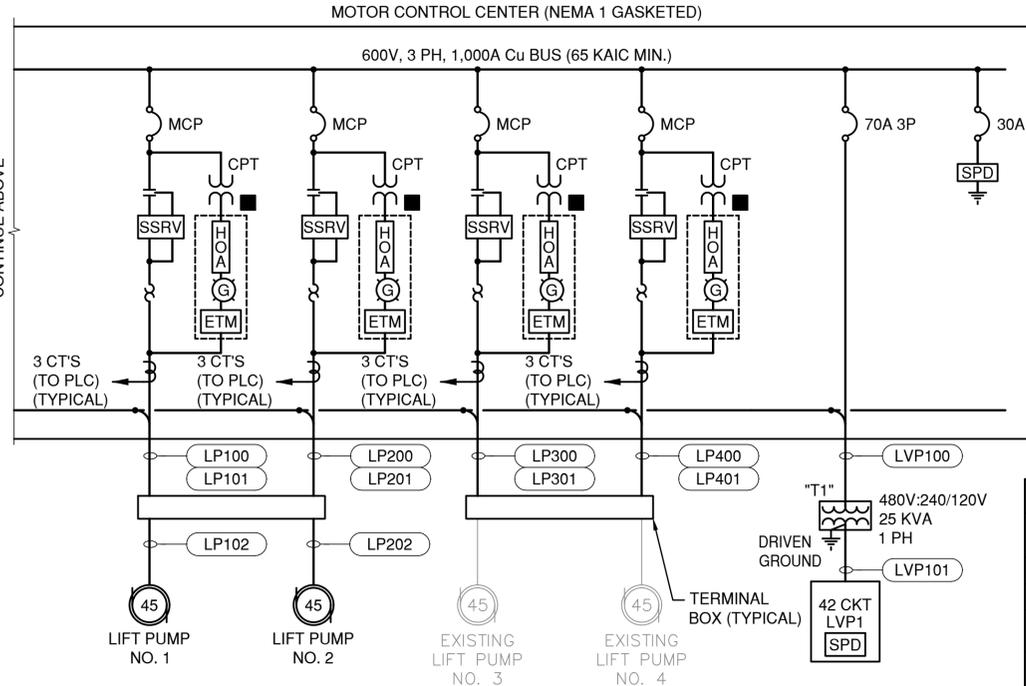
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 Filename: production\101-2506 e-202 solid-prop.dwg



EXISTING 165 KW (206 KVA),
 248A, 480V/277V, 3 PH, 4W
 STANDBY NATURAL GAS
 GENERATOR



LOAD	AMPS		
	PH A	PH B	PH C
LIFT PUMP NO. 1	45HP	58	58
LIFT PUMP NO. 2	45HP	58	58
LIFT PUMP NO. 3	45HP	58	58
LIFT PUMP NO. 4	45HP	58	58
LIFT PUMP NO. 5	168HP	214	214
LIFT PUMP NO. 6	168HP	0	0
TROLLEY AND HOIST	3HP	8	8
FUTURE ODOR CONTROL	10HP	14	14
"T1" TRANSFORMER	25KVA	53	0
25% OF LARGEST MOTOR		54	54
TOTAL LOAD		575	522
SERVICE AMPACITY @ 480V, 3PH, 4W		1000	1000
SPARE AMPACITY		425	478
GENERATOR LOAD		169	116
GENERATOR AMPACITY (165KW)		248	248
GENERATOR SPARE		79	132

USE 65 KAIC RATED DEVICES AND BRACING

FROM	TO	AVAILABLE FAULT @ SOURCE	CONDUCTORS PER PHASE	WIRE SIZE	C	VOLTAGE	LENGTH	F	M	FAULT CURRENT @ LOAD	MINIMUM KAIC RATING
UTILITY	TRANSFORMERS	43553.54	4	500 KCMIL	26706	480	1 IN.	0.00	1.00	48858.56	65
TRANSFORMERS	MCC	48858.56	4	500 KCMIL	26706	480	70 FT	0.12	0.90	49167.57	65
MCC	LIFT PUMP NO.2 TERMINAL BOX	49167.57	1	300 KCMIL	20867	480	45 FT	0.38	0.72	40930.55	22
MCC	LIFT PUMP NO. 5 TERMINAL BOX	49167.57	1	#4	3825	480	27 FT	1.25	0.44	27198.32	42

NOTES:
 1. A PERMANENTLY AFFIXED LABEL SHALL BE APPLIED WITH THE FAULT CURRENT AT THE TIME OF INSTALLATION AND FAULT STUDY. THE LABEL SHALL INCLUDE THE DATE OF THE CALCULATION. REFER TO SPECIFICATIONS.
 2. ALL SERVICES SHALL BE IDENTIFIED WITH A PERMANENT LABEL AT EACH DISCONNECT PER NEC 230.2.
 3. VERIFY NAMEPLATE AND MANUFACTURER'S REQUIREMENTS ON ALL MOTORS PRIOR TO ORDERING EQUIPMENT.

- NOTES:
- ALL CONDUITS, CONDUCTORS AND DEVICES MAY NOT BE SHOWN ON THIS SHEET.
 - VERIFY PUMP MOTOR CURRENT WITH MOTOR MANUFACTURER AND WHERE GREATER THAN NEC VALUE, INCREASE CONDUCTORS AND CONDUIT SIZES ACCORDINGLY.
 - ALL HOA'S, ETM'S AND RUN LIGHTS TO BE MOUNTED ON FACE OF AUTOSENSORY PANEL. PROVIDE PILOT LIGHTS FOR RUN/STOP/FAIL AT MCC STARTER BUCKET.
 - SEE CONDUIT SCHEDULE AND MOTOR DATA TABLE ON SCHEDULE SHEET FOR CONDUIT AND CONDUCTOR REQUIREMENTS.
 - INSTALL SURGE PROTECTOR ACCORDING TO MANUFACTURERS INSTRUCTIONS. SURGE PROTECTOR MUST CONFORM TO SPECIFICATIONS.
 - ALL STARTER BREAKERS TO HAVE LOCKOUT FEATURE.
 - SSRV STARTERS SHALL HAVE NEMA RATED BYPASS CONTACTOR CAPABLE OF STARTING MOTOR WHEN SSRV FAILS, OR WHEN SELECTED TO START FULL VOLTAGE ACROSS THE LINE. THE STANDARD RUN BYPASS CONTACTOR ALONE WILL NOT SUFFICE.
 - ALL ENCLOSURES, HARDWARE, STRAPS, AND ANCHORS TO BE 316 STAINLESS STEEL.
 - CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH POWER COMPANY AND PROVIDE EQUIPMENT RATED ACCORDINGLY.
 - CONTRACTOR SHALL READ ENTIRE CONTENTS OF SPECIFICATIONS BEFORE BIDDING ON THIS PROJECT.
 - PROVIDE ALL REQUIRED ALARM AND DEVICE POWER CONDUCTORS FOR LOCAL PANELS INSTALLED NEAR MOTORS AND EQUIPMENT. SEE ONE-LINE DIAGRAM, CONTROL DIAGRAMS, AND EQUIPMENT SPECIFICATIONS FOR REQUIREMENTS.
 - ALL UNDERGROUND CONDUITS SHALL BE PVC SCH. 80. ALL ABOVE GROUND CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL.
 - SERVICE SHALL ADHERE TO THE LATEST UTILITY STANDARDS. COORDINATE AND PAY FOR ALL UTILITY RELATED EXPENSES PER POWER COMPANY ALLOWANCE. SUBMIT AUTOMATIC TRANSFER SWITCH DATA TO UTILITY COMPANY.
 - PROVIDE RELAY FOR BREAKER STATUS TO CONTROLLER.
 - IF EXISTING MANUFACTURES CABLE PROVES TO BE UNUSABLE, CONTRACTOR SHALL RUN NEW MANUFACTURERS RECOMMENDED CABLE TO EXISTING LIFT PUMPS.

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STATE OF TEXAS
 RICARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 July 23, 2025

KHA PROJECT: 068913102
 DATE: JULY 2025
 SCALE: AS SHOWN
 DESIGNED BY: SK
 DRAWN BY: JA
 CHECKED BY: RG

CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

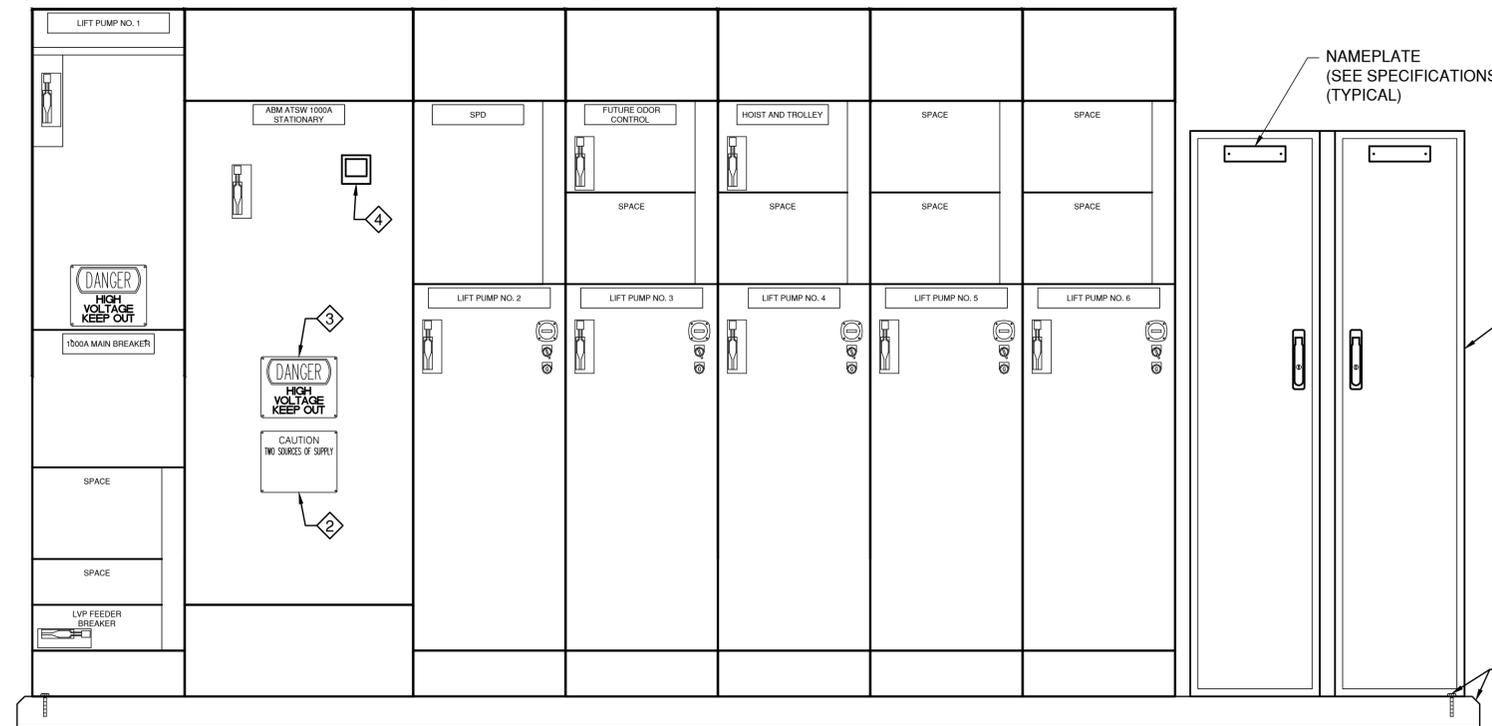
ELECTRICAL ONE-LINE DIAGRAM - PROPOSED

SHEET NUMBER
 10



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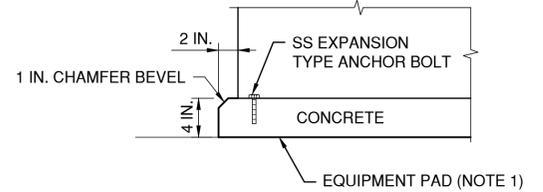
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 Filename: production\101-2506 e-301 emcc.dwg



NOTES:

- SUBMIT LAYOUT OF MCC, SWITCHGEAR, TRANSFORMER AND OTHER ELECTRICAL EQUIPMENT TO ENGINEER FOR APPROVAL BEFORE INSTALLING CONDUIT.
- INSTALL TOP OF SCREENS AT APPROXIMATELY 5 FT. - 6 IN. AFF. ARRANGE ALL ALARMS HIGH ON PANEL. ARRANGE CONTROLS IN LIKE ORDER VERTICALLY. ALL DEVICES MAY NOT BE SHOWN. CONTRACTOR SHALL PROVIDE FULL FUNCTIONALITY AS DEFINED IN THE PROJECT SPECIFICATIONS.
- SEAL ALL UNDERGROUND CONDUITS STUB-UPS INTO MOTOR CONTROL CENTER AND SECTIONS WITH CSBE SEAL WHEN 1 & 1/2 IN. AND LARGER AND WITH DUCT SEAL WHEN SMALLER.
- CONTRACTOR SHALL COORDINATE CONCRETE PAD SIZE REQUIREMENTS WITH ALL EQUIPMENT MANUFACTURERS. DIMENSIONS VARY WITH MANUFACTURERS. CONFIRM EQUIPMENT SIZE WITH SELECTED MANUFACTURER AND ADJUST AS NECESSARY TO FIT SPACE IN CONTROL ROOM. MCC LAYOUT IS TYPICAL AND MAY VARY PER MANUFACTURER ADDITIONAL SECTIONS MAY BE REQUIRED.
- CONTRACTOR SHALL PROTECT EXISTING EQUIPMENT DURING CONCRETE INSTALLATION TO PREVENT OVERSPRAY AND CONCRETE SPLATTER. ALL EXISTING EQUIPMENT SHALL BE SALVAGED AND DELIVERED TO CITY OPERATIONS PER SITE COORDINATION. ALL DAMAGE TO EXISTING EQUIPMENT SHALL BE CORRECTED OR REPLACED WITH EQUAL.
- MCC DIMENSIONS MAY VARY PER MANUFACTURER. MCC MUST FIT INTO SPACE AVAILABLE.
- INNER SWING PANELS MAY BE REQUIRED FOR INSTALLING ALL DEVICES.
- ALL PANEL MOUNTED DEVICES MAY NOT BE SHOWN. SEE ONE-LINE AND CONTROL DIAGRAMS, AND DETAILS FOR ADDITIONAL DEVICES. LAYOUT IS TYPICAL.
- USE STAINLESS STEEL SCREWS TO ATTACH NAMEPLATES. ADHESIVE IS NOT ACCEPTABLE FOR NAMEPLATES NOR CABLE RESTRAINTS.
- INSTALL PLASTIC LAMINATED DIAGRAMS IN POCKETS INSIDE EACH MCC DOOR.
- TERMINATE MCC FEEDERS THIS SECTION. ADDITIONAL SECTION FOR OPTIONAL MCC MANUFACTURERS TO BE COORDINATED BY CONTRACTOR.

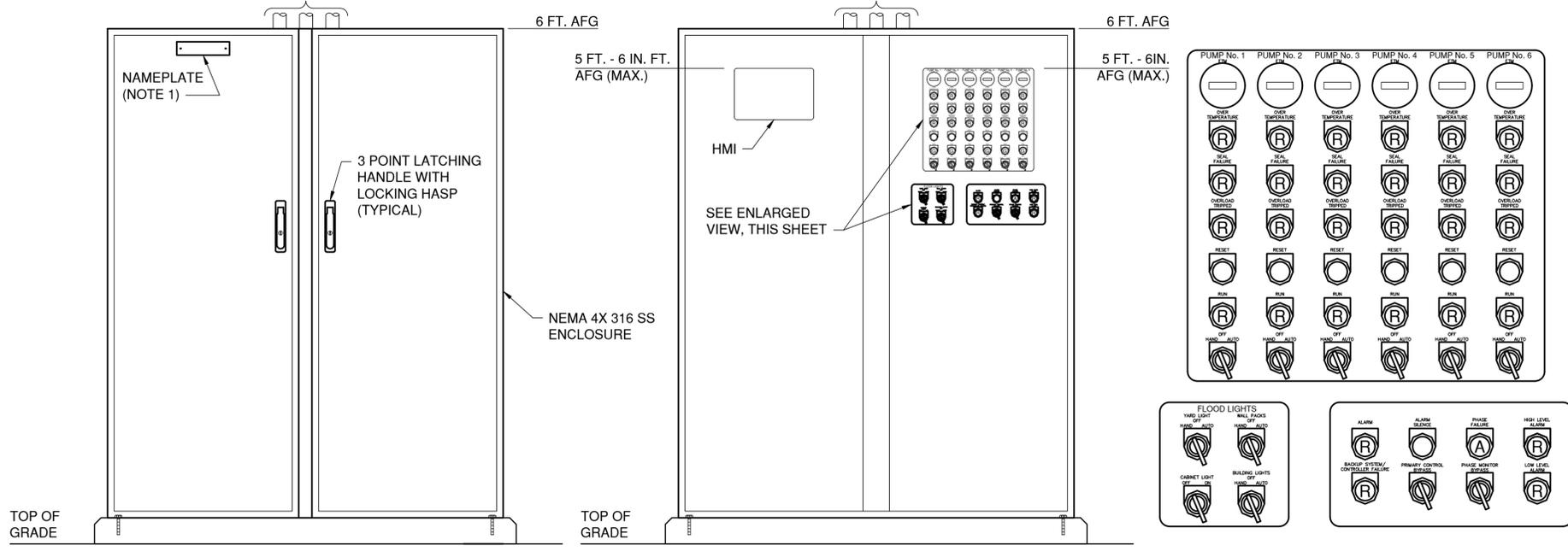
MOTOR CONTROL CENTER ELEVATION DETAIL
 SCALE: N.T.S. / (NOTES 3 & 6)



NOTE:

- ALL HOUSE KEEPING PADS SHALL EXTEND 2 INCHES BEYOND EQUIPMENT. PROVIDE 1 INCH CHAMFER OR BEVEL ON ALL EXPOSED EDGES.

MCC PAD AND ANCHOR DETAIL
 SCALE: N.T.S.



CONTROL CABINET DETAIL
 SCALE: N.T.S.

NOTES:

- NAMEPLATES SHALL BE MOUNTED TO CONTROL PANEL USING STAINLESS STEEL HARDWARE.
- UNLESS OTHERWISE NOTED, ALL EXPOSED CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL.
- UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL.
- SEAL ALL CONDUITS ENTERING CONTROL PANEL WITH CSBE. ALL OTHER CONTROL PENETRATIONS SHALL USE LIQUID TIGHT RE-ENTERABLE SEALING COMPOUND.
- BASE OF ENCLOSURE TO BE 18 IN. ABOVE FINISHED GRADE AND NOT LESS THAN 12 IN. ABOVE FLOOD PLAIN ELEVATION.
- ARRANGE INNER DOOR DEVICES TO MATCH DETAIL.

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STATE OF TEXAS
 RICHARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 JULY 23, 2025

KHA PROJECT	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
068913102	JULY 2025	SK	JA	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

ELECTRICAL
MOTOR CONTROL CENTER

GUZMAN ENGINEERING
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- GENERAL NOTES:
1. ALL SERVICE3 AND MOTOR FEEDER CONDUCTORS TO BE XHHW-2. LOW VOLTAGE CONDUCTORS IN FEEDER CONDUIT TO BE 600V RATED
 2. PROVIDE LAMINATED PANEL SCHEDULE TO OPERATIONS PRIOR TO CLOSE OUT.
 3. LVP102 IS TO BE INSTALLED PRIOR TO MCC INSTALLATION. REFER TO PHASING PLAN FOR ADDITIONAL INFORMATION.

CABLE AND CONDUIT SCHEDULE

CABLE/CONDUIT TAG	CONDUIT QUANTITY	CONDUIT SIZE	FROM	TO	CONDUCTOR (EACH CONDUIT)	CABLE TYPE	DESCRIPTION
BRD100	1	1 IN.	LOW VOLTAGE PANEL	BARD UNIT	2-#10 + #8 GND	XHHW-2	BARD UNIT
FLT100	1	1 & 1/2 IN.	CONTROL CABINET	FLOATS/TRANSDUCER TERMINAL BOX	14-#12 + #12 GND	THWN-2	FLOATS
FLT101	1	1 & 1/2 IN.	FLOATS/TRANSDUCER TERMINAL BOX	WET WELL	(7) MANUFACTURER'S CABLE	-	FLOATS
GEN100	1 + 1 SPARE	3 IN.	EMERGENCY GENERATOR	AUTOMATIC TRANSFER SWITCH	3-400 KCMIL + 1/0 GND	XHHW-2	EMERGENCY POWER
GEN101	1	1 IN.	EMERGENCY GENERATOR	AUTOMATIC TRANSFER SWITCH	4-#12 + #12 GND	THWN-2	ATS CONTROLS
GEN102	1	1 & 1/2 IN.	EMERGENCY GENERATOR	MCC	4-#12 + #12 GND	THWN-2	GENERATOR ALARM SIGNALS
GEN103	1	1 & 1/2 IN.	LOW VOLTAGE PANEL	EMERGENCY GENERATOR	12-#10 + #12 GND	THWN-2	GENERATOR DEVICES (HEATER, BATTERY CHARGER, LIGHTS, RECEPTACLE)
GEN104	1	1 IN.	EMERGENCY GENERATOR	CONTROL CABINET	ETHERNET CABLE	-	GENERATOR ETHERNET COMMUNICATIONS
HST100	1	1 & 1/2 IN.	MCC	HOIST TERMINAL BOX	3-#10 + #8 GND	XHHW-2	HOIST POWER
HST101	1	1 & 1/2 IN.	HOIST TERMINAL BOX	HOIST	MANUFACTURES CABLE	-	HOIST POWER
LP100	1	3 IN.	MCC	LIFT PUMP NO. 1 & 2 TERMINAL BOX	3-#4 + #8 GND	XHHW-2	LIFT PUMP NO. 1 POWER
LP101	1	1 IN.	MCC	LIFT PUMP NO. 1 & 2 TERMINAL BOX	6-#12 + #12 GND	THWN-2	LIFT PUMP NO. 1 CONTROLS
LP102	1	1 & 1/2 IN.	LIFT PUMP NO. 1 & 2 TERMINAL BOX	LIFT PUMP NO. 1	MANUFACTURERS CABLE	-	LIFT PUMP NO. 1 CABLE
LP200	1	3 IN.	MCC	LIFT PUMP NO. 1 & 2 TERMINAL BOX	3-#4 + #8 GND	XHHW-2	LIFT PUMP NO. 2 POWER
LP201	1	1 & 1/2 IN.	MCC	LIFT PUMP NO. 1 & 2 TERMINAL BOX	6-#12 + #12 GND	THWN-2	LIFT PUMP NO. 2 CONTROL
LP202	1	1 & 1/2 IN.	LIFT PUMP NO. 1 & 2 TERMINAL BOX	LIFT PUMP NO. 2	MANUFACTURERS CABLE	-	LIFT PUMP NO. 2 CABLE
LP300	1	3 IN.	MCC	LIFT PUMP NO. 3 & 4 TERMINAL BOX	3-# 4 + #8 GND	XHHW-2	LIFT PUMP NO. 3 POWER
LP301	1	1 & 1/2 IN.	MCC	LIFT PUMP NO. 3 & 4 TERMINAL BOX	6-#12 + #12 GND	THWN-2	LIFT PUMP NO. 3 CONTROLS
LP400	1	3 IN.	MCC	LIFT PUMP NO. 3 & 4 TERMINAL BOX	6-#12 + #12 GND	XHHW-2	LIFT PUMP NO. 4 POWER
LP401	1	1 & 1/2 IN.	MCC	LIFT PUMP NO. 3 & 4 TERMINAL BOX	3-# 4 + #8 GND	THWN-2	LIFT PUMP NO. 4 CONTROLS
LP500	1	3 IN.	MCC	LIFT PUMP NO. 5 TERMINAL BOX	3-300 KCMIL + #2 GND	THWN-2	LIFT PUMP NO. 5 POWER
LP501	1	1 & 1/2 IN.	MCC	LIFT PUMP NO. 5 TERMINAL BOX	6-#12 + #12 GND	XHHW-2	LIFT PUMP NO. 5 CONTROLS
LP600	1	3 IN.	MCC	LIFT PUMP NO. 6 TERMINAL BOX	3-300 KCMIL + #2 GND	THWN-2	LIFT PUMP NO. 6 POWER
LP601	1	1 & 1/2 IN.	MCC	LIFT PUMP NO. 6 TERMINAL BOX	6-#12 + #12 GND	XHHW-2	LIFT PUMP NO. 6 CONTROLS
LTG100	1	1 & 1/2 IN.	LOW VOLTAGE PANEL	AREA LIGHT	2-#10 + #8 GND	XHHW-2	AREA LIGHT
LTG200	1	1 & 1/2 IN.	LOW VOLTAGE PANEL	AREA LIGHT	2-#10 + #8 GND	XHHW-2	AREA LIGHT
LVP100	1	1 & 1/2 IN.	MCC	LOW VOLTAGE TRANSFOMER	2-#4 + #8 GND	XHHW-2	TRANSFORMER FEEDER
LVP101	1	1 & 1/2 IN.	LOW VOLTAGE TRANSFORMER	LOW VOLTAGE PANEL	2-#1 + #6 GND	XHHW-2	LOW VOLTAGE PANEL FEEDER
LVP102	1	1 & 1/2 IN.	EXISTING MCC	LOW VOLTAGE PANEL	2-#1 + #6 GND	XHHW-2	LOW VOLTAGE PANEL FEEDER (NOTE 3)
SER100	3 + 1 SPARE	3 IN.	OVERHEAD TRANSFORMER POLE	EXTERNAL MAIN BREAKER	4-500KCMIL + 1/0 GND	XHHW-2	UTILITY SERVICE
SER101	3 + 1 SPARE	3 IN.	EXTERNAL MAIN BREAKER	MCC	4-500KCMIL + 1/0 GND	XHHW-2	UTILITY SERVICE
XDCR100	1	1 IN.	CONTROL PANEL	TRANSDUCER TERMINAL BOX	SHIELDED TWSITED PAIR CABLE	THWN-2	TRANSDUCER
XDCR101	1	1 IN.	TRANSDUCER TERMINAL BOX	TRANSDUCER STILLING WELL	MANUFACTURERS CABLE	-	TRANSDUCER

