PORT OF BROWNSVILLE 0.5 MGD WASTEWATER TREATMENT PLANT

PORT OF BROWNSVILLE

0.5 MGD FISHING HARBOR WASTEWATER TREATMENT PLANT

This document is released for bidding "letting" on 01/06/2025 under the authority of Daniel Christodoss, Phd, PE, TBPE Registration No. 86016.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
the port that *works*

100% SUBMITTAL
NOT FOR CONSTRUCTION

Texas Registered Engineering Firm F-4440

PLANS PREPARED BY

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SUBMITTED FOR LETTING:

DANIEL CHRISTODOSS PhD, P.E. PROJECT MANAGER

ARIEL CHAVEZ PE RPLS DIRECTOR OF ENGINEERING SERVICES

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SITE PLAN SYMBOLOGY LEGEND:

- EMBANKMENT SLOPE
- 200 — CONTOUR
- CO — CLEAN OUT
- MH — MANHOLE
- MW — MONITORING WELL
- PZ — PIEZOMETER
- SD — STORM DRAIN
- CB — CATCH BASIN
- UV — UTILITY VAULT
- PP — POWER POLE
- TP — TELEPHONE POLE
- FH — FIRE HYDRANT
- YH — YARD HYDRANT
- X 210.5 — EXISTING SPOT ELEVATION
- 210.8 — FINISHED SPOT ELEVATION
- CP — HORIZONTAL CP-X, CONTROL POINT
- BM BM — BENCHMARK
- SB-1 — SOIL TEST HOLE (BORING) AND IDENTIFICATION
- DOWN GUY WIRE
- OT — OVERHEAD TELEPHONE LINE
- UT — UNDERGROUND TELEPHONE LINE
- OE — OVERHEAD ELECTRIC LINE
- UE — UNDERGOUND ELECTRIC LINE
- F — FIBER OPTIC
- C — COMMUNICATION
- G — G — GAS LINE
- HANDRAIL
- PIPELINE
- PIPELINE (LARGE)
- PIPELINE (BENEATH CONCRETE OR STRUCTURE, UNDERGROUND)
- PIPELINE ABANDON IN PLACE
- RAILROAD
- DRAINAGE FLOW
- NATURAL WATERWAY
- X — X — BARBED WIRE FENCE
- CHAIN-LINK FENCE
- WOODEN FENCE
- WIRE — WIRE FENCE
- LOC — LIMITS OF CONSTRUCTION
- PROPERTY LINE
- CENTERLINE
- RB — RB — ROCK BERM
- SF — SILT FENCE
- EXISTING TREE
- X — KEY NOTE

NOMINAL PIPE DIAMETER (INCHES) — 6" DI - WL — PIPE MATERIAL (SEE LIST THIS DRAWING); PROCESS FLOW STREAM (SEE LIST THIS DRAWING)

PROCESS FLOW STREAM

BWW	BACKWASH WASTE
CE	CLARIFIER EFFLUENT
CL	CLARIFIER LOADING
CS	CHLORINE SOLUTION
DS	DIGESTED SLUDGE
EFF	TREATED EFFLUENT
FE	FILTER EFFLUENT
FIL	FILTRATE
LPA	LOW PRESSURE AIR
MCS	MEMBRANE CLEANING SUPPLY
MPD	MEMBRANE PERMEATE DISCHARGE
MPS	MEMBRANE PERMEATE SUCTION
NPW	NON-POTABLE WATER
OA	ODOROUS AIR
OF	OVERFLOW
PD	PLANT DRAIN
PW	POTABLE WATER
RAS	RETURN ACTIVATED SLUDGE
RAW	RAW WASTE WATER
SC	SCUM
SD	STORM DRAIN
SGW	SCREENED & DEGRITTED WASTE WATER
SH	SUCTION
SL	SLUDGE (BIOSOLIDS)
WAS	WASTE ACTIVATED SLUDGE
WL	WATER LINE
WWL	WASTE WATER LINE

PIPE MATERIAL

CISP	CAST IRON SOIL PIPE
CSTL	CARBON STEEL PIPE
DIP	DUCTILE IRON PIPE
FRP	FIBER REINFORCED PLASTIC PIPE
GSP	GALVANIZED STEEL PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
SS	STAINLESS STEEL PIPE

PIPE IDENTIFICATION SYSTEM

SECTION CUT SYMBOL: A / C-101 — SECTION IDENTIFICATION NUMBER; SHEET NUMBER WHERE SECTION IS DRAWN OR "-" IF SECTION IS DRAWN ON THE SAME SHEET AS CALLOUT

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TITLE FOR SECTION: SCALE: SCALE NOTED FOR 22x34 SHEETS

DETAIL CALLOUT SYMBOL: 1 / C-101 — DETAIL IDENTIFICATION NUMBER; SHEET NUMBER WHERE DETAIL IS DRAWN OR "-" IF DETAIL IS DRAWN ON THE SAME SHEET AS CALLOUT

TITLE FOR DETAILS: 1 / C-101 — DETAIL IDENTIFICATION NUMBER; SHEET NUMBER WHERE DETAIL IS REFERENCED OR "-" IF DETAIL IS REFERENCED ON THE SAME SHEET AS CALLOUT OR DETAIL IS PART OF STANDARD DETAILS

SECTION AND DETAIL DESIGNATION

DRAWING ID SYSTEM: G - 0 01 — DISCIPLINE; SERIES NUMBER; SEQUENTIAL SHEET NUMBER

DISCIPLINE DESIGNATION

A-ARCHITECTURAL	H-HVAC
C-CIVIL	I-INSTRUMENTATION
D-DEMOLITION	M-MECHANICAL
E-ELECTRICAL	S-STRUCTURAL
G-GENERAL	

NORTH ARROW: TRUE ARROW

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0.5 MGD WASTE WATER
TREATMENT PLANT
INDEX

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the port that works

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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
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GENERAL NOTES:

1. THE CONTRACTOR SHALL PROVIDE SURVEY STAKEOUT FOR THE PROPOSED IMPROVEMENTS.
2. THE CONTRACTOR SHALL PROVIDE PUMPS, WELL POINTS OR OTHER METHODS OF DEWATERING EXCAVATIONS SO FIRM BEDDING AND FOUNDATION CONDITIONS CAN BE MAINTAINED.
3. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT ALL EXISTING SHRUBS AND TREES. ANY SHRUBS OR TREES ARE THAT DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN KIND OR AS NOTED ON PLANS.
4. UNDERGROUND UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL BEAR THE RESPONSIBILITY OF VERIFYING UTILITY LOCATION AND SIZES. THE CONTRACTOR SHALL CALL TEXAS 811 PRIOR TO COMMENCING WORK TO HAVE UTILITIES STAKED IN THE FIELD.
5.
6. THE CONTRACTOR SHALL SUPPORT UTILITY MAINS AND SERVICES EXPOSED

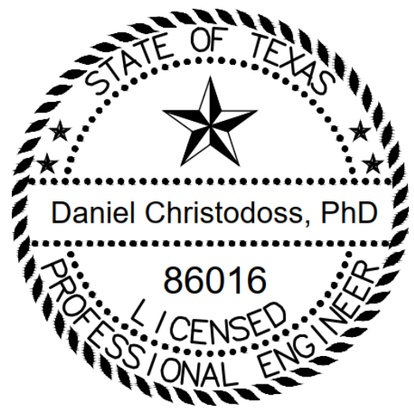
   SAFELY INSTALL WORK WITHOUT INTERRUPTION TO THE EXISTING UTILITY.
7. THE CONTRACTOR SHALL REQUEST TEMPORARY POLE SUPPORT SERVICES PROVIDED BYTHEUTILITY OWNERS ATANY POLE THATMAY BEUNDERCUT BY TRENCH OPERATIONS. THE CONTRACTOR SHALL PROVIDE THE UTILITY COMPANY(S)WITH A MINIMUM OF THREE (3)WORKING DAYS NOTICE OF THE NEED FOR POLE SUPPORT.
8. EROSION CONTROL MEASURES TO BEESTABLISHED AND MAINTAINED BYTH CONTRACTOR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER.
9. ALL PAVEMENT CUTS SHALL BE MADE BY A PAVEMENT SAW TO NEAREST JOINT. SAW CUTS SHALL BE PERPENDICULAR TO THE LENGTH OF DRIVEWAY. SAW CUTTING SHALL BE REQUIRED PRIOR TO ALL WORK.
10. CONTRACTOR WILL PROTECT AND MAINTAIN AT ALL TIMES DRAINAGE SWALES, PIPES, TILES, ETC., PROTECT AND MAINTAIN AT ALL TIMES ALL SEPTIC SYSTEMS/LEACH FIELDS. ALSO PROTECT AND PRESERVE ALL PROPERTY CORNERS, MONUMENTS, MARKERS, ETC., ANY GUIDE RAILING DAMAGED OR DISTURBED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED IN KIND.
11. COMPACTED STONE SHALL BE 95% OF MAXIMUM DRY DENSITY IN ACCORDANCE THE MODIFIED PROCTOR TEST (ASTM D1557).
12. CONTRACTOR SHALL COMPLETE FINAL GRADING OR STABILIZATION TOP-SOILING AND SEEDING WITHIN TWO (2)WEEKS OFFINALIZING THAT AREA OF WORK. ALL DISTURBED AREAS SHALL BE TOP-SOILED, SEEDED AND MULCHED PRIOR TO CLOSE OF BUSINESS EVERY FRIDAY. IN CASE OF INCLEMENT WEATHER, THEAREA SHALLBERESTORED BEFORE ANY FURTHER EXCAVATION TAKES PLACE ON THE NEXT BUSINESS DAY.
13. CONTRACTOR SHALL SAFEGUARD AND PRESERVE ALL RIGHT-OF-WAY MONUMENTS AND PROPERTY CORNERS AT THE PROJECT SITE. ALL PROPERTY CORNERS THAT ARE DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION ARE TO BE REPLACED AND CERTIFIED BY ATEXAS LICENSED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION, ANY DAMAGES DONE TO EXISTING FENCES, STREETS DRIVEWAYS, LANDSCAPING AND STRUCTURES, AND ANY EXISTING UTILITIES COSTS OF RESTORATIONS, IF ANY, SHALL BE THE CONTRACTORS ENTIRE EXPENSE.
15. ANY TREE CLEARING SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT AND INCLUDED IN THE CONTRACTORS BID PRICE.
16. THE OWNER WILL RETAIN A TESTING SERVICE COMPANY TO PROVIDE MATERIAL AND BACKFILL COMPACTION TESTING. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO SCHEDULE TESTING.

EROSION CONTROL NOTES

1. ALL SWALES AND SEDIMENTATION TRAPS MUST BE CLEANED AND MAINTAINED AT ALL TIMES BY CONTRACTOR TO ALLOW ADEQUATE DRAINAGE.
2. CONTRACTOR MUST PROTECT AT ALL TIMES ADJACENT PROPERTIES AND ROADWAYS FROM SEDIMENTATION, EROSION, RUNOFF, DEBRIS AND/O ANY OTHER EFFECTS FROM THE SITE CONSTRUCTION.
3. UPON INSTALLATION OF DRAINAGE CULVERTS CONTRACTOR MUST MAINTAIN AND PERIODICALLY FLUSH THOSE CULVERTS TO ALLOW DRAINAGE FLOWS.
4. CONTRACTOR(S) MUST TAKE ALL PRECAUTIONS AS NECESSARY AND/OR AS ORDERED BY ENGINEER FOR DUST CONTROL AND FLYING DEBRISPROTECTION. (ie. WATER, FENCE, MATTING, COVERS, ETC.)
5. DURING CONSTRUCTION, BEFORE SUFFICIENT SEEDING COVER IS ESTABLISHED ON STEEPER SLOPES, CONTRACTOR MAY BE REQUIRED TO PLACE MATTING, BLANKETS, OR OTHER MEASURES TO PROTECT SLOPES AGAINSTEROSION AS NECESSARY AND/OR ASORDERED BY THE ENGINEER.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR FULL COMPLIANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN AS REQUIRED PER THE CURRENT STORMWATER REGULATIONS.
7. ALL EROSION CONTROL MEASURES SHALL BE ROUTINELY CHECKED CLEANED AND REPAIRED, PARTICULARLY AFTER STORM EVENTS.
8. SILT FENCE SHALL BE ERECTED ATTHE LIMITS OF ALL DISTURBED AREAS WHERE, IN THE JUDGEMENT OF THE ENGINEER THERE IS THE POTENTIAL FOR FILTRATION OF STREAMS, STORM SEWERS, WETLANDS OR NEIGHBORING PROPERTIES, REGARDLESS OF WHETHER THE SILTFENC IS INDICATED ON THE DRAWINGS.
9. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
10. ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS SENSITIVE FEATURES, ETC.
11. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
12. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICAL EXPOSED TO STORM WATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
13. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE NOT TO BE REUSES, SHALL BE DISPOSED OF PROPERLY.
14. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14th DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21st DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14th DAY, STABILIZATION MEASURES SHALLBE INITIATED AS SOON AS POSSIBLE.

EROSION CONTROL CONSTRUCTION SEQUENCE:

1. INSTALL ALL EROSION CONTROL DEVICES AS SHOWN ON THE PLAN PRIOR TO EARTHWORK CONSTRUCTION. BASED ON FIELD PERFORMANCE AND WEATHER CONDITIONS, ADDITIONAL EROSION CONTROL DEVICES MAY BE REQUIRED. DISTURBANCE TO THE SITE TO BE LIMITED.
2. CONTRACTOR SHALL RESTRICT GRADING OPERATIONS TO THE AREAS INDICATED ON THE CONTRACT DRAWINGS, PERFORMING WORK OUTSIDE THE IDENTIFIED LIMITS SHALL NOT BE PERMITTED WITHOUT APPROVAL OF THE ENGINEER.
3. PROTECT EXISTING VEGETATION AND OTHER ENVIRONMENTAL FEATURES TO BE PRESERVED WITH CONSTRUCTION BARRIERS.
4. CONSTRUCTION OF UNDERGROUND UTILITIES MAY BEGIN AT THIS TIME. MAXIMUM OF 5ACRES OF DISTURBED SOIL IS PERMITTED AT ANY ON TIME PRIOR TO STABILIZATION.
5. RESTORE EROSION CONTROL MEASURES AS NEEDED FOLLOWING THE UTILITY INSTALLATION. CONTINUE TO MAINTAIN AND REPAIR TEMPORARY EROSION CONTROL DEVICES THROUGHOUT CONSTRUCTION AS NEEDED.
6. COMPLETE FINAL GRADING OF SITE. AREAS TO REMAIN UNDISTURBED FOR GREATER THAN 14 DAYS WILL BE SEEDED/MULCHED. REAPPLY TOPSOIL, INSTALL PERMANENT SEEDING, FERTILIZER AND MULCH.
7. ALL TEMPORARY EROSION CONTROLDEVICES SHALL BE MAINTAINED BYTHE CONTRACTOR.
8. EROSION CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL AN APPROVED PERMANENT COVER OF VEGETATION IS ESTABLISHED REMOVAL OF DEVICES TO BE COORDINATED WITH THE OWNER, LOCAL MUNICIPALITY OR REPRESENTATIVE THEREOF.



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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
GENERAL NOTES 1 of 2

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - LIFT STATIONS AND FORCE MAINS GENERAL CONSTRUCTION NOTES:

1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE DESIGNED AN CONSTRUCTED IN ACCORDANCE WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) CARRIZO-WILCOX AQUIFER RULES 30 TEXAS ADMINISTRATIVE CODE (TAC)§ 213.5(C), THE DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS 30TAC CHAPTER 217, AND THE CITY'S STANDARD SPECIFICATIONS.
2. LIFT SHALL BE DESIGNED TO WITHSTAND AND OPERATE DURING A 100-YEAR FLOOD EVENT AND SHALL BE ACCESSIBLE DURING A 25-YEAR FLOOD. ALL LIFT STATIONS SHALL BE INTRUDER-RESISTANT WITH A CONTROLLED ACCESS.
3. PUMP CONTROLS.
   - A. A LIFT STATION PUMP MUST OPERATE AUTOMATICALLY, BASED ON THE WATER LEVEL IN A WET WELL
   - B. THE LOCATION OF A WET WELL LEVEL MECHANISM MUST ENSURE THAT THE MECHANISM IS UNAFFECTED BY CURRENTS, RAGS, GREASE, OR OTHER FLOATING MATERIALS.
   - C. A LEVEL MECHANISM MUST BE ACCESSIBLE WITHOUT ENTERING THE WET WELL.
   - D. WET WELL CONTROLS WITH A BUBBLER SYSTEM REQUIRE DUAL AIR SUPPLY AND DUAL CONTROLS.
   - E. MOTOR CONTROL CENTERS MUST BE MOUNTED AT LEAST 4.0 INCHES ABOVE GRADE TO PREVENT WATER INTRUSION AND CORROSION FROM STANDING WATER IN THE ENCLOSURE.
   - F. ELECTRICAL EQUIPMENT AND ELECTRICAL CONNECTIONS IN A WET WELL OR A DRY WELL MUST MEET NATIONAL FIRE PREVENTION ASSOCIATION 70 NATIONAL ELECTRIC CODE EXPLOSION PREVENTION REQUIREMENTS, UNLESS CONTINUOUS VENTILATION IS PROVIDED.
4. WET WELLS.
   - A. A WET WELL MUST BE ENCLOSED BY WATERTIGHT AND GAS TIGHT WALLS.
   - B. A PENETRATION THROUGH A WALL OF A WET WELL MUST BE GAS TIGHT.
   - C. A WET WELLMUST NOT CONTAIN EQUIPMENT REQUIRING REGULAR OR ROUTINE INSPECTION OR MAINTENANCE, UNLESS INSPECTION AND MAINTENANCE CAN BE DONE WITHOUT STAFF ENTERING THE WET WELL.
   - D. A GRAVITY PIPE DISCHARGING TO A WET WELL MUST BE LOCATED SO THAT THE INVERT ELEVATION ISABOVE THE LIQUID LEVEL OF A PUMP'S "ON" SETTING.
   - E. GATE VALVES AND CHECK VALVES ARE PROHIBITED IN A WET WELL.
   - F. GATE VALVES AND CHECK VALVES MAY BE LOCATED IN A VALVE VAULT NEXT TO A WET WELL OR IN A DRY WELL.
   - G. PUMP CYCLE TIME, BASED ON PEAK FLOW, MUST EQUAL OR EXCEED THOSE IN THE FOLLOWING TABLE:

PUMP HORSEPOWER	MINIMUM CYCLE TIMES (MINUTES)
< 50	6
50-100	10
> 100	15

   - H. AN EVALUATION OF MINIMUM WET WELL VOLUME REQUIRES THE FOLLOWING FORMULA:

$$V = \frac{T \times Q}{4 \times 7.48}$$

WHERE:
V = ACTIVE VOLUME (CUBIC FEET)
Q = PUMP CAPACITY (GALLONS PER MINUTE)
T = CYCLE TIME (MINUTES)
7.48 = CONVERSION FACTOR (GALLONS/CUBIC FOOT)

5. WET WELL SLOPES.
   - A. A WET WELL FLOOR MUSTHAVE ASMOOTH FINISH AND MINIMUM SLOPE OF 10% TO A PUMP INTAKE.
   - B. A WET WELL DESIGN MUST PREVENT DEPOSITION OF SOLIDS UNDER NORMAL OPERATING CONDITIONS.
   - C. A LIFT STATION WITH GREATER THAN 5.0 MILLION GALLONS PER DAY FIRM PUMPING CAPACITY MUST
6. DRY WELL ACCESS.
   - A. AN UNDERGROUND DRY WELL MUST BE ACCESSIBLE.
   - B. A STAIRWAY IN ADRY WELLMUST USE NON-SLIP STEPS AND CONFORM TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS WITH RESPECT TO RISE AND RUN.
   - C. A LADDER IN A DRY WELL MUST MADE OFNON-CONDUCTIVE MATERIAL AND RATED FOR THE LOAD NECESSARY FOR STAFF AND EQUIPMENT TO DESCEND AND ASCEND.
7. VENTILATION SHALL BE PROVIDED FOR LIFT STATIONS, INCLUDING BOTH WET AND DRY WELLS.
8. HOISTING EQUIPMENT. A LIFT STATION MUST HAVE PERMANENT HOISTING EQUIPMENT OR BE ACCESSIBLE TO PORTABLE HOISTING EQUIPMENT FOR REMOVAL OF PUMPS, MOTORS, VALVES, PIPES, AND OTHER SIMILAR EQUIPMENT.
9. A FLOOR DRAIN FROM AVALVE VAULT TO AWET WELLMUST PREVENT GAS FROM SUBMERGED OUTLETS, OR A COMBINATION OF THESE DEVICES.
10. PUMPS.
    - A. GENERAL REQUIREMENTS. A RAW WASTEWATER PUMP, WITH THE EXCEPTION OF A GRINDER PUMP, MUST:
      - A.1. BE DESIGNED TO PREVENT CLOGGING;
      - A.2. BE CAPABLE OF PASSING A SPHERE OF 2.5INCHES IN DIAMETER OR GREATER; AND
      - A.3. HAVE GREATER THAN 3.0 INCH DIAMETER SUCTION AND DISCHARGE OPENINGS.
    - B. SUBMERSIBLE AND NON-SUBMERSIBLE PUMPS.
      - B.1. A NON-SUBMERSIBLE PUMP MUST HAVE INSPECTION AND CLEANOUT PLATES ON BOTH THE SUCTION AND DISCHARGE SIDES OF EACH PUMPING UNIT THAT FACILITATE LOCATING AND REMOVING BLOCKAGE-CAUSING MATERIALS, UNLESS THE PUMP DESIGN ACCOMMODATES EASY REMOVAL OF THE ROTATION ELEMENTS.
      - B.2. A PUMP SUPPORT MUST PREVENT MOVEMENT AND VIBRATION DURING OPERATION.
      - B.3. A SUBMERSIBLE PUMP MUST USE A RAIL-TYPE PUMP SUPPORT SYSTEM WITH MANUFACTURER-APPROVED MECHANISMS DESIGNED TO ALLOW PERSONNEL TO REMOVE AND REPLACE ANY SINGLE PUMP WITHOUT ENTERING OR DEWATERING THE WE WELL.
      - B.4. SUBMERSIBLE PUMP RAILS AND LIFTING CHAINS MUST BE CONSTRUCTED OF A MATERIAL THAT PERFORMS TO AT LEAST THE STANDARD OF SERIES 300 STAINLESS STEEL.
    - C. LIFT STATION PUMPING CAPACITY. THE FIRM PUMPING CAPACITY OF A LIFT STATION MUST HANDLE THE EXPECTED PEAK FLOW.
    - D. PUMP HEAD CALCULATIONS.
      - D.1. AN OWNER SHALL SELECT A PUMP BASED UPON ANALYSIS OF THE SYSTEM HEAD AND PUMP CAPACITY CURVES THAT DETERMINE THE PUMPING CAPACITIES ALONE AND WITH OTHER PUMPS AS THE TOTAL DYNAMIC-HEAD INCREASES DUE TO ADDITIONA FLOWS PUMPED THROUGH A FORCE MAIN.
      - D.2. THE PIPE HEAD LOSS CALCULATIONS, USING THE HYDRAULIC INSTITUTE STANDARDS, PERTAINING TO HEAD LOSSES THROUGH PIPES, VALVES, AND FITTINGS, MUST BE INCLUDED IN THE REPORT.
      - D.3. THE SELECTED FRICTION COEFFICIENT (HAZEN-WILLIAMS "C VALUE) USED IN FRICTION HEAD LOSS CALCULATIONS MUST B BASED ON THE PIPE MATERIAL SELECTED.
      - D.4. FOR A LIFTSTATION WITH MORE THAN TWO PUMPS, AFORCE MAIN IN EXCESS OF ONE-HALF MILE, OR FIRM PUMPING CAPACITY OF 100 GALLONS PER MINUTE OR GREATER, SYSTEM CURVES MUST BE PROVIDED FOR BOTH THE NORMAL AND PEAK OPERATING CONDITIONS AT C VALUES FOR PROPOSED AND EXISTING PIPE.
    - E. FLOW CONTROL.
      - E.1. A LIFT STATION OR A TRANSFER PUMPING STATION LOCATED AT OR DISCHARGING DIRECTLY TO A WASTEWATER TREATMENT SYSTEM MUST HAVE A PEAK PUMP CAPACITY EQUAL TO OR LESS THAN THE PEAK DESIGN FLOW, UNLESS EQUALIZATION IS PROVIDED.
      - E.2. A WASTEWATER TREATMENT SYSTEM WITH APEAK FLOW THAT IS GREATER THAN 300,000 GALLON PER DAY MUST USE THREE OR MORE PUMPS, UNLESS DUPLEX, AUTOMATICALLY CONTROLLED VARIABLE CAPACITY PUMPS ARE PROVIDED.
    - F. SELF-PRIMING PUMPS.
      - F.1. A SELF-PRIMING PUMP MUST BE CAPABLE OF PRIMING WITHOUT RELIANCE UPON A SEPARATE PRIMING SYSTEM, AN INTERNA FLAP VALVE, OR ANY EXTERNAL MEANS FOR PRIMING.
      - F.2. A SELF-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND, AND MUST INCORPORATE ITS OWN SUCTION PIPE.
      - F.3. A SELF-PRIMING PUMP MUST VENT AIR BACK INTO THE WET WELL DURING PRIMING.
    - G. VACUUM-PRIMING PUMPS.
      - G.1. A VACUUM-PRIMED PUMP MUST BE CAPABLE OF PRIMING BY USING A SEPARATE POSITIVE PRIMING SYSTEM WITH A DEDICATED VACUUM PUMP FOR EACH MAIN WASTEWATER PUMP.
      - G.2. A VACUUM-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT LESS THAN 7.0 FEET PER SECOND AND MUST HAVE ITS OWN SUCTION PIPE.
    - H. VERTICAL POSITIONING OF PUMPS. A RAW WASTEWATER PUMP MUST HAVE POSITIVE STATIC SUCTION HEAD DURING NORMAL ON-OFF CYCLING, EXCEPT A SUBMERSIBLE PUMP WITH "NO SUCTION"PIPES, A VACUUM-PRIMED PUMP, OR A SELF-PRIMING UNIT CAPABLE OF SATISFACTORY OPERATION UNDER ANY NEGATIVE SUCTION HEAD ANTICIPATED FOR THE LIFT STATION.
    - I. INDIVIDUAL GRINDER PUMPS. A GRINDER PUMP SERVING ONLY ONE RESIDENTIAL OR COMMERCIAL STRUCTURE THAT ISPRIVATELY OWNED MAINTAINED, AND OPERATED IS NOT SUBJECT TO THE RULES OF THIS CHAPTER.
    - J. PUMP FOR LOW-FLOW LIFTSTATION. APUMP USED FOR ALIFTSTATION WITH A PEAK FLOW OFLESS THAN 120GALLONS PER MINUTE MUST BE SUBMERSIBLE AND INCLUDE A GRINDER.

11. PIPING.
    - A. HORIZONTAL PUMP SUCTIONS.
      - A.1. EACH PUMP MUSTHAVE ASEPARATE SUCTION PIPETHATUSES AN ECCENTRIC REDUCER.
      - A.2. PIPES IN A WET WELL MUST HAVE A TURNDOWN TYPE FLARED INTAKE.
    - B. VALVES.
      - B.1. THE DISCHARGE SIDE OF EACH PUMP FOLLOWED BY A FULL-CLOSING ISOLATION VALVE MUST ALSO HAVE A CHECK VALVE.
      - B.2. A CHECK VALVE MUST BE A SWING TYPE VALVE WITH AN EXTERNAL LEVER.
      - B.3. A VALVE MUST INCLUDE A POSITION INDICATOR TO SHOW ITS OPEN AND CLOSED POSITIONS, UNLESS AFULL-CLOSING VALVE IS A RISING-STEM GATE VALVE.
      - B.4. A GRINDER PUMP INSTALLATION MAY USE ARUBBER-BALL CHEC VALVE OR A SWING-TYPE CHECK VALVE.
      - B.5. A BUTTERFLY VALVE, TILTING-DISC CHECK VALVE, OR ANY OTHER VALVE USING A TILTING-DISC IN A FLOW PIPE IS PROHIBITED.
    - C. PIPES.
      - C.1. A LIFT STATION PIPE MUST HAVE FLANGED OR FLEXIBLE CONNECTIONS TO ALLOW FOR REMOVAL OF PUMPS AND VALVES WITHOUT INTERRUPTION OF THE LIFT STATION OPERATIONS.
      - C.2. WALL PENETRATIONS MUST ALLOW FOR PIPE FLEXURE WHILE EXCLUDING EXFILTRATION OR INFILTRATION.
      - C.3. PIPE SUCTION VELOCITIES MUST BE AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND.

12. EMERGENCY PROVISIONS FOR LIFT STATIONS.
    - A. A COLLECTION SYSTEM LIFT STATION MUST BE EQUIPPED WITH A TESTED QUICK-CONNECT MECHANISM OR A TRANSFER SWITCH PROPERLY SIZED TO CONNECT TO A PORTABLE GENERATOR, IF NOT EQUIPPED WITH AN ONSITE GENERATOR.
    - B. LIFT STATIONS MUST INCLUDE AN AUDIOVISUAL ALARM SYSTEM AND THE SYSTEM MUST TRANSMIT ALL ALARM CONDITIONS THROUGH USE OF AN AUTO-DIALER SYSTEM, SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM, OR TELEMETERING SYSTEM CONNECTED TO A CONTINUOUSLY MONITORED LOCATION.
    - C. AN ALARM SYSTEM MUST SELF-ACTIVATE FOR APOWER OUTAGE, PUMP FAILURE, OR A HIGH WET WELL WATER LEVEL.
    - D. A LIFT STATION CONSTRUCTED TO PUMP RAW WASTEWATER MUST HAVE SERVICE RELIABILITY BASED ON:
      - D.1. RETENTION CAPACITY:
        - THE RETENTION CAPACITY IN A LIFT STATION'S WET WELL AND INCOMING GRAVITY PIPES MUST PREVENT DISCHARGES OF UNTREATED WASTEWATER AT THE LIFT STATION OR ANY POINT UPSTREAM FOR A PERIOD OF TIME EQUAL TO THE LONGEST ELECTRICAL OUTAGE RECORDED DURING THE PAST 24MONTHS
        - BUT NOT LESS THAN 20 MINUTES.

        FOR CALCULATION PURPOSES, THE OUTAGE PERIOD BEGINS WHEN A LIFT STATION PUMP FINISHED ITS LAST NORMAL CYCLE EXCLUDING A STANDBY PUMP.
    - E. ON-SITE GENERATORS. ALIFT STATION MAY BE PROVIDED EMERGENCY POWER BY ON-SITE, AUTOMATIC ELECTRICAL GENERATORS SIZED TO OPERATE THE LIFTSTATION ATITS FIRM PUMPING CAPACITY OR ATTHE AVERAGE DAILY FLOW, IF THE PEAK FLOW CAN BE STORED IN THE COLLECTION SYSTEM.
    - F. PORTABLE GENERATORS AND PUMPS.
      - F.1. A LIFTSTATION MAY USE PORTABLE GENERATORS AND PUMPS TO GUARANTEE SERVICE IF THE REPORT INCLUDES
      - F.2. THE STORAGE LOCATION OF EACH GENERATOR AND PUMP;
      - F.3. THE AMOUNT OF TIME THAT WILL BE NEEDED TO TRANSPORT EACH GENERATOR OR PUMP TO A LIFT STATION;
      - F.4. THE NUMBER OFLIFTSTATIONS FOR WHICH EACH GENERATOR OR PUMP IS DEDICATED AS A BACKUP; AND
    - G. THE TYPE OFROUTINE MAINTENANCE AND UPKEEP PLANNED FOR EACH PORTABLE GENERATOR AND PUMP TO ENSURE THAT THEY WILL BE OPERATIONAL WHEN NEEDED.
    - H. AN OPERATOR THAT IS KNOWLEDGEABLE IN OPERATION OF THE PORTABLE GENERATORS AND PUMPS SHALLBEON CALL24HOURS PER DAY EVERY DAY.
    - I. THE SIZE OF A PORTABLE GENERATOR MUST HANDLE THE FIRM PUMPING CAPACITY OF THE LIFT STATION.
    - J. SPILL CONTAINMENT STRUCTURES.
      - J.1. THE USE OF A SPILL CONTAINMENT STRUCTURE AS A SOLE MEANS OF PROVIDING SERVICE RELIABILITY IS PROHIBITED.
      - J.2. A LIFT STATION MAY USE A SPILL CONTAINMENT STRUCTURE IN ADDITION TO ONE OF THE SERVICE RELIABILITY OPTIONS DETAILED IN THIS IN SUBSECTION (A) OF THIS SECTION.
      - J.3. THE REPORT MUST INCLUDE ADETAILED MANAGEMENT PLAN FOR CLEANING AND MAINTAINING EACH SPILL CONTAINMENT STRUCTURE.
      - J.4. A SPILL CONTAINMENT STRUCTURE MUST HAVE A LOCKED GATE AND BE SURROUNDED AN INTRUDER RESISTANT FENCE THAT IS 6.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST THREE STRANDS OFBARBED WIRE OR 8.0FEETHIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST ONE STRAND OF BARBED WIRE.
    - K. A LIFT STATION MUST BE FULLY ACCESSIBLE DURING A 25-YEAR 24-HOUR RAINFALL EVENT.
    - L. LIFT STATION SYSTEM CONTROLS MUSTPREVENT OVER-PUMPING UPON RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE. BACKUP OR STANDBY UNITS MUSTBEELECTRICALLY INTERLOCKED TO PREVEN OPERATION AT THE SAME TIME THATOTHER LIFTSTATIONS PUMPS ARE OPERATING ONLY ON THE RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE.

THESE LIFT STATION AND FORCE MAINS CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
GENERAL NOTES 2 of 2

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
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BUILDING CODES AND STANDARDS

1. THE FOLLOWING CODES AND STANDARDS, INCLUDING ALL SPECIFICATION REFERENCED WITHIN, SHALL APPLY TO THE DESIGN, CONSTRUCTION, QUALITY CONTROL AND SAFETY OF ALL WORK PERFORMED ON THE PROJECT.

   A. THE 2018 INTERNATIONAL BUILDING CODE - IBC 2018, DESIGN CATEGORY II

   B. "MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES", (ANSI/ASCE) AMERICAN SOCIETY OF CIVIL ENGINEERS, ASCE 7-16

   C. ADDITIONAL CODES FOR MATERIALS SHALL BE FOUND IN THE APPROPRIATE SECTIONS THAT FOLLOW. SEE THOSE SECTIONS FOR THE APPLICABLE CODES.

2. DESIGN LOADS:

   A. GRAVITY - DEAD LOADS

AREA	PSF
ROOF	12 PSF
ADD FOR MECHANICALS	5 PSF

   B. GRAVITY - FLOOR LIVE LOADS

AREA	PSF
FIRST FLOOR	100 PSF
STORAGE MEZZANINE	125 PSF

   C. GRAVITY - ROOF LIVE LOADS
   - ROOF LIVE LOAD 20 PSF + WIND - MINIMUM

   D. WIND LOAD

   - DESIGN WIND SPEED 108 MPH - CAT II BUILDING
   - WIND EXPOSURE B

   E. SEISMIC LOADS

   - SEISMIC IMPORTANCE FACTOR (IE) 1.0 (CAT. II)
   - S_{DS} 0.08
   - S_{D1} 0.075
   - SITE CLASS D - STIFF SOIL
   - SEISMIC DESIGN CATEGORY B

FOUNDATION AND SOIL PREPARATION

1. THESE NOTES APPLY TO ALL FOUNDATIONS AND SLABS ON GRADE DETAILED ON THE STRUCTURAL DRAWINGS, UNLESS NOTED OTHERWISE.
2. FOUNDATION DESIGN IS BASED ON THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PROJECT NO. W22-057 DATED FEBRUARY 24, 2023 AND PREPARED BY LANGERMAN ENGINEERING. A COPY IS AVAILABLE ON FILE AT MRB GROUP.
3. THE NET ALLOWABLE SOIL BEARING PRESSURE FOR THE DESIGN OF FOUNDATIONS WAS ASSUMED TO BE 2,000 PSF.
4. ALL EXCAVATION, CONSTRUCTION, AND BACK FILL FOR CONCRETE FOOTINGS, FOUNDATIONS AND WALLS SHALL BE PERFORMED UNDER DRY CONDITIONS. CONTRACTOR TO PERFORM SHORING AND DEWATERING AS REQUIRED.
5. NO LOOSE, SOFT, WET, FROZEN OR OTHERWISE UNSUITABLE MATERIAL SHOULD BE LEFT IN PLACE BELOW FOUNDATIONS.
6. SUBGRADE PREPARATION UNDER BUILDING SLAB ON GROUND:
   - 6.1. REMOVE THE TOPSOIL, TREE ROOTS, VEGETATION, ANY WET, SOFT OR LOOSE SOILS, SURFICIAL CLAY SOIL, AND UNCONTROLLED FILL TO A MIN. OF 1'-0", EXTENDED 3'-0" OUTSIDE THE BUILDING LINES.
   - 6.2. PLACE SELECT FILL UNDER AND AROUND THE BUILDING PAD TO PLANNED GRADE. THE SELECT FILL SHALL BE LAYER COMPACTED IN 6 INCH MAXIMUM LOOSE THICKNESS TO A DRY DENSITY OF NOT LESS THAN 95% OF STANDARD PROCTOR (ASTM D-698) MAXIMUM DRY DENSITY. THE SOIL MOISTURE AT TIME OF COMPACTION SHALL BE WITHIN 3% THE MATERIAL'S OPTIMUM MOISTURE CONTENT. PLACE SELECT FILL AS SOON AS POSSIBLE OVER SUBGRADE TO LIMIT MOISTURE LOSS WITHIN THE UNDERLYING SOILS.
   - 6.3. SELECT FILL SHALL MEET THE REQUIREMENTS OF 2014 TXDOT ITEM 247, TYPE A, GRADE 3 OR BETTER.
7. UNLESS SPECIFIED OTHERWISE, VAPOR BARRIER SHALL CONSIST OF 10 MIL POLYETHYLENE SHEET. TURN DOWN AT GRADE BEAMS AND PIERS. LAP AND SEAL AT ALL JOINTS AND AROUND ALL COLUMNS AND STUB-OUTS. PATCH ALL TEARS PRIOR TO PLACING CONCRETE.

CONCRETE & FLOOR SLAB NOTES

1. CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST AMERICAN CONCRETE INSTITUTE BUILDING CODES.
2. PROVIDE MIX DESIGN FOR REVIEW/APPROVAL BY ENGINEER OF RECORD BEFORE BEGINNING CONSTRUCTION. SUBMITTAL SHALL INCLUDE GRADATION ANALYSIS OF COARSE AND FINE AGGREGATE, AS WELL AS A STATISTICAL ANALYSIS OF AVERAGE COMPRESSIVE STRENGTH OF BATCH PLANT'S PREVIOUS FIELD RESULTS FOR SIMILAR TYPE OF CONCRETE.
3. ALL SLABS-ON-GRADE SHALL BE PLACED OVER A MINIMUM OF 12" SELECT FILL, UNLESS OTHERWISE NOTED. COMPACTION SHALL BE 95% MAX. DRY DENSITY IN ACCORDANCE WITH MODIFIED PROCTOR TEST.
4. DEPRESSED AND/OR SLOPING SLABS SHALL MAINTAIN FULL THICKNESS.
5. CONTRACTOR TO VERIFY THE LOCATION OF ALL FLOOR DEPRESSIONS, SLEEVES, AND FLOOR DRAINS WITH DRAWINGS PRIOR TO POURING FLOOR SLAB. VERIFY WITH E.C. THAT ALL ELECTRICAL CONDUITS ARE IN PLACE PRIOR TO POURING FLOOR SLABS. SLEEVES FURNISHED BY OTHER CONTRACTORS SHALL BE INSTALLED BY G.C.
6. ALL CONSTRUCTION JOINTS ADDED FOR CONSTRUCTABILITY SHALL BE VERIFIED WITH THE STRUCTURAL ENGINEER IF NOT SPECIFICALLY SHOWN ON THE DRAWINGS.
7. PROVIDE 3/4" CHAMFER AT ALL EXPOSED CORNERS U.N.O.
8. REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60, U.N.O
9. REINFORCING STEEL, SPECIFICALLY NOTED TO BE SHOP OR FIELD WELDED SHALL CONFORM TO ASTM A-706, GRADE 60. WELDING OF OTHER REINFORCING STEEL IS NOT PERMITTED.
10. ALL REINFORCING SHALL HAVE MINIMUM LAP LENGTH AS FOLLOWS: #4 BAR-16", #5 BAR-24", #6 BAR-36" UNLESS OTHERWISE NOTED. HOOK TOP CONTINUOUS BARS AT DISCONTINUOUS ENDS. TOP REINF. SHALL BE CONTINUOUS AT SUPPORTS AND LAP SPLICED AT MIDSPAN TYP.
11. LAP ALL REINFORCEMENT AT FOOTING CORNERS/ENDS WITH #5 BENT CORNER BARS WITH 2' X 2' LEGS U.N.O.
12. DETAILING OF CONCRETE REINFORCING AND ACCESSORIES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 315. SUBMIT REBAR SHOP DRAWINGS FOR REVIEW/APPROVAL BY ENGINEER OF RECORD PRIOR TO ORDERING REBAR.
13. UNLESS NOTED OTHERWISE, CONCRETE COVER FOR REINFORCING SHALL BE AS FOLLOWS:
    BEAMS, FOOTINGS, AND WALLS ON EARTH = 2" SIDES AND TOP, 3" BOTTOM
    SLABS ON GROUND = 2" MIN. ON EA. SIDE, REINF. ON TOP THIRD
14. VERTICAL JOINTS SHALL OCCUR AT OR NEAR CENTER OF SPANS FOR WALLS AND SLABS.
15. NOTIFY THE CODE ENFORCEMENT OFFICIAL, THE SPECIAL INSPECTOR AND MRB GROUP AT LEAST 48 HOURS IN ADVANCE TO REVIEW THE FOUNDATION CONSTRUCTION BEFORE CONCRETE PLACEMENT.
16. NOTIFY CERTIFIED TECHNICIANS ACCORDING TO ACI 301 TO MONITOR AND TEST CONCRETE ACCORDING TO ACI 311.5R. TEST ACCORDING TO SPECIFICATIONS AND ACI REQUIREMENTS. REJECT OR ACCEPT CONCRETE BASED ON THE RESULTS OF TESTS. REPORT ALL TESTING PROMPTLY.
17. PLACE AND CURE CONCRETE ACCORDING TO ACI 302. IR. DO NOT USE CONCRETE THAT HAS NOT BEEN PLACED IN THE FORMS 1.5 HOURS AFTER THE INITIAL MIXING WATER WAS ADDED.
18. ALL EXPOSED CONCRETE AND EXTERIOR CONCRETE PADS AND SUPPORTS NOT TO BE PAINTED SHALL BE SEALED BY AN APPROVED PRODUCT, CONTRACTOR TO SUBMIT PRODUCT DATA TO ENGINEER FOR APPROVAL.
19. DESIGN MIXES TO PROVIDE NORMAL WEIGHT CONCRETE WITH THE FOLLOWING PROPERTIES:

ELEMENT	28 DAY STRENGTH	AIR CONT.	COARSE AGGREGATE	MAX SLUMP	NOTES
FOOTINGS	4000 PSI	1-3%	ASTM #57	3"	
INTER. SLAB ON GRADE	4000 PSI	1-3%	ASTM #57	3"	A, B, C, D, E
EXTERIOR SLABS	4000 PSI	6-8%	ASTM #57	3"	A, C, E
FILL CONCRETE	2000 PSI	-	ASTM #67	4"	

NOTES:
A. USE TYPE II CEMENT.

B. A VIBRATORY SCREED SHALL BE USED FOR ALL THESE SLABS. THIS REQUIREMENT MAY BE RELAXED (AS APPROVED BY STRUCTURAL ENGINEER), IF A HRWR IS USED.

C. MIXING WATER FOR THIS CONCRETE SHALL BE LIMITED TO 250 LBS. PER CUBIC YARD. WORKABILITY SHALL BE OBTAINED BY METHODS OTHER THAN THE ADDITION OF WATER.

D. A GRADATION ANALYSIS OF THE COARSE AGGREGATE SHALL BE SUBMITTED WITH THE MIX DESIGN. A MINIMUM OF 5% SHALL BE RETAINED ON A 1" SIEVE.

E. SLUMP LIMIT MAY BE RELAXED WITH USE OF A HIGH RANGE WATER REDUCING ADD MIXTURE, IF APPROVED BY THE ENGINEER.

MASONRY NOTES:

1. MASONRY WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES (ACI-530).
2. UNLESS OTHERWISE NOTED, ALL MASONRY UNITS SHALL CONFORM TO ASTM C90, GRADE N, TYPE 1. ALL UNITS SHALL BE TWO CORE, NORMAL WEIGHT BLOCK, F'M=2000 PSI.
3. ALL MORTAR SHALL CONFORM TO ASTM C270, TYPE S, WITH A MINIMUM COMPRESSIVE STRENGTH OF 1,800 PSI @ 28 DAYS.
4. GROUT FOR FILLING BLOCK CORES SHALL CONFORM TO ASTM C476, WITH A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI @ 28 DAYS, GROUT SHALL BE PLACED IN LIFTS NOT EXCEEDING 4 FEET IN HEIGHT, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. ALL CMU WALLS SHALL BE LAID IN HALF RUNNING BOND, U.N.O.
6. ALL MASONRY SHALL BE REINFORCED WITH A 9 GAUGE HORIZONTAL LADDER TYPE WIRE REINFORCING AT 16" O.C. HORIZONTAL REINFORCING SHALL BE GALVANIZED AS REQUIRED BY ACI 530. PROVIDE ADDITIONAL REINFORCING WITHIN 8" OF OPENINGS AND DISCONTINUITIES, U.N.O.
7. VERTICAL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. MINIMUM LAP LENGTHS: #4 BAR-24", #5 BAR-32". PROVIDE VERTICAL REINFORCEMENT AT CORNERS OF ALL CMU WALLS, WITHIN 16" OF EACH SIDE OF OPENINGS AND WITHIN 8" OF CONTROL JOINTS.
8. A MINIMUM OF TWO BLOCKS (16" WIDE X 16" HIGH) SHALL BE FILLED SOLID WITH 3,000 PSI GROUT AT ALL LINTEL, BEAM AND COLUMN BEARING POINTS, UNLESS OTHERWISE NOTED ON PLANS.
9. PROVIDE A 5/8" MIN GAP AROUND WALL PENETRATIONS AND MASONRY. ALL GAPS SHALL BE SEALED TO PROVIDE A WATER TIGHT SEAL.
10. WHERE INTERIOR MASONRY WALLS MEET OTHER INTERIOR OR EXTERIOR WALLS, PROVIDE A CONTROL JOINT WITH METAL STRAP ANCHORS BETWEEN WALLS.

STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL SHALL BE DESIGNED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE LATEST AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "SPECIFICATIONS FOR STRUCTURAL STEEL FOR BUILDINGS"
2. ALL WIDE FLANGE BEAMS AND COLUMNS SHALL BE 50 KSI STEEL, ASTM A992.
3. ALL HSS MEMBERS SHALL BE 50 KSI STEEL, ASTM A1085.
4. ALL MISCELLANEOUS STEEL ANGLES AND PLATES SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.
5. ALL WELDING SHALL BE DESIGNED ACCORDING TO LATEST AWS SPECIFICATIONS FOR E-70 SERIES.
6. ALL STRUCTURAL STEEL SHOP CONNECTIONS SHALL BE WELDED AND ALL FIELD CONNECTIONS SHALL BE HIGH STRENGTH BOLTED, UNLESS OTHERWISE NOTED.
7. ALL BOLTED CONNECTIONS SHALL BE MADE WITH ¾" DIAMETER HIGH-STRENGTH BOLTS, CONFORMING TO ASTM F3125.
8. UNLESS OTHERWISE NOTED, ALL CONNECTIONS SHALL BE DESIGNED AS BEARING-TYPE BOLTED CONNECTIONS.
9. ALL STRUCTURAL STEEL SHALL RECEIVE ONE SHOP COAT OF PRIMER (AFTER FABRICATION) AND FINAL COATED PER SPECIFICATIONS.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

PREFABRICATED TRUSS NOTES

1. DESIGN
   - 1.1. CONTRACTOR AND TRUSS DESIGNER SHALL BE RESPONSIBLE FOR VERIFYING ALL DIMENSIONS.
   - 1.2. DESIGN, FABRICATION AND ERECTION OF PLATE CONNECTED TRUSSES SHALL CONFORM TO NEW YORK STATE BUILDING CODE AND TRUSS PLATE INSTITUTE CRITERIA TPI 1 "NATIONAL DESIGN STANDARD FOR METAL PLATE CONNECTED WOOD TRUSS CONSTRUCTION".
   - 1.3. TRUSS DESIGNS AND LAYOUTS SHALL BE SEALED BY A TEXAS LICENSED PROFESSIONAL ENGINEER AND SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION. SUBMITTAL SHALL CLEARLY INDICATE DESIGN LOADS, MEMBER STRESSES, LUMBER GRADES, SPLICE LOCATIONS, REQUIRED BLOCKING, BRIDGING, BRACING, PLACEMENT PROCEDURES, LOAD BEARING WALLS, TRUSS DESIGNATION, AND NAME OF PROJECT. LOADING SHALL BE AS NOTED AND INDICATED ON THE DRAWINGS.
   - 1.4. ALL TRUSS ELEVATIONS REPRESENT CHORD GEOMETRY AND BEARING LOCATIONS SCHEMATICALLY. ACTUAL TRUSS BRACING (WEB) CONFIGURATION IS LEFT TO THE DESIGNER AS NECESSARY TO MEET THE LOAD REQUIREMENTS. REFER TO DRAWINGS FOR DIMENSION, OVERHANGS, ETC.
   - 1.5. 2"X DIMENSIONAL LUMBER ASSUMED FOR TOP AND BOTTOM TRUSS CHORDS.TEMPORARY BRACING SHALL BE PROVIDED BY THE CONTRACTOR.
   - 1.6. SINGLE PIECE, FULL HEIGHT TRUSSES ARE INTENDED. IF PIGGY BACK TRUSSES ARE NECESSARY FOR SHIPPING, CONTACT ENGINEER FOR APPROVAL.
2. LOADING
   - 2.1. SEE LOADING LISTED UNDER BUILDING CODES AND STANDARDS AND TRUSS SCHEMATIC.
   - 2.2. APPLY WIND LOAD AS REQUIRED BY APPLICABLE CODES.
   - 2.3. ACCOUNT FOR SPECIAL CONDITIONS SHOWN ON THE ARCHITECTURAL AND STRUCTURAL PLANS SUCH AS DORMERS, VALLEY TRUSSES, MECHANICAL EQUIPMENT, ETC.
   - 2.4. THE DESIGNER SHALL APPLY THE LOADS SHOWN IN APPROPRIATE LOAD COMBINATIONS PER APPLICABLE WOOD TRUSS DESIGN CODES.
3. TRUSSES SHALL BE CONNECTED AT EACH BEARING POINT TO THE TOP PLATE WITH SPECIFIED SIMPSON ANCHORS OR EQUAL.
4. WOOD TRUSSES SHALL NOT BE CUT, NOTCHED, OR BORED TO CLEAR PIPES, WIRE, CONDUIT, OR FOR ANY OTHER PURPOSE WITHOUT THE APPROVAL OF THE ENGINEER.
5. TEMPORARY TRUSS BRACING SHALL NOT BE REMOVED UNTIL PERMANENT LATERAL TRUSS BRACING IS INSTALLED AND ALL OTHER IMPROVEMENTS ARE COMPLETE.
6. ALL METAL TRUSS CONNECTOR PLATES SHALL BE HOT-DIP GALVANIZED.

LEGEND:

XXX'-X"	.....TOP OF FOOTING OR WALL ELEVATION
F.S.(TYP.)	.....TYPICAL STEP FOOTING
XJ	.....CONCRETE WALL CONSTRUCTION JOINT
CJ	.....CONTROL JOINT
FD	.....FLOOR DRAIN
HR	.....HOSE REEL
HDG	.....HOT DIP GALV.
◇	.....PIPE SUPPORT KEY (REFER TO PIPE SUPPORT DETAILS, SEE BOTH PLAN AND SECTION VIEWS FOR SUPPORTS)

NOTE: ALL AIR PIPING SHALL BE MIN. SCHEDULE 10 WELDED 304 STAINLESS STEEL, UNLESS OTHERWISE SHOWN

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT
STRUCTURAL NOTES 1 of 2

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

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NOTES	NAME	DATE
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DRAWN BY	J3	11/13/2024
CHECKED BY	AC	11/13/2024
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WOOD FRAMING NOTES

1. CODES
   - A. "DESIGN SPECIFICATIONS", TIMBER CONSTRUCTION MANUAL, AMERICAN INSTITUTE OF TIMBER CONSTRUCTION.
   - B. "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION," AMERICAN FOREST AND PAPER ASSOCIATION, AMERICAN WOOD COUNCIL.
   - C. "PERFORMANCE STANDARD AND POLICIES FOR STRUCTURAL USE PANELS," PRP-108, AMERICAN PLYWOOD ASSOCIATION (APA).
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL FRAMING LUMBER SHALL BE CLEARLY MARKED NO. 2 K.D. PINE BY THE SPIB WITH A MINIMUM FB = 1000 PSI. ALL WALL STUDS SHALL BE KILN DRIED S-P-F LUMBER, NO. 2 OR BETTER.
3. SOLID 2" BLOCKING SHALL BE PROVIDED AT THE ENDS AND POINTS OF SUPPORT OF ALL JOISTS, RAFTERS, AND PURLINS, AND SHALL BE PLACED BETWEEN SUPPORTS IN ROWS NOT EXCEEDING 8'-0" APART. ALL WALLS SHALL HAVE SOLID 2" BLOCKING AT 8'-0" O.C. MAX. VERTICALLY. END NAIL WITH (2)-16D NAILS OR SIDE TOE NAIL WITH (2) 12D NAILS. ALL BLOCKING SHALL BE SAME DEPTH AS MEMBERS BEING BLOCKED U.N.O.
4. ALL TIMBER FRAMING SHALL BE BRACED AND ERECTED IN ACCORDANCE WITH THE LATEST NATIONAL FOREST PRODUCTS ASSOCIATION SPECIFICATIONS.
5. NOTCHES, HOLES AND COPES IN WOOD MEMBERS ARE NOT PERMITTED UNLESS SPECIFICALLY DETAILED OR APPROVED BY ENGINEER. NOTCHES AND HOLES IN PRE-ENGINEERED MEMBERS SHALL BE IN ACCORDANCE WITH MANUFACTURER DETAILS.
6. WOOD PRESERVATIVE TREATMENT
   - A. LUMBER IN CONTACT WITH CONCRETE, MASONRY OR SOIL SHALL BE SOUTHERN PINE PRESSURE TREATED WITH .40 LBS/CU. FT. ACQ.
   - B. WHERE WOOD IS INDICATED AS "TREATED" OR "PRESSURE TREATED" COMPLY WITH THE APPLICABLE REQUIREMENTS OF AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA) STANDARDS C2 (LUMBER) AND C4 (PLYWOOD). MARK EACH TREATED ITEM WITH THE AWPA QUALITY MARK REQUIREMENTS.
9. FASTENERS/CONNECTIONS
   - A. CONNECTOR SELECTIONS NOTED ON PLANS ARE BASED ON SIMPSON STRONG TIE (SST) TYP. U.N.O. CONTRACTOR TO OBTAIN APPROVAL FOR ALTERNATE PRODUCTS.
   - B. ALL NAILED CONNECTIONS FOR WOOD FRAMING MEMBERS SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE FASTENING SCHEDULE (TABLE 2304.10.1). U.N.O.
   - C. FASTENERS FOR P.T. WOOD SHALL BE HOT-DIPPED GALVANIZED (MIN. G185 COATING) OR TYPE 304 OR 316 STAINLESS STEEL, AND SHALL BE COMPATIBLE WITH THE WOOD PRESERVATIVE TO PREVENT CORROSION. THESE LOCATIONS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
     - a. ANCHOR BOLTS AT SOLE PLATE TO FOUNDATION
     - b. MUD SILL ANCHORS AT SOLE PLATE TO FOUNDATION
     - c. NAILS FROM SOLE PLATE TO WALL STUDS
     - d. NAILS AT EXTERIOR PLYWOOD SHEATHING TO SOLE PLATE
     - e. BOLTS AT LEDGER TO CONCRETE
     - f. JOIST TO TREATED LEDGER CONNECTIONS
     - g. ALL HANGERS ON TREATED JOISTS
     - h. PLYWOOD DECKING TO TREATED JOISTS
     - i. WOOD POSTS TO CONCRETE
     - j. NAILS AT FLOOR JOISTS AND RIM JOISTS TO SOLE PLATE
     - k. DECK BOARDS TO TREATED JOISTS
10. ALL BOLTS AND LAG BOLTS SHALL BE GALVANIZED, ASTM A307, GRADE 36 MINIMUM AND SHALL BE FITTED WITH GALVANIZED, MALLEABLE IRON OR STEEL PLATE WASHERS.
11. ALL PLYWOOD DECKING AT ROOFS SHALL BE 19/32" THICK GRADE C-D WITH EXTERIOR GLUE. ALL JOINTS IN PLYWOOD DECKING SHALL BE STAGGERED.
12. ALL ROOF DECKING SHALL BE NAILED TO SUPPORTING MEMBERS ALONG THE EDGES WITH 10d NAILS SPACED AT 6" O.C. AND AT INTERMEDIATE SUPPORTS WITH 10d NAILS SPACED AT 6" O.C. UNLESS NOTED OTHERWISE ON PLANS. PROVIDE PANEL CLIPS AT ALL NON-SUPPORTED EDGES. PROVIDE RECOMMENDED GAP AT ALL PANEL JOINTS.

COLD-FORMED STEEL FRAMING

1. COLD FORMED STEEL INCLUDES ALL LIGHT GAGE STEEL BEAMS, JOISTS, TRACKS, BRIDGING, AND RELATED ACCESSORIES AS INDICATED ON THE STRUCTURAL DRAWINGS.
2. THE COLD-FORMED FRAMING MATERIALS ARE TO BE MANUFACTURED BY ANY SSMA MEMBER MANUFACTURER IN ACCORDANCE WITH ASTM C955. MATERIAL SIZES AND GAUGES ARE INDICATED ON THE DRAWINGS. ALL COLD-FORMED MEMBERS SHALL BE MANUFACTURED FROM SHEET STEEL.
3. THE COLD-FORMED STUDS SHALL BE PUNCHED. TRACKS SHALL BE THE SAME THICKNESS AND DEPTH AS THE STUDS.
4. THE STEEL USED SHALL HAVE THE FOLLOWING MINIMUM YIELD STRESS (U.N.O.):

4.1. STRUCTURAL STUDS, JOISTS, & TRACKS	
4.1.1. 18 OR 20 GAUGE	33 KSI
4.1.2. 12, 14 OR 16 GAUGE	50 KSI
4.2. BRIDGING AND RELATED ACCESSORIES	33 KSI

5. THE COLD-FORMED FRAMING HAS BEEN DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES, STANDARDS, AND SPECIFICATIONS:
   - 5.1. AISI "NORTH AMERICAN SPECIFICATION FOR DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS"
   - 5.2. AISI "CODE OF STANDARD PRACTICE FOR STRUCTURAL COLD-FORMED STEEL FRAMING"
   - 5.3. AISI "STANDARD FOR COLD-FORMED STEEL FRAMING: PRODUCT DATA"
   - 5.4. AISI "STANDARD FOR COLD-FORMED STEEL FRAMING: GENERAL PROVISIONS"
   - 5.5. AISI "STANDARD FOR COLD-FORMED STEEL FRAMING: WALL STUD DESIGN"
6. ALL CONNECTIONS SHALL BE FASTENED AS INDICATED ON THESE DRAWINGS:
   - 6.1. SCREWS (FOR CFS TO CFS FRAMING) - #10 SELF DRILLING SCREWS (UNLESS NOTED OTHERWISE) MANUFACTURED BY GRABBER, HILTI, BUILDEX, COMPASS OR EQUAL AND INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS. MINIMUM 1/2" LENGTH FOR COLD-FORMED TO COLD-FORMED CONNECTIONS. SCREWS SHALL COMPLY WITH ASTM C1513. SCREWS SHALL BE SPACED A MINIMUM OF 1/2" BETWEEN ADJACENT SCREWS AND FROM METAL EDGES.
   - 6.2. POWDER ACTUATED FASTENERS (PAF) - PROVIDE PAF ANCHORS WITH 0.157" SHANK DIAMETER MANUFACTURED BY SIMPSON STRONG TIE OR EQUAL FOR COLD-FORMED CONNECTIONS TO CONCRETE/STEEL/CMU WHERE NOTED IN THE DRAWINGS. PROVIDE A MINIMUM OF 3.5" FROM CONCRETE EDGES AND 1/2" FROM STEEL EDGES.
7. FIELD CUTTING OF COLD-FORMED MEMBERS SHALL BE DONE BY SAWING OR SHEARING. TORCH CUTTING IS NOT PERMITTED.
8. ALL BEARING WALLS TO BE BRACED AT 4'-0" O.C. MAX PER TYP. DETAIL U.N.O.
9. PROVIDE A MINIMUM OF DOUBLE STUDS AT EACH SIDE OF EACH WINDOW OR DOOR OPENING, U.N.O.
10. DO NOT CUT OR SPLICE COLD-FORMED MEMBERS UNLESS INDICATED BY THESE DRAWINGS.
11. DO NOT BEAR OR CONNECT COLD-FORMED MEMBERS WITHIN TEN INCHES OF THE PUNCHED OPENINGS IN THE MEMBER WEBS UNLESS THE MEMBERS ARE REINFORCED WITH A MINIMUM 18" LONG UNPUNCHED TRACK OR STUD AT THE PUNCHED OPENING. THE TRACK OR STUD REINFORCING PIECE SHALL BE THE SAME SIZE AND GAGE AS THE PUNCHED MEMBER. FASTEN THE REINFORCING PIECE TO THE MEMBER WITH A MINIMUM OF FOUR SCREWS.
12. ALL LIGHT GAGE STRUCTURAL STEEL FRAMING SHALL BE GALVANIZED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
13. THE CONTRACTOR SHALL PROVIDE COLD-FORMED MEMBERS AT THE SIZES AND SPACING INDICATED ON THESE DRAWINGS. LARGER SIZES AND/OR CLOSER SPACING MAY BE SUBSTITUTED PROVIDED THE SUBSTITUTIONS ARE COORDINATED WITH THE PROJECT STRUCTURAL DRAWINGS.
14. COLD-FORMED TRACKS INDICATED AS CURVED SHALL BE STANDARD BENT TRACK OR "READY-TRACK" MANUFACTURED BY SIMPSON STRONG-TIE, "PERFECT CURVE" MANUFACTURED BY SCAFCO, OR AN APPROVED EQUAL.
15. CONTRACTOR TO PROVIDE SHOP DRAWINGS W/ CALCULATIONS FOR ANY MISC. DETAILING OR FIELD MODIFICATION DURING CONSTRUCTION THAT IS NOT COVERED IN THE PLANS.

PRECAST HOLLOW CORE PLANK

1. PRECAST CONCRETE HOLLOW CORE PLANK SHALL BE DESIGNED IN ACCORDANCE WITH THE PROVISIONS OF PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI) AND ACI 318. DESIGN SHALL BE BY A PRECAST SPECIALTY ENGINEER REGISTERED IN TEXAS. MEMBERS SHALL WITHSTAND THEIR OWN WEIGHT, ERECTION FORCES, AND LIVE & DEAD LOADS. FLOOR MEMBERS SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION LIMITATION OF NO MORE THAN 1/360 OF SPAN. AT NO TIME SHALL CONSTRUCTION LOADS ON THE PLANKS BE OF SUCH MAGNITUDE AS TO INDUCE MORE THAN ALLOWABLE STRESSES AS PRESCRIBED BY ACI 318.
2. SUBMIT DESIGN, FABRICATION, HANDLING AND ERECTION DRAWINGS IN ACCORDANCE WITH PCI 116 FOR ENGINEER'S REVIEW PRIOR TO FABRICATION. SUBMITTALS SHALL BE PREPARED UNDER THE SUPERVISION OF THE PRECAST SPECIALTY ENGINEER AND SHALL BEAR THEIR ENGINEERING REGISTRATION SEAL.
3. QUALITY CONTROL, WHICH INCLUDES CONCRETE TESTING, SHALL BE IN ACCORDANCE WITH PCI 116.
4. FABRICATION AND HANDLING DURING MANUFACTURE, STOCK PILING, TRANSPORTING AND ERECTION OPERATIONS OF PRECAST PLANKS/STAIRS SHALL BE IN ACCORDANCE WITH PCI 116. MARK UNITS WITH DATE OF PRODUCTION AND FINAL POSITION IN STRUCTURE. FABRICATION AND ERECTION TOLERANCES SHALL BE IN ACCORDANCE WITH ACI 117.
5. PROVIDE FOR ERECTION PROCEDURE, TEMPORARY BRACING, AND INDUCED LOADS DURING ERECTION. MAINTAIN TEMPORARY BRACING IN PLACE UNTIL FINAL SUPPORT IS PROVIDED. ERECT MEMBERS WITHOUT DAMAGE TO SHAPE OR DIMENSION.
6. CONNECTIONS SHALL BE ACHIEVED THROUGH ANCHORS GROUTED IN JOINTS AND CORES. DESIGN COMPONENT CONNECTIONS TO PROVIDE ADJUSTMENT TO ACCOMMODATE MISALIGNMENT OF STRUCTURE.
7. BEARING SURFACES SHALL BE TRUE TO LINE AND GRADE, SMOOTH AND LEVEL UNLESS SHOWN OTHERWISE AND SHALL PROVIDE A MINIMUM BEARING SURFACE OF AT LEAST 3 INCHES AT EACH END OF EACH PLANK OR AS REQUIRED BY MANUFACTURER.
8. ALIGN AND MAINTAIN UNIFORM HORIZONTAL AND VERTICAL JOINTS AS ERECTION PROGRESSES. ADJUST DIFFERENTIAL CAMBER BETWEEN PLANKS TO TOLERANCE BEFORE FINAL ATTACHMENT. LEVEL DIFFERENTIAL ELEVATION OF ADJOINING PLANKS WITH GROUT TO A MAXIMUM SLOPE OF 1:12.
9. GROUT SHALL CONSIST OF A MIXTURE OF NOT LESS THAN ONE PART OF PORTLAND CEMENT TO THREE PARTS OF SAND AND SHALL BE FLUID ENOUGH TO FILL THE JOINTS WITHOUT EXCESSIVE SEEPAGE, WITH MIN. 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
10. GROUT CONNECTIONS AND JOINTS AND OPEN SPACES AT KEYWAYS, CONNECTIONS, AND JOINTS WHERE REQUIRED OR INDICATED ON SHOP DRAWINGS. RETAIN GROUT IN PLACE UNTIL HARD ENOUGH TO SUPPORT ITSELF. CLEAN EXCESS GROUT AND PROVIDE A FLUSH AND SMOOTH FINISH THAT IS ACCEPTABLE FOR PLACING FINISHES.
11. THE GROUTED JOINT SHALL BE ALLOWED NOT LESS THAN 24 HOURS CURING TIME AFTER INITIAL SET BEFORE ANY SHORES AND LEVELING DEVICES ARE REMOVED OR ANY CONSTRUCTION LOADS APPLIED.

