TALLADEGA MAIN WWTP PUMP UPGRADES

PREPARED FOR:

THE CITY OF TALLADEGA

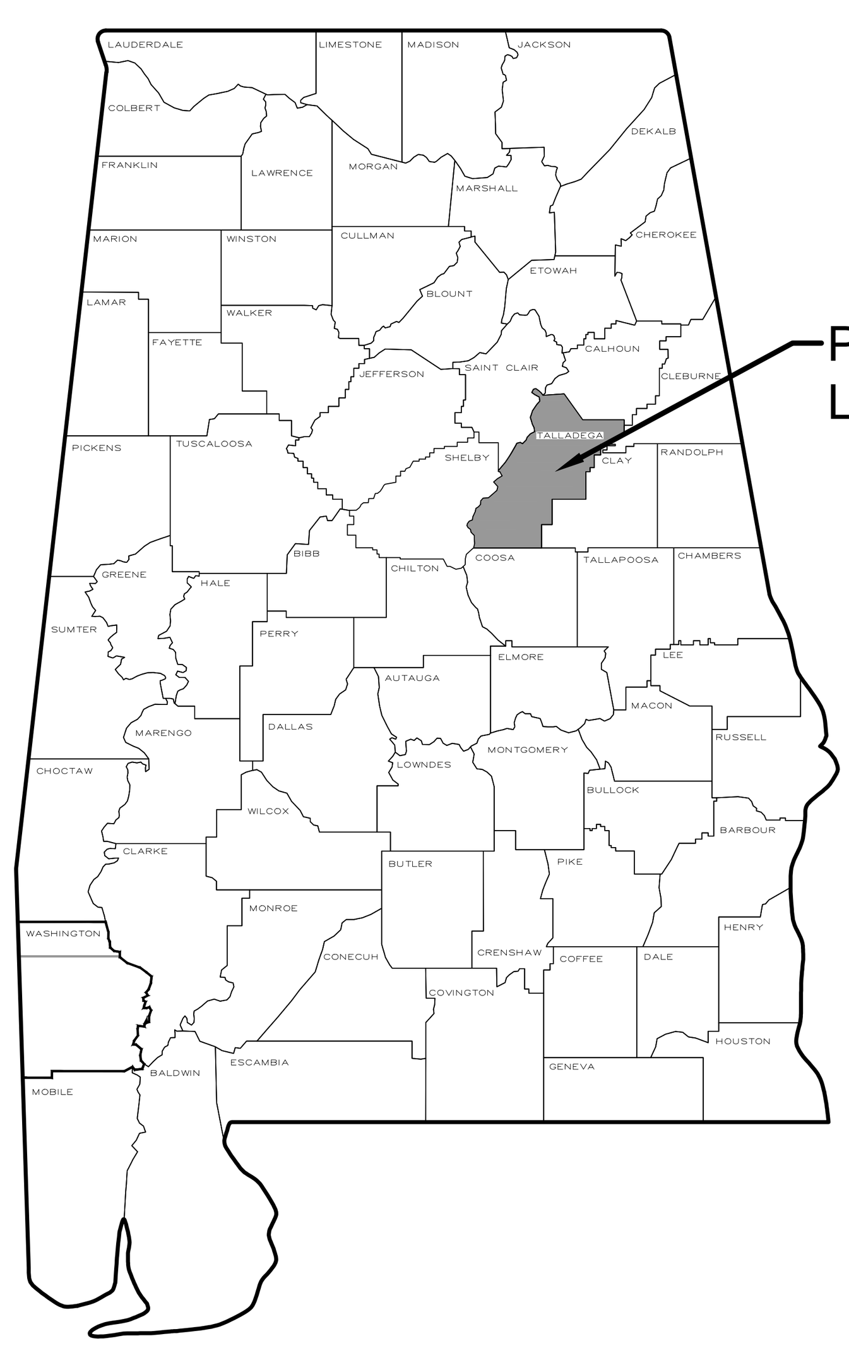
PREPARED BY:

INSITE ENGINEERING

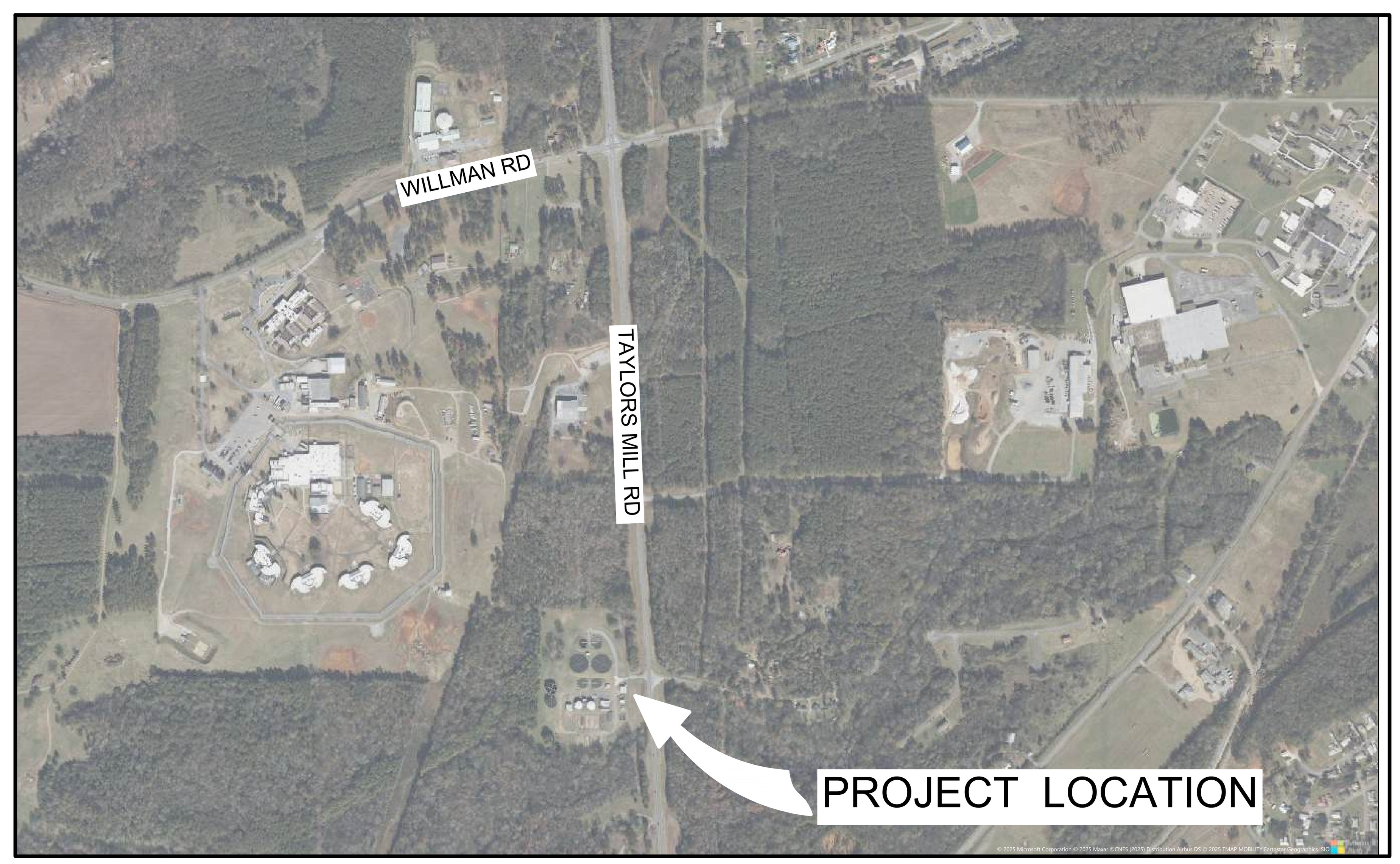
INSITE ENGINEERING, LLC.

5800 FELDSPAR WAY
HOOVER, ALABAMA 35244
OFFICE (205) 733-9696
www.insiteengineering.org

DRAWING INDEX



COUNTY LOCATION
SCALE: NONE



LOCATION MAP
SCALE: NONE

ISSUE FOR BID

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CONSTRUCTION PLANS FOR:
TALLADEGA MAIN WWTP PUMP UPGRADES
TALLADEGA, AL

TALLADEGA
At every turn

PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/16/25

10/15/25

THIS SHEET CONTAINS:
COVER SHEET, SITE LOCATION, AND DRAWING INDEX

SHEET 1 OF 25

GN-1

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ABBREVIATIONS

ACQ'D	ACQUIRED
AC	ACRE
ALDOT	ALABAMA DEPARTMENT OF TRANSPORTATION
AVE	AVENUE
BM	BENCH MARK
BLDG	BUILDING
BLVD	BOULEVARD
CIP	CAST IRON PIPE
℄	CENTER LINE
CL	CLASS
CONC	CONCRETE
COR	CORNER
CFS	CUBIC FEET PER SECOND
CY	CUBIC YARD
C & G	CURB AND GUTTER
Q	DESIGN FLOW
DIST	DISTANCE
DBL	DOUBLE
Da	DRAINAGE AREA
DI	DUCTILE IRON PIPE
ESMT	EASEMENT
EL	ELEVATION
F	FLOW LINE
FPS	FEET PER SECOND
GAL	GALLON
GPM	GALLONS PER MINUTE
GPD	GALLONS PER DAY
HDWL	HEADWALL
HWEL	HEADWATER ELEVATION
HP	HIGH POINT
HWL	HIGH WATER LEVEL
HORIZ	HORIZONTAL
INV	INVERT
JCT	JUNCTION
JB	JUNCTION BOX
LF	LINEAR FEET
LP	LOW POINT
MB	MAIL BOX
MH	MANHOLE
MP	MILEPOST
MGD	MILLION GALLONS PER DAY
NWL	NORMAL WATER LEVEL
N	NORTHING
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PT	POINT OF TANGENCY
POT	POINT ON TANGENT
LB	POUND
P	PROPERTY LINE
RR	RAILROAD
R	RANGE
RCP	REINFORCED CONCRETE PIPE
REQ'D	REQUIRED
ROW	RIGHT OF WAY
RD	ROAD
SS	SANITARY SEWER
SEC	SECTION
SHLDR	SHOULDER
SD	SIDE DRAIN
SY	SQUARE YARD
STA	STATION
ST	STREET
TBM	TEMPORARY BENCH MARK
T	TOWNSHIP
VERT	VERTICAL
VLF	VERTICAL FEET
VPC	VERTICAL POINT OF CURVE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENT
VCP	VITRIFIED CLAY PIPE
WL	WATER LEVEL
W	WATER MAIN

STANDARD LEGEND

EXISTING / PROPOSED

- SIDEWALK
- UNPAVED ROAD OR DRIVEWAY
- PAVED ROAD OR DRIVEWAY
- PAVED ROAD WITH GUTTER
- DRAIN WITH HEADWALL (SIZE AND TYPE STRUCTURE NOTED)
- EXISTING BRIDGE, BOX CULVERT, OR STORM DRAIN (SIZE AND TYPE STRUCTURE NOTED) WALK BRIDGE
- RAILROAD TRACK SINGLE
- RAILROAD TRACK DOUBLE
- RAILROAD MILEPOST (M.P. 129)
- OUTDOOR ADVERTISING SIGN
- MASONRY WALL (NOTE TYPE)
- MAILBOX
- CLOTHES LINE AND POLES (NOTED)
- WELL
- LEVEE OR EARTH DAM
- WOOD FENCE
- HOG WIRE OR BARBED WIRE FENCE
- CHAIN LINK FENCE
- DROP INLET (NOTED)

EXISTING / PROPOSED / UTILITIES

EXISTING	PROPOSED	UTILITIES
		SANITARY SEWER MANHOLE
X" SS		SANITARY SEWER GRAVITY LINE (NOTE DIA. OF PIPE IF KNOWN)
		SANITARY SEWER FORCE LINE (ARROW INDICATES FLOW)
X	X	UTILITY MANHOLE (NOTE TYPE IN CIRCLE - P,T,ETC.)
P	P	POWER JUNCTION BOX
		POWER POLE
		LIGHT POLE (NOTE TYPE)
		HIGH VOLTAGE TRANSMISSION POLE OR TOWER
UP	UP	UNDERGROUND POWER CONDUIT
P	P	OVERHEAD POWER LINES
T	T	TELEPHONE JUNCTION BOX
UT	UT	UNDERGROUND TELEPHONE CONDUIT
T	T	OVERHEAD TELEPHONE LINES
T&P	T&P	OVERHEAD TELEPHONE AND POWER LINES
		GUY POLE
		UTILITY POLE ANCHOR
		GAS LINE MARKER (NOTED)
		GAS METER
X"G		GAS LINE (NOTE DIA. OF PIPE IF KNOWN)
		GAS VALVE
		WATER VALVE
X"W		WATER LINE (NOTE DIA. OF PIPE IF KNOWN)
		WATER METER
		FIRE HYDRANT