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RICARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 JULY 23, 2025

KHA PROJECT	068913102
DATE	JULY 2025
SCALE AS SHOWN	
DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

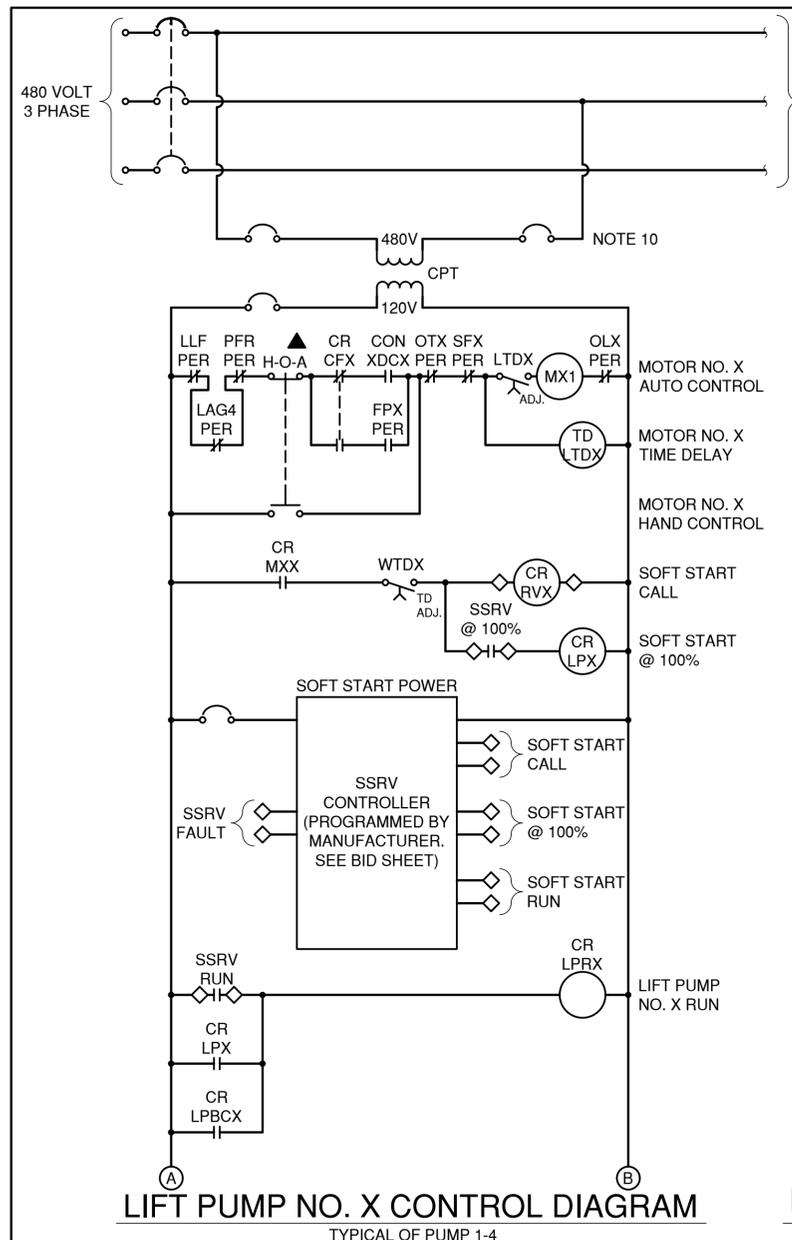
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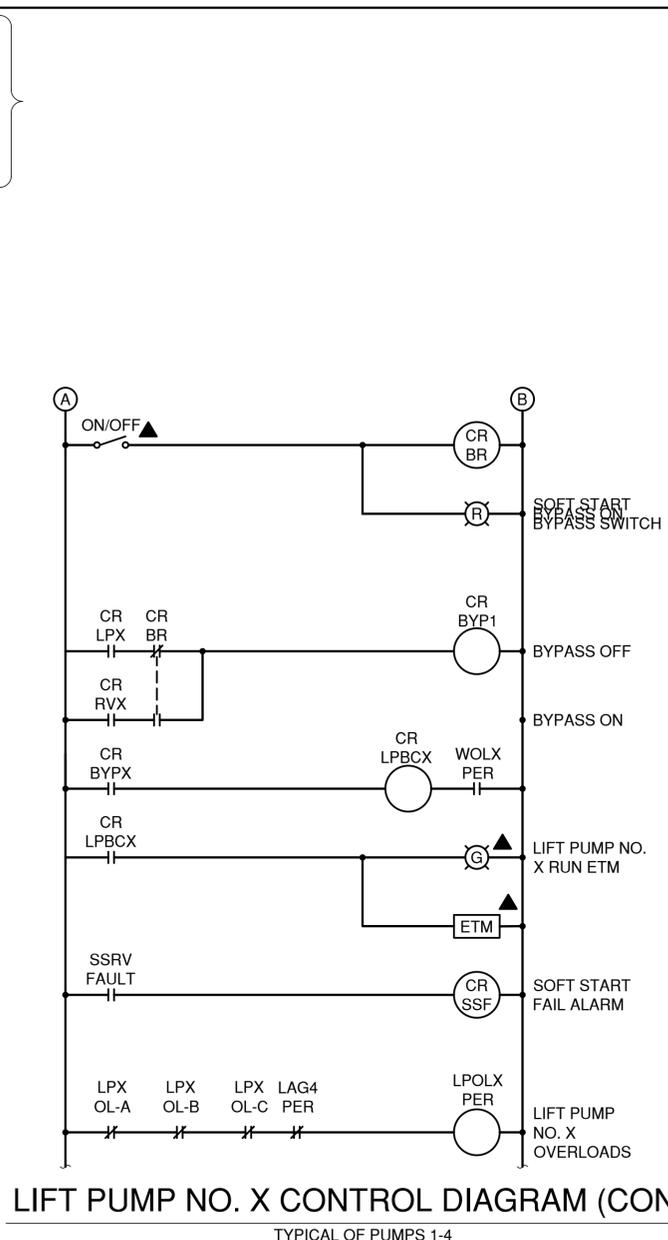
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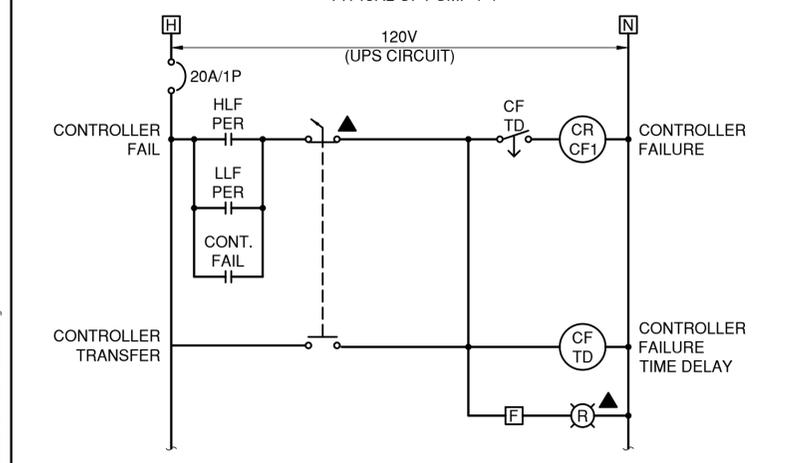
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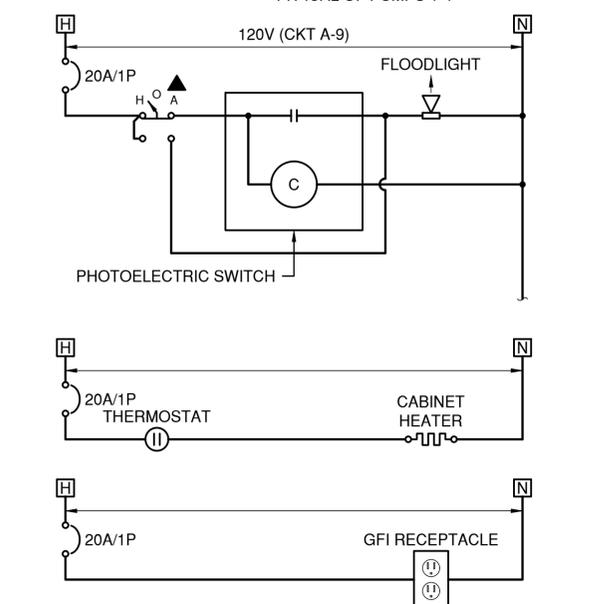
LIFT PUMP NO. X CONTROL DIAGRAM
 TYPICAL OF PUMP 1-4



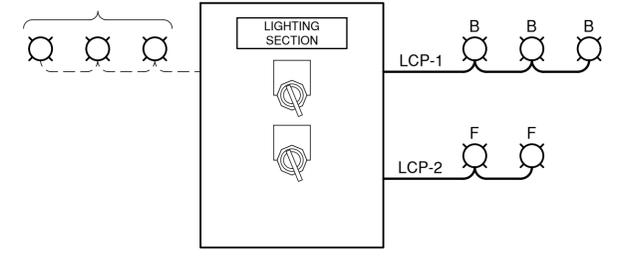
LIFT PUMP NO. X CONTROL DIAGRAM (CONT.)
 TYPICAL OF PUMPS 1-4



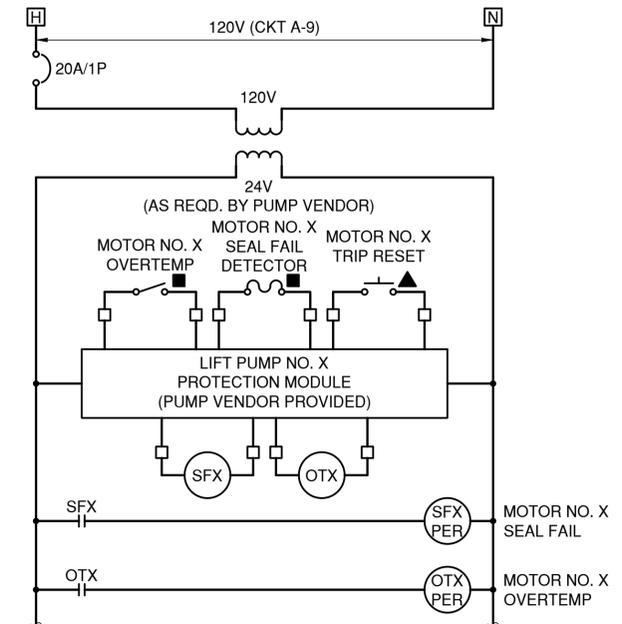
CONTROLLER FAILURE CONTROL DIAGRAM



CONTROL PANEL CONTROL DIAGRAM



LIGHTING NOTIONAL DIAGRAM
 (NOTES 18 & 19)



LIFT STATION PUMP PROTECTION MODULE
 TYPICAL OF ALL PUMPS

- NOTES:**
- PROVIDE SINGLE ALARM RESET SWITCH FOR ALL DEVICES INCLUDING PUMP PROTECTION MODULES, OVERLOADS, AND ALARMS. MOUNT TO INNER DOOR OF CONTROL PANEL.
 - REFER TO ABBREVIATION PAGE FOR SYMBOL LEGEND.
 - CONTRACTOR TO INSTALL ALL SAFETY AND ACCESSORIES REQUIRED BY PUMP VENDOR.
 - COORDINATE TIME DELAY RELAY SETTINGS SO THAT ONLY ONE PUMP WILL BE IN START MODE AT ONE TIME - START AT 30 SECOND INTERVALS.
 - ALL INDICATING LIGHTS TO BE LED PUSH TO TEST OIL TIGHT TYPE.
 - AUTO START/STOP FROM PUMP CONTROLLER AS PRIMARY MEANS OF CONTROL. WHERE CONTROLLER FAILS, BACKUP CONTROLS SHALL RESUME OPERATION OF SITE AND ALARM SHALL BE ISSUED FOR "CONTROLLER FAILURE"
 - ALL SWITCHES, INDICATING LIGHTS, AND PUSH BUTTONS TO BE MOUNTED ON INNER SWING PANEL.
 - ALL CONTROLS FOR EQUIPMENT INSIDE WET WELL ARE TO BE INTRINSICALLY SAFE.
 - PROVIDE SUBMITTAL WITH ALARM WIRING DIAGRAM FOR ENGINEERS REVIEW.
 - MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504 BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.
 - ONLY QUALIFIED PANEL MANUFACTURERS WITH OVER 5 YEARS OF EXPERIENCE BUILDING PANELS SHALL BE ALLOWED TO BUILD PANEL.
 - COORDINATE WITH PUMP MANUFACTURER FOR PUMP PROTECTION MODULE PROVIDE AND INSTALL MODULE SEAL FAIL AND OVERTEMP.
 - WHERE ADDITIONAL CONTACTS ARE REQUIRED, PROVIDE ADDITIONAL CONTACT BLOCK OR ADDITIONAL RELAYS WITH COILS WIRED IN PARALLEL.
 - PROVIDE CIRCUIT FUSES RECOMMENDED BY MANUFACTURER.
 - COORDINATE ALL NORMALLY CLOSED AND NORMALLY OPEN CONTACTS.
 - STARTER AND MOTOR PROTECTION MODULE ARE TYPICAL OFF ALL LIFT PUMPS.
 - INTENDED SEQUENCING OF PUMPS IS AS FOLLOWS: PUMPS 1-4 ARE TO BE OPERATED UNTIL LAG4 IS DETECTED. UPON DETECTION OF LAG4, PUMPS 1-4 SHALL TURN OFF AND PUMPS 5-6 SHALL TURN ON. PUMPS 5-6 SHALL NOT RUN CONCURRENTLY WITH ANY OTHER PUMP.
 - DIAGRAM SHOWN FOR CLARITY. CONTRACTOR TO BE RESPONSIBLE FOR PROVIDING ALL PLANT LIGHTING CIRCUITS NOT SHOWN.
 - ALL LIGHTING FIXTURES SHALL HOMERUN BACK TO LIGHTING CONTROL SECTION. ROUTE TO CIRCUITS TO INDIVIDUAL CONTACTORS AS NOTED. CONDUIT SHALL BE MINIMUM 1 1/2 IN. CONDUCTORS SHALL BE MINIMUM #12 XHHW-2.

BY	
DATE	
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**CITY OF FRIENDSWOOD
 LIFT STATION #2
 REHABILITATION**

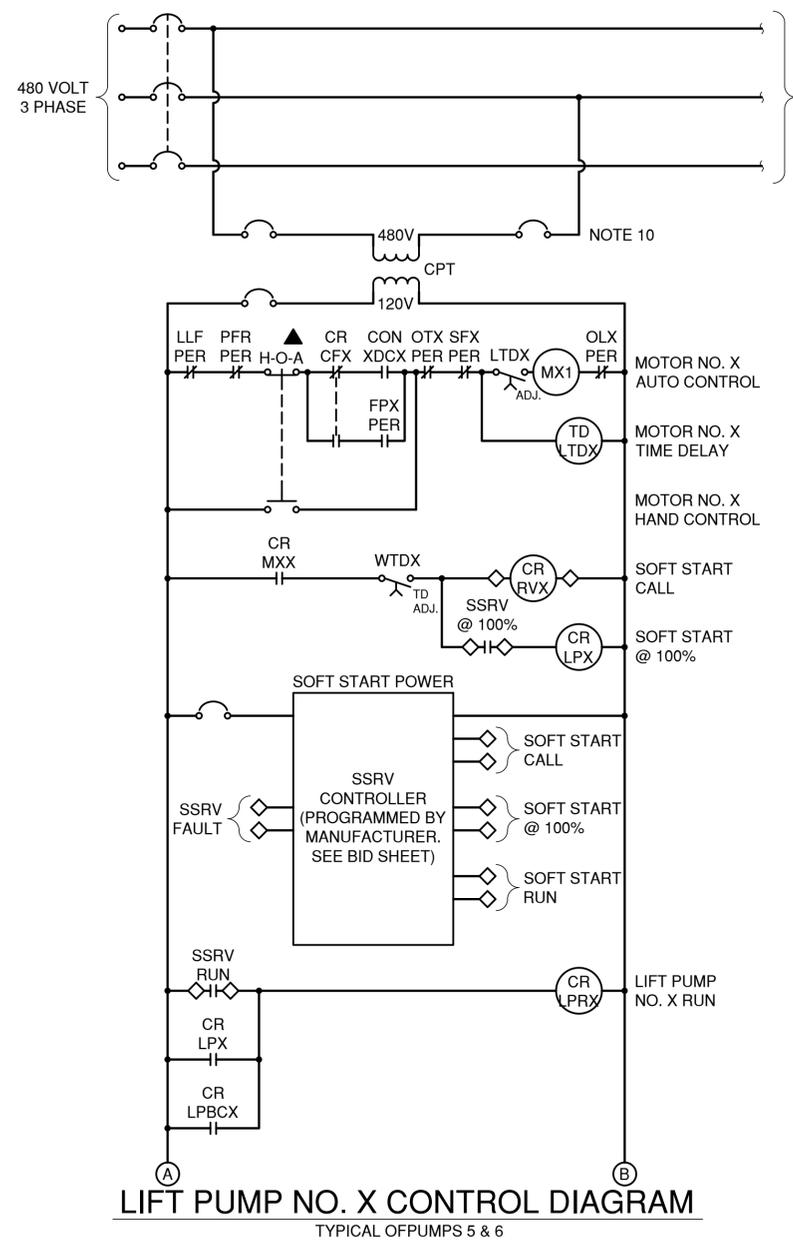
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 SHEET 1**

SHEET NUMBER
 14

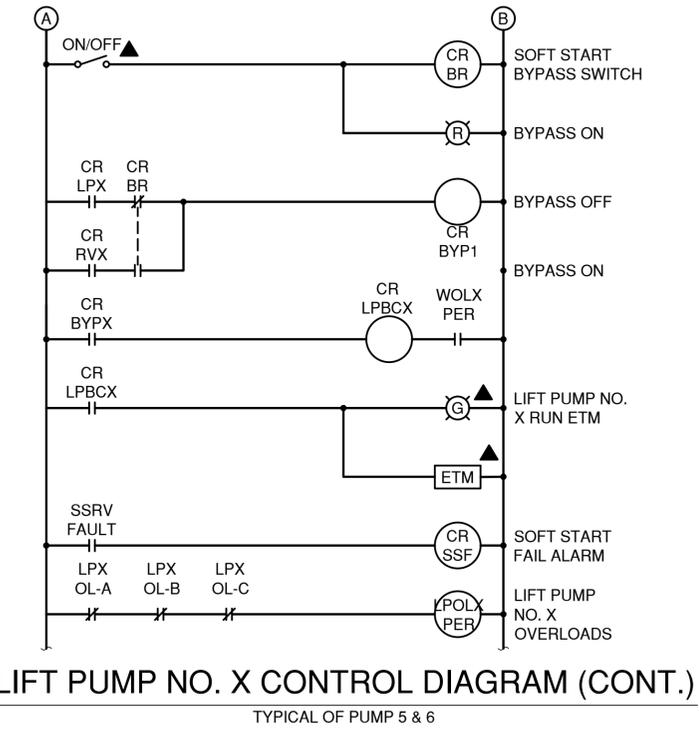


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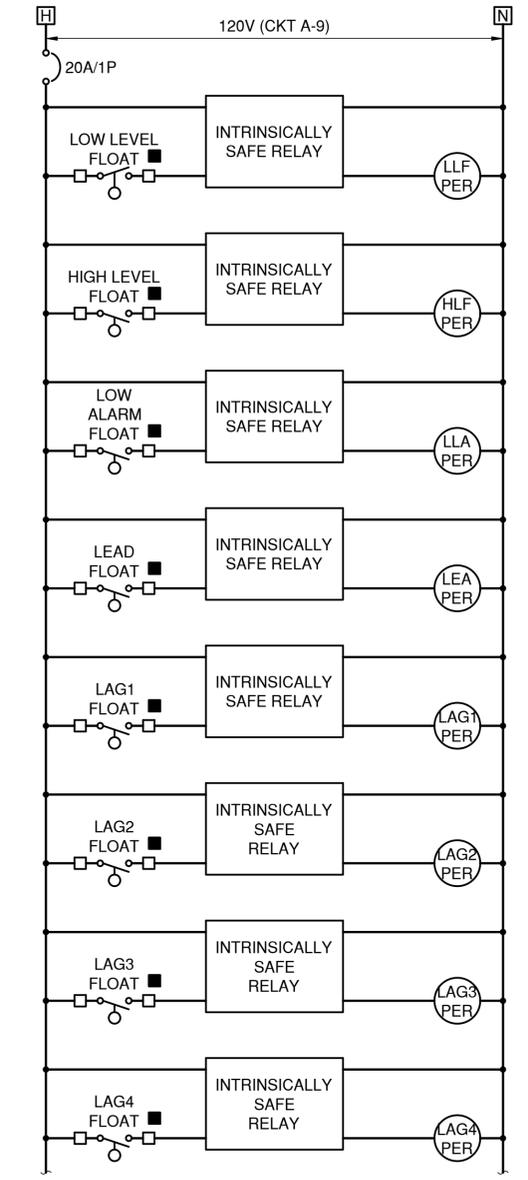
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LIFT PUMP NO. X CONTROL DIAGRAM
 TYPICAL OF PUMPS 5 & 6