SPECIAL INSPECTIONS (ATTENTION OWNER AND CONTRACTOR)

1. PURSUANT TO SECTION 1704 OF THE INTERNATIONAL BUILDING CODE, WHERE APPLICATION IS MADE FOR CONSTRUCTION AS DESCRIBED IN THAT SECTION, THE OWNER SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED UNDER SECTION 1704. THESE MAY INCLUDE, BUT NOT BE LIMITED TO:
   - 1.1. SOILS AND FOUNDATIONS
   - 1.2. CAST-IN-PLACE CONCRETE
   - 1.3. MASONRY
   - 1.4. WOOD CONSTRUCTION
2. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON AS PER SECTION 1704 OF THE INTERNATIONAL BUILDING CODE WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE CODE ENFORCEMENT OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.
3. THE SCHEDULE OF STRUCTURAL SPECIAL INSPECTIONS SHALL BE COORDINATED WITH MRB GROUP DURING THE CONSTRUCTION ADMINISTRATION PHASE.
4. ALL PREFABRICATED ITEMS SHALL BE MANUFACTURED BY APPROVED AND CERTIFIED SHOPS, AND INSPECTED AS REQUIRED PER SECTION 17 OF THE INTERNATIONAL BUILDING CODE.
5. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER'S TESTING AND SPECIAL INSPECTION REPRESENTATIVES.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
STRUCTURAL NOTES 2 of 2

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
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DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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A/C	AIR CONDITIONING
A/E	ARCHITECT/ENGINEER
A	ARCHITECTURAL (DWG DISCIPLINE), AMP
AB	ANCHOR BOLT
ABC	AGGREGATE BASE COURSE
ABAN	ABANDON
AC	ALTERNATING CURRENT
ACK	ACKNOWLEDGE
ACP	ACOUSTIC CEILING PANEL, ASPHALTIC CONCRETE PAVEMENT
ACST	ACOUSTIC
AD	ADDENDUM, AREA DRAIN
ADDL	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
AF	AMP FRAME, AMP FUSE
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AGGR	AGGREGATE
AI	AREA INLET
AIC	AMPS INTERRUPTING CAPACITY
ALIG	ALIGNMENT
ALUM	ALUMINUM
ALT	ALTERNATE, ALTITUDE
AM	ACOUSTICAL MATERIAL
AMB	AMBIENT
ANC	ANCHOR
AP	ACCESS PANEL
APRX	APPROXIMATE
APVD	APPROVED
ARCH	ARCHITECTURAL
ASSY	ASSEMBLY
AT	AMP TRIP
ATC	ACOUSTICAL TILE CEILING
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
AWT	ACOUSTICAL WALL TILE
B/B	BACK TO BACK
BAL	BALANCE
BBD	BULLETIN BOARD
BC	BASE CABINET, BOTTOM CHORD, BOLT CENTER, BOLT CIRCLE
BD	BOARD
BE	BOTH ENDS, BELL END
BF	BOTH FACES, BOTTOM FACE, BLIND FLANGE, BOARD FEET
BITUM	BITUMINOUS
BKG	BACKING
BL	BASE LINE
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BENCHMARK, BEAM
BOC	BACK OF CURB
BOD	BOTTOM OF DUCT
BOG	BOTTOM OF GRILLE
BOL	BOTTOM OF LOUVER
BOP	BOTTOM OF PIPE
BOR	BOTTOM OF REGISTER
BOT	BOTTOM
BOU	BOTTOM OF UNIT
BP	BASE PLATE
BRG	BEARING
BRGP	BEARING PLATE
BRKT	BRACKET
BS	BOTH SIDES
BTU	BRITISH THERMAL UNIT
BTW	BETWEEN
BTWLD	BUTT WELD
BU	BELL UP, BUILT UP
BUR	BUILT-UP ROOFING
BV	BALL VALVE
BW	BOTH WAYS, BACKWASH (SLUDGE)
BYP	BYPASS
C TO C	CENTER TO CENTER
C&G	CURB & GUTTER
C	CHANNEL SHAPE, CENTIGRADE, CONDUIT, CIVIL (DRAWING DISCIPLINE)
CAB	CABINET
CAP	CAPACITY
CAT	CATALOG
CAV	CAVITY
CB	CATCH BASIN
CCB	CONCRETE BLOCK
CCW	COUNTER CLOCKWISE
CDF	CONTROLLED DENSITY FILL
CE	CONCRETE EDGE, CLARIFIED EFFLUENT
CER	CERAMIC
CF	CUBIC FEET (FOOT)
CFL	COUNTER FLASHING
CHFR	CHAMFER
CHBD	CHALKBOARD
CHD	CHORD
CHH	COMMUNICATION HANDHOLE
CI	CURB INLET
CIP	CLEAN IN PLACE, CAST-IN-PLACE
CIPB	CONCRETE INTERLOCKING PAVER BALLAST
CIRC	CIRCULATION, CIRCULAR
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CL	CENTERLINE, CLASS, CLOSE
CLG	CEILING
CLJ	CONTROL JOINT
CLKG	CAULKING
CLR	CLEAR
CMH	COMMUNICATION MANHOLE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT, CONCRETE OPENING
COL	COLUMN
COM	COMMON
COMB	COMBINATION
COMM	COMMUNICATION
COMP	COMPOSITION, COMPRESSIBLE, COMPOSITE
CONC	CONCENTRIC, CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COOR	COORDINATE
CORR	CORROSIVE, CORRUGATED
CP	CHECKER PLATE, CONTROL POINT
CPLG	COUPLING
CPVC	POLYVINYL CHLORIDE
CRL	CORROSION RESISTANT LINING
CS	CHLORINE SOLUTION
CSC	COMPRESSION SLEEVE COUPLING
CSK	COUNTERSINK
CSS	CLINIC SERVICE SINK
CT	CERAMIC TILE
CTR	CENTER
CTRL	CONTROL
CVAC	CHLORINE VACUUM
CVT	CULVERT
CU	COPPER, CUBIC
CW	CLOCKWISE
CY	CUBIC YARD
d	PENNY (NAIL MEASURE)
D	DEEP, DIFFUSER
DB	DUCT BANK, DECIBEL, DRY BULB
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DEG C	DEGREE CENTIGRADE
DEG F	DEGREE FAHRENHEIT
DEMO	DEMOLITION
DEP	DEPRESSED
DEPT	DEPARTMENT
DET	DETAIL
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL, DIAGRAM
DIFF	DIFFERENTIAL, DIFFERENCE
DIP	DUCTILE IRON PIPE
DIM	DIMENSION
DISCH	DISCHARGE
DIST	DISTANCE, DISTRIBUTION
DIV	DIVISION
DL	DEAD LOAD
DMJ	DOUBLE MECHANICAL JOINT
DMPF	DAMP PROOFING
DN	DOWN
DO	DISSOLVED OXYGEN, DITTO
DP	DEPTH
DPDT	DOUBLE POLE, DOUBLE THROW
DPST	DOUBLE POLE, SINGLE THROW
DR	DRAIN, DIMENSION RATIO
DS	DOWN SPOUT
DT	DOUBLE TEE, DRIP TRAP ASSEMBLY
DUP	DUPLICATE
DWG	DRAWING
DWL	DOWEL
DWR	DRAWER
E	EAST, ELECTRICAL (DWG DISCIPLINE)
EA	EACH, EXHAUST AIR
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
ED	EQUIPMENT DRAIN
EDB	ELECTRICAL DUCT BANK
EE	EACH END
EF	EACH FACE
EFF	EFFLUENT, EFFICIENCY
EHH	ELECTRICAL HANDHOLE
EIFS	EXTERIOR INSULATION & FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELBOW, ELEVATION
ELEC	ELECTRICAL
EMBD	EMBEDDED
EMER	EMERGENCY
EMH	ELECTRICAL MANHOLE
ENCL	ENCLOSURE
ENGR	ENGINEER
ENTR	ENTRANCE
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	EACH SIDE, EQUAL SPACE, EMERGENCY SHOWER
ESEW	EMERGENCY SHOWER AND EYE WASH
EST	ESTIMATE
EW	EACH WAY, EMERGENCY EYE/FACE WASH
EWC	ELECTRIC WATER COOLER
EWEF	EACH WAY, EACH FACE
EWTB	EACH WAY, TOP AND BOTTOM
EXC	EXCAVATION
EXH	EXHAUST
EXST	EXISTING
EXP	EXPANSION, EXPOSED
EXT	EXTERIOR, EXTERNAL, EXTENSION
F&B	FACE & BYPASS
F TO F	FACE TO FACE
FAB	FABRICATE
FB	FLOOR BEAM
FBD	FIBERBOARD
FBG	FIBERGLASS
FBM	BOARD FOOT MEASURE
FBO	FURNISHED BY OWNER
FC	FLUSHING CONNECTION, FERROUS CHLORIDE
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
FDC	FLEXIBLE DUCT CONNECTION
FDTN	FOUNDATION
FDR	FEEDER
FE	FLANGED END
FEC	FIRE EXTINGUISHER CABINET
FES	FLARED END SECTION
FEXT	FIRE EXTINGUISHER
FF	FAR FACE, FACTORY FINISH, FLAT FACE
FG	FINISHED GRADE
FIG	FIGURE
FH	FIRE HYDRANT
FIN	FINISH
FJT	FLUSH JOINT
FL	FLOW, FLOW LINE
FLEX	FLEXIBLE
FLG	FLANGE
FLOR	FLUORESCENT
FLR	FLOOR
FLS	FLASHING, FLUSH
FO	FINISHED OPENING
FM	FORCE MAIN
FN	FENCE
FOB	FLAT ON BOTTOM
FOC	FACE OF CONCRETE, FACE OF CURB
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FOT	FLAT ON TOP
FPT	FEMALE PIPE THREAD
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FRTM	FIRE RETARDANT TREATED MATERIAL
FS	FLOOR SINK, FAR SIDE
FT	FEET, FOOT
FTG	FOOTING, FITTING
FUR	FURRED, FURRING
FURN	FURNITURE, FURNISH
FUT	FUTURE
FV	FACE VELOCITY
FW	FIELD WELD, FIRE WALL
FWD	FORWARD
FWE	FURNISHED WITH EQUIPMENT
FXTR	FIXTURE
G	GRILLE, GROUND, GENERAL (DWG DISCIPLINE)
GA	GAGE (METAL THICKNESS)
GAL	GALLON
GALV	GALVANIZED
GB	GRAB BAR, GRADE BREAK
GC	GROOVED COUPLING
GD	GUARD
GEN	GENERAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFMU	GROUND FACE MASONRY UNIT
GG	GUTTER GRADE
GJ	GROOVED JOINT
GL	GLASS
GLB	GLASS BLOCK
GND	GROUND
GP	GUY POLE
GR	GRADE
GRTG	GRATING
GSB	GYPSUM SHEATHING BOARD
GT	GREASE TRAP
GVL	GRAVEL
GV&B	GATE VALVE AND BOX
GWB	GYPSUM WALLBOARD
GYP	GYPSUM HARDBOARD
H	HIGH
HB	HOSE BIB
HBD	HARDBOARD
HC	HANDICAPPED, HOLLOW CORE, HORIZONTAL CURVE
HC	HORIZONTAL CENTERLINE
HDD	HORIZONTAL DIRECTIONAL DRILLING
HDG	HOT DIPPED GALVANIZED
HDR	HEADER
HDW	HARDWARE
HEX	HEXAGONAL
HGR	HANGER
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HIGH POINT, HORSEPOWER
HPC	HORIZONTAL POINT OF CURVATURE
HPS	HIGH PRESSURE SODIUM
HPT	HORIZONTAL POINT OF TANGENCY
HR	HOSE REEL HOUR
HS	HEADED STUD, HIGH STRENGTH
HSS	HOLLOW STRUCTURAL SHAPE
HT	HEIGHT
HTG	HEATING
HV	HIGH VOLTAGE
HVAC	HEATING, VENTILATION & AIR CONDITIONING
HWD	HARDWOOD
HWL	HIGH WATER LEVEL
HYD	HYDRAULIC
HZ	HERTZ, CYCLES PER SECOND
ID	INSTRUMENTATION (DWG DISCIPLINE) INSIDE DIAMETER, INTERIOR DIMENSION
IE	INVERT ELEVATION
IF	INSIDE FACE
IH	INTAKE HOOD
IMP	IMPACT
IN	INCH
INC	INCLUDE, INCANDESCENT
INF	INFLUENT
INSTR	INSTRUMENTATION
INSUL	INSULATION
INT	INTERIOR, INTERSECTION
INTR	INTERMEDIATE, INTERIOR
INV	INVERT
IPS	IRON PIPE SIZE
IPT	INTERNAL PIPE THREAD
IR	INSIDE RADIUS
IRR	IRRIGATION
ISO	ISOMETRIC
JB	JUNCTION BOX
JCT	JUNCTION
JF	JOINT FILLER
JST	JOIST
JT	JOINT
K	KIP
KB	KNEE BRACE
KCMIL	THOUSAND CIRCULAR MILS
KD	KNOCK DOWN
KO	KNOCK OUT
KSI	KIPS PER SQUARE INCH
L	ANGLE, LENGTH, LAVATORY
LAD	LADDER
LAM	LAMINATE
LATL	LATERAL
LB	LAG BOLT, POUND
LCTB	LIQUID CHALK AND TACK BOARD
LDG	LANDING
LDR	LEADER
LE	LIFTING EYE
LF	LINEAR FOOT
LG	LONG
LH	LEFT HAND
LIN	LINEAR
LIQ	LIQUID
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LMLU	LIQUID MARKER LECTURE UNIT
LNG	LONGITUDINAL
LOC	LOCATION
LP	LOW POINT
LPA	LOW PRESSURE AIR
LPS	LOW PRESSURE SODIUM
LR	LONG RADIUS
LT	LEFT
LTD	LIMITED
LTG	LIGHTING
LTL	LINTEL
LTNG	LIGHTNING
LV	LOW VOLTAGE
LVR	LOUVER
LW	LIGHTWEIGHT
LWC	LIGHTWEIGHT CONCRETE
LWL	LOW WATER LEVEL
M	MECHANICAL (DWG DISCIPLINE)
MA	MIXED AIR
MACH	MACHINED
MAINT	MAINTENANCE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MBR	MEMBER
MC	MECHANICAL CONTRACTOR, MECHANICAL COUPLING
MCB	METAL CORNER BEAD
MCJ	MASONRY CONTROL JOINT
MDMJ	MODIFIED DOUBLE MECHANICAL JOINT
MECH	MECHANICAL
MED	MEDIUM
MFR	MANUFACTURER
MH	MANHOLE, METAL HALIDE
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
ML	MIXED LIQUOR
MLO	MAIN LUGS ONLY
MMB	MEMBRANE
MO	MASONRY OPENING
MOD	MODULAR, MODIFY
MON	MONUMENT
MPT	MALE PIPE THREAD
MRGWB	MOISTURE RESISTANT GYPSUM WALLBOARD
MS	MOP SINK
MSL	MEAN SEA LEVEL
MT	MOUNT
MU	MASONRY UNIT
MULL	MULLION
MV	MEDIUM VOLTAGE
MW	MONITORING WELL
N	NORTH, NEUTRAL
NA	NOT APPLICABLE
NAT	NATURAL
NC	NORMALLY CLOSED
NEG	NEGATIVE
NF	NEAR FACE, NON-FUSED
NFV	NOT FIELD VERIFIED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN, NUMBER
NOM	NOMINAL
NPS	NOMINAL PIPE SIZE
NPW	NON-POTABLE WATER
NPT	NATIONAL PIPE THREAD
NS	NEAR SIDE
NTS	NOT TO SCALE
NWL	NORMAL WATER LEVEL
O TO O	OUT-TO-OUT
OA	OUTSIDE AIR, OVERALL
OC	ON CENTER
OCPD	OVER CURRENT PROTECTION DEVICE
OD	OUTSIDE DIAMETER
OED	OPEN END DUCT
OF	OUTSIDE FACE, OFFICE FURNISHING
OG	ORIGINAL GROUND
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OPT	OPTIONAL
OR	OUTSIDE RADIUS
ORD	OVERFLOW ROOF DRAIN
ORIG	ORIGINAL
OUT	OUTFALL
OVFL	OVERFLOW
OVHG	OVERHANG
OZ	OUNCE
P	PAINT, PROCESS (DWG DISCIPLINE)
PA	PUBLIC ADDRESS
PAR	PARALLEL, PARAPET
PB	PANIC BAR, PULL BOX
PBD	PARTICLE BOARD
PC	POINT OF CURVE, PIECE, PRECAST
PCC	POINT OF COMPOUND CURVATURE
PCF	POUNDS PER CUBIC FOOT
PCT	PERCENT
PE	PLAIN END
PED	PEDESTAL
PEN	PENETRATION
PERF	PERFORATED
PERM	PERMANENT
PERP	PERPENDICULAR
PF	POWER FACTOR
PFMU	PREFACED MASONRY UNIT
PFS	POLYMER FEED SOLUTION
PH	PHASE
PI	POINT OF INTERSECTION
PKG	PACKAGE
PL	PLATE, PROPERTY LINE
PLAS	PLASTER
PLAT	PLATFORM
PLBG	PLUMBING
PLF	POUNDS PER LINEAR FOOT
PNEU	PNEUMATIC
POL	POLISH
POS	POSITIVE, POSITION
PP	POLYPROPYLENE, POWER POLE
PRC	POINT OF REVERSE CURVATURE
PREF	PREFINISHED
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PREP	PREPARE
PRES	PRESSURE
PRI	PRIMARY
PROP	PROPERTY
PROT	PROTECTION
PS	PIPE SUPPORT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAGE
PST	PRESTRESSED
PT	POINT, POINT OF TANGENCY
PTN	PARTITION
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PW	POTABLE WATER
PWD	PLYWOOD
PWJ	PLYWOOD WEB JOIST
PZ	PIEZOMETER
Q	RATE OF FLOW
QT	QUARRY TILE
QTR	QUARTER
QTY	QUANTITY
QUAL	QUALITY
R&R	REMOVE AND REPLACE
R&S	REMOVE AND SALVAGE
R	RADIUS, REGISTER, RISER
RA	RETURN AIR
RAS	RETURN ACTIVATED SLUDGE
RB	RESILIENT BASE, ROCK BERM
RCP	REINFORCED CONCRETE PIPE
RCPT	RECEPTACLE
RD	ROOF DRAIN
REC	RECESS
RECD	RECEIVED
RECT	RECTANGULAR
RED	REDUCER
REF	REFERENCE
REINF	REINFORCING
REM	REMOVE
REQD	REQUIRED
RESIL	RESILIENT
RET	RETAINING, RETURN
REV	REVISION, REVERSE
RF	RESILIENT FLOORING
RFG	ROOFING
RFL	REFLECTED, REFLECTOR
RGH	ROUGH
RGS	RIGID GALVANIZED STEEL
RGS-PVC	PVC COATED RGS
RH	RELIEF HOOD, RIGHT HAND, RELATIVE HUMIDITY
RL	REQUIRED LAP
RLFA	RELIEF AIR
RND	ROUND
RNG	RUNNING
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RS	RAW SEWAGE
RSG	ROUND SLIDE GATE
RSP	ROCK SLOPE PROTECTION
RT	RIGHT
RVT	RESILIENT VINYL TILE
RW	RECLAIMED WATER LINE
RWL	RE-USE WATER LINE
RY	READY
S	SOUTH, SINK, STRUCTURAL (DWG)
SA	SUPPLY AIR
SAMU	SOUND ABSORBING MASONRY UNIT
SAN	SANITARY
SB	SPLASH BLOCK, SODIUM BISULFITE
SC	SOLID CORE, SCUM
SCH	SCHEDULE
SCHEM	SCHEMATIC
SCN	SCREEN
SE	STEEL/ALUMINUM EDGE
SEC	SECONDARY, SECONDS
SECT	SECTION
SEP	SEPARATE
SF	SQUARE FOOT
SG	SHEET GLASS, SEALANT GROOVE SLIDE GATE (SQUARE/RECTANGULAR)
SH	SHOWER
SHT	SHEET
SHTG	SHEATHING
SIL	SILENCE
SIM	SIMILAR
SL	SLUDGE LINE
SLTD	SLOTTED
SLV	SLEEVE
SMLS	SEAMLESS
SN	SUPERNATENT
SOG	SLAB ON GRADE
SP	SOUNDPROOF, STANDPIPE
SPA	SPACING
SPEC	SPECIFICATION
SPLY	SUPPLY
SPST	SINGLE POLE SINGLE THROW
SPT	SET POINT
SQ	SQUARE
SR	SHORT RADIUS
SS	SANITARY SEWER, SERVICE SINK
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP
STL	STEEL
STOR	STORAGE
STR	STRUCTURAL, STRAIGHT
SUB	SUBSTITUTE
SUC	SUCTION
SUSP	SUSPENDED
SWD	SIDEWATER DEPTH
SY	SQUARE YARD
SYM	SYMBOL
SYMM	SYMMETRICAL
SYN	SYNTHETIC
SYS	SYSTEM
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
T	TILE, TREAD
TA	TOILET ACCESSORY, TEMPERED AIR
TAN	TANGENT
TBM	TEMPORARY BENCHMARK
TCE	TEMPORARY CONSTRUCTION EASEMENT
TEF	TROWELED EPOXY FLOORING
TEMP	TEMPORARY, TEMPERATURE
THD	THREAD
THK	THICK
THRESH	THRESHOLD
THRU	THROUGH
TKBD	TACK BOARD
TOB	TOP OF BOLT, TOP OF BANK, TOP OF BEAM
TOC	TOP OF CURB, TOP OF CONCRETE
TOD	TOP OF DUCT
TOF	TOP OF FOOTING
TOG	TOP OF GRATING
TOL	TOLERANCE, TOP OF LEDGER
TOM	TOP OF MASONRY
TOP	TOP OF PLATE
TOPO	TOPOGRAPHY
TOS	TOP OF SLAB, TOP OF STEEL
TW	TOP OF WALL
TP	TOILET PARTITION, TELEPHONE POLE, TOE PLATE, TRAP PRIMER
TPD	TOILET PAPER DISPENSER
TPG	TOPPING
TR	TRANSOM
TRANS	TRANSITION
TRD	TRENCH DRAIN
TS	THICKENED SLUDGE
TYP	TYPICAL
U	URINAL
UG	UNDERGROUND
ULT	ULTIMATE
UNFN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
V	VENT, VELOCITY, VOLT
VA	VOLT AMPERE
VAC	VACUUM
VAR	VARNISH, VARIABLE, VOLT AMPERES REACTIVE
VB	VAPOR BARRIER, VINYL BASE, VALVE BOX
VC	VERTICAL CURVE
VCT	VINYL COMPOSITION TILE, VERTICAL CENTERLINE
VEL	VELOCITY
VENT	VENTILATION
VERT	VERTICAL
VG	VERTICAL GRAIN
VIF	VERIFY IN FIELD
VIN	VINYL
VS	VERSES, VAPOR SEAL
VOL	VOLUME
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
VTR	VENT THROUGH ROOF
VWC	VINYL WALL COVERING
W/	WITH
W/O	WITHOUT
W	WATT, WEST, WIDE, WINDOW, WIRE, WIDE FLANGE BEAM, POTABLE WATER LINE
WAS	WASTE ACTIVATED SLUDGE
WB	WOOD BASE
WC	WATER CLOSET, WATER COLUMN
WD	WOOD, WIDTH
WF	WIDE FLANGE, WASH FOUNTAIN
WG	WIRE GLASS, WATER GAGE, WEIR GATE
WH	WALL HYDRANT, WEEP HOLE
WI	WROUGHT IRON
WL	WATER LINE, WATER LEVEL
WLD	WELDED
WM	WIRE MESH
WP	WATERPROOF, WORKING POINT
WTHP	WEATHERPROOF
WS	WATERSTOP, WATER SURFACE
WSCT	WAINSCOT
WT	WEIGHT, WATER TIGHT
WW	WASTE WATER, SANITARY SEWER
WWF	WELDED WIRE FABRIC
WWL	WASTE WATER LINE
XP	EXPLOSION PROOF
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG
XSECT	CROSS SECTION
YH	YARD HYDRANT
YS	YIELD STRENGTH

GENERAL NOTES:

1. THESE ABBREVIATIONS APPLY TO THE ENTIRE SET OF CONTRACT DRAWINGS.
2. LISTING OF ABBREVIATIONS DOES NOT IMPLY ALL ABBREVIATIONS ARE USED IN THE CONTRACT DRAWINGS.
3. ABBREVIATIONS SHOWN ON THIS DRAWING INCLUDE VARIATIONS OF THE WORD. FOR EXAMPLE, "MOD" MAY MEAN MODIFY OR MODIFICATION; "INC" MAY MEAN INCLUDED OR INCLUDING; "REINF" MAY MEAN EITHER REINFORCE OR REINFORCING.
4. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH DRAWING FOR USAGE.

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
GENERAL ABBREVIATIONS

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

PORT OF BROWNSVILLE
the port that works

RRP YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

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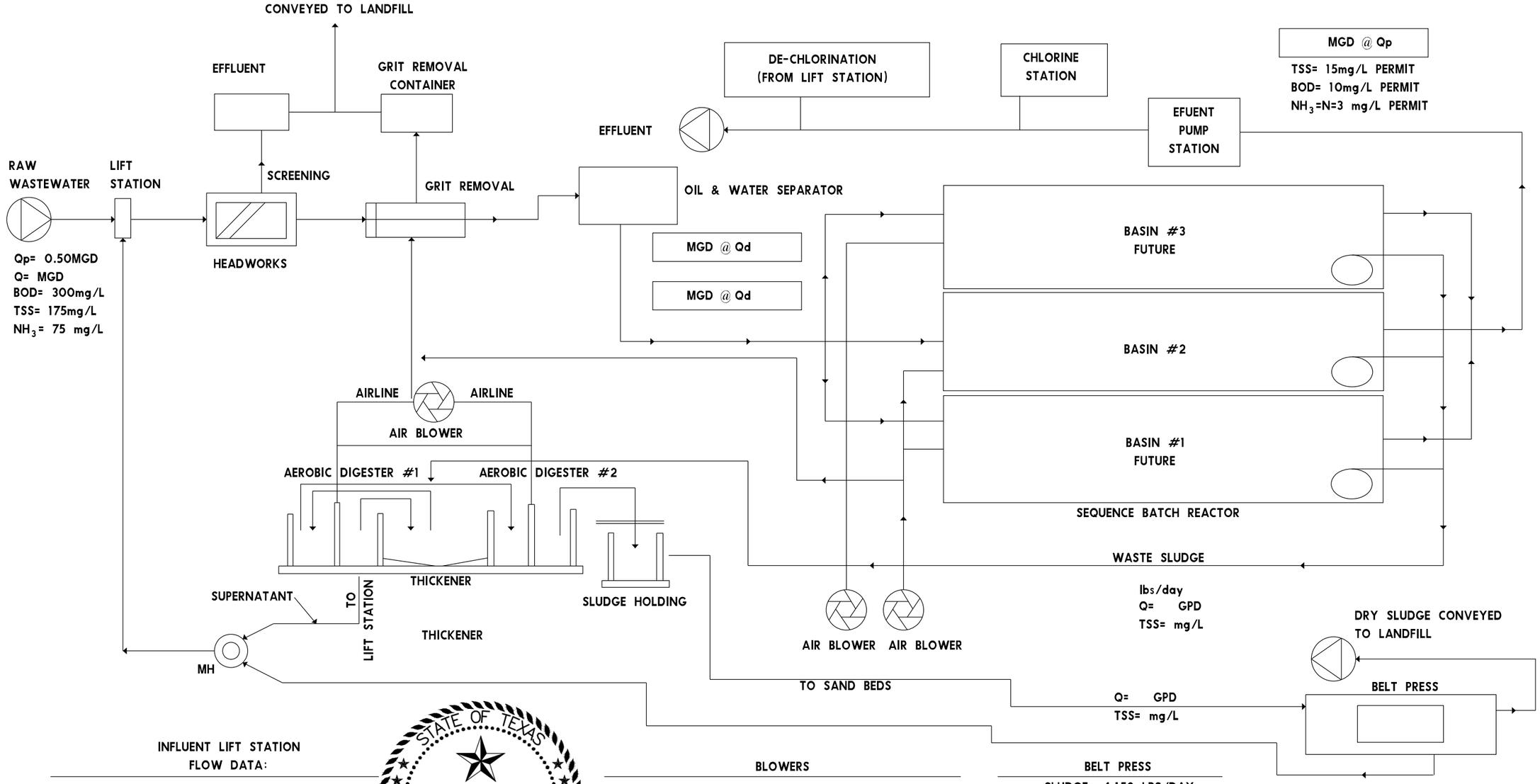

INFLUENT LIFT STATION FLOW DATA:

AVERAGE ANNUAL FLOW=		182,383,200 GAL
PEAK ANNUAL FLOW	=	729,532,800 GAL
DESIGN BOD	=	1,251 ppd
DESIGN TSS	=	730 ppd
DESIGN NH_3N	=	313 ppd

BLOWERS

TREATMENT PLANT BLOWER CAPACITY=		746 SCFM EACH
TOTAL DIGESTION BLOWER	=	2,202 SCFM
GRIT REMOVAL	=	36 SCFM

BELT PRESS

SLUDGE= 4,152 LBS/DAY

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT FLOW DIAGRAM

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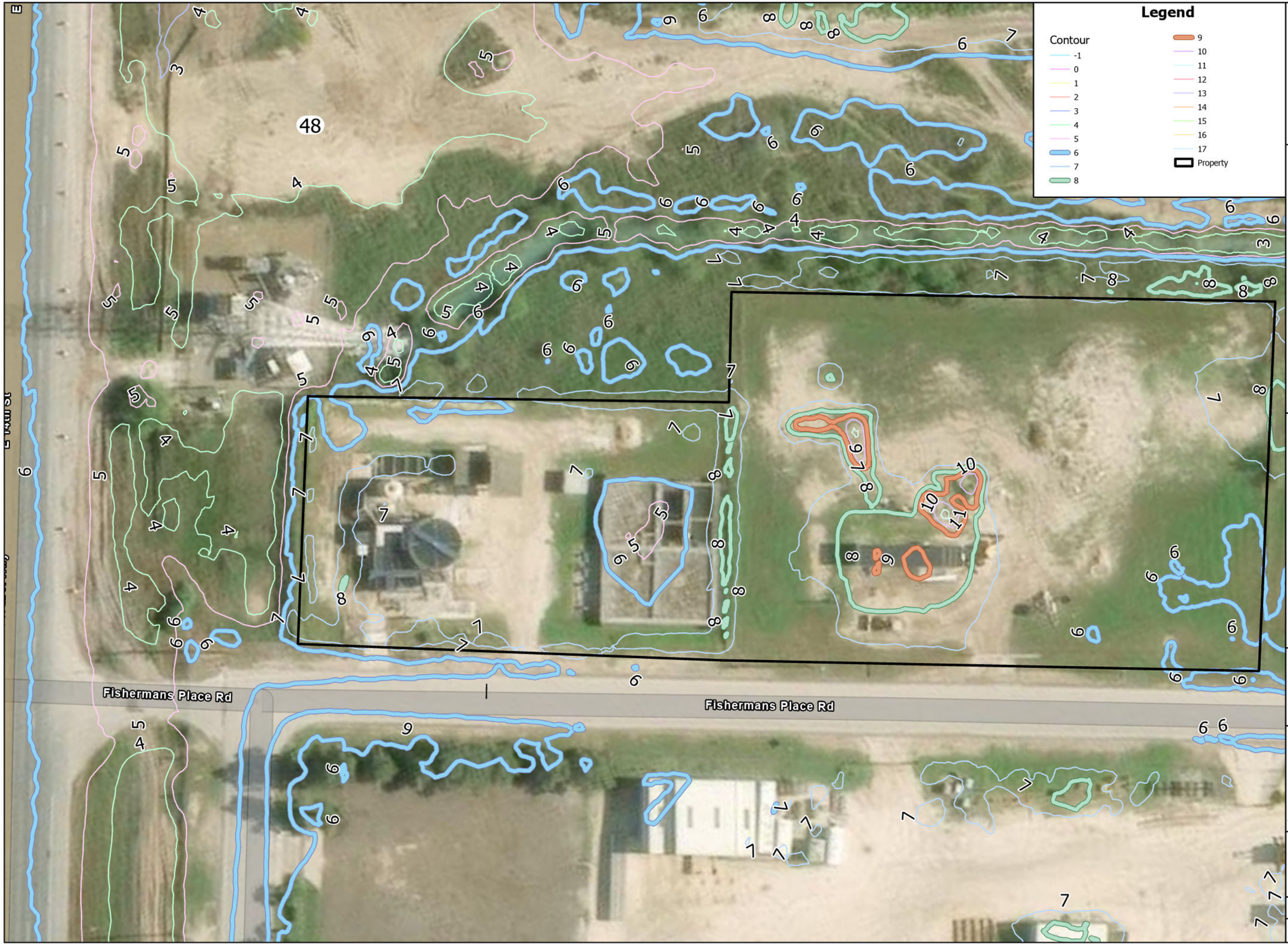

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT

CONTOUR MAP

PORT OF BROWNSVILLE
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SCALE: 1"=50'

Sheet Number 9

N E S W

0 25 50 Feet

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT

FEMA MAP

PORT OF BROWNSVILLE
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SCALE: 1"=50'

Sheet Number 10

PROPERTY FENCE		
ID	POINT X	POINT Y
F1	1366400.925	16519974.09
F2	1366213.248	16519904.02
F3	1366102.216	16520184.15
F4	1366014.365	16520408.45
F5	1366142.231	16520459.37
F6	1366230.648	16520235.2
F7	1366290.307	16520257.96

AERATION BASINS		
ID	POINT X	POINT Y
A1	1366188.177	16520225.62
A2	1366114.019	16520195.79
A3	1366089.976	16520256.33
A4	1366165.147	16520286.17

Legend

- Control Points for Site
- Property
- Aeration Basins

0 25 50 Feet

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT

CONTROL POINTS FOR SITE MAP

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SCALE: 1"=50'

Sheet Number 11

ID	RADIUS
R1	36
R2	36
R3	36
R4	24
R5	24
R6	24
R7	24
R8	3.5
R9	3.5
R10	35
R11	35
R12	4

ID	POINT X	POINT Y	ID	POINT X	POINT Y	ID	POINT X	POINT Y
1	1366206.32	16519922.34	16	1366375.704	16520015.87	30	1366131.59	16520110.05
2	1366210.035	16519923.82	17	1366314.35	16520169.4	31	1366126.89	16520121.09
3	1366237.47	16520162.37	18	1366267.561	16520189.47	32	1366140.49	16520126.59
4	1366272.757	16520176.47	19	1366242.109	16520150.76	33	1366142.44	16520131.14
5	1366277.395	16520164.86	20	1366204.965	16520135.92	34	1366132.42	16520156.21
6	1366308.588	16520151.48	21	1366202.735	16520130.72	35	1366185.35	16520177.37
7	1366308.588	16520151.48	22	1366224.939	16520075.16	36	1366195.07	16520153.05
9	1366223.414	16519955.01	23	1366215.653	16520071.45	37	1366199.94	16520150.29
10	1366234.558	16519959.47	24	1366202.273	16520040.25	38	1366234.02	16520176.06
11	1366265.75	16519946.09	25	1366165.223	16520100.63	39	1366216.73	16520161.81
12	1366210.773	16519911.19	26	1366168.219	16520101.83			
13	1366355.634	16519969.08	27	1366160.797	16520120.4			
14	1366351.181	16519980.23	28	1366142.225	16520112.98			
15	1366364.561	16520011.42	29	1366141.769	16520114.12			

Legend

- Control Points for Pavement
- Proposed Road
- Property

0 30 60 Feet

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT

CONTROL POINTS FOR
PROPOSED ROAD MAP

PORT OF BROWNSVILLE
the port that works

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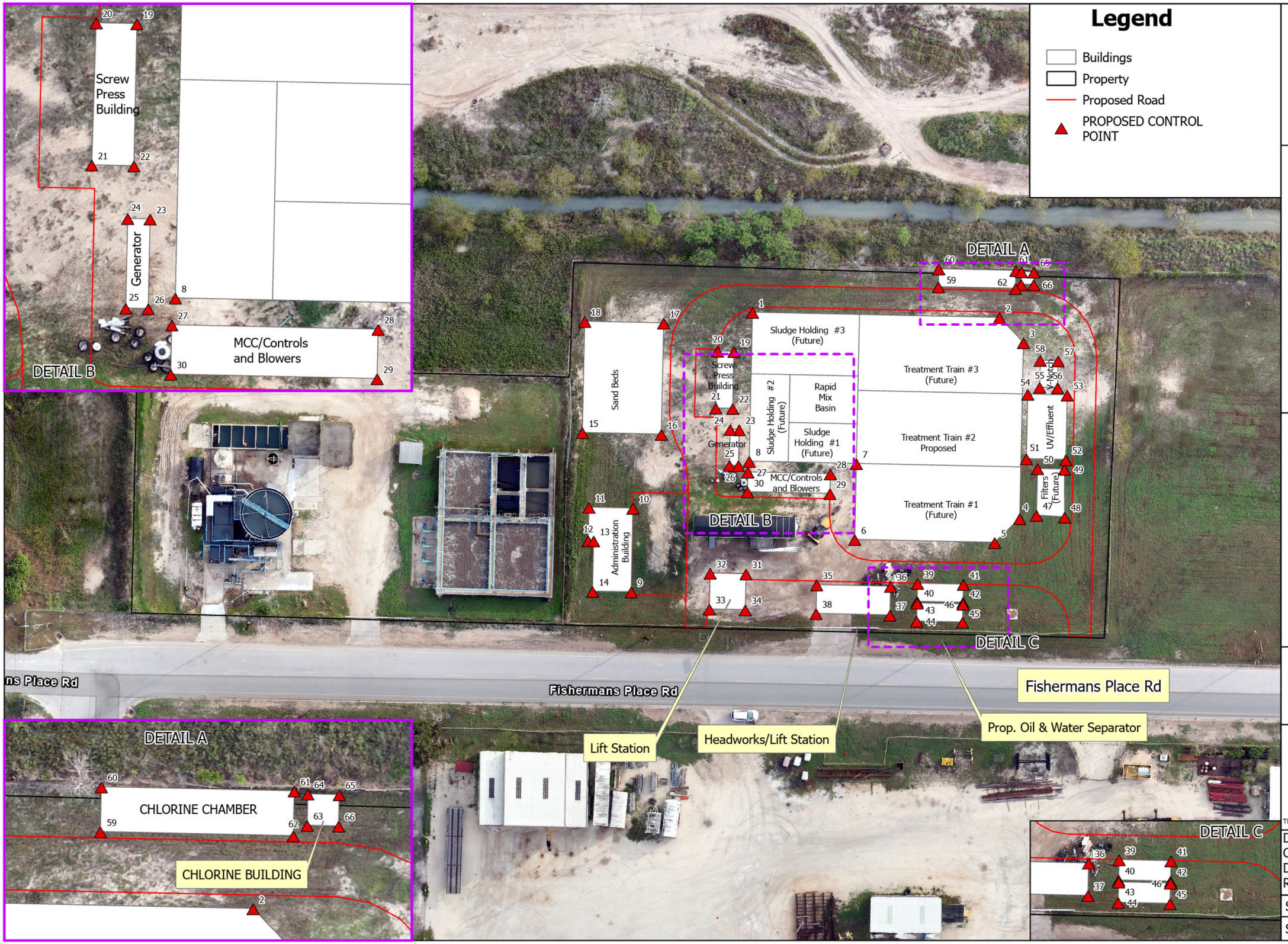
Sheet Number 12



Legend

- Buildings
- Property
- Proposed Road
- PROPOSED CONTROL POINT

N E S W

0 25 50 Feet

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT

PROPOSED STRUCTURES SITE CONTROL POINTS PLAN MAP 1 of 2

PORT OF BROWNSVILLE
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REVIEWED BY DC

SCALE: 1"=50'

Sheet Number 13

ID	POINT X	POINT Y
1	1366303.763	16520155.46
2	1366354.85	16520027.63
3	1366347.229	16520009.86
4	1366256.231	16519973.5
5	1366238.466	16519981.12
6	1366209.521	16520053.54
7	1366248.832	16520069.25
8	1366226.69	16520124.66

Administration Building		
ID	POINT X	POINT Y
9	1366134.027	16520156.84
10	1366177.302	16520174.15
11	1366168.212	16520196.89
12	1366150.879	16520189.96
13	1366151.992	16520187.17
14	1366125.837	16520176.72

Sand Beds		
ID	POINT X	POINT Y
15	1366205.06	16520216.51
16	1366221.388	16520175.65
17	1366278.961	16520198.66
18	1366262.633	16520239.52

Screw Press Building		
ID	POINT X	POINT Y
19	1366279.625	16520156.44
20	1366276.255	16520164.87
21	1366246.716	16520153.41
22	1366250.202	16520144.68

Generator		
ID	POINT X	POINT Y
23	1366240.714	16520136.73
24	1366238.858	16520141.37
25	1366220.287	16520133.95
26	1366222.142	16520129.3

MCC/Controls and Blowers		
ID	POINT X	POINT Y
27	1366220.871	16520123.05
28	1366237.941	16520080.34
29	1366227.726	16520076.26
30	1366210.657	16520118.97

Lift Station		
ID	POINT X	POINT Y
31	1366168.219	16520101.83
32	1366160.799	16520120.38
33	1366142.227	16520112.96
34	1366149.649	16520094.39

Headworks/Lift Station		
ID	POINT X	POINT Y
35	1366178.018	16520063.21
36	1366193.295	16520024.98
37	1366178.437	16520019.05
38	1366163.161	16520057.27

Oil/Water Separators		
ID	POINT X	POINT Y
39	1366200.718	16520011.8
40	1366191.374	16520008.06
41	1366210.205	16519988.06
42	1366200.86	16519984.33

Future Oil/Water Separators		
ID	POINT X	POINT Y
43	1366190.504	16520007.72
44	1366181.16	16520003.98
45	1366190.646	16519980.24
46	1366199.99	16519983.98

Future Filters		
ID	POINT X	POINT Y
47	1366261.55	16519965.57
48	1366266.744	16519950.78
49	1366291.259	16519961.29
50	1366285.693	16519975.22

UV/Effluent		
ID	POINT X	POINT Y
51	1366288.295	16519983.08
52	1366296.459	16519962.65
53	1366329.889	16519976.01
54	1366321.725	16519996.44

V-Notch		
ID	POINT X	POINT Y
55	1366327.874	16519991.83
56	1366331.585	16519982.54
57	1366345.514	16519988.11
58	1366341.803	16519997.4

Chlorine Chamber		
ID	POINT X	POINT Y
59	1366357.341	16520065.64
60	1366366.627	16520069.36
61	1366382.584	16520029.43
62	1366373.298	16520025.71

Chlorine Building		
ID	POINT X	POINT Y
63	1366376.638	16520023.77
64	1366383.138	16520026.37
65	1366385.736	16520019.87
66	1366379.235	16520017.27

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT

PROPOSED STRUCTURES
SITE CONTROL POINTS
PLAN MAP
2 of 2

PORT OF BROWNSVILLE
the port that works

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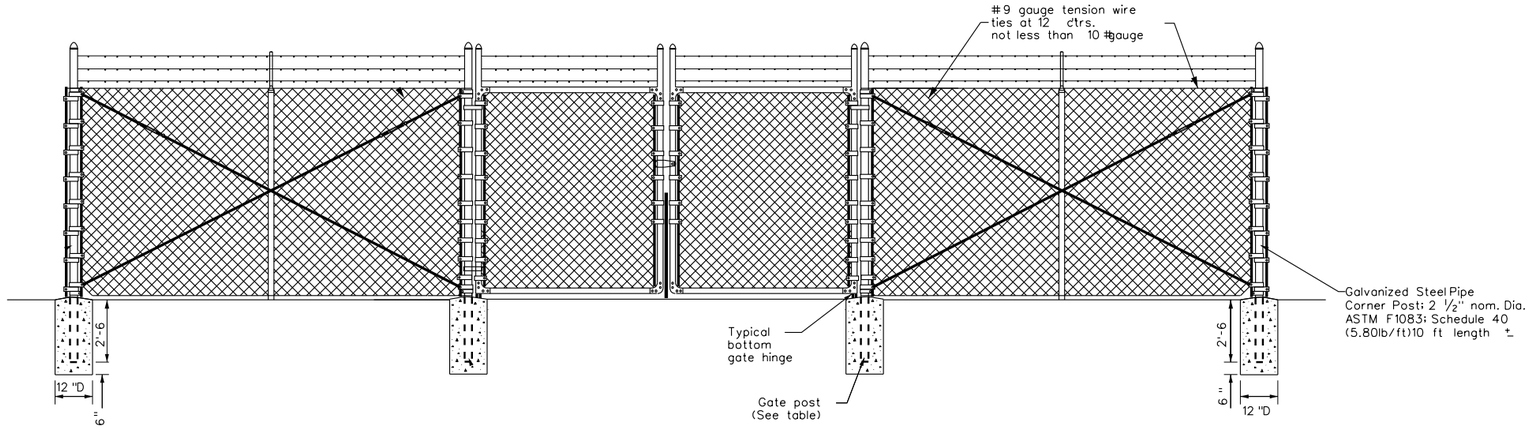
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

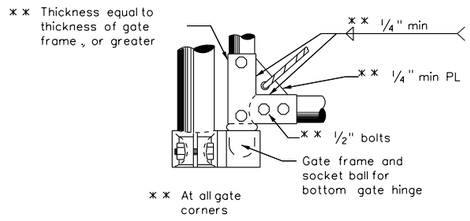
DRAWN BY J3
CHECKED BY JC
DESIGNED BY JC
REVIEWED BY DC

SCALE: 1"=50'

Sheet Number 14

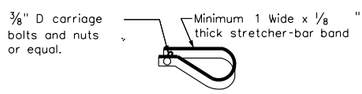


CHAIN-LINK BARRIER FENCE (8 FT.)



TYPICAL BOTTOM GATE HINGE

(NO SCALE)



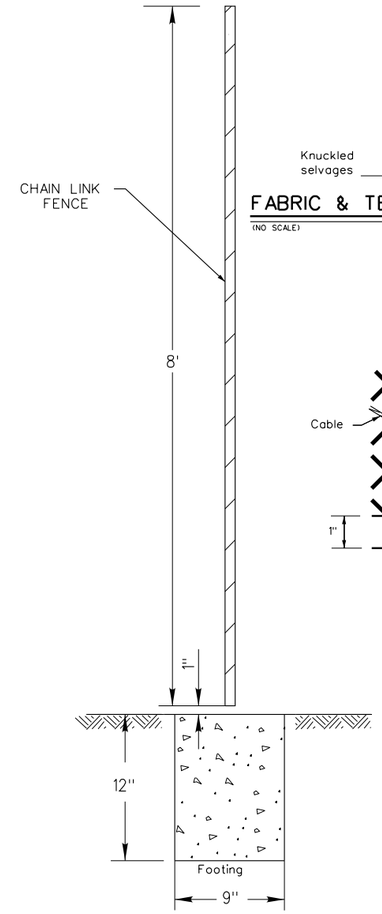
TYPICAL STRETCHER-BAR BAND

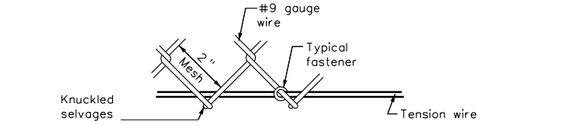
(NO SCALE)

TABLE OF MINIMUM SIZES & WEIGHTS

GATE OPENING TYPE	
Single Inclusive	Double Inclusive
Up to 6'	Up to 12'
Over 6' to 12'	Over 12' to 26'
Over 12' to 18'	Over 26' to 36'
Over 18'	Over 36'

GATE FRAME		GATE POST	
SIZE	WT./LIN. FT.	SIZE	WT./LIN. FT.
1 ½ "nom D or equal	2.72 LBS.	2 ½" nom D or equal	5.79 LBS.
	2.72 LBS.	3 ½" nom D or equal	9.11 LBS.
	2.72 LBS.	6" nom D	18.97 LBS.
	2.72 LBS.	8" nom D	24.70 LBS.

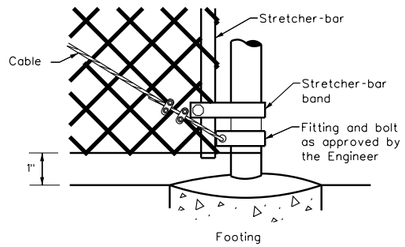




FABRIC & TENSION WIRE DETAIL TOP & BOTTOM

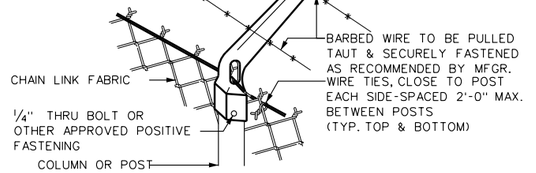
(NO SCALE)

(Tension wire should not allow greater than 1" hor. movement)



TERMINAL POST DETAIL

(NO SCALE)



EXTENSION ARM FOR BARBED WIRE

(NO SCALE)

GENERAL NOTES

1. Typical installation plan may vary as shown elsewhere on the plans or as directed by the Engineer. Location of gates shown elsewhere on plans.
2. Gate-frame members shall be bolted at frame corners to joint fittings with four ½ bolts per joint.
3. All cable connections are to be made with two ⅜ cable clamps.
4. All pull posts and end posts and their foundations shall have the same respective dimensions as those shown for corner post.
5. All pull post shall be furnished with two stretcher bars.
6. One end of each turnbuckle may be attached directly to fittings with a clevis.
7. All concrete shall be 4000 f'c @ 28 days

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
FENCE DETAILS

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

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REVIEWED BY	DC	11/13/2024
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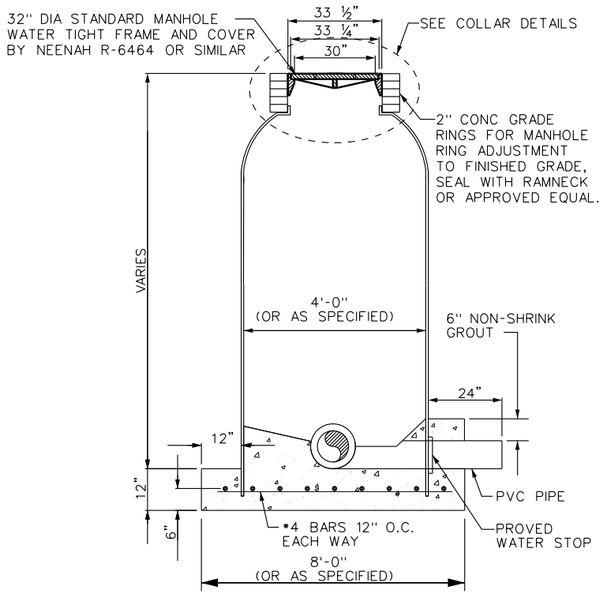
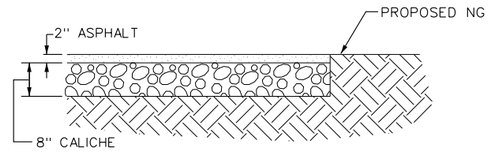


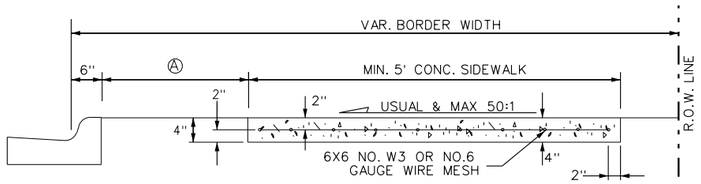
FIBERGLASS MANHOLE DETAIL

SCALE: NTS



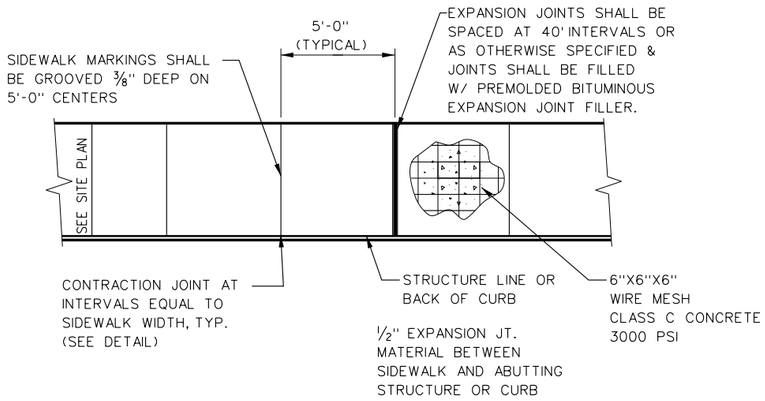
TYP. ROADWAY DETAIL

SCALE: NTS



TYP. SIDEWALK DETAIL

SCALE: NTS



SIDEWALK DETAIL

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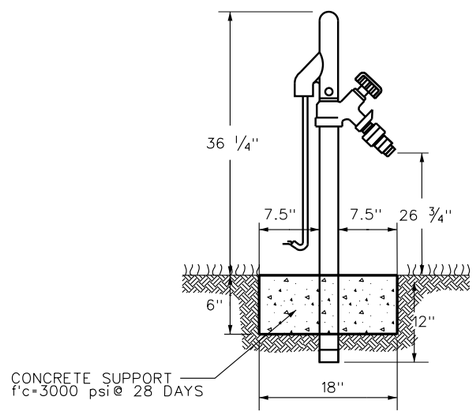
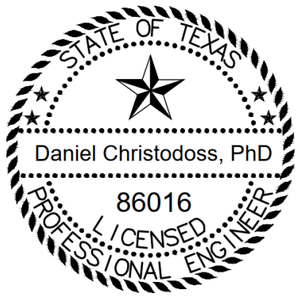


YARD HYDRANT DETAIL

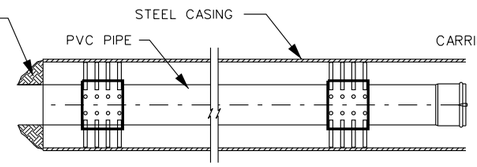
SCALE: NTS



01-06-2025

ENCASEMENT PIPE ENDS SHALL BE SEALED WITH BOOT OR SEAL WRAP ON EACH END

STEEL CASING WALL THICKNESS CHART	
MINIMUM THICKNESS	DIAMETER OF CASING PIPE
¼"	12" OR LESS
⅜"	OVER 12"-18"
⅜"	OVER 18"-22"
⅜"	OVER 28"-34"
½"	OVER 34"-42"
⅝"	OVER 42"-48"



NOMINAL PIPE SIZE	CASING SIZE (OD)	NO. OF SKIDS
6"	14"	4
8"	16"	4
12"	22"	4
15"	24"	5
16"	26"	5
18"	28"	5

GENERAL NOTES:

1. ALL STEEL CASING SHALL BE WELDED.
2. STEEL CASING SHALL BE CLOSED AT EACH END USING BRICK OR BLOCK AND MORTAR GROUTED.
3. CASING SPACERS SHALL BE USED TO INSTALL THE CARRIER PIPE INSIDE THE ENCASEMENT PIPE. CASING SPACERS SHALL FASTEN TIGHTLY ONTO THE CARRIER PIPE SO THAT WHEN THE CARRIER PIPE IS BEING INSTALLED THE SPACERS WILL NOT MOVE ALONG THE PIPELINE. CASING SPACERS SHALL BE DOUBLED ON EACH END OF THE ENCASEMENT.
4. PROJECTION - TYPE CASING SPACERS SHALL BE CONSTRUCTED OF PREFORMED SECTIONS OF HIGH DENSITY POLYETHYLENE. THE FLEXIBLE SECTIONS SHALL BE JOINED TOGETHER AROUND THE PIPE TO PROVIDE A MINIMUM OF 16 PLASTIC PROJECTIONS PER SPACER SECTION OR AS RECOMMENDED BY MANUFACTURER.
5. INSTALLATION AND SIZE OF SPACERS SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS.

PVC PIPE CASING & SKIDS (BORE & ENCASEMENT) DETAIL

SCALE: NTS

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0.5 MGD WASTE WATER
TREATMENT PLANT
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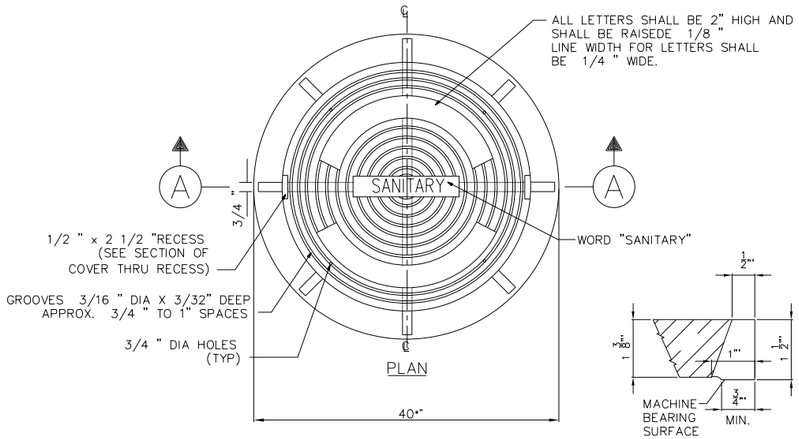
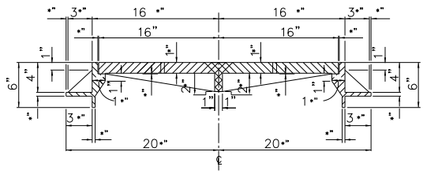


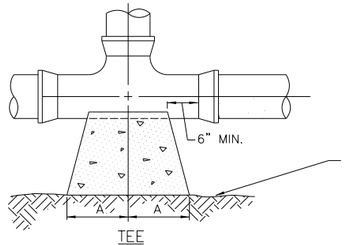
PLAN

SECTION OF COVER THRU RECESS

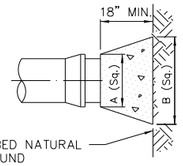


SECTION

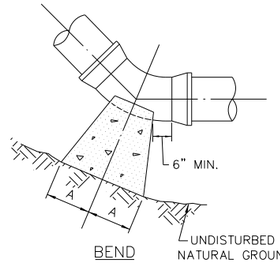
32" MANHOLE COVER WITH FRAME



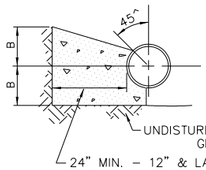
TEE



BEND & TEE



BEND



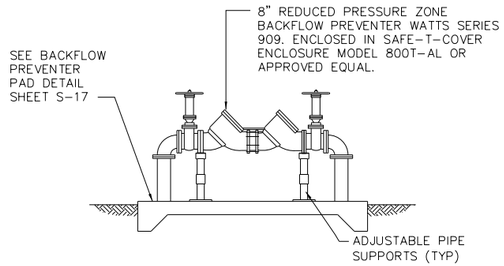
PLUG

SIZE	90^ BEND		45^ BEND		22½^ BEND		TEES		PLUGS	
	A	B	A	B	A	B	A	B	A	B
2 ½"	12"	7"	6"	7"	6"	6"	7"	8"	8"	14"
4"	14"	8"	7"	9"	6"	6"	8"	11"	8"	18"
6"	16"	10"	9"	10"	6"	8"	10"	12"	10"	21"
8"	22"	13"	12"	13"	8"	10"	13"	16"	12"	29"
12"	29"	21"	16"	21"	11"	16"	18"	24"	16"	41"
16"	45"	35"	26"	33"	13"	32"	32"	36"	24"	68"

NOTE: THRUST BLOCKS AT TRENCH FACE MUST HAVE A MINIMUM BEARING SURFACE OF 1.0 SQ. FOOT AND THE LEAST DIMENSION SHALL BE NO SMALLER THAN 1.5 TIME PIPE DIAMETER, BUT NOT LESS THAN 1.0 FT.

THRUST BLOCK DETAILS

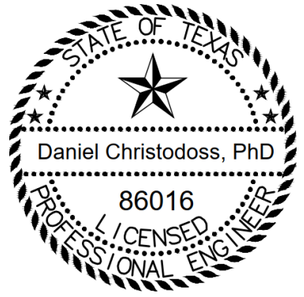
NOTE:
ENCLOSE AND INSTALL COMPLETE EQUIPMENT ASSEMBLY INSIDE ENCLOSURE BY SAFE-T-COVER MODEL 800T-AL. ENCLOSURE SHALL BE CERTIFIED BY ASSE TO CLASS 1, CLASS 2, AND CLASS 3 OF ASSE STANDARD #1060



REDUCED PRESSURE ZONE BACKFLOW PREVENTER

NTS

4 C-2



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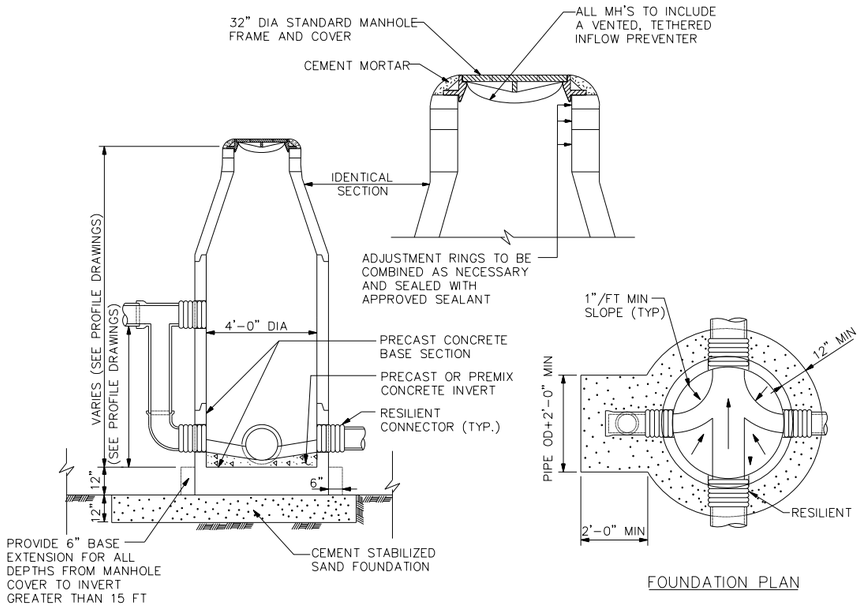
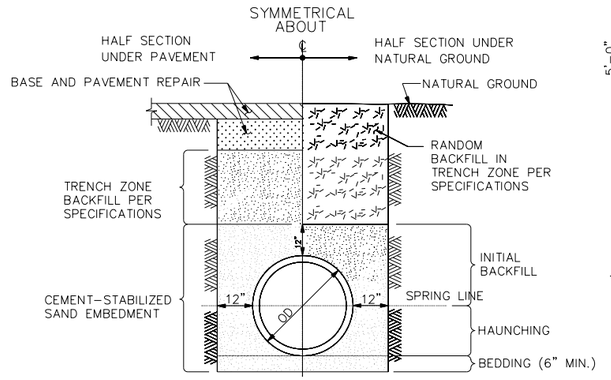
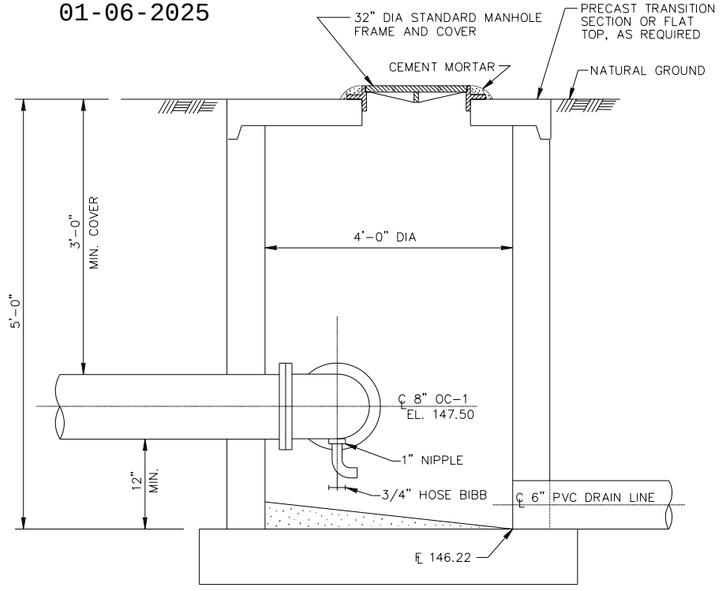


SANITARY SEWER PRECAST CONCRETE MANHOLE DETAIL

FOUNDATION PLAN



TYPICAL CROSS-SECTION FOR DRY STABLE TRENCH



MH-16 DETAIL

NTS

3 ---

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
DETAILS

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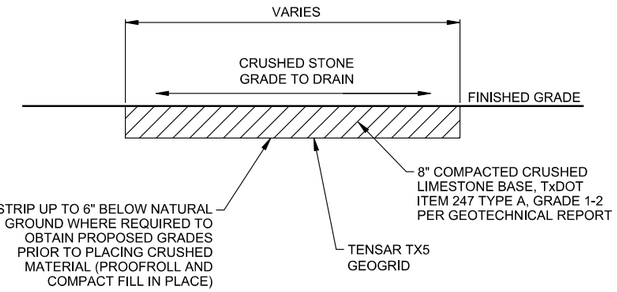
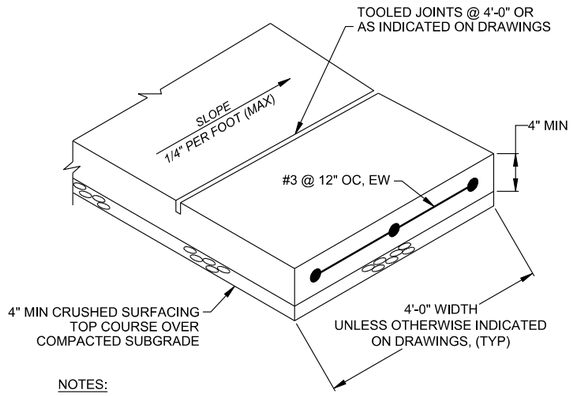


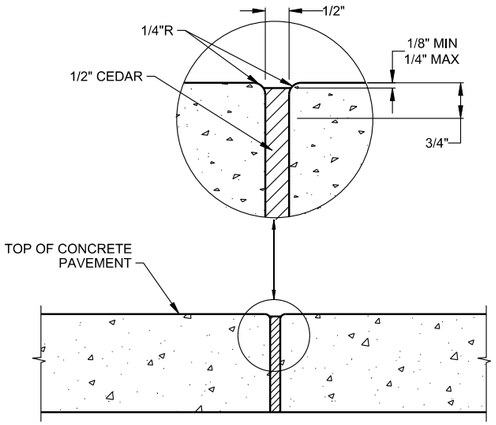
1 CRUSHED LIMESTONE PAVEMENT DETAIL
NTS



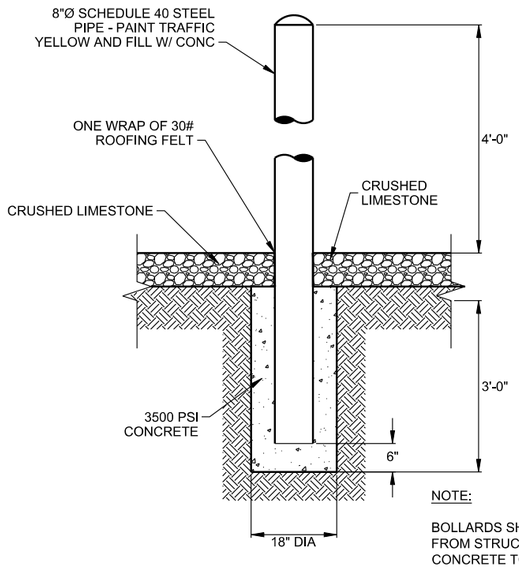
NOTES:

1. PROVIDE 1/2" PREMOLDED JOINT FILLER (FULL DEPTH) ALL AROUND ALL UTILITY POLES, METER BOXES, BUILDING FOUNDATIONS, ETC.
2. PROVIDE EXPANSION JOINTS AT 30' MAX SPACING, TYPICAL.
3. WHEN SIDES ARE ADJACENT TO BUILDINGS OR EQUIPMENT FOUNDATIONS, SLOPE SIDE WALK AWAY FROM FOUNDATIONS.