NATURAL

- TREES. (DRAW DOT TO SCALE OF TREE)
- HEDGES OR SHRUBBERY
- SHRUB
- FLOWER BED, GARDEN, OR ROCK GARDEN (NOTED)
- LAKE OR POND
- SWAMP, MARSH, ETC.
- DITCH OR STREAM (ARROW INDICATES DIRECTION OF FLOW)
- EARTH
- ROCK

- WATTLE DITCH CHECK DAM
- SILT FENCE
- HEADWALL
- DOUBLE WING CURB INLET
- SINGLE WING CURB INLET
- NORTHING & EASTING (N 9,952.45 / E 9,439.16)
- DRAINAGE CALLOUT (STRUCTURE NUMBER; LINE NUMBER — LINE: SL-1, N= 1210812.28, E= 2217825.67; 1 / ST-1; PROFILE SHEET NUMBER)

EXISTING / PROPOSED / SURVEY

EXISTING	PROPOSED	SURVEY
PI	PI	PROPERTY IRON (SIZE AND TYPE NOTED)
℘	℘	PROPERTY LINE
		SECTION CORNER OR ¼ SECTION CORNER IRON (SIZE, TYPE, AND DESCRIPTION NOTED)
		¼ OR ¼ - ¼ SECTION LINE
		SECTION LINE
R/W	R/W	RIGHT OF WAY MONUMENTS (NOTED FOR EXISTING)
ROW	ROW	ROW LINE
		CONSTRUCTION LIMITS
ESMT	ESMT	EASEMENT
CE	CE	CONSTRUCTION EASEMENT

NORTH ARROW

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PLOTTED: 10/16/25

ALABAMA REGISTERED PROFESSIONAL ENGINEER No. 33... RICHARD RYAN ...
10/15/25

THIS SHEET CONTAINS:
STANDARD LEGEND AND ABBREVIATIONS

SHEET 2 OF 25

GN-2

GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE BETWEEN ARCHITECTURAL, MECHANICAL, STRUCTURAL, ELECTRICAL, AND OTHER DRAWINGS. ANY DISCREPANCIES BETWEEN DRAWINGS OF DIFFERENT DISCIPLINES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.

2. UNDERGROUND UTILITY LOCATIONS SHOWN ARE FROM UTILITY COMPANY RECORDS OR FROM LINE LOCATOR MARKS AND ARE SHOWN IN APPROXIMATE MANNER ONLY. CONTRACTOR SHALL FIELD VERIFY THE EXISTENCE, LOCATION, SIZE, AND TYPE OF ANY AND ALL UTILITY LINES PRIOR TO BEGINNING ANY CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES AS A RESULT OF HIS CONSTRUCTION OPERATIONS.

3. CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION METHODS, SEQUENCES, PROCEDURES, AND JOB SITE SAFETY. THE CONTRACTOR SHALL TAKE ALL MEANS NECESSARY TO MAINTAIN AND PROTECT THE INTEGRITY OF ALL CONSTRUCTION (NEW AND EXISTING) AT ALL STAGES. ENGINEER ASSUMES NO LIABILITY FOR SAFETY ON THE JOB SITE.

4. ALL UTILITIES WITHIN ROADWAY SHALL BE BACKFILLED COMPLETELY WITH STONE UNLESS OTHERWISE DIRECTED BY THE GEOTECHINAL ENGINEER OR THE GOVERNING AUTHORITY.

5. ALL AREAS WHICH WILL LIE UNDER NEW STRUCTURES, PAVING, CONCRETE, OR WALKWAYS SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY OR AS DIRECTED BY GEOTECHNICAL ENGINEER.

6. ALL PERMITS, OTHER THAN THOSE LISTED IN THE SPECIFICATIONS, FOR THE DEVELOPMENT OF THESE PLANS ARE THE CONTRACTORS RESPONSIBILITY AND SHOULD BE OBTAINED PRIOR TO DISTURBING ANY AREAS OR BEGINNING ANY CONSTRUCTION.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND LEGAL DISPOSAL OF ALL MATERIALS AND DEBRIS NOT ACCEPTABLE TO THE OWNER.

8. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER CONCURRENT WORK BEING PERFORMED IN THE AREA.

9. CONTRACTOR IS RESPONSIBLE FOR ENSURING ALL FACILITIES AND PROCESSES STAY ACTIVE DURING CONSTRUCTION. SHUT DOWNS SHOULD BE SCHEDULED WITH THE OWNER AND ENGINEER AS OUTLINED IN THE SPECIFICATIONS.

GRADING NOTES

1. ENGINEER TO BE PROVIDED AT LEAST 24 HOURS NOTICE PRIOR TO THE STARTING OF EACH PHASE OF WORK.

2. ALL PERMITS/APPROVALS BY ADEM, ALDOT, FEMA, CORPS OF ENGINEERS WILL BE REQUIRED PRIOR TO DISTURBING AREAS UNDER JURISDICTIONS OF SUCH PERMITS.

3. THERE SHALL BE NO LAND DISTURBING ACTIVITY UNTIL PROOF OF ADEM NOR COVERAGE IS PROVIDED TO THE ENGINEER AND ADEQUATE EROSION CONTROL MEASURES ARE IN PLACE.

4. ELEVATIONS SHOWN ARE FINISHED GRADE. THE CALCULATION OF THE APPROPRIATE SUBGRADE ELEVATIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SUBGRADE ELEVATIONS SHALL VARY IN ACCORDANCE WITH THE SURFACE TREATMENT CALL FOR ON THESE PLANS (I. E. ASPHALT PAVEMENT, CONCRETE PAVEMENT, SIDEWALK, TOPSOIL, ETC.) AND THE RELATED SECTIONS OR DETAILS.

5. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AT ALL TIMES.

6. ALL CUT AND FILL SIDE SLOPES ARE 2:1 UNLESS NOTED OTHERWISE.

7. CLEARING LIMITS TO BE 5' OUTSIDE OF TOE AND TOP OF SLOPE.

EROSION CONTROL NOTES

1. ALL EROSION CONTROL PERMITS FOR THE DEVELOPMENT OF THESE PLANS SHALL BE OBTAINED BY THE CONTRACTOR PRIOR TO ANY GROUND DISTURBANCE.

2. EROSION CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO BEGINNING ANY OTHER CONSTRUCTION ON THE JOB SITE.

3. CONTRACTOR IS RESPONSIBLE FOR INSTALLING, MAINTAINING, AND REMOVING ALL EROSION AND SEDIMENT CONTROLS IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES AS SHOWN ON THESE DRAWINGS OR REQUIRED BY LOCAL, STATE, AND/OR FEDERAL REGULATORY AUTHORITIES.

4. THE EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THESE DRAWINGS ARE CONSIDERED THE MINIMUM ACCEPTABLE AND SHALL BE MODIFIED IN THE FIELD AS NECESSARY TO COMPLY WITH LOCAL, STATE, AND/OR FEDERAL REQUIREMENTS.

5. EROSION CONTROL MEASURES MUST BE MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED AND THE NPDES PERMIT IS TERMINATED.

6. ALL DISTURBED AREAS NOT SHOWN TO BE LANDSCAPED SHALL BE SEEDED & MULCHED AS PER LOCAL STANDARDS AND SPECIFICATIONS.

7. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS RELATING TO THE ONSITE STORAGE OF FUEL, OIL, AND GREASE. AN SPCC PLAN MUST BE MAINTANED AND IMPLEMENTED ON SITE.

8. STREAMS SHALL NOT BE USED AS TRANSPORTATION ROUTES FOR HEAVY EQUIPMENT. CROSSINGS SHALL BE LIMITED TO ONE POINT AND EROSION CONTROL MEASURES MUST BE UTILIZED WHERE STREAM BANKS AND DRAINAGE DITCHES ARE DISTURBED.

EROSION CONTROL PLAN AND PERFORMANCE STANDARDS

1. THE EROSION CONTROL PLAN SHALL CONTAIN A DESCRIPTION OF THE EXISTING SITE CONDITIONS, A DESCRIPTION OF ADJACENT TOPOGRAPHICAL FEATURES, INFORMATION NECESSARY TO DETERMINE THE EROSION QUALITIES OF THE SOIL ON THE SITE, POTENTIAL PROBLEM AREAS OF SOIL EROSION AND SEDIMENTATION, SOIL STABILIZATION SPECIFICATIONS, STORM WATER MANAGEMENT CONSIDERATIONS, PROJECTED TIME SCHEDULE FOR COMMENCEMENT AND COMPLETION OF THE LAND-DISTURBING ACTIVITY, SPECIFICATIONS FOR BMP PLAN MAINTENANCE DURING THE PROJECT AND AFTER THE COMPLETION OF THE PROJECT, CLEARING AND GRADING LIMITS, AND ALL OTHER INFORMATION NEEDED TO DEPICT ACCURATELY THE SOLUTIONS TO POTENTIAL SOIL EROSION AND SEDIMENTATION PROBLEMS TO THE MS4. THE CONTROL PLAN SHALL INCLUDE THE SERIES OF BMP'S AND SHALL BE REVIEWED BY, AND SUBJECT TO THE APPROVAL OF, THE OFFICIAL PRIOR TO THE ISSUANCE OF THE PERMIT.

2. CONTROL MEASURES SHALL BE MAINTAINED AS AN EFFECTIVE BARRIER TO SEDIMENTATION AND EROSION IN ACCORDANCE WITH THIS PLAN.

3. THERE SHALL BE NO DISTINCTLY VISIBLE FLOATING SCUM, OIL OR OTHER MATTER CONTAINED IN THE STORM WATER DISCHARGE. THE STORM WATER DISCHARGE TO AN MS4 MUST NOT CAUSE AN UNNATURAL COLOR (EXCEPT DYES OR OTHER SUBSTANCES DISCHARGED TO AN MS4 FOR THE PURPOSE OF ENVIRONMENTAL STUDIES AND WHICH DO NOT HAVE HARMFUL EFFECT ON THE BODIES OF WATER WITHIN THE MS4) OR ODOR IN THE COMMUNITY WATERS. THE STORM WATER DISCHARGE TO THE MS4 MUST RESULT IN NO MATERIALS IN CONCENTRATIONS SUFFICIENT TO BE HAZARDOUS OR OTHERWISE DETRIMENTAL TO HUMANS, LIVESTOCK, WILDLIFE, PLANT LIFE OR FISH AND AQUATIC LIFE IN THE COMMUNITY WATERS.

EROSION CONTROL SEQUENCE

ALL CONSTRUCTION SHALL BE DONE IN A LOGICAL SEQUENCE SO TO MINIMIZE THE AREA OF DISTURBANCE.