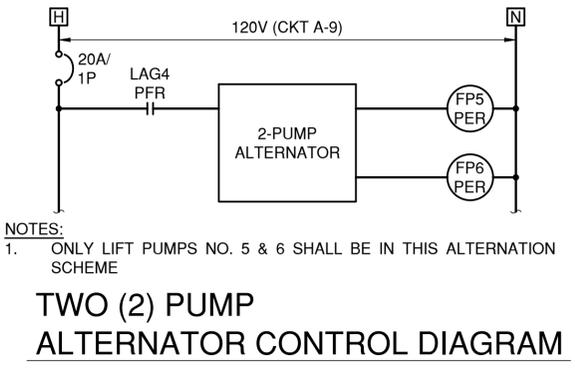


LIFT PUMP NO. X CONTROL DIAGRAM (CONT.)
 TYPICAL OF PUMP 5 & 6

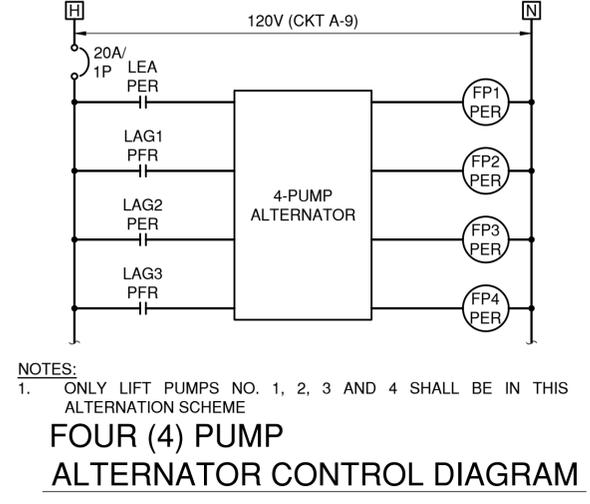


LIFT STATION PUMP FLOAT CONTROL DIAGRAM

- GENERAL NOTES:**
1. PROVIDE SINGLE ALARM RESET SWITCH FOR ALL DEVICES INCLUDING PUMP PROTECTION MODULES, OVERLOADS, AND ALARMS. MOUNT TO INNER DOOR OF CONTROL PANEL.
 2. REFER TO ABBREVIATION PAGE FOR SYMBOL LEGEND.
 3. CONTRACTOR TO INSTALL ALL SAFETY AND ACCESSORIES REQUIRED BY PUMP VENDOR.
 4. COORDINATE TIME DELAY RELAY SETTINGS SO THAT ONLY ONE PUMP WILL BE IN START MODE AT ONE TIME - START AT 30 SECOND INTERVALS.
 5. ALL INDICATING LIGHTS TO BE LED PUSH TO TEST OIL TIGHT TYPE.
 6. AUTO START/STOP FROM PUMP CONTROLLER AS PRIMARY MEANS OF CONTROL. WHERE CONTROLLER FAILS, BACKUP CONTROLS SHALL RESUME OPERATION OF SITE AND ALARM SHALL BE ISSUED FOR "CONTROLLER FAILURE"
 7. ALL SWITCHES, INDICATING LIGHTS, AND PUSH BUTTONS TO BE MOUNTED ON INNER SWING PANEL.
 8. ALL CONTROLS FOR EQUIPMENT INSIDE WET WELL ARE TO BE INTRINSICALLY SAFE.
 9. PROVIDE SUBMITTAL WITH ALARM WIRING DIAGRAM FOR ENGINEERS REVIEW.
 10. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504 BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.
 11. ONLY QUALIFIED PANEL MANUFACTURERS WITH OVER 5 YEARS OF EXPERIENCE BUILDING PANELS SHALL BE ALLOWED TO BUILD PANEL.
 12. COORDINATE WITH PUMP MANUFACTURER FOR PUMP PROTECTION MODULE PROVIDE AND INSTALL MODULE SEAL FAIL AND OVERTEMP.
 13. WHERE ADDITIONAL CONTACTS ARE REQUIRED, PROVIDE ADDITIONAL CONTACT BLOCK OR ADDITIONAL RELAYS WITH COILS WIRED IN PARALLEL.
 14. PROVIDE CIRCUIT FUSES RECOMMENDED BY MANUFACTURER.
 15. COORDINATE ALL NORMALLY CLOSED AND NORMALLY OPEN CONTACTS.
 16. LIFT PUMPS NO. 5 & 6 SHALL NOT RUN WHILE ANY LIFT PUMP NO. 1-4 ARE RUNNING.



TWO (2) PUMP ALTERNATOR CONTROL DIAGRAM



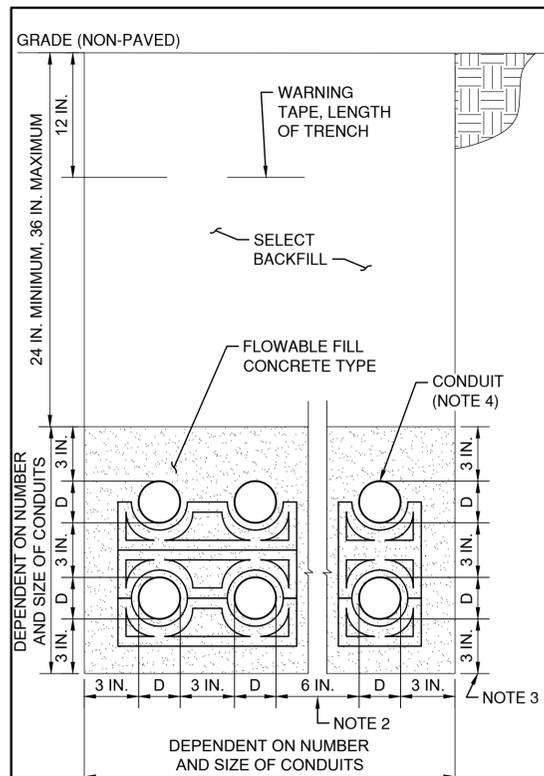
FOUR (4) PUMP ALTERNATOR CONTROL DIAGRAM



KHA PROJECT 068913102	DATE	JULY 2025	SCALE AS SHOWN	DESIGNED BY: SK	DRAWN BY: JA	CHECKED BY: RG
	DATE					
Kimley»Horn STATE OF TEXAS REGISTRATION NO. F-928 11700 KATY FREEMAN SUITE 800 HOUSTON, TX 77079 WWW.KIMLEY-HORN.COM © 2025 KIMLEY-HORN AND ASSOCIATES, INC.						
CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION						
ELECTRICAL CONTROL DIAGRAMS SHEET 2						
SHEET NUMBER						15

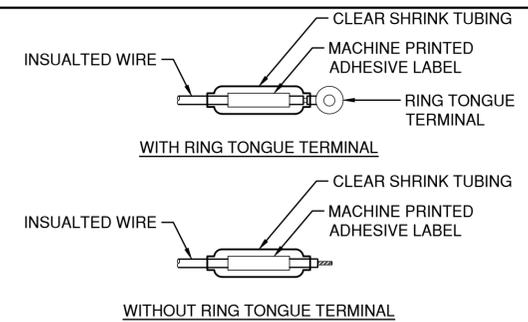
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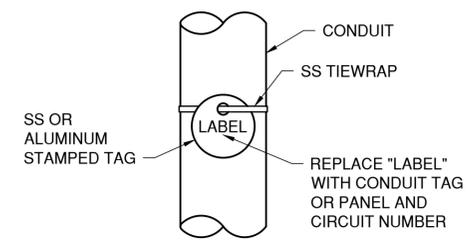
- NOTES:**
1. D = NOMINAL CONDUIT TRADE SIZE PER PLAN.
 2. MINIMUM SEPARATION OF POWER AND SYSTEMS IN COMMON TRENCH.
 3. MINIMUM SEPARATION BETWEEN CONDUITS OF SAME TYPE.
 4. CONDUIT SIZE INDICATED ON PLANS.

TYPICAL PRIMARY DUCT BANK SECTION DETAIL
 SCALE: N.T.S.



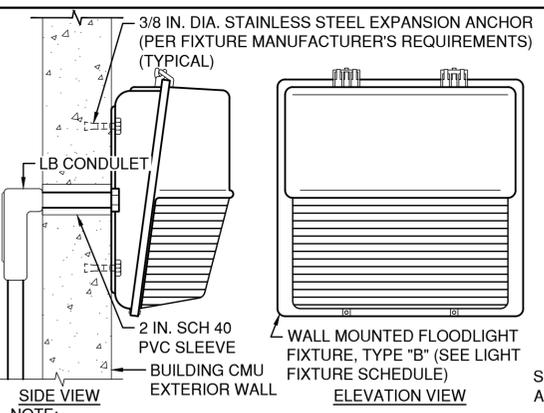
- NOTES:**
1. WHERE POSSIBLE RING TERMINALS SHALL BE USED. ONE OF THE ABOVE METHODS MUST BE USED ON ALL WIRE #8 AWG AND SMALLER. THE SAME MUST ALSO BE USED ON LARGER WIRE UNLESS AN ALTERNATE METHOD IS SUBMITTED AND APPROVED.

WIRE TERMINATION AND MARKING DETAIL
 SCALE: N.T.S.



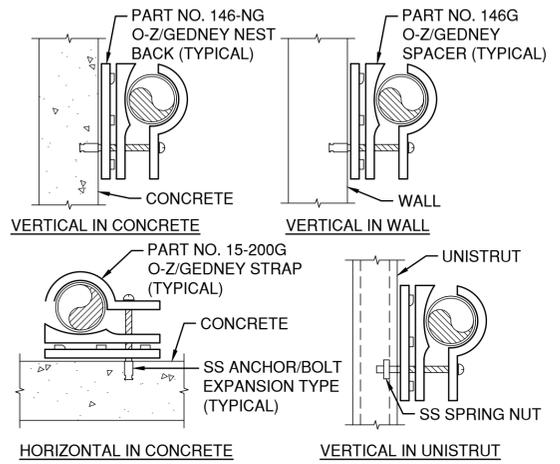
- NOTE:**
1. AS-BUILT DRAWINGS SHOULD CONTAIN RECORD OF ACTUAL INSTALLED CONDUITS AND CONDUCTORS THAT COORDINATE WITH FIELD LABELS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

CONDUIT LABEL DETAIL
 SCALE: N.T.S. / (TYPICAL)

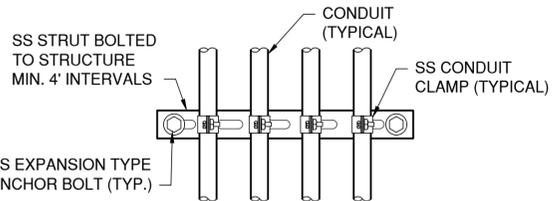


- NOTE:**
1. MOUNT BOTTOM OF FIXTURE AT 7 FT. - 6 IN. AFG. MINIMUM.

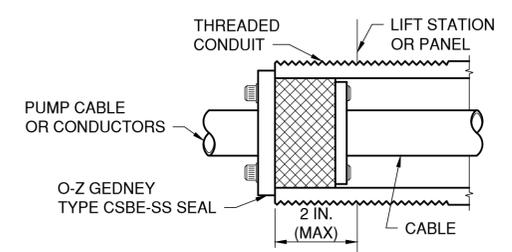
TYPICAL BUILDING EXTERIOR LIGHT INSTALLATION DETAIL
 SCALE: N.T.S. / (NOTE 1)



CONDUIT SUPPORT DETAIL
 SCALE: N.T.S.

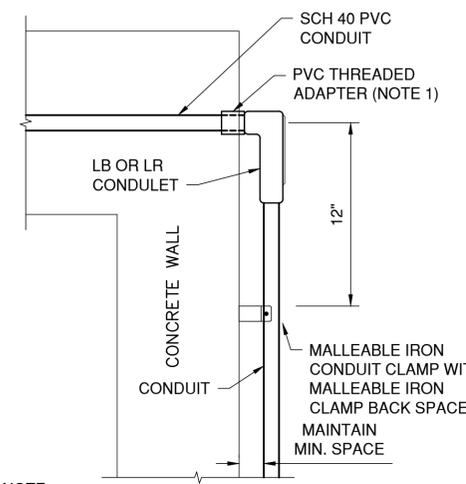


CONDUIT SUPPORT DETAIL
 SCALE: N.T.S.



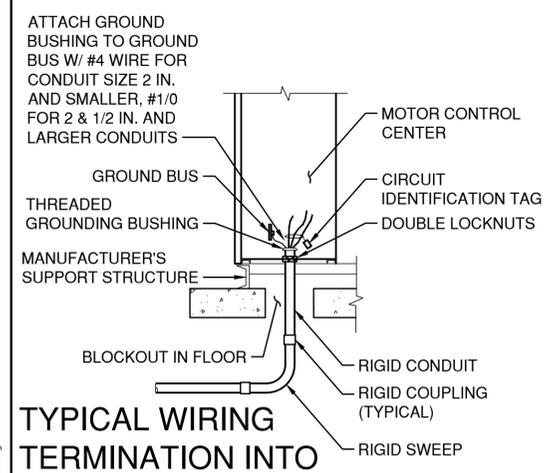
- NOTE:**
1. USE CSBE SEALS IN ALL CONDUITS 1 1/2 IN. AND GREATER AND USE EYS SEALS FOR LESS THAN 1 1/2 IN. EXCEPT WHERE SHOWN OTHERWISE.

CONDUIT SEAL DETAIL
 N.T.S. (TYPICAL)

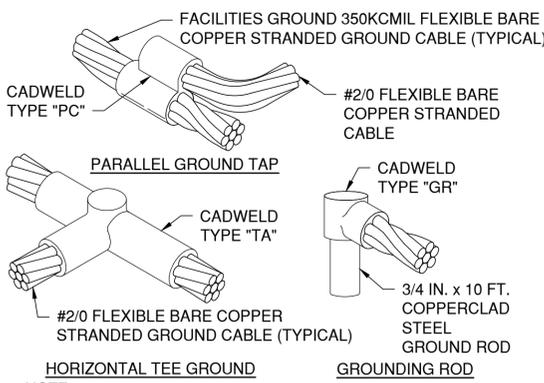


- NOTE:**
1. LEAVE SPACE FOR CEMENTING ADAPTER IN PLACE AFTER SCREWED INTO LB. INSTALL GROUT AFTER INSTALLATION.

CONDUIT ENTRY DETAIL
 SCALE: N.T.S.

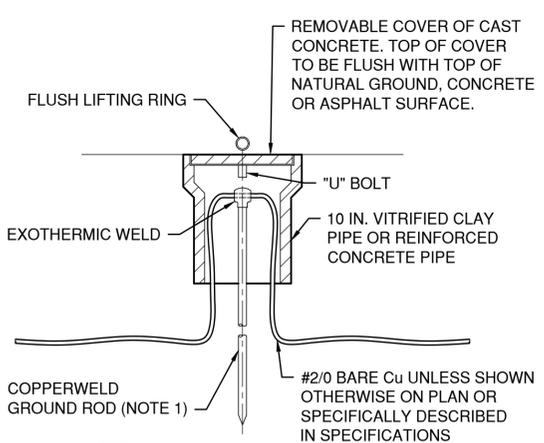


TYPICAL WIRING TERMINATION INTO MOTOR CONTROL CENTER DETAIL
 SCALE: N.T.S.



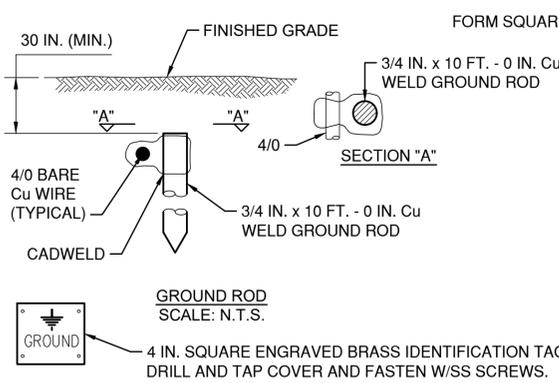
- NOTE:**
1. SPRAY ALL EXPOSED GROUNDING CONNECTORS AND CABLE WITH SCOTCHKOTE CORROSION PROTECTION - APPLY SEPARATE COATS; TWO MINIMUM ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

GROUNDING CONNECTION DETAIL
 SCALE: N.T.S.



- NOTE:**
1. GROUND ROD SHALL BE 3/4 IN. x 10 FT.

GROUND WELL DETAIL
 SCALE: N.T.S.



- NOTES:**
1. ANY EXPOSED OR ABOVE GRADE CONNECTIONS SHALL BE MECHANICAL TYPE WITH CRIMP LUGS. USE CADWELD FOR BURIED LOCATIONS.
 2. EXOTHERMICALLY WELD ALL BELOW GRADE CONNECTIONS.
 3. EXTEND #6 SOFT DRAWN BARE COPPER CABLE UP INTO ATs/EQUIPMENT PANELS AND GROUND TO GROUND BUS.

GROUNDING SYSTEM TEST WELL DETAIL
 SCALE: N.T.S.

NO.	REVISIONS	DATE	BY

Kimley»Horn

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STATE OF TEXAS
 RICHARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 July 23, 2025

KHA PROJECT	DATE	SCALE AS SHOWN	DESIGNED BY	DRAWN BY	CHECKED BY
068913102	JULY 2025	SK	JA	RG	

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

ELECTRICAL DETAILS SHEET 1

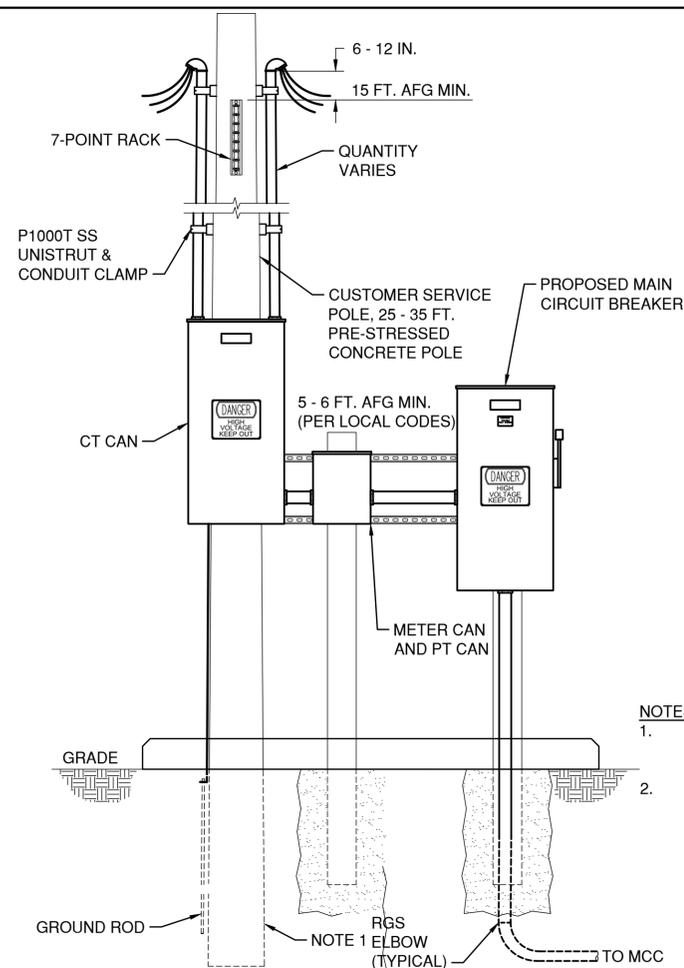
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GUZMAN ENGINEERING

118 VINTAGE PARK BLVD.
 SUITE W610
 HOUSTON, TX 77070
 P: (713) 324-4120

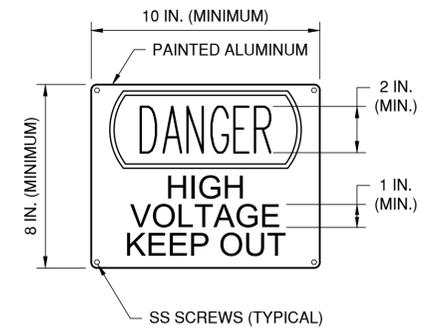
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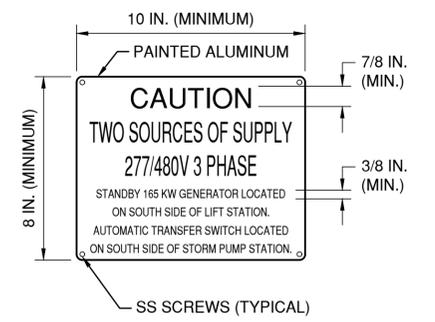


SERVICE POLE DETAIL
SCALE: N.T.S.

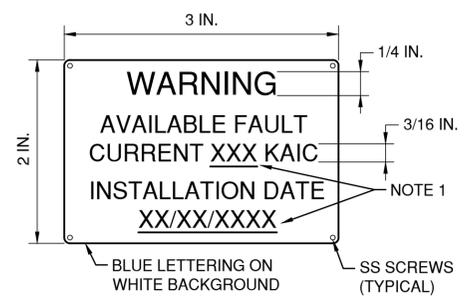
- NOTES:**
- SEE PLANS AND SPECIFICATIONS FOR CONDUIT ENCASEMENT IN CONCRETE.
 - REFER TO STRUCTURAL SHEETS S.09 DETAIL 5 - YARD PAD DETAIL FOR PAD DETAIL INCLUDING GRADE BEAM REQUIREMENTS FOR ADDITIONAL REQUIREMENTS. CONTRACTOR SHALL REFER TO CIVIL SHEETS FOR GRADING PLAN AND ELEVATION CHANGES. REFER TO SITE PLAN FOR DIMENSIONS.



HIGH VOLTAGE SIGN DETAIL
SCALE: N.T.S.

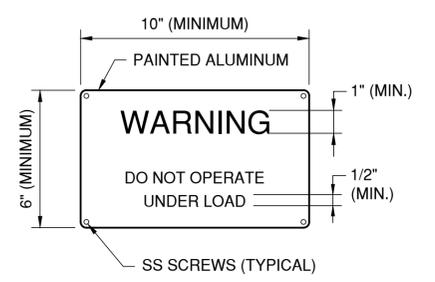


DUAL SOURCE SIGN DETAIL
SCALE: N.T.S.