2 CONCRETE SIDEWALK DETAIL
NTS



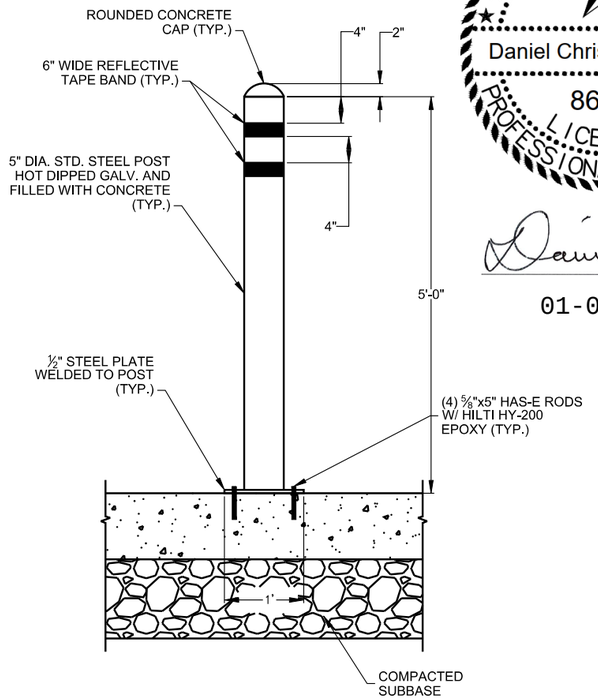
3 CONCRETE SIDEWALK EXPANSION JOINT DETAIL
NTS



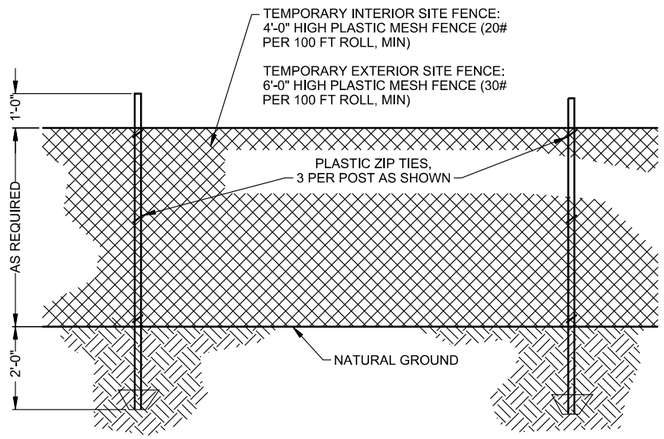
NOTE:

BOLLARDS SHALL BE LOCATED 1'-0" FROM STRUCTURE OR EDGE OF CONCRETE TO BE PROTECTED OR AS DIRECTED BY THE ENGINEER.

4 BOLLARD DETAIL
NTS



4A PAVEMENT BOLLARD DETAIL
NTS



5 SAFETY FENCE DETAIL
NTS

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0.5 MGD WASTE WATER TREATMENT PLANT
SITE DETAILS SHEET 1 OF 2

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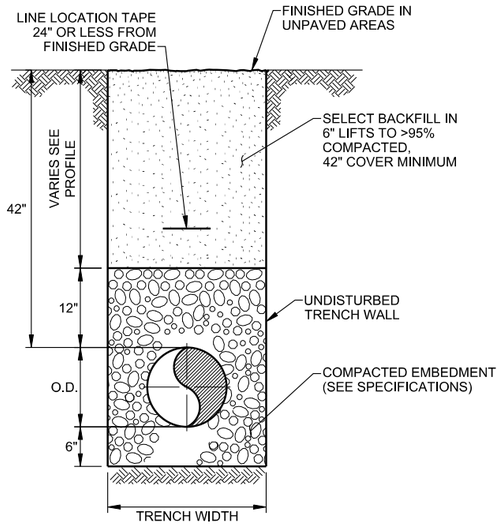
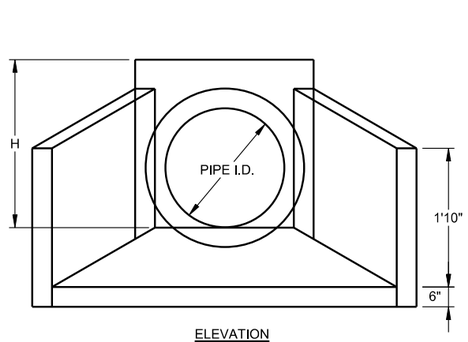


NOTES:

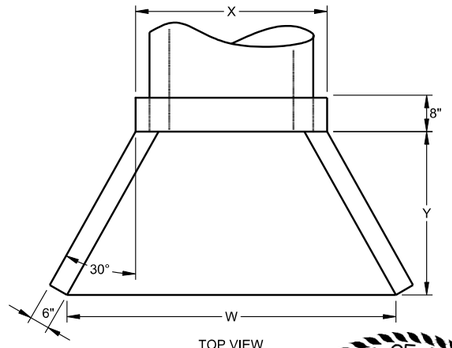
1. SELECT BACKFILL SHALL CONTAIN NO MORE THAN 2" DIAMETER ROCK FROM SPOILS.
2. PROVIDE LINE LOCATION TAPE WITH 6" WIDTH FOR 24" DETECTION DEPTH.

1 PIPE TRENCH DETAIL UNPAVED AREAS NEW PIPE
NTS

PIPE DIA	TABLE OF DIMENSIONS				
	X	H	Y	W	WEIGHT
12'	2'-11 1/2"	2'-5 1/2"	1'-11 3/4"	4'-2 1/2"	2663#
15"	2'-11 1/2"	2'-5 1/2"	1'-11 3/4"	4'-2 1/2"	2619#
18"	2'-11 1/2"	2'-5 1/2"	1'-11 3/4"	4'-2 1/2"	2556#
21"	3'-2"	3'-0"	3'-0"	4'-11"	4227#
24"	3'-2"	3'-0"	3'-0"	4'-11"	4156#

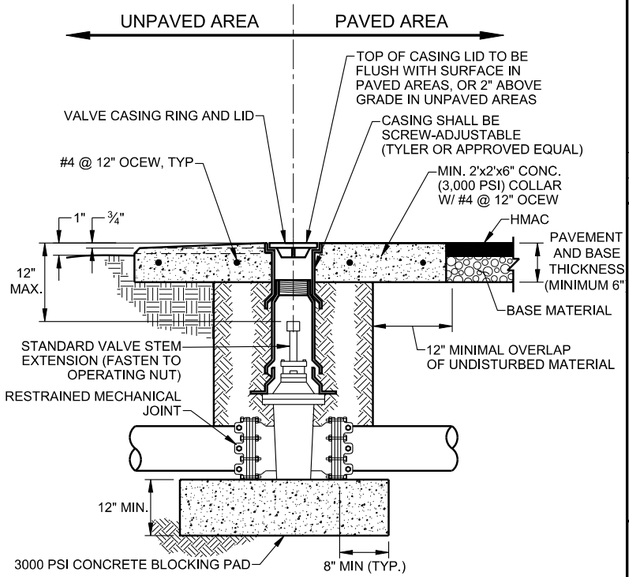


ELEVATION



TOP VIEW

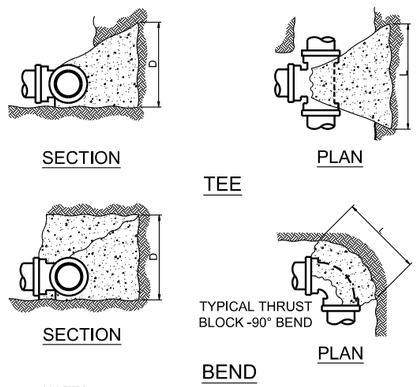
2 PRECAST CONCRETE HEADWALL
NTS



NOTES:

1. VALVES IN POTABLE AND REUSE SERVICE SHALL BE RESILIENT WEDGE GATE VALVES BY AMERICAN AVK COMPANY, OR ENGINEER-APPROVED EQUAL.
2. VALVE CASING, RING, LID, ETC., SHALL BE DESIGNED FOR HS-20 LOADING WHERE INSTALLED IN PAVED AREAS.
3. FOR CONNECTION TO HDPE, PROVIDE AND INSTALL FUSION-WELDED MJ ADAPTER KIT WITH METAL INSERT, METAL GLAND, GASKET, AND HARDWARE, ALL TYPE 316 SST.

3 BURIED VALVE, VALVE BOX & COVER DETAIL
NTS



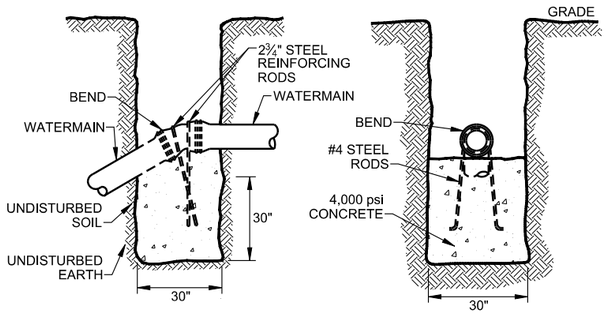
PIPE SIZE (INCHES)	WORKING PRESSURE (PSIG)	TEE OF PLUG (FT) L	TEE OF PLUG (FT) D	90° BEND (FT) L	90° BEND (FT) D	45° BEND (FT) L	45° BEND (FT) D	22-1/2° BEND (FT) L	22-1/2° BEND (FT) D
4	150	2.00	1.25	2.75	1.25	2.00	1.00	1.25	.75
	250	2.75	1.50	3.00	2.00	2.50	1.25	1.50	1.00
6	150	2.75	2.00	4.00	2.00	2.75	1.50	2.25	1.00
	250	4.00	2.25	5.25	2.50	3.50	2.00	2.75	1.25
8	150	4.50	2.25	5.25	2.75	3.75	2.00	3.75	2.00
	250	5.50	3.00	6.75	3.50	5.25	2.50	3.75	1.75
10	150	5.25	3.00	6.75	3.25	4.75	2.50	3.50	1.75
	250	7.50	3.50	8.75	4.25	6.25	3.25	4.50	2.25
12	150	6.50	3.50	8.00	4.00	5.75	3.00	4.50	2.00
	250	8.75	4.25	10.25	5.25	7.75	3.75	5.25	2.75
14	150	7.75	4.00	9.00	4.75	6.75	3.50	5.00	2.40
	250	10.25	5.00	12.00	6.00	8.75	4.50	6.25	3.25
16	150	9.00	4.50	10.75	5.25	7.75	4.00	5.75	2.75
	250	11.50	5.75	14.00	6.75	10.25	5.00	7.00	3.75

THRUST BLOCK SCHEDULE

NOTES:

1. ALL DIMENSIONS ARE IN FEET.
2. BEARING AREAS ARE BASED ON ALLOWABLE SOIL BEARING PRESSURE OF 1500 PSF.
3. HEIGHT OF THRUST BLOCK SHOULD BE EQUAL TO OR LESS THAN 1/2 THE DEPTH FROM THE GROUND SURFACE TO THE BASE OF THE BLOCK.
4. ALL THRUST BLOCKS SHALL CURE A MINIMUM OF SEVEN (7) DAYS BEFORE ANY PRESSURE TESTS ARE CONDUCTED. CONCRETE SHALL BE MINIMUM 2500 PSI.

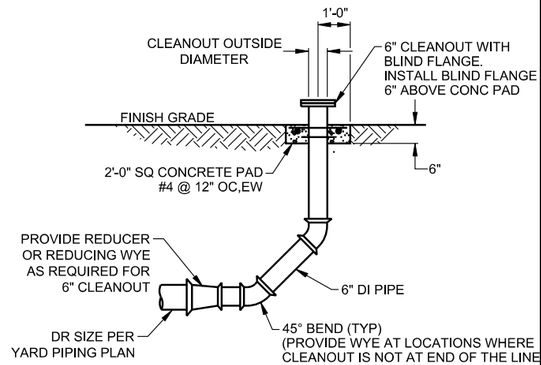
4 THRUST BLOCK DETAIL
NTS



NOTE:

1. RESTRAINING RODS MAY BE USED IN LIEU OF THRUST BLOCKS. METHOD TO BE USED SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.

5 VERTICAL THRUST BLOCK DETAIL
NTS



NOTES:

1. ALL BELOW GRADE JOINTS TO BE RESTRAINED MECHANICAL JOINTS.

6 CLEANOUT DETAIL
NTS

Daniel Christodoss, PhD
86016
STATE OF TEXAS
LICENSED PROFESSIONAL ENGINEER
01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SITE DETAILS SHEET 2 OF 2

PORT OF BROWNSVILLE
the port that works

RRP YOUR RELIABLE PARTNER
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
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REVIEWED BY	DC	11/13/2024
SCALE:	___	___

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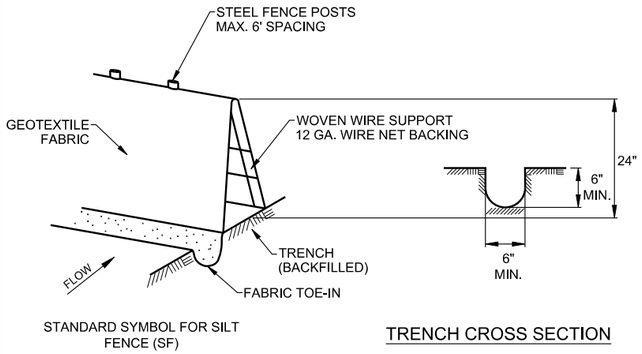


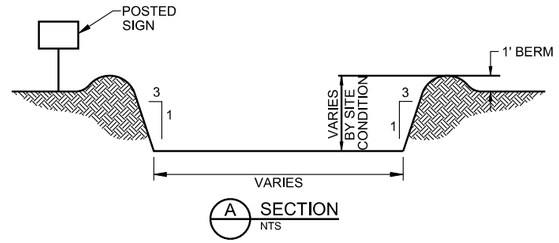
STANDARD SYMBOL FOR SILT FENCE (SF)

TRENCH CROSS SECTION

NOTES

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 18".
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CAN NOT BE TRENCHED INTO THE SURFACE (E.G. PAVEMENT), THE FABRIC FLAP SHALL BE WEIGHTED DOWN WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 6" DEEP AND 6" WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6". THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. ALL EROSION CONTROL MEASURES MUST CONFORM TO TCEQ REQUIREMENTS FOR NON-POINT SOURCE POLLUTION.

1 SILT FENCE
NTS



A SECTION
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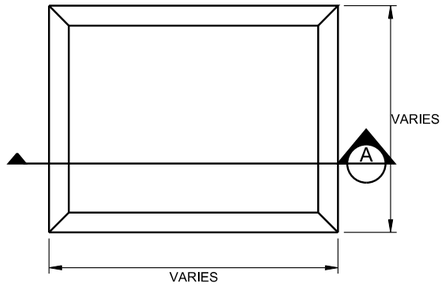
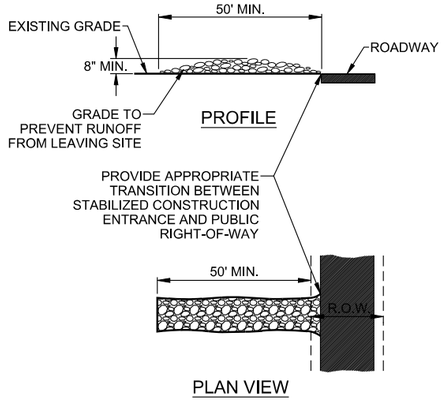


PLAN VIEW
N.T.S.

GENERAL NOTES:

1. CONCRETE WASHOUT AREA SHALL BE LINED WITH 10 MIL POLYETHELYENE SHEETING.
2. POST A SIGN READING "CONCRETE WASH OUT PIT" NEXT TO THE PIT.
3. VERBALLY INSTRUCT THE CONCRETE TRUCK DRIVERS WHERE THE PIT IS AND TO WASH OUT THEIR TRUCKS IN THE PIT AND NO WHERE ELSE.
4. UPON THE CONCRETE SETTING UP (CURING, DRYING OUT), THE CONCRETE WASTE SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF PROPERLY BY THE CONTRACTOR. AFTER REMOVAL OF THE CONCRETE WASTE, THE WASH OUT PIT SHALL BE FILLED WITH CLEAN FILL MATERIAL AND COMPACTED TO IN-SITU CONDITIONS, OR AS DIRECTED BY THE PROJECT SPECIFICATIONS.
5. CONCRETE WASH OUT PITS SHALL NOT BE LOCATED DIRECTLY ADJACENT TO, NOR AT ANY TIME DRAIN INTO THE STORM SEWER SYSTEM OR ANY OTHER SWALE, DITCH, OR WATERWAY.
6. CONSTRUCT ENTRY ROAD AND BOTTOM OF WASHOUT AREA TO SUPPORT EXPECTED LOADINGS FROM TRUCKS EQUIPMENT.

2 CONCRETE TRUCK WASHOUT AREA
NTS

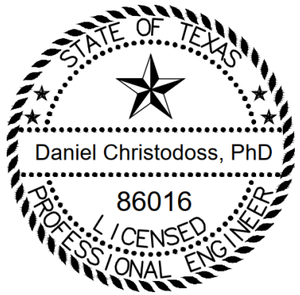


PLAN VIEW

NOTES:

1. STONE SIZE: 3-5" OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 50'.
3. THICKNESS: NOT LESS THAN 8".
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENT THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

3 STABILIZED CONSTRUCTION ENTRANCE
NTS



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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
POLLUTION PREVENTION DETAILS

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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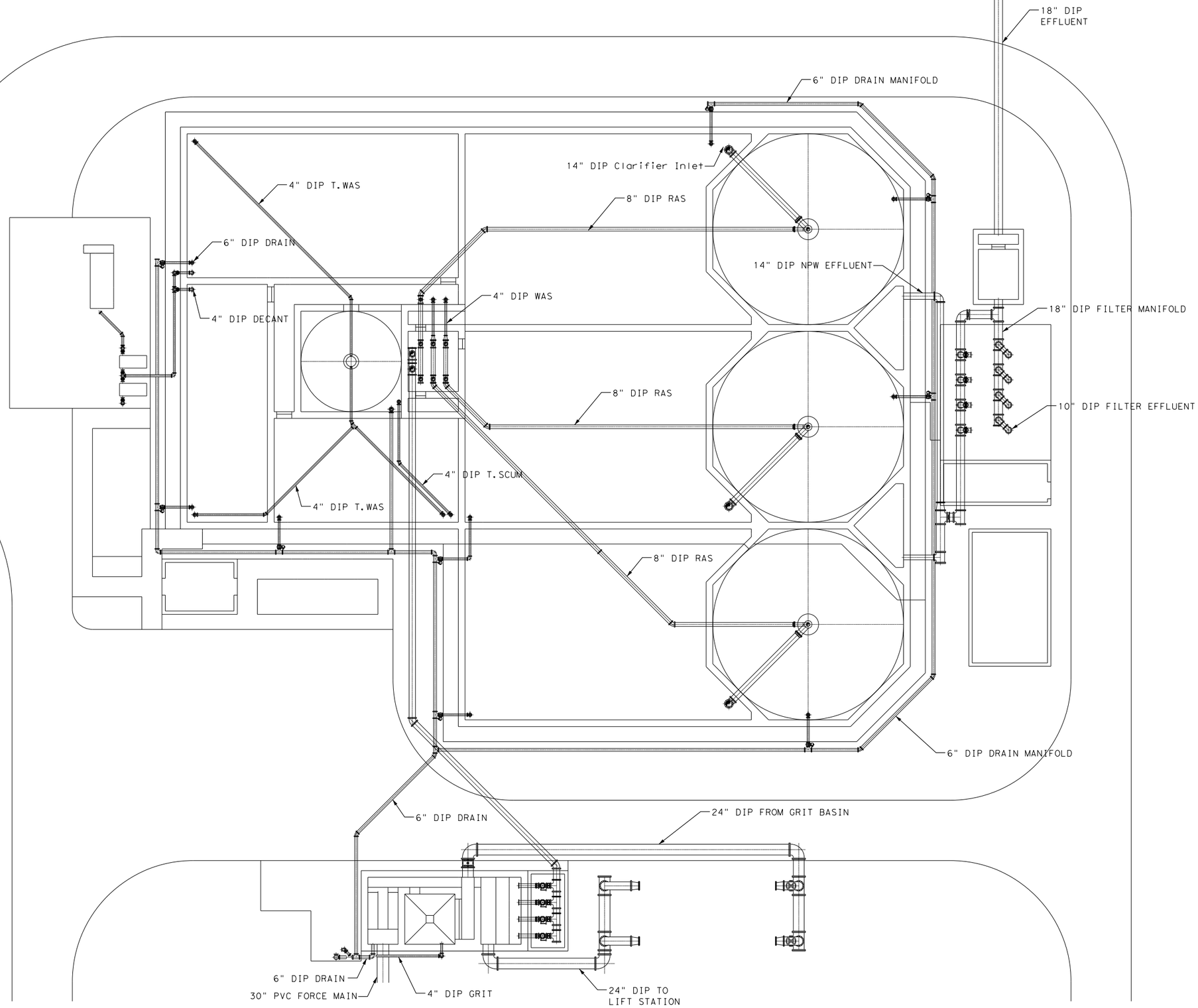

STATE OF TEXAS
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86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT YARD PIPING

PORT OF BROWNSVILLE
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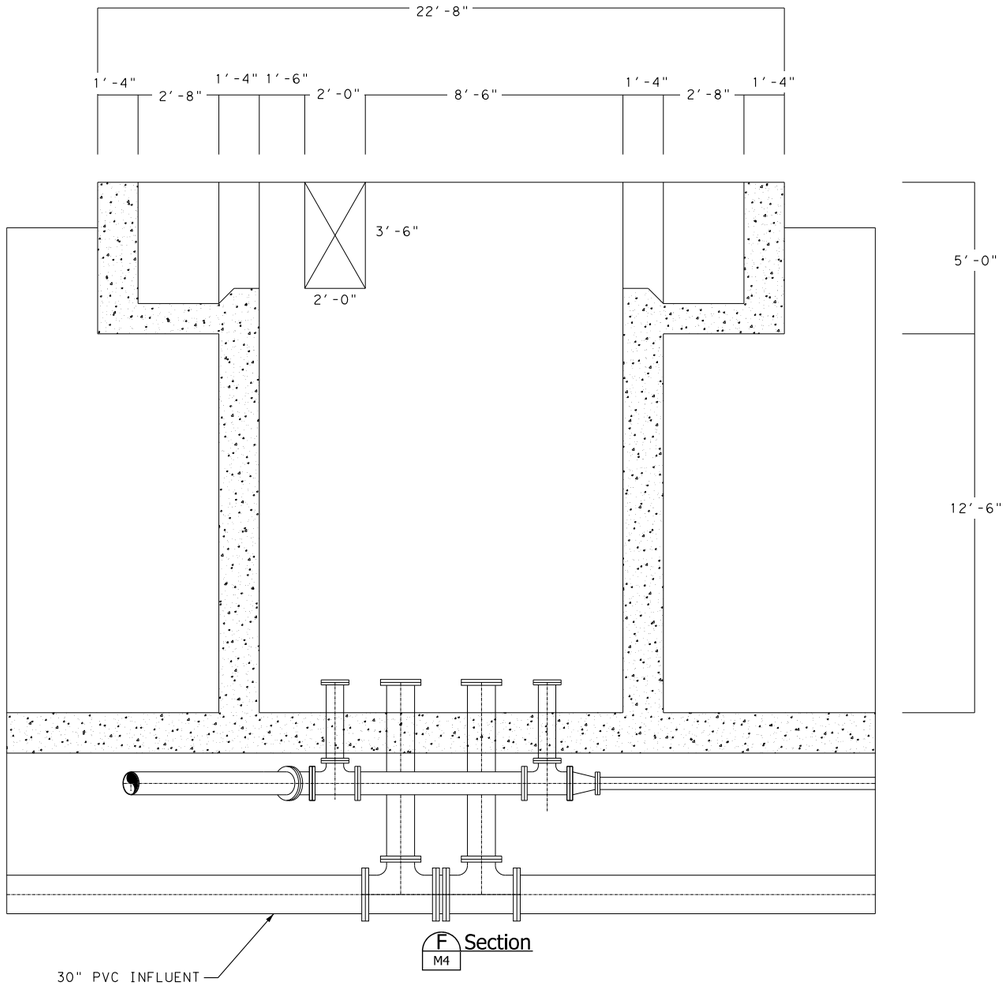

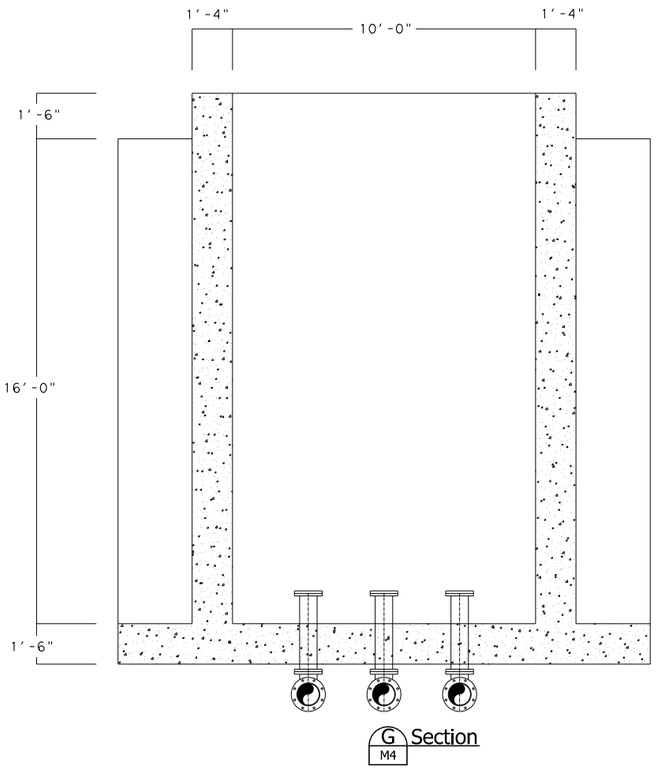

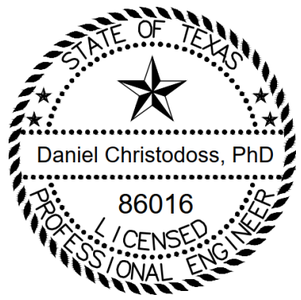

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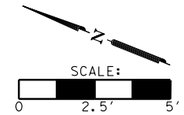

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
RAPID MIX

PORT OF BROWNSVILLE
the port that works

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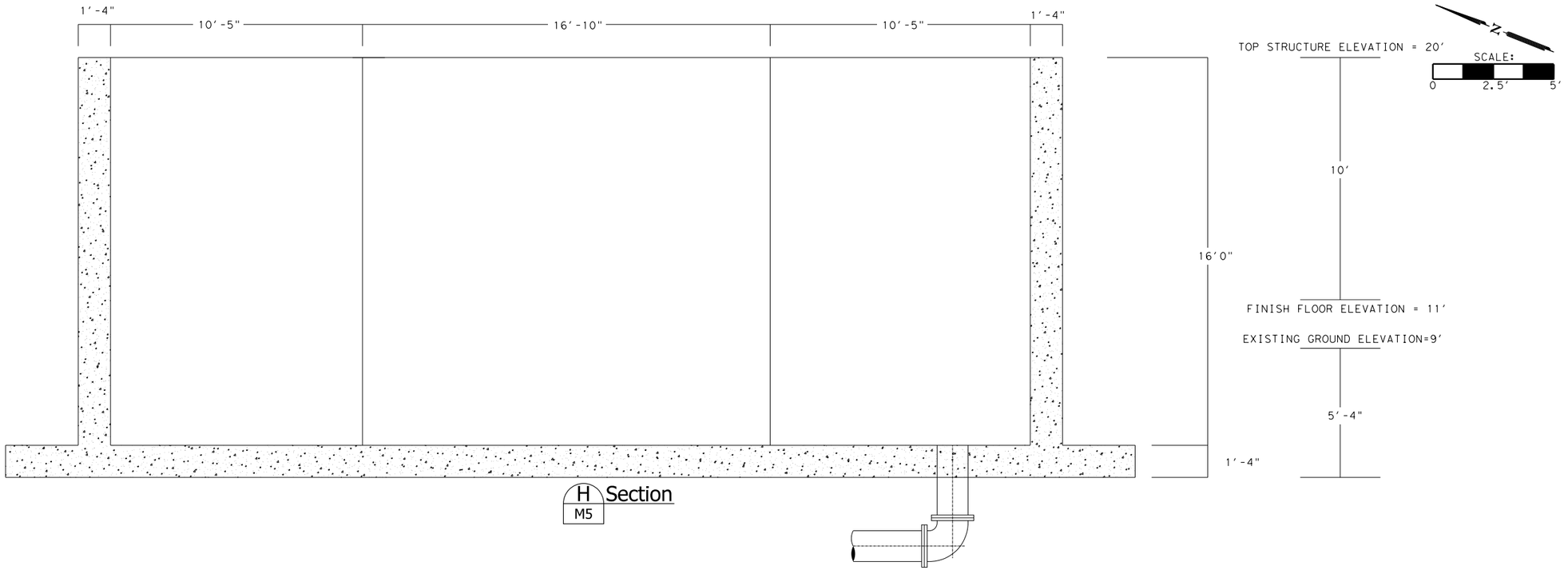

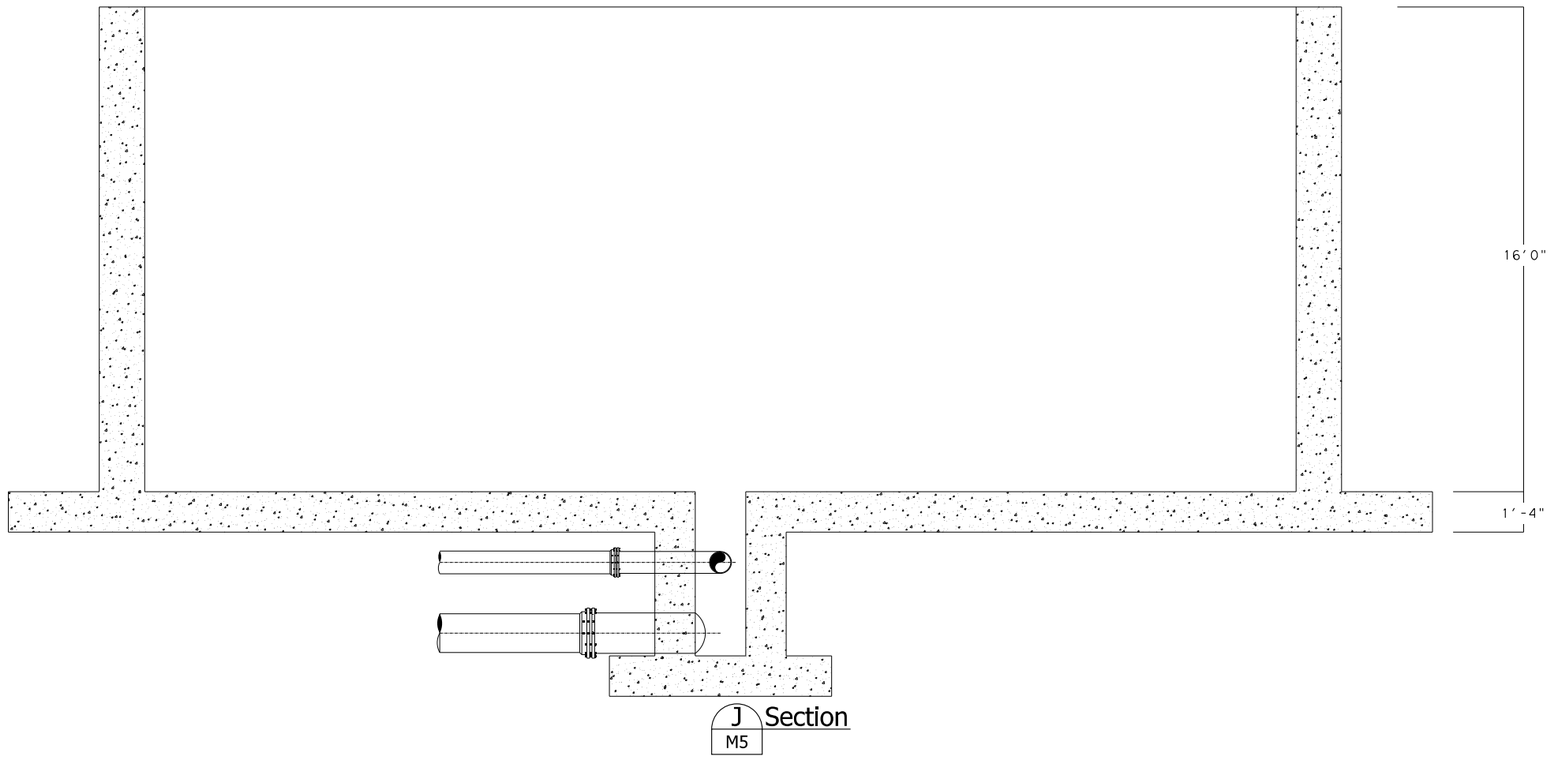

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
AERATION AND CLARIFER

PORT OF BROWNSVILLE
the port that works

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86016
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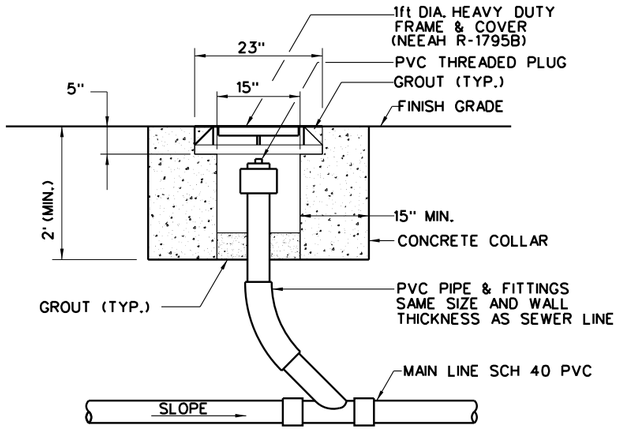
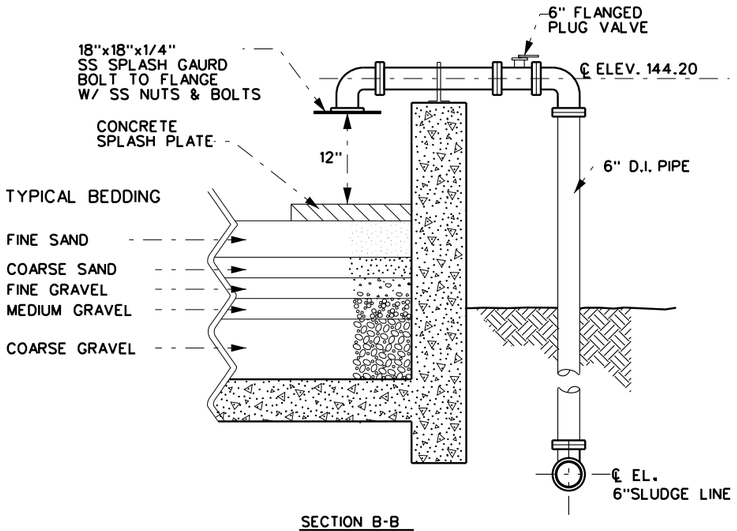


CLEAN OUT DETAIL



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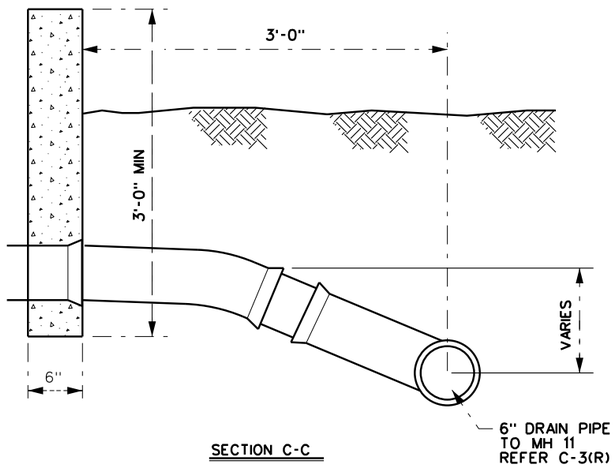

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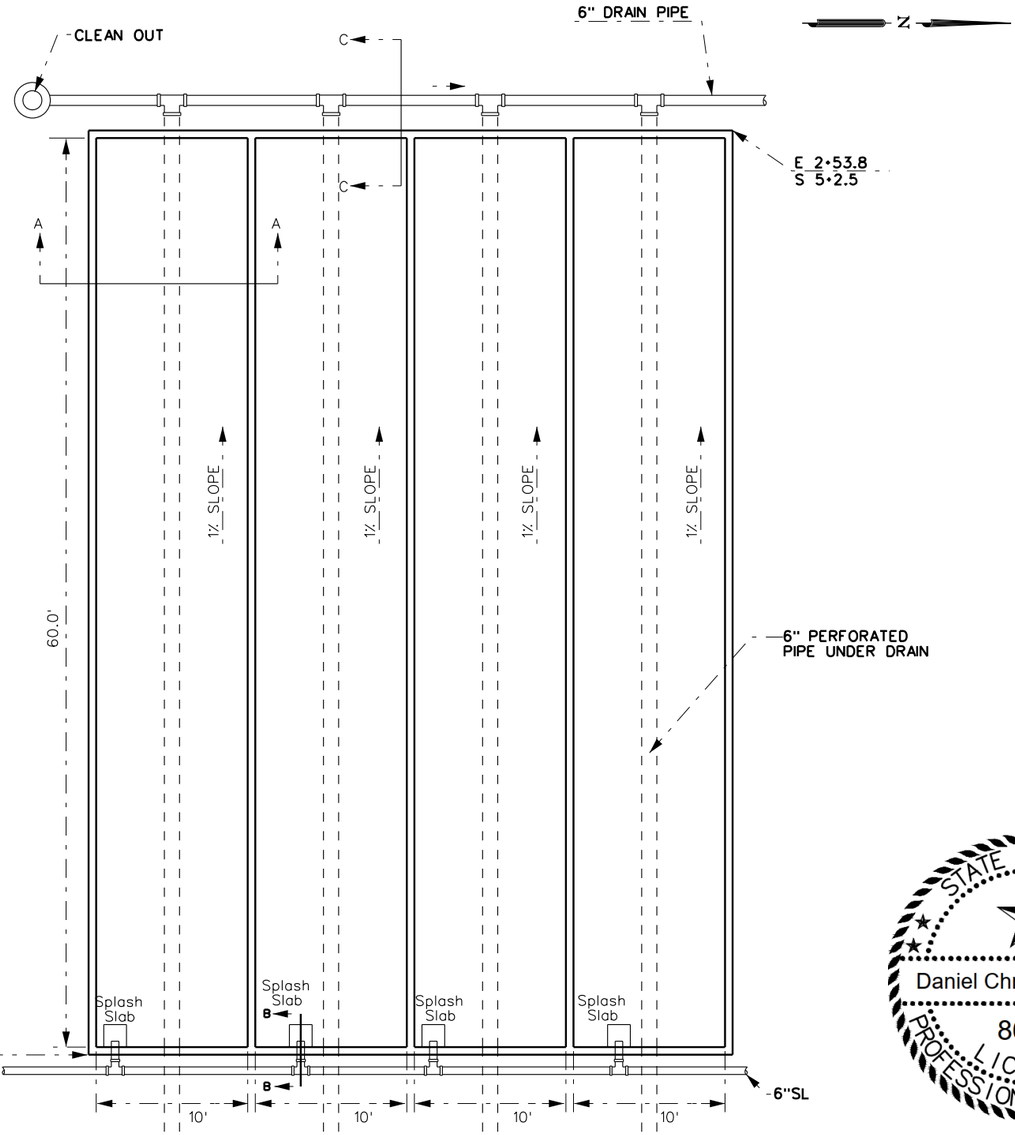
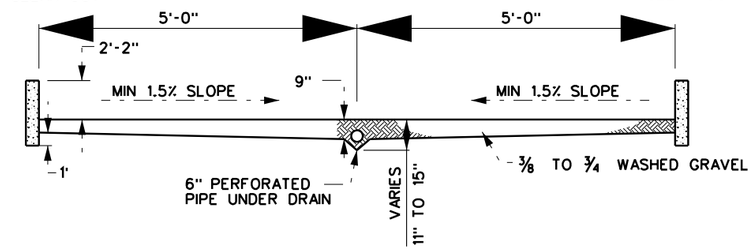
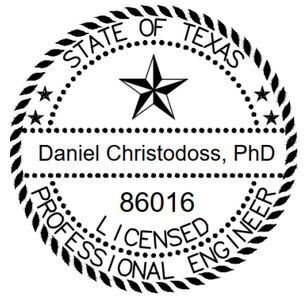


PLAN VIEW



SECTION A-A

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SAND BEDS SHEET #1



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PORT OF BROWNSVILLE
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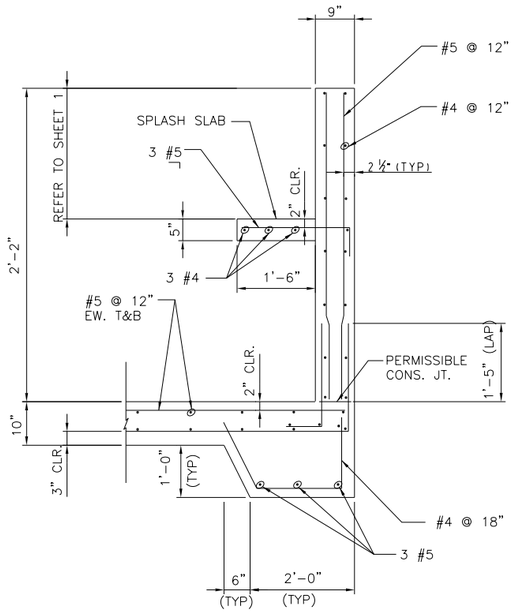

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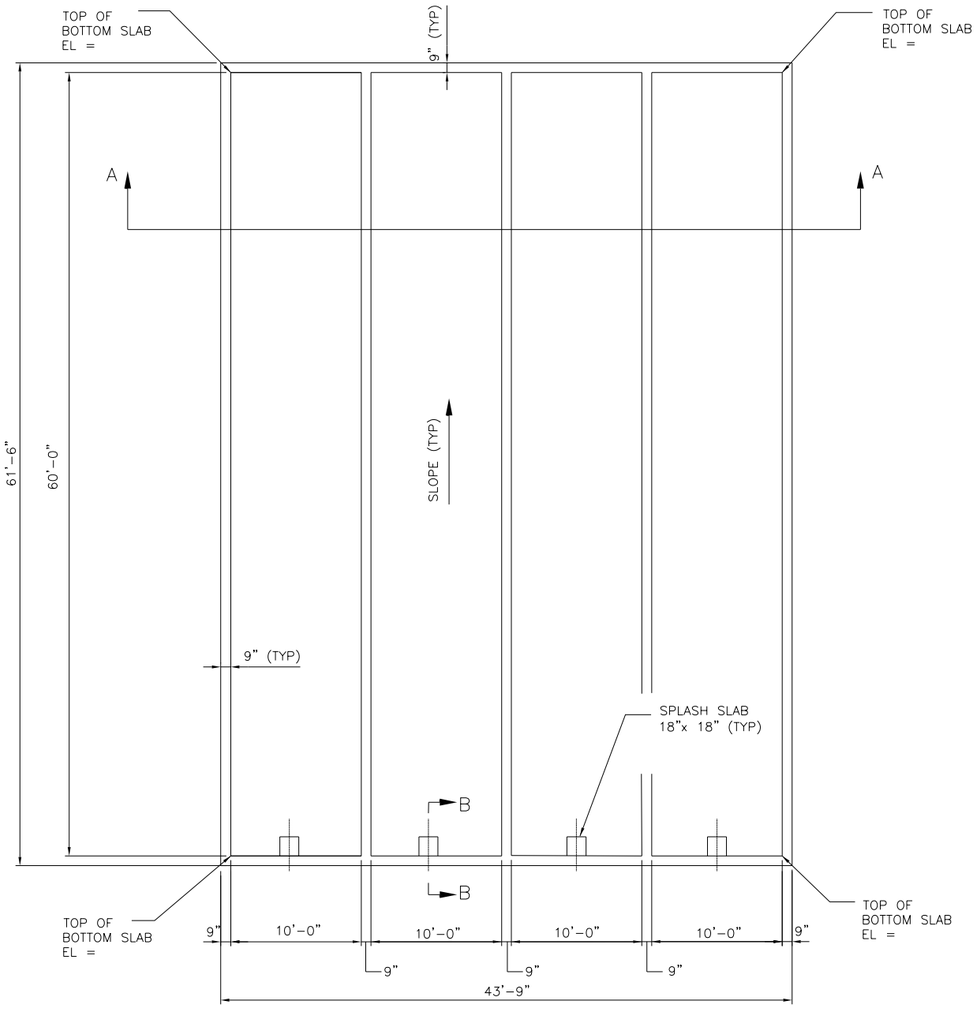

PLAN VIEW

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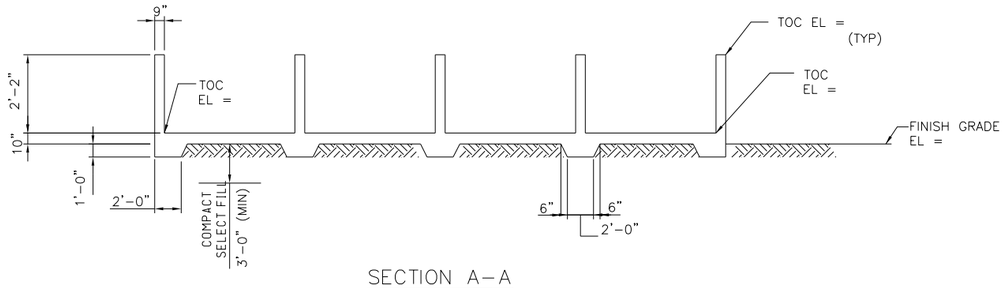
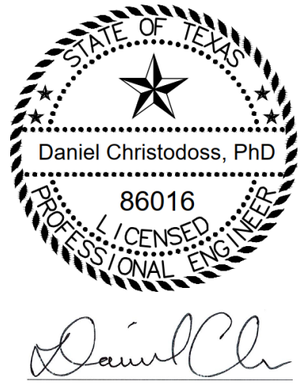


SECTION A–A

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SAND BEDS SHEET #2



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PORT OF BROWNSVILLE
the port that works

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YOUR RELIABLE PARTNER

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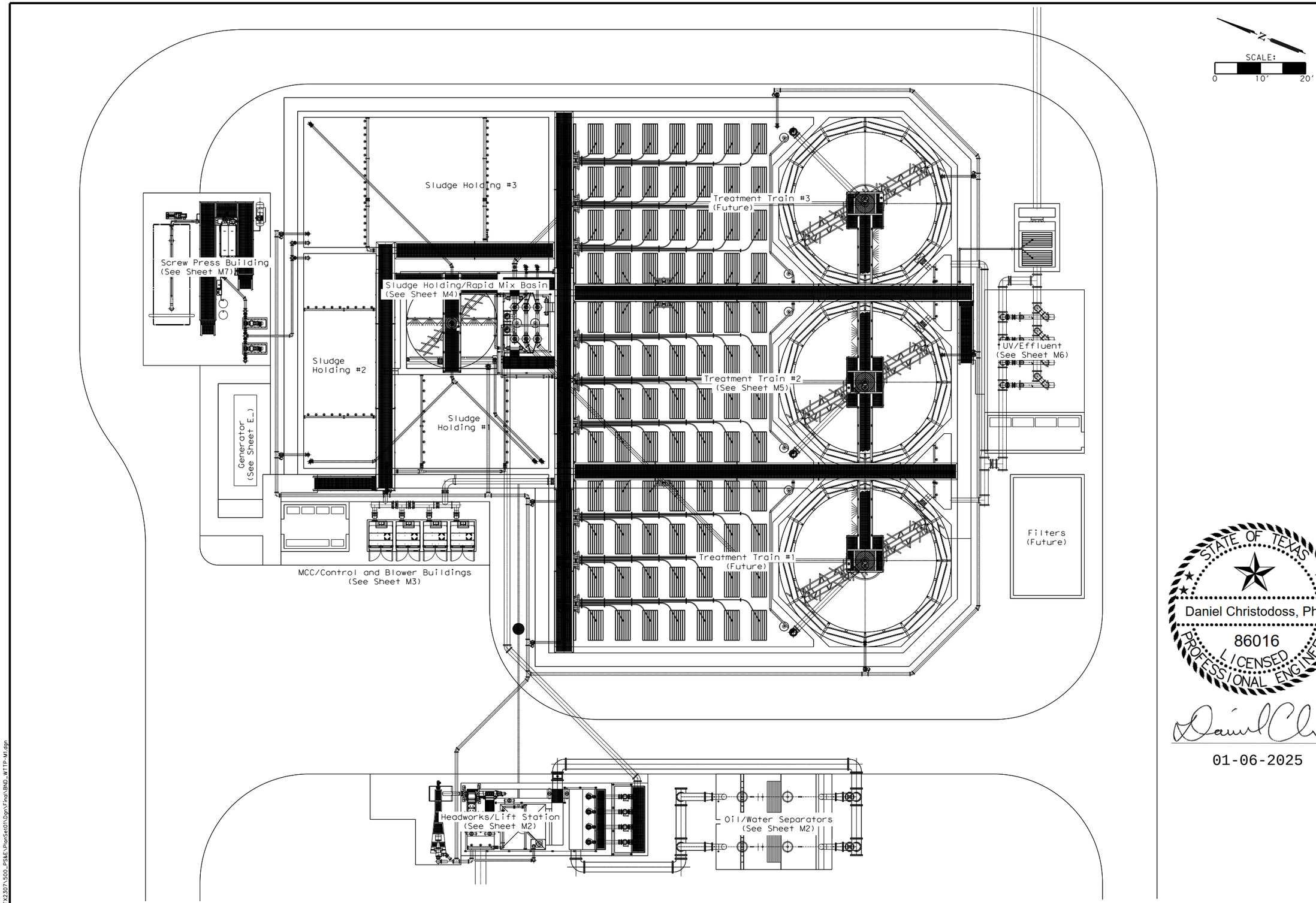

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT OVERALL PLANT

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

PORT OF BROWNSVILLE
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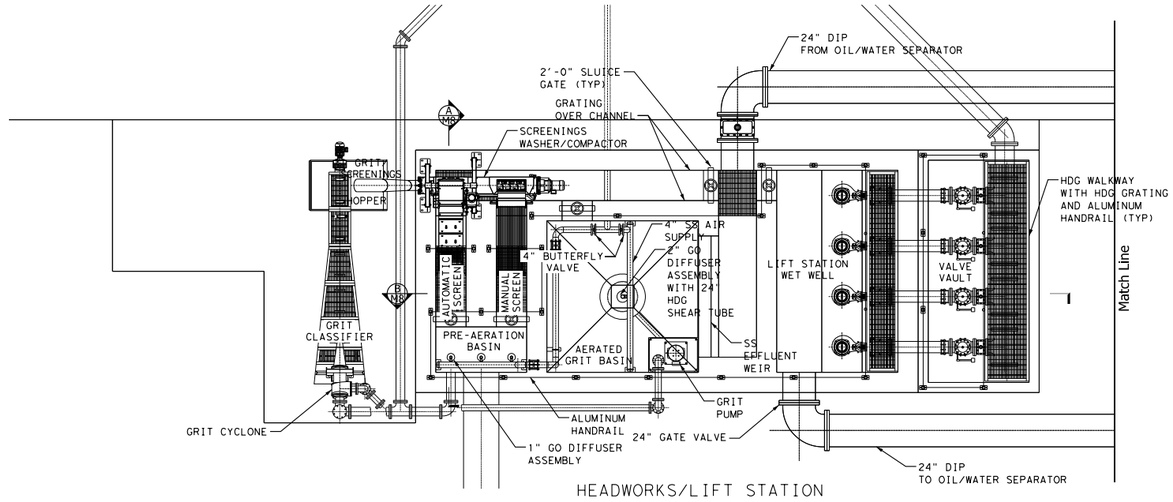
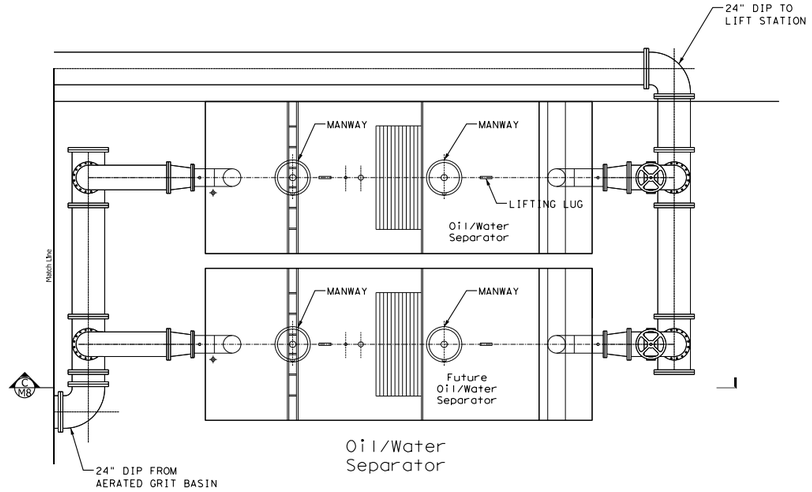


HEADWORKS/LIFT STATION



Oil/Water
Separator

SCALE:
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STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
HEADWORKS/LIFT STATION/ OIL/WATER

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:	___	___
SHEET NUMBER	M2	

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11/13/2024
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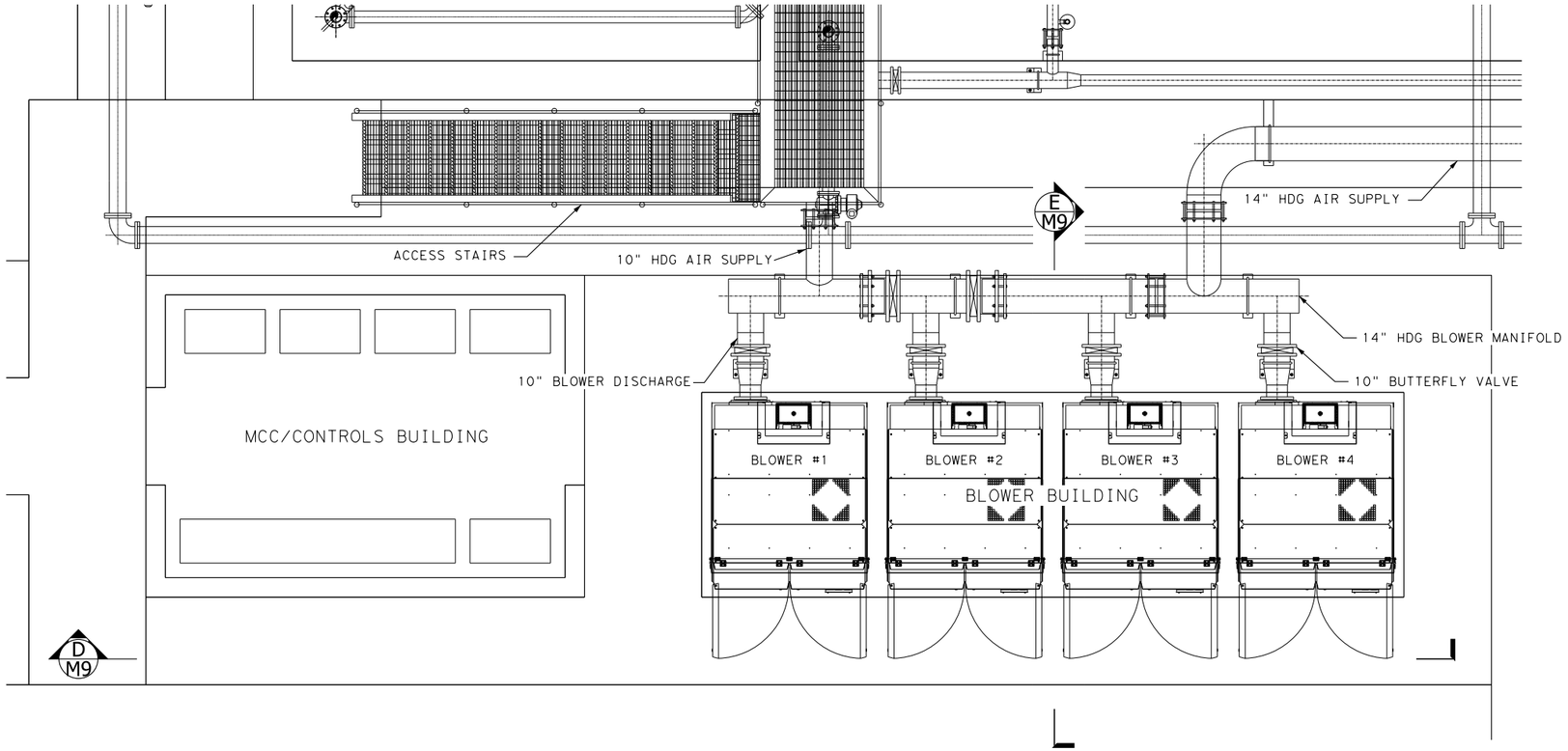

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
MCC/CONTROL AND BLOWER BUILDINGS

PORT OF BROWNSVILLE
the port that works

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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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SHEET NUMBER M3

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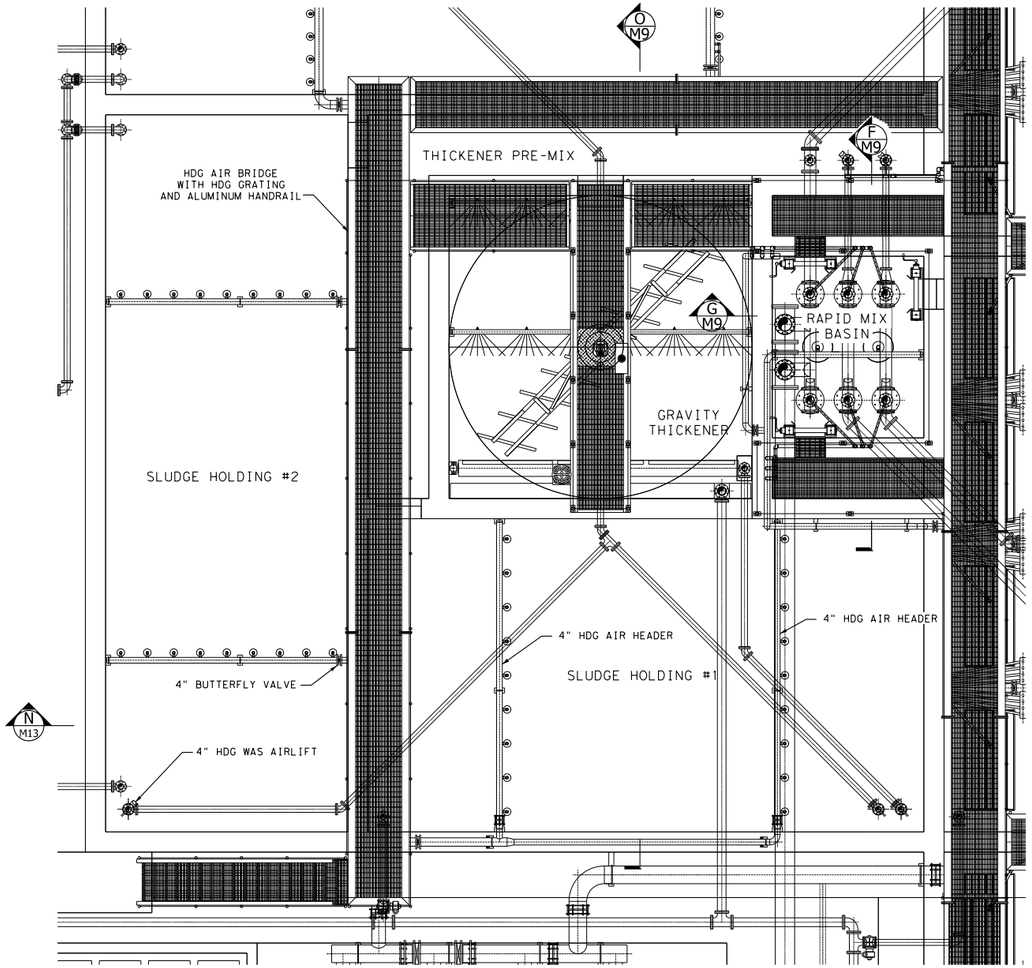

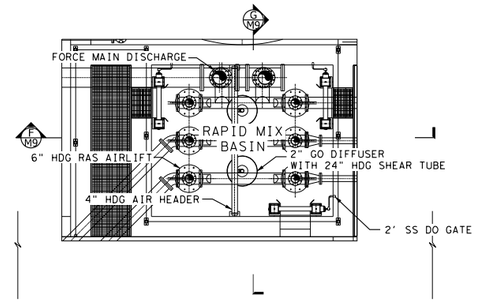

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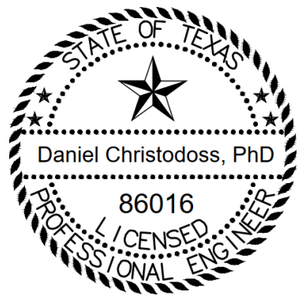
PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SLUDGE HOLDING/RAPID MIX BASIN