1. OBTAIN REQUIRED PERMITS.
2. STAKE PROPERTY LINES AND CLEARING LIMITS.
3. SELECTIVELY CLEAR PATH AS REQUIRED TO INSTALL SILT FENCING AND PERIMETER EROSION CONTROL MEASURES.
4. INSTALL SILT FENCES ALONG SIDE SLOPE BOUNDARIES.
5. INSTALL STONE ENTRANCE DRIVE.
6. PROTECT STORM DRAIN INLETS DOWNSTREAM OF CONSTRUCTION WITH HAY BALES, WATTLES, SILT FENCE AND/OR OTHER PROTECTIVE MEASURES.
7. INSTALL OTHER REQUIRED EROSION CONTROL MEASURES DOWNSTREAM OF PROJECT AREA.
8. PERFORM CLEARING AND GRUBBING.
9. INSTALL SILT FENCE AROUND STOCKPILES.
10. BEGIN EARTHWORK AND CONSTRUCT PROJECT.
11. MODIFY AND MAINTAIN EROSION CONTROL AS REQUIRED DURING CONSTRUCTION.
12. INSPECT ALL EROSION CONTROL MEASURES AFTER EVERY 0.50" RAINFALL. COPIES OF ALL INSPECTION REPORTS SHALL BE SUBMITTED TO THE PROPER AUTHORITIES IN ACCORDANCE WITH APPLICABLE PERMITS.
13. TEMPORARILY OR PERMANENTLY STABILIZE STRIPPED AREAS AND STOCKPILES LEFT INACTIVE FOR 14 OR MORE CALENDAR DAYS.
14. REMOVE ANY SEDIMENT REACHING PUBLIC OR PRIVATE ROADWAYS BY STREET CLEANING BEFORE THE END OF EACH DAY. FLUSHING OF STREETS WILL NOT BE ALLOWED.
15. INSTALL TEMPORARY SEDIMENTATION PONDS OR DIVERSION BERMS AS NEEDED TO CONTROL THE FLOW OF WATER AND COLLECTION OF SEDIMENT DURING THE PROJECT.
16. COMPLETE FINE GRADING AND INSTALL PERMANENT SEEDING AND PLANTING.
17. COMPLETE FINAL PAVING FOR ROADS.
18. REMOVE SILT FENCE UPON COMPLETION OF ALL CONSTRUCTION ACTIVITY.
19. RESEED AND STABILIZE ANY BARE SPOTS OR WASHOUTS.
20. TERMINATE ALL PERMITS.

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TALLADEGA, AL

TALLADEGA
AT EVERY TURN

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INSITE JOB No. 10033.00
PLOTTED: 10/16/25

ALABAMA REGISTERED No. 34182 PROFESSIONAL ENGINEER RICHARD RUSSELL
10/15/25

THIS SHEET CONTAINS:
GENERAL NOTES

SHEET 3 OF 25

GN-3

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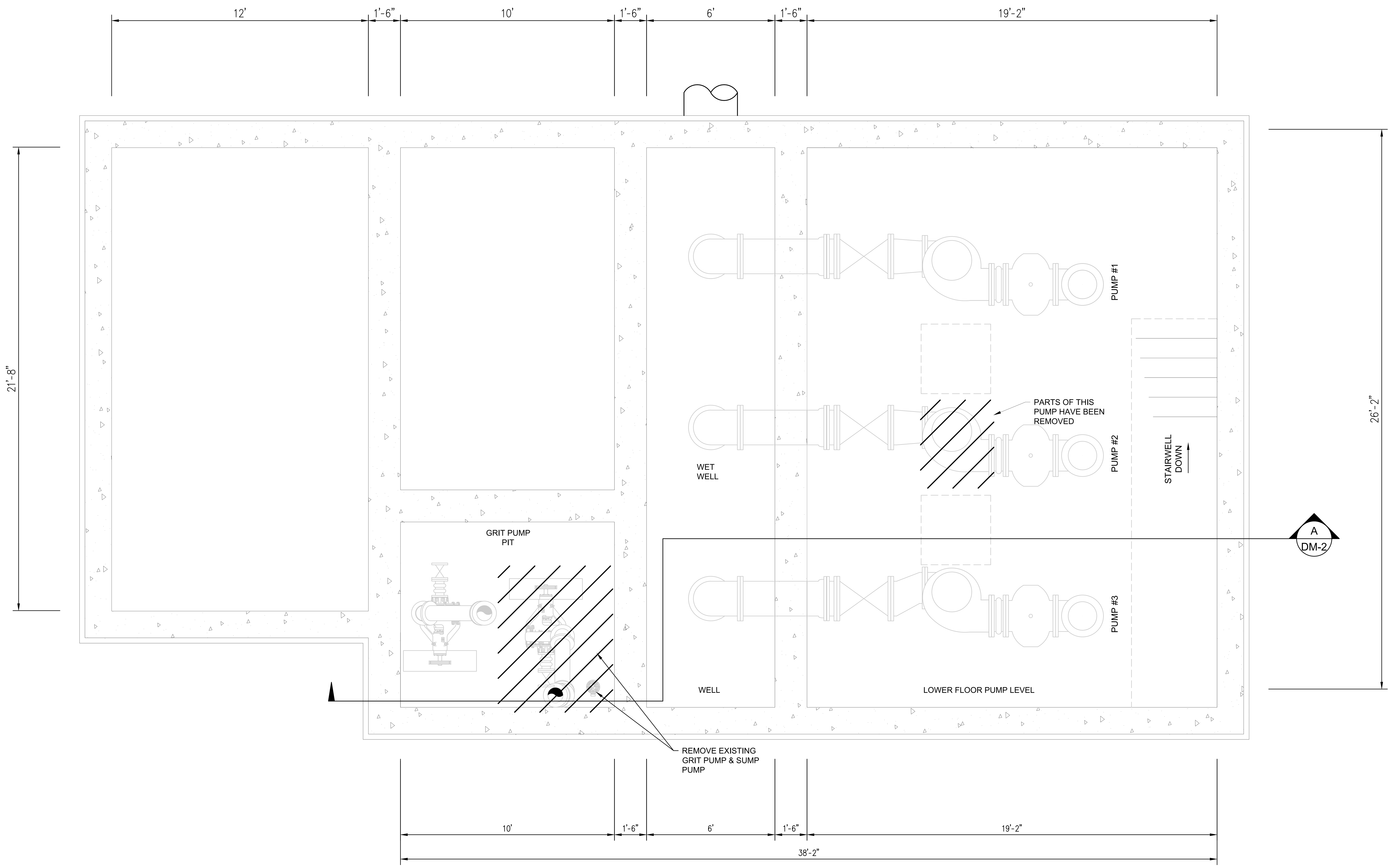
ALABAMA REGISTERED No. 32464 PROFESSIONAL ENGINEER TIMOTHY RICHARD RYLEE
10/15/25

THIS SHEET CONTAINS:
SITE PLAN

SHEET 4 OF 25

SI-1



BOTTOM FLOOR DEMO PLAN

SCALE: 3/8" = 1'-0"

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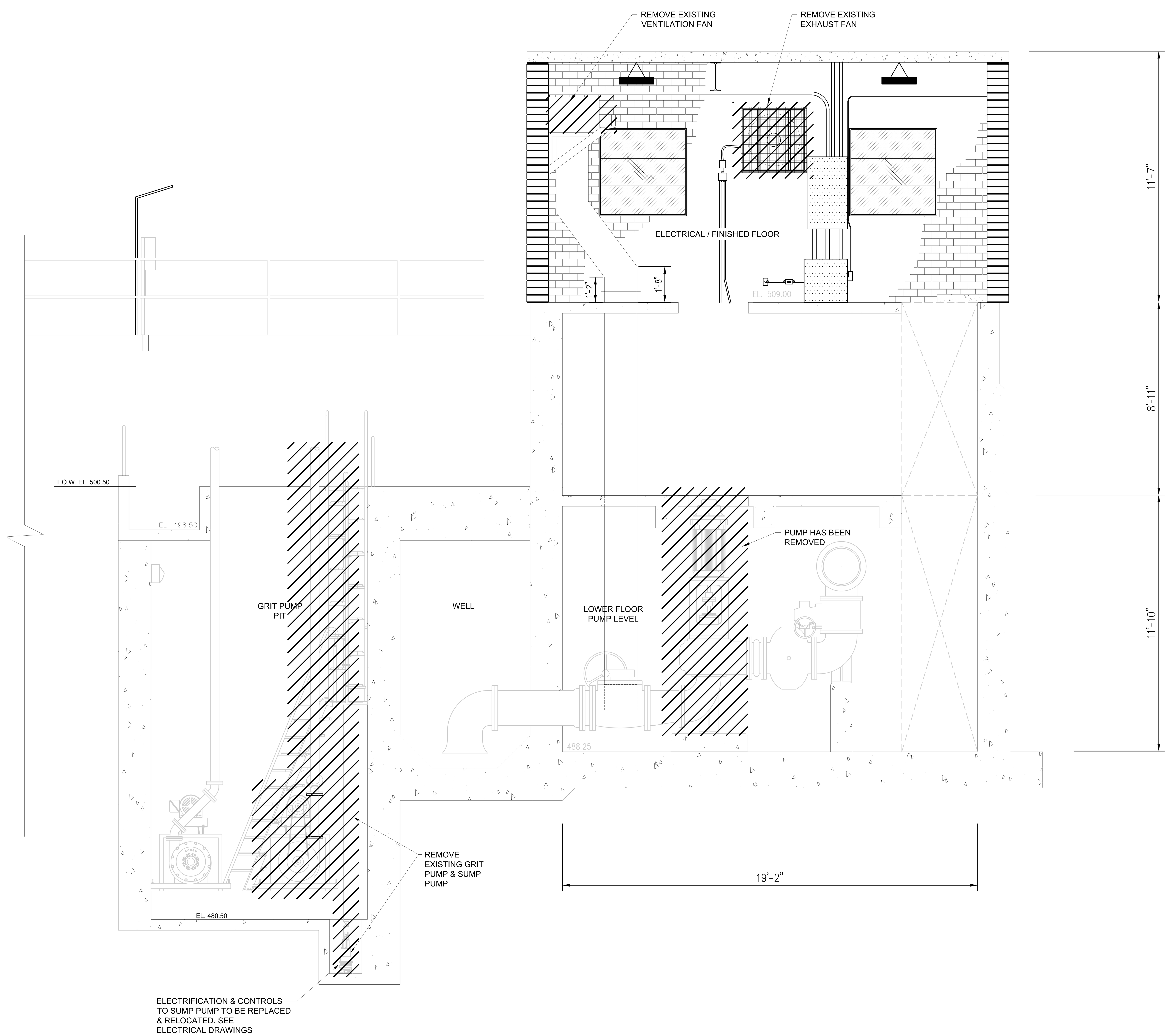
DEMO SHEET



DEMO SECTION A (A / DM-2)

SCALE: 3/8" = 1'-0"

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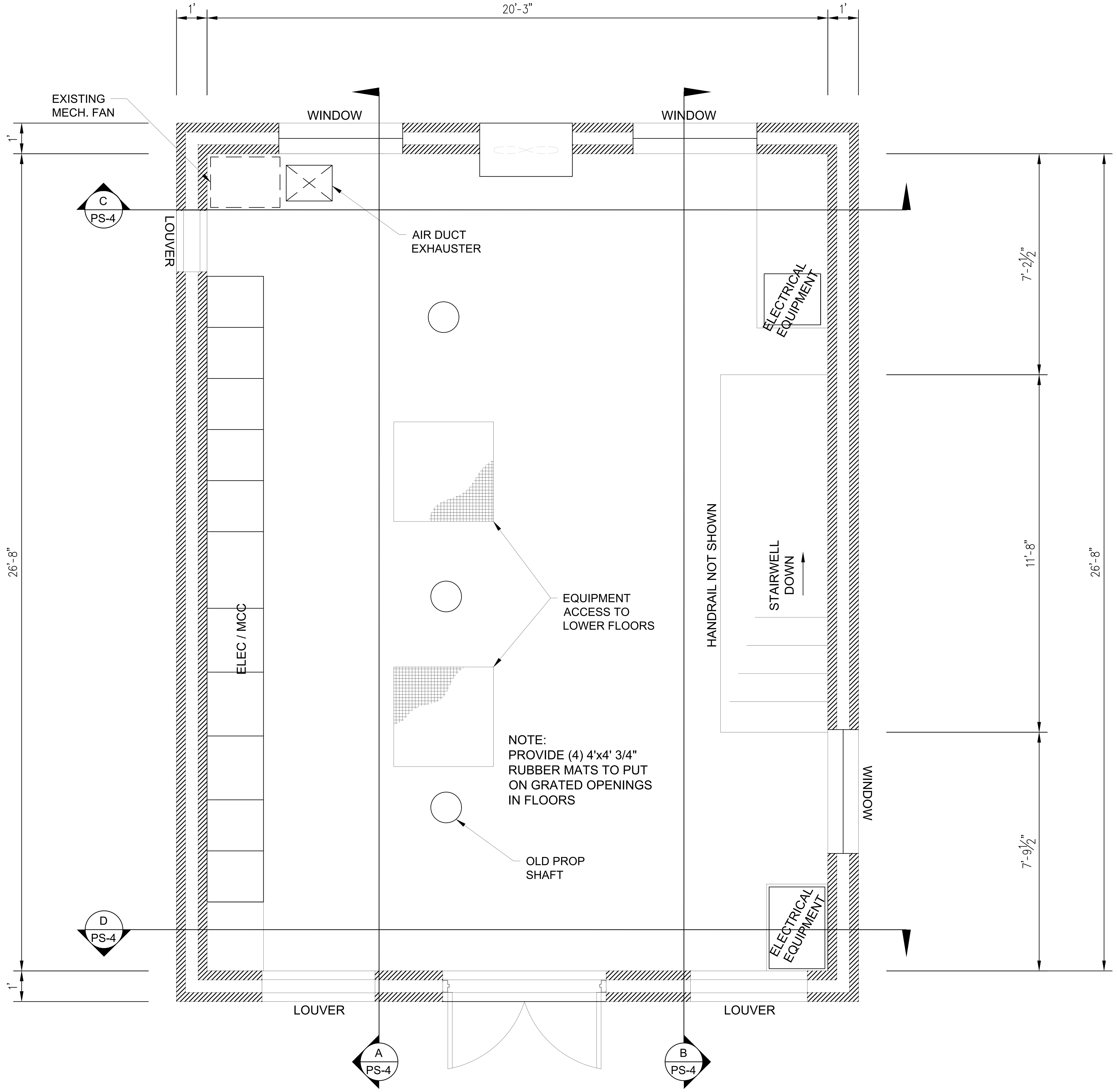
ALABAMA REGISTERED No. 32... PROFESSIONAL ENGINEER RICHARD RYDELL