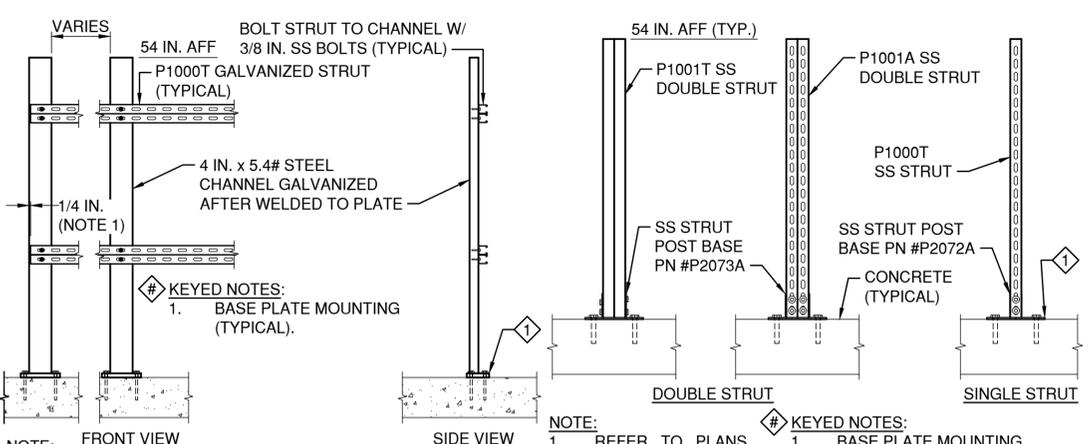


FAULT CURRENT WARNING SIGN DETAIL
SCALE: N.T.S.

- NOTE:**
- CONTRACTOR TO FILL AVAILABLE FAULT CURRENT KAIC BASED ON DATA OUTLET STATEMENT FROM ELECTRICAL PROVIDER.



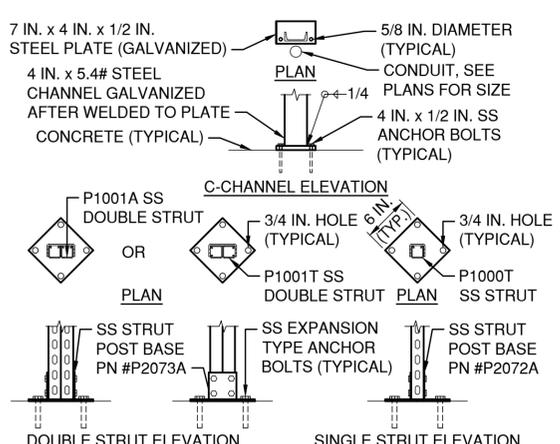
DO NOT OPERATE WARNING SIGN DETAIL
SCALE: N.T.S.



C-CHANNEL SUPPORT DETAIL
SCALE: N.T.S.

STRUT SUPPORT DETAIL
SCALE: N.T.S.

- NOTE:**
- REFER TO PLANS FOR APPROPRIATE APPLICATION.
- KEYED NOTES:**
- BASE PLATE MOUNTING (TYPICAL).



BASE PLATE MOUNTING DETAIL
SCALE: N.T.S.

- NOTE:**
- REFER TO PLANS FOR APPROPRIATE APPLICATION.

NO.	REVISIONS	DATE	BY

Kimley»Horn

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KHA PROJECT	068913102
DATE	JULY 2025
SCALE AS SHOWN	SCALE AS SHOWN
DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

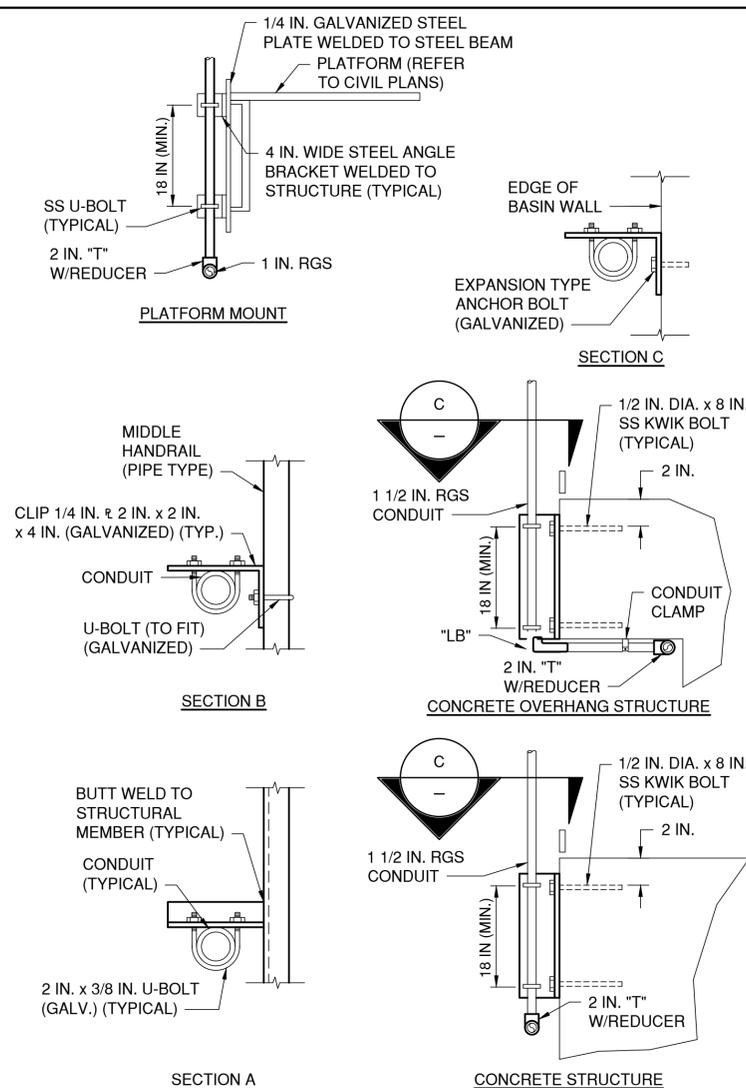
ELECTRICAL
DETAILS SHEET 2

SHEET NUMBER
19

GUZMAN ENGINEERING
 118 VINTAGE PARK BLVD.
 SUITE 1010
 HOUSTON, TX 77070
 P: (979) 324-4120
 F-26942

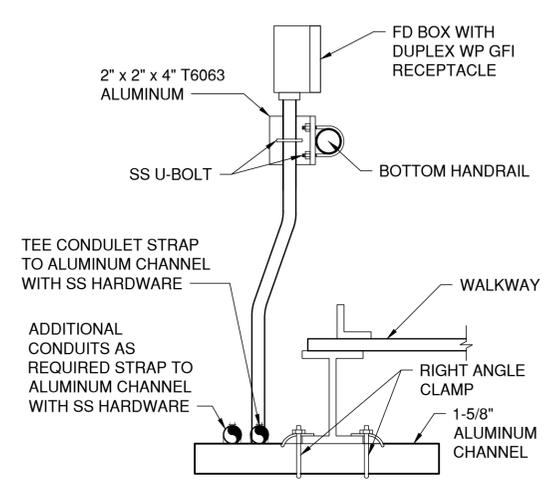
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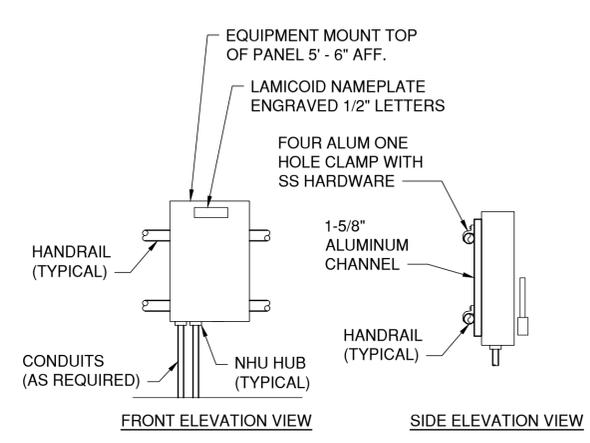


NOTE:
 1. USE SEPARATE 120V CIRCUITS FOR LIGHTING AND FOR RECEPTACLE.

SUPPORT RAIL MOUNTING DETAIL
 SCALE: N.T.S.



WALKWAY HANDRAIL MOUNTED RECEPTACLE INSTALLATION DETAIL
 SCALE: N.T.S.



HANDRAIL MOUNTED EQUIPMENT DETAIL
 SCALE: N.T.S.

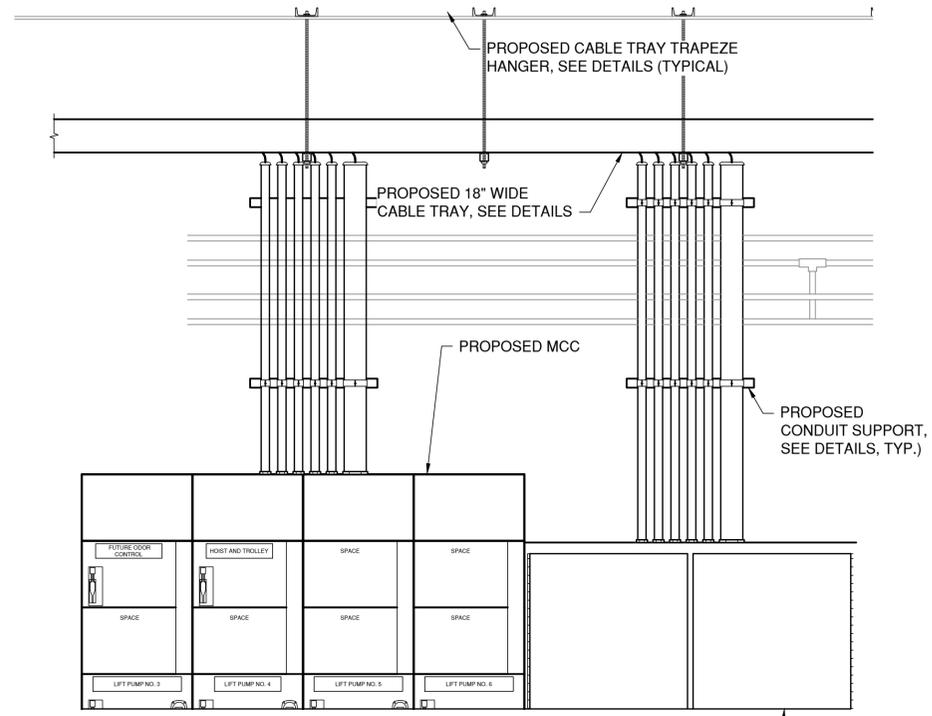


E-603

KHA PROJECT 068913102	DATE JULY 2025	SCALE AS SHOWN	DESIGNED BY: SK	DRAWN BY: JA	CHECKED BY: RG	No.	REVISIONS	DATE	BY
CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION						Kimley»Horn STATE OF TEXAS REGISTRATION NO. F-628 11700 KATY FREEMAN SUITE 800 HOUSTON, TX 77079 WWW.KIMLEY-HORN.COM © 2025 KIMLEY-HORN AND ASSOCIATES, INC.			
						STATE OF TEXAS RICHARDO GUZMAN 134592 LICENSED PROFESSIONAL ENGINEER JULY 23, 2025			
ELECTRICAL DETAILS SHEET 3						SHEET NUMBER 20			

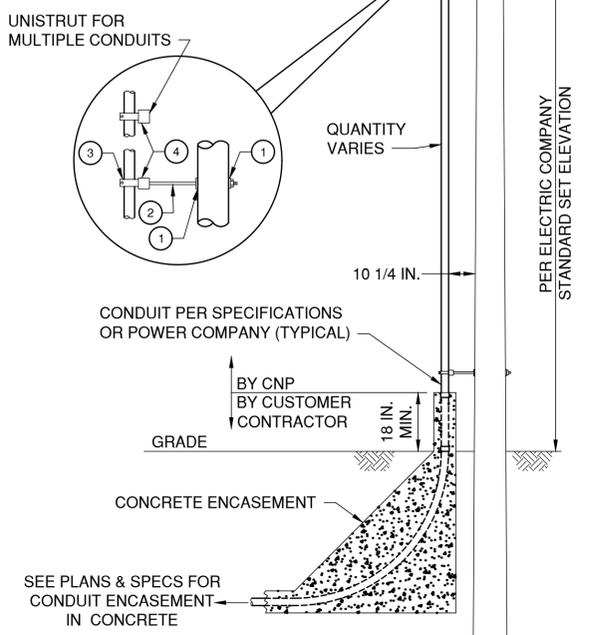
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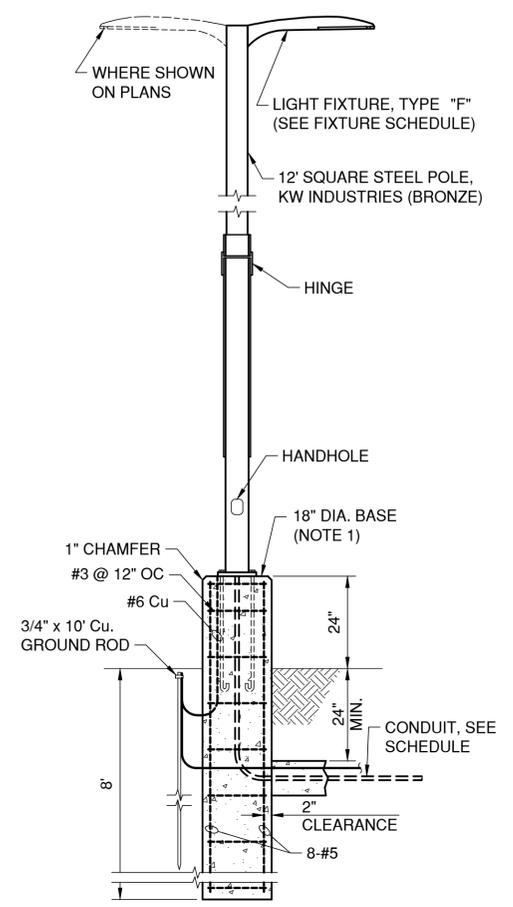
ALTERNATE BID ITEM - CABLE TRAY RUN DETAIL
SCALE: N.T.S.

MATERIAL LIST	
ITEM	DESCRIPTION
1	2-1/4 IN. X 2 1/4 IN. SQUARE WASHER
2	5/8 IN. DIA. X 24 IN. DOUBLE ARMING BOLT
3	CHANNEL PIPE STRAP
4	1/2 IN. X 12 GA. ALUMINUM CHANNEL



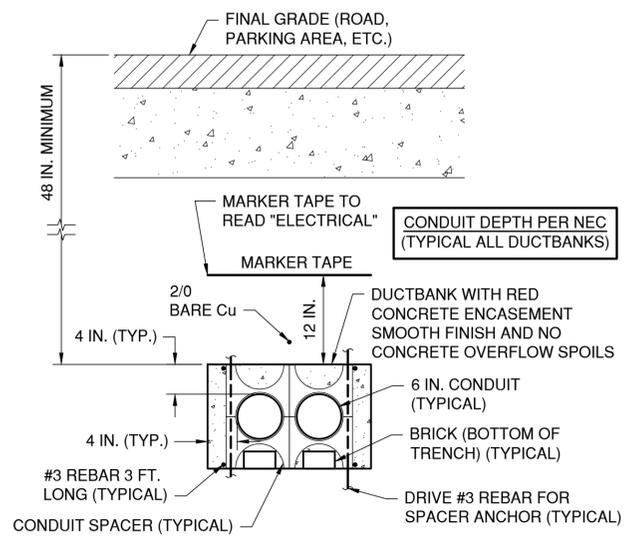
- NOTES:**
- 1 IN. SPACE BETWEEN MULTIPLE CONDUITS.
 - 4 IN. MAX. CONDUIT SIZE.
 - MAX. QUANTITY:
 3.A. 3-4 IN. CONDUITS
 3.B. 4-3 IN. CONDUITS
 3.C. WHERE PRIMARY RISERS ARE ATTACHED TO POLE, NO OTHER CONDUITS ALLOWED.

SERVICE POLE RISER DETAIL
SCALE: N.T.S.

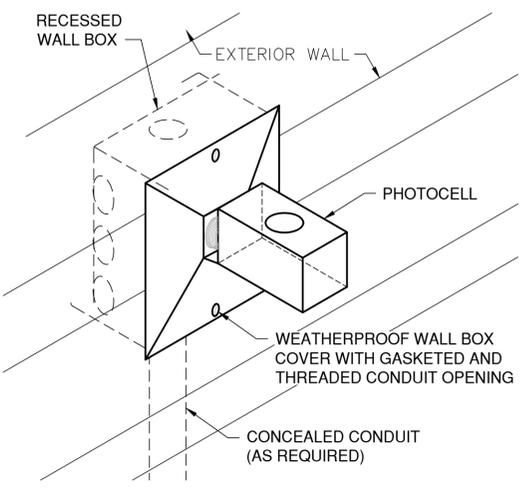


- NOTES:**
- POLE, FOUNDATION, AND ANCHOR BOLTS SHALL BE RATED FOR LOCAL JURISDICTION WIND REQUIREMENTS. CONTRACTOR SHALL SUBMIT SUBMITTAL WITH CALCULATIONS FOR ENGINEERS APPROVAL.

AREA LIGHT POLE DETAIL
SCALE: N.T.S.



CENTERPOINT DUCTBANK DETAIL
SCALE: N.T.S.



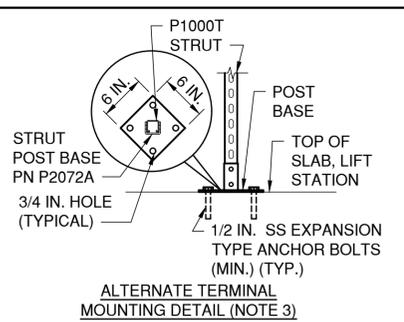
PHOTOCELL MOUNTING DETAIL
SCALE: N.T.S.



KHA PROJECT	068913102	DATE	JULY 2025	SCALE AS SHOWN	SCALE AS SHOWN	DESIGNED BY:	SK	DRAWN BY:	JA	CHECKED BY:	RG
	DATE		JULY 2025		DESIGNED BY:		SK		DRAWN BY:		JA
<p style="text-align: center;">Kimley»Horn</p> <p style="text-align: center; font-size: small;">STATE OF TEXAS REGISTRATION NO. F-928 11700 KATY FREEMAN SUITE 800 HOUSTON, TX 77079 WWW.KIMLEY-HORN.COM © 2025 KIMLEY-HORN AND ASSOCIATES, INC.</p>											
<p>CITY OF FRIENDSWOOD LIFT STATION #2 REHABILITATION</p>											
<p>ELECTRICAL DETAILS SHEET 4</p>											
										SHEET NUMBER	21

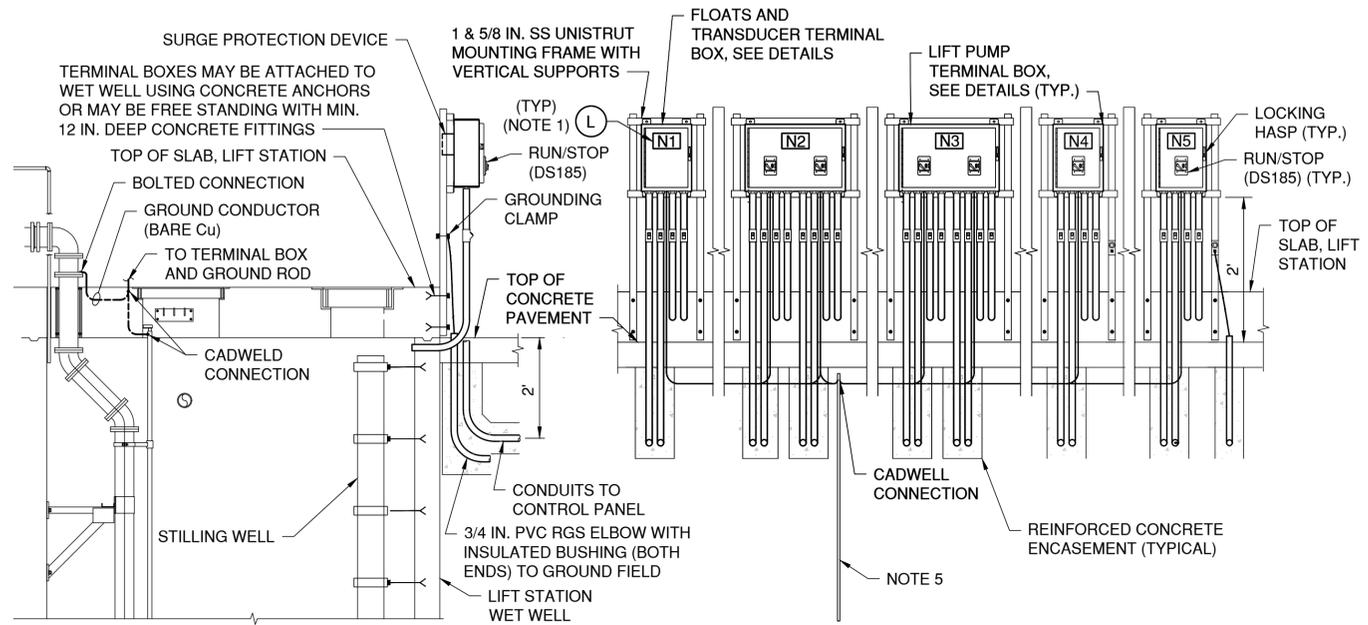
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TERMINAL BOX SCHEDULE

- A. OZ GEDNEY CSBE SEAL.
- B. WATERTIGHT CONDUIT HUB W/INSULATED BUSHING.
- C. CLASS I, DIV 1, EXPLOSION PROOF SEAL INSTALLED PER NEC DIV 501.
- D. POWER TERMINAL BLOCK W/SCREW DOWN BOX LUGS.
- E. CONTROL TERM BLOCK W/SCREW DOWN BOX LUGS.
- F. MULTI-CONDUCTOR CABLE, REMOVE OUTER JACKET AS SHOWN.
- G. WIRING AS SCHEDULED.
- H. WIRING HARNESS PERMANENTLY AFFIXED.
- I. PUMP CONTROL WIRING.
- J. CGB FITTING.
- K. HOFFMAN NEMA 4X SS J-BOX W/GASKETED FRONT COVER, CONTINUOUS HINGE, SCREW-DOWN CLAMPS, HASP & PADLOCKING PROVISIONS. MINIMUM SIZE: 12 IN. W x 16 IN. H x 6 IN. D OR 24 IN. W x 16 IN. H x 6 IN. D.
- L. MICARTA NAMEPLATE, 3/8" HIGH LETTERS IN WHITE ON BLACK BACKGROUND (SEE NAMEPLATE SCHEDULE).
- M. TRANSDUCER BREATHER.
- N. SURGE PROTECTION DEVICE: BLUE RIBBON CORP. No. BCP3000 SURGE PROTECTOR.
- O. SURGE PROTECTION DEVICE: EATON MODEL No. CVX 100 480Y. SEE ONE-LINE DIAGRAM FOR VOLTAGE.