01-06-2025

PORT OF BROWNSVILLE
the port that works

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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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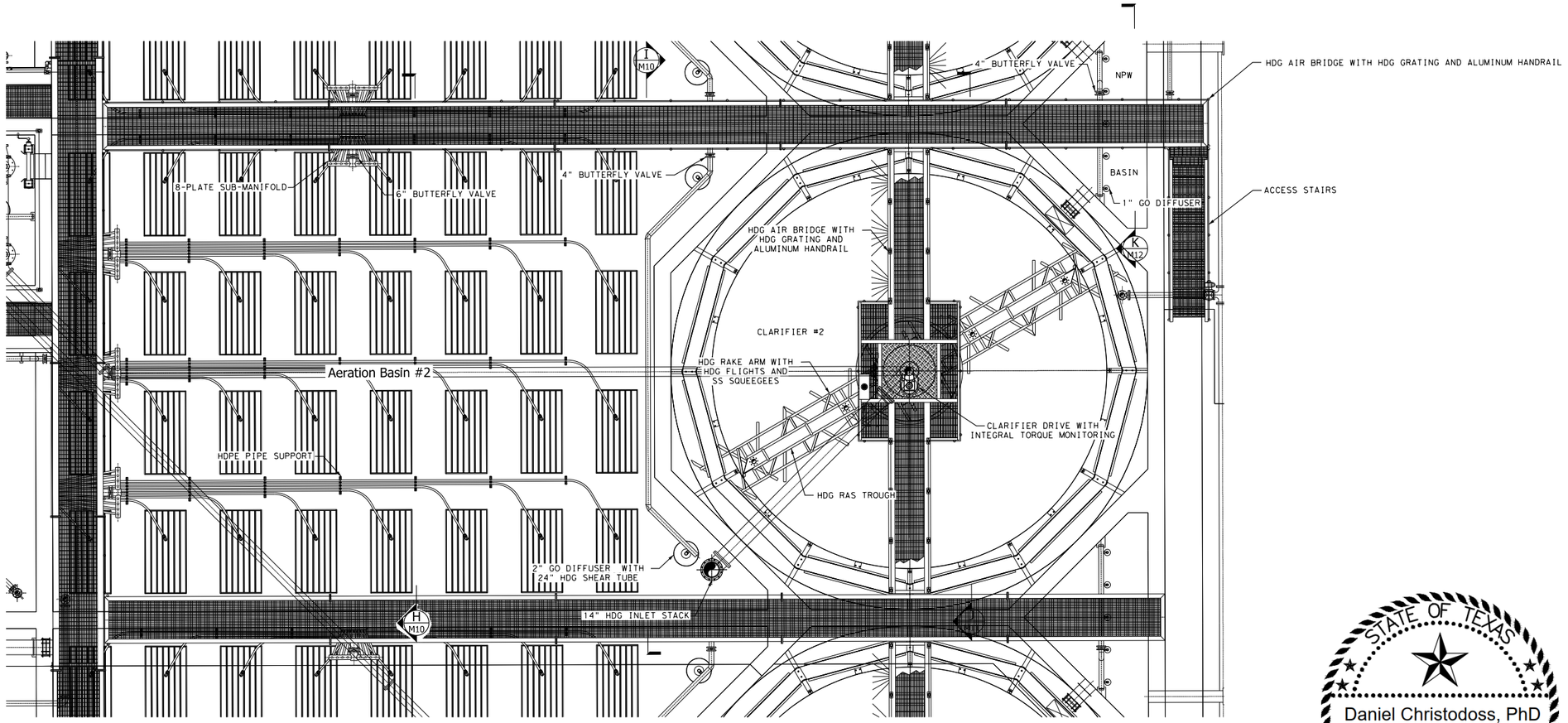

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SCALE:
0 5' 10'

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
TREATMENT TRAIN # 2

PORT OF BROWNSVILLE
the port that works

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NOTES	NAME	DATE
SURVEY BY		
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CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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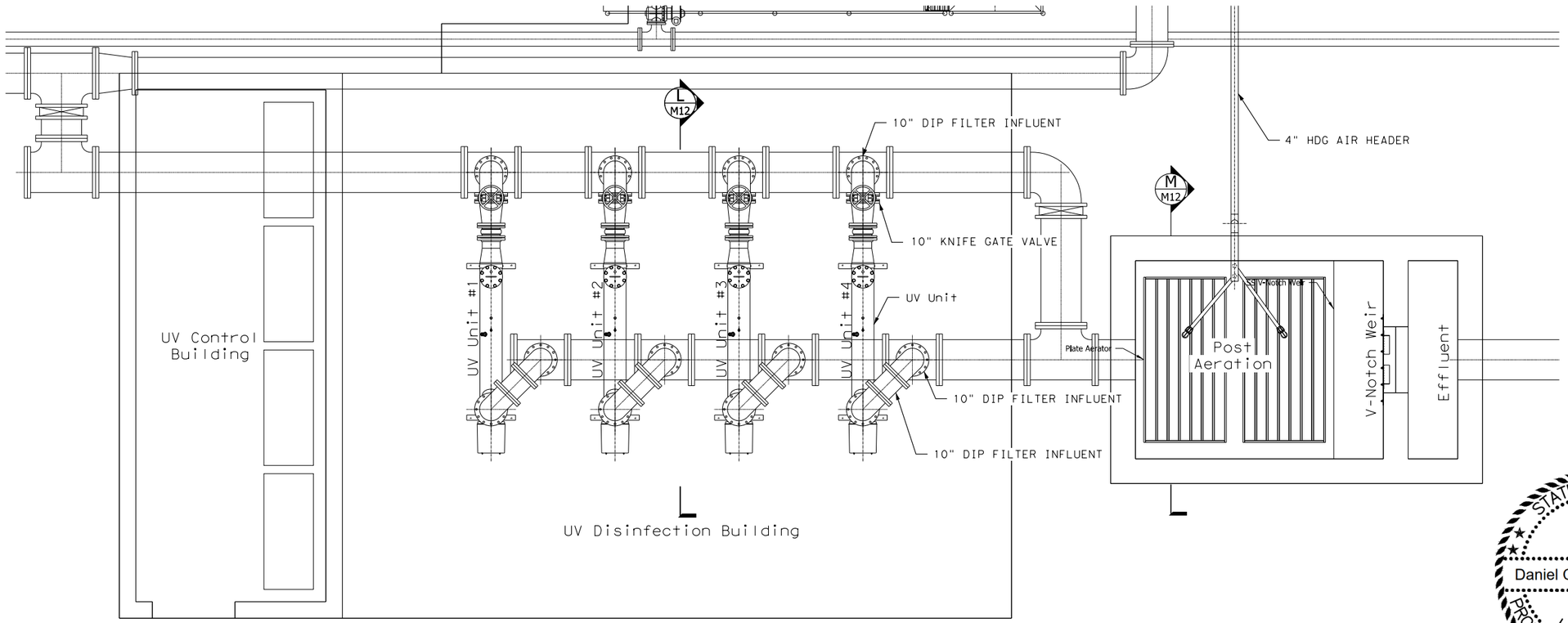

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SCALE:
0 2.5' 5'

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
UV DISINFECTION / EFFLUENT

PORT OF BROWNSVILLE
the port that works

RRP
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01-06-2025

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

SHEET NUMBER M6

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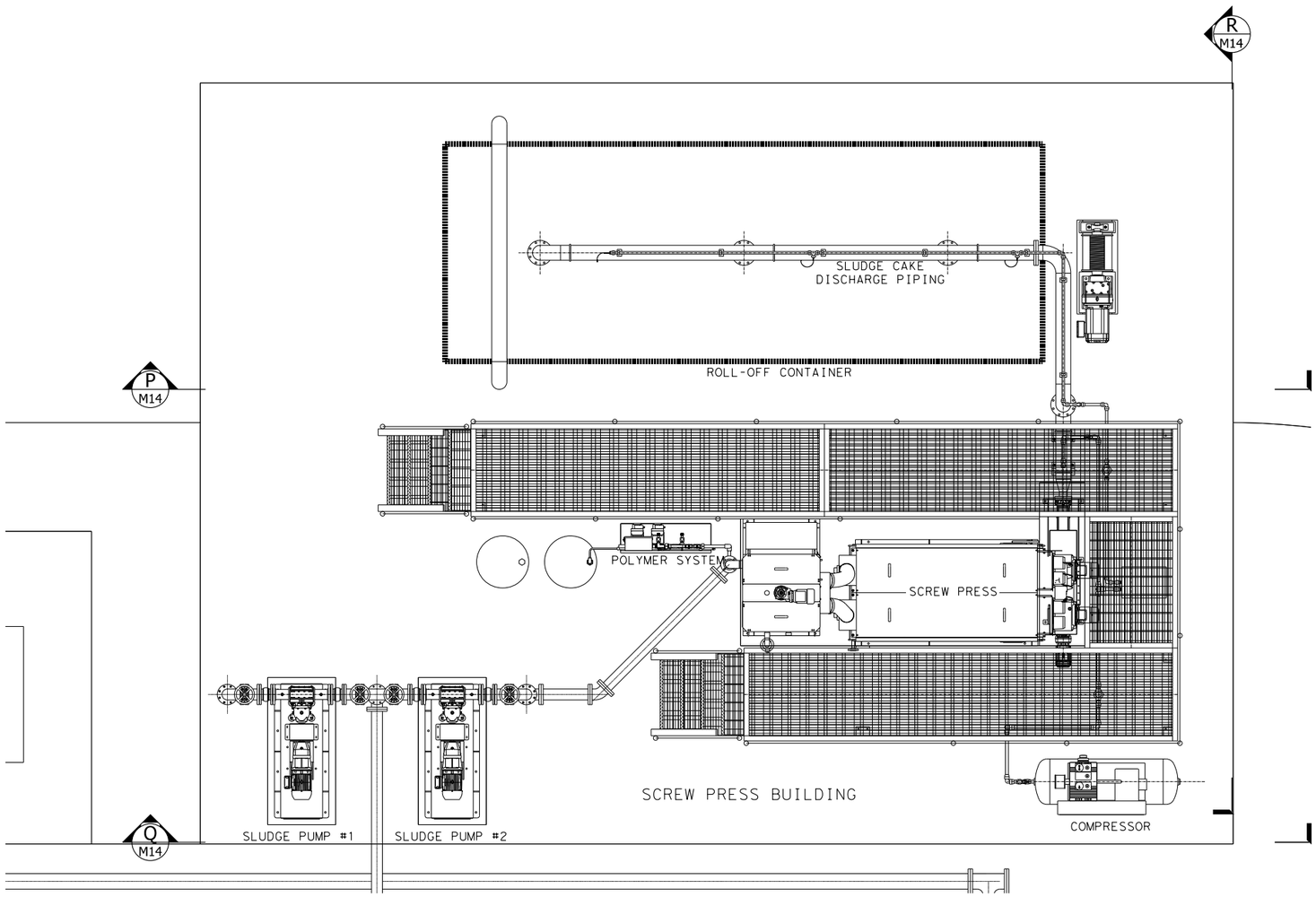

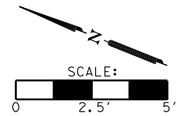

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SCREW PRESS BUILDING

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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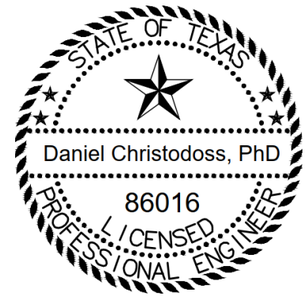

01-06-2025

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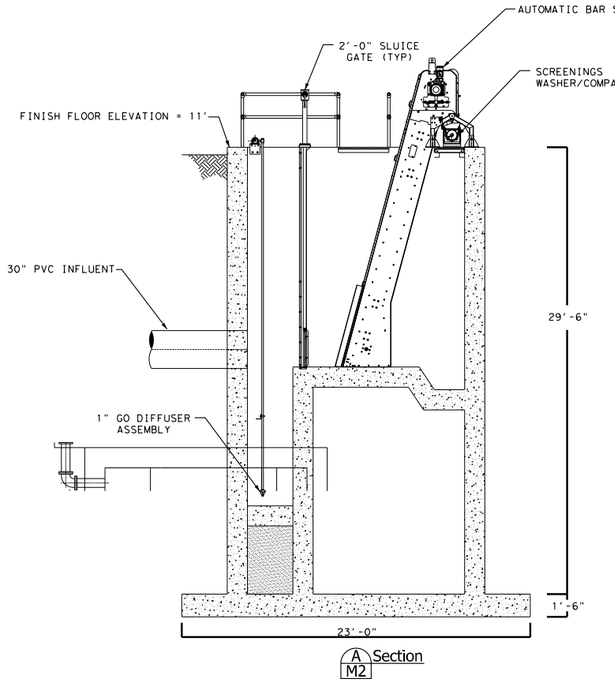

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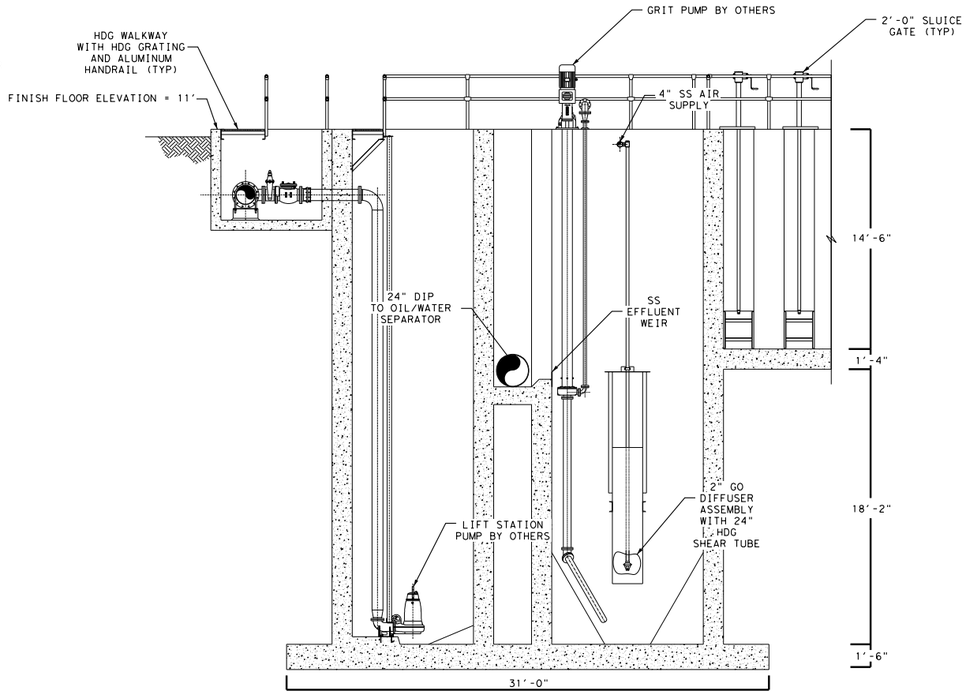

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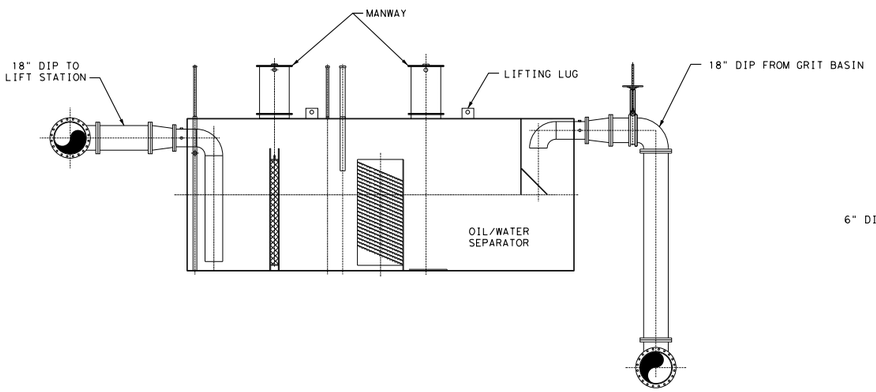
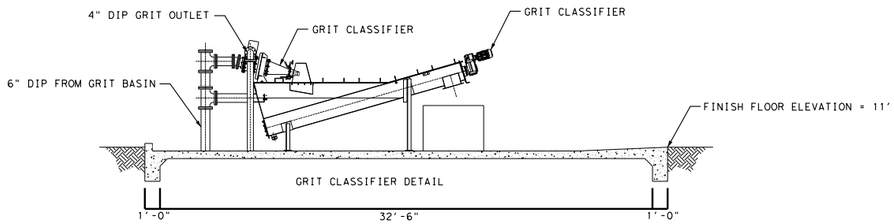
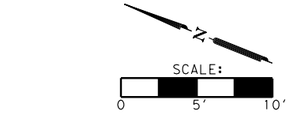


C Section
M2





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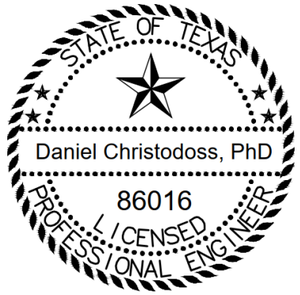

01-06-2025

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
HEADWORKS/ LIFTSTATION OIL/WATER

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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11/13/2024
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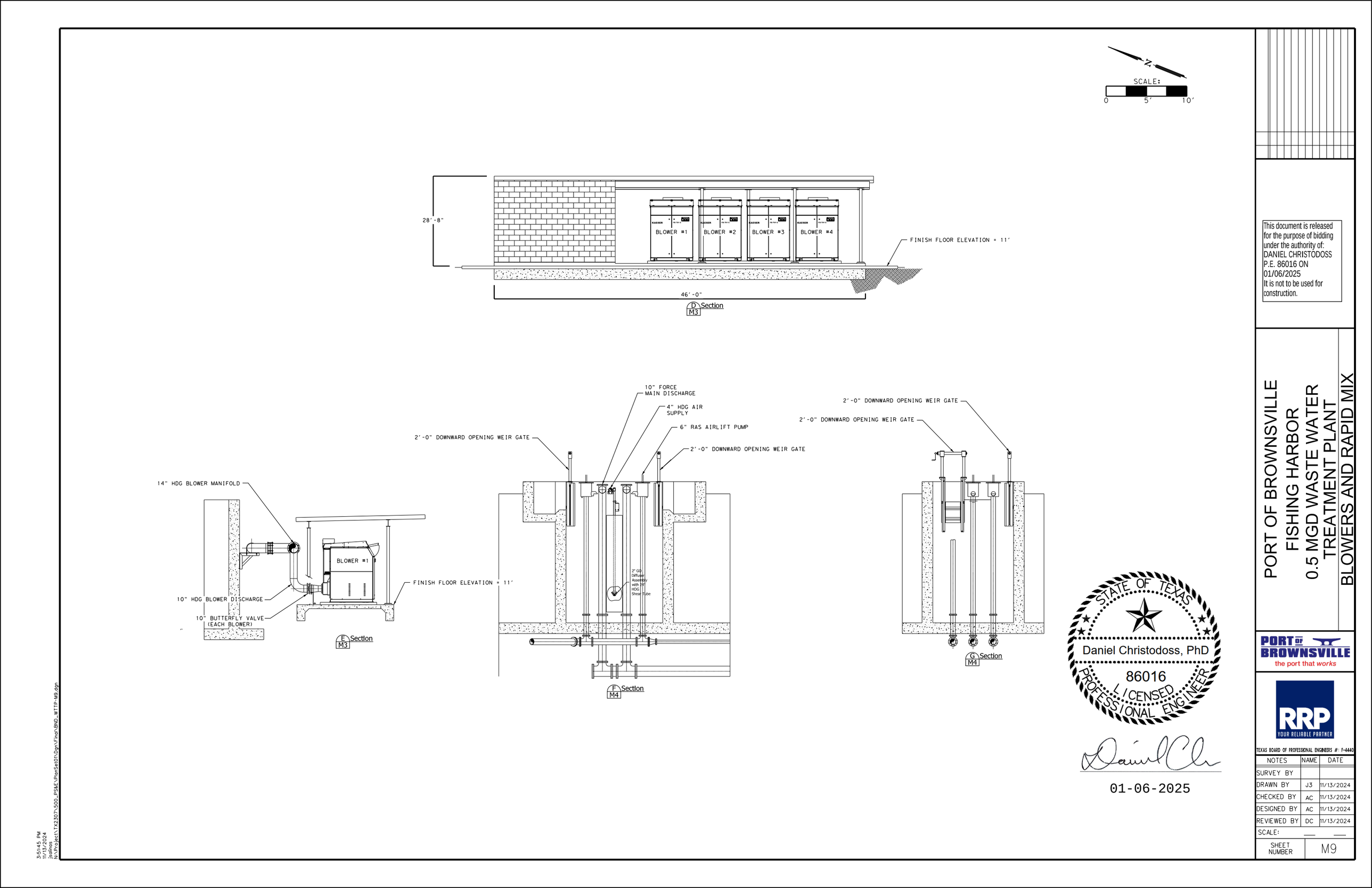
D Section M3

F Section M4

E Section M3

G Section M4



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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT BLOWERS AND RAPID MIX

PORT OF BROWNSVILLE
the port that *works*

STATE OF TEXAS
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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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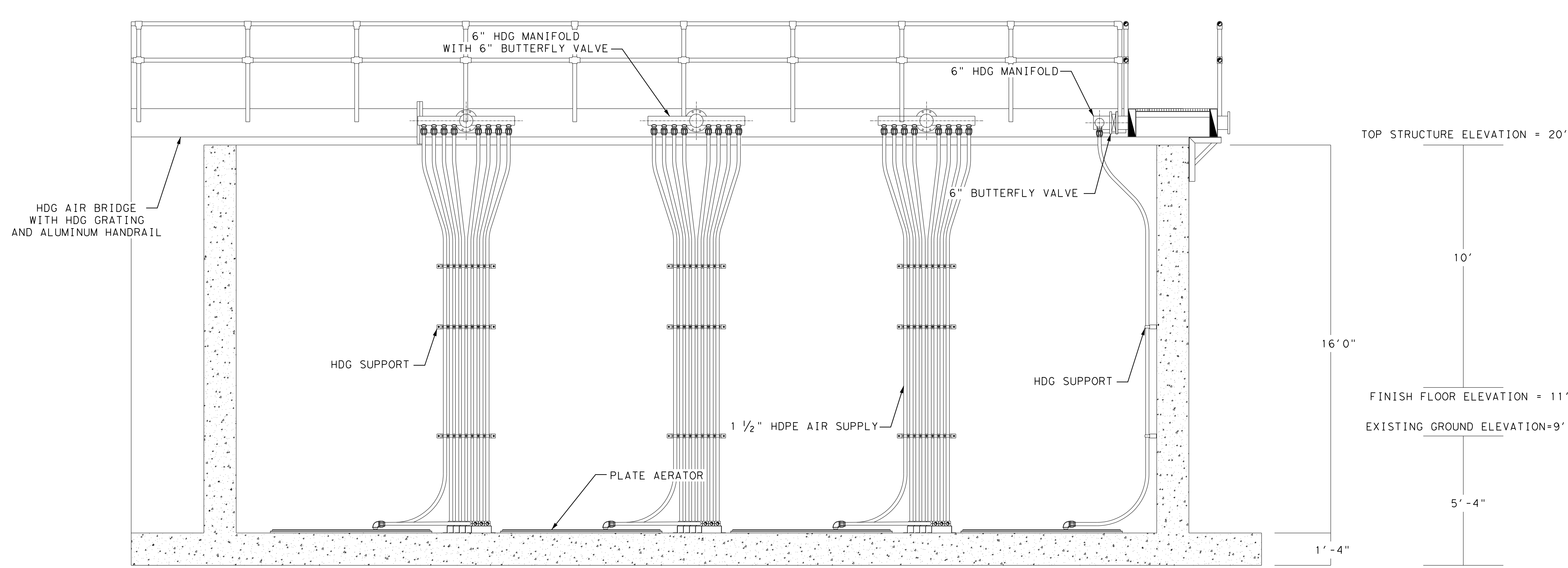

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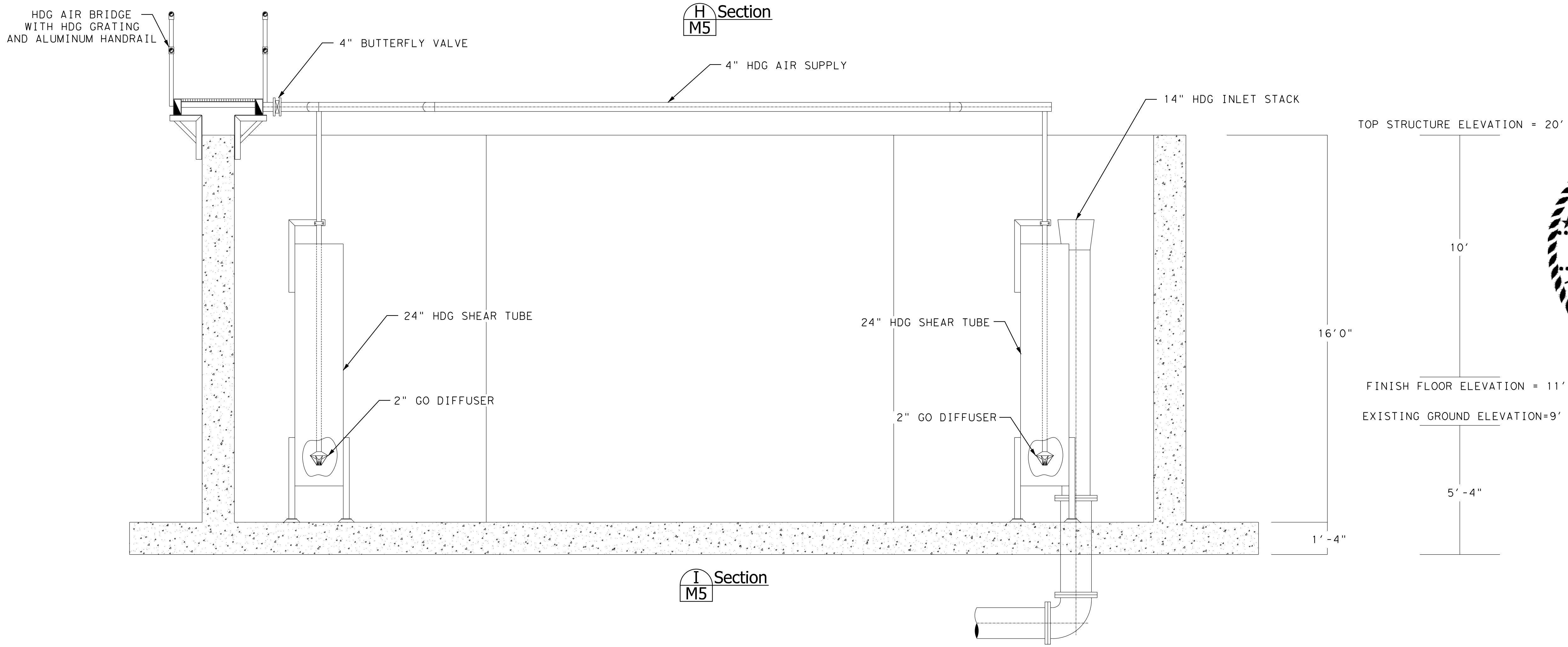

I
M5
Section

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
AERATION

PORT OF BROWNSVILLE
the port that *works*

RRP
YOUR RELIABLE PARTNER

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NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

SHEET NUMBER M10

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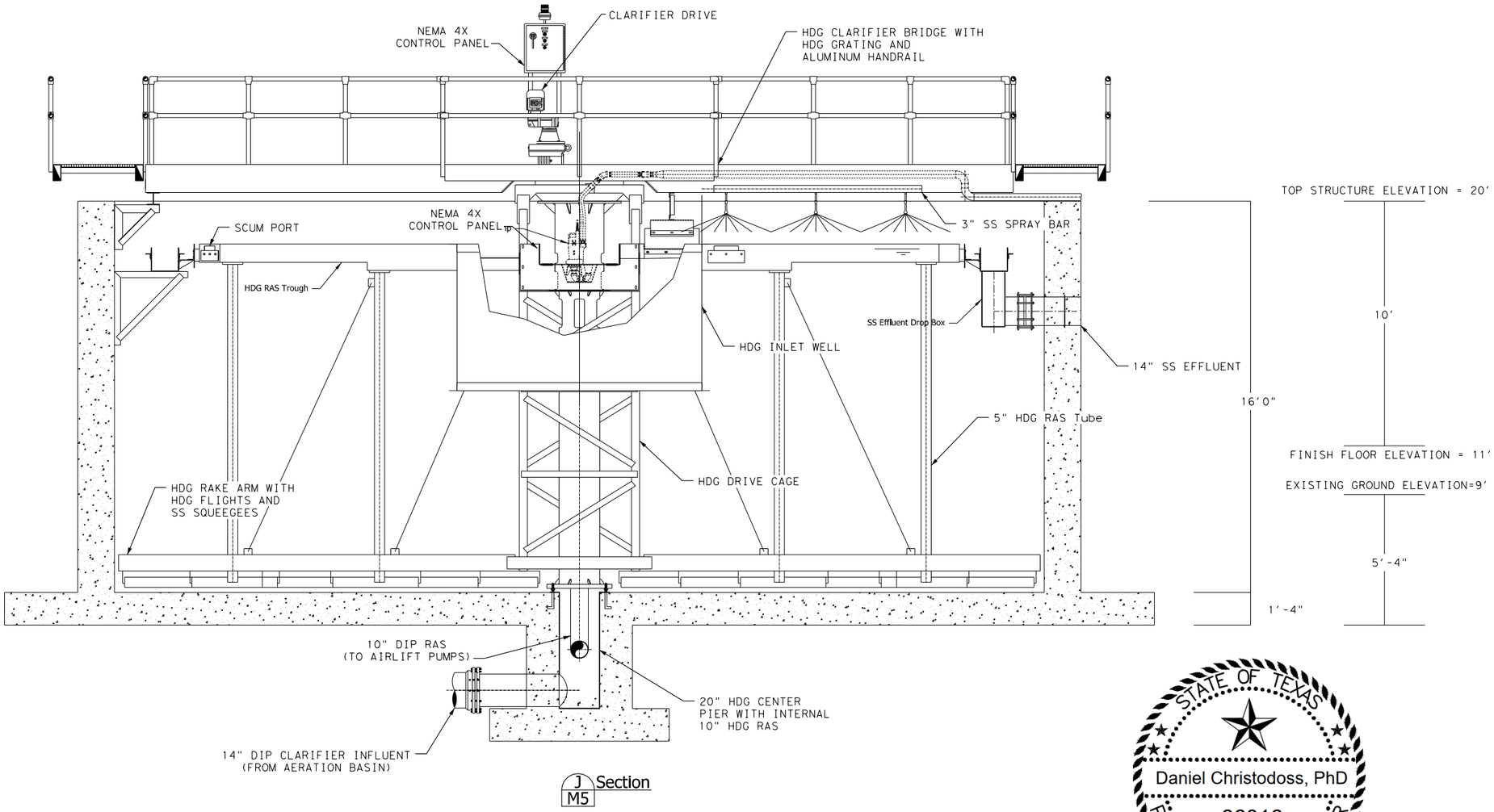
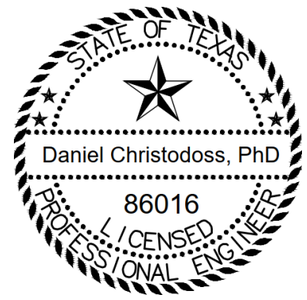


J / M5 Section



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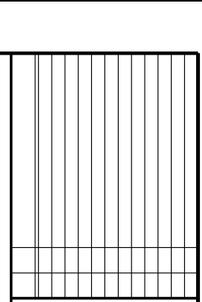

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT CLARIFIER

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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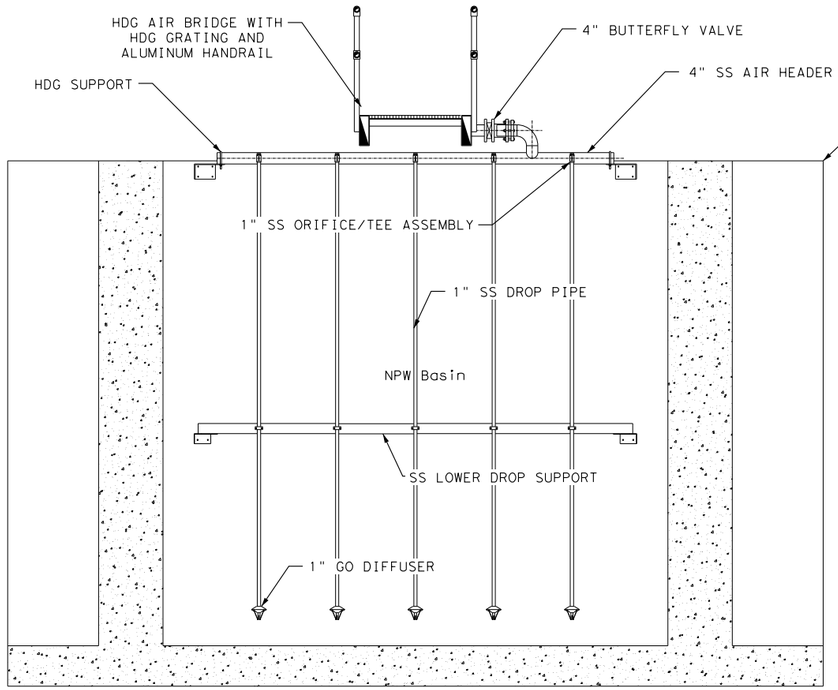

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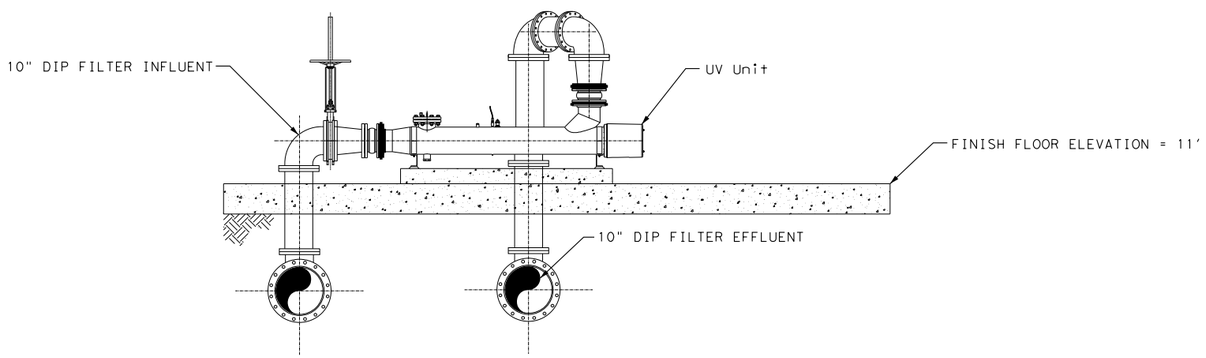

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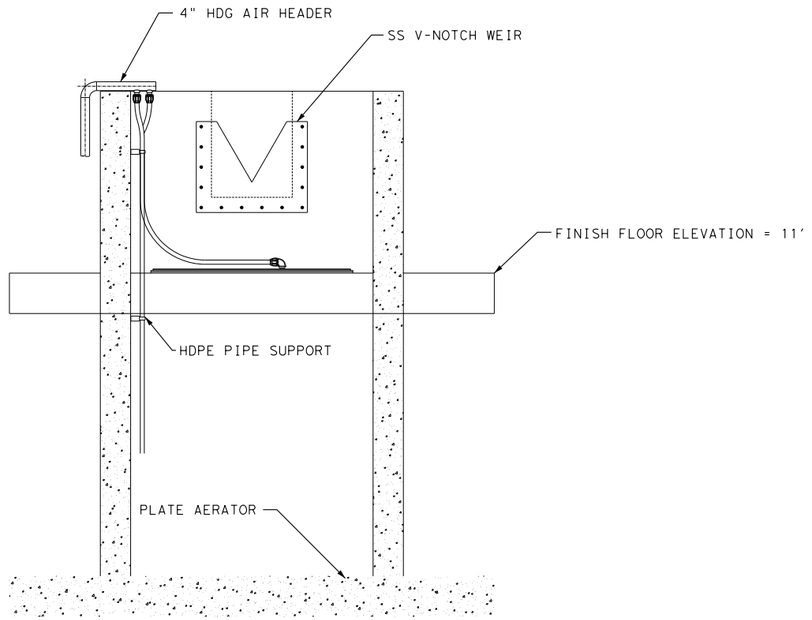

M M6 Section

SCALE: 0 2.5' 5'

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01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
NPW, UV, AND EFFLUENT

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	J3	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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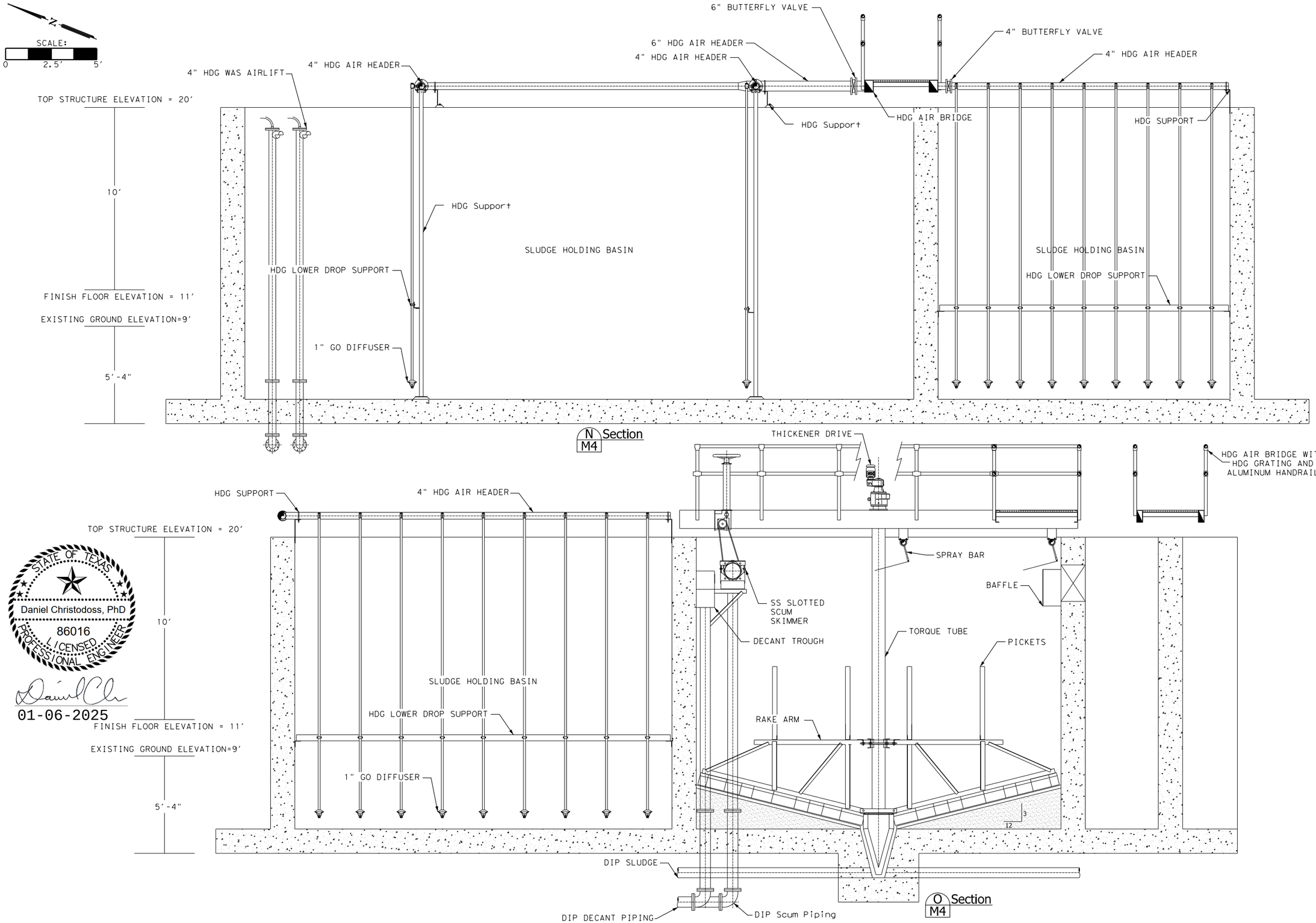

N Section M4

O Section M4

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01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
SOLIDS HANDLING

PORT OF BROWNSVILLE
the port that *works*

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
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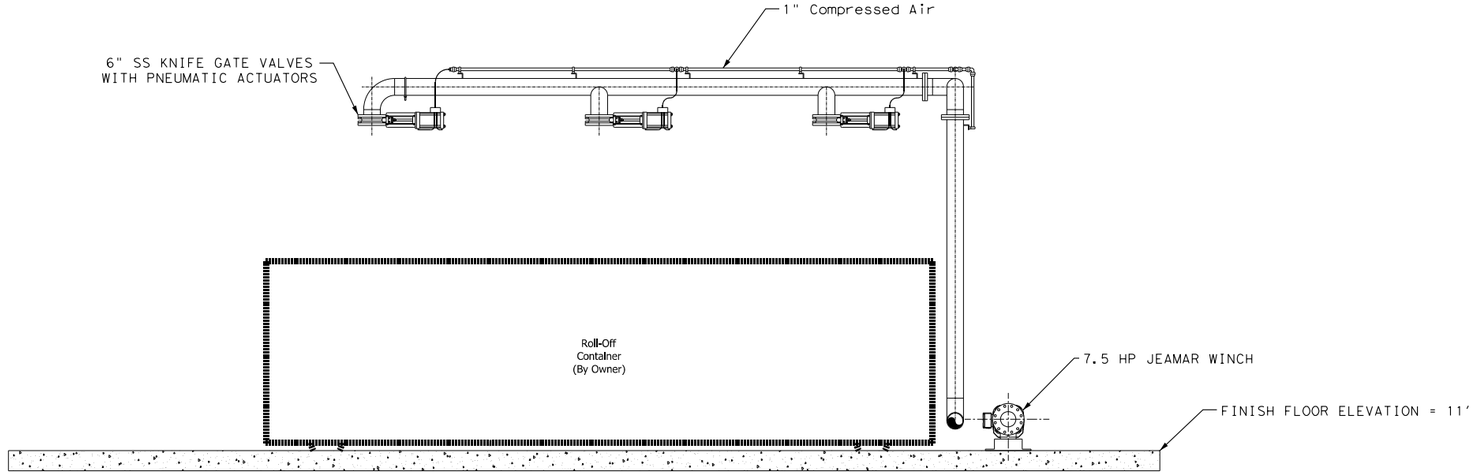
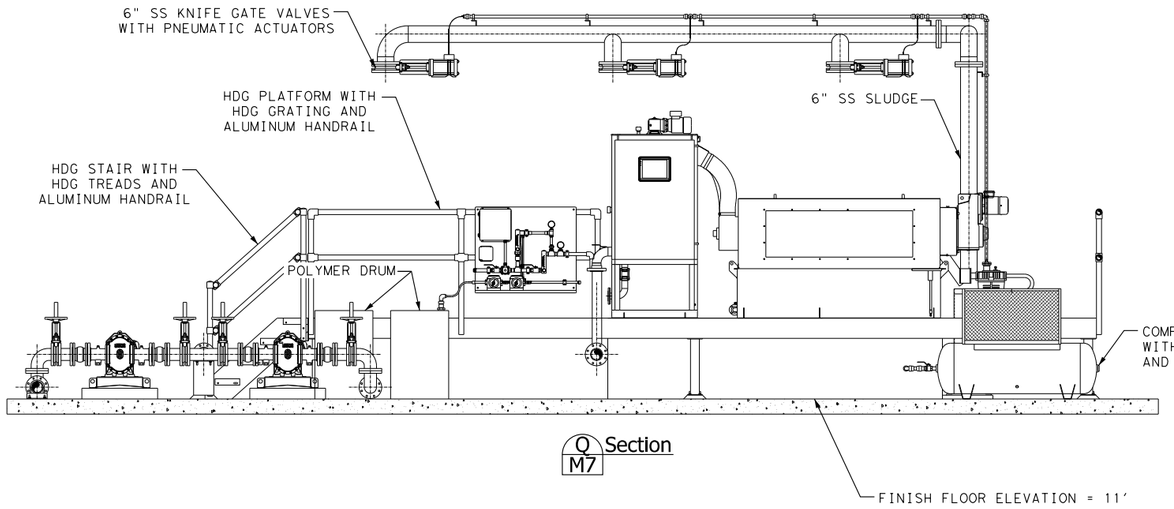
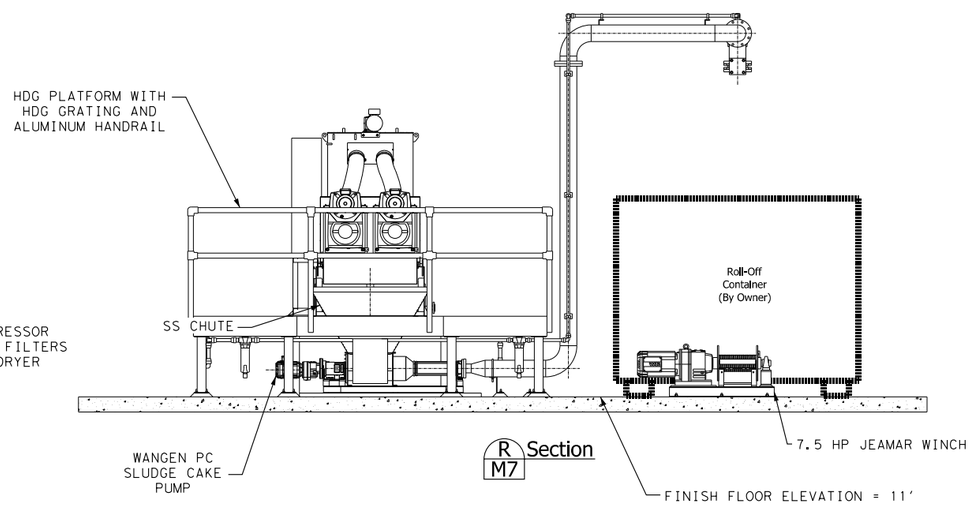
SHEET NUMBER M13



P M7 Section



Q M7 Section



R M7 Section

N

SCALE:
0 2.5' 5'

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01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
SCREW PRESS

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	J3	11/13/2024
CHECKED BY	AC	11/13/2024
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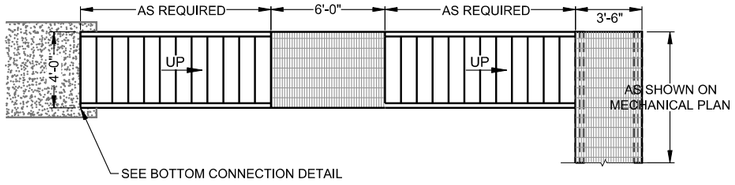
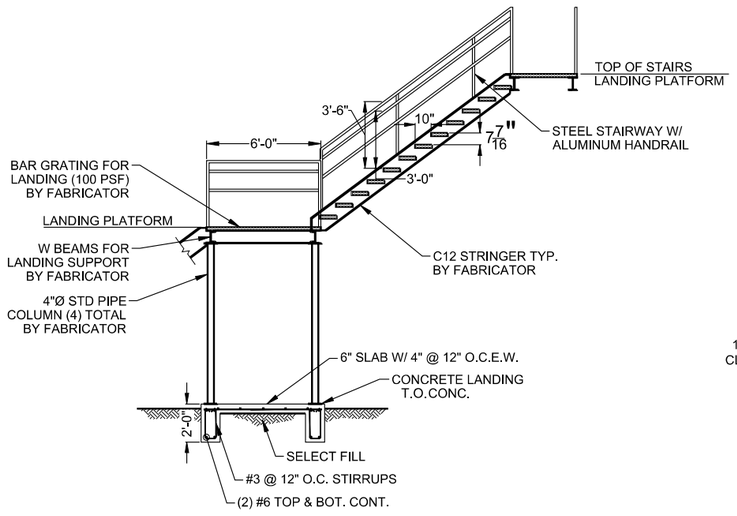
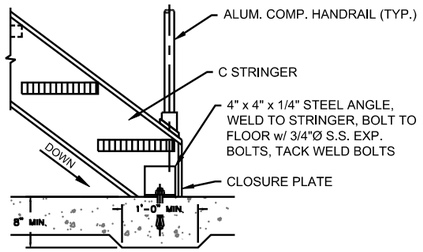




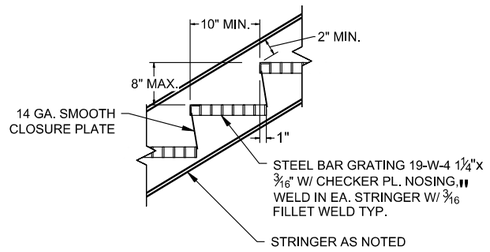
1 TYPICAL STEEL ACCESS STAIRWAY DETAIL
1/4" = 1'-0"



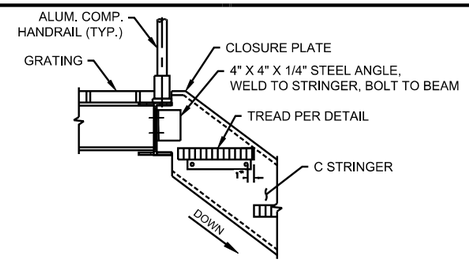
BOTTOM CONNECTION DETAIL

NOTE:

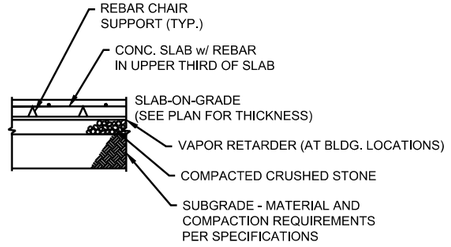
1. THE ABRASIVE NOSING ON ALL STAIRWAYS SHALL BE PAINTED SAFETY YELLOW.



STAIR DETAIL



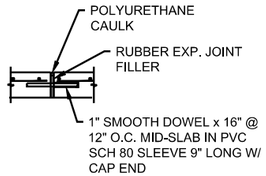
TOP CONNECTION DETAIL



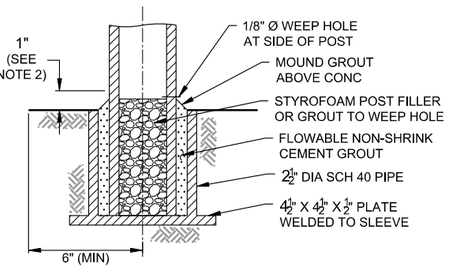
NOTES:

1. ISOLATION JOINTS (I.J.) OR CONSTRUCTION JOINTS (XJ) LOCATED AS SPECIFIED ON CONSTRUCTION DRAWINGS BY THE ENGINEER.
2. EXPANSION JOINT (EJ) LOCATED AS SPECIFIED ON DRAWINGS.

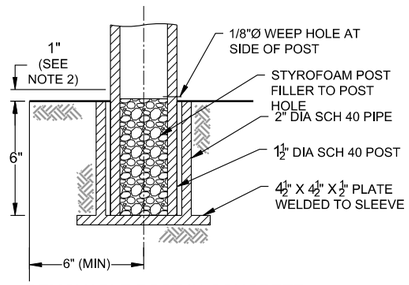
4 TYPICAL FLOOR SLAB DETAIL (ALL STRUCTURES)
SCALE: 1/2" = 1'-0"



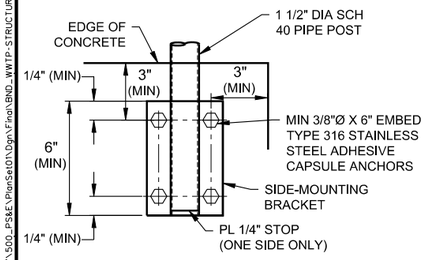
EXPANSION JOINT



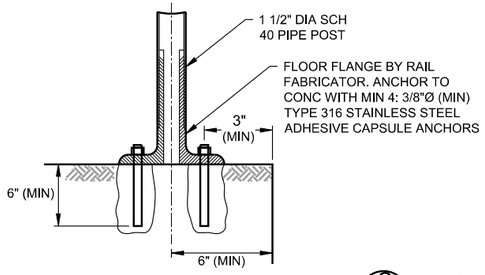
POST IN CONCRETE



REMOVABLE POST IN CONCRETE



SIDE-MOUNTED TO CONCRETE

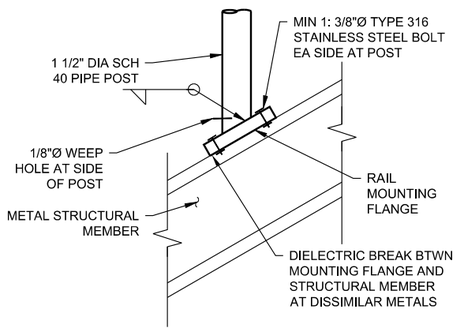


SURFACE MOUNTED TO CONCRETE

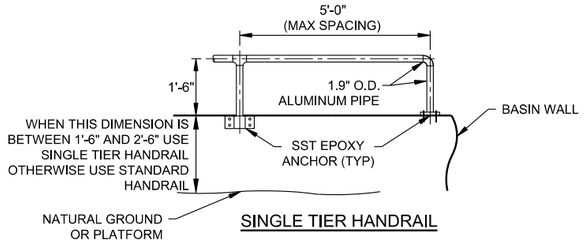
2 HANDRAIL MOUNTING DETAILS
N.T.S.

NOTES:

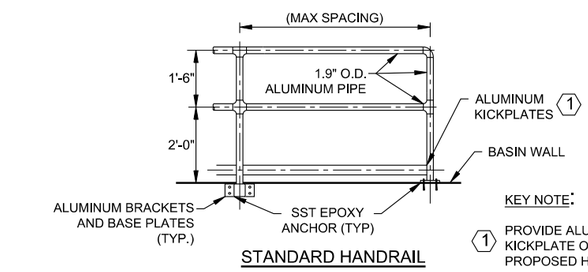
1. ALL ALUMINUM CONSTRUCTION UNLESS OTHERWISE NOTED.
2. DIP POSTS IN EPOXY PAINT AND CURE PAINT PRIOR TO POST INSTALLATION. COAT POSTS TO MIN 1" ABOVE WEEP HOLE.
3. PROVIDE SIDE-MOUNTED RAILINGS TO CONCRETE UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR SPECIFIED.
4. SIDE MOUNTED RAILINGS WILL ALSO BE ACCEPTABLE.



SURFACE MOUNTED TO SLOPED METAL



SINGLE TIER HANDRAIL



STANDARD HANDRAIL

KEY NOTE:

1 PROVIDE ALUMINUM KICKPLATE ON ALL PROPOSED HANDRAIL.

3 TYPICAL HANDRAIL DETAIL
N.T.S.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
STRUCTURAL DETAIL 1 of 2

PORT OF BROWNSVILLE
the port that works

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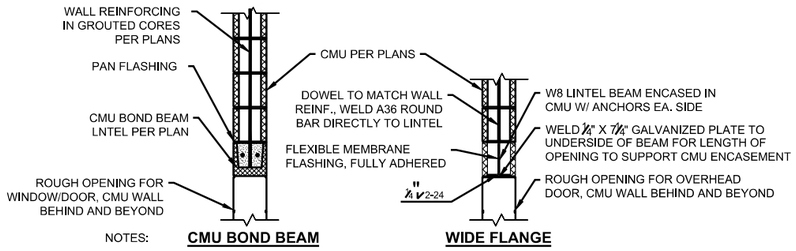
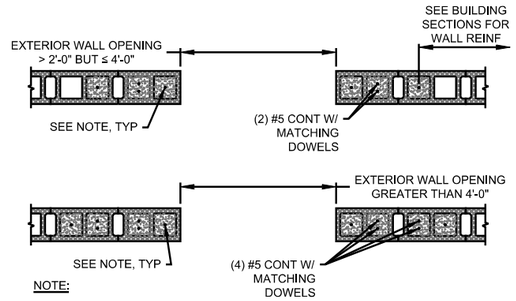


NOTES: **CMU BOND BEAM** **WIDE FLANGE**

1. PROVIDE FLASHING AT EXTERIOR OPENINGS.
2. CMU WALLS SHALL BE GROUTED SOLID THREE COURSES BELOW LINTEL BEARING POINT FOR A WIDTH OF 16".
3. CENTER OF LINTELS SHALL BE CENTER OF THE CMU WALL.
4. PROVIDE TEMPORARY SHORING FOR LINTELS UNTIL MASONRY WALL HAS ATTAINED SUFFICIENT STRENGTH TO CARRY ITS OWN WEIGHT.

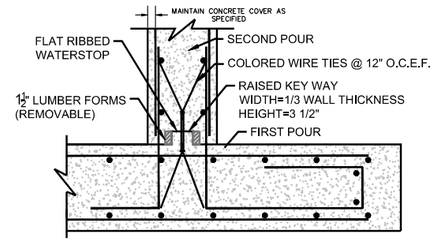
1 TYP LINTEL DETAILS
SCALE: 3/4" = 1'-0"



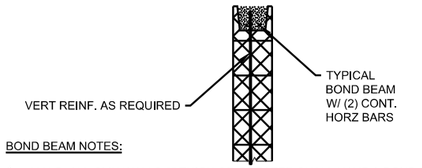
NOTE:

BARS IN CORE ADJACENT TO OPENING ON EACH SIDE SHALL EXTEND TO UNDERSIDE OF LINTEL BEARING. ALL OTHER BARS SHOWN SHALL EXTEND FULL HEIGHT OF THE WALL AND TERMINATE IN BOND BEAM, UNLESS SHOWN OTHERWISE IN SECTION.

2 TYP ADDITIONAL REINF. AT CMU OPENINGS
SCALE: 3/4" = 1'-0"



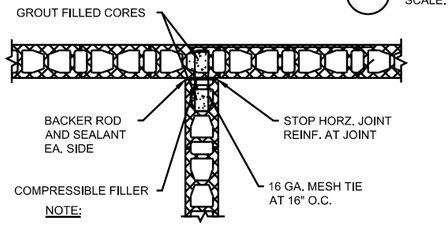
3 WATERSTOP - NEW WORK @ BASE
SCALE: 3/8" = 1'-0"



BOND BEAM NOTES:

1. U.N.O. ALL CMU WALLS 6" THICK OR GREATER SHALL HAVE A BOND BEAM AS TOP COURSE.
2. INSTALL REINFORCEMENT AT CONTROL AND EXPANSION JOINTS AS DETAILED HEREIN.
3. WHERE BOND BEAMS ARE INTERRUPTED BY OPENINGS, BEND BARS 12" INTO REINFORCED JAMBS.

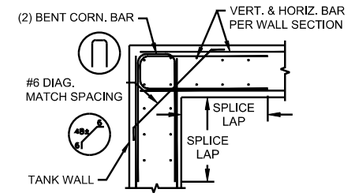
CONC. BLOCK BOND BEAMS
(N.T.S.)



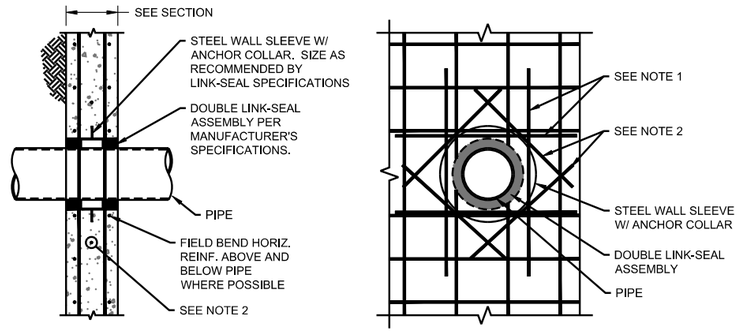
NOTE:

1. VERTICAL WALL REINFORCING NOT SHOWN FOR CLARITY

CONC. BLOCK CORNER WALL INTERSECTION JOINT
(N.T.S.)

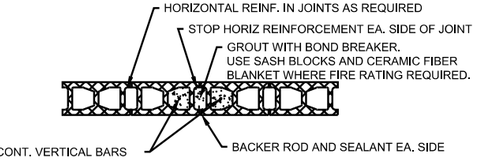


5 CORNER BARS - TYPICAL
SCALE: 3/8" = 1'-0"



NOTES:
1. CUT ALL INTERRUPTED REINF. AND SPLICE WITH SAME SIZE BAR WITH A LENGTH OF 36" + PIPE Ø.
2. ADD DIAGONAL BARS 32" LG. AT MID-WALL FOR PIPE SIZES LARGER THAN 10"Ø.

8 TYP PIPE PENETRATION DETAIL
SCALE: 3/4" = 1'-0"



PLAN

NOTES:

1. PROVIDE JOINTS AT INTERVALS NOT TO EXCEED 24'-0".
2. HORIZONTAL WIRE JOINT REINFORCING DOES NOT EXTEND THRU JOINT.
3. HORIZONTAL BOND BEAM REINFORCING SHALL CONTINUE THRU JOINT.
4. SEE PLAN FOR TYPICAL VERTICAL WALL REINFORCING REQUIREMENTS.

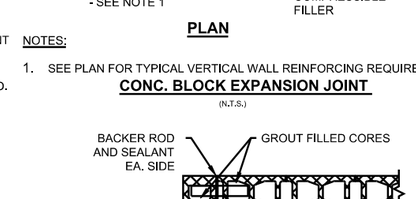
CONC. BLOCK CONTROL JOINT
(N.T.S.)

NOTES:

PROVIDE VERTICAL CONTROL JOINTS IN THE CONCRETE MASONRY UNIT PORTION OF ALL WALLS AND PARTITIONS AS FOLLOWS:

1. WHEN WALL LENGTH EXCEEDS 24 FEET.
2. AT JUNCTIONS OF BEARING AND NON-BEARING WALLS, CHANGES IN WALL HEIGHT OR THICKNESS, JUNCTIONS OF WALL WITH COLUMNS & PIERS, INTERSECTING WALL, PARTITION JUNCTION WHEN THE PARTITION LENGTH EXCEEDS 12'-0".
3. AT RETURN ANGLES OF "L", "T", AND "U" SHAPED CONSTRUCTION.
4. AT CHASES AND RECESSES FOR PIPING AND FIXTURES.
5. AT ONE SIDE OF WALL OPENINGS LESS THAN 6'-0" AND AT BOTH SIDES OF OPENINGS OVER 6'-0".
6. CONTROL JOINT SPACING SHALL NOT EXCEED 24'-0" WHEREVER FEASIBLE. CONTROL JOINTS MAY BE BEST LOCATED AT THE ENDS OF LINTELS OVER DOOR OPENINGS AND EXTEND UP FOR THE REMAINDER OF THE WALL HEIGHT.
7. CONTROL JOINTS TO EXTEND THRU ENTIRE WALL THICKNESS AND FOR THE FULL WALL HEIGHT.
8. SUBMIT CONTROL JOINT LOCATIONS AS A SHOP DRAWING SUBMITTAL.

4 TYPICAL CONCRETE MASONRY DETAILS
N.T.S.

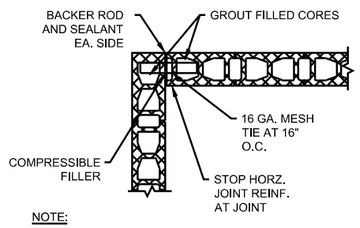


PLAN

NOTES:

1. SEE PLAN FOR TYPICAL VERTICAL WALL REINFORCING REQUIREMENTS.

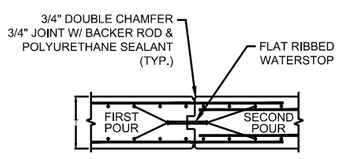
CONC. BLOCK EXPANSION JOINT
(N.T.S.)



NOTE:

1. VERTICAL WALL REINFORCING NOT SHOWN FOR CLARITY

CONC. BLOCK CORNER CONTROL JOINT
(N.T.S.)



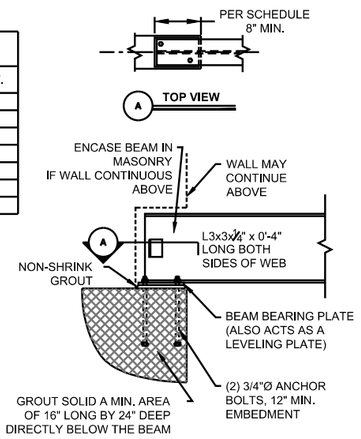
NOTES:

1. KEYWAY: 1/3t x 3-1/2"
2. PASS 10 $\overline{0F}$ HOR. RING BARS THRU JOINT, LAP PER N-100.

6 CONSTRUCTION JOINT AT WALL
SCALE: 3/8" = 1'-0"

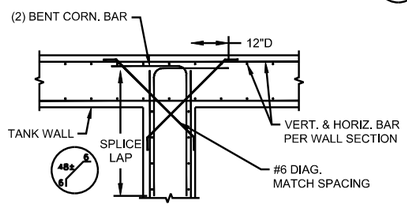
REINFORCING LAP LENGTH (f'c = 4,000 PSI)			
REBAR SIZE	LAP SPLICE CLASS	VERTICAL REINF.	HORIZ. REINF.
#4	B	25	33
#5	B	31	41
#6	B	37	49
#7	B	52	71
#8	B	62	81
#9	B	70	91
#10	B	78	101

10 REBAR SPLICES TABLE
SCALE: N.T.S.



STEEL BEAM BEARING PARALLEL TO WALL

9 BEAM BEARING ON CMU
SCALE: 3/4" = 1'-0"



7 T-INTERSECTION BARS - TYPICAL
SCALE: 3/8" = 1'-0"

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

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DANIEL CHRISTODOSS
P.E. 86016 ON
01/06/2025
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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
STRUCTURAL DETAIL 2 of 2

PORT OF BROWNSVILLE
the port that works

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ELECTRICAL SPECIFICATIONS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. ELECTRICAL SYSTEMS

1.02 RELATED WORK

A. THE WORK COVERED BY THIS SPECIFICATION CONSISTS OF FURNISHING ALL LABOR, SUPPLIES AND MATERIALS, SHOP DRAWINGS AND A LIST OF MAKE AND CATALOG NUMBERS OF ALL EQUIPMENT AND MATERIALS TO BE INSTALLED AND PERFORMING ALL OPERATIONS, INCLUDING INSTALLATION OF LIGHTING FIXTURES, ELECTRICAL EQUIPMENT, CUTTING AND PATCHING, COORDINATION WITH OTHER TRADES ON THE JOB, ETC., NECESSARY FOR THE INSTALLATION OF COMPLETE ELECTRICAL SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREINAFTER SPECIFIED. THESE SPECIFICATIONS SUPPLEMENT THE GENERAL CONDITIONS AND SPECIFICATIONS.

B. EXAMINATION OF SITE: THE CONTRACTOR SHALL THOROUGHLY EXAMINE SITE AND SATISFY HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE CONTRACTOR SHALL VERIFY AT THE SITE ALL MEASUREMENTS AFFECTING HIS WORK AND SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF THE SAME. NO EXTRA COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR EXPENSES DUE TO HIS NEGLECT TO EXAMINE OR FAILURE TO DISCOVER CONDITIONS WHICH AFFECT HIS WORK. NO EXTRA COMPENSATION WILL BE ALLOWED ON ACCOUNT OF DIFFERENCES BETWEEN ACTUAL DIMENSIONS AND THOSE INDICATED ON THE DRAWINGS.

C. THE AGREEMENT FORMS, GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS OF THE SPECIFICATIONS SHALL APPLY TO THE WORK SPECIFIED IN DIVISION 26.

1.03 DEFINITION

A. "WIRING": WIRE OR CABLE, INSTALLED IN RACEWAY WITH ALL REQUIRED BOXES, FITTINGS, CONNECTORS AND ACCESSORIES, COMPLETELY INSTALLED.