10/15/25

THIS SHEET CONTAINS:
DEMO SECTION

SHEET 6 OF 25

DM-2



TOP FLOOR PLAN

SCALE: 1/2" = 1'-0"

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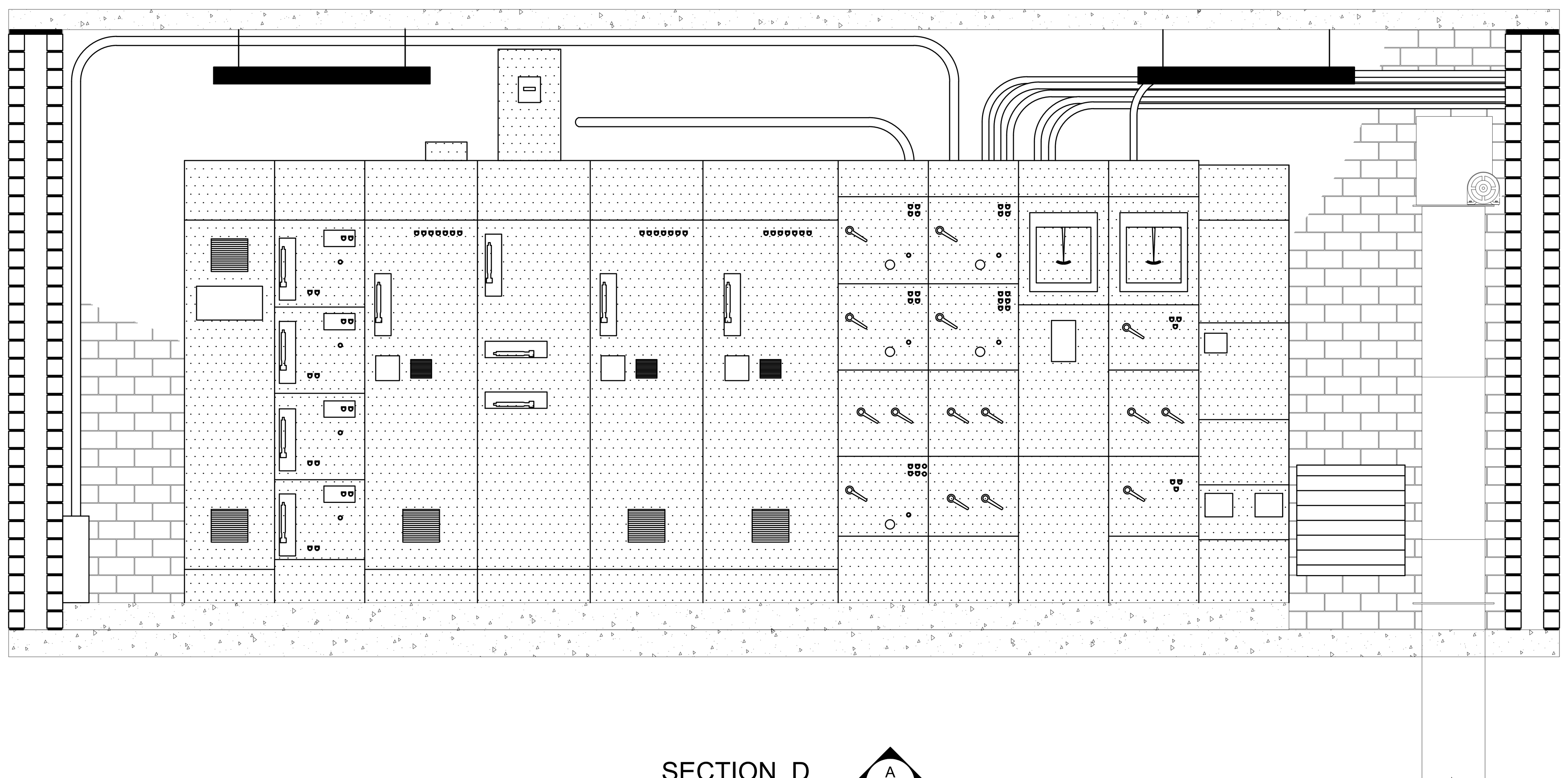
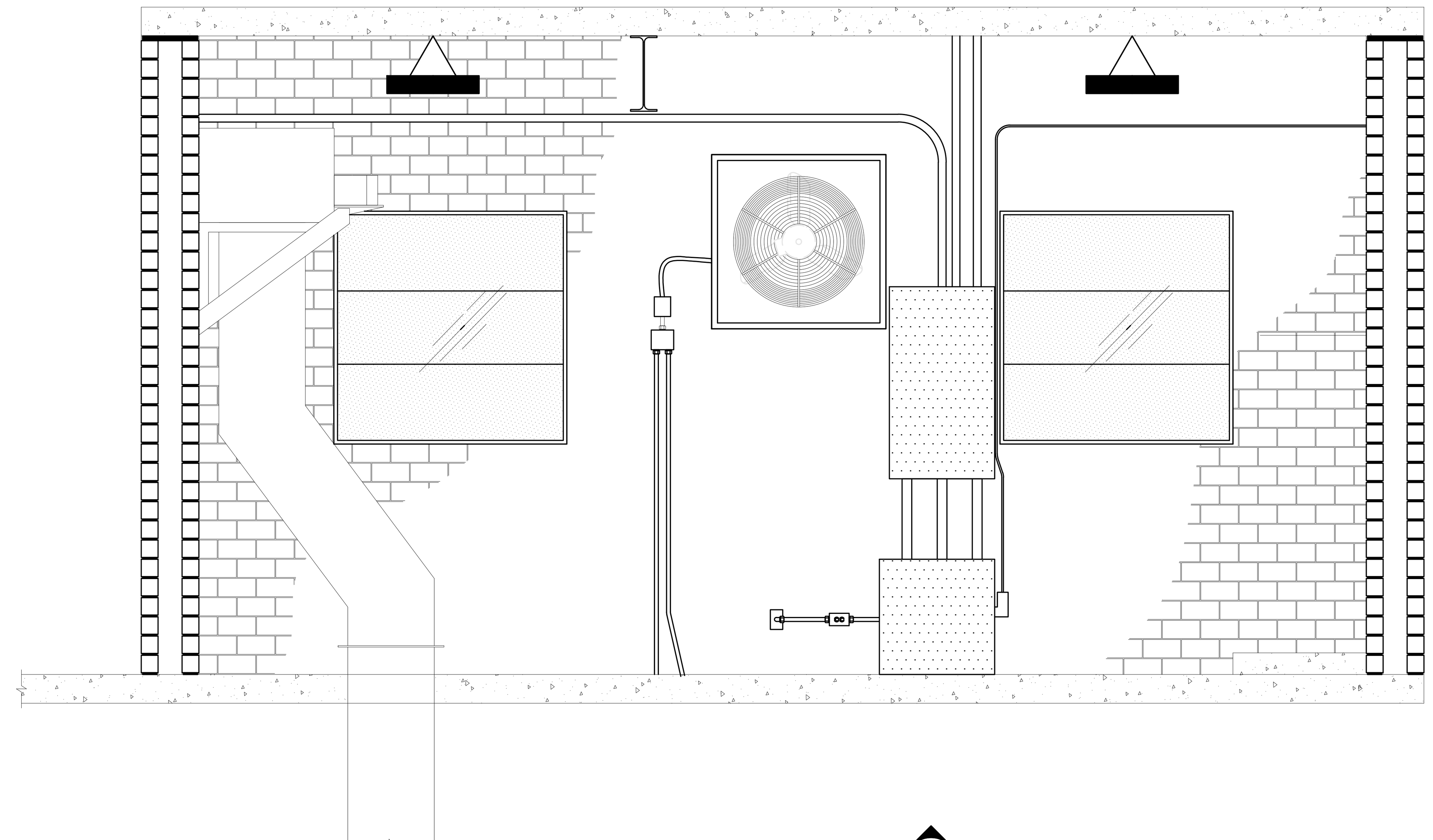
THIS SHEET CONTAINS:
TOP FLOOR PLAN