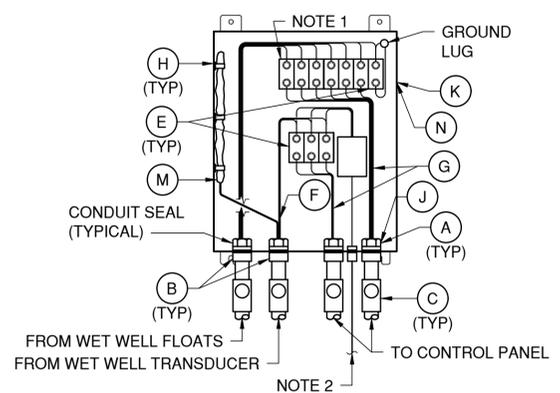
- NOTES:**
- NAMEPLATES SHALL BE MOUNTED TO TERMINAL BOXES USING STAINLESS STEEL HARDWARE.
 - TERMINAL BOX ARRANGEMENT VARIES. SEE ELECTRICAL PLAN.
 - MOUNT TERMINAL BOX ON TOP OF LIFT STATION USING POST BASE WHERE TOP OF LIFT STATION IS FLUSH WITH GRADE.
 - DOOR HINGE ON LEFT ONLY. DO NOT ROTATE ENCLOSURE.
 - ROUTE SURGE PROTECTION DEVICE GROUND CONDUCTOR STRAIGHT PATH TO STRUCTURE STEEL AND TO 20' GROUND ROD.

NAMEPLATE SCHEDULE

DESIGNATION	ENGRAVED
N1	TRANSDUCER/FLOATS
N2	PUMP No. 1 & 2
N3	PUMP No. 3 & 4
N4	PUMP No. 5
N5	PUMP No. 6

TERMINAL BOX INSTALLATION DETAIL

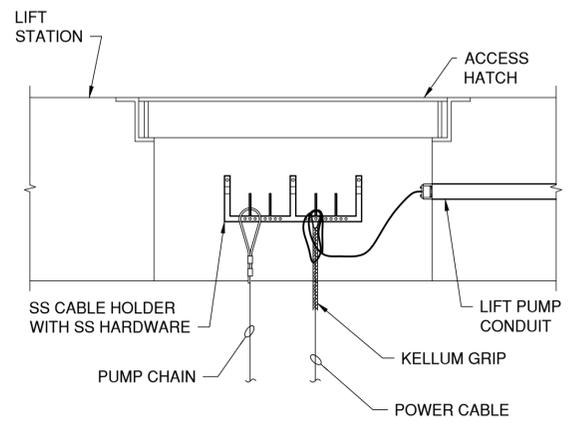
N.T.S.



- NOTE:**
- PROVIDE REQUIRED NUMBER OF TERMINAL BLOCKS RECOMMENDED BY LEVEL SENSOR PROBE MANUFACTURER.
 - ROUTE SURGE PROTECTION DEVICE GROUND CONDUCTOR STRAIGHT PATH TO STRUCTURE STEEL AND TO 20 FT. GROUND ROD.

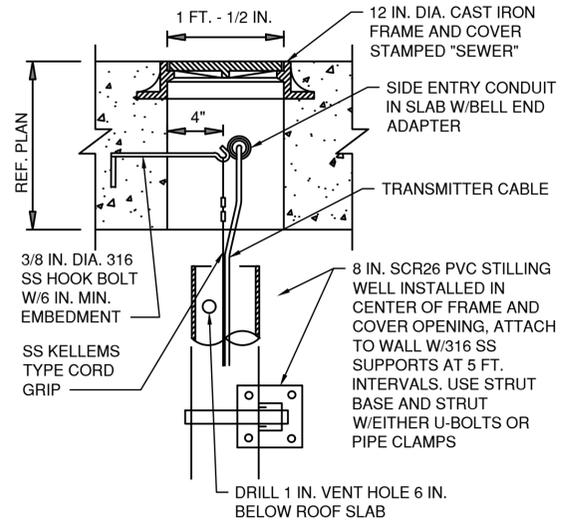
FLOATS TERMINAL BOX DETAIL

SCALE: N.T.S.



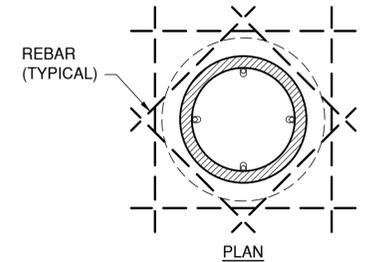
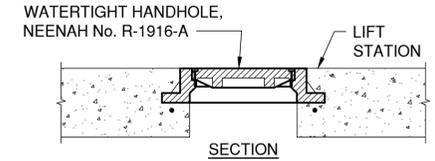
PUMP CABLE INSTALLATION

SCALE: N.T.S.



TRANSDUCER STILLING WELL DETAIL

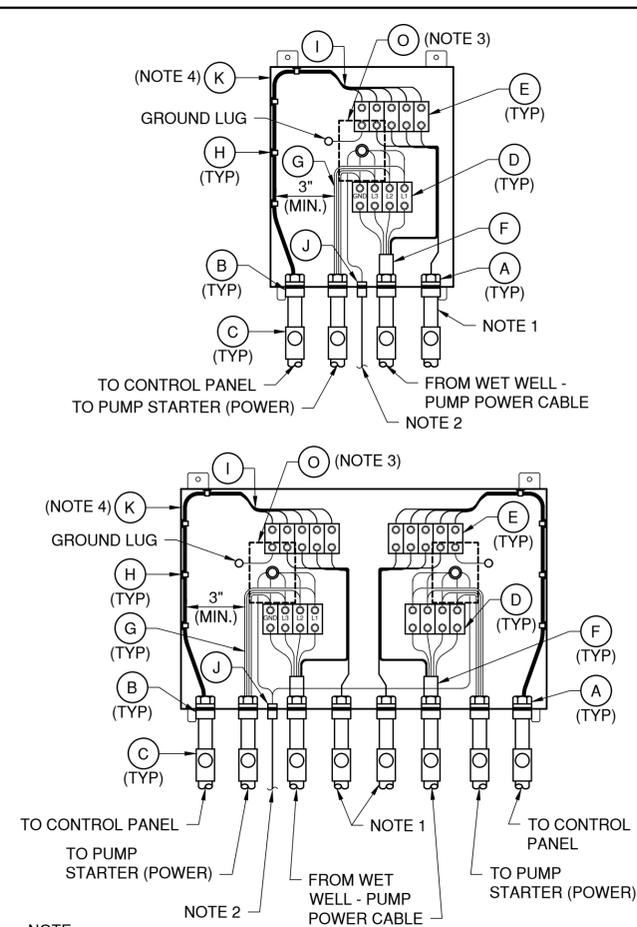
SCALE: N.T.S.



- NOTE:**
- REBAR SIZING BY STRUCTURAL ENGINEER.

HANDHOLE DETAIL

SCALE: N.T.S.



- NOTE:**
- PROVIDE ADDITIONAL CONDUIT ONLY WHERE PUMP HAS 2 CABLES.
 - ROUTE SURGE PROTECTION DEVICE GROUND CONDUCTOR STRAIGHT PATH TO STRUCTURE STEEL AND TO 20' GROUND ROD.
 - SURGE PROTECTOR MOUNTED ON BACK OF TERMINAL BOX.
 - TERMINAL BOXES SIZES MINIMUMS SHALL BE FOLLOWED AS SHOWN BUT IT IS THE ULTIMATE RESPONSIBILITY OF THE CONTRACTOR TO SIZE BOXES BASED ON THE REQUIRED SPACE NEEDED FOR THE POWER DISTRIBUTION TERMINAL BLOCKS, WIRING DUCTS, AND BENDING RADIUS (REQUIRED BY NEC) FOR TOTAL NUMBER OF CABLES NEEDED.

LIFT PUMP TERMINAL BOX DETAIL

N.T.S.

- GENERAL NOTES:**
- MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.
 - UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE STAINLESS STEEL.

NO.	REVISIONS	DATE	BY

Kimley»Horn

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 11700 KATY FREEMAN, SUITE 800, HOUSTON, TX 77079
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STATE OF TEXAS
 RICARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 JULY 23, 2025

KHA PROJECT	068913102
DATE	JULY 2025
SCALE AS SHOWN	SCALE AS SHOWN
DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

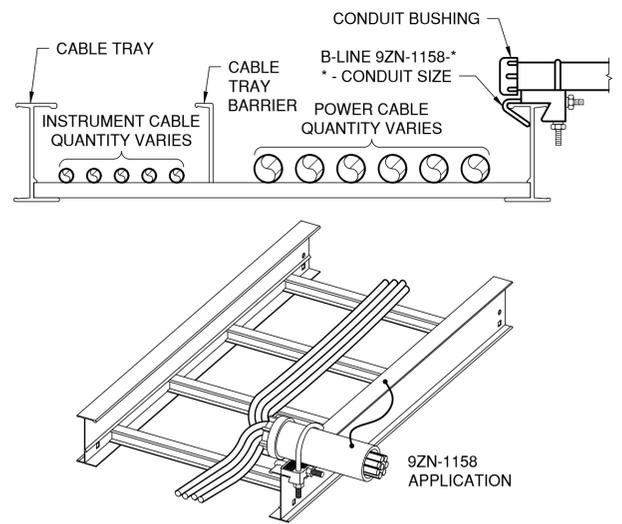
ELECTRICAL
DETAILS SHEET 5

GUZMAN ENGINEERING

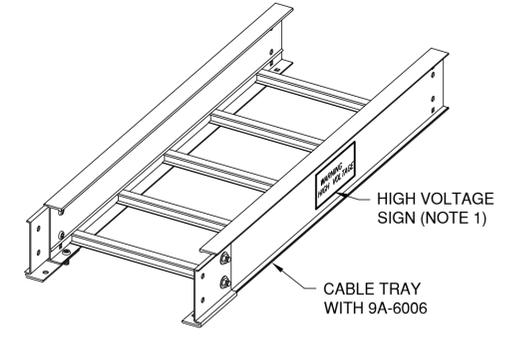
118 VINTAGE PARK BLVD.
 SUITE W010
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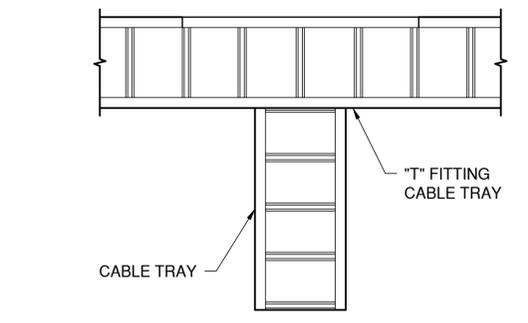
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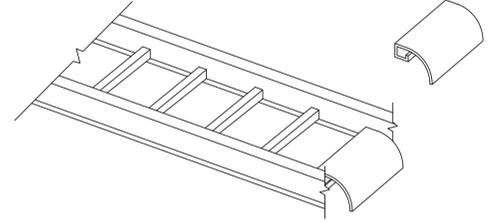
CONDUIT TO CABLE TRAY ADAPTER DETAIL
SCALE: N.T.S.



HEAVY DUTY MID-SPAN SPLICE DETAIL
SCALE: N.T.S.



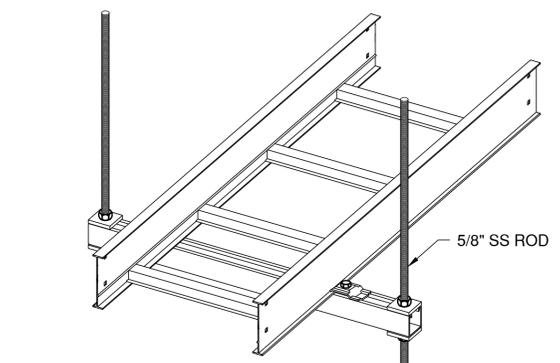
CABLE TRAY "T" DETAIL
SCALE: N.T.S.



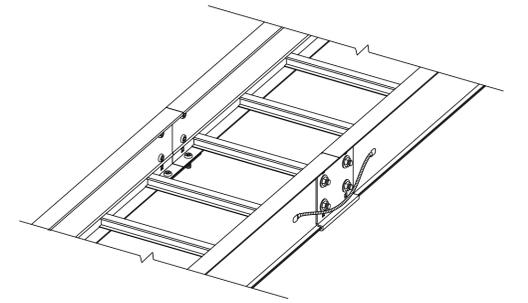
CABLE TRAY DROP OUT DETAIL
SCALE: N.T.S.

GENERAL NOTES:

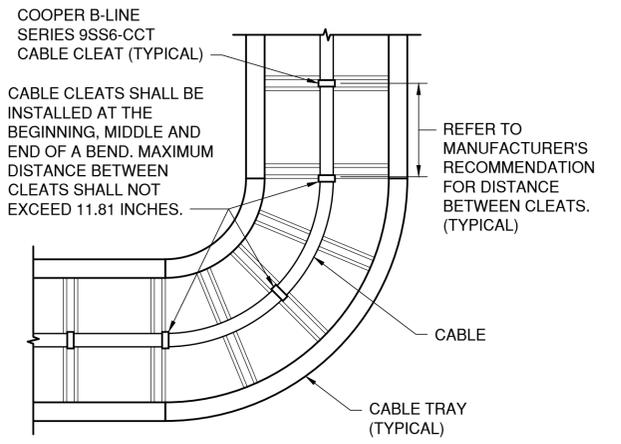
- ALL CABLE TRAY SECTIONS AND FITTINGS SHALL BE FIBERGLASS WITH 316 SS HARDWARE.
- ALL PART NUMBERS SHOWN ARE B-LINE. CONTRACTOR MAY PROVIDE AS SHOWN, OR APPROVED EQUAL.
- USE STIFFENER SIZED TO SUPPORT LOAD OF EXTENDED TRAY SECTIONS. PROVIDE COVERS FOR ALL SECTIONS OF TRAY.



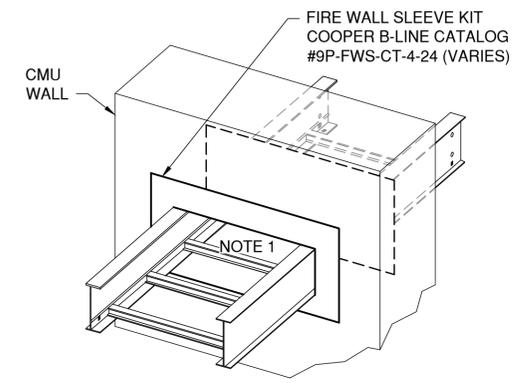
SINGLE TRAY TRAPEZE HANGER
SCALE: N.T.S.



CABLE TRAY BONDING JUMPER DETAIL
SCALE: N.T.S.



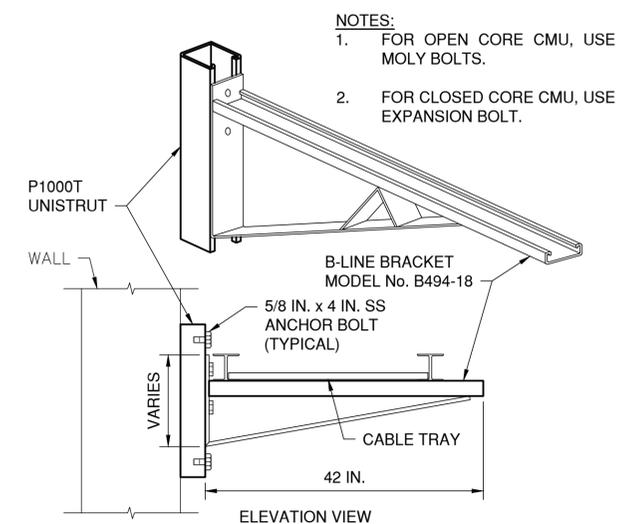
CABLE TRAY TURN DETAIL
SCALE: N.T.S.



CABLE TRAY FIRE STOP DETAIL
SCALE: N.T.S.

NOTES:

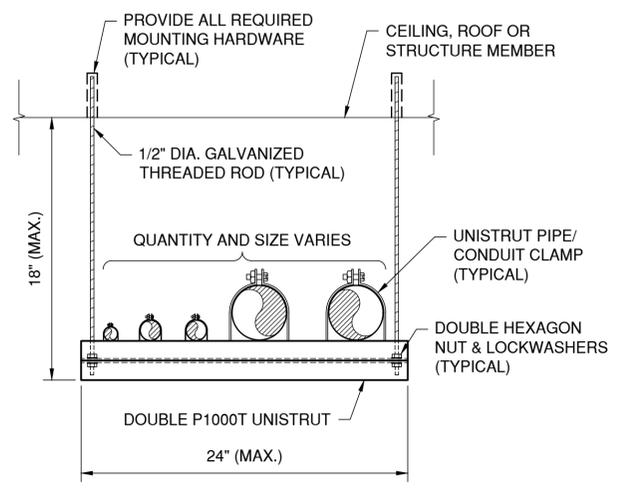
- INSTALL FIRE STOP PILLOWS PROVIDED WITH FIRE WALL SLEEVE KIT.
- APPLY GROUT COATING TO MATCH OUTSIDE WALL.
- PAINT TO MATCH WALL COLOR.



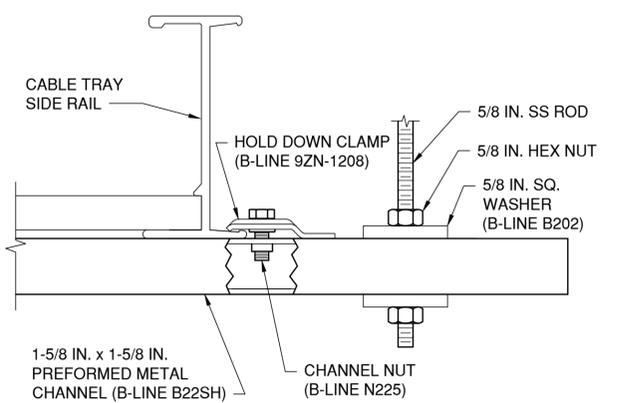
CABLE TRAY SUPPORT DETAIL
SCALE: N.T.S.

NOTES:

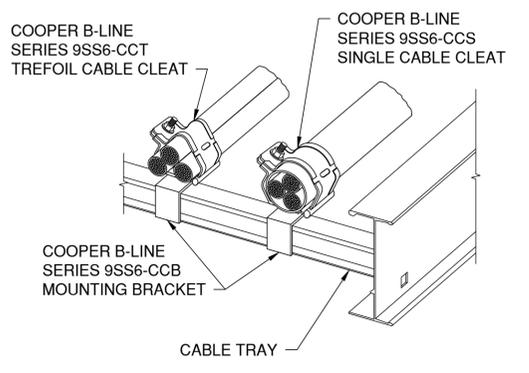
- FOR OPEN CORE CMU, USE MOLY BOLTS.
- FOR CLOSED CORE CMU, USE EXPANSION BOLT.



TRAPEZE SUPPORT DETAIL
SCALE: N.T.S.



ALUMINUM CABLE TRAY CLAMPING DETAIL
SCALE: N.T.S.



CABLE FIXING DETAIL
SCALE: N.T.S.

NO.	REVISIONS	DATE	BY

Kimley»Horn

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STATE OF TEXAS
 RICARDO GUZMAN
 134592
 LICENSED PROFESSIONAL ENGINEER
 July 23, 2025

KHA PROJECT	068913102
DATE	JULY 2025
SCALE AS SHOWN	SCALE AS SHOWN
DESIGNED BY:	SK
DRAWN BY:	JA
CHECKED BY:	RG

**CITY OF FRIENDSWOOD
 LIFT STATION #2
 REHABILITATION**

**ELECTRICAL
 DETAILS SHEET 7**

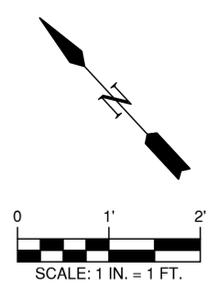
SHEET NUMBER
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GUZMAN ENGINEERING

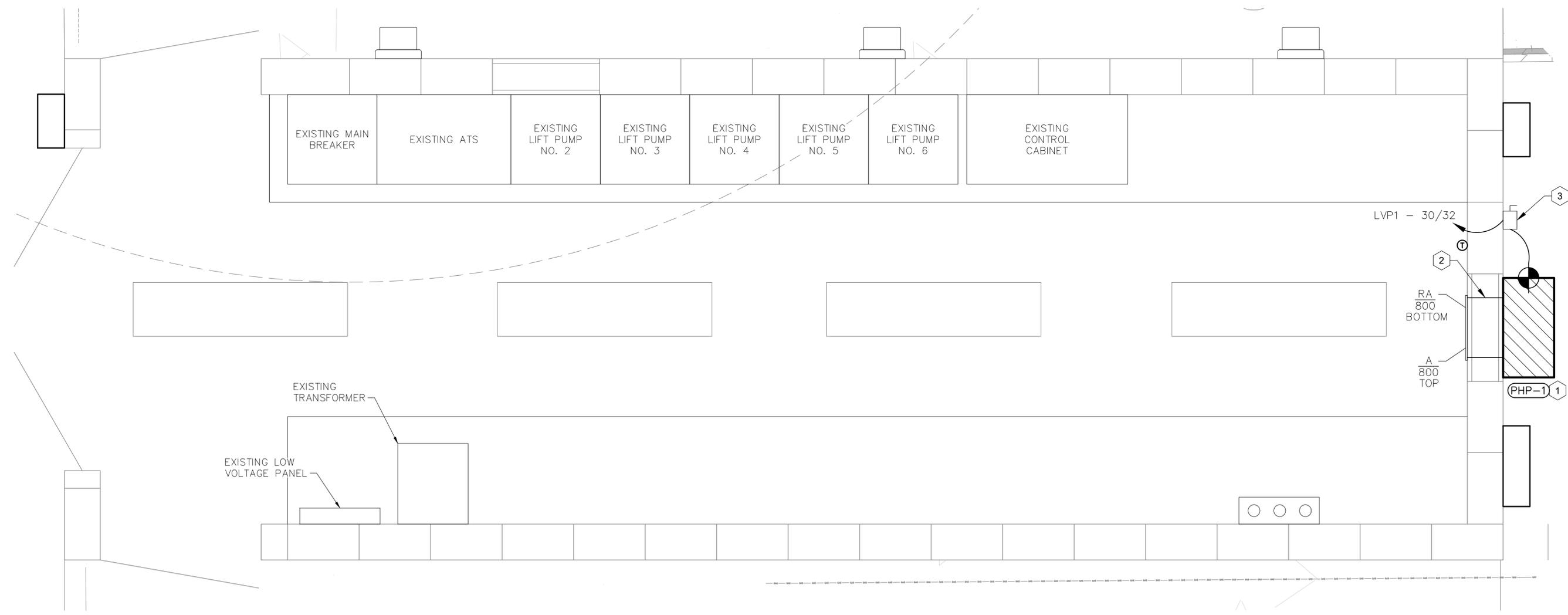
118 VINTAGE PARK BLVD.
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 Filename: production\101-2506 m-101 msp.dwg



- # KEYED NOTES:
1. INSTALL PACKAGED HEAT PUMP ON EXTERIOR WALL OF CONTROL BUILDING PER DETAILS. INSTALL AT MIN. 2 FT. AFG. RE: MECHANICAL DETAILS SHEET.
 2. PROVIDE KNOCK-OUTS IN EXTERIOR WALL FOR SUPPLY AND RETURN DUCT SLEEVES.
 3. PROVIDE HEAVY DUTY, 250V, 30A, 2P, NF DISCONNECT SWITCH IN NEMA 4X S.S. ENCL.



MECHANICAL SITE PLAN
 SCALE: 1 IN. = 1 FT.