B. "FEEDER": WIRING TO ANY DEVICE OR EQUIPMENT IN WHICH NUMBER SIX AWG COPPER (#6 CU) OR LARGER CONDUCTORS ARE USED.

C. "POWER WIRING": WIRING TO ANY DEVICE OR EQUIPMENT SERVED BY A MULTI-POLE BREAKER.

1.04 QUALITY ASSURANCE

A. CODES: COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND ANY OTHER AUTHORITIES HAVING JURISDICTION OVER THE WORK.

B. PERMITS AND INSPECTIONS: PROVIDE ALL PERMITS REQUIRED AND OBTAIN FINAL INSPECTION AND APPROVAL FROM THE INSPECTION DEPARTMENT HAVING JURISDICTION.

C. WHERE DIFFERENT SECTIONS OF ANY APPLICABLE CODES SPECIFY DIFFERENT MATERIALS, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE SHALL GOVERN.

D. STANDARDS FOR MATERIAL AND WORKMANSHIP: USE MATERIALS THAT ARE NEW AND LISTED AND LABELED BY UNDERWRITERS LABORATORIES (UL) AS CONFORMING TO ITS STANDARDS, WHERE SUCH A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR TYPE OF MATERIAL IN QUESTION. EXECUTE WORK IN A WORKMAN LIKE MANNER, TO PRESENT A NEAT AND MECHANICAL APPEARANCE WHEN COMPLETED.

1.05 SUBSTITUTION OF MATERIALS

A. NO SUBSTITUTION OF MATERIAL IS ALLOWED WITHOUT WRITTEN PRIOR AUTHORIZATION FROM THE ENGINEER AND OWNER. DETERMINATION OF WHAT IS CONSIDERED EQUAL IS AT THE SOLE DISCRETION OF THE ENGINEER AND OWNER.

B. INCLUDE SUFFICIENT DESCRIPTIVE INFORMATION, INCLUDING MANUFACTURER'S PUBLISHED DATA TO ESTABLISH CONTRACT COMPLIANCE. SUBMIT SAMPLES IF REQUESTED BY ARCHITECT/ENGINEER.

1.06 DRAWINGS AND SPECIFICATIONS

A. THE WIRING LAYOUTS ARE SCHEMATIC AND DO NOT NECESSARILY SHOW THE EXACT LOCATION OF RACEWAYS, OUTLETS, ETC. REFER TO THE ARCHITECTURAL DRAWINGS FOR ACTUAL DIMENSIONS. FIT WORK TO CONFORM TO THE DETAILS OF BUILDING CONSTRUCTION. COORDINATE ALL WORK TO ASSURE PROPER CLEARANCE.

1.07 AS-BUILT DRAWINGS

A. AS WORK PROGRESSES, RECORD ON ONE (1) SET OF ELECTRICAL PRINTS ALL CHANGES AND DEVIATIONS FROM THE CONTRACT DOCUMENTS IN SIZE, LOCATIONS AND TYPES OF ALL MATERIALS AND EQUIPMENT. RECORD FINAL LOCATION OF OUTLETS, SWITCHES, STARTERS, UNDERGROUND AND EXPOSED CONDUITS, ETC. TO INDICATE THE FINAL INSTALLATION. MAKE SUFFICIENT MEASUREMENTS TO LOCATE ALL EQUIPMENT AND CONDUITS. PROVIDE AS-BUILT DRAWINGS.

B. THE CONTRACTOR SHALL PREPARE A TYPED PANEL DIRECTORY FOR EACH PANEL UTILIZED FOR THIS PROJECT. THIS DIRECTORY SHALL IDENTIFY THE CIRCUIT NUMBER, DEVICES SERVED, AND LOCATION OF DEVICES BY ROOM NUMBER. HE SHALL FILE THEM WITH THE BUILDING MANAGER WHEN THE WORK IS COMPLETE.

1.08 MAINTENANCE DATA

A. FURNISH AND DELIVER TO THE ARCHITECT/ENGINEER TWO (2) COMPLETE COPIES OF ALL DATA PREPARED BY MANUFACTURERS, DETAILING OPERATION AND MAINTENANCE INSTRUCTION FOR ALL EQUIPMENT.

1.09 PENETRATIONS, CUTTING, AND PATCHING

A. PERFORM CUTTING AND PATCHING IN ACCORDANCE WITH THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THE CONTRACT.

B. PROVIDE ALL SLEEVES REQUIRED FOR PROPER INSTALLATION OF WORK INCLUDED IN THIS SECTION.

C. MAKE ALL PENETRATIONS THROUGH WALLS AT 90 DEGREE ANGLES. SEAL ALL PENETRATIONS AT FIRE AND SMOKE PARTITIONS WITH FIRE SAFING MATERIAL. SEAL ALL PENETRATIONS AT SOUND WALLS WITH SOUNDPROOFING MATERIAL.

1.10 SUBMITTALS

A. SHOP DRAWINGS AND MATERIAL BROCHURES: FURNISH AN ELECTRONIC SET OF SHOP DRAWINGS AND PRODUCT DATA IN PDF FORMAT TO THE ARCHITECT/ENGINEER ON THE FOLLOWING MATERIALS:

1. LIGHTING FIXTURES
2. DISCONNECT SWITCHES
3. TRANSFORMERS
4. RACEWAYS
5. CONDUCTORS
6. MOTOR CONTROLLERS
7. SWITCHGEAR, PANELBOARDS
8. CONTROL PANELS
9. INSTRUMENTATION
10. GENERATOR & ATS
11. SCADA

1.11 COOPERATION

A. THE CONTRACTOR SHALL SCHEDULE HIS WORK, AND IN EVERY WAY POSSIBLE, COOPERATE WITH ALL OTHER TRADES IN THE JOB TO AVOID DELAYS, INTERFERENCES AND UNNECESSARY WORK. HE SHALL COOPERATE WITH THEM IN PROVIDING FOR THE INSTALLATION OF THIS WORK AND COORDINATE WITH WORK OF OTHER TRADES TO ASSURE PROPER CLEARANCE OF PIPING, DUCTWORK, CONDUIT, ETC. WHEN SUCH IS REQUIRED.

1.12 WIRING WORKMANSHIP

A. RUN WIRING IN ALL BRANCH CIRCUIT PANELBOARDS AND TERMINAL CABINETS PARALLEL OR AT RIGHT ANGLES TO THE SIDES OR TOP OF THE EQUIPMENT HOUSING.

B. GROUP AND HARNESS CONDUCTORS TOGETHER USING LOCKING TYPE CABLE TIES. CABLE TIES: AS MANUFACTURED BY THE PANDUIT CORPORATION OR THOMAS AND BETTS.

1.13 STORAGE MATERIALS

A. KEEP THE BUILDING AND PREMISES CLEAN AND CLEAR OF SCRAP MATERIALS AT ALL TIMES. STORE MATERIALS AND EQUIPMENT IN DESIGNATED STORAGE AREAS.

1.14 ORDERING OF MATERIALS

A. ORDER MATERIALS AND EQUIPMENT SO AS NOT TO JEOPARDIZE PROGRESS OF CONSTRUCTION OR COMPLETION DATE.

1.15 SAFETY PRECAUTIONS AND PROGRAMS

A. IT SHALL BE THE DUTY AND RESPONSIBILITY OF THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS TO BE FAMILIAR AND COMPLY WITH ALL REQUIREMENTS OF PUBLIC LAW 91-96, 29 U.S.C. SECS. 651 ET. SEQ., THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA), AND ALL AMENDMENTS THERETO AND TO ENFORCE AND COMPLY WITH ALL OF THE PROVISIONS OF THIS ACT. IN ADDITION, ON PROJECTS IN WHICH TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE FEET (5'), THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF 29 C.F.R., SECS. 1926.652 AND 1926.653, OSHA SAFETY AND HEALTH STANDARDS.

1.16 WARRANTY

A. GUARANTEE ALL WORK UNDER THIS SECTION FOR WORKMANSHIP, LABOR AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER OR HIS AUTHORIZED REPRESENTATIVE.

PART 2 – PRODUCTS AND EXECUTION

2.01 CONDUIT

A. EXCEPT AS OTHERWISE NOTED, SPECIFIED OR REQUIRED, INSTALL ALL WIRES USED IN THIS PROJECT IN CONDUIT AS HEREINAFTER SPECIFIED:

BELOW GRADE: SCHEDULE 40 PVC
ABOVE GRADE (OUTSIDE): ALUMINUM RIGID
ABOVE GRADE (INSIDE): ALUMINUM RIGID
ELBOWS: PVC COATED RIGID STEEL

B. INSTALL CONDUITS CONTINUOUS FROM OUTLET TO OUTLET, FROM OUTLET TO CABINET, JUNCTION BOX AND PULL BOX. SECURE CONDUITS TO ALL BOXES, ETC., IN SUCH A MANNER THAT EACH SYSTEM WILL BE ELECTRICALLY CONTINUOUS FROM SERVICE TO ALL OUTLETS. TERMINATE ALL CONDUIT RUNS FROM CABINETS AND JUNCTION BOXES IN APPROVED OUTLET BOXES. INSTALL CONDUITS AS HIGH AS POSSIBLE UP AGAINST STRUCTURE ABOVE. AVOID ROUTING CONFLICTS WITH HVAC EQUIPMENT/DUCTWORK, SANITARY WASTE, VENT PIPING, AND DOMESTIC WATER PIPING.

C. INSTALL A NYLON PULL WIRE (200 LB. TEST) AND TIE ENDS IN ALL CONDUIT LINES LEFT EMPTY FOR FUTURE USE.

D. TRAPPED OR INACCESSIBLE JUNCTION BOXES, OUTLETS, ETC. ARE NOT ALLOWED.

E. GENERALLY, CONCEAL ALL CONDUITS UNLESS OTHERWISE DIRECTED OR INDICATED ON THE DRAWINGS.

F. NO BENDS PERMITTED WITH A RADIUS LESS THAN SIX (6) TIMES THE DIAMETER OF THE CONDUIT OR MORE THAN 900.

G. PROVIDE JUNCTION BOXES OR PULL BOXES TO AVOID EXCESSIVE RUNS OR TOO MANY BENDS BETWEEN OUTLETS.

H. INCREASE CONDUIT SIZES SHOWN ON THE PLANS AS REQUIRED FACILITATING PULLING OF CONDUCTORS.

I. RUN ALL CONDUITS PARALLEL TO OR AT RIGHT ANGLES TO THE BUILDING WALLS AND SUPPORT FROM WALLS OR CEILINGS AT INTERVALS REQUIRED BY CODE WITH APPROVED CLAMPS OR HANGERS.

J. INSTALL APPROVED APPLETON, CROUSE HINDS, OR O.Z. MANUFACTURING CO. EXPANSION FITTINGS IN ALL EMT RUNS WHICH PASS THROUGH EXPANSION JOINTS IN THE BUILDING. OTHER METHODS TO PROVIDE FOR THIS EXPANSION MUST BE APPROVED BY THE ARCHITECT/ENGINEER.

2.02 WIRING

A. INSTALL WIRING AS FOLLOWS:

1. FEEDERS AND POWER WIRING: CONDUCTORS IN RIGID ALUMINUM RIGID CONDUIT WHEN INSTALLED IN DRY LOCATION ABOVE GRADE. SCHEDULE 40 PVC WHEN INSTALLED BELOW GRADE. USE PVC COATED RIGID ELBOWS.
2. BRANCH CIRCUITS: INSTALL CONDUCTORS IN ALUMINUM RIGID CONDUIT.
3. INSTALL ALL WIRING IN CONDUIT. USE ONLY UL LISTED LUBRICANTS IN PULLING THE CONDUCTORS.
4. INSTALL CONDUCTORS CONTINUOUS FROM OUTLET TO OUTLET AND FROM OUTLET TO JUNCTION BOX OR PULL BOX. INSTALL SPLICES AND JOINTS CAREFULLY AND SECURELY TO BE MECHANICALLY AND ELECTRICALLY SOLID WITH PRESSURE TYPE CONNECTORS. USE 3M "SCOTCHLOCK" OR IDEAL "WING NUT" OR EQUAL TWIST-ON CONNECTORS FOR #10 AND SMALLER CONDUCTORS.
5. CONNECT CONDUCTORS FOR LIGHTING AND RECEPTACLE CIRCUITS TO THE PANEL AS DETAILED WITH COLOR CODED JACKET. COLOR CODE ALL WIRES WITH THE TYPE, SIZE, MAKE AND VOLTAGE MARKED ON IT. COLOR CODE WIRING WITH THE SAME COLOR BEING USED WITH ITS RESPECTIVE PHASE AS FOLLOWS, UNLESS OTHERWISE REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

	120/240 VOLT DELTA	120/208 VOLT WYE	480/277 VOLT WYE
PHASE A	RED	RED	BROWN
PHASE B	ORANGE	BLACK	YELLOW
PHASE C	BLACK	BLUE	PURPLE
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

6. BRANCH CIRCUIT CONDUCTORS SHALL NOT BE SMALLER THAN NO. 12 AWG. INCREASE THE WIRE SIZES UP ONE (1) SIZE WHEREVER THE RUN DISTANCE EXCEEDS 200 FEET.
7. ALL WIRING AND CABLE INCLUDING FIBER OPTIC, ELECTRICAL, DATA, TELECOMMUNICATIONS, TEMPERATURE CONTROLS, SECURITY, FIRE PROTECTION, ETC. SHALL BE RUN IN CONDUIT.
8. ELECTRICAL CONTRACTOR MAY GROUP WIRES WITH SAME VOLTAGE FOR FIELD DEVICES IN CONDUIT AS HE DEEMS BEST APPROPRIATE.
9. ANALOG AND LOW VOLTAGE SIGNALS SHALL NOT RUN IN SAME CONDUIT AS 120VAC AND 480VAC CIRCUITS.

2.03 CONDUCTORS

A. COPPER OF 98% CONDUCTIVITY.

B. NO. 10 AND SMALLER: SOLID TYPE SIMPULL XHHW-2, EXCEPT AS OTHERWISE NOTED.

C. NO. 8 AND LARGER: STRANDED, TYPE SIMPULL XHHW-2, EXCEPT AS OTHERWISE NOTED.

D. MINIMUM SIZE CONDUCTORS USED SHALL BE NO. 12 AWG FOR ALL APPLICATIONS EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE (A.C. CONTROLS, ETC.).

E. USE WIRE AND CABLE FROM ONE (1) MANUFACTURER. DELIVER IN THE ORIGINAL WRAPPING BEARING THE UNDERWRITERS LABORATORIES (UL) LABEL.

2.04 OUTLETS

A. USE GALVANIZED STEEL OR CAST TYPE BOXES AT ALL OUTLETS FOR LIGHTING FIXTURES, WALL SWITCHES, WALL RECEPTACLES, ETC.

B. SECURELY ATTACH OUTLET BOXES FOR FIXTURES AND DEVICES TO THE BUILDING CONSTRUCTION WITH EXPANSION BOLTS.

C. FLUSH MOUNT ALL OUTLET BOXES, REGARDLESS OF WALL OR CEILING CONSTRUCTION, UNLESS THEY ARE SPECIFICALLY SHOWN AS BEING USED WITH EXPOSED CONDUIT. IF SURFACE MOUNTED, USE CAST TYPE AS SPECIFIED ABOVE. UTILITY BOXES ARE NOT ALLOWED.

2.05 INSTALLATION

A. INSTALL RACEWAYS EXPOSED. SUPPORT EXPOSED RACEWAYS AT INTERVALS NOT EXCEEDING TEN FEET (10') WITH MACHINE SCREWS FOR METAL CONSTRUCTION AND EXPANSION BOLTS FOR CONCRETE CONSTRUCTION.

B. INSTALL THE EDGES OF ALL OUTLET BOXES FLUSH WITH THE SURFACE IN WHICH THEY ARE RECESSED. SCREW ATTACH INTERNAL DEVICES BEFORE ATTACHING COVERPLATE. DO NOT USE COVERPLATES AS A MEANS OF TIGHTENING THE DEVICES IN PLACE.

2.06 DISCONNECT AND FEEDER SWITCHES

A. FEEDER SWITCHES AND DISCONNECT SWITCHES: HEAVY DUTY, EXCEPT AS OTHERWISE NOTED. IN DAMP LOCATIONS OR EXPOSED TO THE WEATHER, USE NEMA 3R, RAINTIGHT.

B. DISCONNECT SWITCHES: FACTORY INSTALLED PROVISION FOR PADLOCKING IN EITHER THE "ON" OR "OFF" POSITION.

2.07 FUSES

A. FUSES: BUSSMANN OR APPROVED EQUAL. NG

2.08 LABELING

A. LABEL ALL PANELS, CONTROL POINTS, SWITCHES, AND MOTORS, AS DIRECTED. IDENTIFY PANELS BY PANEL NUMBER. LABEL SWITCHES, INDICATI THE EQUIPMENT WHICH THEY CONTROL. ALL LABELS SHALL BE ENGRAVED. PANEL DIRECTORIES TO BE TYPED. NG COORDINATE ALL EQUIPMENT NUMBERING WITH MECHANICAL CONTRACTOR.

B. INSTALL ARC FLASH HAZARD LABELS ON ALL NEW SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES A MOTOR CONTROL CENTERS PER NEC 110.16. PANDUIT #PPS0305W2100 OR EQUAL.

2.09 GROUNDING

A. PROVIDE GROUNDING FOR ELECTRICAL SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC)

2.10 COVERPLATES

A. WHERE WIRING DEVICES ARE FLUSH MOUNTED, INSTALL STAINLESS STEEL COVERPLATES.

B. WHERE WIRING DEVICES ARE SURFACE MOUNTED, INSTALL FORMED STEEL COVERPLATES WITH CADMIUM PLATING.

C. WHERE WEATHERPROOF COVERPLATES ARE REQUIRED, MEET UL "WET LOCATION COVER CLOSED" REQUIREMENTS. NUSE COVERPLATES THAT ARE HINGED AND GASKETED WITH SPRING LOADED CLOSER.

D. INSTALL FINISHED COVERPLATES ON ALL JUNCTION BOXES, OUTLET BOXES, SECTIONAL SWITCH BOXES, UTILITY BOXES, ETC.

E. WHERE MORE THAN ONE (1) DEVICE IS INDICATED AT A LOCATION, MOUNT DEVICES IN COMBINED SECTION GANG BOXES, COVERED BY A COMMO PLATE.

2.11 RECEPTACLES

A. DUPLEX RECEPTACLES: 20 AMPERE, 125 VOLT, SELF OR AUTOMATIC GROUNDING, GFCI.

B. SPECIAL MOUNTING HEIGHTS ARE NOTED ON THE ARCHITECTURAL DRAWINGS. UNLESS OTHERWISE INDICATED ON THE ELECTRICAL DRAWINGS, MOUNT DEVICES AT THE FOLLOWING HEIGHTS ABOVE FINISHED FLOOR:

1. DUPLEX RECEPTACLE	18"	
2. WALL SWITCHES	48"	
3. VOICE & VOICE/DATA OUTLETS	18"	D
4. WALL TELEPHONE OUTLETS	48"	

2.12 SWITCHES ED

A. PROVIDE HEAVY-DUTY, AC, QUIET SWITCHES. THE SWITCHES SHALL BE HUBBELL 1221 OR EQUAL, 120-277 VOLT, 20 AMPERES, SPECIFICATION GRADE. SWITCHES SHALL BE SINGLE POLE, DOUBLE POLE, THREE WAY, FOUR WAY, OR KEY OPERATED AS SCHEDULED ON THE DRAWINGS AN SHALL BE THE SELF GROUNDING TYPE. COLOR SHALL BE IVORY.

2.13 LIGHTING FIXTURES

A. PROVIDE ALL LIGHTING FIXTURES, AS SCHEDULED ON DRAWINGS, COMPLETE WITH LAMPS AND HARDWARE. INSTALL COMPLETELY WIRED, CONNECT AND IN OPERATING ORDER.

B. CONFIRM ALL CEILING CONDITIONS, CLEARANCES AND OPERATING VOLTAGES BEFORE ORDERING LIGHTING FIXTURES.

C. SUBMIT SHOP DRAWINGS.

2.13.1 LAMPS S

A. INSTALL SCHEDULED LAMPS MANUFACTURED BY GENERAL ELECTRIC, PHILLIPS, OR APPROVED EQUAL.

2.13.2 FIXTURES

A. PROVIDE LIGHTING FIXTURES WHICH HAVE BEEN TESTED AND CERTIFIED FOR PROPER OPERATION BY THE FIXTURE'S MANUFACTURER.

B. PROVIDE LIGHTING FIXTURES WITH TRIM COMPATIBLE WITH CEILING OR SURFACE ON OR IN WHICH INSTALLED.

C. EACH LUMINAIRE SHALL HAVE TWO SUPPORT WIRES INSTALLED, ONE ON EACH END, AT DIAGONAL CORNERS. LUMINAIRES IN FIRE RATED CEILING SHALL BE SUPPORTED ON ALL FOUR CORNERS.

D. SUPPORT AND SECURELY ATTACH WITH GALVANIZED FASTENERS IN A LEVEL POSITION.

E. INSTALL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

F. FIRE RATED ASSEMBLIES, COMPLY WITH DETAILS OF LISTED ASSEMBLY.

2.14 TEMPORARY POWER

A. PROVIDE TEMPORARY POWER (SMALL TOOL) AND LIGHTING PER OSHA REQUIREMENTS.

3.00 ELECTRICAL STUDIES

A. THE ELECTRICAL CONTRACTOR SHALL SUBMIT A POWER SYSTEM STUDY CONTAINING THE FOLLOWING: SHORT CIRCUIT ANALYSIS, PROTECTIVE COORDINATION ANALYSIS, HARMONIC ANALYSIS, AND ARC FLASH ANALYSIS OF ALL BUSES AND PROTECTIVE DEVICES. CONTRACTOR TO SUBMIT FOR REVIEW PRIOR TO EQUIPMENT SUBMITTALS, IN ORDER TO VERIFY RATINGS OF ALL EQUIPMENT.

ELECTRICAL STUDIES SHALL BE PERFORMED BY APPROVED THIRD PARTY, SUCH AS AMPSAFE, 2722 W. BITTERS RD, SUITE 125, SAN ANTONIO, TX 78248. CONTACT: CHRISTOPHER HERZING, PHONE: 210-465-7180, EXT. 2. EMAIL: CHRISTOPHER.HERZING@AMPSAFE.COM.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

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FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
ELECTRICAL SPECIFICATION

PORT OF BROWNSVILLE
the port that works

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YOUR RELIABLE PARTNER

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PACKAGE DIESEL GENERATOR 450 KW

1 GENERAL

1.1 REFERENCES AND STANDARDS

THE GENERATOR SET COVERED BY THESE SPECIFICATIONS SHALL BE DESIGNED, TESTED, RATED, ASSEMBLED AND INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE STANDARDS BELOW:

- CSA C22.2 NO14
- CSA 282
- CSA 100
- EN61000-6
- EN55011
- FCC PART 15 SUBPART B
- ISO8528
- IEC61000
- UL508
- UL2200
- UL142
- DESIGNED TO ALLOW FOR INSTALLED COMPLIANCE TO NFPA 70, NFPA99 AND NFPA 110

1.2 RELATED SECTIONS

1.2.1 DIVISION 3 – STRUCTURAL CONCRETE

1.2.2 DIVISION 15 – MECHANICAL

1.3 WORK INCLUDED

1.3.1 INSTALLATION

THE WORK INCLUDES SUPPLYING AND INSTALLING A COMPLETE INTEGRATED GENERATOR SYSTEM. THE SYSTEM CONSISTS OF A DIESEL GENERATOR SET WITH RELATED COMPONENT ACCESSORIES AND AUTOMATIC TRANSFER SWITCH(ES) SPECIFIED UNDER A SEPARATE SECTION.

1.3.2 FUEL SYSTEM

THE CONTRACTOR SHALL PROVIDE A FULL TANK OF DIESEL FUEL AFTER THE COMPLETION OF ALL TESTING.

1.3.3 SYSTEM TEST

A COMPLETE SYSTEM LOAD TEST SHALL BE PERFORMED AFTER ALL EQUIPMENT IS INSTALLED. GUIDELINES IN THE START-UP SECTION.

1.3.4 REQUIREMENTS, CODES AND REGULATIONS

THE EQUIPMENT SUPPLIED AND INSTALLED SHALL MEET THE REQUIREMENTS OF THE NEC AND ALL APPLICABLE LOCAL CODES AND REGULATIONS. ALL EQUIPMENT SHALL BE OF NEW AND CURRENT PRODUCTION BY A MANUFACTURER WHO HAS 25 YEARS OF EXPERIENCE BUILDING THIS TYPE OF EQUIPMENT. MANUFACTURER SHALL BE ISO9001 CERTIFIED.

1.3.5 APPROVED MANUFACTURES

THE STANDBY DIESEL GENERATOR SHALL BE SUPPLIED BY:

- SOUTHERN PLAINS – CUMMINS®
- HOLT – CAT®
- LOFTIN – KOHLER POWER SYSTEMS®

OR BY ALTERNATE MANUFACTURES WHO SHALL SUBMIT A REQUEST TWO WEEKS PRIOR TO BID AND INCLUDE A WRITTEN LIST OF DEVIATIONS FROM THIS SPECIFICATION TO BE CONSIDERED FOR APPROVAL.

1.4 SUBSTITUTION

PROPOSED DEVIATIONS FROM THE SPECIFICATIONS SHALL BE TREATED AS FOLLOWS:

1.4.1 SUBSTITUTION TIME REQUIREMENT

REQUESTS FOR SUBSTITUTIONS SHALL BE MADE A MINIMUM OF TWO WEEKS PRIOR TO BID DATE. MANUFACTURERS CATALOG DATA SHALL ACCOMPANY EACH REQUEST AND AUTHORIZED ACCEPTANCE SHALL BE ADDENDA ONLY.

1.4.2 SUBSTITUTION RESPONSIBILITY

THE POWER SYSTEM HAS BEEN DESIGNED TO SOUTHERN PLAINS/CUMMINS ELECTRICAL AND PHYSICAL CHARACTERISTICS. THE EQUIPMENT SIZING, SPACING, AMOUNTS, ELECTRICAL WIRING, VENTILATION EQUIPMENT, FUEL AND EXHAUST COMPONENTS HAVE ALL BEEN SIZED AND DESIGNED AROUND SOUTHERN PLAINS/CUMMINS SUPPLIED EQUIPMENT. SHOULD ANY OF THE OTHER APPROVED MANUFACTURER SUBSTITUTIONS BE MADE, THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE INSTALLATION, COORDINATION AND OPERATION OF THE SYSTEM AS WELL AS ANY ENGINEERING AND REDESIGN COSTS, WHICH MAY RESULT FROM SUCH SUBSTITUTIONS.

1.5 SUBMITTALS

ENGINE-GENERATOR SUBMITTALS SHALL INCLUDE THE FOLLOWING INFORMATION:

1. FACTORY PUBLISHED SPECIFICATION SHEET.
2. MANUFACTURER'S CATALOG CUT SHEETS OF ALL AUXILIARY COMPONENTS SUCH AS BATTERY CHARGER, CONTROL PANEL, ENCLOSURE, ETC.
3. DIMENSIONAL ELEVATION AND LAYOUT DRAWINGS OF THE GENERATOR SET, ENCLOSURE AND TRANSFER SWITCHGEAR AND RELATED ACCESSORIES.
4. WEIGHTS OF ALL EQUIPMENT.
5. CONCRETE PAD RECOMMENDATION, LAYOUT AND STUB-UP LOCATIONS OF ELECTRICAL AND FUEL SYSTEMS.
6. INTERCONNECT WIRING DIAGRAM OF COMPLETE EMERGENCY SYSTEM, INCLUDING GENERATOR, SWITCHGEAR, DAY TANK, REMOTE PUMPS, BATTERY CHARGER, CONTROL PANEL, AND REMOTE ALARM INDICATIONS.
7. ENGINE MECHANICAL DATA, INCLUDING HEAT REJECTION, EXHAUST GAS FLOWS, COMBUSTION AIR AND VENTILATION AIR FLOWS, FUEL CONSUMPTION, ETC.
8. GENERATOR ELECTRICAL DATA INCLUDING TEMPERATURE AND INSULATION DATA, COOLING REQUIREMENTS, EXCITATION RATINGS, VOLTAGE REGULATION, VOLTAGE REGULATOR, EFFICIENCIES, WAVEFORM DISTORTION AND TELEPHONE INFLUENCE FACTOR.
9. GENERATOR RESISTANCES, REACTANCES AND TIME CONSTANTS.
10. GENERATOR LOCKED ROTOR MOTOR STARTING CURVES.
11. MANUFACTURER'S DOCUMENTATION SHOWING MAXIMUM EXPECTED TRANSIENT VOLTAGE AND FREQUENCY DIPS, AND RECOVERY TIME DURING OPERATION OF THE GENERATOR SET AT THE SPECIFIED SITE CONDITIONS WITH THE SPECIFIED LOADS.
12. MANUFACTURER'S AND DEALER'S WRITTEN WARRANTY.

1.7 SYSTEM RESPONSIBILITY

1.7.1 GENERATOR SET DISTRIBUTOR

THE COMPLETED ENGINE GENERATOR SET SHALL BE SUPPLIED BY THE MANUFACTURER'S AUTHORIZED DISTRIBUTOR ONLY.

- SOUTHERN PLAINS – CUMMINS®
- HOLT – CAT®
- LOFTIN – KOHLER POWER SYSTEMS®

1.7.2 REQUIREMENTS, CODES AND REGULATIONS

THE EQUIPMENT SUPPLIED AND INSTALLED SHALL MEET THE REQUIREMENTS OF NEC AND ALL-APPLICABLE LOCAL CODES AND REGULATIONS. ALL EQUIPMENT SHALL BE NEW, OF CURRENT PRODUCTION. THERE SHALL BE ONE SOURCE RESPONSIBILITY FOR WARRANTY; PARTS AND SERVICE THROUGH A LOCAL REPRESENTATIVE WITH FACTORY TRAINED SERVICE PERSONNEL.

1.7.3 AUTOMATIC TRANSFER SWITCH(ES)

THE AUTOMATIC TRANSFER SWITCH(ES) SPECIFIED IN ANOTHER SECTION SHALL BE SUPPLIED BY THE GENERATOR SET MANUFACTURER IN ORDER TO ESTABLISH AND MAINTAIN A SINGLE SOURCE OF SYSTEM RESPONSIBILITY AND COORDINATION.

1.8 WARRANTY

1.8.1 TWO YEAR STANDBY (ISO 8528-1: ESP) GENERATOR SET WARRANTY

THE MANUFACTURER'S STANDARD WARRANTY SHALL IN NO EVENT BE FOR A PERIOD OF LESS THAN TWO (2) YEARS FROM DATE OF INITIAL START-UP OF THE SYSTEM AND SHALL INCLUDE REPAIR PARTS, LABOR, REASONABLE TRAVEL EXPENSE NECESSARY FOR REPAIRS AT THE JOB SITE, AND EXPENDABLES (LUBRICATING OIL, FILTERS, ANTIFREEZE, AND OTHER SERVICE ITEMS MADE UNUSABLE BY THE DEFECT) USED DURING THE COURSE OF REPAIR. RUNNING HOURS SHALL BE LIMITED TO 500 HOURS ANNUALLY FOR THE SYSTEM WARRANTY BY BOTH THE MANUFACTURER AND SERVICING DISTRIBUTOR. SUBMITTALS RECEIVED WITHOUT WRITTEN WARRANTIES AS SPECIFIED WILL BE REJECTED IN THEIR ENTIRETY.

1.9 PARTS AND SERVICE QUALIFICATIONS

1.9.1 SERVICE FACILITY

THE ENGINE-GENERATOR SUPPLIER SHALL MAINTAIN 24 HOUR PARTS AND SERVICE CAPABILITY WITHIN 100 MILES OF THE PROJECT SITE. THE DISTRIBUTOR SHALL STOCK PARTS AS NEEDED TO SUPPORT THE GENERATOR SET PACKAGE FOR THIS SPECIFIC PROJECT. THE SUPPLIER MUST CARRY SUFFICIENT INVENTORY TO COVER NO LESS THAN 80% PARTS SERVICE WITHIN 24 HOURS AND 95% WITHIN 48 HOURS.

1.9.2 SERVICE PERSONNEL

THE DEALER SHALL MAINTAIN QUALIFIED FACTORY TRAINED SERVICE PERSONNEL.

2 PRODUCT SPECIFICATIONS

2.1 GENERAL REQUIREMENTS

2.1.1 GENSET REQUIREMENTS

THE GENERATOR SET SHALL BE STANDBY DUTY RATED AT 450.0 KW, 562.5 KVA, 1800 RPM, 0.8 POWER FACTOR, 480/277 V, 3-PHASE, 60 HERTZ, INCLUDING RADIATOR FAN AND ALL PARASITIC LOADS. GENERATOR SET SHALL BE SIZED TO OPERATE AT THE SPECIFIED LOAD AT A MAXIMUM AMBIENT OF 115F (46.1C) AND ALTITUDE OF 1,000.0 FEET (304.8 M).

STANDBY RATING AS DEFINED BY THE FOLLOWING:
TYPICAL LOAD FACTOR = 70% OR LESS WITH VARIABLE LOAD
TYPICAL HOURS PER YEAR = 200 HOURS
MAXIMUM EXPECTED USAGE = 500 HOURS/YEAR
TYPICAL APPLICATION = STANDBY
TYPICAL PEAK DEMAND = 80% OF ESP RATED KW WITH 100% OF RATING AVAILABLE FOR THE DURATION OF AN EMERGENCY OUTAGE

2.1.2 MATERIAL AND PARTS

ALL MATERIALS AND PARTS COMPRISING THE UNIT SHALL BE NEW AND UNUSED.

2.1.3 ENGINE

THE ENGINE SHALL BE DIESEL FUELED, FOUR (4) CYCLE, WATER-COOLED, WHILE OPERATING WITH NOMINAL SPEED NOT EXCEEDING 1800 RPM. THE ENGINE WILL UTILIZE IN-CYLINDER COMBUSTION TECHNOLOGY, AS REQUIRED, TO MEET APPLICABLE EPA NON-ROAD MOBILE REGULATIONS AND/OR THE EPA NSPS RULE FOR STATIONARY RECIPROCATING COMPRESSION IGNITION ENGINES. ADDITIONALLY, THE ENGINE SHALL COMPLY WITH THE STATE EMISSION REGULATIONS AT THE TIME OF INSTALLATION/COMMISSIONING. ACTUAL ENGINE EMISSIONS VALUES MUST BE IN COMPLIANCE WITH APPLICABLE EPA EMISSIONS STANDARDS PER ISO 8178 – D2 EMISSIONS CYCLE AT SPECIFIED EKW / BHP RATING. UTILIZATION OF THE "TRANSITION PROGRAM FOR EQUIPMENT MANUFACTURERS" (ALSO KNOWN AS "FLEX CREDITS") TO ACHIEVE EPA CERTIFICATION IS NOT ACCEPTABLE. THE IN-CYLINDER ENGINE TECHNOLOGY MUST NOT PERMIT UNFILTERED EXHAUST GAS TO BE INTRODUCED INTO THE COMBUSTION CYLINDER. EMISSIONS REQUIREMENTS / CERTIFICATIONS OF THIS PACKAGE: EPA TIER 3

2.1.3.1 ENGINE GOVERNING

THE ENGINE WILL BE EQUIPPED WITH AN ISOCHRONOUS ELECTRONIC GOVERNOR TO MAINTAIN +/- 0.25% STEADY STATE FREQUENCY VARIATION FROM STEADY STATE NO LOAD TO STEADY STATE FULL LOAD.

2.2 GENERATOR

2.2.1 GENERATOR SPECIFICATIONS

THE SYNCHRONOUS THREE PHASE GENERATOR SHALL BE A SINGLE BEARING, SELF-VENTILATED, DRIP-PROOF DESIGN IN ACCORDANCE WITH NEMA MG 1 AND DIRECTLY CONNECTED TO THE ENGINE FLYWHEEL HOUSING WITH A FLEX COUPLING. THE GENERATOR SHALL MEET PERFORMANCE CLASS G2 OF ISO 8528. THE EXCITATION SYSTEM SHALL ENABLE THE ALTERNATOR TO SUSTAIN 300% (250% FOR 50HZ) OF RATED CURRENT BASED ON THE 125C (CLASS H) OR 105C (CLASS F) RISE RATING FOR TEN SECONDS DURING A FAULT CONDITION AND SHALL IMPROVE THE IMMUNITY OF THE VOLTAGE REGULATOR TO NON-LINEAR DISTORTING LOADS. THE EXCITATION SYSTEM SHALL BE OF BRUSHLESS CONSTRUCTION AND BE INDEPENDENT OF MAIN STATOR WINDINGS, PERMANENT MAGNET.

2.2.2 VOLTAGE REGULATOR

2.2.2.1 AUTOMATIC VOLTAGE REGULATOR

THE AUTOMATIC VOLTAGE REGULATOR (AVR) SHALL MAINTAIN GENERATOR OUTPUT VOLTAGE WITHIN +/- 0.5% FOR ANY CONSTANT LOAD BETWEEN NO LOAD AND FULL LOAD. THE REGULATOR SHALL BE A TOTALLY SOLID STATE DESIGN, WHICH INCLUDES ELECTRONIC VOLTAGE BUILDUP, VOLTS PER HERTZ REGULATION, OVER-EXCITATION PROTECTION, SHALL LIMIT VOLTAGE OVERSHOOT ON STARTUP, AND SHALL BE ENVIRONMENTALLY SEALED.

2.2.3 MOTOR STARTING

PROVIDE LOCKED ROTOR MOTOR STARTING CAPABILITY OF 1749 SKVA AT 20% INSTANTANEOUS VOLTAGE DIP AS DEFINED PER NEMA MG 1. SUSTAINED VOLTAGE DIP DATA IS NOT ACCEPTABLE.

2.3 CIRCUIT BREAKER

2.3.1 CIRCUIT BREAKER SPECIFICATIONS

PROVIDE A GENERATOR MOUNTED 100% CIRCUIT BREAKER, MOLDED CASE, QTY. (1) 800 AMP TRIP, 3 POLE, NEMA 1/IP22. BREAKER SHALL UTILIZE A SOLID STATE TRIP UNIT. THE BREAKER SHALL BE UL/CSA LISTED OF IEC CONSTRUCTION AND CONNECTED TO ENGINE/GENERATOR SAFETY SHUTDOWNS. BREAKER SHALL BE HOUSED IN AN EXTENSION TERMINAL BOX WHICH IS ISOLATED FROM VIBRATIONS INDUCED BY THE GENERATOR SET. MECHANICAL TYPE LUGS, SIZED FOR THE CIRCUIT BREAKER FEEDERS SHOWN ON DRAWING, SHALL BE SUPPLIED ON THE LOAD SIDE OF BREAKER.

2.4 CONTROLS – GENERATOR SET MOUNTED

PROVIDE A FULLY SOLID-STATE, MICROPROCESSOR BASED, GENERATOR SET CONTROL. THE CONTROL PANEL SHALL BE DESIGNED AND BUILT BY THE ENGINE MANUFACTURER. THE CONTROL SHALL PROVIDE ALL OPERATING, MONITORING, AND CONTROL FUNCTIONS FOR THE GENERATOR SET. THE CONTROL PANEL SHALL PROVIDE REAL TIME DIGITAL COMMUNICATIONS TO ALL ENGINE AND REGULATOR CONTROLS.

2.4.1 ENVIRONMENTAL

THE GENERATOR SET CONTROL SHALL BE TESTED AND CERTIFIED TO THE FOLLOWING ENVIRONMENTAL CONDITIONS.

1. -40°C TO +70C OPERATING RANGE
2. 95% HUMIDITY NON-CONDENSING, 30C TO 60C
3. IP22 PROTECTION FOR REAR OF CONTROLLER; IP55 WHEN INSTALLED IN CONTROL PANEL
4. 5% SALT SPRAY, 48 HOURS, +38C, 36.8V SYSTEM VOLTAGE
5. SINUSOIDAL VIBRATION 4.3G'S RMS, 24-1000HZ
6. ELECTROMAGNETIC CAPABILITY (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2)
7. SHOCK: WITHSTAND 15G

2.4.2 FUNCTIONAL REQUIREMENTS

THE FOLLOWING FUNCTIONALITY SHALL BE INTEGRAL TO THE CONTROL PANEL.

1. THE CONTROL SHALL INCLUDE A 33 X 132 PIXEL, 24MM X 95MM, POSITIVE IMAGE, TRANSFLECTIVE LCD DISPLAY WITH TEXT BASED ALARM/EVENT DESCRIPTIONS.
2. AUDIBLE HORN FOR ALARM AND SHUTDOWN WITH HORN SILENCE SWITCH
3. STANDARD ISO LABELING
4. MULTIPLE LANGUAGE CAPABILITY
5. REMOTE START/STOP CONTROL
6. LOCAL RUN/OFF/AUTO CONTROL INTEGRAL TO SYSTEM MICROPROCESSOR
7. COOLDOWN TIMER
8. SPEED ADJUST
9. LAMP TEST
10. PUSH BUTTON EMERGENCY STOP BUTTON
11. PASSWORD PROTECTED SYSTEM PROGRAMMING

2.4.3 DIGITAL MONITORING CAPABILITY

THE CONTROLS SHALL PROVIDE THE FOLLOWING DIGITAL READOUTS FOR THE ENGINE AND GENERATOR.
ALL READINGS SHALL BE INDICATED IN EITHER METRIC OR ENGLISH UNITS

ENGINE

1. ENGINE OIL PRESSURE
2. ENGINE OIL TEMPERATURE
3. ENGINE COOLANT TEMPERATURE
4. ENGINE RPM
5. BATTERY VOLTS

GENERATOR

1. GENERATOR AC VOLTS (LINE TO LINE, LINE TO NEUTRAL AND AVERAGE)
2. GENERATOR AC CURRENT (AVG AND PER PHASE)
3. GENERATOR AC FREQUENCY
4. GENERATOR KW (TOTAL AND PER PHASE)
5. GENERATOR KVA (TOTAL AND PER PHASE)
6. GENERATOR KVAR (TOTAL AND PER PHASE)
7. POWER FACTOR (AVG AND PER PHASE)
8. TOTAL KW-HR
9. TOTAL KVAR-HR
10. % KW
11. % KVA
12. % KVAR

2.4.4 ALARMS AND SHUTDOWNS

THE CONTROL SHALL MONITOR AND PROVIDE ALARM INDICATION AND SUBSEQUENT SHUTDOWN FOR THE FOLLOWING CONDITIONS. ALL ALARMS AND SHUTDOWNS ARE ACCOMPANIED BY A TIME, DATE, AND ENGINE HOUR STAMP THAT ARE STORED BY THE CONTROL PANEL FOR FIRST AND LAST OCCURRENCE:

ENGINE ALARM/SHUTDOWN

1. LOW OIL PRESSURE ALARM/SHUTDOWN
2. HIGH COOLANT TEMPERATURE ALARM/SHUTDOWN
3. LOSS OF COOLANT SHUTDOWN
4. OVERSPEED SHUTDOWN
5. OVERCRANK SHUTDOWN
6. LOW COOLANT LEVEL ALARM
7. LOW FUEL LEVEL ALARM
8. EMERGENCY STOP DEPRESSED SHUTDOWN
9. LOW COOLANT TEMPERATURE ALARM
10. LOW BATTERY VOLTAGE ALARM
11. HIGH BATTERY VOLTAGE ALARM
12. CONTROL SWITCH NOT IN AUTO POSITION ALARM
13. BATTERY CHARGER FAILURE ALARM

GENERATOR ALARM/SHUTDOWN

1. GENERATOR OVER VOLTAGE
2. GENERATOR UNDER VOLTAGE
3. GENERATOR OVER FREQUENCY
4. GENERATOR UNDER FREQUENCY
5. GENERATOR REVERSE POWER
6. GENERATOR OVERCURRENT

2.4.5 INPUTS AND OUTPUTS

PROGRAMMABLE DIGITAL INPUTS
THE CONTROLLER SHALL INCLUDE THE ABILITY TO ACCEPT SIX (6) DIGITAL INPUT SIGNALS. THE SIGNALS MAY BE PROGRAMMED FOR EITHER HIGH OR LOW ACTIVATION USING PROGRAMMABLE NORMALLY OPEN OR NORMALLY CLOSED CONTACTS.

DIGITAL OUTPUTS
THE CONTROL SHALL INCLUDE THE ABILITY TO OPERATE SIX (6) PROGRAMMABLE RELAY OUTPUT SIGNALS, INTEGRAL TO THE CONTROLLER. THE OUTPUT RELAYS SHALL BE RATED FOR 2A @ 30VDC.

DISCRETE OUTPUTS
THE CONTROL SHALL INCLUDE THE ABILITY TO OPERATE ONE (1) DISCRETE OUTPUTS, INTEGRAL TO THE CONTROLLER, WHICH ARE CAPABLE OF SINKING UP TO 300MA.

2.4.6 MAINTENANCE

ALL ENGINE, VOLTAGE REGULATOR, CONTROL PANEL AND ACCESSORY UNITS SHALL BE ACCESSIBLE THROUGH A SINGLE ELECTRONIC SERVICE TOOL.
THE FOLLOWING MAINTENANCE FUNCTIONALITY SHALL BE INTEGRAL TO THE GENERATOR SET CONTROL:

1. ENGINE RUNNING HOURS DISPLAY
2. SERVICE MAINTENANCE INTERVAL (RUNNING HOURS OR CALENDAR DAYS)
3. ENGINE CRANK ATTEMPT COUNTER
4. ENGINE SUCCESSFUL STARTS COUNTER
5. 20 EVENTS ARE STORED IN CONTROL PANEL MEMORY
6. PROGRAMMABLE CYCLE TIMER THAT STARTS AND RUNS THE GENERATOR FOR A PREDETERMINED TIME. THE TIMER SHALL USE 14 USER-PROGRAMMABLE SEQUENCES THAT ARE REPEATED IN A 7-DAY CYCLE. EACH SEQUENCE SHALL HAVE THE FOLLOWING PROGRAMMABLE SET POINTS:
   A. DAY OF WEEK
   B. TIME OF DAY TO START
   C. DURATION OF CYCLE

2.4.7 REMOTE COMMUNICATIONS

REMOTE COMMUNICATIONS
THE CONTROL SHALL INCLUDE MODBUS RTU COMMUNICATIONS AS STANDARD VIA RS-485 HALF DUPLEX WITH CONFIGURABLE BAUD RATES FROM 2.4K TO 57.6K.

REMOTE ANNUNCIATOR (NFPA 99/110, CSA 282)
PROVIDE A REMOTE ANNUNCIATOR TO MEET THE REQUIREMENTS OF NFPA 110, LEVEL 1.

1. THE ANNUNCIATOR SHALL PROVIDE REMOTE ANNUNCIATION OF ALL POINTS STATED ABOVE AND SHALL INCORPORATE RING-BACK CAPABILITY SO THAT AFTER SILENCING THE INITIAL ALARM, ANY SUBSEQUENT ALARMS WILL SOUND THE HORN.
2. ABILITY TO BE LOCATED UP TO 800 FT FROM THE GENERATOR SET

REMOTE MONITORING SOFTWARE
THE CONTROL SHALL PROVIDE MONITORING SOFTWARE WITH THE FOLLOWING FUNCTIONALITY:

1. PROVIDE ACCESS TO ALL DATE AND EVENTS ON GENERATOR SET COMMUNICATIONS NETWORK
2. PROVIDE REMOTE CONTROL CAPABILITY FOR THE GENERATOR SET
3. ABILITY TO MONITOR UP TO 12 GENERATOR SETS
4. ABILITY TO COMMUNICATE VIA MODBUS RTU OR REMOTE MODEM

2.5 COOLING SYSTEM

THE GENERATOR SET SHALL BE EQUIPPED WITH A RAIL-MOUNTED, ENGINE-DRIVEN RADIATOR WITH BLOWER FAN AND ALL ACCESSORIES. THE COOLING SYSTEM SHALL BE SIZED TO OPERATE AT FULL LOAD CONDITIONS AND 110 F* AMBIENT AIR ENTERING THE ROOM OR ENCLOSURE (IF AN ENCLOSURE IS SPECIFIED). THE GENERATOR SET SUPPLIER IS RESPONSIBLE FOR PROVIDING A PROPERLY SIZED COOLING SYSTEM BASED ON THE ENCLOSURE STATIC PRESSURE RESTRICTION.

2.6 FUEL SYSTEM

2.6.1 FUEL SYSTEM

THE FUEL SYSTEM SHALL BE INTEGRAL WITH THE ENGINE. IN ADDITION TO THE STANDARD FUEL FILTERS PROVIDED BY THE ENGINE MANUFACTURER, THERE SHALL ALSO BE INSTALLED A PRIMARY FUEL FILTER/WATER SEPARATOR IN THE FUEL INLET LINE TO THE ENGINE. ALL FUEL PIPING SHALL BE BLACK IRON OR FLEXIBLE FUEL HOSE RATED FOR THIS SERVICE. NO GALVANIZED PIPING WILL BE PERMITTED. FLEXIBLE FUEL LINES SHALL BE MINIMALLY RATED FOR 300 DEGREES F AND 100 PSI.

2.6.2 FUEL SUB BASE TANK

PROVIDE A DOUBLE WALL SUB-BASE TANK CONSTRUCTED TO MEET ALL LOCAL CODES AND REQUIREMENTS. A FUEL TANK BASE OF 48 HOUR CAPACITY SHALL BE PROVIDED AS AN INTEGRAL PART OF THE ENCLOSURE. IT SHALL BE CONTAINED IN A RUPTURE BASIN WITH 110% CAPACITY. THE TANK SHALL MEET UL142 STANDARDS. A LOCKING FILL CAP, A MECHANICAL READING FUEL LEVEL GAUGE, LOW FUEL LEVEL ALARM CONTACT, AND FUEL TANK RUPTURE ALARM CONTACT SHALL BE PROVIDED.

2.7 EXHAUST SYSTEM

2.7.1 SILENCER

A CRITICAL GRADE SILENCER, COMPANION FLANGES, AND FLEXIBLE EXHAUST FITTING PROPERLY SIZED SHALL BE FURNISHED AND INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION. MOUNTING SHALL BE PROVIDED BY THE CONTRACTOR AS SHOWN ON THE DRAWINGS (INDOOR INSTALLATIONS ONLY). THE SILENCER SHALL BE MOUNTED SO THAT ITS WEIGHT IS NOT SUPPORTED BY THE ENGINE NOR WILL EXHAUST SYSTEM GROWTH DUE TO THERMAL EXPANSION BE IMPOSED ON THE ENGINE. EXHAUST PIPE SIZE SHALL BE SUFFICIENT TO ENSURE THAT EXHAUST BACKPRESSURE DOES NOT EXCEED THE MAXIMUM LIMITATIONS SPECIFIED BY THE ENGINE MANUFACTURER.

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER
01-06-2025

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PORT OF BROWNSVILLE FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
GENERATOR SPECIFICATIONS

PORT OF BROWNSVILLE
the port that works

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YOUR RELIABLE PARTNER

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2.8 STARTING SYSTEM

2.8.1 STARTING MOTOR

A DC ELECTRIC STARTING SYSTEM WITH POSITIVE ENGAGEMENT SHALL BE FURNISHED. THE MOTOR VOLTAGE SHALL BE AS RECOMMENDED BY THE ENGINE MANUFACTURER.

2.8.2 JACKET WATER HEATER

JACKET WATER HEATER SHALL BE PROVIDED AND SHALL BE SIZED TO INSURE THAT GENSET WILL START WITHIN THE SPECIFIED TIME PERIOD AND AMBIENT CONDITIONS.

2.8.3 BATTERIES

BATTERIES – A LEAD–ACID STORAGE BATTERY SET OF THE HEAVY–DUTY STARTING TYPE SHALL BE PROVIDED. BATTERY VOLTAGE SHALL BE COMPATIBLE WITH THE STARTING SYSTEM. THE BATTERIES SUPPLIED SHALL MEET NFPA 110 CRANKING REQUIREMENTS OF 90 SECONDS MINIMUM OF TOTAL CRANKING TIME. BATTERY SPECIFICATIONS (TYPE, AMP–HOUR RATING, COLD CRANKING AMPS) TO BE PROVIDED IN THE SUBMITTAL.

2.8.4 BATTERY CHARGER

BATTERY CHARGER – A CURRENT LIMITING BATTERY CHARGER SHALL BE FURNISHED TO AUTOMATICALLY RECHARGE BATTERIES. THE CHARGER SHALL BE DUAL CHARGE RATE WITH AUTOMATIC SWITCHING TO THE BOOST RATE WHEN REQUIRED. THE BATTERY CHARGER SHALL BE MOUNTED ON THE GENSET PACKAGE OR INSIDE THE GENSET ENCLOSURE/ROOM.

2.9 ENCLOSURE

2.9.1 SOUND ATTENUATED ENCLOSURE

THE COMPLETE DIESEL ENGINE GENERATOR SET, INCLUDING GENERATOR CONTROL PANEL, ENGINE STARTING BATTERIES AND FUEL OIL TANK, SHALL BE ENCLOSED IN A FACTORY ASSEMBLED, SOUND ATTENUATED ENCLOSURE MOUNTED ON THE FUEL TANK BASE.

1. A WEATHER RESISTANT, SOUND ATTENUATED ENCLOSURE OF STEEL WITH ELECTROSTATICALLY APPLIED POWDER COATED BAKED POLYESTER PAINT. THE ENCLOSURE SHALL HAVE A RESULTING SOUND LEVEL OF 75 DBA @ 23 FT WITH THE GENSET RUNNING UNDER FULL LOAD. IT SHALL CONSIST OF A ROOF, SIDE WALLS, AND END WALLS. FASTENERS SHALL BE EITHER ZINC PLATED OR STAINLESS STEEL.
2. ENCLOSURE SOUND ATTENUATION: ACOUSTICAL FOAM SHALL BE PROVIDED BETWEEN ALL SUPPORTS AND INSIDE DOORS AND SOUND BAFFLES ON AIR INTAKE AND AIR DISCHARGE.

3 EXECUTION

3.1 INSTALLATION

INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, THE PROJECT DRAWINGS AND SPECIFICATIONS, AND ALL APPLICABLE CODES.

3.2 START–UP AND TESTING

COORDINATE ALL START–UP AND TESTING ACTIVITIES WITH THE ENGINEER AND OWNER. AFTER INSTALLATION IS COMPLETE AND NORMAL POWER IS AVAILABLE, THE MANUFACTURER'S LOCAL DEALER SHALL PERFORM THE FOLLOWING:

NFPA 110 LOAD TEST REQS

1. VERIFY THAT THE EQUIPMENT IS INSTALLED PROPERLY.
2. CHECK ALL AUXILIARY DEVICES FOR PROPER OPERATION, INCLUDING BATTERY CHARGER, JACKET WATER HEATER(S), GENERATOR SPACE HEATER, REMOTE ANNUNCIATOR, ETC.
3. TEST ALL ALARMS AND SAFETY SHUTDOWN DEVICES FOR PROPER OPERATION AND ANNUNCIATION.
4. CHECK ALL FLUID LEVELS.
5. START ENGINE AND CHECK FOR EXHAUST, OIL, FUEL LEAKS, VIBRATIONS, ETC.
6. VERIFY PROPER VOLTAGE AND PHASE ROTATION AT THE TRANSFER SWITCH BEFORE CONNECTING TO THE LOAD.
7. CONNECT THE GENERATOR TO BUILDING LOAD AND VERIFY THAT THE GENERATOR WILL START AND RUN ALL DESIGNATED LOADS.
8. THE SYSTEM SHALL BE TESTED UNDER FULL LOAD AND MONITOR THE FOLLOWING READINGS:

OIL PRESSURE
COOLANT TEMPERATURE
BATTERY CHARGE RATE
AC VOLTS
AC AMPERES– ALL PHASES
FREQUENCY
KILOWATTS
AMBIENT TEMPERATURE

3.3 OPERATION AND MAINTENANCE MANUALS

PROVIDE TWO (2) SETS OF OPERATION AND MAINTENANCE MANUALS COVERING THE GENERATOR, SWITCHGEAR, AND AUXILIARY COMPONENTS. INCLUDE FINAL AS–BUILT WIRING INTERCONNECT DIAGRAMS AND RECOMMENDED PREVENTATIVE MAINTENANCE SCHEDULES.

3.4 TRAINING

3.4.1 ON–SITE TRAINING

PROVIDE ON–SITE TRAINING TO INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT. REVIEW OPERATION AND MAINTENANCE MANUALS, PARTS MANUALS, AND EMERGENCY SERVICE PROCEDURES.

AUTOMATIC TRANSFER SWITCH 800 AMP, 4 POLE, NEMA 4X

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

1 GENERAL

1.1 SCOPE

A. IT IS THE INTENT OF THIS SPECIFICATION TO SECURE A TRANSFER SWITCH THAT HAS BEEN PROTOTYPE TESTED, FACTORY BUILT, PRODUCTION TESTED AND SITE TESTED. A TRANSFER SWITCH WITH THE NUMBER OF POLES, VOLTAGE AND CURRENT RATINGS SHOWN ON THE PLANS AND SPECIFIED HEREIN SHALL BE PROVIDED.

1.2 CODES AND STANDARDS

A. THE AUTOMATIC TRANSFER SWITCH SHALL CONFORM TO THE REQUIREMENTS OF:

1. UL 1008: UNDERWRITERS LABORATORIES STANDARD FOR AUTOMATIC TRANSFER SWITCHES
2. CSA: C22.2 NO. 178 CERTIFIED
3. IEC: 947–6–1 CERTIFIED AT 480 VAC
4. NFPA 70: NATIONAL ELECTRICAL CODE INCLUDING USE IN EMERGENCY AND STANDBY SYSTEMS IN ACCORDANCE WITH ARTICLES 517, 700, 701, 702
5. NFPA 99: ESSENTIAL ELECTRICAL SYSTEMS FOR HEALTH CARE FACILITIES
6. NFPA 101: LIFE SAFETY CODE
7. NFPA 110: STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS
8. IEEE 241: I.E.E.E. RECOMMENDED PRACTICE FOR ELECTRICAL POWER SYSTEMS IN COMMERCIAL BUILDINGS
9. IEEE 446: I.E.E.E. RECOMMENDED PRACTICE FOR EMERGENCY AND STANDBY POWER SYSTEMS
10. NEMA ICS10: AC AUTOMATIC TRANSFER SWITCH EQUIPMENT
11. UL 50/50B: ENCLOSURES
12. ICS 6: ENCLOSURES
13. ANSI C33.76: ENCLOSURES
14. NEMA 250: ENCLOSURES
15. IEEE 472: (ANSI C37.90A): RINGING WAVE IMMUNITY
16. EN55022 (CISPR11): CONDUCTED AND RADIATED EMISSIONS (EXCEEDS EN55011 & MILSTD 461 CLASS 3)
17. EN61000–4–2: (LEVEL 4): ESD IMMUNITY TEST CLASS B:
18. EN61000–4–3: (ENV50140): RADIATED RF, ELECTROMAGNETIC FIELD IMMUNITY
19. EN61000–4–4: ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST
20. EN61000–4–5: IEEE C62.41: SURGE IMMUNITY TEST (1.2 X 50___S, 5 & 8 KV)
21. EN61000–4–6: (ENV50141): CONDUCTED IMMUNITY TEST
22. EN61000–4–11: VOLTAGE DIPS AND INTERRUPTION IMMUNITY
23. IEE–693–2005: SEISMIC CERTIFIED AT HIGH LEVEL WITH 2.5 AMPLIFICATION FACTOR
24. IBC–2003: AT IP=1.5 FOR Z/H LESS THAN OR EQUAL TO (IN ACCORDANCE WITH ICC–ES–AC156)

1.3 APPROVED MANUFACTURES

A. THE AUTOMATIC TRANSFER SWITCH SHALL BE SUPPLIED BY:

- ASCO®
- RUSSELECTRIC®
- ABB–ZENITH®

OR BY ALTERNATE MANUFACTURES WHO SHALL SUBMIT A REQUEST ONE WEEK PRIOR TO BID AND INCLUDE A WRITTEN LIST OF DEVIATIONS FROM THIS SPECIFICATION TO BE CONSIDERED FOR APPROVAL.

2 PRODUCTS

2.1 PERFORMANCE AND CONSTRUCTION

A. THE AUTOMATIC TRANSFER SWITCH SHALL BE OF DOUBLE THROW CONSTRUCTION OPERATED BY A RELIABLE SOLENOID DRIVEN MECHANISM. THERE SHALL BE A DIRECT MECHANICAL COUPLING TO FACILITATE TRANSFER IN 6 CYCLES OR LESS.

B. THE TRANSFER SWITCH SHALL INCORPORATE A TIMED, CENTER–OFF OR NEUTRAL POSITION FOR MOTOR AND INDUCTIVE LOAD DECAY. TRANSFER TIME SHALL BE ADJUSTABLE FROM 0–10 MINUTES TO EITHER SOURCE. A MECHANICAL INTERLOCK SHALL BE PROVIDED TO ENSURE THAT BOTH SETS OF CONTACTS CANNOT BE CLOSED AT THE SAME TIME.

C. FOR SWITCHES INSTALLED IN SYSTEMS HAVING GROUND FAULT PROTECTIVE DEVICES, AND/OR WIRED SO AS TO BE DESIGNATED A SEPARATELY DERIVED SYSTEM BY THE NEC, A 4TH POLE SHALL BE PROVIDED. THIS ADDITIONAL POLE SHALL ISOLATE THE NORMAL AND EMERGENCY NEUTRALS. THE NEUTRAL POLE SHALL HAVE THE SAME WITHSTAND AND OPERATIONAL RATINGS AS THE OTHER POLES AND SHALL BE ARRANGED TO BREAK LAST AND MAKE FIRST TO MINIMIZE NEUTRAL SWITCHING TRANSIENTS. ADD–ON OR ACCESSORY POLES THAT ARE NOT OF IDENTICAL CONSTRUCTION AND WITHSTAND CAPABILITY WILL NOT BE CONSIDERED.

D. THE CONTACT STRUCTURE SHALL CONSIST OF A MAIN CURRENT CARRYING CONTACT, WHICH IS A SILVER ALLOY WITH A MINIMUM OF 50% SILVER CONTENT. THE CURRENT CARRYING CONTACTS SHALL BE PROTECTED BY SILVER TUNGSTEN ARCING CONTACTS ON ALL SIZES ABOVE 400 AMPS.

E. THE TRANSFER SWITCH MANUFACTURER SHALL SUBMIT TEST DATA FOR EACH SIZE SWITCH, SHOWING IT CAN WITHSTAND FAULT CURRENTS OF THE MAGNITUDE AND THE DURATION NECESSARY TO MAINTAIN THE SYSTEM INTEGRITY. MINIMUM UL LISTED WITHSTAND AND CLOSE INTO FAULT RATINGS SHALL BE AS FOLLOWS:

SIZE (AMPS)	COORDINATED BREAKER	CURRENT LIMITING FUSE
40 – 600	50,000	200,000
800	65,000	200,000
1000 – 1200	85,000	200,000
1600 – 3000	100,000	200,000

F. A DIELECTRIC TEST AT THE CONCLUSION OF THE WITHSTAND AND CLOSING TESTS SHALL BE PERFORMED.

G. THE AUTOMATIC TRANSFER SWITCH MANUFACTURER SHALL CERTIFY SUFFICIENT ARC INTERRUPTING CAPABILITIES FOR 50 CYCLES OF OPERATION BETWEEN A NORMAL AND EMERGENCY SOURCE THAT ARE 120 DEGREES OUT OF PHASE AT 480 VOLTS, 600% OF RATED CURRENT AT .50 POWER FACTOR. THIS CERTIFICATION IS TO ENSURE THAT THERE WILL BE NO CURRENT FLOW BETWEEN THE TWO ISOLATED SOURCES DURING SWITCHING.

H. ALL RELAYS SHALL BE CONTINUOUS DUTY INDUSTRIAL TYPE WITH WIPING CONTACTS. COILS, RELAYS, TIMERS AND ACCESSORIES SHALL BE READILY FRONT ACCESSIBLE. THE CONTROL PANEL AND POWER SECTION SHALL BE INTERCONNECTED WITH A HARNESS AND KEYED DISCONNECT PLUGS FOR MAINTENANCE.

I. MAIN AND ARCING CONTACTS SHALL BE VISIBLE WITHOUT MAJOR DISASSEMBLY TO FACILITATE INSPECTION AND MAINTENANCE.

J. A MANUAL HANDLE SHALL BE PROVIDED FOR MAINTENANCE PURPOSES WITH THE SWITCH DE–ENERGIZED. AN OPERATOR DISCONNECT SWITCH SHALL BE PROVIDED TO DEFEAT AUTOMATIC OPERATION DURING MAINTENANCE, INSPECTION OR MANUAL OPERATION.

K. SWITCHES COMPOSED OF MOLDED CASE BREAKERS, LIGHTING CONTACTORS OR COMPONENTS THEREOF WILL NOT BE ACCEPTABLE.

L. THE CURRENT RATING SHALL BE A CONTINUOUS RATING WHEN THE SWITCH IS INSTALLED IN AN ENCLOSURE, AND SHALL CONFORM TO NEMA TEMPERATURE RISE STANDARDS.

M. THE UNIT SHALL BE RATED BASED ON ALL CLASSES OF LOADS, I.E., RESISTIVE, TUNGSTEN, BALLAST AND INDUCTIVE LOADS. SWITCHES RATED 400 AMPERES OR LESS SHALL BE UL LISTED FOR 100% TUNGSTEN LAMP LOAD.

N. TEMPERATURE RISE TESTS IN ACCORDANCE WITH UL 1008 SHALL HAVE BEEN CONDUCTED AFTER THE OVERLOAD AND ENDURANCE TESTS TO CONFIRM THE ABILITY OF THE UNITS TO CARRY THEIR RATED CURRENTS WITHIN THE ALLOWABLE TEMPERATURE LIMITS.

O. UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS, THE SWITCH SHALL BE MOUNTED IN A NEMA 1 ENCLOSURE.

2.2 CONTROL

A. THE CONTROL PANEL SHALL BE OPTO–ISOLATED FROM ELECTRICAL NOISE AND PROVIDED WITH THE FOLLOWING INHERENT CONTROL FUNCTIONS AND CAPABILITIES:

1. EASY–TO–VIEW 4X20 LCD DISPLAY WITH LONG LASTING LED INDICATORS.
2. CONTROL PANEL SHALL DISPLAY VOLTAGE AND FREQUENCY OF BOTH SOURCES.
3. THE USER SHALL BE ABLE TO VIEW THE LAST 16 RECORDED EVENTS.
4. CAPABILITY FOR EXTERNAL COMMUNICATION AND NETWORK INTERFACE.
5. ADJUSTMENTS TO ALL SETTINGS SHALL BE MADE FROM THE FRONT OF THE PANEL WITHOUT OPENING THE DOOR.

B. THE TRANSFER SWITCH SHALL BE EQUIPPED WITH A MICROPROCESSOR BASED CONTROL PANEL. THE CONTROL PANEL SHALL PERFORM THE OPERATIONAL AND DISPLAY FUNCTIONS OF THE TRANSFER SWITCH. THE DISPLAY FUNCTIONS OF THE CONTROL PANEL SHALL INCLUDE ATS POSITION, SOURCE AVAILABILITY, SEQUENCE INDICATION AND DIAGNOSTICS.

C. ALL PROGRAMMABLE AND CONTROL FUNCTIONS SHALL BE PASS CODE PROTECTED AND ACCESSIBLE THROUGH THE KEYPAD.

D. THE CONTROL PANEL SHALL BE PROVIDED WITH A SIMPLE USER INTERFACE FOR TRANSFER SWITCH MONITORING, CONTROL AND FIELD CHANGEABLE FUNCTIONS AND SETTINGS.

E. TOUCH PAD TEST SWITCH WITH FAST TEST/LOAD/NO LOAD SELECTION CAPABILITY TO SIMULATE A NORMAL SOURCE FAILURE.

F. THE CONTROLLER SHALL PROVIDE DIGITAL TIMER ADJUSTMENTS WITH 1–SECOND RESOLUTION. VOLTAGE AND FREQUENCY SHALL BE ADJUSTABLE TO 1% RESOLUTION TO FACILITATE ACCURATE TRANSFER.

G. TO ENSURE RELIABLE AND CONSISTENT USER OPERATION THE CONTROLS MUST BE EQUIPPED WITH NONVOLATILE MEMORY AND ALLOW AUTOMATIC DAYLIGHT SAVINGS TIME ADJUSTMENT.

3 OPERATION

3.1 SEQUENCE OF OPERATION

A. THE ATS SHALL INCORPORATE ADJUSTABLE THREE PHASE UNDER VOLTAGE SENSING ON THE NORMAL SOURCE.

B. WHEN THE VOLTAGE OF ANY PHASE OF THE NORMAL SOURCE IS REDUCED TO 80% OF NOMINAL VOLTAGE, FOR A PERIOD OF 0–10 SECONDS (PROGRAMMABLE) A PILOT CONTACT SHALL CLOSE TO INITIATE STARTING OF THE ENGINE GENERATOR.

C. THE ATS SHALL INCORPORATE ADJUSTABLE UNDER VOLTAGE AND UNDER FREQUENCY SENSING ON THE EMERGENCY SOURCE. IN ADDITION, THE SWITCH WILL BE PROVIDED WITH A CENTER–OFF OR NEUTRAL POSITION

D. WHEN THE EMERGENCY SOURCE HAS REACHED A VOLTAGE VALUE OF 90% NOMINAL, ACHIEVED FREQUENCY WITHIN 95% OF THE RATED VALUE AND HAS REACHED THE END OF THE ADJUSTABLE DELAY, THE LOAD SHALL BE TRANSFERRED TO THE NEUTRAL POSITION FOR AN ADJUSTABLE TIME PERIOD OF 0–10 MINUTES. UPON COMPLETION OF THIS NEUTRAL TIME DELAY THE SWITCH SHALL BE TRANSFERRED TO THE EMERGENCY SOURCE.

E. WHEN THE NORMAL SOURCE HAS BEEN RESTORED TO NOT LESS THAN 90% OF RATED VOLTAGE ON ALL PHASES AND THE TIME DELAY TRANSFER TO NORMAL HAS EXPIRED, THE LOAD SHALL BE RETRANSFERRED TO THE NEUTRAL POSITION FOR AN ADJUSTABLE TIME PERIOD OF 0–10 MINUTES. AFTER WHICH THE SWITCH SHALL BE CONNECTED TO THE NORMAL SOURCE. THE GENERATOR SHALL RUN UNLOADED FOR 5 MINUTES (PROGRAMMABLE) AND THEN AUTOMATICALLY SHUT DOWN. THE GENERATOR SHALL BE READY FOR AUTOMATIC OPERATION UPON THE NEXT FAILURE OF THE NORMAL SOURCE.

F. IF THE ENGINE GENERATOR SHOULD FAIL WHILE CARRYING THE LOAD, RETRANSFER TO THE NORMAL SOURCE SHALL BE MADE INSTANTANEOUSLY UPON RESTORATION OF PROPER VOLTAGE (90%) ON THE NORMAL SOURCE.

G. INSPECTION AND OPERATIONAL TESTING/DEMONSTATION OF THE ATS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE TO INDICATE THE ATS SATISFIES THESE SPECIFICATIONS.

3.2 STANDARD ACCESSORIES

A. ADJUSTABLE TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE FAILURE PRIOR TO ENGINE START. FIELD PROGRAMMABLE 0–10 SECONDS FACTORY SET AT 3 SECONDS.

B. ADJUSTABLE TIME DELAY ON RETRANSFER TO NORMAL SOURCE, PROGRAMMABLE 0–60 MINUTES FACTORY SET AT 30 MINUTES. IF THE EMERGENCY SOURCE FAILS DURING THE RETRANSFER TIME DELAY, THE TRANSFER SWITCH CONTROLS SHALL AUTOMATICALLY BYPASS THE TIME DELAY AND IMMEDIATELY RETRANSFER TO THE NORMAL POSITION.

C. A TIME DELAY ON TRANSFER TO EMERGENCY, PROGRAMMABLE 0–5 MINUTES, FACTORY SET AT 1 SECOND.

D. A TIME DELAY AND CONTROL PANEL DISPLAY ON TRANSFER TO EITHER SOURCE WITH A CENTER–OFF POSITION, PROGRAMMABLE 0–10 MINUTES, AND FACTORY SET AT 5 SECONDS.

E. AN IN–PHASE MONITOR SHALL BE PROVIDED. THE MONITOR SHALL COMPARE THE PHASE ANGLE DIFFERENCE BETWEEN THE NORMAL AND EMERGENCY SOURCES AND BE PROGRAMMED TO ANTICIPATE THE ZERO CROSSING POINT TO MINIMIZE SWITCHING TRANSIENTS.

F. AN EXERCISER TIMER WITH MOMENTARY TEST PUSHBUTTON SHALL BE INCORPORATED WITHIN THE MICROPROCESSOR AND SHALL BE CAPABLE OF STARTING THE ENGINE GENERATOR SET AND TRANSFERRING THE LOAD (WHEN SELECTED) FOR EXERCISE PURPOSES ON A DAILY, WEEKLY OR MONTHLY BASIS. THE EXERCISER SHALL CONTAIN A BATTERY FOR MEMORY RETENTION DURING AN OUTAGE.

G. PROVIDE A MOMENTARY PUSHBUTTON TO BYPASS THE TIME DELAYS ON TRANSFER AND RETRANSFER AND PROGRAMMABLE COMMIT/NO COMMIT CONTROL LOGIC.

H. THE CONTROLLER SHALL ACCEPT A REMOTE PEAK SHAVE OR TEST INPUT TO SIGNAL THE TRANSFER SWITCH TO THE EMERGENCY POSITION.

I. A SET OF CUSTOMER CONTACTS SHALL BE PROVIDED TO INDICATE BOTH EMERGENCY AND NORMAL SOURCE POSITION.

J. ADDITIONAL AUXILIARY CONTACTS (A3) – CLOSED WHEN THE TRANSFER SWITCH IS IN SOURCE 2 POSITION.

K. ADDITIONAL AUXILIARY CONTACTS (A4) – CLOSED WHEN THE TRANSFER SWITCH IS IN SOURCE 1 POSITION.

4 EXECUTION

4.1 GENERAL

A. THE TRANSFER SWITCH SHALL BE INSTALLED AS SHOWN ON THE PLANS, IN ACCORDANCE WITH THE MANUFACTURE'S RECOMMENDATIONS AND ALL APPLICABLE CODES.

4.2 FACTORY TESTS

A. THE TRANSFER SWITCH MANUFACTURER SHALL PERFORM A COMPLETE FUNCTIONAL TEST ON THE SWITCH, CONTROLLER AND ACCESSORIES PRIOR TO SHIPPING FROM THE FACTORY. A CERTIFIED TEST REPORT SHALL BE AVAILABLE UPON REQUEST.

4.3 SERVICE

A. THE MANUFACTURER SHALL MAINTAIN A NATIONAL SERVICE ORGANIZATION THAT IS FACTORY TRAINED AND CERTIFIED FOR TRANSFER SWITCH EQUIPMENT. IN ADDITION, THE SERVICE ORGANIZATION SHALL BE AVAILABLE 24 HOURS PER DAY, 365 DAYS PER YEAR.

4.4 WARRANTY

A. THE AUTOMATIC TRANSFER SWITCH SHALL BE WARRANTED AGAINST DEFECTIVE WORKMANSHIP FOR A PERIOD OF TWO YEARS.

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
GENERATOR / ATS SPECIFICATIONS

PORT OF BROWNSVILLE
the port that works

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YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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SCADA SYSTEM – GENERAL PROVISIONS

PART 1: GENERAL

1.01 SCOPE OF WORK:

A. THE PROJECT SHALL CONSIST OF A COMPLETE AND OPERATING SCADA SYSTEM FOR THE FOLLOWING SITES:

- CITY OF BUFFALO WASTEWATER TREATMENT PLANT

THE COMPLETE SYSTEM SHALL INCLUDED BUT NOT LIMITED TO ALL HARDWARE, SOFTWARE, LABOR, ANTENNA BASE, ANTENNA TOWER, COAX CABLE AND ANTENNA AS LISTED IN THIS PERFORMANCE SPECIFICATION. THE CONTRACTOR SHALL VISIT EACH SITE PRIOR TO SUBMITTING THEIR BID.

B. A SINGLE PRE–APPROVED SCADA SYSTEM INTEGRATOR (SSI) SHALL FURNISH ALL SERVICES AND EQUIPMENT DEFINED HEREIN AND IN OTHER SPECIFICATION SECTIONS AS REQUIRED TO PROVIDE A FULLY–FUNCTIONAL SCADA SYSTEM.

PRE–APPROVED SSI'S

1. BLOCKDESIGN–BUILD, LLC (903–247–9444)
2. TRAC–N–TROL (512–930–5721)
3. TEI CONTROLS (512–259–2977)
4. ALTERMAN ELECTRIC, INC. (512–836–3950)
5. CONTROL PANELS USA, INC. (512–863–3224)
6. DEDICATED CONTROLS, LLC. (972–736–2880)

C. THE SSI SHALL PROVIDE ALL MATERIALS, EQUIPMENT, LABOR, AND SERVICES REQUIRED TO ACHIEVE A FULLY INTEGRATED AND OPERATIONAL SCADA SYSTEM. THE SSI SHALL DESIGN AND COORDINATE THE CONTROL SYSTEM FOR PROPER OPERATION WITH RELATED EQUIPMENT AND MATERIALS FURNISHED BY OTHER SUPPLIERS UNDER OTHER SECTIONS OF THESE SPECIFICATIONS AND WITH RELATED EXISTING EQUIPMENT. THE SSI SHALL PROVIDE A TURNKEY SCADA SYSTEM INCLUDING ALL REQUIRED ELECTRICAL CONDUIT AND WIRE UNLESS OTHERWISE SPECIFIED.

D. TO FACILITATE THE OWNER'S FUTURE CONSTRUCTION, OPERATION, AND MAINTENANCE, PRODUCTS SHALL BE BY A MAJOR INSTRUMENTATION AND SCADA EQUIPMENT MANUFACTURERS, WITH PANEL MOUNTED DEVICES OF THE SAME TYPE AND MODEL AS FAR AS POSSIBLE.

E. ALL MATERIALS, EQUIPMENT, LABOR, AND SERVICES NECESSARY TO ACHIEVE THE MONITORING AND CONTROL FUNCTIONS DESCRIBED HEREIN SHALL BE PROVIDED IN A TIMELY MANNER SUCH THAT THE MONITORING AND CONTROL FUNCTIONS ARE AVAILABLE WHEN THE EQUIPMENT IS READY TO BE PLACED INTO SERVICE.

F. A MANDATORY PRE–BID WALK–THROUGH SHALL BE SCHEDULED FOR ALL PLAN HOLDERS BIDDING ON THE SCADA PORTION OF THIS PROJECT.

1.02 QUALIFICATIONS AND REQUIREMENTS:

A. IN ORDER TO ENSURE A COMPLETE AND SUCCESSFUL PROJECT, THE SSI'S MUST DEMONSTRATE A HISTORY OF SUCCESSFUL REFERENCES AND FINANCIAL STABILITY, AND FIVE YEARS OF SUSTAINED BUSINESS ACTIVITY IN THE SCADA INDUSTRY SERVING WATER AND WASTEWATER UTILITIES IN TEXAS.

B. IN ORDER TO ENSURE QUALITY CONTROL AND COMPATIBILITY WITH EXISTING OPERATIONS, THE INDIVIDUAL INTEGRATOR(S) TO COMPLETE THE WORK MUST BE SPECIFIED IN THE PROPOSAL AND THEIR EXPERIENCE MUST BE ACCEPTABLE, WITHOUT LIMITATION, IN THE FOLLOWING AREAS:

LIST SPECIFIC QUALIFICATIONS INCLUDING:

1. INTEGRATION EXPERIENCE OF WATER UTILITIES SERVING SIMILAR GEOGRAPHICAL OR COUNTY–WIDE AREAS OF AT LEAST TEN PROJECTS OF SUCCESSFUL REFERENCE FOR RADIO TELEMETRY SCADA WITHIN THE STATE OF TEXAS.

C. IN ORDER TO ENSURE ADEQUATE RESPONSE TO EMERGENCIES AND SERVICE NEEDS, THE SSI MUST HAVE A SERVICE FACILITY WITHIN A 150 MILE RADIUS OF THE WATER TREATMENT PLANT.

D. THE ATTACHED "SCOPE OF PROJECT AND EQUIPMENT SPECIFICATIONS" WILL BE REQUIRED AS PRESENTED. SEE SECTION ON "SUBSTITUTE EQUIPMENT".

E. THE SSI WILL SPECIFY EQUIPMENT, SIZES AND QUANTITIES WHICH ARE PROPOSED TO BE USED FOR THE PROJECT. ALL EQUIPMENT SPECIFIED SHALL BE NON–PROPRIETARY AND UNIVERSALLY AVAILABLE TO ALL SSI'S. ALL COMPUTER AND COMPUTER RELATED EQUIPMENT SHALL BE COMPLIANT FOR DATE–BASED FUNCTIONALITY. A COMPLIANCE CERTIFICATE SHALL BE REQUIRED FROM THE SSI STATING COMPLIANCE WITH THESE REQUIREMENTS.

F. THE SSI SHALL PROVIDE A SCHEDULE OF THE WARRANTY PROVIDED FOR WORK COMPLETED UNDER THIS PROPOSAL AND NON–WARRANTY SERVICE SCHEDULE WITH PRICING AND TERMS BEYOND THE WARRANTY PERIOD AS A PART OF ITS PROPOSAL.

G. THE SSI SHALL BE A "SYSTEMS HOUSE" REGULARLY ENGAGED IN THE DESIGN AND THE INSTALLATION OF COMPUTER SYSTEMS AND THEIR ASSOCIATED SUBSYSTEM AS THEY ARE APPLIED TO THE RETAIL PUBLIC WATER UTILITY INDUSTRY. FOR THE PURPOSES OF THIS SPECIFICATIONS SECTION, A "SYSTEMS HOUSE" SHALL BE INTERPRETED TO MEAN AN ORGANIZATION THAT COMPLIES WITH ALL OF THE FOLLOWING CRITERIA:

1. EMPLOYS DESIGN AND TECHNICAL PERSONNEL ON THIS PROJECT WHO HAVE SUCCESSFULLY COMPLETED A MANUFACTURER'S TRAINING COURSE ON THE CONFIGURATION AND IMPLEMENTATION OF THE SPECIFIC HARDWARE AND SOFTWARE FOR THIS PROJECT.

H. THE SSI SHALL MAINTAIN A FULLY EQUIPPED OFFICE/PRODUCTION FACILITY WITH FULL TIME EMPLOYEES CAPABLE OF, CONFIGURING, INSTALLING, CALIBRATING, TROUBLESHOOTING, AND TESTING THE SYSTEM SPECIFIED HEREIN.

I. LISTED SSI'S SHALL NOT BE REQUIRED TO SUBMIT A QUALIFICATION PROPOSAL. SSI'S INTERESTED IN BEING LISTED AS AN EQUAL SHALL SUBMIT THREE (3) COPIES OF A QUALIFICATIONS PROPOSAL, AS REQUIRED HEREIN, TO THE ENGINEER NO LATER THAN TEN (10) DAYS BEFORE THE BID OPENING DATE. A LIST OF APPROVED EQUALS WILL BE ISSUED NO LATER FIVE (5) DAYS BEFORE THE BID OPENING DATE BY ADDENDUM.

1. THE QUALIFICATIONS PROPOSAL SHALL PROVIDE DETAILS AND A DESCRIPTION OF HOW THE SSI PROPOSES TO FULFILL THE REQUIREMENTS SET FORTH IN THIS SPECIFICATION. THE SSI SHALL ALSO BE CAPABLE OF SATISFYING THE OWNER'S FUTURE NEEDS WITH REGARD TO A FULLY FUNCTIONAL SCADA SYSTEM. THE SSI SHALL PRESENT THE PROPOSAL IN SUFFICIENT DETAIL SO THAT PROPER EVALUATION REGARDING THE EXPERIENCE AND CAPABILITIES OF THE SSI CAN BE PERFORMED. ALL ITEMS LISTED AS QUALIFICATION REQUIREMENTS SET FORTH IN THIS SECTION MUST BE PROVIDED FOR PROPER EVALUATION. FAILURE TO PROVIDE SUCH DOCUMENTATION WILL DISQUALIFY THE APPLICANT.

2. THE PROPOSAL SHALL CONTAIN EVIDENCE THAT THE SSI HAS SUFFICIENT FINANCIAL RESOURCES TO MEET THE OBLIGATIONS INCIDENTAL TO THE PERFORMANCE OF THE WORK INCLUDING BONDING. (THIS REQUIREMENT MAY BE PROVIDED IN THE FORM OF A VERIFIABLE OR CERTIFIED FINANCIAL REPORT FOR THE COMPANY'S LATEST FISCAL YEAR).

3. THE PROPOSAL SHALL CONTAIN A LIST OF PERSONNEL AVAILABLE FOR ASSIGNMENT TO THE RESPONSIBLE POSITIONS OF PROJECT MANAGER, PROJECT ENGINEER, LEAD PROGRAMMER, INSTALLATION SUPERVISOR, AND AREA SERVICE REPRESENTATIVE. ALSO, INCLUDE A CONCISE RESUME OF EACH INDIVIDUAL'S EDUCATION, TRAINING, WORK EXPERIENCE, AND ACCOMPLISHMENTS.

4. THE PROPOSAL SHALL CONTAIN THE FOLLOWING SPECIFIC INFORMATION:

A. LOCATION OF SERVICE CENTER IN RELATION TO THE OWNER'S OFFICE.
B. TECHNICAL VALIDATION SAMPLES OF RECENTLY COMPLETED AND SIMILAR SCOPE PROJECTS.
C. A DESCRIPTION OF HOW THE SUPPLIER PLANS TO EXECUTE THE VARIOUS FUNCTIONS AND LOCATIONS WHERE THE VARIOUS WORK CAN BE PERFORMED, INCLUDING EXISTING LOCATIONS TO INTEGRATE INTO THE FUTURE PROJECTS AS DESIGNATED BY THE OWNER.

5. THE SSI SHALL BE REQUIRED TO PROVIDE A REFERENCE LIST OF A MINIMUM OF FIVE (5) YEARS RECENT PAST EXPERIENCE IN THE DESIGN, ASSEMBLY, AND COMMISSIONING OF INSTRUMENTATION AND CONTROL SYSTEMS OF COMPARABLE SIZE, TYPE, AND COMPLEXITY TO THE PROPOSED PROJECT. THE SSI SHALL BE REQUIRED TO HAVE HIS/HER OWN IN–HOUSE CAPABILITY TO HANDLE COMPLETE SYSTEM ENGINEERING, FABRICATION, AND TESTING.

6. THE SSI SHALL INDICATE THAT HE/SHE HAS IN HIS/HER EMPLOY CAPABLE PERSONNEL FOR DETAILED ENGINEERING, COORDINATION, DRAFTING, PROCUREMENT AND EXPEDITING, SCHEDULING, CONSTRUCTING, TESTING, INSPECTION, INSTALLATION, TRAINING, AND START–UP SERVICE FOR CALIBRATION AND COMMISSIONING AND WARRANTY COMPLIANCE FOR THE PERIOD SPECIFIED.

PART 2: SCADA SYSTEM

2.01 SCOPE OF PROJECT AND EQUIPMENT SPECIFICATIONS

A. THE SCADA SYSTEM SHALL BE A MICRO–PROCESSOR BASED MONITORING AND CONTROL–SYSTEM READY FOR COMMUNICATION WITH A MASTER TERMINAL UNIT (MTU) COMMUNICATING WITH OTHER REMOTE TERMINAL UNITS (RTU'S) VIA RADIO TELEMETRY OR OTHER SPECIFIED COMMUNICATION TECHNOLOGIES. RTU'S HEREIN SPECIFIED SHALL ALSO BE REQUIRED TO COMMUNICATE WITH OTHER RTU'S IN A PEER–TO–PEER MANNER FOR THE PURPOSE OF MEETING REGIONAL OR PRESSURE–PLANE–SPECIFIC REQUIREMENTS. PEER–TO–PEER COMMUNICATIONS BETWEEN RTU'S SHALL NOT REQUIRE PROGRAMMING AT EACH LOCATION. EACH MONITORING AND CONTROL SITE AT WHICH COMMANDS WILL BE EXECUTED SHALL BE LOCALLY CONTROLLED UTILIZING A LOGIC CONTROLLER WHICH SHALL BE PROGRAMMED ACCORDING TO IEC 61131 STANDARDS. RADIO–BASED RTU'S SHALL REPORT BY POLLING AND/OR BY EXCEPTION THE SCADA SYSTEM SHALL BE FULLY EXPANDABLE UP TO 500 I/O POINTS IN ORDER TO MEET FUTURE NEEDS WITHOUT LOSS OF INVESTMENT IN EQUIPMENT TO BE INSTALLED UNDER THIS PROPOSAL. WHENEVER THE RADIO SYSTEM DESIGNED IS 900 MHZ SPREAD SPECTRUM, THE SSI SHALL PROVIDE A FUNCTIONAL RADIO TELEMETRY SYSTEM IN ACCORDANCE WITH PROPER PRE–DESIGN ANALYSIS, RADIO PATH ANALYSIS, AND FIELD SIGNAL STRENGTH MEASUREMENTS. INSTALLED 900 MHZ SPREAD SPECTRUM SYSTEM MUST YIELD THE USER A SYSTEM COMPARABLE TO A HIGHER POWER VHF/UHF OR 902/928 MHZ RADIO TELEMETRY SYSTEM WITH TRANSMISSIONS EXCEEDING 98.0% RELIABILITY BETWEEN ALL LOCATIONS.

B. SYSTEM EQUIPMENT SPECIFICATIONS:

1. MASTER TERMINAL UNIT (MTU): THE MTU IS A CONTROLLER/INTERPRETER WHICH IS TO BE INSTALLED IN THE PROCESS BUILDING AND SHALL BE PROVIDED AS NECESSARY TO ACHIEVE THE MONITORING AND CONTROL FUNCTIONS DESCRIBED HEREINAFTER. THE MTU SHALL COMMUNICATE WITH AN OPERATOR INTERFACE TERMINAL (OIT) CONTAINING THE HUMAN MACHINE INTERFACE (HMI) SOFTWARE (VTS SCADA). THE MTU SHALL INCLUDE THE REQUIRED NUMBER OF OPERATOR INTERFACE TERMINALS ALONG WITH WHATEVER IS NECESSARY IN ORDER TO EFFECT GOOD COMMUNICATIONS, DATA ACQUISITION AND SUPERVISORY CONTROL TO AND WITH THE RTU'S. THE MTU SHALL INCLUDE SCADA ALARM SOFTWARE THAT WILL PROVIDE ALARM DIALING CAPABILITY AND AN INSQL HISTORIAN WITH REPORTING CAPABILITY. THE MTU SHALL BE CAPABLE OF RECEIVING THE FOLLOWING SITES:

- WATER TREATMENT PLANT

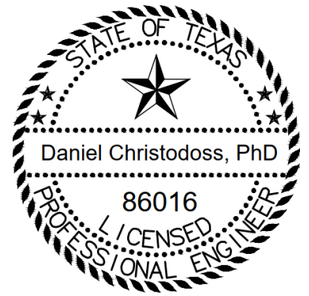
2. REMOTE TERMINAL UNIT (RTU): THE RTU IS A LOGIC CONTROLLER INSTALLED AT EACH REMOTE WELL SITE FOR THE CONTROL OF THE LOCAL EQUIPMENT AND THE MONITORING OF OPERATING PARAMETERS OF EACH SITE. EACH RTU SHALL CONTAIN A LOGIC CONTROLLER, RADIO, MODEM, POWER SUPPLIES, RELAYS, WIRING, CONDUIT, ANTENNA, CABLING, POWER/SURGE SUPPRESSION PROTECTION, BACKUP BATTERY/UPS AND NEMA 3R RATED ENCLOSURES.

3. ENCLOSURES W/BACK PANELS: NEMA 1 RATED ELECTRICAL AND INSTRUMENTATION ENCLOSURES TO HOUSE ELECTRONIC SCADA EQUIPMENT, CONTROL AND INSTRUMENTATION DEVICES PER THE CONSULTING ENGINEERS REQUIREMENTS SHALL BE PROVIDED. THE SSI SHALL INSTALL THE SCADA RTU EQUIPMENT PER THE PLANS. THE RTU SHALL BE SUFFICIENTLY SIZED TO INCORPORATE THE SCADA HARDWARE HARDWARE. THE RTU ENCLOSURE SHALL HAVE 25% SPARE CAPACITY.

4. LOGIC CONTROLLER (LC): AN LC IS A MICRO–PROCESSOR INSTALLED AT THE MTU AND/OR EACH RTU SCADA SITE TO INTERPRET INFORMATION REGARDING THE OPERATION AT THE SITE AND TO EXECUTE LOCAL COMMANDS OR COMMANDS SENT FROM OTHER SCADA SITES.

AS SPECIFIED:
ALLEN–BRADLEY MICROLOGIX 1400 OR APPROVED EQUAL
NOTE: WHEREVER POSSIBLE, ALL LOGIC CONTROLLERS SHALL BE OF THE SAME MODEL AND CONFIGURATION FOR ALL SITES IN ORDER TO PROVIDE THE OWNER WITH STANDARD PARTS FOR SERVICE CONTINUITY.

5. POWER SUPPLY: EACH RTU/MTU REQUIRES ALTERNATING CURRENT CONVERSION TO DIRECT CURRENT FOR OPERATIONS OF ITS COMPONENTS. A BATTERY PACK ALLOWS FOR DIRECT CURRENT FEED IN THE EVENT OF A POWER FAILURE. THIS BATTERY PACK WILL ENSURE CONTINUED OPERATION AND FLOW OF INFORMATION FROM THE RADIO AND LOGIC CONTROLLERS AT SCADA SITES DURING SHORT TERM POWER OUTAGES AND ENSURE MTU COMPUTER POWER SUPPLY BACKUP DURING SHORT– TERM POWER OUTAGES.



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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTEWATER TREATMENT PLANT
SCADA SPECIFICATIONS

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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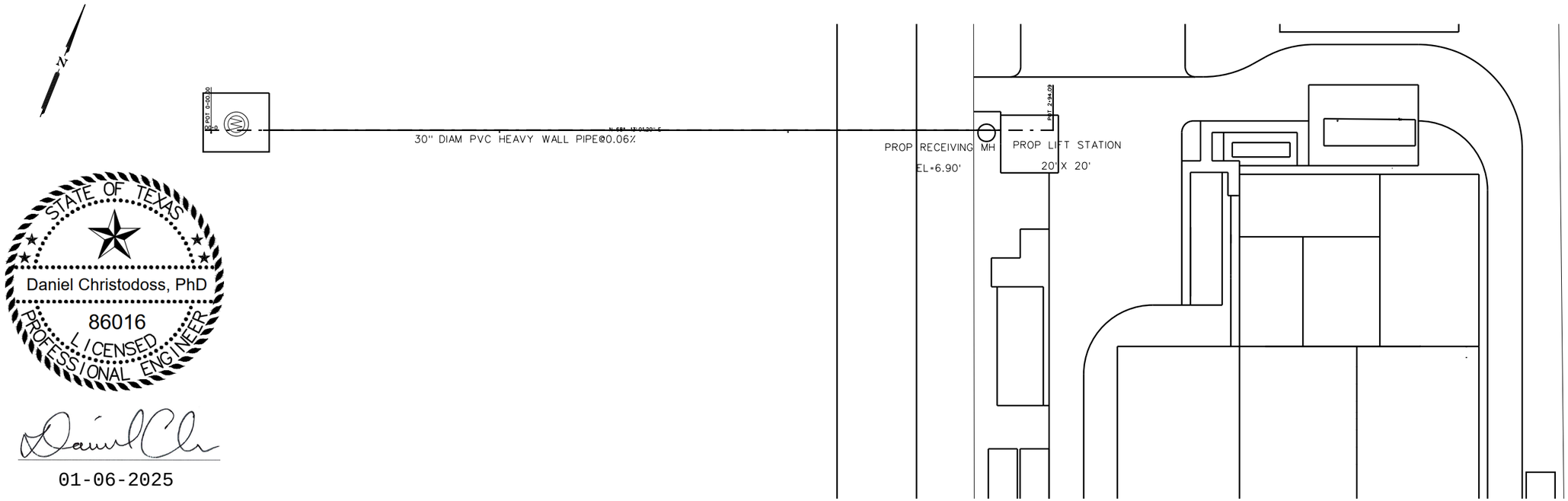

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

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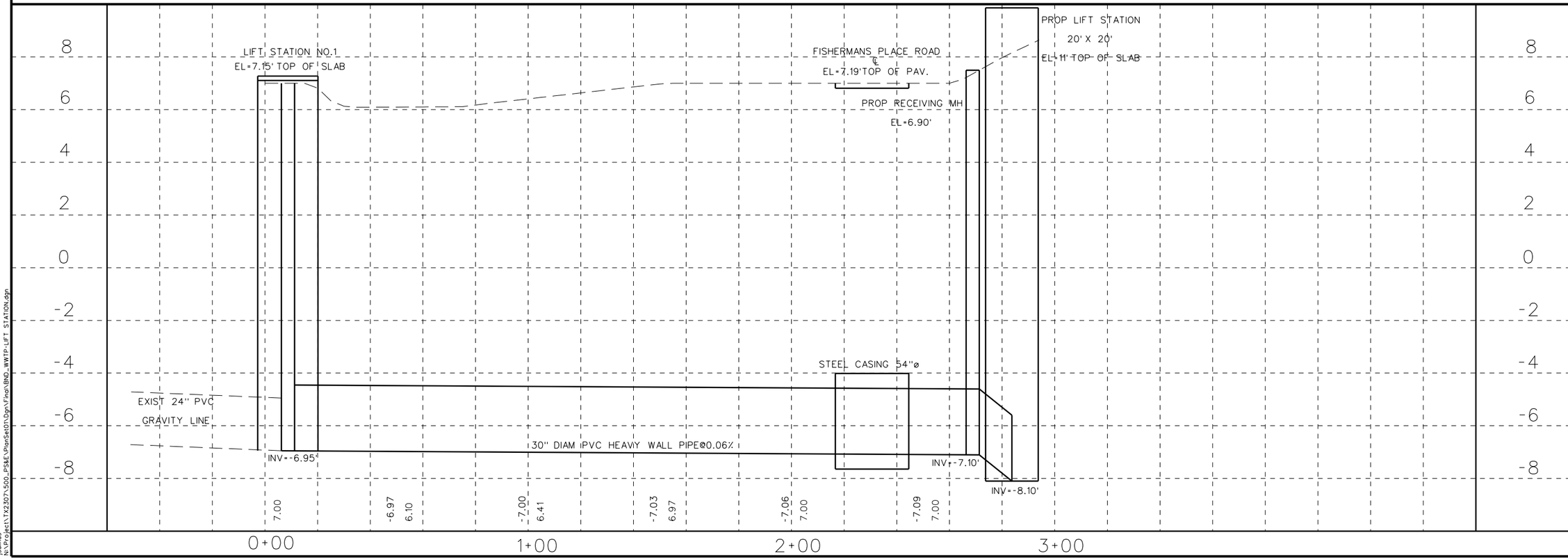

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
LIFT STATION

PORT OF BROWNSVILLE
the port that *works*

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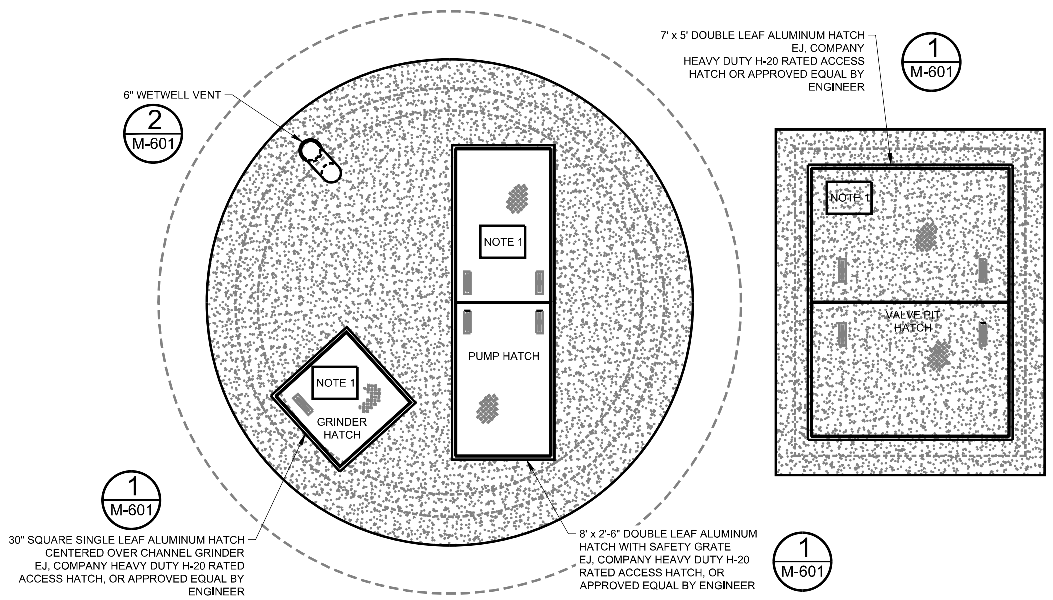

LIFT STATION IMPROVEMENTS TOP PLAN
SCALE: 1/2" = 1'-0"

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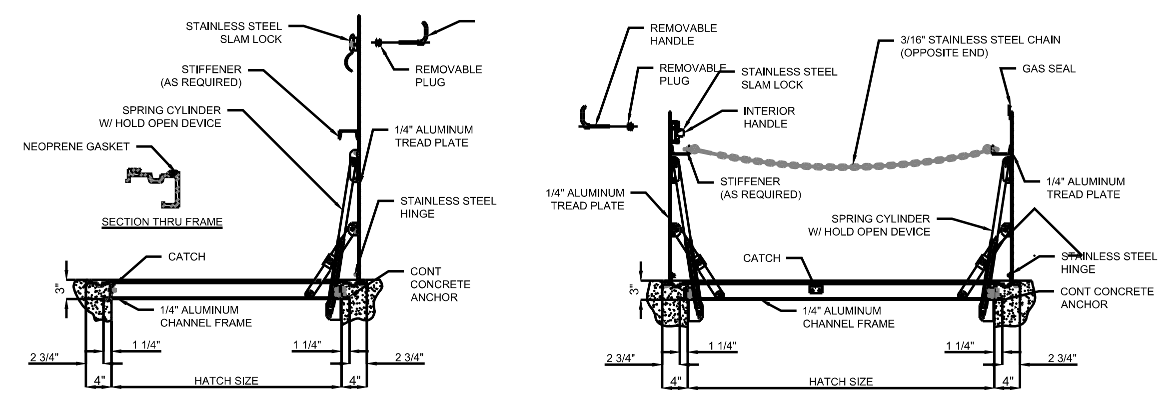
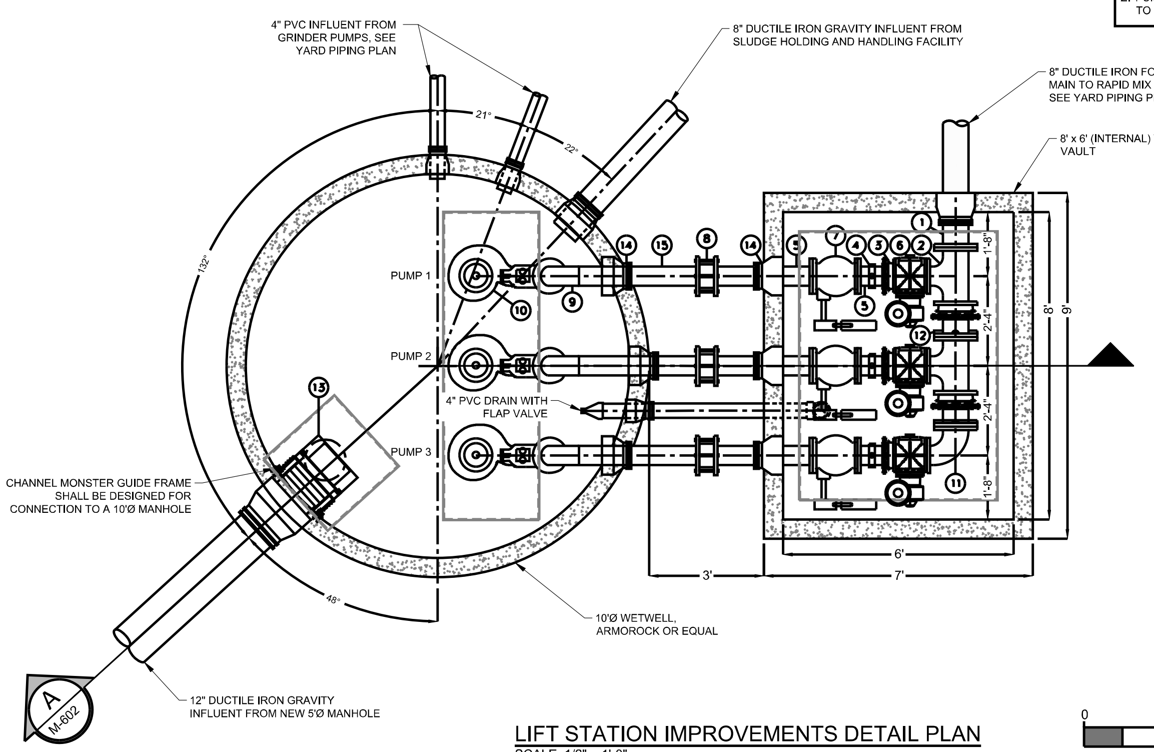


HATCH NOTES:
1. PROVIDE INTEGRAL SAFETY GRATING ONLY WHERE SPECIFICALLY INDICATED ON PLANS.
2. ALUMINUM SURFACES IN CONTACT WITH CONCRETE, GROUT OR DISSIMILAR METALS WILL BE PROTECTED WITH A COAT OF BITUMINOUS PAINT, MYLAR ISOLATORS OR OTHER APPROVED MATERIAL.
3. ADDITIONAL REQUIREMENT AND LOADS PER SPECIFICATIONS.

1 M-601 SINGLE AND DOUBLE LEAF ALUMINUM HATCH
SCALE: NTS

NOTE:
1. CONFINED SPACE SIGN REQUIRED PER OSHA 1910,146(c)(2) AND SHALL BE 14" x 10" ALUMINUM READING "DANGER PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER"
2. PUMP 2 AND 3 PROCESS PIPING AND VALVES SHALL BE SIMILAR TO PUMP 1.



FITTINGS LIST
1. 8" DI PIPE, FLG x PO
2. 8" x 6" DI FLG TEE
3. MEGAFLANGE
4. FLOOR MOUNTED SADDLE PIPE SUPPORT, 3/M-601
5. 6" DI SPOOL PIECE, FLG x PE, LENGTH AS REQ'D
6. 6" FLG PLUG VALVE WITH HAND WHEEL
7. 6" FLG SWING CHECK VALVE
8. 6" SMITH BLAIR TRANSITION COUPLING, MODEL 413
9. 6" SCH 40 SS 90° BEND, WELD x WELD
10. SUBMERSIBLE PUMP - 600 GPM @ 33 TDH
11. 8" x 6" REDUCING 90° BEND, FLG x FLG
12. FLOOR MOUNTED FLANGE PIPE SUPPORT, 3/M-601
13. JWC ENVIRONMENTAL CHANNEL MONSTER MODEL 30005
14. KOR-N-SEAL BOOT
15. 6" SCH 40 304 SST PIPE, WELD x PE

LIFT STATION IMPROVEMENTS DETAIL PLAN
SCALE: 1/2" = 1'-0"

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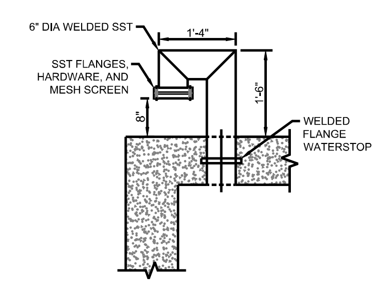

2 M-601 TYP WETWELL VENT
SCALE: NTS

STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED PROFESSIONAL ENGINEER

01-06-2025

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
LIFT STATION PLAN

PORT OF BROWNSVILLE the port that works

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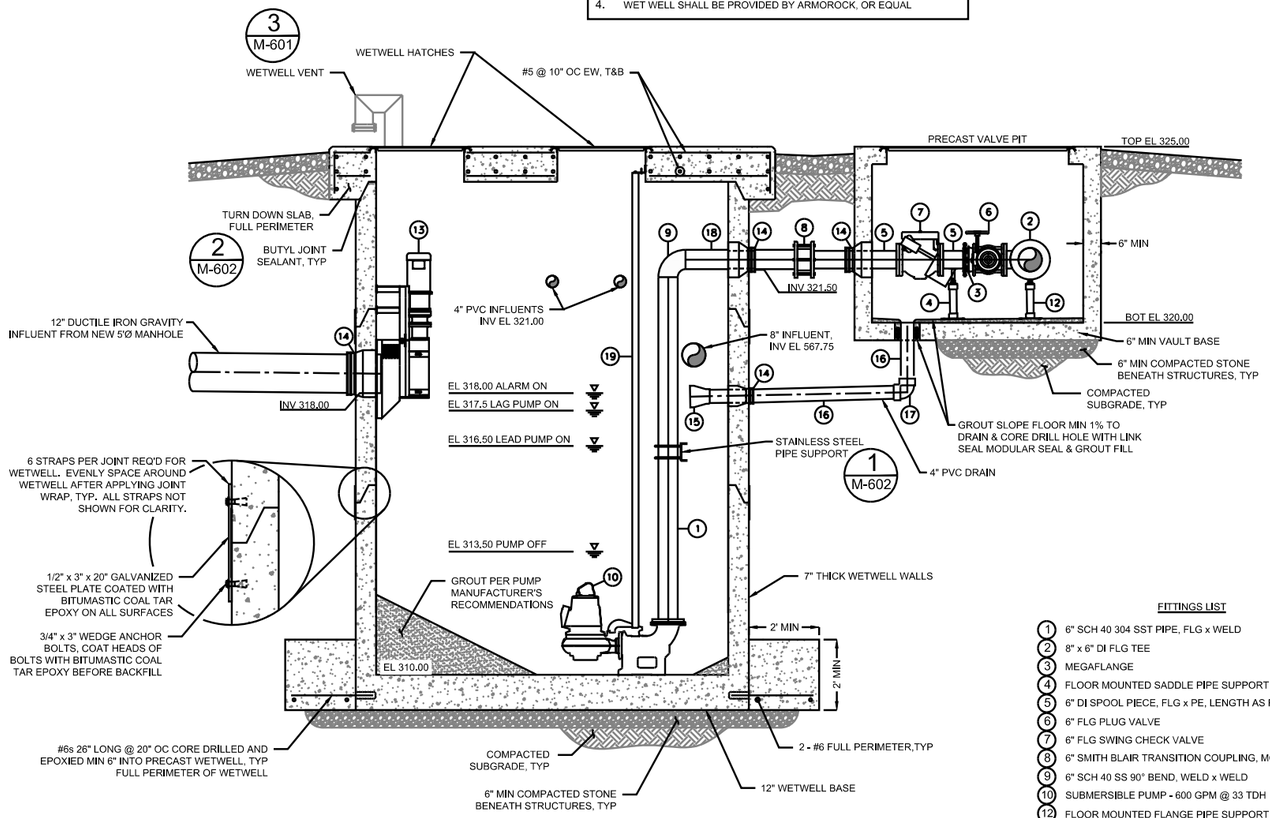
NOTES:

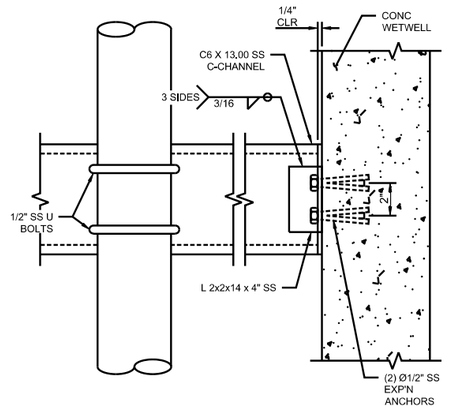
1. SOME OBJECTS MAY BE SHOWN OUT OF ORIENTATION FOR CLARITY. PLEASE REFER TO SHEET 33 FOR PROPER ORIENTATION.
2. CHANNEL MONSTER FRAME SHALL BE MADE FOR COMPATIBILITY WITH A 10Ø WET WELL AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
3. ALL EXPOSED DUCTILE IRON PIPING SHALL BE PAINTED AND COATED PER SPECIFICATION SECTION 09 90 00.
4. WET WELL SHALL BE PROVIDED BY ARMOROCK, OR EQUAL



A M-602 LIFT STATION IMPROVEMENTS SECTION
SCALE: NTS

FITTINGS LIST

1. 6" SCH 40 304 SST PIPE, FLG x WELD
2. 8" x 6" DI FLG TEE
3. MEGAFLANGE
4. FLOOR MOUNTED SADDLE PIPE SUPPORT
5. 6" DI SPOOL PIECE, FLG x PE, LENGTH AS REQ'D
6. 6" FLG PLUG VALVE
7. 6" FLG SWING CHECK VALVE
8. 6" SMITH BLAIR TRANSITION COUPLING, MODEL 413
9. 6" SCH 40 SS 90° BEND, WELD x WELD
10. SUBMERSIBLE PUMP - 600 GPM @ 33 TDH
12. FLOOR MOUNTED FLANGE PIPE SUPPORT
13. JWC ENVIRONMENTAL CHANNEL MONSTER MODEL 30005-0018, OR EQUAL
14. KOR-N-SEAL BOOT
15. 4" FLG TIDEFLEX SERIES TF-2 CHECK VALVE W/ SS STRAPS
16. 4" SCH 80 PVC PIPE
17. 4" SCH 80 PVC 90° BEND
18. 6" SCH 40 304 SST PIPE, WELD x PE
19. PUMP RAILS AND STAINLESS STEEL LIFTING CHAIN, PER MANUFACTURER



1 M-602 STAINLESS STEEL PIPE SUPPORT
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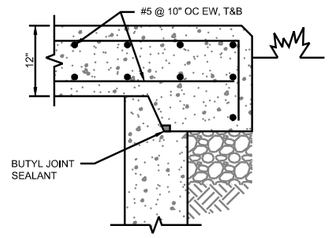
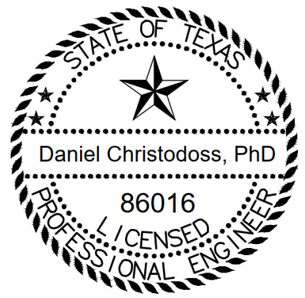


2 M-602 TURN-DOWN SLAB
SCALE: NTS



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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
LIFT STATION SECTION

PORT OF BROWNSVILLE
the port that works

RRP YOUR RELIABLE PARTNER
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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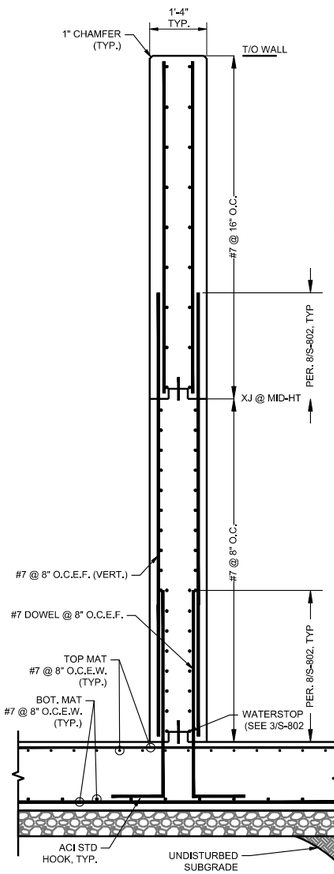
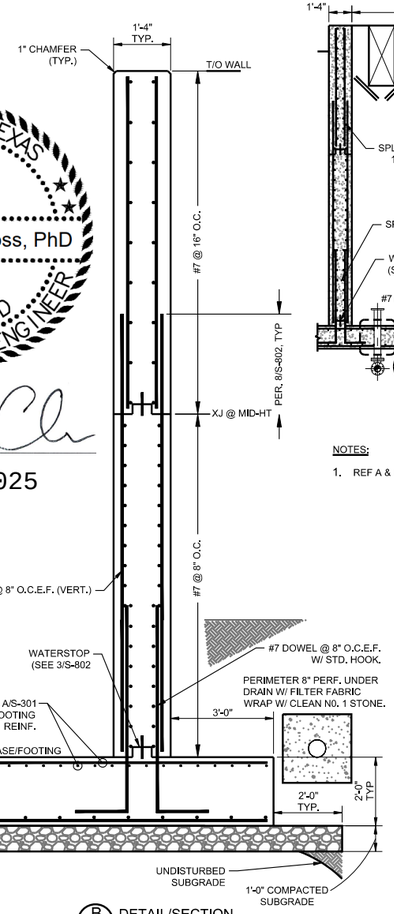


A S-301 DETAIL/SECTION
SCALE: 1/2" = 1'-0"

NOTES:

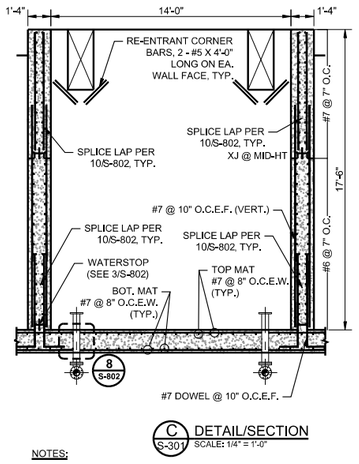
1. REFER TO GEOTECH REPORT FOR SUBBASE PREP, STRUCTURAL FILL, COMPACTION REQUIREMENTS AND LIMITS.



B S-301 DETAIL/SECTION
SCALE: 1/2" = 1'-0"

NOTES:

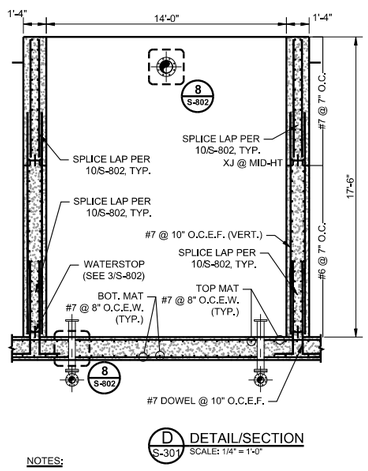
1. REFER TO GEOTECH REPORT FOR SUBBASE PREP, STRUCTURAL FILL, COMPACTION REQUIREMENTS AND LIMITS.



C S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

NOTES:

1. REF A & B/S-301 FOR WALL AND FOOTING REINF.



D S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

NOTES:

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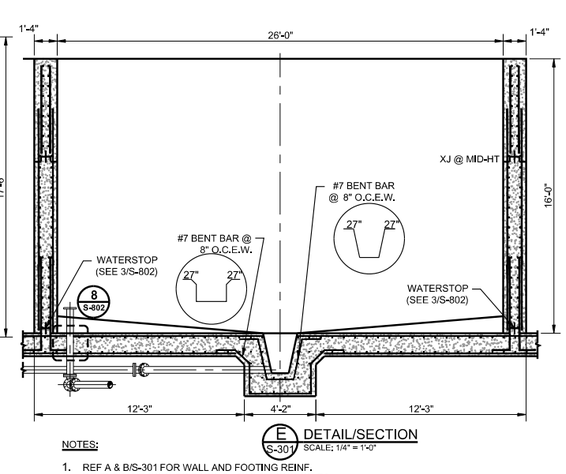
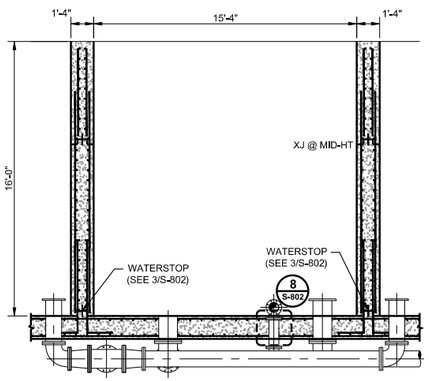


E S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

NOTES:

1. REF A & B/S-301 FOR WALL AND FOOTING REINF.
2. RE-ENTRANT CORNER BARS, 2-#5X4'-0" LONG ON EA. WALL FACE, TYP.



F S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

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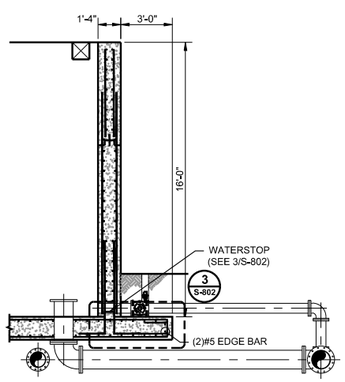

G S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

NOTES:

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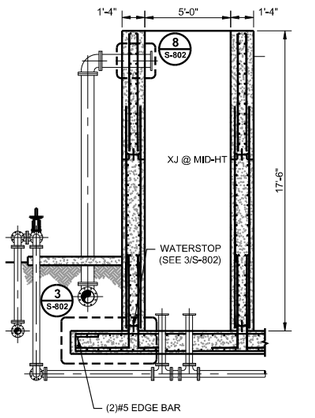

I S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

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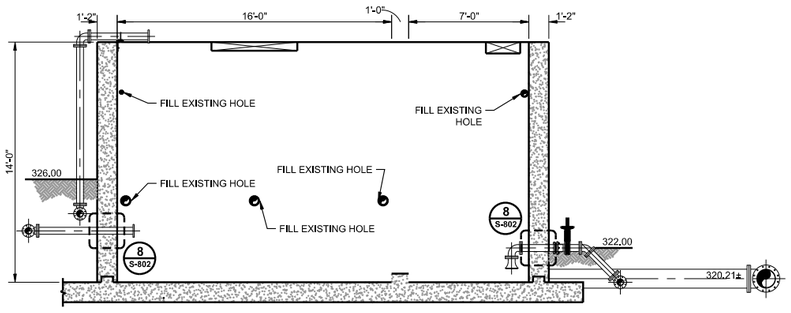
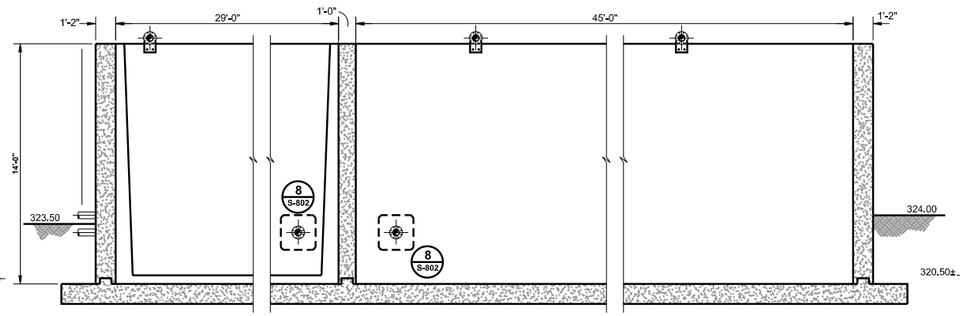
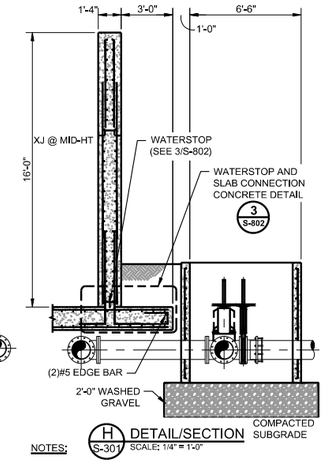


J S-301 EXISTING DETAIL/SECTION
SCALE: 1/4" = 1'-0"



K S-301 EXISTING DETAIL/SECTION
SCALE: 1/4" = 1'-0"



H S-301 DETAIL/SECTION
SCALE: 1/4" = 1'-0"

NOTES:

1. REF B/S-301 FOR WALL AND FOOTING REINF.

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the port that works

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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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ELECTRICAL PLAN LEGEND

SYMBOL	DESCRIPTION
	FLUORESCENT LIGHTING FIXTURE
	BRACKET MOUNTED INCANDESCENT OR HIGH INTENSITY DISCHARGE FIXTURE (NUMBER INDICATES LIGHTING PANEL CIRCUIT NUMBER - TYPICAL FOR ALL LIGHTING & RECEPTACLE CIRCUITS)
	WALL-PAK FLOODLIGHT
	GROUND ROD & WELL
	SINGLE CONVENIENCE RECEPTACLE - FLUSH MOUNTED
	SINGLE CONVENIENCE RECEPTACLE - WALL MOUNTED
WP GFCI	GFCI DUPLEX CONVENIENCE RECEPTACLE (WP INDICATES CAST WEATHER PROOF OUTLET BOX & COVER)
	240 VOLT, SIGNAL SPECIAL PURPOSE RECEPTACLE
$	SINGLE POLE TOGGLE SWITCH FLUSH MOUNTED
$3	3 - WAY SWITCH
$M	MOTOR SWITCH
$	SINGLE POLE TOGGLE SWITCH WALL MOUNTED
$D	DOOR SWITCH
$OHD	OVERHEAD DOOR SWITCH
▶	TELEPHONE UTILITY SYSTEM OUTLET
J	JUNCTION BOX
T	ELECTRIC THERMOSTAT
SV	SOLENOID VALVE
	UNFUSED SAFETY SWITCH
	FUSED SAFETY SWITCH
	UNDERGROUND CONDUIT
	EXPOSED CONDUIT
	HIDDEN CONDUIT
	FLOOD LIGHT FIXTURE
	CEILING MOUNTED HIGH INTENSITY DISCHARGE FLOODLIGHT
PE	PHOTOELECTRIC SWITCH
	LIGHT LINEWEIGHT - EXISTING
	HEAVY LINEWEIGHT - PROPOSED
E	EXIT/EMERGENCY LIGHT
	WALL PACK LIGHT FIXTURE

ONE-LINE DIAGRAM LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONTACT POINT		FUSE
	CIRCUIT BREAKER		POWER FACTOR CORRECTION CAPACITOR
	STARTER CONTACT	SM	SYSTEM MONITOR
VFD	VARIABLE FREQUENCY DRIVE	V	VOLTMETER
	SOFT START STARTER	A	AMMETER
10	1| MOTOR	VS	VOLTMETER SWITCH
10	3| MOTOR	AS	AMMETER SWITCH
ETM	ELAPSED TIME METER		SEPARABLE CONTACTS
R	INDICATING LIGHT A-AMBER; B-BLUE G-GREEN; R-RED; W-WHITE		CURRENT TRANSFORMER (CT)
HOA	HAND-OFF-AUTO SWITCH		LIGHTING TRANSFORMER
RS	RUN-STOP CONTROL STATION		POTENTIAL TRANSFORMER
	SPACE HEATER		COMBINATION MOTOR STARTER
	TERMINAL POINT		FUSED DISCONNECT SWITCH
LOR	LOCAL-OFF-REMOTE SWITCH	LR	LOCAL-REMOTE SWITCH
HOR	HAND-OFF-REMOTE SWITCH	LI	LOAD INDICATOR AMMETER
LCP	LOCAL CONTROL PANEL	T	THERMOSTAT
SM	SYSTEM MONITOR	PXS	PROXIMITY SWITCH
VCP	VENDOR CONTROL PANEL		LIQUID LEVEL PROBES
ES	EMERGENCY STOP		SOLID STATE STARTER
SV	SOLENOID VALVE		

CONTROL DIAGRAM LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CR	CONTACT RELAY, 4 POLE UNIVERSAL - PLUG IN	CT	PRE-DETERMINE COUNTER RELAY
	CIRCUIT BREAKER	RT	RECYCLE TIMING RELAY
TD	TIME DELAY RELAY	TEST	PUSHBUTTON
M	MAGNETIC MOTOR STARTER	ON-OFF	ON-OFF SWITCH
M M	HOLDING COIL CONTRACT (NORMALLY OPEN - NORMALLY CLOSED)	F	FLOAT OPERATED SWITCH, OPENS ON RISE
CR CR	CONTROL COIL CONTRACT (NORMALLY OPEN - NORMALLY CLOSED)	F	FLOAT OPERATED SWITCH, CLOSES ON RISE
ETM	ELAPSED TIME METER	TDC	TIME DELAY RELAY CONTACT N.C., TIME DELAY CLOSING (I.O.T.D.C.)
	FUSE	TDO	TIME DELAY RELAY CONTACT N.C., TIME DELAY OPENING
	SPACE HEATER	TDO	TIME DELAY RELAY CONTACT N.O., TIME DELAY OPENING (I.C.T.D.O.)
	ALARM HORN NEMA 4X	TDC	TIME DELAY RELAY CONTACT N.O., TIME DELAY CLOSING
	RECEPTACLE	PS	PRESSURE SWITCH, OPENS ON RISING PRESSURE
OL'S	OVERLOAD, N.C.	PS	PRESSURE SWITCH, CLOSES ON RISING PRESSURE
3 OL	OVERLOAD, N.C.	TEMP.	TEMPERATURE ACTUATED SWITCH, OPENS ON RISE
120V R	PRESS-TO-TEST INDICATING LIGHT A-AMBER; B-BLUE; G-GREEN; R-RED; W-WHITE	TEMP.	TEMPERATURE ACTUATED SWITCH, CLOSES ON RISE
	CONTROL POWER TRANSFORMER	ZS	LIMIT SWITCH, N.O.
H1 H2	2 POSITION SELECTOR SWITCH	ZS	LIMIT SWITCH, N.O., HELD CLOSED
		ZS	LIMIT SWITCH, N.C.
H O A	HAND-OFF-AUTO SWITCH	ZS	LIMIT SWITCH, N.C., HELD OPEN
H1 H2	2 POSITION SELECTOR SWITCH	▲	ITEM LOCATED ON FACE OF MCC STARTER
	PROXIMITY SENSOR SWITCH	■	ITEM LOCATED ON LOCAL CONTROL PANEL
		□	TERMINAL BLOCK FOR LOCAL CONTROL PANEL DEVICE OR FIELD DEVICE
C	INDUCTION RELAY	⊡	TERMINAL BLOCK FOR I/O COMPARTMENT
		◪	TERMINAL BLOCK FOR AUTODIALER

ABBREVIATIONS

AC — ALTERNATING CURRENT	CAP — CAPACITOR	EPB — ELECTRIC PULL BOX	INCAN. — INCANDESCENT	MISC. — MISCELLANEOUS	PT — POTENTIAL TRANSFORMER	RPLD1 — RUN PUMP DRY LAG 1 RELAY	SOL. — SOLENOID
ADJ — ADJUSTABLE	CAT. — CATALOG	ETM — ELAPSE TIME METER	J-BOX — JUNCTION BOX	MFG — MANUFACTURE	PVC — POLY VINYL CARBONATE	RPLD2 — RUN PUMP DRY LAG 2 RELAY	STR. — STARTER
AFF — ABOVE FINISHED FLOOR	CKT. BKR. — CIRCUIT BREAKER	EXIST. — EXISTING	KS — KEY SWITCH	MFGR — MANUFACTURER	PWR — POWER	RPLC — PLC MODE AUX RELAY	SW. — SWITCH
AF — AMPERE FRAME	CKT. — CIRCUIT	FIXT. — FIXTURE	KV — KILOVOLT	MTR — MOTOR	R — RELAY	RPLCOR — PLC OVERRIDE	SWBD — SWITCH BOARD
AH — AMPERE HOUR	CKT. BKR. — CIRCUIT BREAKER	FC — FOOTCANDLE	KVA — KILOVOLT-AMPERES	NEC — NATIONAL ELECTRIC CODE	RAPSL — AIR PRESSURE SWITCH LOW RELAY	RPLM — PLC PUMP RUN RELAY	SWBT — SOUTHWESTERN BELL TELEPHONE
AHM — AMPERE HOUR METER	CND — CONDUIT	FLEX. — FLEXIBLE	KVAR — KILOVAR (KILOVOLT-AMPERE-REACTIVE)	NF — NON-FUSED	RECPT. — RECEPTACLE	RPLMP — BACKUP SYSTEM RUN RELAY	T — THERMOSTAT
AI — ANALOG INPUT	C.S. — CONTROL SWITCH	FLD. LT. — FLOODLIGHT	KWH — KILOWATT HOUR	NEU — NEUTRAL	REE — ELEC BLDG ENTRY AUX RELAY	RR — RUN RELAY	TD — TIME DELAY RELAY
ALT — ALTERNATOR	C.T. — CURRENT TRANSFORMER	FLUOR. — FLUORESCENT	LIS — LEVEL INDICATING SWITCH HIGH	N.C. — NORMALLY CLOSED	RGS — RIGID GALVANIZED STEEL	RRST — PUMP RESET AUX RELAY	TDLP — LOSS OF POWER TIME DELAY RELAY
AMP or A — AMPERE	COAX — COAXIAL	FVNR — FULL VOLTAGE NON-REVERSING	LISH — LEVEL INDICATING SWITCH	N.O. — NORMALLY OPEN	RHLA — HIGH LEVEL ALARM RELAY	RTAH — TEMPERATURE ALARM AUX RELAY	TDR — TIME DELAY RELAY
AM — AMMETER	CONC. — CONCRETE	FVR — FULL VOLTAGE REVERSING	LISL — LEVEL INDICATING SWITCH LOW	No. — NUMBER	RLH — HIGH LEVEL AUX RELAY	RTU — REMOTE CONTROL UNIT	TDRM — PUMP TIME DELAY RELAY
AO — ANALOG OUTPUT	CONT. — CONTINUE	GEN. — GENERATOR	LS — LIMIT SWITCH	OL — OVERHEAD DOOR	RLL — LOW LEVEL AUX RELAY	RUV — UNDERVOLTAGE AUX RELAY	TEMP — TEMPERATURE
AS — AMMETER SWITCH	CPU — CENTRAL PROCESSING UNIT	GFI — GROUND FAULT INTERRUPT	LTG — LIGHTING	OHD — OVERLOAD	RM — PUMP RUN AUX RELAY	RWD — WATCHDOG RELAY	V — VOLT
ARMD — ARMORED	CT — CURRENT TRANSFORMER	GND — GROUND	LV — LOW VOLTAGE	P — POLE	RMOR — MOTOR OVERLOAD AUX RELAY	RVNR — REDUCED VOLTAGE NON-REVERSING	VA — VOLT-AMPERE
AT — AUTO TRANSFORMER	Cu — COPPER	GST — GROUND STORAGE TANK	LVP — LIGHTING PANEL	PEC — PHOTO ELECTRIC CELL	RMTH — MOTOR TEMPERATURE RELAY	SEC — SECONDS	VS — VOLTMETER SWITCH
AUTO — AUTOMATIC	CUR. — CURRENT	HL&P — HOUSTON LIGHTING & POWER	LVP — LOW VOLTAGE PANEL	PFR — PHASE FAILURE RELAY	RPLD — RUN PUMP LEAD RELAY	SEL. SW. — SELECTOR SWITCH	W — WATT
AUX — AUXILIARY	DC — DIRECT CURRENT	HOA — HAND-OFF-AUTO	M — MOTOR RUN CONTACT	PH or ϕ — PHASE	RPL1 — RUN PUMP LAG 1 RELAY	SHT. — SHEET	1PH or 1ϕ — SINGLE PHASE
AWG or MCM — CONDUCTOR CROSS SECTIONAL AREA	DET. — DETAIL	HP — HORSEPOWER	M — METER	PLC — PROGRAMMABLE LOGIC CONTROLLER	RPL2 — RUN PUMP LAG 2 RELAY	SHLD. — SHIELDED	3PH or 3ϕ — THREE PHASE
BAT — BATTERY	DIFF — DIFFERENTIAL	HTR. — HEATER	mA — MILLIAMPERE	PNL — PANEL	RPL3 — RUN PUMP LAG 3 RELAY	SL — SEAL LEAK SWITCH	
BKR — BREAKER	DISC. SW. — DISCONNECT SWITCH	HVP — HIGH VOLTAGE PANEL	MCC — MOTOR CONTROL CENTER	POS — POSITION	RPL4 — RUN PUMP LAG 4 RELAY	SN — SOLID NEUTRAL	
BLDG. — BUILDING	ELECT. — ELECTRICAL	HZ — HERTZ	MCP — MOTOR CIRCUIT PROTECTOR	PROP. — PROPOSED	RPDLD — RUN PUMP DRY LEAD RELAY	SP — SURGE PROTECTOR	
BWR — BLOWER	EMERG. — EMERGENCY	ILLUM. — ILLUMINATE	MIN. — MINIMUM	PRV — PRESSURE REDUCING VALVE	RPDL1 — RUN PUMP DRY LAG I RELAY	SPST — SINGLE POLE SINGLE THROW	

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Daniel Christodoss, PhD
86016
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0.5 MGD WASTE WATER
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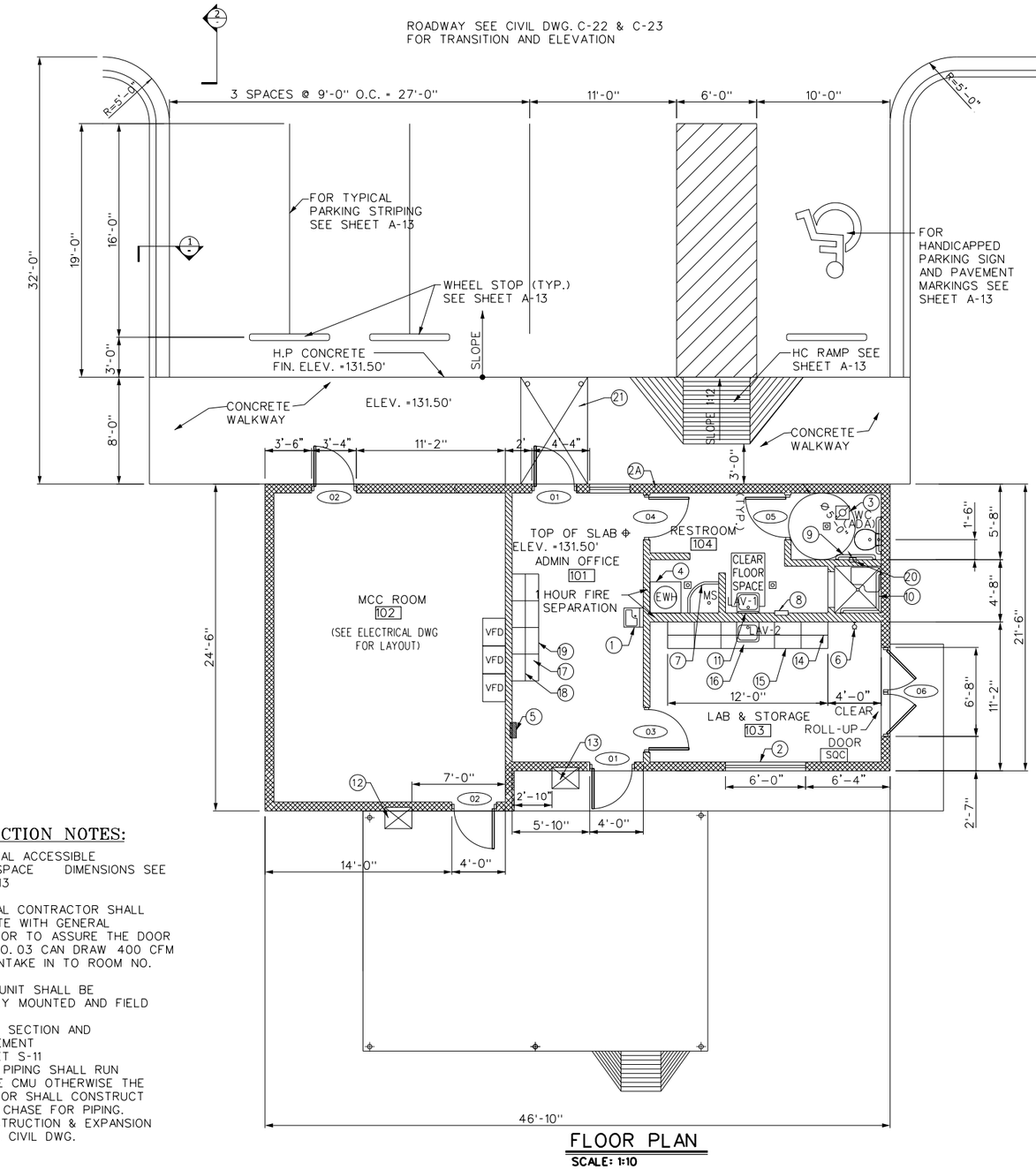

FLOOR PLAN

SCALE: 1:10

CONSTRUCTION NOTES:

1. FOR TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS SEE SHEET A-13
2. MECHANICAL CONTRACTOR SHALL COORDINATE WITH GENERAL CONTRACTOR TO ASSURE THE DOOR LOUVER NO. 03 CAN DRAW 400 CFM FOR AIR INTAKE IN TO ROOM NO. 103
3. THE A/C UNIT SHALL BE VERTICALLY MOUNTED AND FIELD LOCATE.
4. FOR WALL SECTION AND REINFORCEMENT SEE SHEET S-11
5. PLUMBING PIPING SHALL RUN INSIDE THE CMU OTHERWISE THE CONTRACTOR SHALL CONSTRUCT PLUMBING CHASE FOR PIPING.
6. FOR CONSTRUCTION & EXPANSION JOINT SEE CIVIL DWG.