SHEET 7 OF 25

PS-1



SECTION D
SCALE: 1/2" = 1'-0"
A
PL-2



SECTION D
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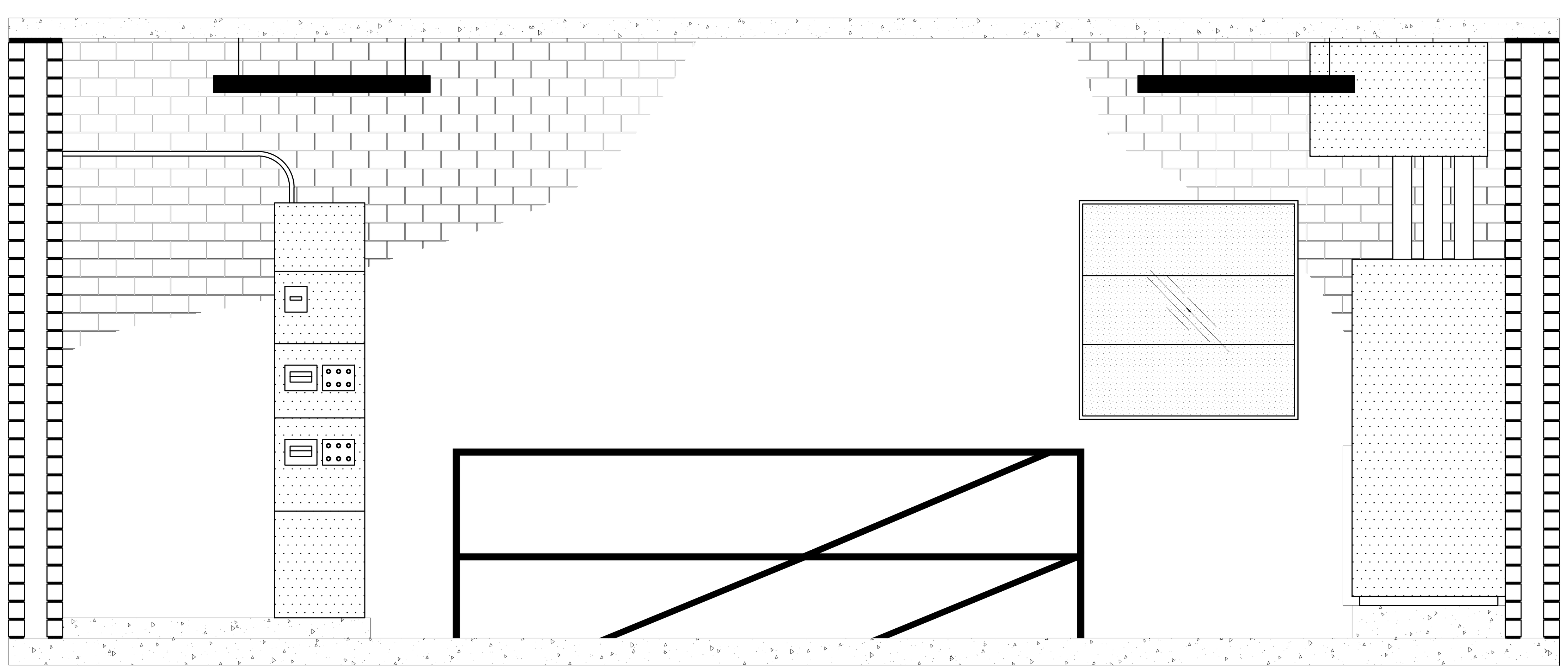
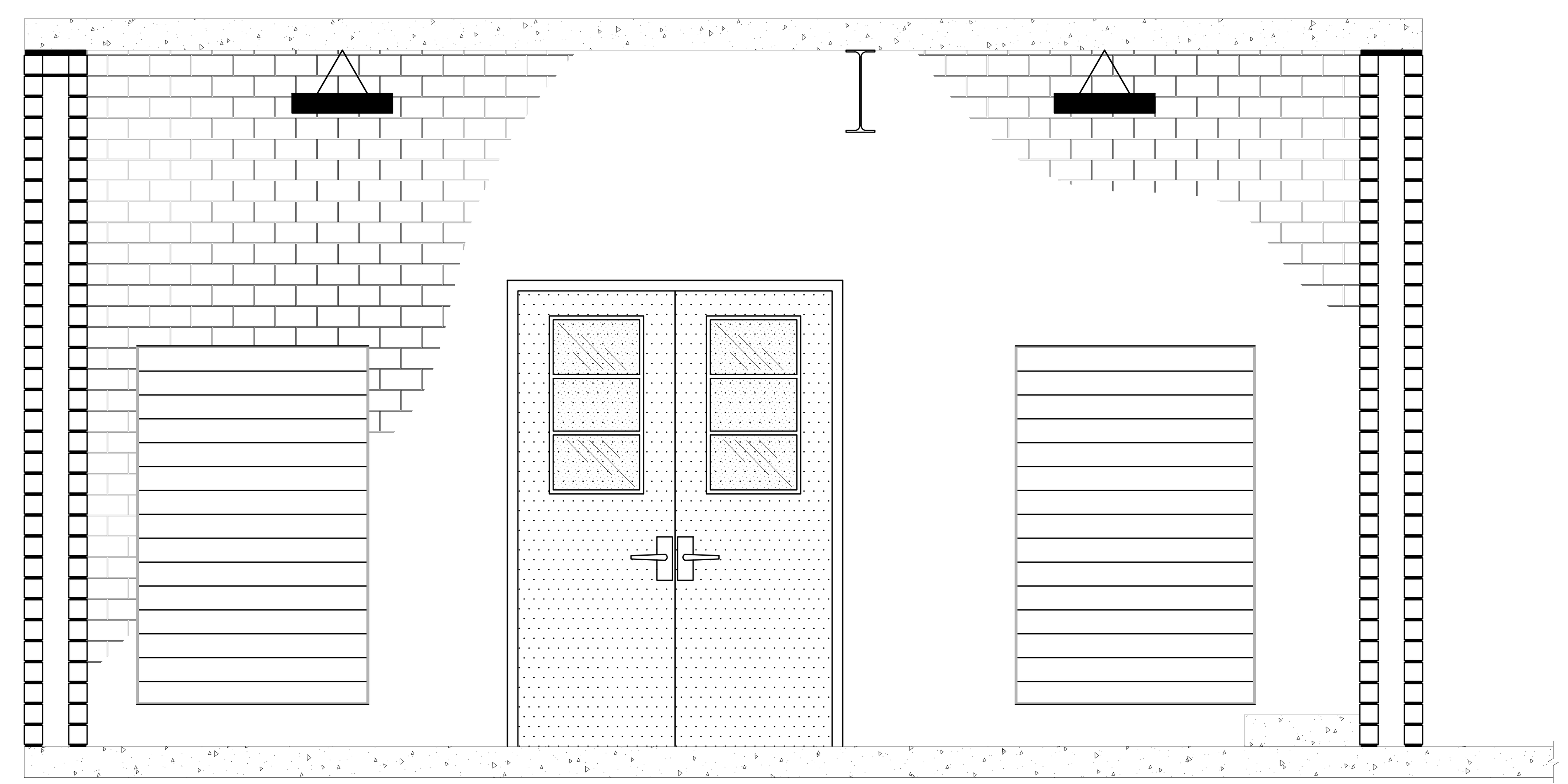
C
PL-2



SECTION D
SCALE: 1/2" = 1'-0"
B
PL-2



SECTION D
SCALE: 1/2" = 1'-0"
D
PL-2

NOTE:
EXISTING PARTIAL SECTIONS
SEE MECHANICAL & ELECTRICAL
DRAWINGS FOR CHANGE

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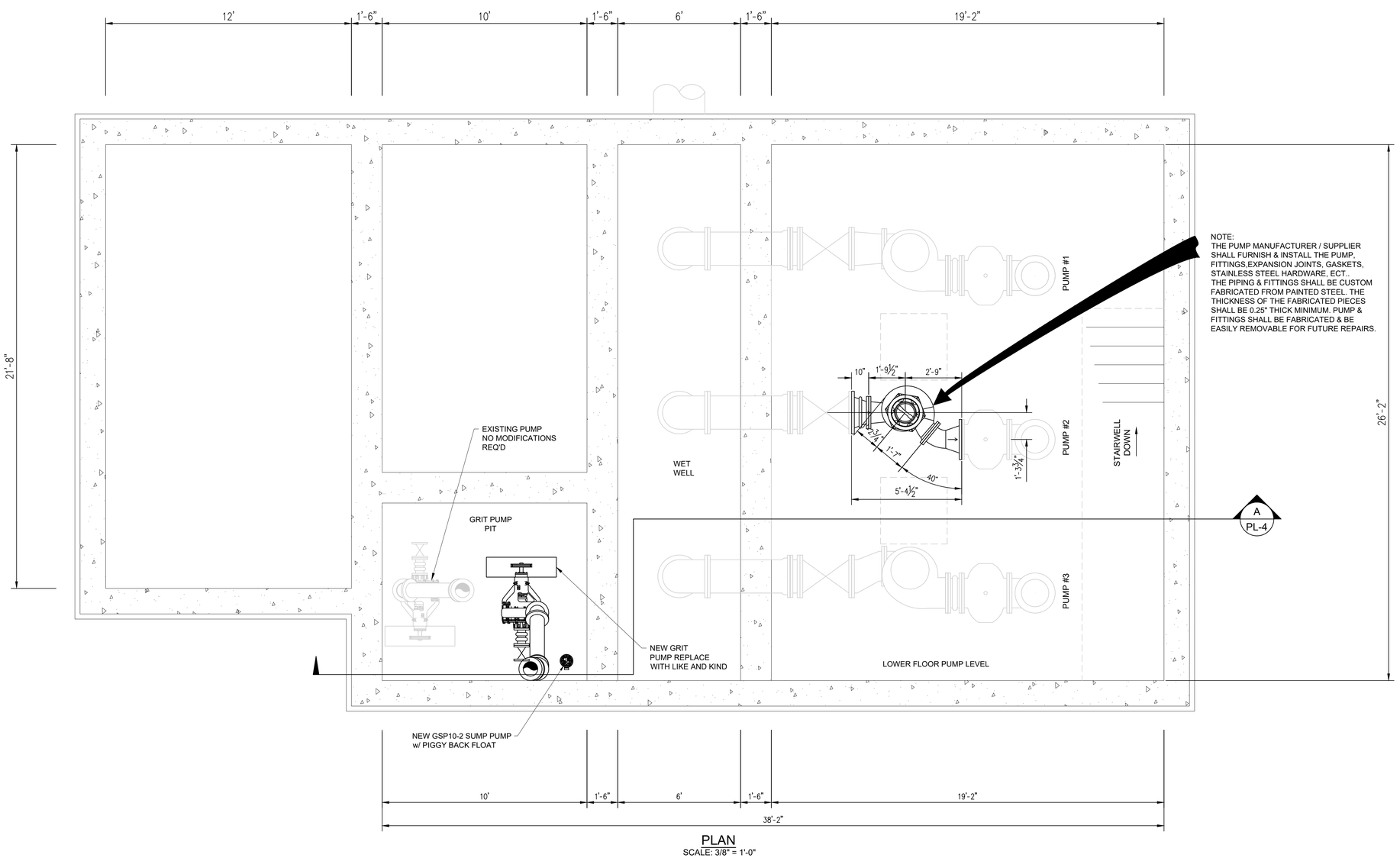
TOP FLOOR SECTIONS



NOTE:
THE PUMP MANUFACTURER / SUPPLIER SHALL FURNISH & INSTALL THE PUMP, FITTINGS,EXPANSION JOINTS, GASKETS, STAINLESS STEEL HARDWARE, ECT.. THE PIPING & FITTINGS SHALL BE CUSTOM FABRICATED FROM PAINTED STEEL. THE THICKNESS OF THE FABRICATED PIECES SHALL BE 0.25" THICK MINIMUM. PUMP & FITTINGS SHALL BE FABRICATED & BE EASILY REMOVABLE FOR FUTURE REPAIRS.

PLAN
SCALE: 3/8" = 1'-0"

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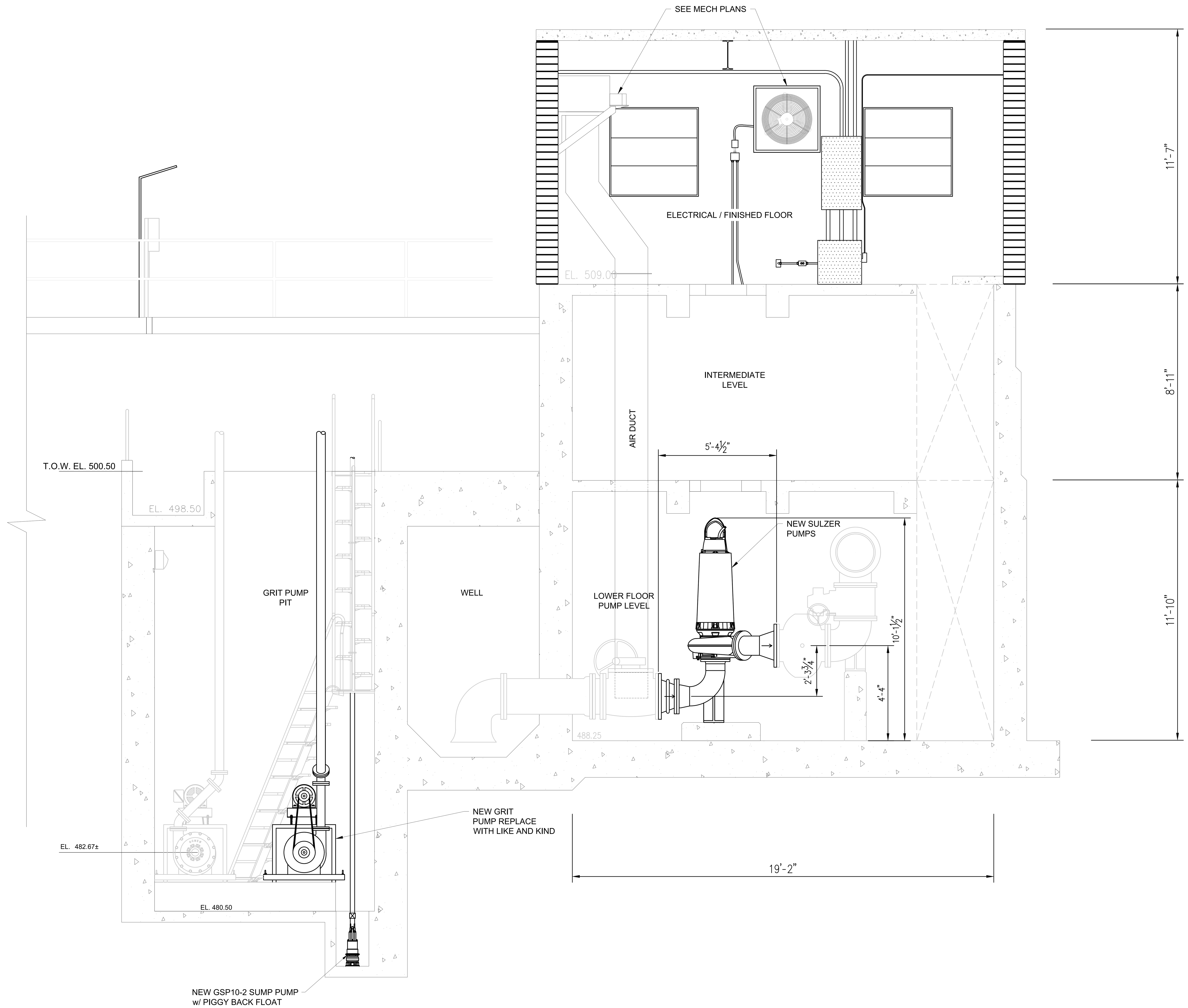
10/15/25