GUZMAN ENGINEERING
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 F-26942

No.	REVISIONS	DATE	BY

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RICHARDO GUZMAN
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 JULY 23, 2025

KHA PROJECT	DATE	SCALE	DESIGNED BY	DRAWN BY	CHECKED BY
068913102	JULY 2025	AS SHOWN	SK	JA	RG

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

MECHANICAL
SITE PLAN

SHEET NUMBER
 26

M-101

SPECIAL INSPECTIONS

- SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH CHAPTER 17 OF THE 2018 INTERNATIONAL BUILDING CODE (IBC) BY A SPECIAL INSPECTOR HIRED BY THE OWNER TO PERFORM THE SPECIAL INSPECTIONS LISTED BELOW. THE SPECIAL INSPECTOR SHALL BE QUALIFIED BY AN APPROVED AGENCY ACCORDING TO THE CITY'S BUILDING OFFICIAL TO PERFORM THE SPECIAL INSPECTIONS FOR WHICH THEY WILL BE UNDERTAKING. THE CONTRACTOR SHALL COORDINATE WITH AND NOTIFY THE SPECIAL INSPECTOR OF ALL TESTS. THE SPECIAL INSPECTOR SHALL BE RESPONSIBLE TO VERIFY THAT THE ITEMS DETAILED IN THE CONSTRUCTION DOCUMENTS WERE BUILT ACCORDINGLY AND SHALL PREPARE, SIGN, AND FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL AND THE ARCHITECT FOR ALL TIME SPENT AT THE SITE. THE INSPECTOR SHALL BRING DISCREPANCIES TO THE IMMEDIATE ATTENTION OF THE GENERAL CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE ARCHITECT PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK. THESE SPECIAL INSPECTIONS ARE IN ADDITION TO THE OTHER INSPECTIONS LISTED IN THESE STRUCTURAL NOTES OR PROJECT SPECIFICATIONS.
- WHERE STRUCTURAL LOAD-BEARING MEMBERS AND ASSEMBLIES ARE SHOP FABRICATED, THE SPECIAL INSPECTOR SHALL VERIFY THAT THE FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES THAT PROVIDE A BASIS FOR INSPECTION CONTROL OF THE WORKMANSHIP AND THE FABRICATOR'S ABILITY TO CONFORM TO THE CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS, UNLESS THE FABRICATOR IS REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION.

VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION (IBC TABLE 1705.3)					
SPECIAL INSPECTION REQUIRED	VERIFICATION AND INSPECTION	INSPECTION FREQUENCY		REFERENCED STANDARD	IBC REFERENCE
		CONTINUOUS	PERIODIC		
YES	1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	--	X	ACI 318 CH. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
	2. REINFORCING BAR WELDING:				
YES	A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706	--	X	AWS D1.4	--
YES	B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"	--	X	ACI 318: 26.6.4	--
YES	C. INSPECT ALL OTHER WELDS.	X	--		
YES	3. INSPECT ANCHORS AND DOWELS CAST IN CONCRETE.	--	X	ACI 318: 17.8.2	--
	4. INSPECT POST-INSTALLED ANCHORS AND DOWELS IN HARDENED CONCRETE.				
YES	A. MECHANICAL ANCHORS AND ADHESIVE ANCHORS AND DOWELS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	X ¹	--	ACI 318: 17.8.2.4	--
YES	B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS AND DOWELS NOT DEFINED IN 4.A.	--	X ¹	ACI 318: 17.8.2	--
YES	5. VERIFY USE OF REQUIRED DESIGN MIX.	--	X	ACI 318: CH 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
YES	6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	--	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
YES	7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	--	ACI 318: 26.5	1908.6, 1908.7, 1908.8
YES	8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	--	X	ACI 318: 26.5.3-26.5.5	1908.9
	9. INSPECTION OF PRESTRESSED CONCRETE:				
NO	A. APPLICATION OF PRESTRESSING FORCES	X	--	ACI 318: 26.10	--
NO	B. GROUTING OF BONDED PRESTRESSING TENDONS	X	--	ACI 318: 26.10	--
NO	10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	--	X	ACI 318: 26.9	--
NO	11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	--	X	ACI 318: 26.11.2	--
YES	12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	--	X	ACI 318: 26.11.1.2(B)	--

- POST-INSTALLED ANCHORS AND DOWELS SHALL BE EITHER (A.) VISUALLY INSPECTED DURING INSTALLATION, OR (B.) LOAD TESTED AFTER INSTALLATION AS NOTED BELOW:
 - VISUAL INSPECTIONS SHALL BE PERFORMED DURING THE INSTALLATION BY A SPECIAL INSPECTOR CERTIFIED BY ACI AS A "POST-INSTALLED CONCRETE ANCHOR INSTALLATION INSPECTOR". SUBMIT A REPORT TO THE LICENSED DESIGN PROFESSIONAL AND BUILDING OFFICIAL DOCUMENTING THAT THE WORK COVERED BY THE REPORT HAS BEEN PERFORMED AND THAT THE MATERIALS USED AND THE INSTALLATION PROCEDURES USED CONFORM WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.
 - LOAD TESTING SHALL COMPLY WITH THE FOLLOWING:
 - TEST AT LEAST TEN (10) PERCENT OF EACH TYPE AND DIAMETER OF POST-INSTALLED ANCHORS. IF ONE OR MORE ANCHORS FAIL THE TEST, ALL POST-INSTALLED ANCHORS OF THE SAME DIAMETER AND TYPE INSTALLED THE SAME DAY AS THE FAILED ANCHOR SHALL BE LOAD TESTED AT THE CONTRACTOR'S EXPENSE. IF ADDITIONAL ANCHORS FAIL, THE ENGINEER MAY REQUIRE TESTING ALL ANCHORS OF THE SAME DIAMETER AND TYPE ALREADY INSTALLED AT THE CONTRACTOR'S EXPENSE.
 - TENSION TESTING SHALL COMPLY WITH ASTM E488
 - TEST POST-INSTALLED ANCHORS TO 50 PERCENT OF ULTIMATE TENSILE CAPACITY OF POST-INSTALLED ANCHOR.
 - APPLY TEST LOADS WITH A CALIBRATED HYDRAULIC RAM.
 - DISPLACEMENT OF POST-INSTALLED ANCHORS SHALL NOT EXCEED D/10, WHERE D IS NOMINAL DIAMETER OF ANCHOR BEING TESTED.
 - CORRECT DEFECTIVE WORK BY REMOVING AND REPLACING OR CORRECTING, AS DIRECTED BY ENGINEER.
 - CONTRACTOR SHALL PAY FOR ALL CORRECTIONS, ENGINEERING, AND ADDITIONAL TESTING ASSOCIATED WITH FAILED ANCHOR TESTS.
 - TESTING AGENCY SHALL SUBMIT TEST RESULTS TO CONTRACTOR AND ENGINEER WITH 24 HOURS OF COMPLETION OF TEST.

VERIFICATION AND INSPECTION OF SOILS (IBC TABLE 1705.6)			
SPECIAL INSPECTION REQUIRED	VERIFICATION, INSPECTION AND TESTING	INSPECTION FREQUENCY	
		CONTINUOUS	PERIODIC
YES	1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	--	X
YES	2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	--	X
YES	3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	--	X
YES	4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	--
YES	5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	--	X

VERIFICATION AND INSPECTION OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS (IBC TABLE 1705.8)			
SPECIAL INSPECTION REQUIRED	VERIFICATION AND INSPECTION	INSPECTION FREQUENCY	
		CONTINUOUS	PERIODIC
YES	1. INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X	--
YES	2. VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, BELL DIAMETERS (IF APPLICABLE), LENGTHS, EMBEDMENT INTO BEDROCK (IF APPLICABLE) AND ADEQUATE END BEARING STRATA CAPACITY. RECORD CONCRETE OR GROUT VOLUMES.	X	--
YES	3. FOR CONCRETE ELEMENTS, PERFORM ADDITIONAL INSPECTIONS IN ACCORDANCE WITH IBC SECTION 1705.3.	--	--

No.	Revisions	By	Date

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 PHONE: 281-597-9300
 WWW.KIMLEY-HORN.COM
 TBP# FIRM REGISTRATION: F-528



DATE: JULY 2025
 DESIGNED BY: JDM
 DRAWN BY: JDM
 CHECKED BY: MKK

CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

STRUCTURAL SPECIAL INSPECTIONS

shaping the built environment
JQ Infrastructure
JQ INFRASTRUCTURE, LLC
 15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
 832.941.5233 JQIENG.COM
 PROJECT NO: 4240220 TBP# FIRM F-7986

SHEET NUMBER
S-03

SYMBOLS LEGEND	
SYMBOL	DESCRIPTION
	COMPOSITE STEEL BEAM
	CONCRETE PIER
	STEEL BEAM MOMENT CONNECTION
	STEEL COLUMN
	CONCRETE COLUMN
	NEW COLUMN GRID
	EXISTING COLUMN GRID
	GRATING
	SLAB OR DECK SPAN DIRECTION
	DROP IN SLAB OR DECK
	DROP AND SLOPE IN SLAB OR DECK
	SLOPE IN SLAB OR DECK
	VERTICAL STEEL BRACE
	STEEL BEAM SPLICE
	HEAVY STEEL CONNECTION
	STUDRAIL
	MASONRY WALL
	WINDOW IN MASONRY WALL
	DOOR IN MASONRY WALL
	NONLOAD-BEARING WALL
	CONCRETE WALL
	PRECAST WALL PANEL
	EXISTING CONSTRUCTION
	MISCELLANEOUS, SEE PLAN
	ROOF TOP UNIT (RTU)

ABOVE
 ABOVE FINISHED FLOOR
 ADDITIONAL
 ADHESIVE
 ADJACENT
 AGGREGATE
 AIR CONDITIONER
 AIR HANDLING UNIT
 ALTERNATE
 ALUMINUM
 AMERICAN CONCRETE INSTITUTE
 AMERICAN INSTITUTE OF STEEL CONSTRUCTION
 ANCHOR BOLT AND
 ANGLE
 APPROVED
 APPROXIMATE
 ARCHITECT
 ARCHITECTURAL
 AT

 BACK FACE
 BACK TO BACK
 BASEMENT
 BEAM
 BEARING
 BELOW FINISH FLOOR
 BETWEEN
 BEVEL(ED)
 BLOCK
 BLOCK LINTEL
 BLOCKING
 BOTTOM
 BOTTOM OF
 BOTTOM OF STEEL
 BRACKET
 BRICKLEDGE
 BRIDGING
 BUILDING

 CAMBER
 CAST-IN-PLACE
 CEILING
 CENTER LINE
 CENTER OF GRAVITY
 CENTER OF GRAVITY OR STRAND
 CLEAR OR CLEARANCE
 COLD FORMED STEEL
 COLUMN
 COMPRESSION
 CONCRETE
 CONCRETE MASONRY UNIT
 CONNECTION(S)
 CONSTRUCTION
 CONSTRUCTION JOINT
 CONTINUOUS
 CONTRACTOR
 CONTROL JOINT
 COORDINATE
 COVER PLATE

 DEAD LOAD
 DEFORMED BAR ANCHOR
 DEMOLISH
 DETAIL
 DIAGONAL
 DIAMETER
 DIMENSION(S)
 DOUBLE
 DOUBLE EXTRA STRONG
 DOVETAIL
 DOWEL(S)
 DRAWING(S)

 EACH
 EACH FACE
 EACH WAY
 ELECTRICAL
 ELEVATION
 ELEVATOR
 EMBEDMENT

ABV
 AFF
 ADDN'L
 ADH
 ADJ
 AGGR
 A/C
 AHU
 ALT
 AL
 ACI
 AISC

 AB
 &
 L
 APPD
 APPROX
 ARCH
 ARCH'L
 @

 BF
 B TO B
 BSMT
 BM
 BRG
 BFF
 BTWN
 BEV('D)
 BLK
 BL
 BLKG
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 BO
 BOS
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 COORD
 COV PL

 DL
 DBA
 DEMO
 DTL
 DIAG
 DIA OR Ø
 DIM(S)
 DBL
 XX-STR
 DVTL
 DWL(S)
 DWG(S)

 EA
 EF
 EW
 ELEC
 EL
 ELEV
 EMBED

ENGINEER
 EQUAL
 EQUIPMENT
 EXHAUST FAN
 EXISTING

 EXPANSION
 EXPANSION JOINT
 EXTERIOR
 EXTRA STRONG

 FABRICATOR
 FACE TO FACE
 FAR SIDE
 FIELD VERIFY
 FINISH(ED)
 FINISHED FLOOR
 FIREPROOF(ING)
 FLANGE
 FLOOR
 FLOOR DRAIN
 FOOT (OR) FEET
 FOUNDATION
 FRAMING

 GAGE OR GAUGE
 GALVANIZED
 GENERAL CONTRACTOR
 GRADE
 GRADE BEAM
 GRATING

 HEADED STUD ANCHOR
 HEIGHT
 HIGH POINT
 HOLLOW STRUCTURAL SECTION
 HOOK
 HORIZONTAL
 HORIZONTAL BRACE
 HOT-DIP
 HYDROPHILIC

 INCH
 INFORMATION
 INSIDE DIAMETER
 INSIDE FACE
 INTERIOR
 INTERMEDIATE

 JOINT
 JOIST GIRDER
 JOIST(S)

 KIP PER LINEAR FOOT
 KIP PER SQUARE FOOT
 KIP PER SQUARE INCH
 KIPS (1000 LBS)

 LENGTH
 LIGHTWEIGHT
 LIGHTWEIGHT CONCRETE
 LIVE LOAD
 LOCATION(S)
 LONG LEG HORIZONTAL
 LONG LEG VERTICAL
 LONG SIDE HORIZONTAL
 LONG SIDE VERTICAL
 LONG SLOTTED HOLE
 LONGITUDINAL
 LOW POINT

 MANUFACTURE(R)
 MASONRY
 MATERIAL
 MAXIMUM
 MECHANICAL
 MECHANICAL, ELECTRICAL,
 PLUMBING
 METAL
 MEZZANINE
 MIDDLE
 MINIMUM
 MISCELLANEOUS

ENGR
 EQ
 EQUIP
 EF
 EX OR
 EXIST
 EXP
 EJ
 EXT
 X-STR

 ON CENTER
 OPENING(S)
 OPPOSITE
 OPPOSITE HAND
 OUTSIDE DIAMETER
 OUTSIDE FACE
 OVER-SIZED HOLE

 PAN
 PANEL JOINT
 PARALLEL
 PERPENDICULAR
 PIECE
 PLATE
 POINT
 POST-TENSION(ED)
 POUNDS
 POUNDS PER CUBIC FOOT
 POUNDS PER LINEAR FOOT
 POUNDS PER SQUARE FOOT
 POUNDS PER SQUARE INCH
 PRE-ENGINEERED METAL BUILDING
 PRECAST CONCRETE
 PREFABRICATED
 PRELIMINARY
 PRESSURE TREATED
 PROJECTION

 QUANTITY

 RADIUS
 REINFORCE(D)(MENT)
 REINFORCED CONCRETE PIPE
 REMAINDER
 REQUIRE
 REQUIRED
 RISER
 ROOF
 ROOF DRAIN
 ROOF TOP UNIT
 ROOM
 ROUGH OPENING
 ROUND

 SCHEDULE(D)
 SECTION
 SHEAR
 SHEET
 SHORT SLOTTED HOLE
 SIDEWALK
 SIMILAR
 SLAB ON GRADE
 SPACE
 SPECIFICATION(S)
 SPECIFIED
 SQUARE
 SQUARE FOOT
 STAGGERED
 STAINLESS STEEL
 STANDARD
 STEEL
 STEEL JOIST INSTITUTE
 STIFFENER
 STIRRUPS
 STRAIGHT
 STRUCTURAL
 STRUCTURE
 SUBCONTRACTOR
 SUPPORT(S)

 TEMPERATURE
 TENSION

M
 MC

 NF
 NOM
 NS
 NIC
 NTS
 NO OR #

 OC
 OPNG(S)
 OPP
 OH
 OD
 OF
 OVS

 P
 PJ
 PAR
 PERP
 PC
 PL
 PT
 P-T
 # OR LBS
 PCF
 PLF
 PSF
 PSI
 PEMB
 P/C
 PREFAB
 PRELIM
 PT
 PROJ

 QTY

 R
 REINF
 RCP
 REM
 REQ
 REQ'D
 RIS
 RF
 RD
 RTU
 RM
 RO
 RND

 SCHED
 SECT
 V
 SHT
 SSL
 SW
 SIM
 SOG
 SPA
 SPEC(S)
 SPEC'D
 SQ
 SF
 STAGG
 SS
 STD
 STL
 SJI
 STIFF
 STIRR
 STR
 STRUCT'L
 STRUCT
 SUBCONTR
 SUPT(S)

 TEMP
 T

THK
 THRD
 T&B
 TO
 TOB
 TOC
 TOG
 TOS
 TOW
 TRANSV
 TR
 TYP

 UNLESS NOTED OTHERWISE

 VERT
 VB

 WS
 WT
 WWM
 W
 WL
 WDW
 W/
 W/O
 WP

 VERT
 VB

 WS
 WT
 WWM
 W
 WL
 WDW
 W/
 W/O
 WP

NOTE:
 THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

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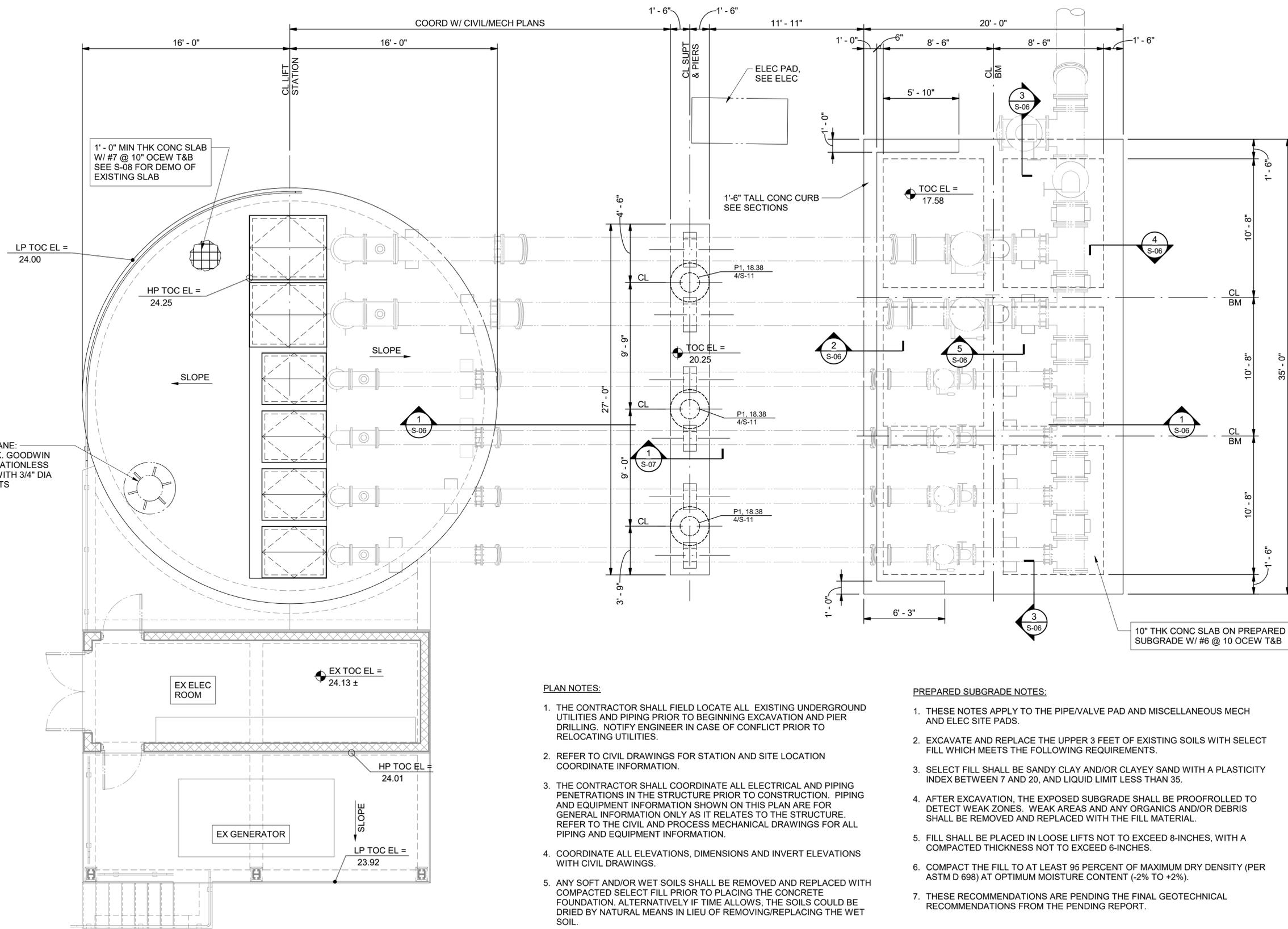


DATE: JULY 2025
 DESIGNED BY: JDM
 DRAWN BY: JDM
 CHECKED BY: NKK

CITY OF FRIENDSWOOD
 LIFT STATION #2 REHABILITATION

STRUCTURAL PROJECT SYMBOLS & ABBREVIATIONS

shaping the built environment
JQ INFRASTRUCTURE, LLC
 15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
 832.941.5233 JQIENG.COM
 PROJECT NO: 4240220 TBPE FIRM F-7986



PLAN NOTES:

1. THE CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UNDERGROUND UTILITIES AND PIPING PRIOR TO BEGINNING EXCAVATION AND PIER DRILLING. NOTIFY ENGINEER IN CASE OF CONFLICT PRIOR TO RELOCATING UTILITIES.
2. REFER TO CIVIL DRAWINGS FOR STATION AND SITE LOCATION COORDINATE INFORMATION.
3. THE CONTRACTOR SHALL COORDINATE ALL ELECTRICAL AND PIPING PENETRATIONS IN THE STRUCTURE PRIOR TO CONSTRUCTION. PIPING AND EQUIPMENT INFORMATION SHOWN ON THIS PLAN ARE FOR GENERAL INFORMATION ONLY AS IT RELATES TO THE STRUCTURE. REFER TO THE CIVIL AND PROCESS MECHANICAL DRAWINGS FOR ALL PIPING AND EQUIPMENT INFORMATION.
4. COORDINATE ALL ELEVATIONS, DIMENSIONS AND INVERT ELEVATIONS WITH CIVIL DRAWINGS.
5. ANY SOFT AND/OR WET SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED SELECT FILL PRIOR TO PLACING THE CONCRETE FOUNDATION. ALTERNATIVELY IF TIME ALLOWS, THE SOILS COULD BE DRIED BY NATURAL MEANS IN LIEU OF REMOVING/REPLACING THE WET SOIL.
6. PIERS ARE NOTED THUS ON PLANS:



SEE SHEET 5/S-11 FOR THE DRILLED PIER DETAIL AND SCHEDULE. FOR ADDITIONAL INFORMATION REFER TO DRILLED PIER NOTES ON SHEET S-02

PREPARED SUBGRADE NOTES:

1. THESE NOTES APPLY TO THE PIPE/VALVE PAD AND MISCELLANEOUS MECH AND ELEC SITE PADS.
2. EXCAVATE AND REPLACE THE UPPER 3 FEET OF EXISTING SOILS WITH SELECT FILL WHICH MEETS THE FOLLOWING REQUIREMENTS.
3. SELECT FILL SHALL BE SANDY CLAY AND/OR CLAYEY SAND WITH A PLASTICITY INDEX BETWEEN 7 AND 20, AND LIQUID LIMIT LESS THAN 35.
4. AFTER EXCAVATION, THE EXPOSED SUBGRADE SHALL BE PROOFROLLED TO DETECT WEAK ZONES. WEAK AREAS AND ANY ORGANICS AND/OR DEBRIS SHALL BE REMOVED AND REPLACED WITH THE FILL MATERIAL.
5. FILL SHALL BE PLACED IN LOOSE LIFTS NOT TO EXCEED 8-INCHES, WITH A COMPACTED THICKNESS NOT TO EXCEED 6-INCHES.
6. COMPACT THE FILL TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY (PER ASTM D 698) AT OPTIMUM MOISTURE CONTENT (-2% TO +2%).
7. THESE RECOMMENDATIONS ARE PENDING THE FINAL GEOTECHNICAL RECOMMENDATIONS FROM THE PENDING REPORT.