KEYED NOTES:

1. ELECTRICAL DRINKING FOUNTAIN "HALSEY TAYLOR" ADA MOUNTED.
2. HOLLOW METAL WINDOW 6'W x 4'H. SEE DOOR/WINDOW SCHEDULE SHEET.
2A. HOLLOW METAL FRAME WINDOW 3'W x 4'H. SEE DOOR/WINDOW SCHEDULE.
3. "PENN" EXHAUST FAN THRU ROOF WITH CAP .125 SP, 150 CFM, DIRECT DRIVE, 1/6HP, 1700 RPM CONTRACTOR SHALL PROVIDE AND INSTALL ROOF CURB.
4. 2'-6" SQ. x 4" HEIGHT REINFORCED CONCRETE PAD FIELD SET UP AND POUR IN PLACE FOR WATER HEATER.
5. FIRE EXTINGUISHER SHALL BE MOUNTED AT 42" ABOVE FINISH FLOOR.
6. EMERGENCY EYE WASH "ENCON" STAINLESS STEEL MODEL 01-0450-10 OR EQUAL APPROVED.
7. MOP SINK.
8. STAINLESS STEEL PAPER TOWER DISPENSER AND WASTE RECEPTACLE
9. STAINLESS STEEL GRAB BAR (1 1/2" ø, 36"x54")
10. STAINLESS STEEL GRAB BAR (1 1/2" ø, 36"x24")
11. STAINLESS STEEL FRAMED MIRROR (18"x24").
12. "BARD" MODEL NO. P1124A3 WITH ELECTRIC HEATER PACKAGE MODEL NO. EH3PB-A05. CONTRACTOR SHALL FIELD INSTALL WITH STEEL FRAME SUPPORT UNIT AS REQUIRED AND DUCT WALL PENETRATION SHALL BE SEALED AROUND DUCT FOR AIR AND WATER TIGHT. FOR SUPPORT DETAIL SEE SHEET A-6(R)
13. "BARD" MODEL NO. P1124A3 WITH ELECTRIC HEATER PACKAGE MODEL NO. EH3PB-A05. CONTRACTOR SHALL FIELD INSTALL WITH STEEL FRAME SUPPORT UNIT AS REQUIRED AND DUCT WALL PENETRATION SHALL BE SEALED AROUND DUCT FOR AIR AND WATER TIGHT.
14. FORMICA LAMINATE OVERHEAD CABINET WHITE COLOR COMMERCIAL TYPE WITH STAINLESS STEEL HANDLE.
15. BASE CABINET UNIT FORMICA LAMINATE WHITE COLOR WITH DRAWERS AND STAINLESS STEEL DRAW.
16. COUNTERTOP FORMICA LAMINATE WHITE COLOR COMMERCIAL TYPE WITH OPEN SPACE FOR SERVICE SINK.
17. 24" WIDE FORMICA COUNTERTOP, 34" HIGH X 24" DEEP STORAGE CABINET.
18. FORMICA LAMINATE OVERHEAD CABINET WHITE COLOR COMMERCIAL TYPE WITH STAINLESS STEEL HANDLE.
19. BASE CABINET UNIT FORMICA LAMINATE WHITE COLOR WITH DRAWERS AND STAINLESS STEEL DRAW.
20. STAINLESS STEEL TOILET PAPER DISPENSER
21. 5'X8'X10'H (TYP. OF 3) AWNING CANOPY

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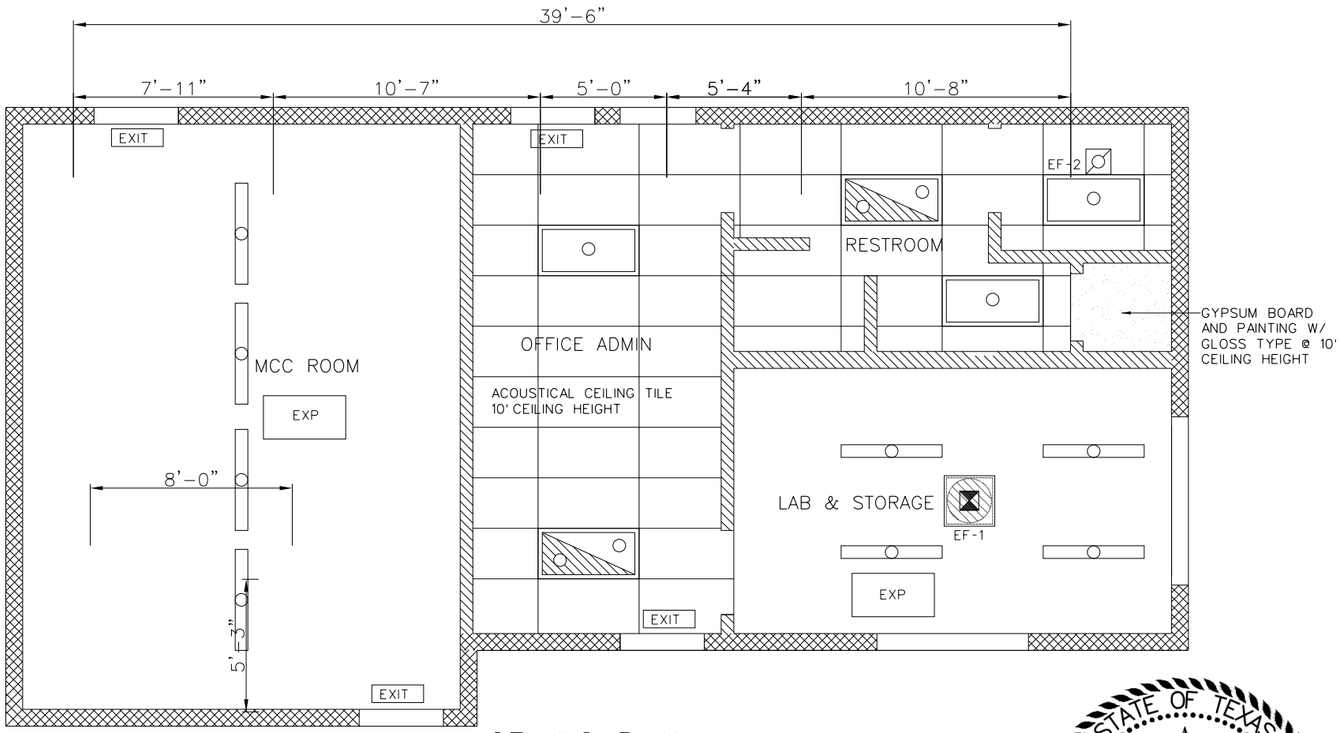

CEILING PLAN

SCALE: 1:8

NOTES:

1. FOR 4' STRIP, 2'x4' A.C.T, 2'x4' LIGHT FIXTURE AND 2'x4' LIGHT FIXTURE W/EMERGENCY BALLAST. SEE ELECTRICAL DWG. FOR EXACT LOCATIONS.
2. FOR ROOF DETAILS AND BAR JOIST SEE STRUCTURAL DWG.
3. FOR AUDIO VIDEO ALARM. SEE ELECTRICAL DWG.

LEGEND:

	2'x4' A.C.T
	2'x4' LIGHT FIXTURE
	2'x4' LIGHT FIXTURE W/EMERGENCY BALLAST
	4' STRIP
EXIT	EXIT LIGHT FIXTURE W/EMERGENCY 2 HOURS BATTERY
	5/8" GYP BD W/ GLOSS PAINTING
EXP	EXPOSED CEILING TO STRUCTURE

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
ADMINISTRATION BUILDING CEILING & ROOF PLAN

PORT OF BROWNSVILLE
the port that works

RRP
YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
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DRAWN BY	JJ	11/13/2024
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SCALE:		
SHEET NUMBER	52	

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1/6/2025
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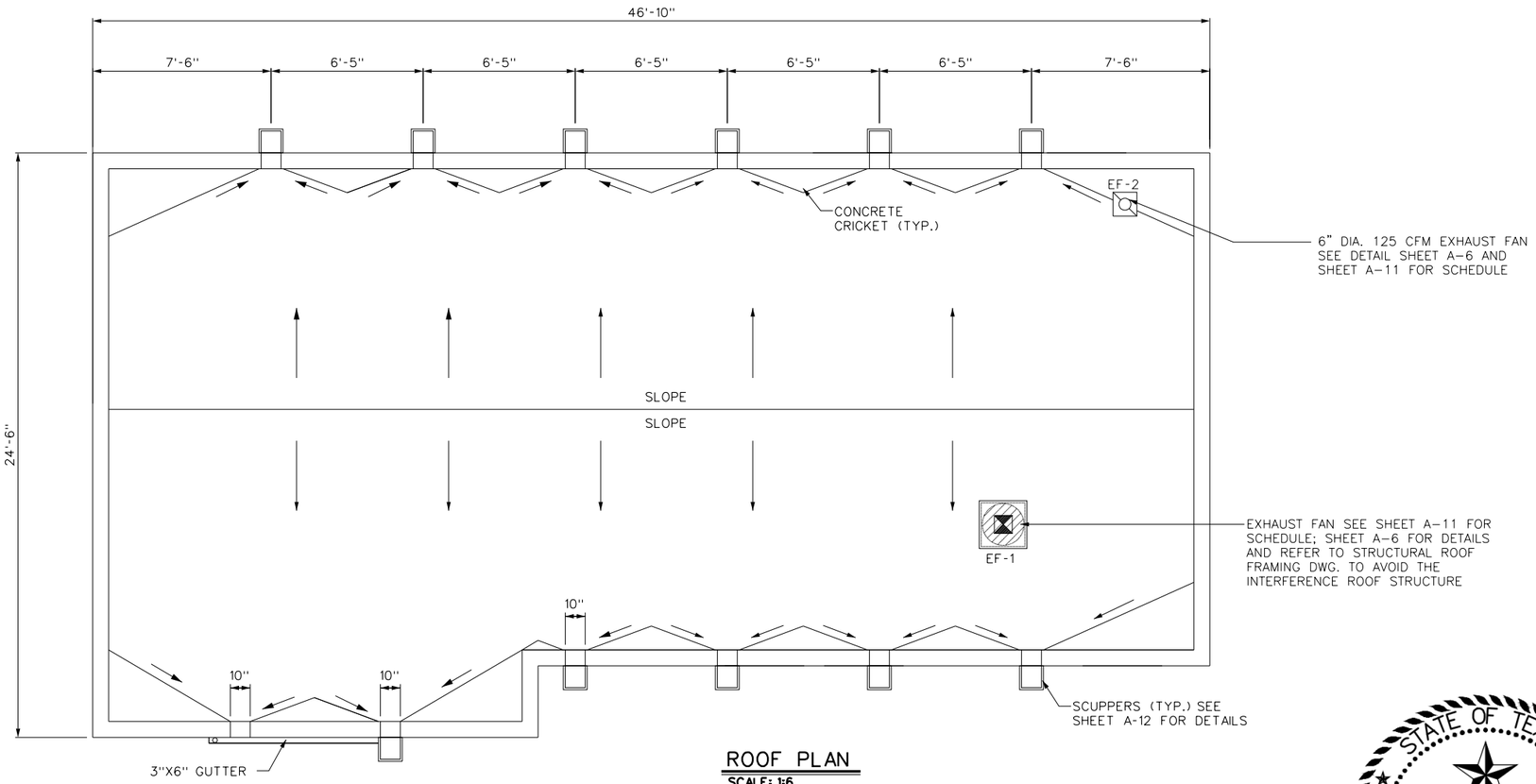
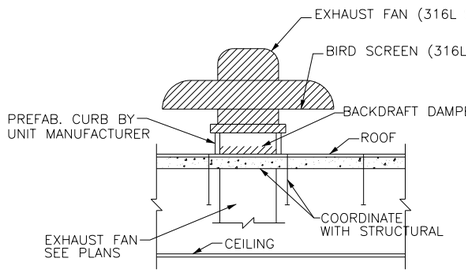
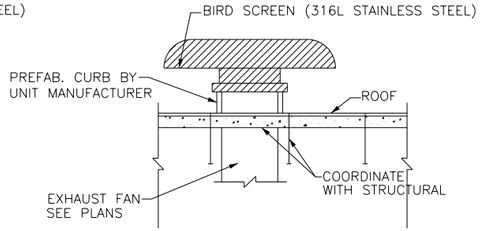


ROOF PLAN
SCALE: 1:6



EXHAUST FAN DETAIL
(OA INTAKE SIMILAR; MANUAL DAMPER REQ'D)
SCALE: NTS



EXHAUST DETAIL
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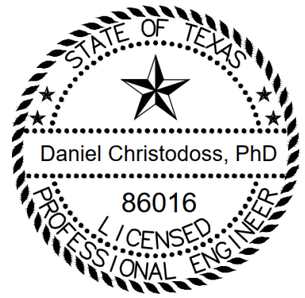

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
ROOF PLAN

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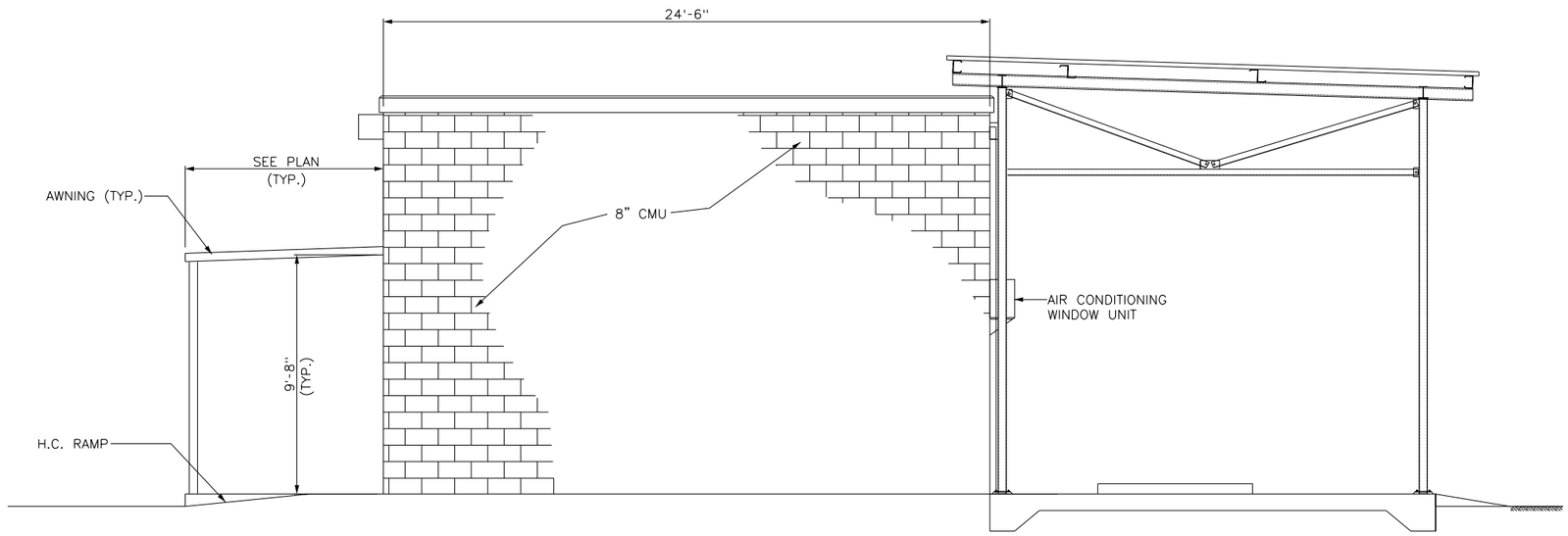
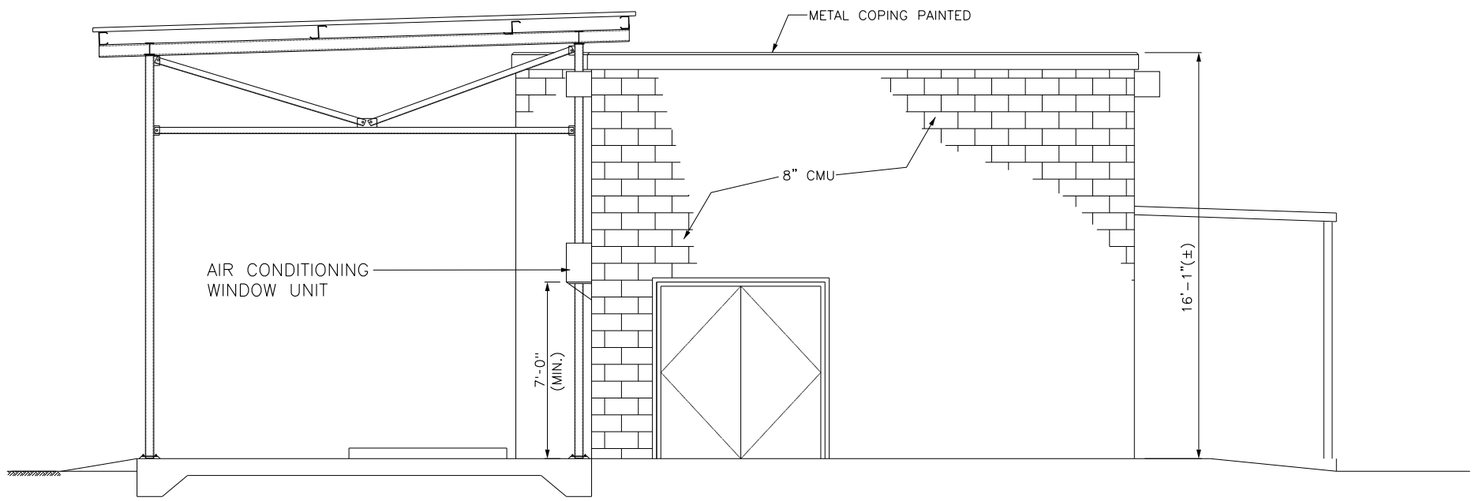


NORTH ELEVATION
SCALE: 1:8



SOUTH ELEVATION
SCALE: 1:8

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
ADMINISTRATION BUILDING ELEVATIONS

STATE OF TEXAS
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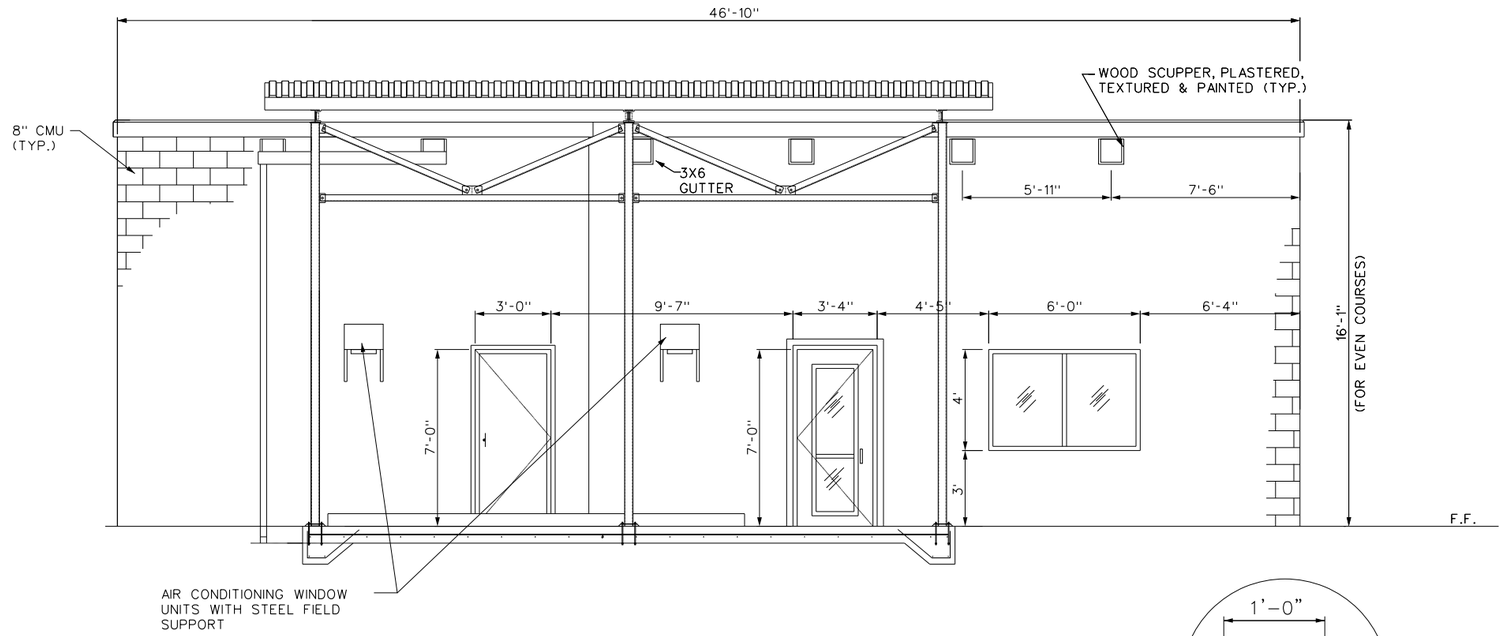
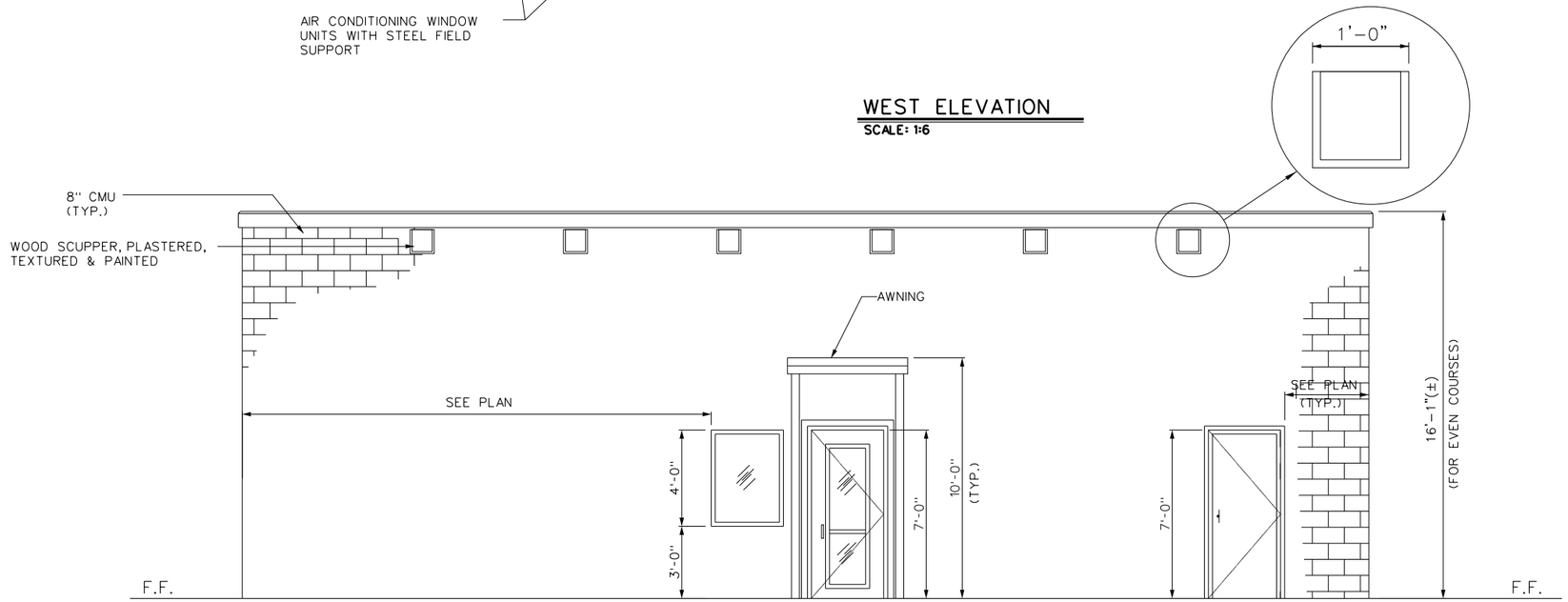


WEST ELEVATION
SCALE: 1:6



EAST ELEVATION
SCALE: 1:6

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
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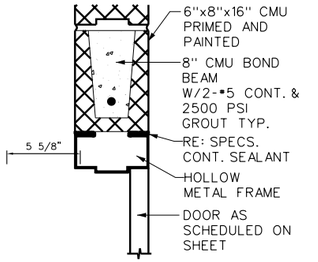
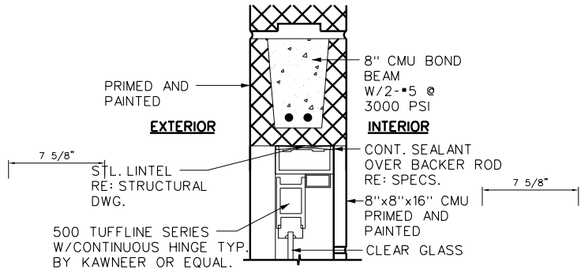
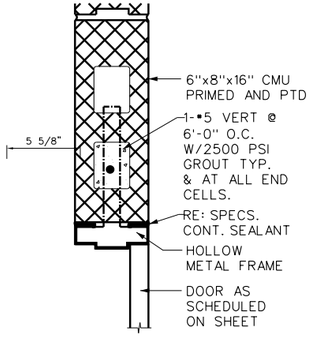


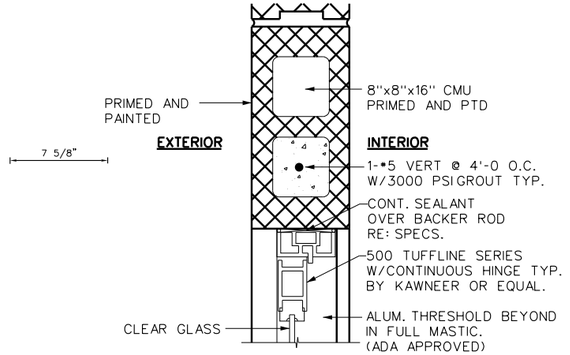
INTERIOR DOOR HEAD DETAIL
SCALE: 1:1



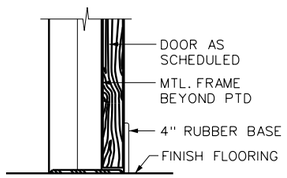
EXTERIOR DOOR HEAD DETAIL
SCALE: 1:1



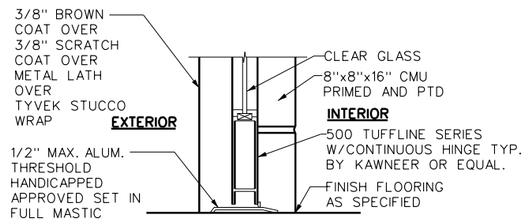
INTERIOR DOOR JAMB DETAIL
SCALE: 1:1



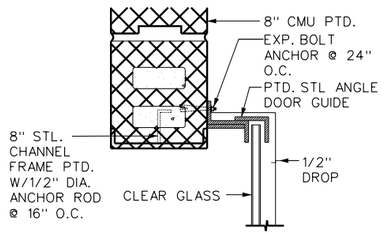
EXTERIOR DOOR JAMB DETAIL
SCALE: 1:1



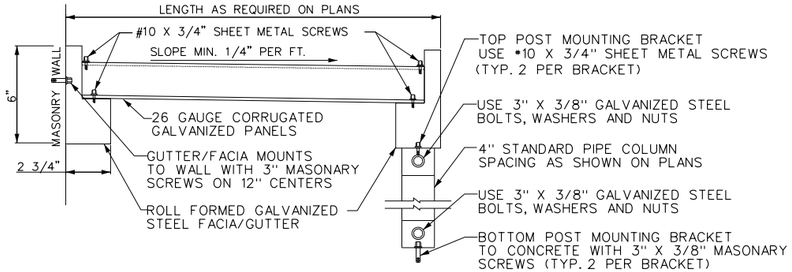
INTERIOR DOOR SILL DETAIL
SCALE: 1:1



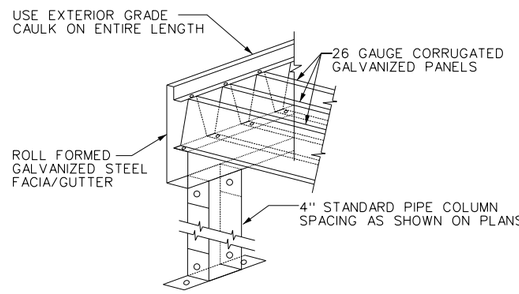
EXTERIOR DOOR SILL DETAIL
SCALE: 1:1



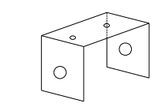
ROLL-UP DOOR JAMB DETAIL
SCALE: 1:1



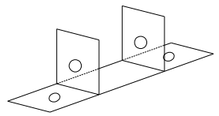
ELEVATION
SCALE: NTS



DETAIL
SCALE: NTS



TOP POST MOUNTING BRACKET
SCALE: NTS



BOTTOM POST MOUNTING BRACKET
SCALE: NTS

AWNING DETAILS
SCALE: NTS

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
ADMINISTRATION BUILDING DOOR DETAILS

PORT OF BROWNSVILLE
the port that works

RRP
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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

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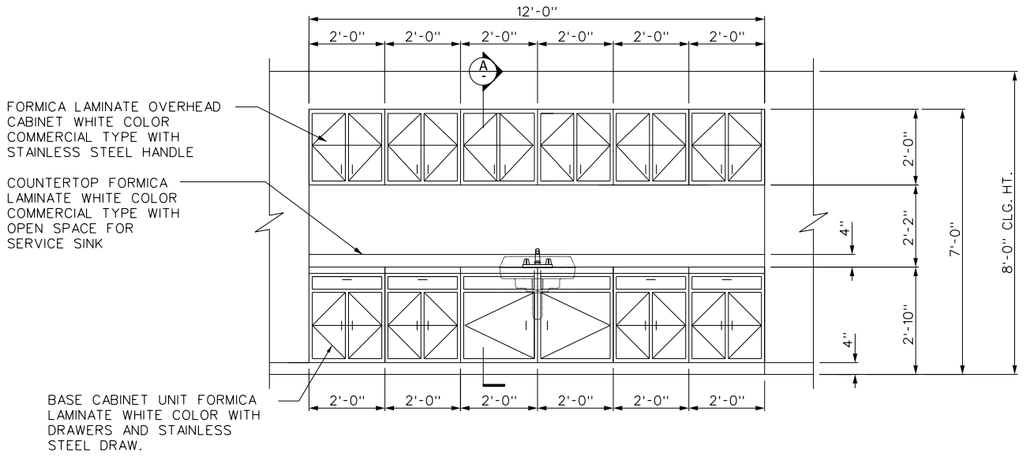

ELEVATION 1

SCALE: 1:4

GENERAL NOTES

1. PLAS LAM OVER ALL EXPOSED SURFACES
2. PROVIDE SUITABLE REINFORCEMENT FOR ALL SUPPORTS
3. LAVATORY TO MEET ADA HANDICAPPED STANDARDS WITH MOUNTING HEIGHT SET AS SCHEDULED ABOVE FINISH FLOOR

KEYED NOTES

1. 3/4" PLYWOOD SHELVES ON ADJUSTABLE STANDARDS-PLAS LAM
2. PLAS LAM ON 3/4" COUNTER TOP AND BACK SPLASH
3. 3/4" PLYWOOD DRAWERS W/ DADOED ATTACHMENT
4. 2 X 4 TREATED WOOD BLOCKING
5. SCHEDULED BASE
6. 1 X WOOD BLOCKING

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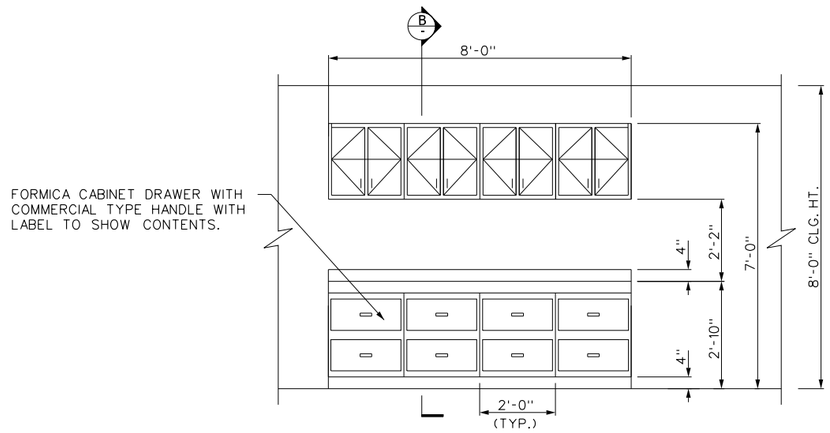
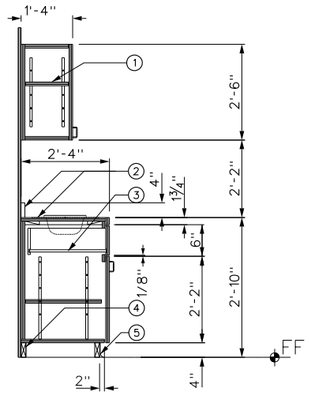


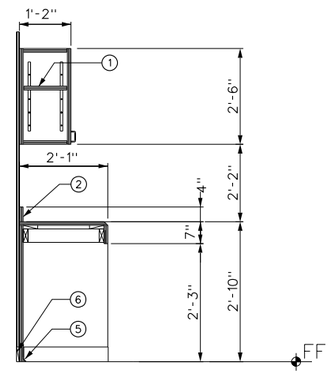
ELEVATION 2

SCALE: 1:4



SECTION AT CABINET

SCALE: 1:4



SECTION AT COUNTER TOP

SCALE: 1:4

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
LAB CABINET DETAILS

PORT OF BROWNSVILLE
the port that works

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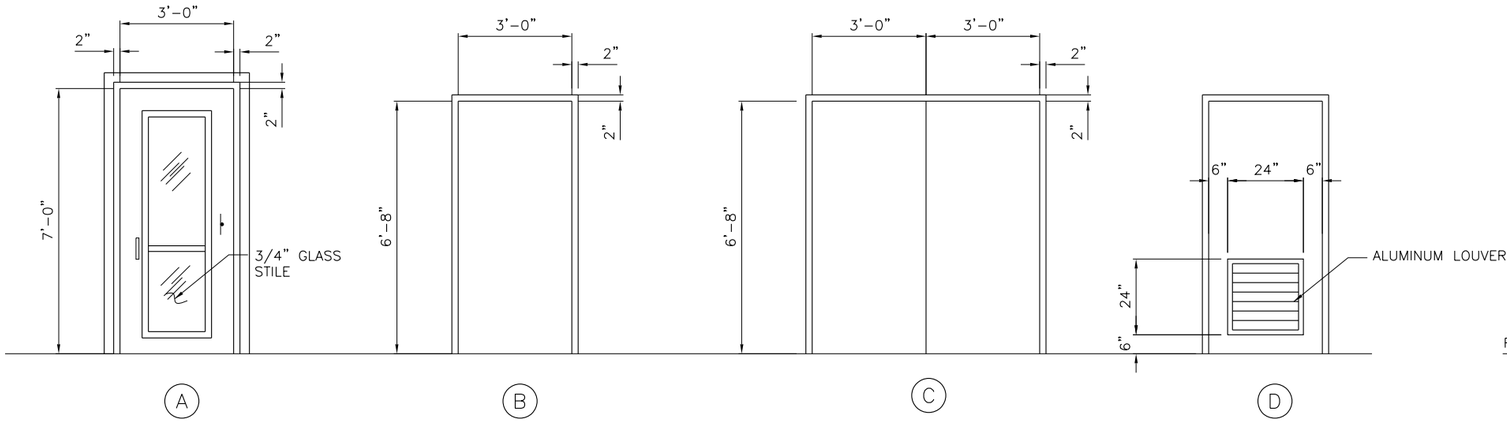
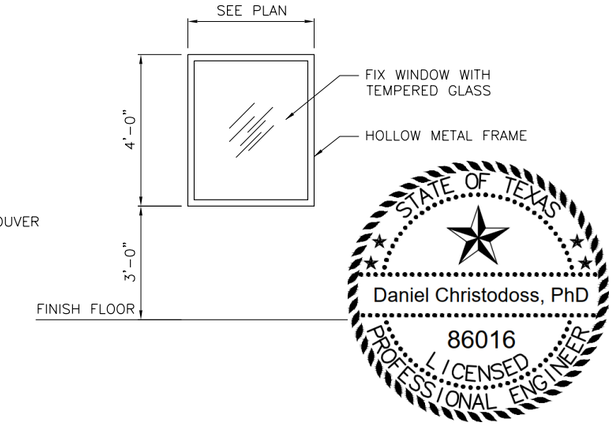


DOOR TYPES
SCALE: NTS



WINDOWS TYPES
SCALE: NTS

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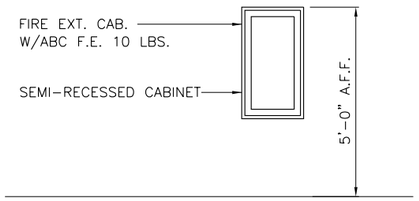


LARSEN'S FIRE EXTINGUISHER-MEDALLION SERIES VERTICAL DUO MODEL FS-B2409-R4 OR APPROVED EQUAL.

FIRE EXTINGUISHER CABINET
SCALE: NTS

EXHAUST FAN SCHEDULE

MARK	EF-1	EF-2
SERVES	LAB ROOM	RESTROOM
TYPE	ROOF-PCV	ROOF-PCV
DRIVE	BELT	BELT
CFM	400	150
STATIC PRESSURE	0.125"	0.50"
SIZE	15	7
DESIGN H.P.	1/25 HP	1/6 HP
VOLTAGE	115V	115V
COOK MODEL#	90 C10UB	070 ACEB
MAXIMUM SONES	6.0	7.2

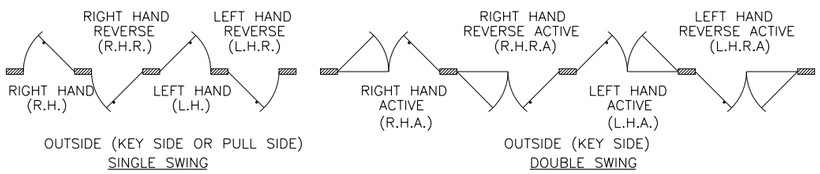
NOTES:
1. INSULATED ROOF CURB, BIRDSCREEN & BACKDRAFT DAMPER
2. DISCONNECT SWITCH
3. ROOF CURB TO MATCH ROOF SLOPE.

HARDWARE SETS

SET NO. 1 (FOR INTERIOR DOORS)
- 3 EA. HINGES
- 1 EA. AUTO CLOSER W/ ACTIVE LEAF & INTERNAL STOP
- 1 EA. KICK PLATE @ ACTIVE LEAF
- 1 SET ASTRAGALS
- 1 EA. FLUSH BOLT
- 1 EA. THRESHOLD
- 1 EA. FLOOR STOP @ ACTIVE LEAF
- 1 EA. LOCKSET EXCEPT DOOR No. 2
- 1 EA. HANDLE

SET NO. 2 (FOR EXTERIOR DOORS)
- 3 EA. HINGES
- 1 EA. AUTO CLOSER W/ ACTIVE LEAF & INTERNAL STOP
- 1 SET WEATHERSTRIPPING
- 1 EA. KICK PLATE @ ACTIVE LEAF
- 1 EA SADDLE
- 1 SET ASTRAGALS
- 1 EA. FLUSH BOLT
- 1 EA. FLOOR STOP @ ACTIVE LEAF
- 1 EA. THRESHOLD
- 1 EA. PANIC HARDWARED "SARGEND SERIES 80 OR APPROVED EQUAL.

SET NO. 3 (FOR REST RM DOORS)
- 1 EA. PUSH BRASS PLATE
- 1 EA. HANDLE
- 1 EA. LATH LOCK S.S



DOOR SWING DETAILS
SCALE: NTS

DOOR SCHEDULE

MARK	TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THK	DOOR MATERIAL	FRAME MATERIAL	DETAIL SEE A-9 HEAD	DETAIL SEE A-9 JAMB	DETAIL SEE A-9 SILL	NOTES	SPECS	REMARKS
01	A	3'-0"	7'-0"	2"	HOLLOW METAL	METAL	4	5	6	PANIC DEVICE	08400	500 WIDE STILE ENTRANCE
02	B	3'-0"	7'-0"	1-3/4"	HOLLOW METAL	METAL	4	5	6	PANIC DEVICE	08100	
03	D	3'-0"	7'-0"	1-3/4"	HOLLOW METAL	METAL	1	2	3	W/ALUMINUM LOUVER	08100	SEE TYPE "D"
04	B	3'-0"	7'-0"	1-3/4"	HOLLOW METAL	METAL	1	2	3		08100	
05	B	3'-0"	6'-8"	1-3/4"	HOLLOW METAL	METAL	1	2	–		08100	
06	C	6'-0"	6'-8"	1-3/4"	HOLLOW METAL	METAL	1	2	–		08100	
07	X	3'-6"	6'-8"	1-3/4"	FIBERGLASS	METAL	1(*)	2(*)	3(*)		08400	SS PIANO HINGE, STD LOCKSET, CHAIN STOP AND DOOR GASKET
							(*) EXTERIOR DOOR					

ROOM FINISH SCHEDULE

ROOM NAME	ROOM NO.	FLOOR	BASE	WALLS PAINTED CMU	WALLS CERAMIC TILE	WALLS PAINTED GYP. BD.	CEILING	CLG. HT.	REMARKS
OFFICE ADMIN	101	12X12 VINYL TILE	4" VINYL	X			2x4 ACOUST. LAY-IN	10'-0"	
MCC ROOM	102	CONCRETE SEAL WITH EPOXY	4" VINYL	X			EXPOSED STRUCTURE	–	
LAB & STORAGE	103	CONCRETE SEAL WITH EPOXY	4" VINYL	X			EXPOSED STRUCTURE	–	
RESTROOM	104	6X6 CERAMIC TILE	6" COVE TILE		X		2x4 ACOUST. LAY-IN	10'-0"	SEE DWG A-12 FOR DETAILS (EXCEPT SHOWER ROOM)
CHLORINE SYSTEM	105	CONCRETE SEAL WITH EPOXY	NO BASE	X			EXPOSED STRUCTURE	–	

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ROOM DOOR FINISH SCHEDULE

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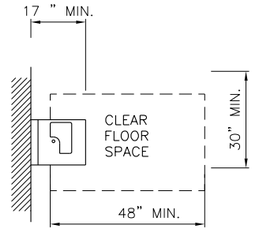
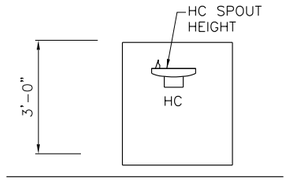
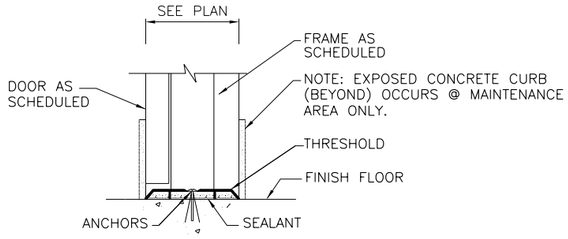


DRINKING FOUNTAIN PLAN
SCALE: 1:4



DRINKING FOUNTAIN FRONT ELEVATION
SCALE: 1:4



THRESHOLD
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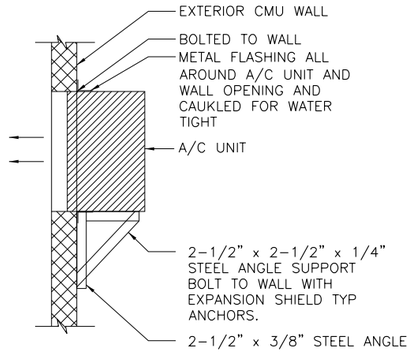
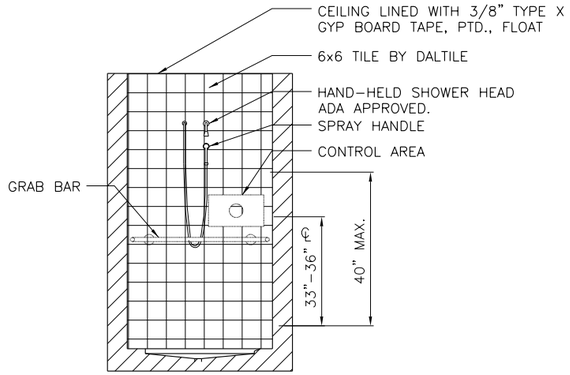
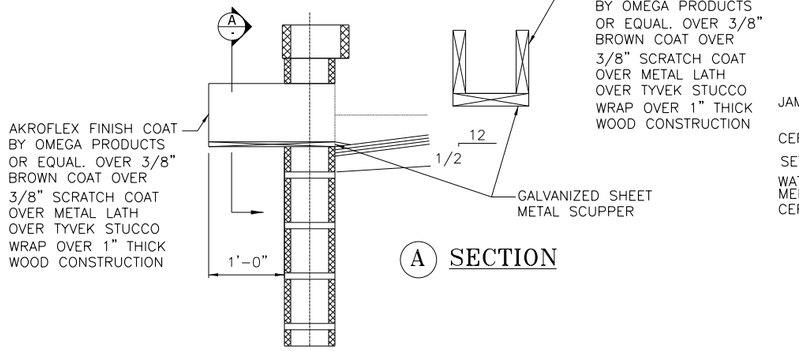


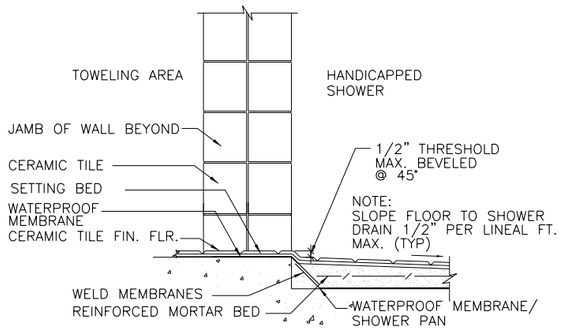
A/C UNIT SUPPORT DETAIL
SCALE: NTS



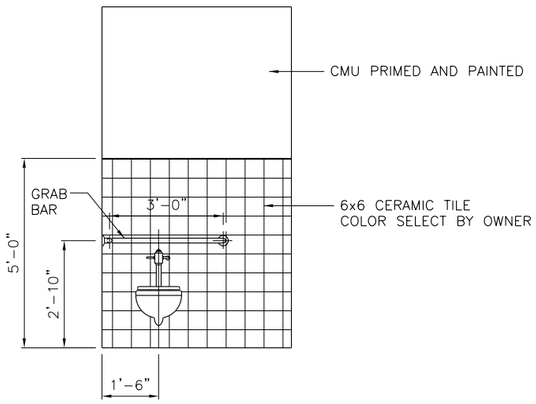
HANDICAPPED SHOWER
SCALE: 1:4



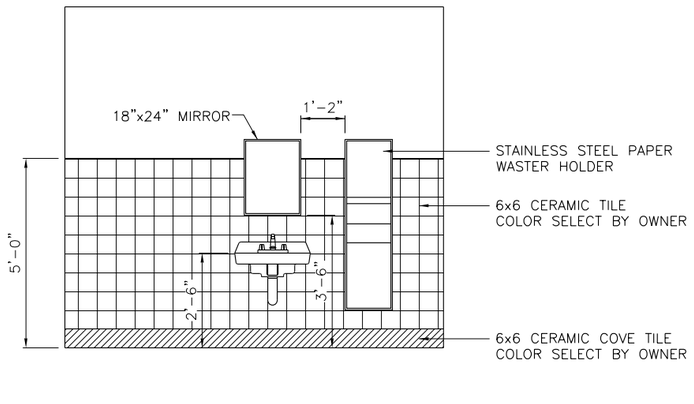
SCUPPER DETAIL
SCALE: 1:4



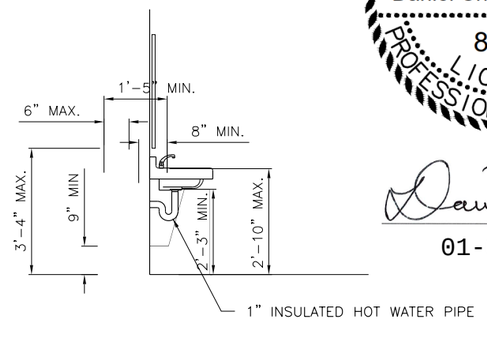
THRESHOLD AT HANDICAPPED SHOWER
SCALE: 1:4



HANDICAPPED RESTROOM
SCALE: 1:4

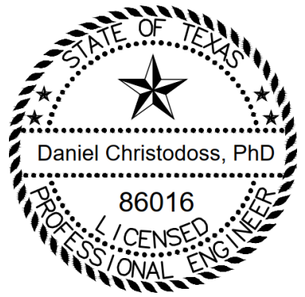


LAVATORY CLEARANCES
SCALE: 1:4



LAVATORY CLEARANCES
SCALE: 1:4

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
DETAILS



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PORT OF BROWNSVILLE
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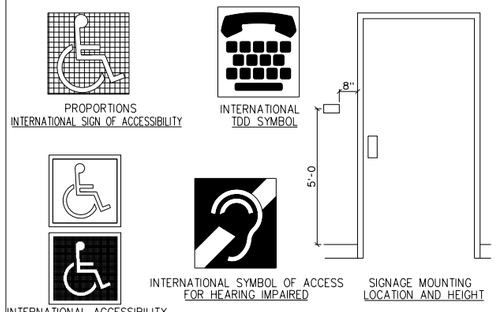
1 INTERNATIONAL SYMBOLS



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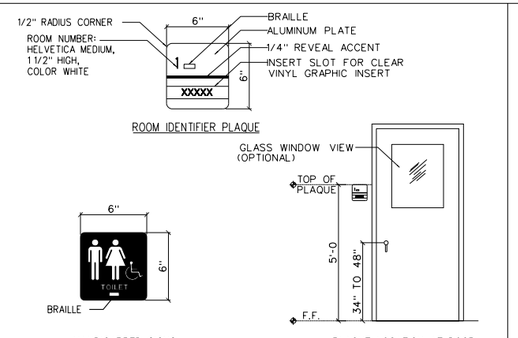
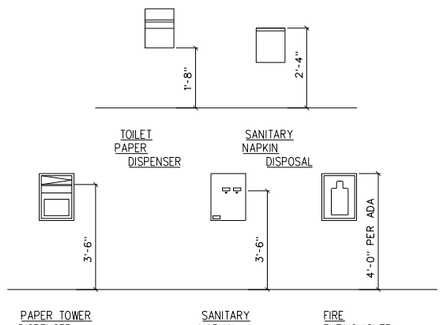
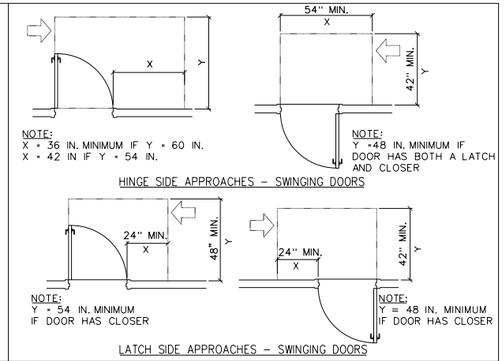


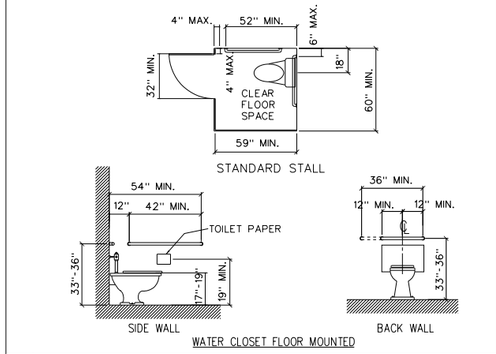
3 MOUNTED TOILET ACCESSORIES



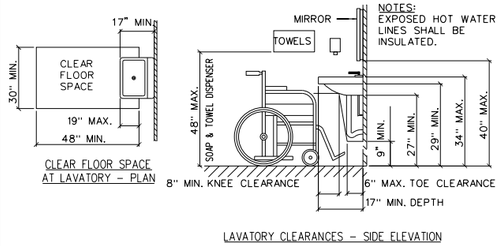
4 MANEUVERING CLEARANCES AT DOORS



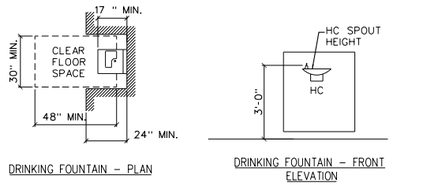
5 GRAB BARS AT WATER CLOSETS



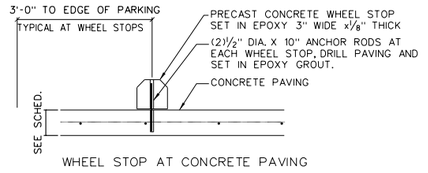
6 LAVATORY CLEARANCES



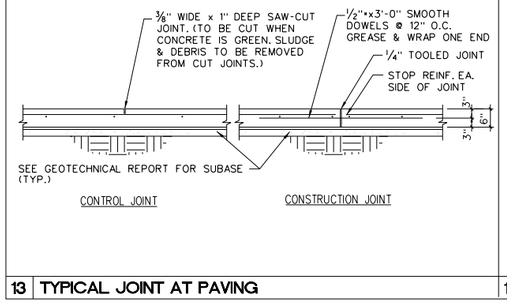
7 DRINKING FOUNTAIN



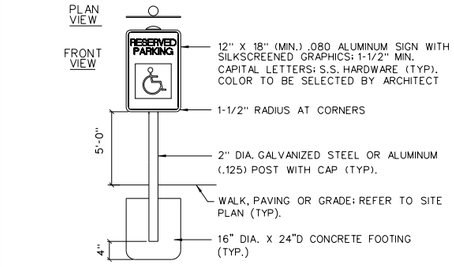
8 WHEEL STOP



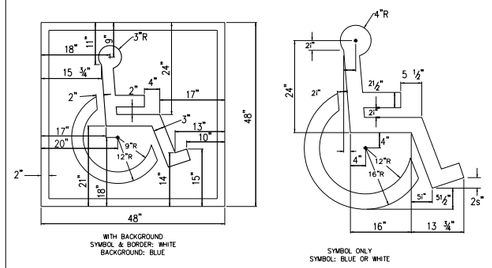
9 ACCESSIBLE RAMP



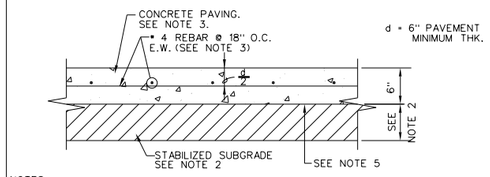
10 SINGLE ACCESSIBLE SIGN



11 DIMENSION OF PARKING SPACES



12 TYPICAL SECTION CONCRETE PAVING

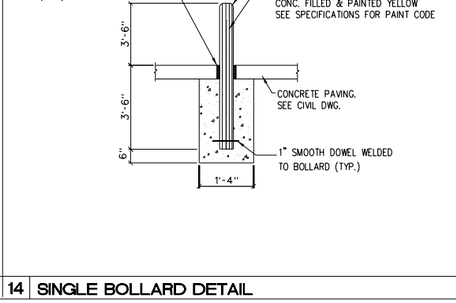


NOTES:

1. d = 5, 6, OR 7-INCHES MINIMUM IN AREAS DESIGNATED SITE PAVING PLAN.
2. SUBGRADE TO BE PREPARED, STABILIZED & COMPACTED IN CONFORMANCE WITH GEOTECHNICAL REPORT.
3. ASTM A615, GRADE 60 DEFORMED BARS, WITH MINIMUM LAP 30-INCHES.
4. PORTLAND CEMENT CONCRETE, 5 SACK, 4-INCH SLUMP, 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS, 500 PSI FLEXURAL STRENGTH AT 7 DAYS.
5. SHAPE SUBGRADE SURFACE TO FINAL GRADE. DO NOT INSTALL SAND CUSHION. DO NOT INSTALL SAND LEVELING COURSE.