THIS SHEET CONTAINS:
BOTTOM FLOOR PLAN

SHEET 9 OF 25

PS-3



SECTION A

SCALE: 3/4" = 1'-0"

A
PL-4

SCALE: 1/2" = 1'-0"

INSITE ENGINEERING

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PLANNING
COMMERCIAL
RESIDENTIAL

CONSTRUCTION PLANS FOR:

TALLADEGA MAIN WWTP PUMP UPGRADES

TALLADEGA, AL

TALLADEGA

PROJECT INFO:

INSITE - HOOVER

INSITE JOB No. 10033.00

PLOTTED: 10/16/25

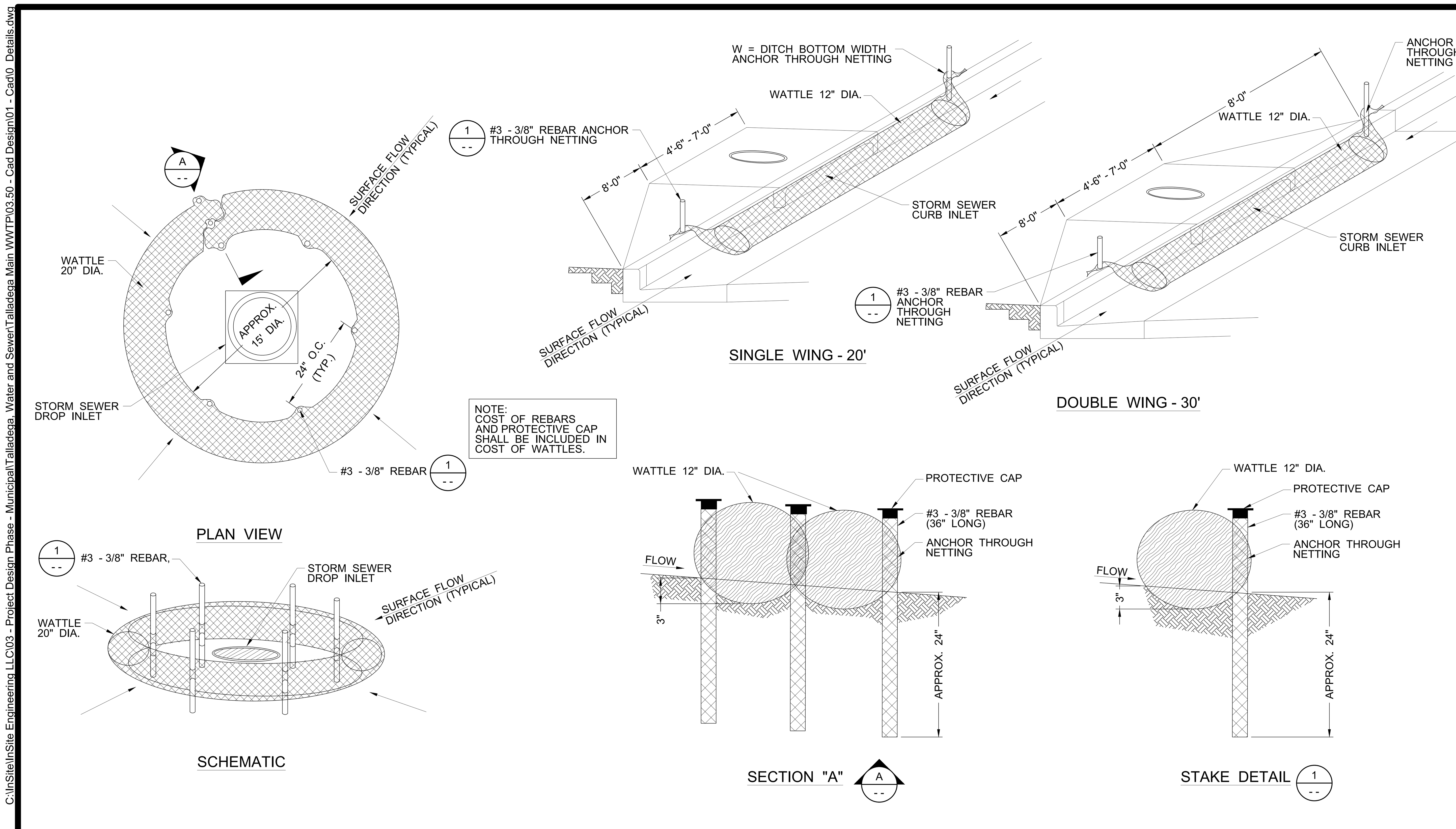
10/15/25

THIS SHEET CONTAINS:

OVERALL SECTION

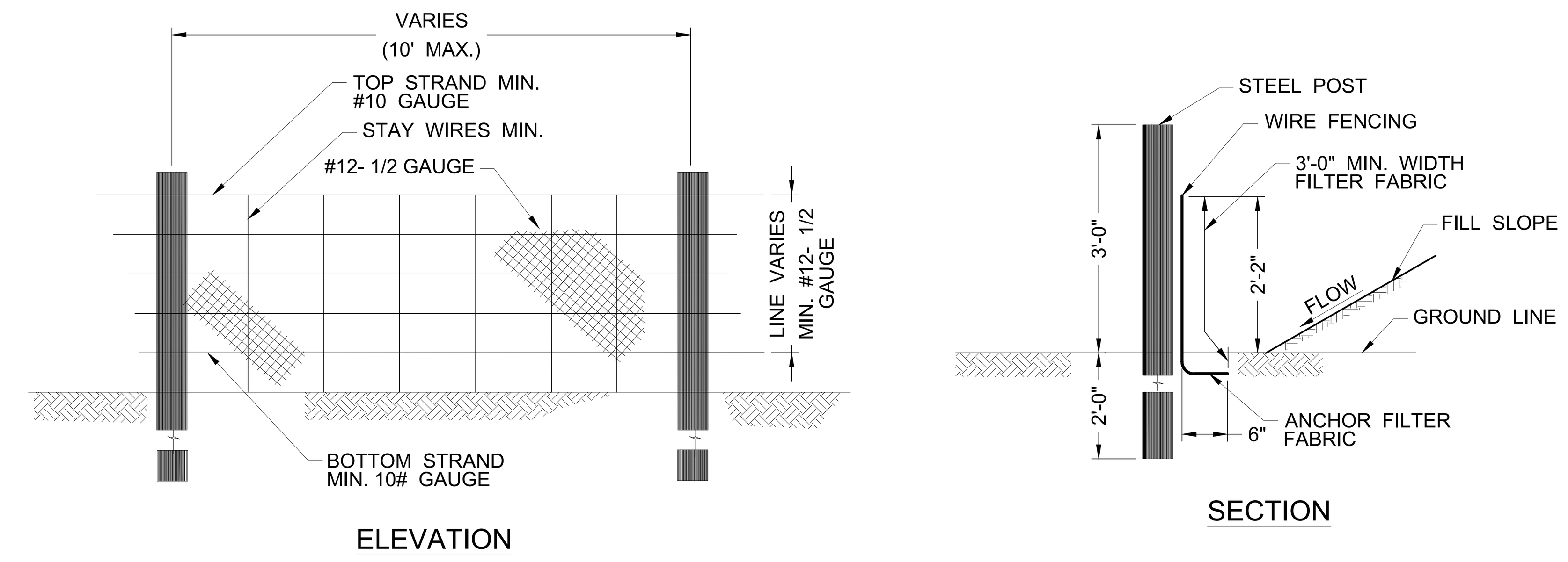
SHEET 10 OF 25

PS-4



1

DETAIL - DROP INLET PROTECTION AND CURB INLET PROTECTION
SCALE: NONE

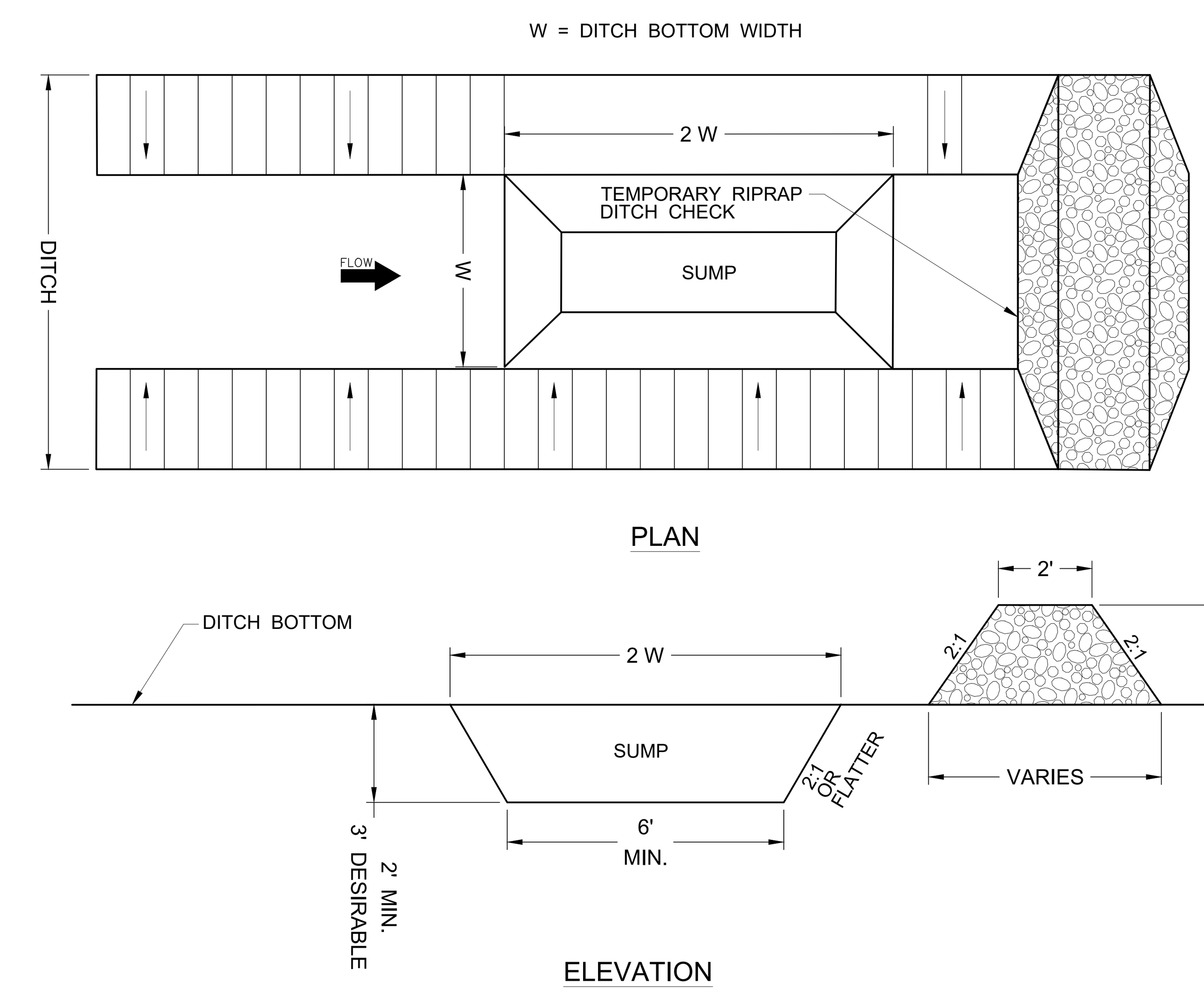


GENERAL NOTES:

1. SILT FENCE SHALL BE INSTALLED WHERE SHOWN ON EROSION CONTROL PLAN.
2. FILTER FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED SECURELY TO THE POSTS.
3. STEEL "T" POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF SELF FASTENER ANGLE STEEL TYPE.
4. FILTER FABRIC SHALL BE FASTENED TO WOODEN POST WITH NOT LESS THAN #9 WIRE STAPLES @ 1" LONG.
5. CONTRACTOR SHALL PERIODICALLY REMOVE ACCUMULATED SEDIMENT, WHEN SEDIMENT DEPTH REACHES 12".
6. THE FILTER FABRIC SHALL MEET THE FOLLOWING REQUIREMENTS:
   A) EOS IS NOT LARGER THAN U.S. STANDARD SIEVE NO.70
   B) GRAB STRENGTH 90-120 LB
   C) CONFORM TO ASTM D-1682 OR ASTM D-177

2

DETAIL - SILT FENCE
SCALE: NONE

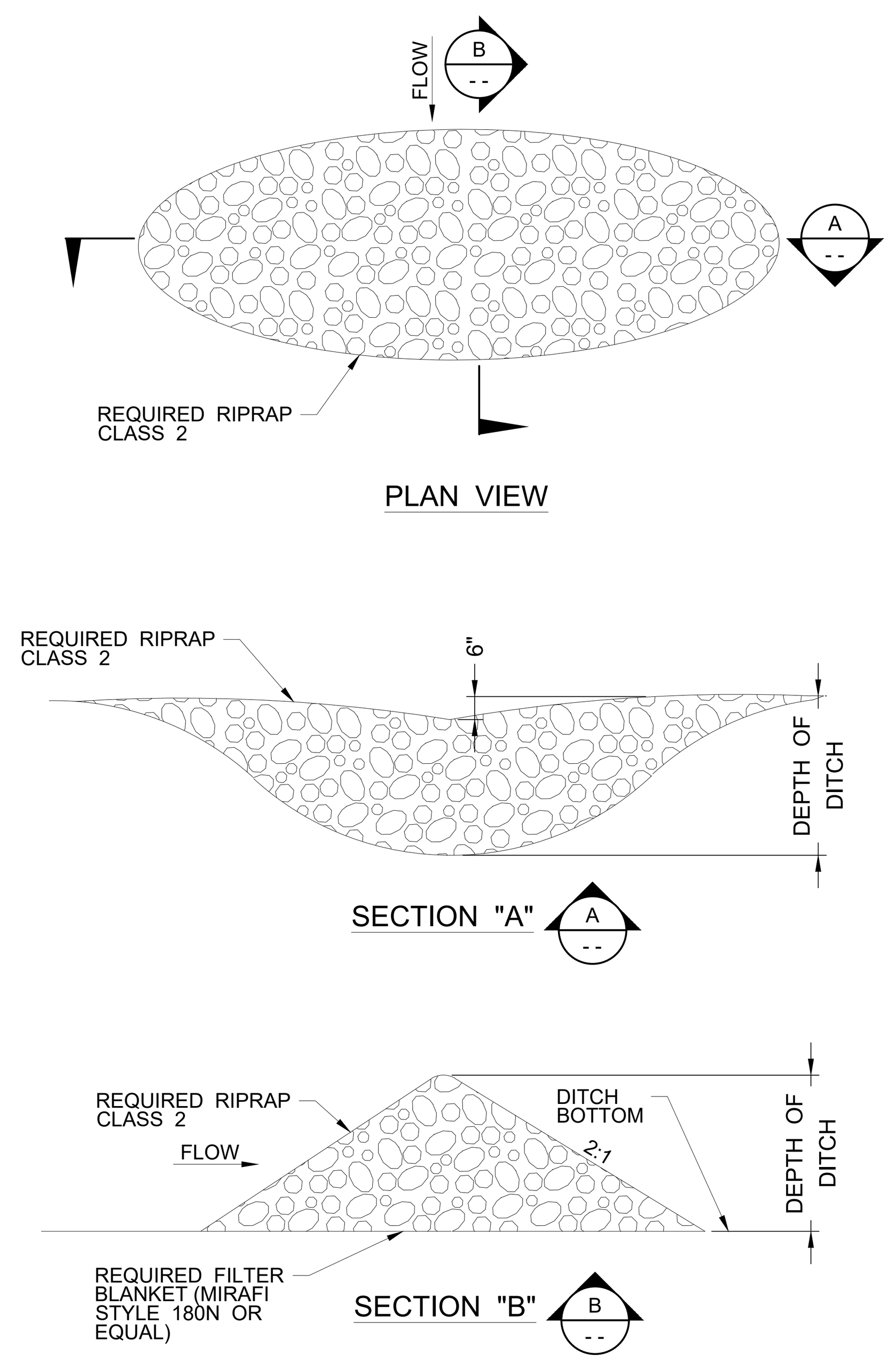


GENERAL NOTES

1. TOTAL VOLUME OF SUMP EXCAVATIONS SHOULD BE APPROX. 67 CU. YDS. PER ACRE OF DISTURBED SOIL RUNOFF.
2. WHERE 67 CU. YDS. OR MORE IS REQUIRED AND SPACE IS LIMITED, MORE THAN ONE SUMP MAY BE REQUIRED.
3. WHERE SEDIMENT RETENTION IS NEEDED, BUT ROCK OUTCROPPING PREVENTS NORMAL EXCAVATION; AN ADEQUATE TEMPORARY DITCH CHECK ONLY SHALL BE INSTALLED.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED AS NEEDED TO MAINTAIN SIZE OF DRAINAGE SUMP SHOWN. COST OF SEDIMENT REMOVAL SHALL BE A SUBSIDIARY OBLIGATION OF DRAINAGE SUMP EXCAVATION.

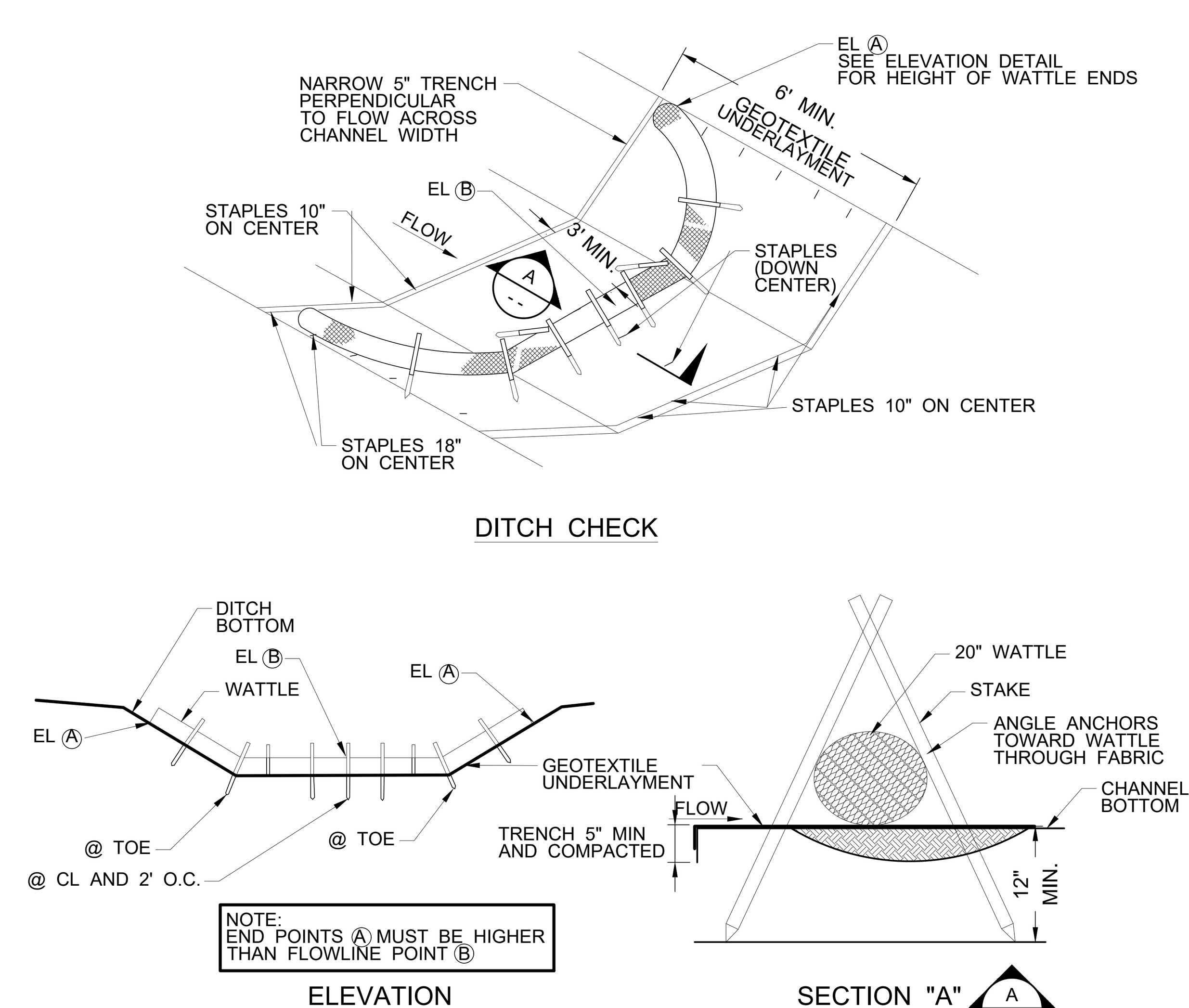
5

DETAIL - DRAINAGE SUMP EXCAVATION
SCALE: NONE



3

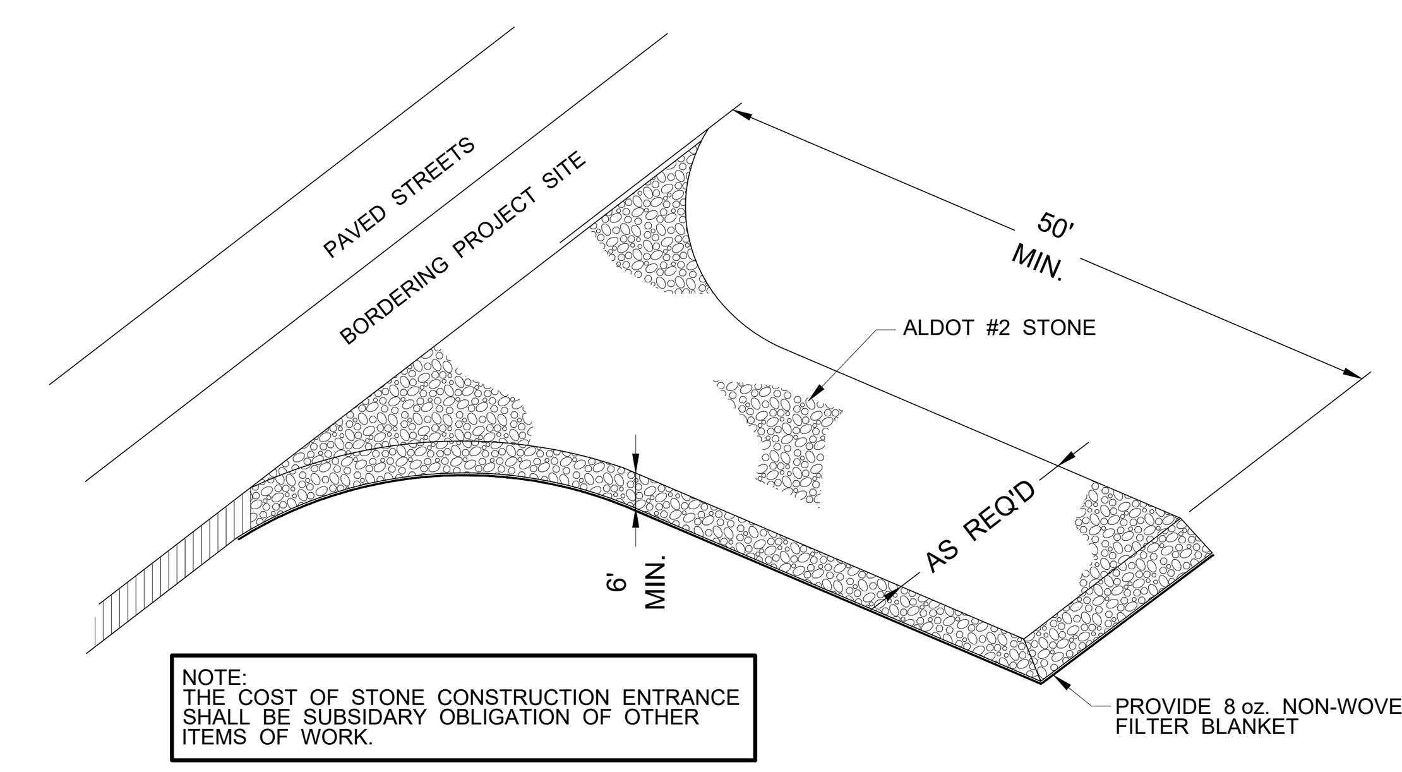
DETAIL - RIPRAP DITCH CHECK
SCALE: NONE



NOTES:
1. MINIMUM RECOMMENDED PLACEMENT INTERVAL BETWEEN WATTLE DITCH CHECK IS 100 FEET UNLESS SHOWN OTHERWISE ON THE PLANS OR APPROVED BY THE ENGINEER.
2. ANCHORING STAKES SHALL BE SIZED, SPACED, DRIVEN, AND BE OF A MATERIAL THAT EFFECTIVELY SECURES THE CHECK. STAKE SPACING SHALL BE A MAXIMUM OF TWO FEET.
3. WATTLES SHOULD NOT BE USED IN HARD BOTTOM CHANNELS.
4. STAPLES SPACED 18 INCHES APART ALONG THE CHANNEL EDGES AND DOWN THE CENTER OF THE CHANNEL. STAPLES SPACED 10 INCHES APART ACROSS THE UPSTREAM AND DOWNSTREAM EDGES.