1 PIPE SUPPORT FOUNDATION PLAN
1/4" = 1'-0"

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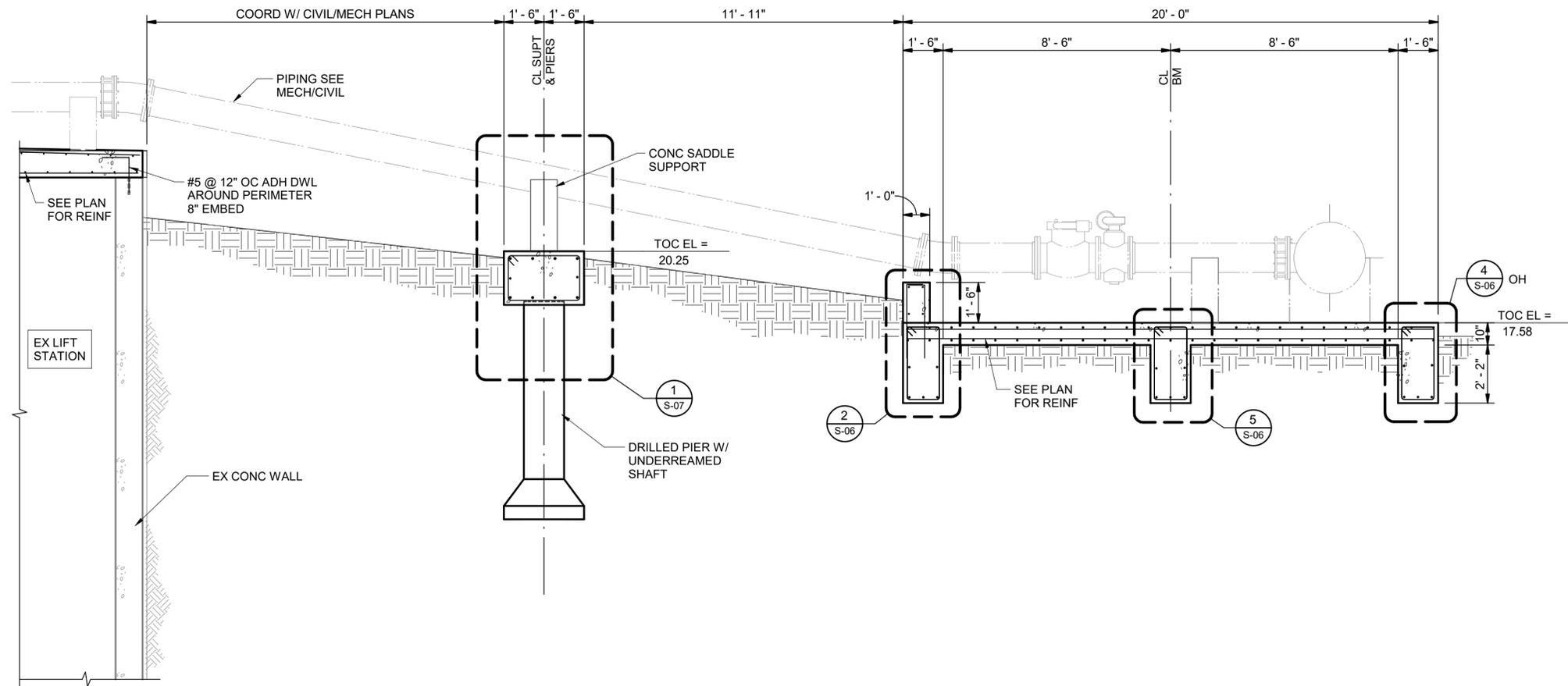
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CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

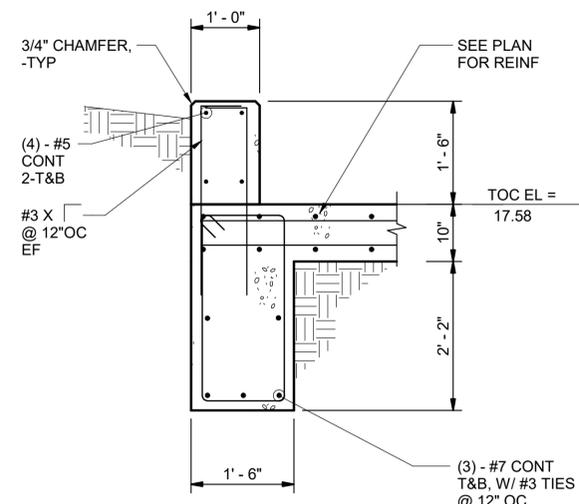
PIPE SUPPORT FOUNDATION PLAN

shaping the built environment

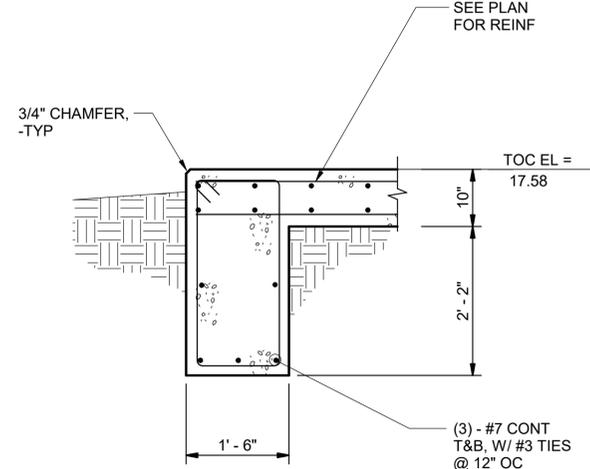
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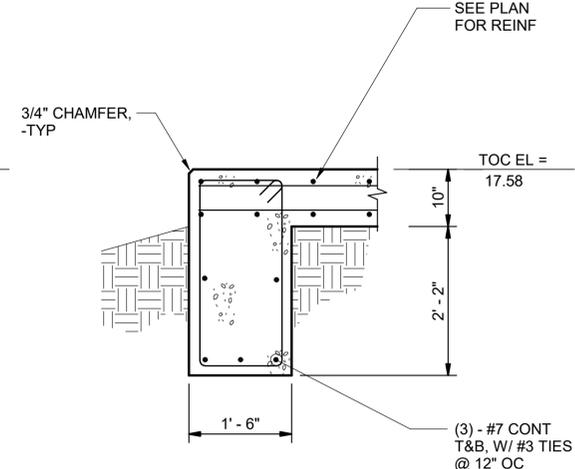
1 SECTION
S-05 3/8" = 1'-0"



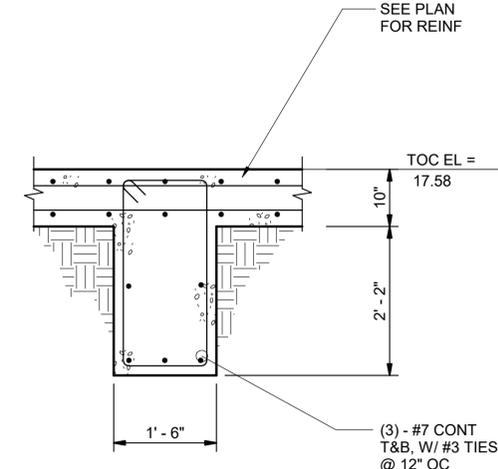
2 SECTION
S-05 3/4" = 1'-0"



3 SECTION
S-05 3/4" = 1'-0"



4 SECTION
S-05 3/4" = 1'-0"



5 SECTION
S-05 3/4" = 1'-0"

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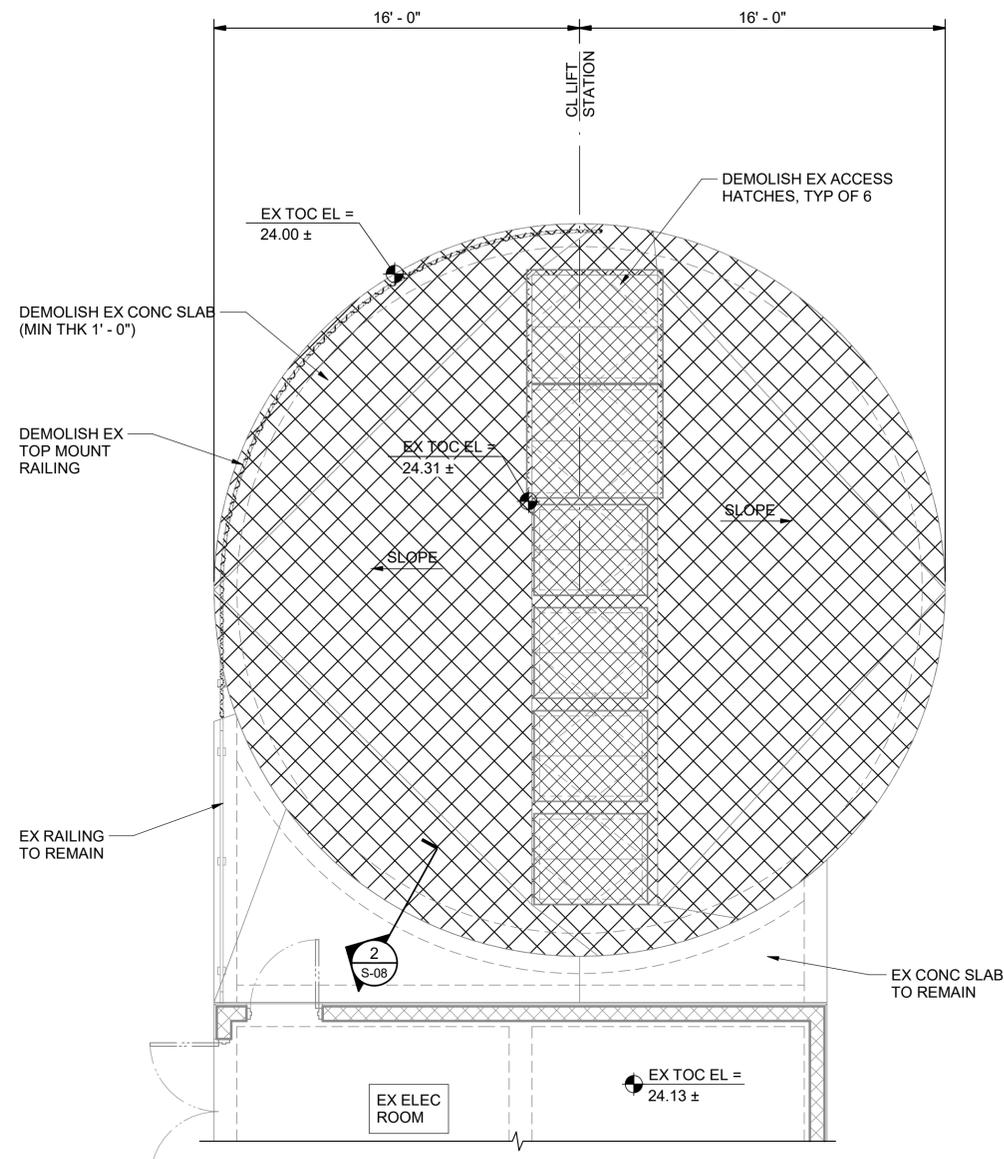
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CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

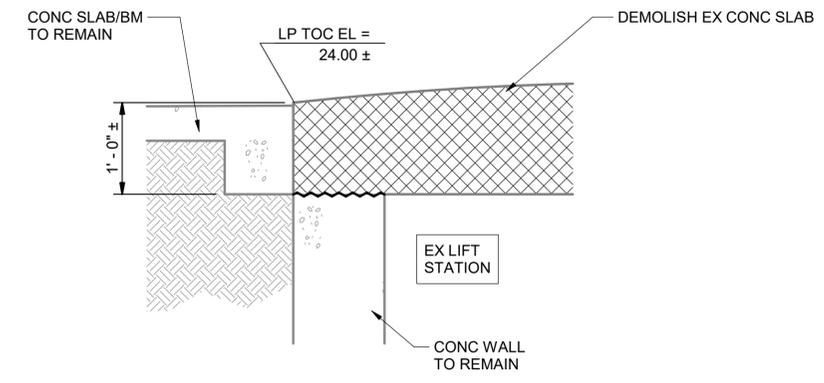
SECTIONS AND DETAILS I

shaping the built environment
JQ INFRASTRUCTURE, LLC
15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
832.941.5233 JQIENG.COM
PROJECT NO: 4240220 TBP# FIRM F-7986

SHEET NUMBER
S-06



1 DEMOLITION PLAN
S-08 1/4" = 1'-0"



2 DEMO SECTION
S-08 1" = 1'-0"

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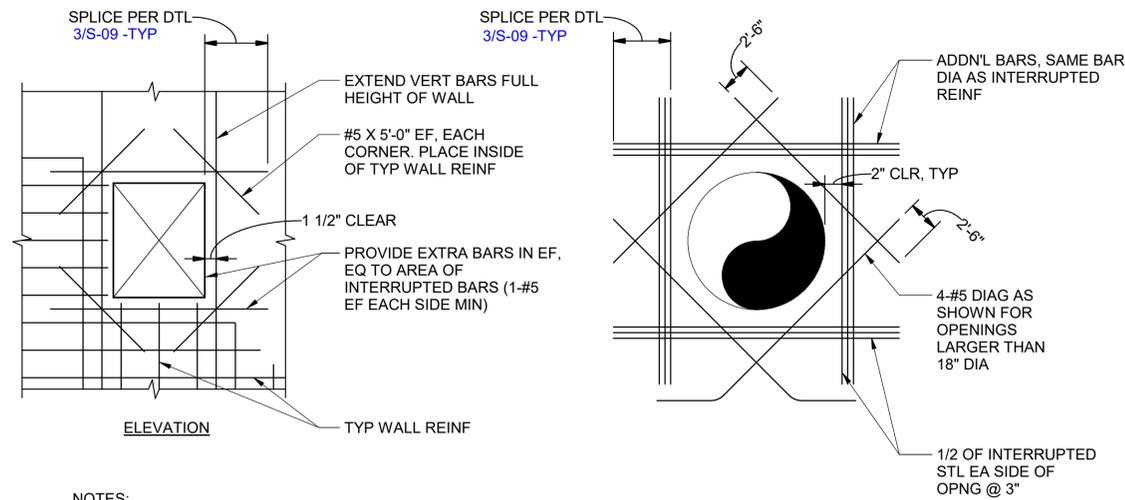
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KHA PROJECT: 088913102			

CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

SECTIONS AND DETAILS III

shaping the built environment **JQ**
JQ INFRASTRUCTURE, LLC
 15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
 832.941.5233 JQIENG.COM
 PROJECT NO: 4240220 TBPB FIRM F-7986

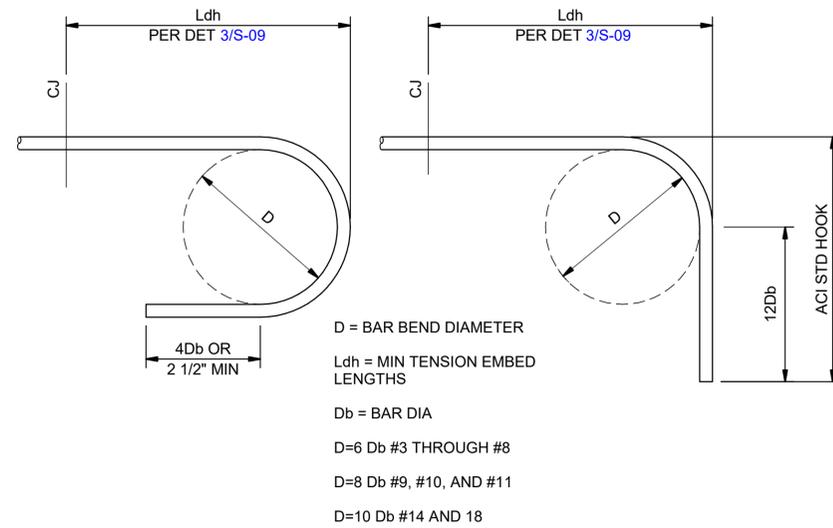
SHEET NUMBER
S-08



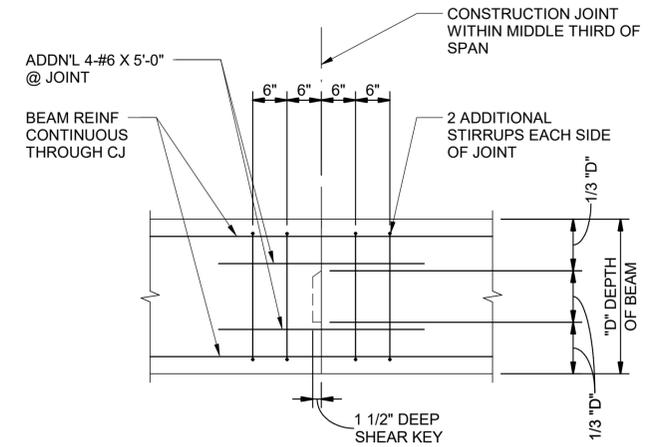
NOTES:

1. TYP FOR ALL OPNGS IN CONC WALLS AND SLABS UNO ON PLANS.
2. DO NOT WELD REINF TO PIPE SLEEVES AND INSERTS.
3. FOR OPNGS LARGER THAN 4'-0", REINF SAME AS FOR 4'-0" OPNGS.
4. SPA @ 3 BAR DIAMETERS (OR 3" MIN) OC.
5. SPLICE PER TENSION LAP SPLICE DTL 3/S-09.
6. INCREASE SIZE OF ADDN'L BARS TO PROVIDE EQ AREA AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL/SLAB THICKNESS FROM OPNG. PROVIDE 2" MIN CLR BTWN BARS.
7. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPNGS ADDN'L BARS ON THAT SIDE MAY BE OMITTED.

1 TYPICAL WALL AND SLAB OPENING REINFORCING
NTS



2 TYPICAL HOOKED BAR
NTS



NOTE:

1. THIS DETAIL APPLIES TO BEAMS ≤ 4'-0" DEPTH.

ELEVATION

KEY WIDTH	
GR BM WIDTH "T"	W
< 12"	3 1/2"
12" TO 16"	5 1/2"
16" TO 20"	7 1/4"
20" TO 24"	9 1/4"
24" TO 30"	11 1/4"

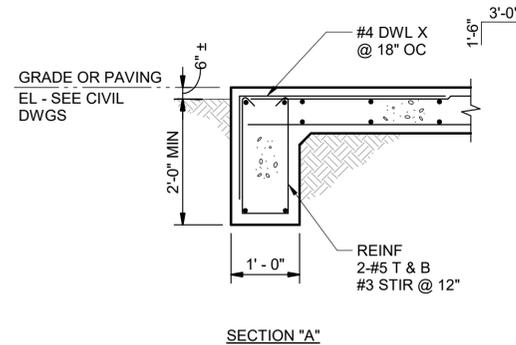
4 TYPICAL GRADEBEAM CONSTRUCTION JOINT
NTS

BAR SIZE	MIN EMBEDMENT LENGTH		MIN LAP SPLICE LENGTHS		TENSION EMBEDMENT LENGTHS Ldh FOR STANDARD END HOOK (INCHES)
	** TOP BARS (INCHES)	OTHER BARS (INCHES)	* TOP BARS (INCHES)	OTHER BARS (INCHES)	
#3	14	12	18	16	7
#4	18	15	25	20	8
#5	23	18	32	24	12
#6	28	22	40	31	14
#7	40	29	54	42	16
#8	46	33	63	45	18
#9	57	41	76	54	20
#10	70	49	84	66	24

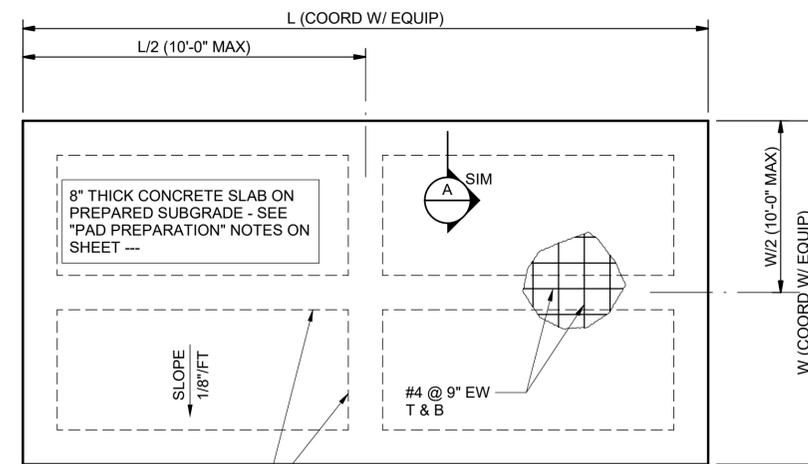
FOOTNOTES:

1. TOP BARS ARE HORIZ BARS SO THAT MORE THAN 12" OF CONC IS CAST IN THE MEMBER BELOW THE BAR. HORIZ BARS IN WALLS ARE TO BE PROVIDED WITH LAPS AS REQ'D FOR TOP BARS.
2. EXCEPT AS OTHERWISE INDICATED ON THE DWGS, TENSION LAP SPLICE LENGTHS AND TENSION EMBEDMENT LENGTHS LDH FOR STANDARD AND END HOOKS SHALL BE NO LESS THAN (NO MINUS TOLERANCE) SHOWN ON THIS SHEET.
3. LAP SPLICES SHALL NOT BE MADE AT POINTS OF MAX STRESS AS DETERMINED BY THE ENGR AND SHALL NOT BE SPACED CLOSER THAN 6" OC.

3 TYPICAL TENSION LAP SPLICE AND EMBEDMENT LENGTH
NTS



5 TYPICAL MECHANICAL OR ELECTRICAL YARD PAD
NTS



NOTES:

1. THIS DTL APPLIES AT THE FOLLOWING UNO IN THE DRAWINGS:
A. SITE ELECTRICAL EQUIP PADS
B. SITE MECH EQUIP PADS
2. REFER TO ELEC/MECH DWGS FOR EXACT SITE LOCATIONS OF PADS.
3. COORD W/ EQUIP MFR FOR ANY OPNGS AND PENETRATIONS REQ'D IN SITE PADS.