13 TYPICAL JOINT AT PAVING

14 SINGLE BOLLARD DETAIL



15 PAVEMENT MARKINGS

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
ARCHITECTURAL & ADA DETAILS

PORT OF BROWNSVILLE
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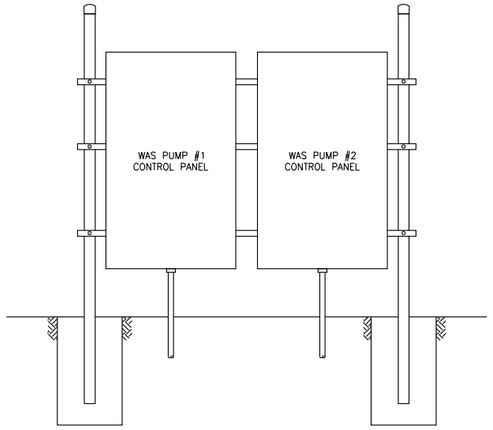
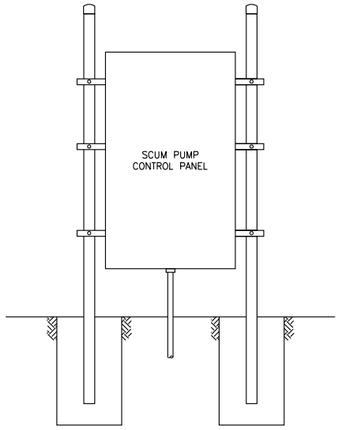
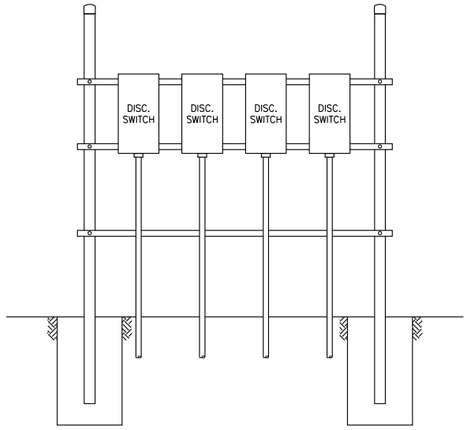


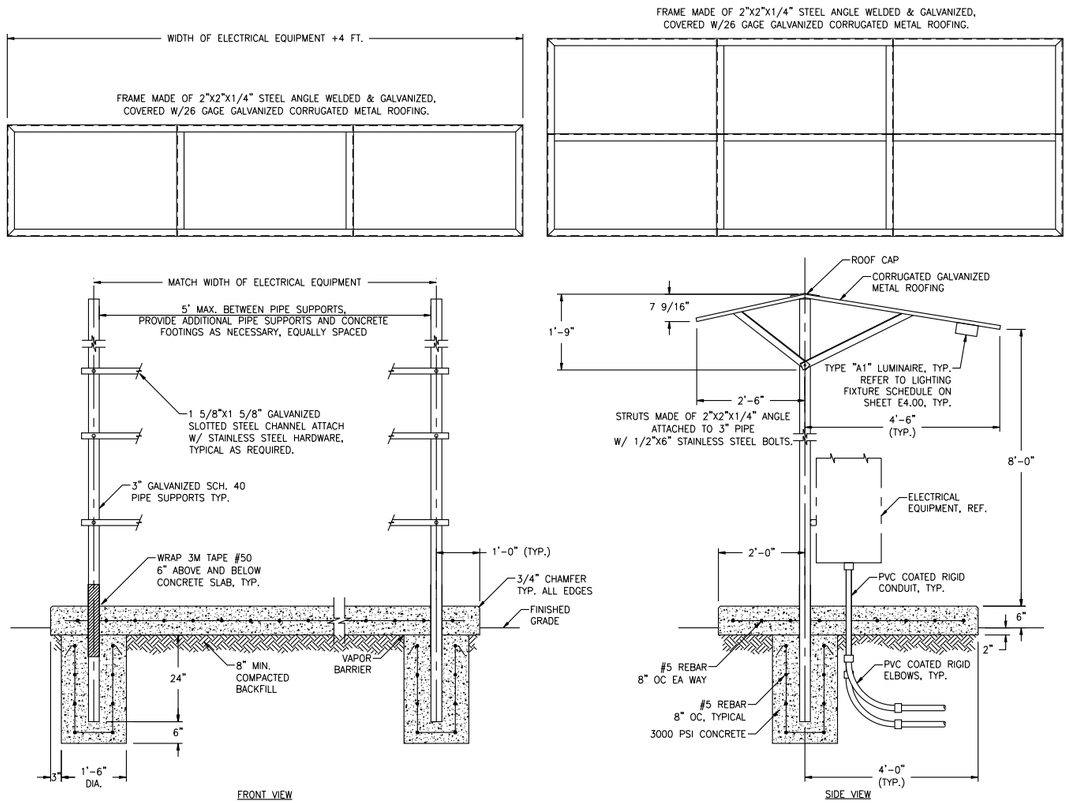
3 E4.01 **DETAIL - WAS PUMP #1 & #2 CONTROL PANEL INSTALLATION**
SCALE: NTS



4 E4.01 **DETAIL - SCUM PUMP CONTROL PANEL INSTALLATION**
SCALE: NTS

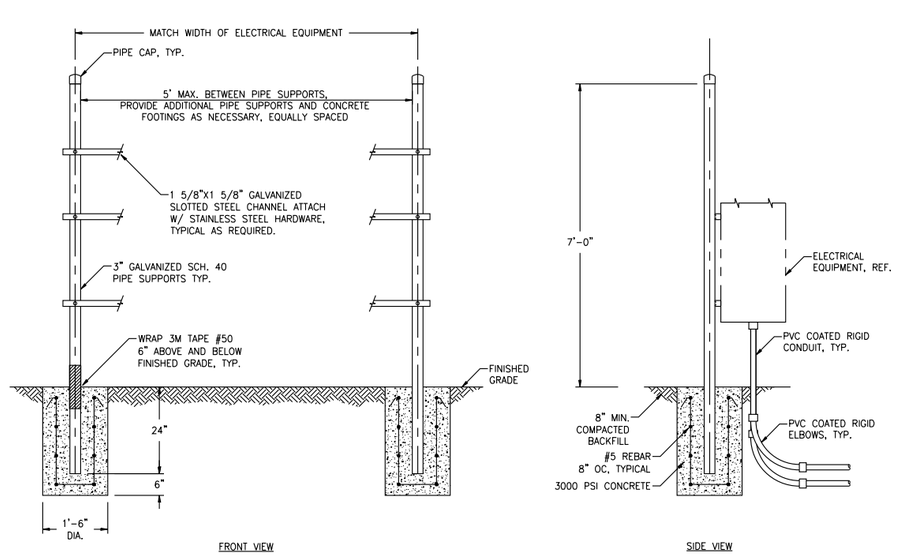


5 E4.01 **DETAIL - BLOWER #1 - #4 EQUIPMENT INSTALLATION**
SCALE: NTS



NOTE:
ALL FABRICATED STEEL COMPONENTS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL FASTENERS SHALL BE STAINLESS STEEL.

1 E4.01 **DETAIL - TYPICAL RACK SUPPORT AND ROOFING**
SCALE: NTS



NOTE:
ALL FABRICATED STEEL COMPONENTS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL FASTENERS SHALL BE STAINLESS STEEL.

2 E4.01 **DETAIL - TYPICAL RACK SUPPORT**
SCALE: NTS

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
ELECTRICAL DETAILS

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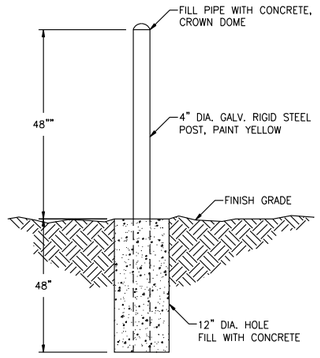
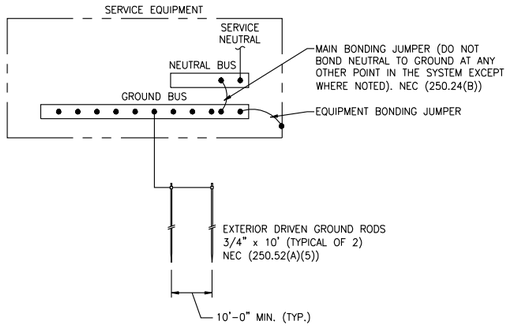
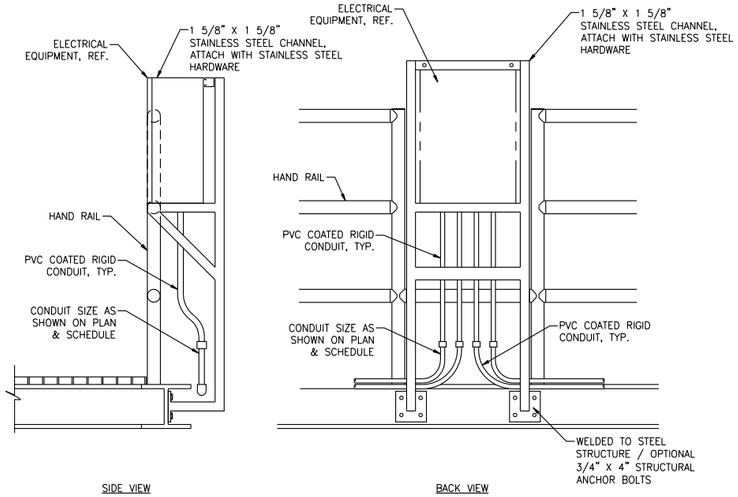


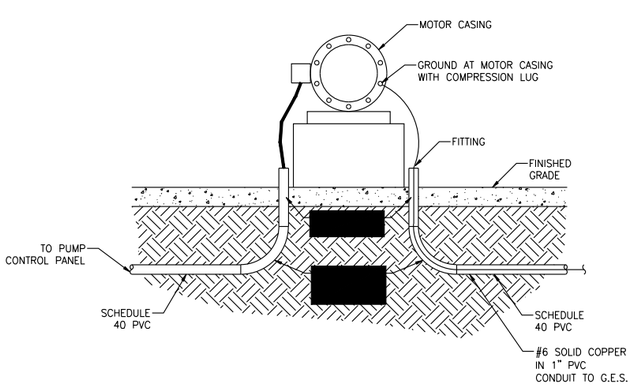
8 DETAIL - BOLLARD
E4.02 SCALE: NTS



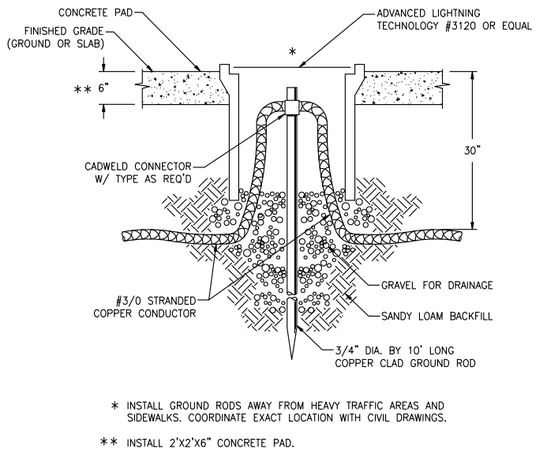
7 GROUNDING ELECTRODE SYSTEM (TYP.)
E4.02 SCALE: NTS



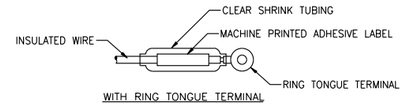
5 DETAIL - PLATFORM MOUNTED CONTROL PANEL
E4.02 SCALE: NTS



6 DETAIL - MOTOR POWER & GROUNDING
E4.02 SCALE: NTS



4 DETAIL - 3/4" X 10' GROUND ROD
E4.02 SCALE: NTS

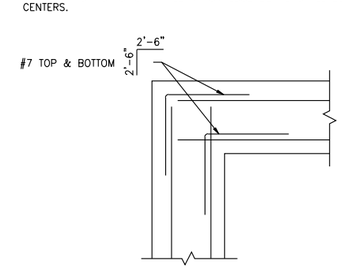


WHERE POSSIBLE RING TERMINALS SHALL BE USED. ONE OF THE ABOVE METHODS MUST BE USED ON ALL WIRE #8 AWG & SMALLER. THE SAME MUST ALSO BE USED ON LARGER WIRE UNLESS AN ALTERNATE METHOD IS SUBMITTED & APPROVED.

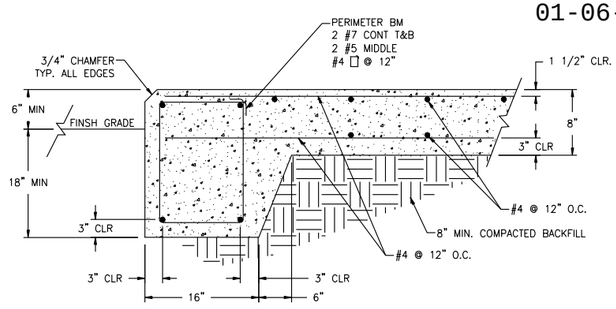
3 DETAIL - WIRE TERMINATION AND MARKING
E4.02 SCALE: NTS

CONCRETE CONSTRUCTION

1. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI. CONCRETE SHALL BE MIXED AND PLACED IN ACCORDANCE WITH ASTM C94 "STANDARD SPECIFICATION FOR READY MIXED CONCRETE" AND ACI 304 "GUIDE FOR MEASURING, MIXING AND PLACING CONCRETE."
2. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ANSI/ASTM A615 WITH SUPPLEMENTAL REQUIREMENTS S1, GRADE 60.
3. DETAILING, FABRICATION AND INSTALLATION OF REBAR SHALL COMPLY WITH THE REQUIREMENTS OF AMERICAN CONCRETE INSTITUTE 315 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES."
4. PROVIDE SUPPORTS OR CHAIRS TO SUPPORT THE REBAR AT THE POSITIONS SHOWN. MAXIMUM SPACING OF SUPPORTS FOR SLAB REBAR SHALL BE 3'-0" ON CENTERS EACH WAY. MAXIMUM SPACING OF REBAR FOR EDGE BEAMS SHALL BE 6'-0" MAXIMUM ON CENTERS.



2 DETAIL - GENERATOR PAD GRADE BEAM CORNER BARS
E4.02 SCALE: NTS



1 DETAIL - GENERATOR PAD
E4.02 SCALE: NTS

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
ELECTRICAL DETAILS

PORT OF BROWNSVILLE
the port that works

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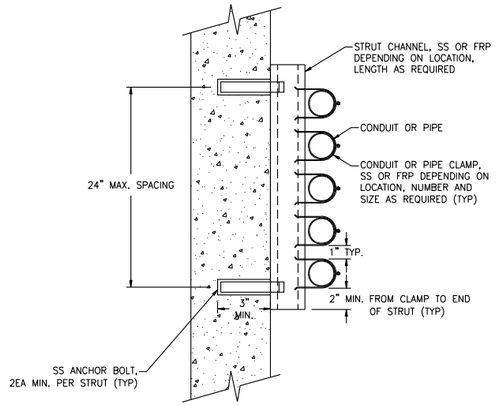
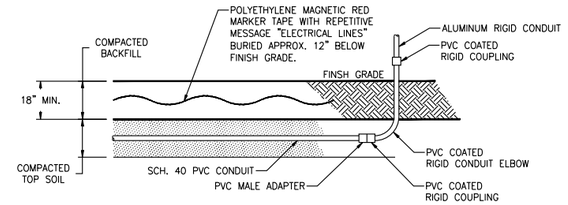
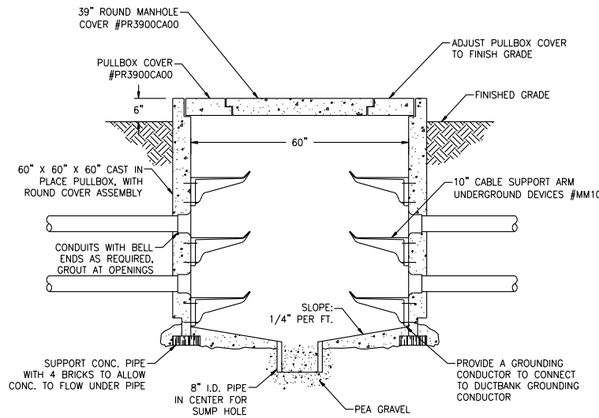


NOTE:
STAINLESS STEEL (SS) SHALL BE 316SS FOR WATER AND WASTEWATER PROJECTS.

6 E4.03 DETAIL - STRUT AND CLAMP
SCALE: NTS

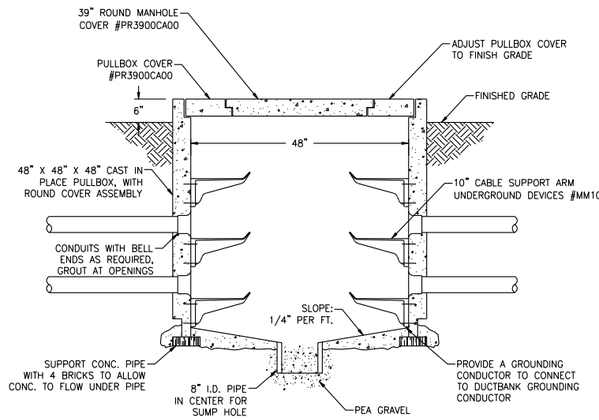


3 E4.03 DETAIL - TYPICAL UNDERGROUND CONDUIT RUN
SCALE: NTS



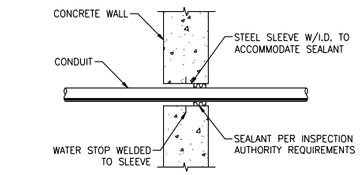
NOTE: ALL CONDUIT ENTERING PULLBOXES MUST DRAIN TO PULLBOXES

2 E4.03 DETAIL - MANHOLE
SCALE: NTS

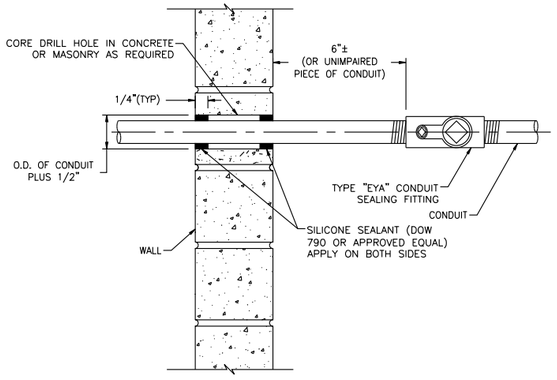


NOTE: ALL CONDUIT ENTERING PULLBOXES MUST DRAIN TO PULLBOXES

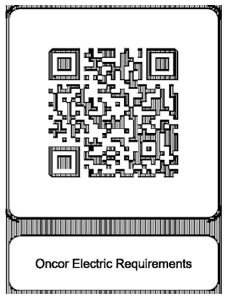
1 E4.03 DETAIL - MANHOLE
SCALE: NTS



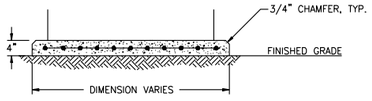
5 E4.03 DETAIL - WALL PENETRATIONS
SCALE: NTS



4 E4.03 DETAIL - WALL PENETRATION CONDUIT SEALING
SCALE: NTS



8 E4.03 ONCOR ELECTRIC REQUIREMENTS
SCALE: NTS



7 E4.03 DETAIL - HOUSEKEEPING PAD
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SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

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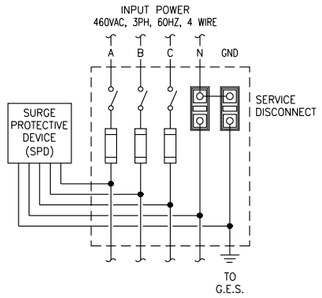

5 E4.04 DETAIL - SURGE PROTECTION DEVICE (SPD)
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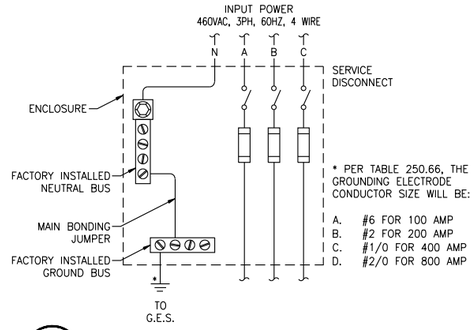
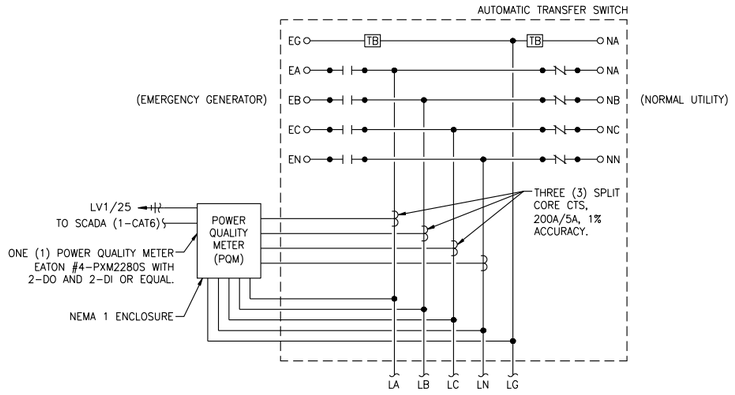


4 E4.04 DETAIL - GROUNDING SERVICE DISCONNECT
SCALE: NTS



3 E4.04 DETAIL - POWER QUALITY METER (PQM)
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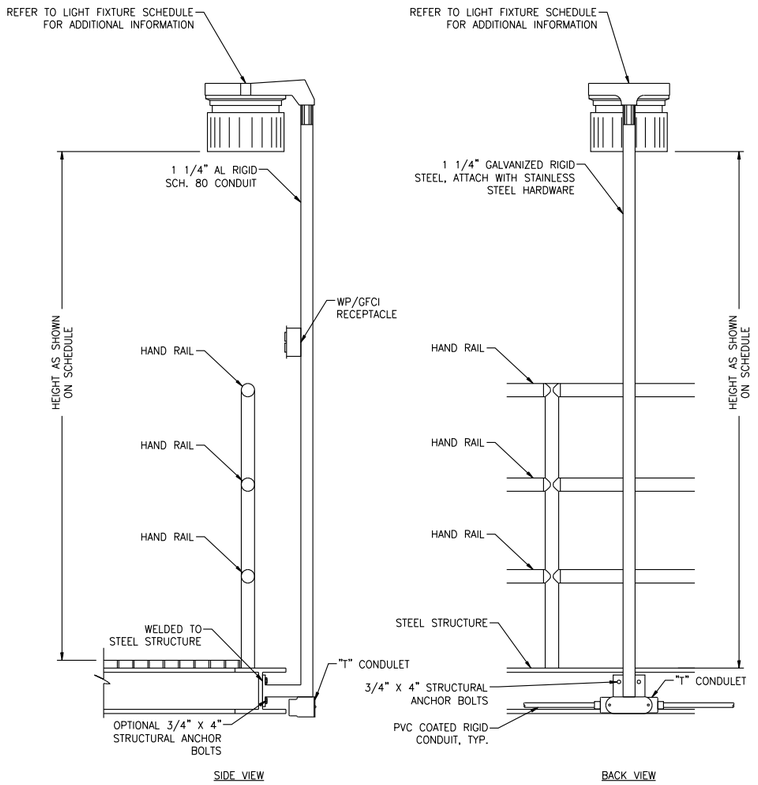
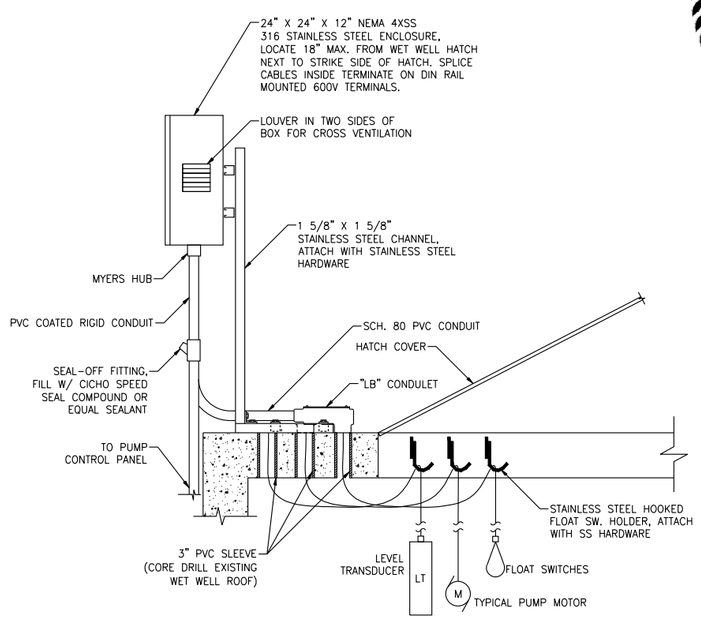


2 E4.04 DETAIL - PLATFORM MOUNTED LIGHTING FIXTURE
SCALE: NTS



1 E4.04 DETAIL - WET WELL JUNCTION BOX
SCALE: NTS

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PORT OF BROWNSVILLE FISHING HARBOR 0.5 MGD WASTE WATER TREATMENT PLANT ELECTRICAL DETAILS

PORT OF BROWNSVILLE
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DRAWN BY	J3	11/13/2024
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SHEET NUMBER	64	

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15 / E4.05 DETAIL - TRENCH SECTION Q-Q
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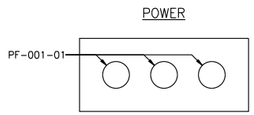

14 / E4.05 DETAIL - TRENCH SECTION P-P
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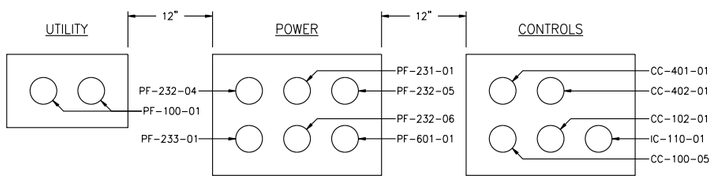

9 / E4.05 DETAIL - TRENCH SECTION N-N
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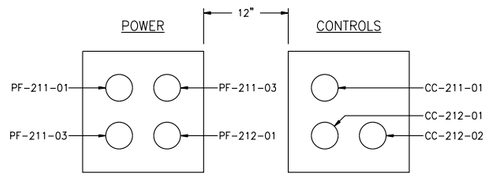
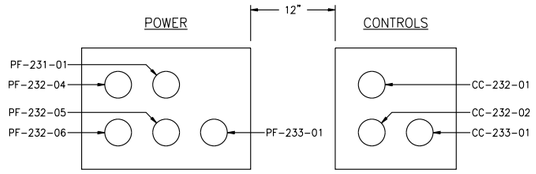
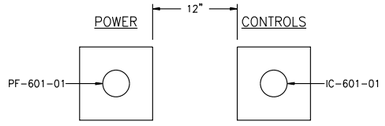


12 / E4.05 DETAIL - TRENCH SECTION M-M
SCALE: NTS



11 / E4.05 DETAIL - TRENCH SECTION K-K
SCALE: NTS



10 / E4.05 DETAIL - TRENCH SECTION J-J
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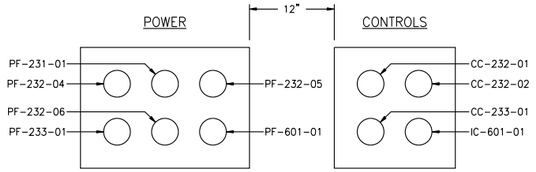

9 / E4.05 DETAIL - TRENCH SECTION H-H
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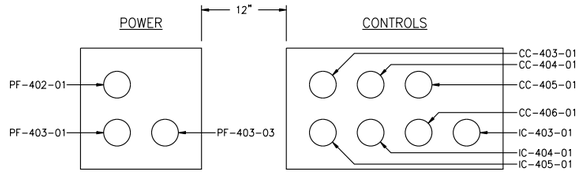
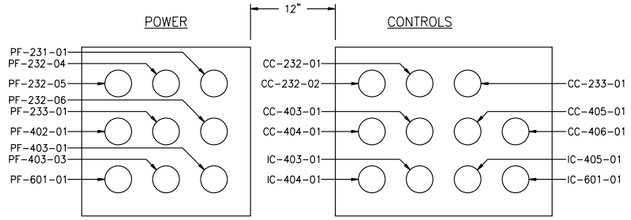


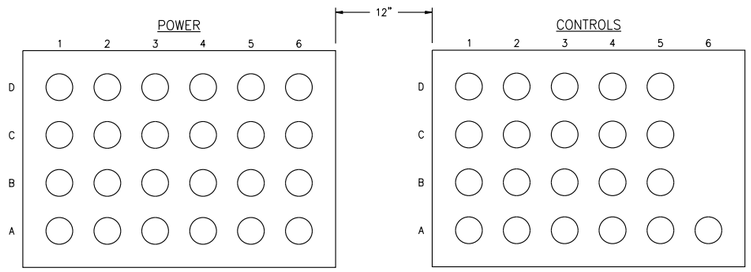
8 / E4.05 DETAIL - TRENCH SECTION G-G
SCALE: NTS



7 / E4.05 DETAIL - TRENCH SECTION F-F
SCALE: NTS

CONDUIT SIZE GRID (SECTION X-X)							
A1	PF-213-01	B1	PF-222-01	C1	PF-233-01	D1	PF-240-01
A2	PF-213-02	B2	PF-222-03	C2	PF-402-01	D2	PF-241-01
A3	PF-220-01	B3	PF-231-01	C3	PF-403-01	D3	PF-242-01
A4	PF-221-01	B4	PF-232-04	C4	PF-403-03	D4	PF-243-01
A5	PF-221-01	B5	PF-232-05	C5	PF-501-01	D5	PF-244-01
A6	PF-221-03	B6	PF-232-06	C6	PF-501-02	D6	PF-601-01

CONDUIT SIZE GRID (SECTION X-X)							
A1	CC-213-01	B1	CC-232-02	C1	CC-406-01	D1	CC-242-01
A2	CC-221-01	B2	CC-233-01	C2	IC-403-01	D2	CC-243-01
A3	CC-221-03	B3	CC-403-01	C3	IC-404-01	D3	IC-240-01
A4	CC-222-01	B4	CC-404-01	C4	IC-405-01	D4	IC-241-01
A5	CC-222-03	B5	CC-405-01	C5	IC-601-01	D5	IC-244-01
A6	CC-232-01						



6 / E4.05 DETAIL - TRENCH SECTION D-D
SCALE: NTS

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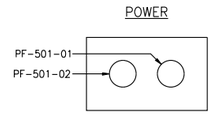

5 / E4.05 DETAIL - TRENCH SECTION E-E
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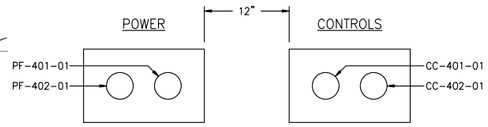

4 / E4.05 DETAIL - TRENCH SECTION C-C
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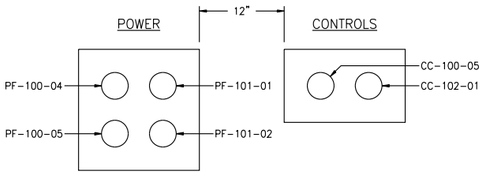

3 / E4.05 DETAIL - TRENCH SECTION B-B
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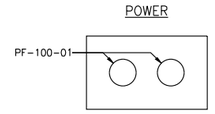

2 / E4.05 DETAIL - TRENCH SECTION A-A
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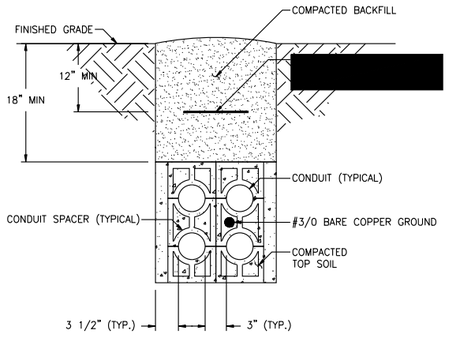

1 / E4.05 DETAIL - TRENCH SECTION CONSTRUCTION (TYPICAL)
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PORT OF BROWNSVILLE
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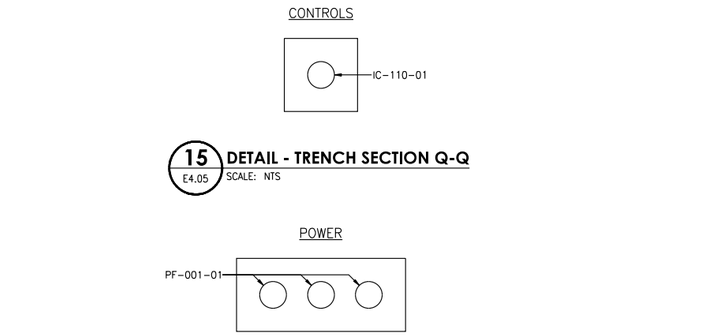

15 / E4.05 DETAIL - TRENCH SECTION Q-Q
SCALE: NTS

14 / E4.05 DETAIL - TRENCH SECTION P-P
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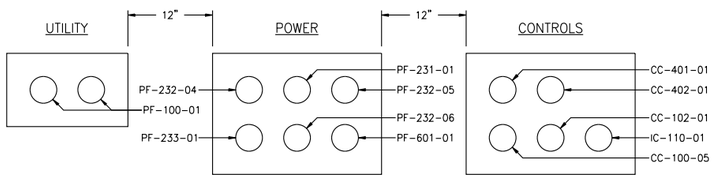

9 / E4.05 DETAIL - TRENCH SECTION N-N
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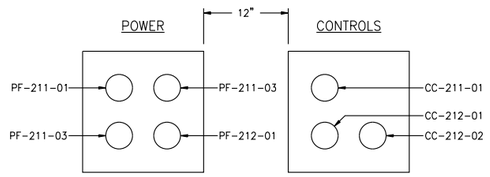

12 / E4.05 DETAIL - TRENCH SECTION M-M
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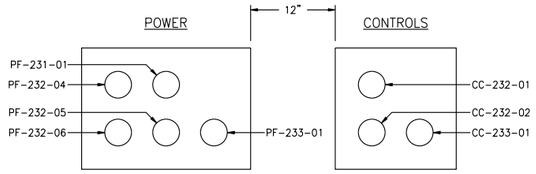

11 / E4.05 DETAIL - TRENCH SECTION K-K
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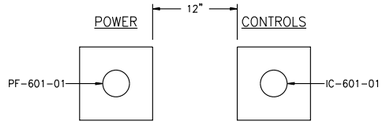

10 / E4.05 DETAIL - TRENCH SECTION J-J
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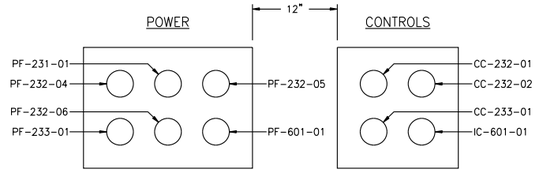

9 / E4.05 DETAIL - TRENCH SECTION H-H
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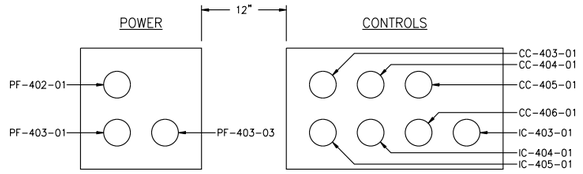

8 / E4.05 DETAIL - TRENCH SECTION G-G
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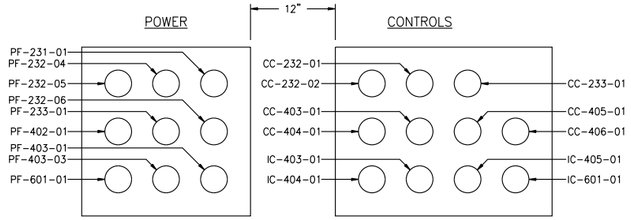

7 / E4.05 DETAIL - TRENCH SECTION F-F
SCALE: NTS

CONDUIT SIZE GRID (SECTION X-X)							
A1	PF-213-01	B1	PF-222-01	C1	PF-233-01	D1	PF-240-01
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A3	PF-220-01	B3	PF-231-01	C3	PF-403-01	D3	PF-242-01
A4	PF-221-01	B4	PF-232-04	C4	PF-403-03	D4	PF-243-01
A5	PF-221-01	B5	PF-232-05	C5	PF-501-01	D5	PF-244-01
A6	PF-221-03	B6	PF-232-06	C6	PF-501-02	D6	PF-601-01

CONDUIT SIZE GRID (SECTION X-X)							
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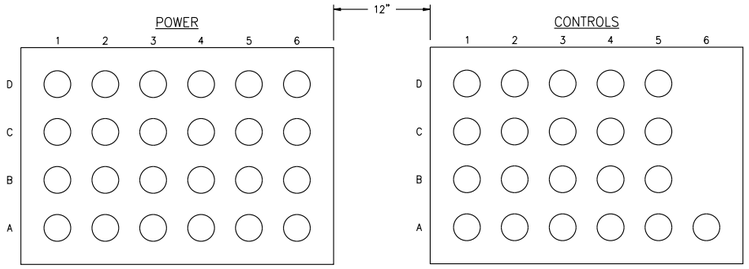
A2	CC-221-01	B2	CC-233-01	C2	IC-403-01	D2	CC-243-01
A3	CC-221-03	B3	CC-403-01	C3	IC-404-01	D3	IC-240-01
A4	CC-222-01	B4	CC-404-01	C4	IC-405-01	D4	IC-241-01
A5	CC-222-03	B5	CC-405-01	C5	IC-601-01	D5	IC-244-01
A6	CC-232-01						



6 / E4.05 DETAIL - TRENCH SECTION D-D
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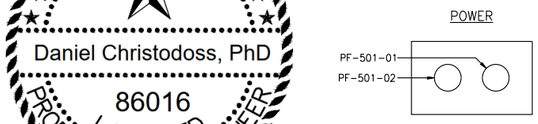

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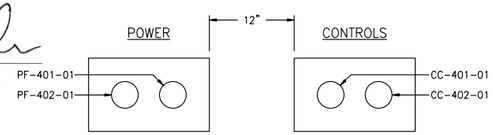

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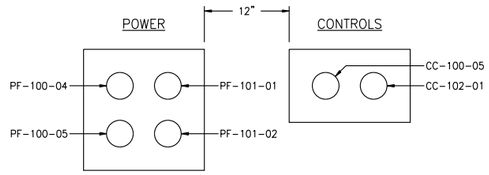

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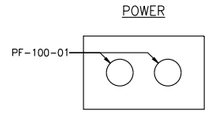

2 / E4.05 DETAIL - TRENCH SECTION A-A
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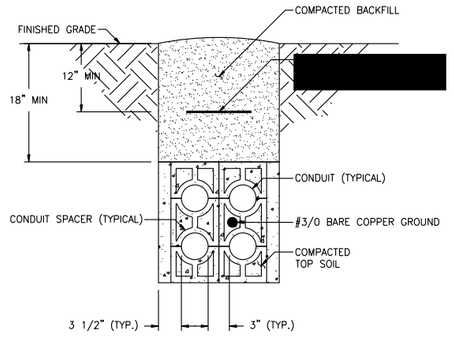

1 / E4.05 DETAIL - TRENCH SECTION CONSTRUCTION (TYPICAL)
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REFERENCE NOTES

1. CONTROL PANEL WIRING IS TYPICAL. FINAL HARDWARE CONFIGURATION WILL VARY ACCORDING TO PUMP CONTROL PANEL SPECIFICATIONS.
2. CONTROL PANEL, 480V, 3 PHASE, UL805A LABELED. VERIFY EXACT PUMP SIZES AND SIZE CIRCUIT BREAKERS AND OVERLOADS ACCORDINGLY. THE PUMP CONTROL PANEL SHALL BE MANUFACTURED BY 5 STAR ELECTRIC, SAN ANTONIO, TEXAS 1(800) 229-8965 OR APPROVED EQUAL.

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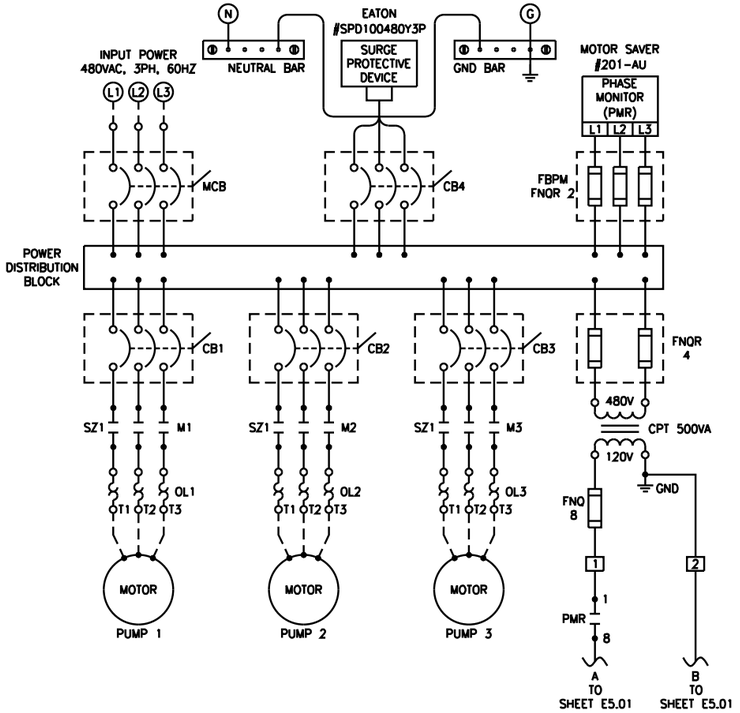
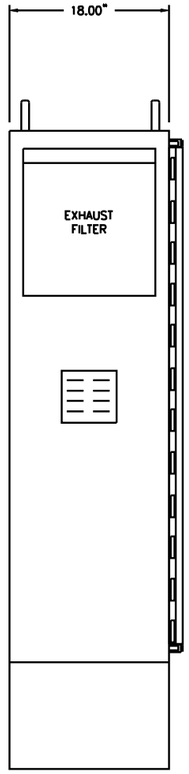
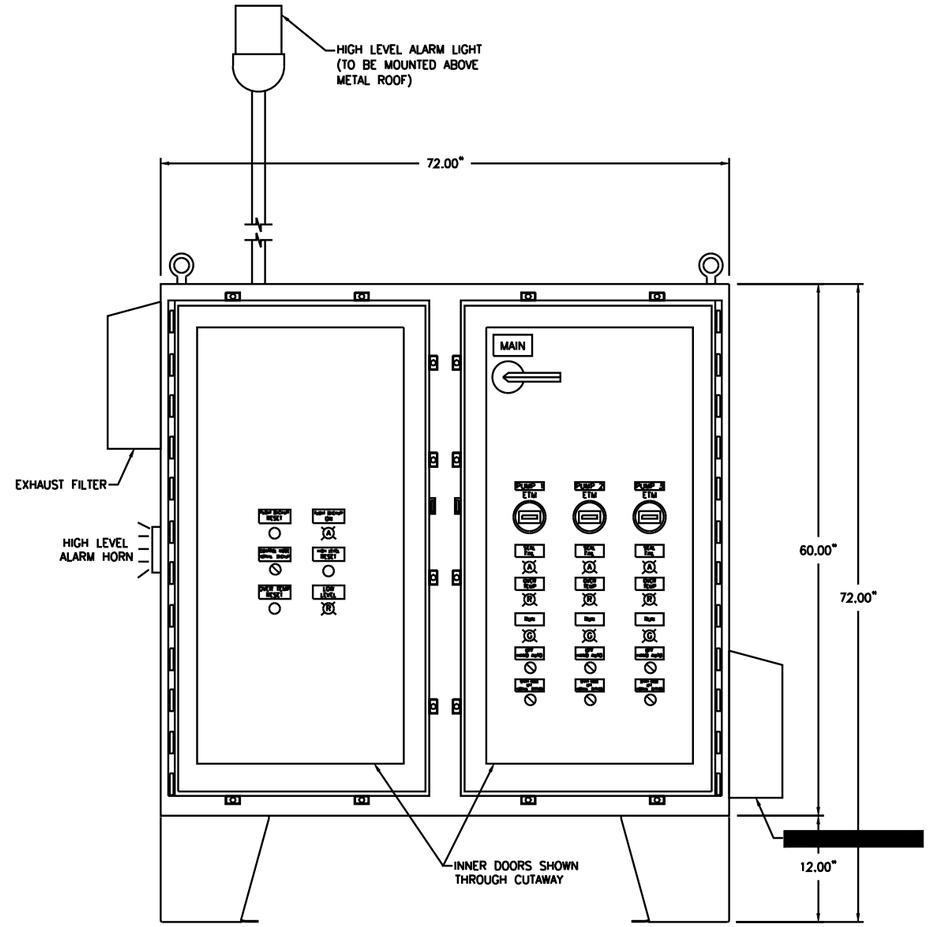


2 E5.00 **LIFT STA. PUMP CONTROL PANEL WIRING DIAGRAM**
SCALE: NTS



SIDE VIEW



FRONT VIEW

NOTE:
ENCLOSURE, NEMA 4X 316 STAINLESS STEEL DEAD FRONT W/ INNER DOORS AND AIR CONDITIONER

1 E5.00 **LIFT STA. PUMP CONTROL PANEL ENCLOSURE**
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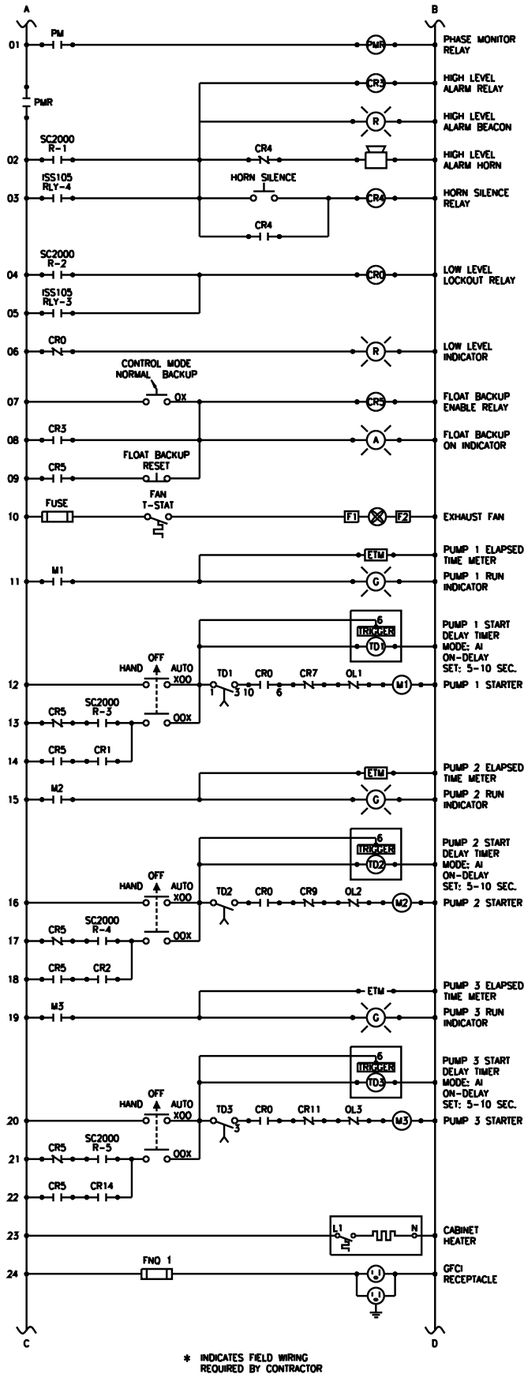
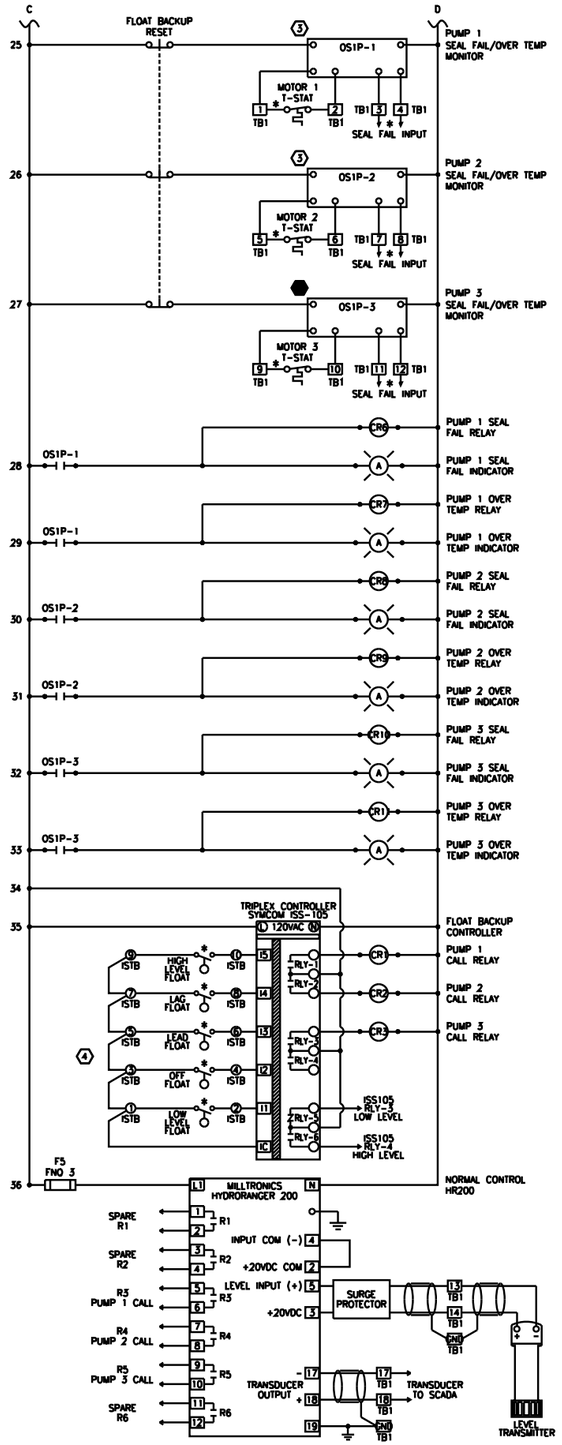
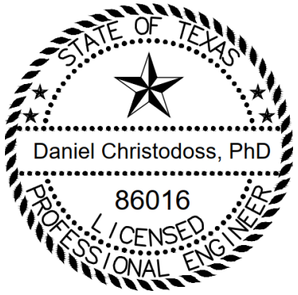


* INDICATES FIELD WIRING REQUIRED BY CONTRACTOR

1 CONTROL SCHEMATIC 1 2
E5.01 SCALE: NTS





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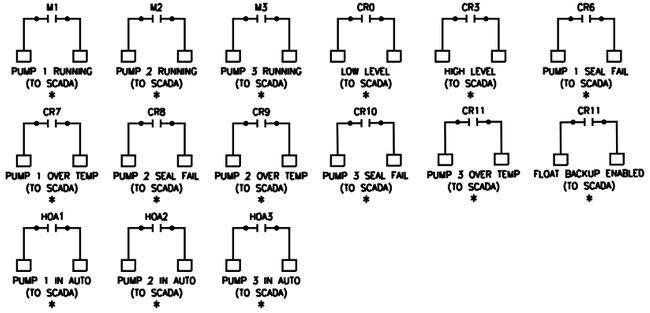

REFERENCE NOTES

1. PUMP CONTROL PANEL WIRING DIAGRAM IS TYPICAL. FINAL HARDWARE CONFIGURATION WILL VARY ACCORDING TO PUMP CONTROL PANEL SPECIFICATIONS FOR THE SUBMERSIBLE PUMPS.
2. PROVIDE STARTUP AND MINIMUM 4 HOURS TRAINING FOR OPERATOR PERSONNEL. SUBMIT STARTUP REPORT TO ENGINEER.
3. MOISTURE/OVER TEMPERATURE MONITOR RELAY SHALL BE INTEGRATED TO THE CONTROL LOGIC TO PROVIDE FAIL SAFE OPERATION. THUS, WHEN THE MOISTURE/OVER TEMPERATURE MONITOR RELAY IS REMOVED FROM THE CONTROL CIRCUIT OR FAILS, THE CORRESPONDING PUMP WILL BE LOCKED OUT.
4. ALL SEALED FLOAT SWITCHES SHALL BE CONNECTED TO THE CONTROL LOGIC VIA INTRINSICALLY SAFE RELAYS.

SEQUENCE OF OPERATION:

LEVEL CONTROL OPERATION:

THE PUMP CONTROL PANEL SHALL UTILIZE ONE (1) LEVEL SENSOR TO CONTROL THE LEVEL IN THE WET WELL. ON SUMP LEVEL RISE TO 1ST PUMP TURN-ON LEVEL SETTING, THE CONTROLLER SHALL START THE 1ST PUMP. IF THE LEVEL CONTINUES TO RISE TO THE 2ND PUMP TURN-ON LEVEL SETTING, THE CONTROLLER SHALL START THE 2ND PUMP. SUMP LEVEL SHALL LOWER TO LOW LEVEL TURN-OFF SETTING AND ALL PUMPS SHALL STOP. ALTERNATING RELAY SHALL INDEX ON STOPPING OF PUMP SO THAT 2ND PUMP WILL START ON NEXT OPERATION AND SO FORWARD. IF LEVEL CONTINUES TO RISE AND HIGH LEVEL SETTING IS REACHED, THE CONTROLLER SHALL TRIGGER THE HIGH LEVEL ALARM. ALARM SHALL BE MANUAL RESET. LEVELS SHALL BE SET AS INDICATED IN THE SPECIFICATIONS AND SHOWN ON THE CIVIL PLANS. AN AUTOMATIC BACKUP LEVEL FLOATS SYSTEM SHALL BE PROVIDED. IF ONE PUMP SHOULD FAIL FOR ANY REASON, THE SECOND PUMP SHALL OPERATE ON THE CONTROLLER OVERRIDE SIGNAL. ALL LEVEL SETTINGS SHALL BE ADJUSTABLE FROM THE CONTROLLER SELECTABLE MENU/SCREEN, WITH THE PUMP OPERATING, THE SUMP FLUID LEVEL SHALL LOWER. WHEN THE LOW LEVEL TURN-OFF SETTING IS REACHED THE PUMP RUNNING WILL THEN CEASE TO OPERATE.

AUTOMATIC BACKUP LEVEL FLOATS OPERATION:

WHEN THE LEVEL TRANSMITTER FAILS THE PUMP CONTROL PANEL SHALL AUTOMATICALLY OPERATE BY THE LEVEL FLOATS ACCORDING TO THE FOLLOWING ORDER.

ON SUMP LEVEL RISE, LOWER (OFF) FLOAT SWITCH SHALL FIRST BE ENERGIZED. WHEN THE LEVEL RISES FURTHER, THE 1ST PUMP (LEAD PUMP) LEVEL SWITCH SHALL NEXT ENERGIZE AND START 1ST PUMP. IF THE LEVEL CONTINUES TO RISE THE 2ND PUMP (LAG PUMP) LEVEL SWITCH SHALL NEXT ENERGIZE AND START THE 2ND PUMP WITH 1ST AND 2ND PUMPS OPERATING. SUMP LEVEL SHALL LOWER TO LOW SWITCH TURN-OFF SETTING AND BOTH PUMPS SHALL STOP. ALTERNATING RELAY SHALL INDEX ON STOPPING OF PUMP SO THAT 2ND PUMP WILL START ON NEXT OPERATION. IF LEVEL CONTINUES TO RISE, ALARM SWITCH SHALL ENERGIZE AND SIGNAL THE ALARM. IF ONE PUMP SHOULD FAIL FOR ANY REASON, THE SECOND PUMP SHALL OPERATE ON THE OVERRIDE CONTROL AND IF LEVEL RISES ABOVE OVERRIDE CONTROL, ALARM SHALL SIGNAL. ALL LEVEL SWITCHES SHALL BE ADJUSTABLE FOR LEVEL SETTINGS FROM THE SURFACE. WITH THE PUMP OPERATING, THE SUMP FLUID LEVEL SHALL LOWER. WHEN THE LEVEL CAUSES THE LOWER (OFF) MERCURY FLOAT SWITCH TO TILT BACK TOWARD HANGING VERTICAL, ITS CONTACT SHALL OPEN CAUSING THE MOTOR CONTACTOR TO LOSE POWER TO THE COIL AND THUS OPEN THE CIRCUIT TO THE PUMP MOTOR. THE PUMP OR PUMPS RUNNING WILL THEN CEASE TO OPERATE.

IF THE HIGH LEVEL FLOAT IS ACTIVATED ALL PUMPS SHALL BE CALLED TO RUN AT 100% FLOW CAPACITY.

PUMPS SHALL ALTERNATE TO MAINTAIN EQUAL RUN TIMES AND SHALL START WITH TIME DELAY TO ASSIST THE GENERATOR STARTING.

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PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER TREATMENT PLANT
PUMP CONTROL DETAILS

PORT OF BROWNSVILLE
the port that works

RRP YOUR RELIABLE PARTNER

TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-4440

NOTES	NAME	DATE
SURVEY BY		
DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

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11/13/2024
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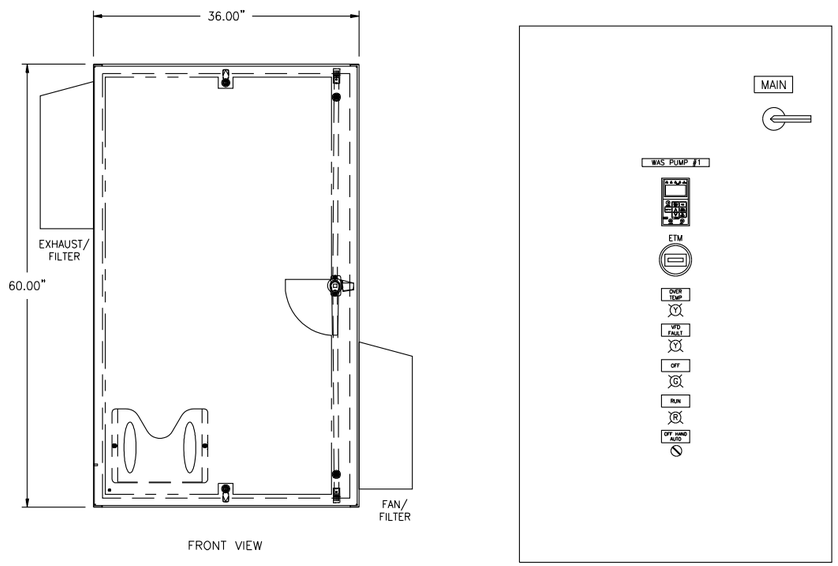
REFERENCE NOTES

1. CONTROL PANEL WIRING DIAGRAM IS TYPICAL FOR WAS PUMPS #1 & #2. FINAL HARDWARE CONFIGURATION WILL VARY ACCORDING TO CONTROL PANEL SPECIFICATIONS FOR PUMPS.
2. PROVIDE STARTUP AND MINIMUM 4 HOURS TRAINING FOR OPERATOR PERSONNEL. SUBMIT STARTUP REPORT TO ENGINEER.
3. CONTROL PANEL TO BE PROVIDED WITH VFD TYPE YASKAWA CIMR-PU-4A-0009-F-A FOR 5 HP MOTORS, 480V, 3 PHASE, UL508A LABELED. VERIFY EXACT MOTOR SIZE, CIRCUIT BREAKERS, AND OVERLOADS ACCORDINGLY. SEE ONE-LINE DIAGRAM SHEET E3.02 FOR DETAILS.

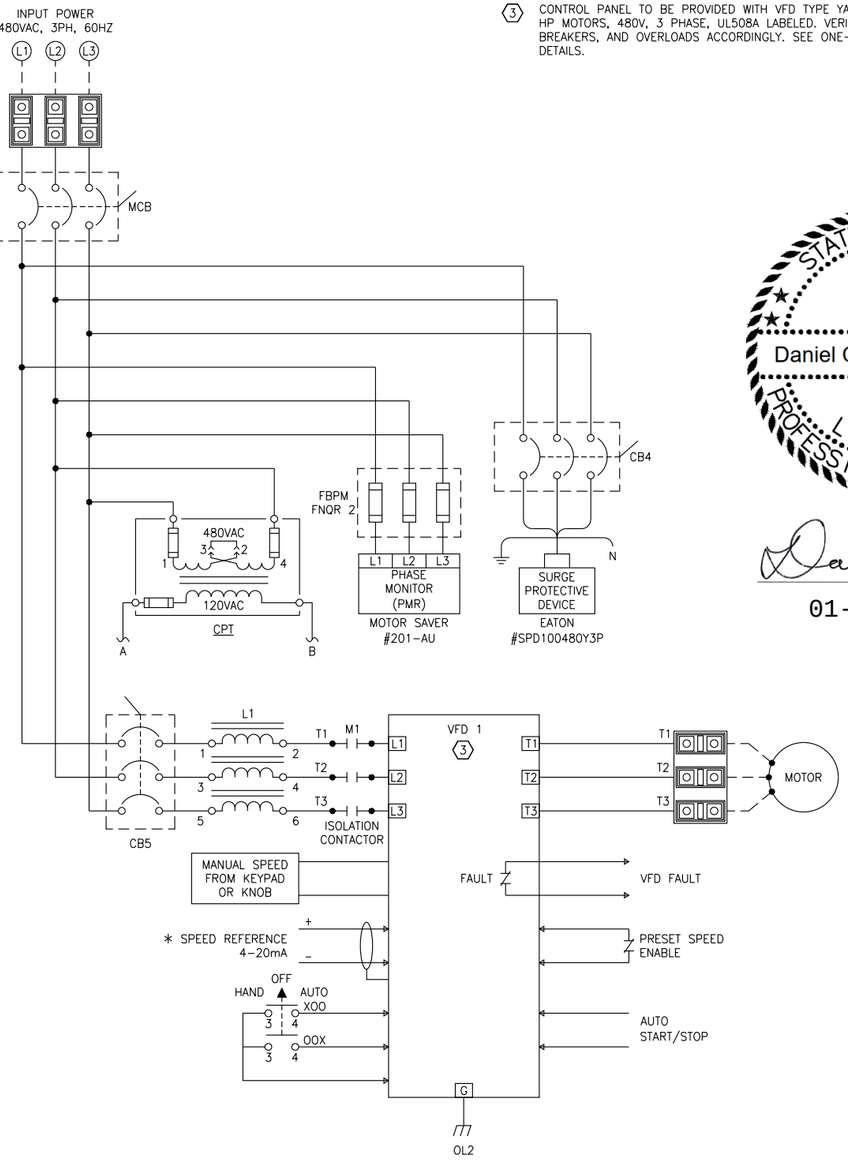


FRONT VIEW

INNER DOORS (ENLARGED)

ENCLOSURE: NEMA 4XSS W/ INNER DOORS
36.00" X 60.00" X 12.00"

1 E5.02 WAS PUMP CONTROL ENCLOSURE
SCALE: NTS



OPERATION MODE:
HAND MODE - VFD IS CONTROLLED VIA KEYPAD / KNOB
AUTO MODE - VFD IS CONTROLLED REMOTELY

* = FIELD WIRED BY CONTRACTOR.

2 E5.02 WAS PUMP CONTROL PANEL WIRING DIAGRAM (1)(2)
SCALE: NTS

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STATE OF TEXAS
Daniel Christodoss, PhD
86016
LICENSED
PROFESSIONAL ENGINEER

01-06-2025

PORT OF BROWNSVILLE
FISHING HARBOR
0.5 MGD WASTE WATER
TREATMENT PLANT
WAS PUMP CONTROL PANEL DETAILS

PORT OF BROWNSVILLE
the port that *works*

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DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
SCALE:		

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REFERENCE NOTES

1. CONTROL PANEL WIRING DIAGRAM IS TYPICAL FOR WAS PUMPS #1 AND #2. FINAL HARDWARE CONFIGURATION WILL VARY ACCORDING TO PUMP CONTROL PANEL SPECIFICATIONS FOR PUMPS.
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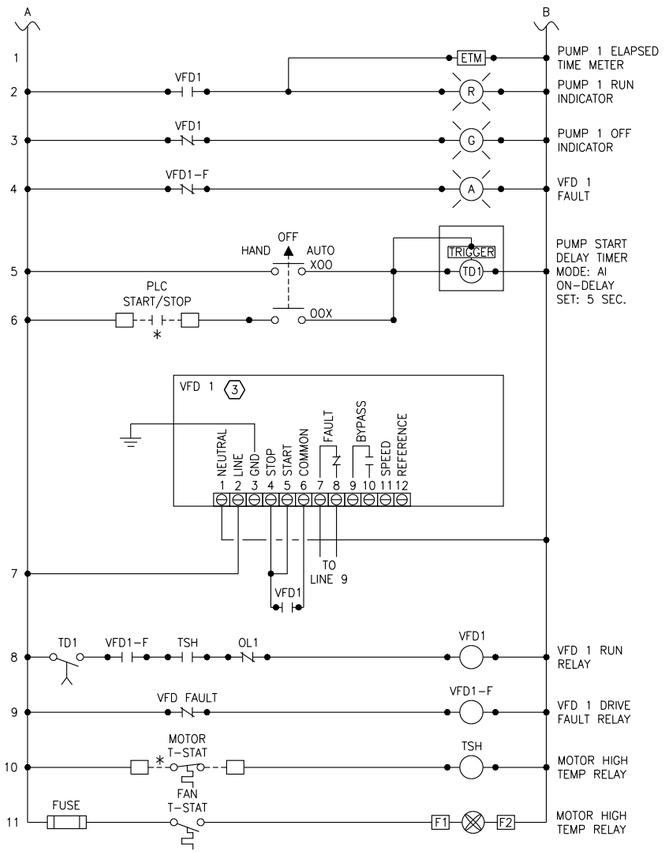
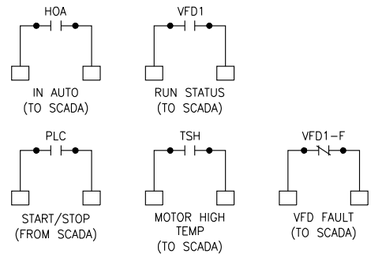
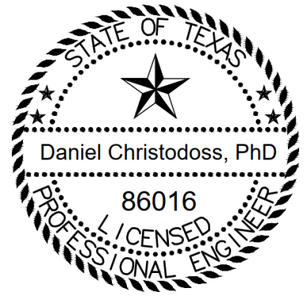


OPERATION MODE:
HAND MODE - VFD IS CONTROLLED VIA KEYPAD / KNOB
AUTO MODE - VFD IS CONTROLLED REMOTELY

* = FIELD WIRED BY CONTRACTOR.

1 / E5.03 **WAS PUMP CONTROL PANEL WIRING DIAGRAM** (1)(2)
SCALE: NTS





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DRAWN BY	JJ	11/13/2024
CHECKED BY	AC	11/13/2024
DESIGNED BY	AC	11/13/2024
REVIEWED BY	DC	11/13/2024
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