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STATE OF TEXAS
JOHN D. WISCHKOT
107566
LICENSED PROFESSIONAL ENGINEER
07/31/2025

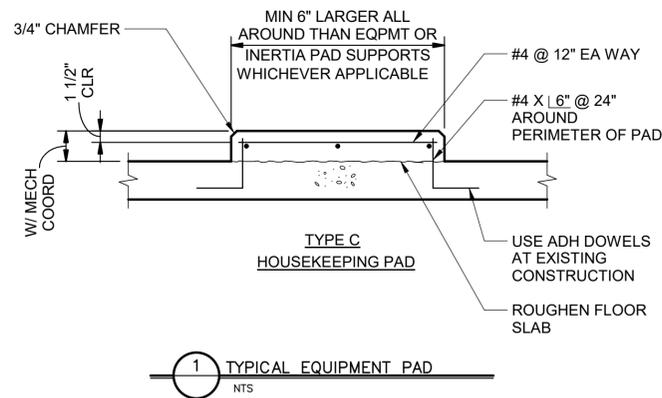
DATE: JULY 2025
DESIGNED BY: JDM
DRAWN BY: JDM
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**CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION**

**STRUCTURAL
TYPICAL DETAILS I**

shaping the built environment
JQ INFRASTRUCTURE, LLC
15810 PARK TEN PLACE, SUITE 225
832-941-5233
HOUSTON, TEXAS 77084
JQIENG.COM
PROJECT NO: 4240220
TBP# FIRM F-7986

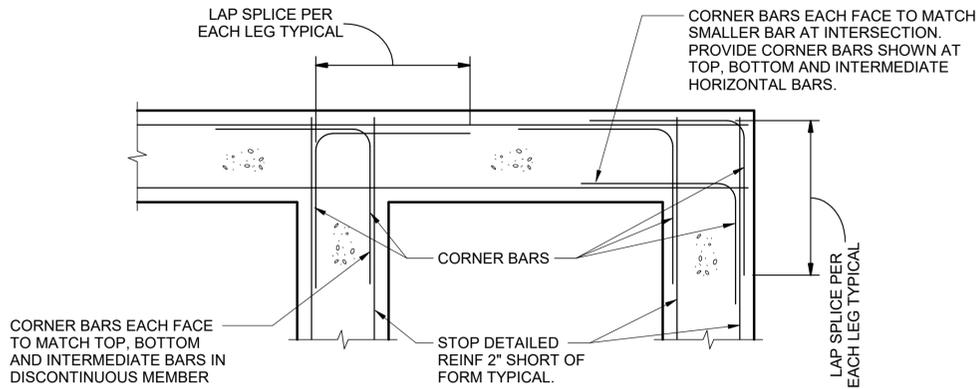
SHEET NUMBER
S-09



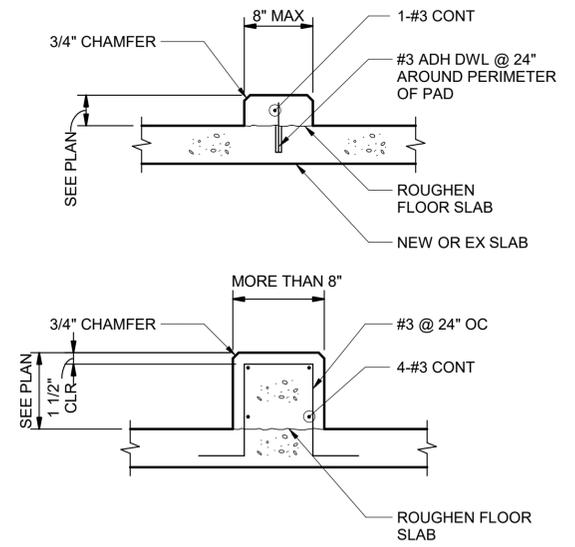
1 TYPICAL EQUIPMENT PAD
NTS

NOTES:

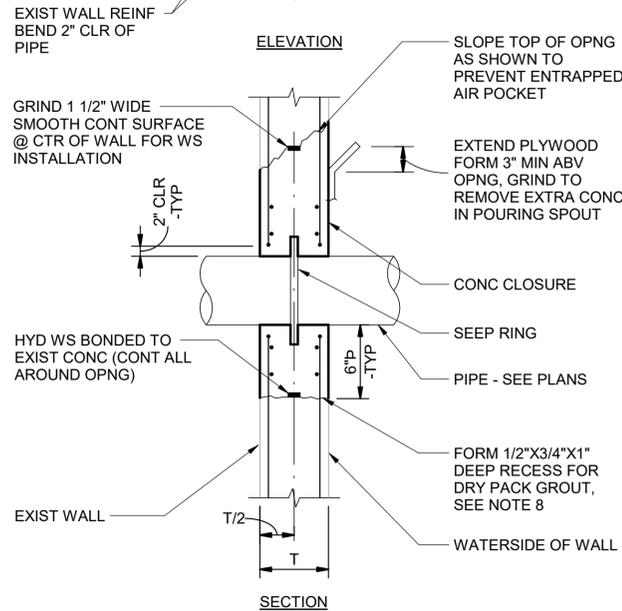
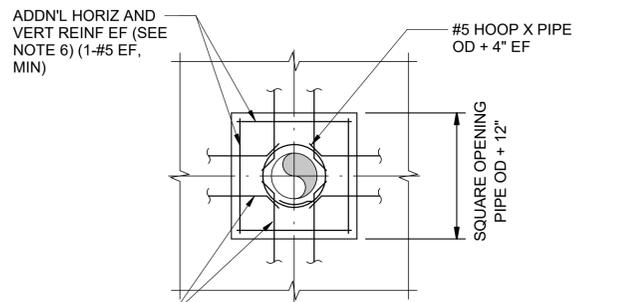
- WHERE 90 DEGREE HOOKS ARE SCHEDULED OR DETAILED FOR TOP BARS, CORNER BARS MAY BE OMITTED.
- MATCH SIZE, LOCATION AND NUMBER OF HORIZONTAL BEAM AND WALL BARS, EXCEPT THAT WHERE THERE ARE MORE THAN 2 TOP OR BOTTOM BARS, ONLY THE INSIDE AND OUTSIDE BARS MUST BE MATCHED.



2 TYPICAL CORNER BARS AT BEAM
NTS



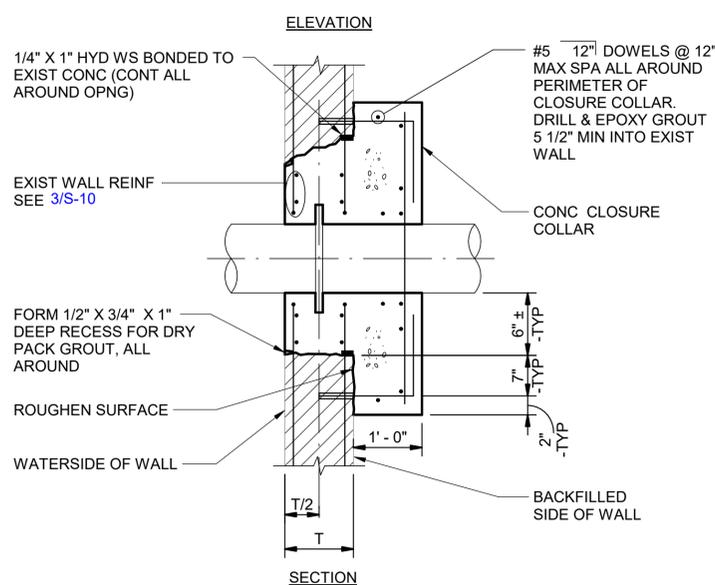
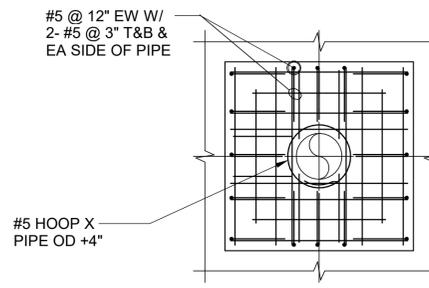
5 TYPICAL CURB
NTS



3 TYPICAL PIPE PENETRATION - EXISTING WALL
NTS

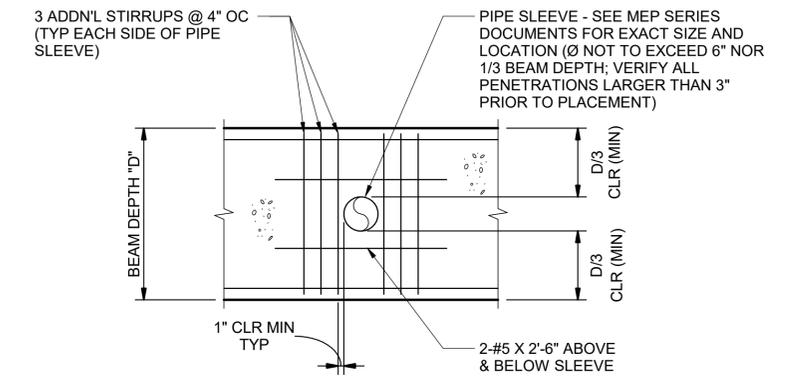
NOTES:

- SAW-CUT 1" DEEP X PIPE OD + 12" SQUARE SCORE LINE ON EF OF WALL. (VERIFY DEPTH OF CUT TO CLR REINF.) INCREASE HT AS NOTED @ TOP ON WATERSIDE FACE FOR POURING.
- CHIP TO REMOVE THE CONC WITHIN THE SCORE LINE, WHILE PRESERVING THE EXIST WALL REINF.
- CUT EXIST REINF @ CENTER OF OPNG AND BEND TO CLR PIPE.
- GRIND 1 1/2" WIDE X CONT. SMOOTH SURFACE ALL AROUND THE OPNG @ CENTER OF WALL. CLEAN SURFACES AND BOND CONT HYDROPHILIC WS IN PLACE.
- INSTALL WALL PIPE. (COAT CONC ENCASED PORTION OF PIPE WITH SPEC'D COATING SYSTEM.)
- INSTALL ADDN'L REINF EF, EACH SIDE, ABV AND BELOW PIPE. HORIZ REINF TO HAVE COMBINED AREA EQ TO AREA OF HORIZ REINF CUT. VERT REINF TO HAVE COMBINED AREA EQ TO AREA OF VERT REINF CUT.
- SOAK CONC SURFACES AND WITHIN 15 MINUTES CAST CONC CLOSURE. (CONC CLOSURE MUST BE CAST BEFORE HYDROPHILIC WS EXPANDS.) FORM GROOVE ON ALL SIDES OF OPNG EXCEPT @ TOP ON THE POUR SIDE.
- CLEAN SURFACES OF FORMED GROOVE WITH POWER WIRE BRUSH OR SANDBLASTING AND DRY-PACK WITH NON-SHRINK GROUT AFTER NEW CONC MIN. 28 DAYS OLD.

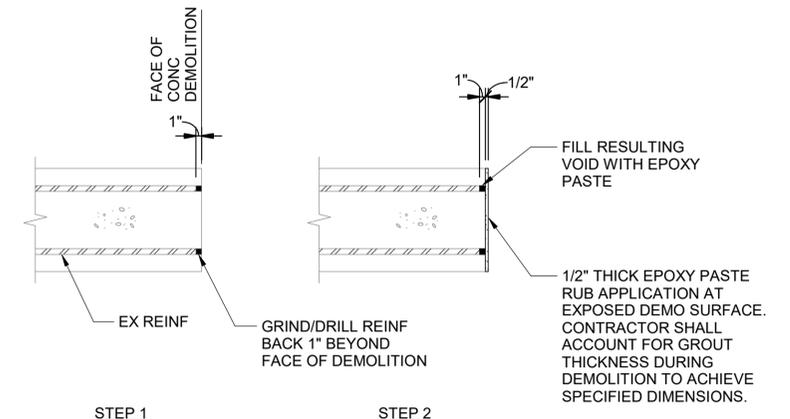


4 TYPICAL PIPE PENETRATION - EXISTING WALL
NTS

NOTE:
SIMILAR TO 3/S-10
EXCEPT AS NOTED



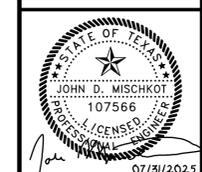
6 TYPICAL HORIZONTAL GRADE/BEAM PENETRATION
NTS



7 TYPICAL CONCRETE DEMOLITION REPAIR
NTS

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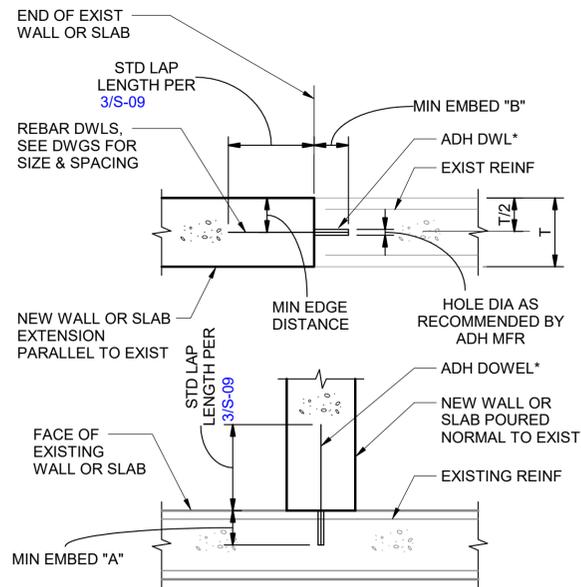


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CITY OF FRIENDSWOOD
LIFT STATION #2
REHABILITATION

STRUCTURAL TYPICAL DETAILS II

shaping the built environment
JQ INFRASTRUCTURE, LLC
15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
832.941.5233 JQIENG.COM
PROJECT NO: 4240220 TBP# FIRM F-7986

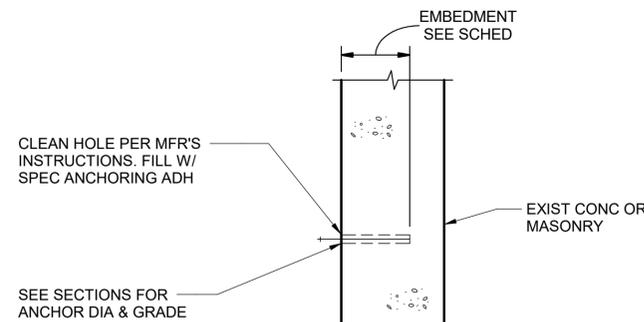


DOWEL SIZE	MIN EDGE DIST	MIN EMBEDMENT "A"	MIN EMBEDMENT "B"
#3	2"	3 1/2"	6"
#4	2 1/2"	5"	8"
#5	3"	6 1/2"	10"
#6	4"	9"	13"
#7	5"	10 1/2"	16"
#8	6"	12"	19"

NOTE:

- CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 03010, CONCRETE REINFORCEMENT.
- FOLLOW ADHESIVE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
- USE MIN EMBEDMENTS SHOWN, EXCEPT USE MANUFACTURER'S MIN RECOMMENDED EMBEDMENT IF GREATER.
- LOCATE DOWELS CENTERED IN WALL OR SLAB UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE 2 ROWS OF DOWELS INDICATED, STAGGER SPACING & LOCATE ALTERNATING DOWELS AT MINIMUM EDGE DISTANCE FROM OPPOSITE FACES.

1 TYPICAL ADHESIVE DOWELS
NTS

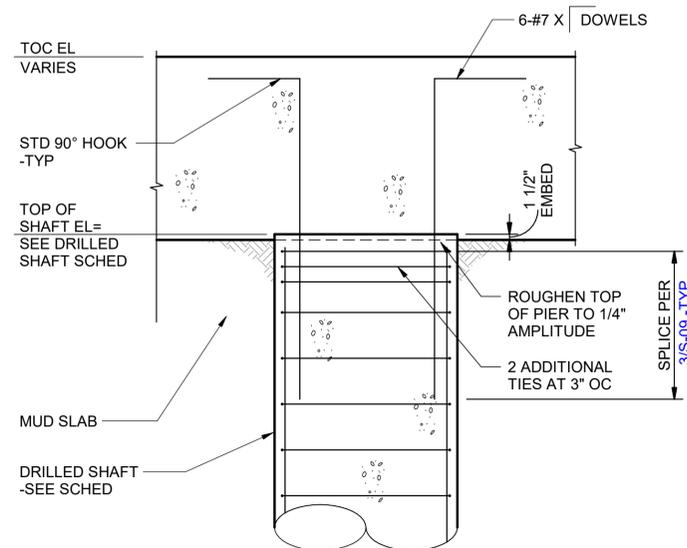


ADHESIVE ANCHOR NOTES

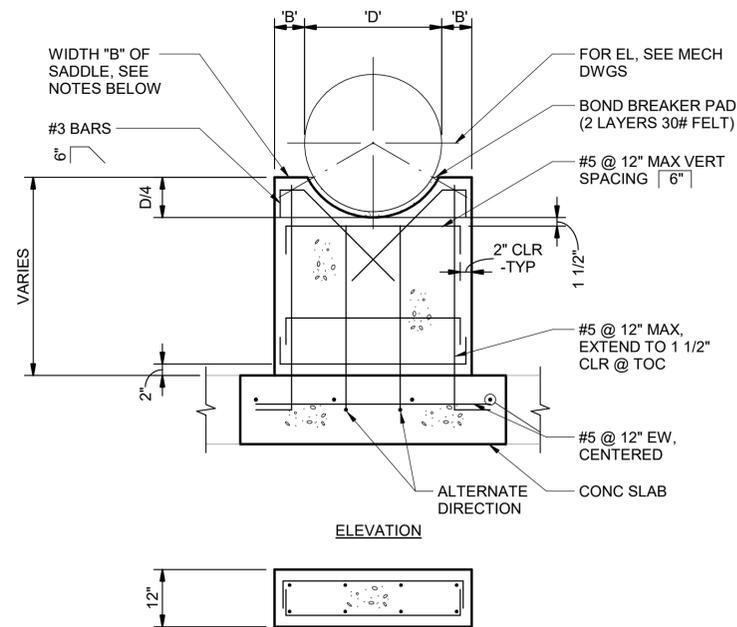
- ADHESIVE ANCHORS SHALL BE ONE OF THE FOLLOWING:
 - HILTI "HIT HY 200" ADHESIVE
 - SIMPSON "ACRYLIC-TIE" ADHESIVE
- LOCATE EXISTING REINFORCING STEEL IN THE CONCRETE USING NON-DESTRUCTIVE METHODS AND POSITION ANCHOR LOCATIONS TO AVOID CONFLICTS WITH EXISTING REINFORCING. ANCHOR LOCATIONS CAN BE ADJUSTED BY A MAXIMUM OF 1 1/2" FROM DETAILED LOCATIONS TO AVOID CONFLICTS, UNLESS NOTED OTHERWISE.
- BASED ON FIELD VERIFIED LOCATIONS OF REINFORCING STEEL AND EMBEDDED ITEMS, THE CONTRACTOR SHALL CREATE TEMPLATES FOR EACH ANCHOR GROUP.
- ALL DEBRIS SHALL BE BLOWN OUT OF THE HOLES WITH COMPRESSED AIR AFTER DRILLING. (NOT REQUIRED FOR "HIT-TZ" ANCHORS).
- ALL ABANDONED HOLES SHALL BE FILLED WITH NONSHRINK GROUT.
- HOLES IN CONNECTION PLATES SHALL BE NO MORE THAN 1/16" LARGER THAN THE ANCHOR DIAMETER. IF LARGER HOLES ARE REQUIRED FOR ERECTION PURPOSES, PROVIDE 1/4" X 3" X 3" PLATE WASHERS CONTINUOUSLY WELDED TO THE CONNECTION PLATE.

ANCHOR INSTALLATION INFORMATION			
ANCHOR DIAMETER	1/2"	5/8"	3/4"
HOLE DIAMETER	9/16"	11/16"	13/16"
EMBEDMENT FOR SS, A307 OR A36 THIRD ROD HIT-TZ	4 1/4" 3 1/2"	5 1/2" 4"	6 3/4" 5 1/4"
MAX TORQUE (FT LBS) SS, A307, A36 THIRD ROD HIT-TZ	30 20	75 50	150 105

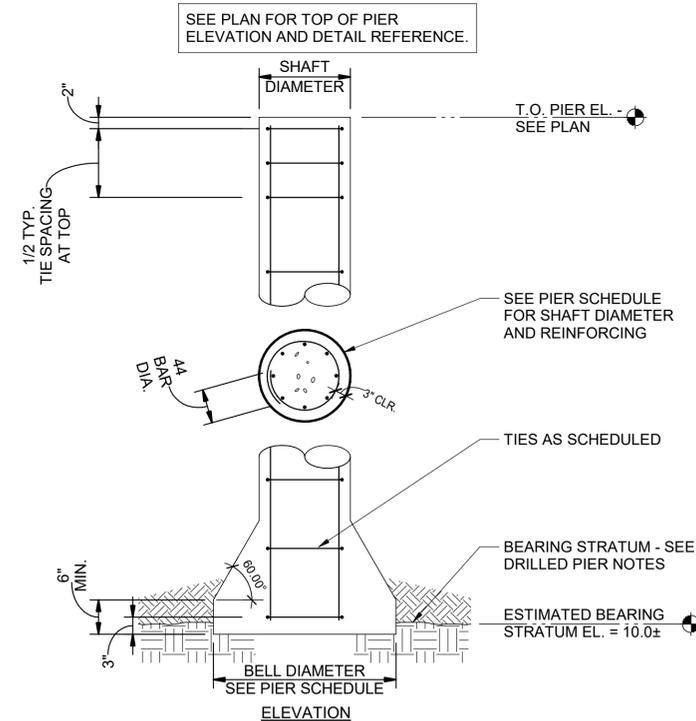
2 TYPICAL ADHESIVE ANCHOR FOR SOLID & GROUTED MASONRY AND CONCRETE
NTS



4 TYPICAL DRILLED SHAFT AT SLAB/BEAM
NTS



3 TYPICAL CONCRETE PIPE SUPPORT
NTS



PIER SCHEDULE					
MARK	SHAFT DIAMETER	BELL DIAMETER	VERTICAL BARS	TIES	CAPACITY
P1	18"	36"	6 - #7	#3 @ 12" OC	30 KIPS

5 DRILLED PIER WITH UNDERREAMED SHAFT
NTS

- NOTES:**
- WIDTH "B" OF SADDLE
 - B = 6" WHEN D < 24"
 - B = 10" WHEN 42" > D > 24"
 - B = 12" WHEN D > 42"
 - USE 2 LAYERS OF REINF, TURN HORIZ BARS 90 DEG. TO HOOK AROUND VERTS 1 1/2" CLR OF CONCRETE.
 - FORM 3/4" BEV ON ALL EXPOSED CORNERS OF SUPT.

No.	Revisions	By	Date

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STATE OF TEXAS
JOHN D. WISCHKOT
107566
LICENSED PROFESSIONAL ENGINEER
07/31/2025

SCALE: 1" = 12"
KHA PROJECT: 088913102
DATE: JULY 2025
DESIGNED BY: JDM
DRAWN BY: JDM
CHECKED BY: NIKK

CITY OF FRIENDSWOOD
LIFT STATION #2 REHABILITATION

STRUCTURAL TYPICAL DETAILS III
SHEET NUMBER 5-11

shaping the built environment
JQ INFRASTRUCTURE, LLC
15810 PARK TEN PLACE, SUITE 225 HOUSTON, TEXAS 77084
832.941.5233 JQIENG.COM
PROJECT NO: 4240220 TBP# FIRM F-7986