4

DETAIL - WATTLE DITCH CHECK
SCALE: NONE



NOTE:
THE COST OF STONE CONSTRUCTION ENTRANCE SHALL BE SUBSIDARY OBLIGATION OF OTHER ITEMS OF WORK.

6

DETAIL - CONSTRUCTION ENTRANCE
SCALE: NONE

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TALLADEGA
At every turn

PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/16/25

ALABAMA REGISTERED PROFESSIONAL ENGINEER RICHARD RYAN
10/15/25

THIS SHEET CONTAINS:
EROSION CONTROL DETAILS

SHEET 11 OF 25

DT-1

LEGEND

- 12x20 — DUCT SIZE, FIRST FIGURE IS SIDE SHOWN INSIDE CLEAR DIMENSION UNLESS NOTED OTHERWISE
- 24x12 — LOW PRESSURE, RECTANGULAR (GALVANIZED STEEL)
- R — DUCT RISE
- D — DUCT DROP
- EXISTING DUCTWORK TO REMAIN
- DUCT TRANSITION
- RECTANGULAR TO ROUND DUCT TRANSITION
- TURNING VANES
- CHWS — CHILLED WATER SUPPLY PIPING
- CHWR — CHILLED WATER RETURN PIPING
- HWS — HOT WATER SUPPLY PIPING
- HWR — HOT WATER RETURN PIPING
- D — CONDENSATE DRAIN PIPING
- AD — AUXILIARY CONDENSATE DRAIN PIPING
- R — REFRIGERANT PIPING (2 LINES TOTAL)
- LPS(15) — LOW PRESSURE STEAM SUPPLY
- LPR — LOW PRESSURE STEAM CONDENSATE RETURN
- MPS(60) — MEDIUM PRESSURE STEAM SUPPLY
- MPR — MEDIUM PRESSURE STEAM CONDENSATE RETURN
- NAME(E) — EXISTING PIPING
- NAME(D) — EXISTING PIPING TO BE DEMOLISHED
- ELBOW, 90° (LONG RADIUS)
- TEE
- TEE, TURNED UP
- TEE TURNED DOWN
- ELBOW, TURNED DOWN
- ELBOW, TURNED UP
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- UNION
- T — WALL MOUNTED THERMOSTAT
- H — WALL MOUNTED HUMIDISTAT
- S — WALL MOUNTED TEMPERATURE SENSOR
- C — WALL MOUNTED CARBON DIOXIDE SENSOR
- WALL MOUNTED DEVICE W/ COVER GAURD
- SMOKE DETECTOR
- TIE NEW INTO EXISTING
- UC — UNDERCUT DOOR 3/4 INCHES
- SUPPLY AIR FLOW
- RETURN OR EXHAUST AIR FLOW

NOTE: THIS LEGEND IS FOR REFERENCE ONLY. ALL SYMBOLS WHICH APPEAR WITHIN THE LEGEND MAY NOT APPLY TO THIS PROJECT.

ABBREVIATIONS

AB.CL'G	ABOVE CEILING
ABV.	ABOVE
AC	ALTERNATING CURRENT
A/C	AIR COMPRESSOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
ALT.	ALTERNATE
AMP	AMPERE
AO	ANALOG OUTPUT
APPROX.	APPROXIMATELY
ARCH.	ARCHITECTURAL
AVG	AVERAGE
B	BOILER
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHWP	CHILLED WATER PUMP
CLG	CEILING
CT	COOLING TOWER
CU	CONDENSING UNIT
CWP	CONDENSER WATER PUMP
DEFL	DEFLECTION
DET	DETAIL
DI	DIGITAL INPUT
DIA	DIAMETER
ø	DIAMETER
DO	DIGITAL OUTPUT
EDB	ENTERING DRY BULB
ELEC.	ELECTRICAL
ELEV.	ELEVATION
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXIST.	EXISTING
°F	DEGREES FAHRENHEIT
GFF	GAS FIRED FURNACE
GPM	GALLONS PER MINUTE
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FOOT OR FEET
HD.	HEAD
HP	HORSE POWER
HR	HOUR(S)
HT.	HEIGHT
HTR	HEATER
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
HWP	HOT WATER PUMP
HX	HEAT EXCHANGER
HZ	FREQUENCY (HERTZ)
ID	INSIDE DIAMETER
IN.	INCHES
KW	KILOWATT
KWH	KILOWATT HOUR
MAX	MAXIMUM
MBH.	1000 BTU PER HOUR
MECH.	MECHANICAL
MFR.	MANUFACTURER
MIN	MINIMUM
NO.	NUMBER
N/A	NOT APPLICABLE
NC	NOISE CRITERIA
O.D.	OUTSIDE DIAMETER
OA	OUTSIDE AIR
⇔	OVAL DUCTWORK
ORIG.	ORIGINAL
PH.	PHASE
PIU	POWERED INDUCTION UNIT
PRESS	PRESSURE
RTN	RETURN AIR
RTU	ROOFTOP AIR HANDLING UNIT
SDC	STAND ALONE DIGITAL CONTROLLER
SENS.	SENSIBLE
SQ.	SQUARE
SPLY	SUPPLY
TEMP	TEMPERATURE
VAV	VARIABLE AIR VOLUME
W	WATT
W/	WITH
W.P.D.	WATER PRESSURE DROP

POWER VENTILATOR SCHEDULE

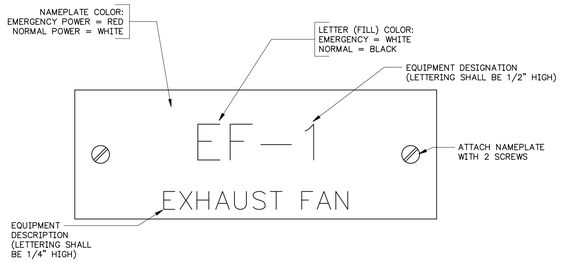
EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	CFM	E.S.P. (IN. W.C.)	RPM	MAX. SONES	ELECTRICAL				LOCATION	TYPE	DRIVE	VIBRATION ISOLATION			WGT. (LBS)	REMARKS
						DISCONNECT	MOTOR STARTER	HP	MOTOR VOLTS/PH./HZ.				TYPE	DEFL. (IN.)	BASE		
EF-1	COOK 150SQN10D	1850	0.25	1103	10.9	BY DIV. 26	INTEGRAL	1/3	115/1/60	INLINE	CENTRIFUGAL	DIRECT	--	--	--	125	2), 4)
VF-1	COOK 20XWH28D17	4500	0.25	1725	27	BY DIV. 26	INTEGRAL	1	460/3/60	WALL	PROPELLER	DIRECT	--	--	--	75	1), 3), 4)
SF-1	COOK 14XW32D152	1650	0.25	1550	10.5	BY DIV. 26	INTEGRAL	1/4	115/1/60	WALL	CENTRIFUGAL	DIRECT	--	--	--	50	2), 4)

REMARKS:
1) PROVIDE INTERLOCK WITH LOCAL THERMOSTAT
2) FAN SHALL RUN CONTINUOUSLY. INTERLOCK WITH DEDICATED WALL SWITCH. COORDINATE CLOSELY WITH ELECTRICAL.
3) PROVIDE FAN WITH WALL SLEEVE, MOTOR GUARD AND GRAVITY DAMPER. FAN SHALL DISCHARGE TO EXHAUST LOUVER.
4) FAN ASSEMBLY SHALL BE COATED WITH PHENOLIC EPOXY POWDER

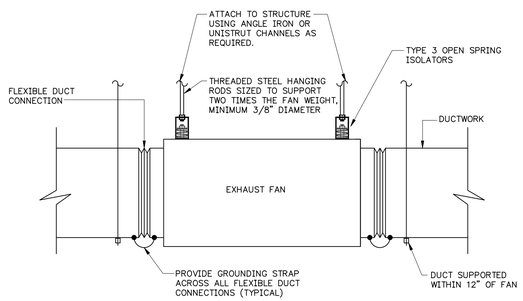
ELECTRIC UNIT HEATER SCHEDULE

EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	KW	STAGES	EAT (°F)	FAN DATA			ELECTRICAL		MOUNTING	WEIGHT (LBS.)	REMARKS
					CFM	HP	TYPE	DISCONNECT	VOLTS/PH./HZ.			
UH-1	CHROMOLOX HD3D-1000	10.0	1	45	800	1/15	PROP	BY DIV. 26	460/3/60	WALL	60	1), 2)
UH-2	CHROMOLOX HD3D-1000	10.0	1	45	800	1/15	PROP	BY DIV. 26	460/3/60	WALL	60	1), 2)

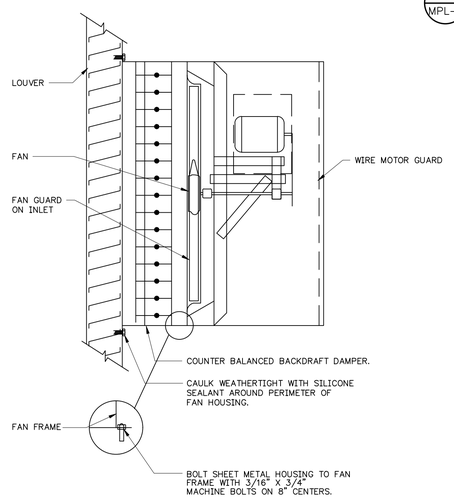
REMARKS:
1) UNIT SHALL BE WALL-MOUNTED. PROVIDE MANUFACTURER'S WALL-MOUNTING BRACKETS.
2) PROVIDE REMOTE MOUNTED NEMA 4X THERMOSTAT.



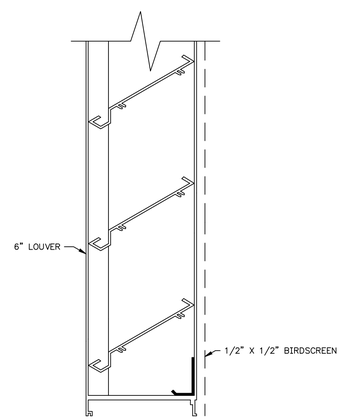
1 MPL-1 MECHANICAL EQUIPMENT NAMEPLATE DETAIL
NO SCALE



3 MPL-1 INLINE EXHAUST FAN DETAIL
NO SCALE



4 MPL-1 WALL EXHAUST FAN OR SUPPLY DETAIL
NO SCALE



2 MPL-1 LOUVER DETAIL
NO SCALE

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CONSTRUCTION PLANS FOR:
TALLADEGA MAIN WWTP PUMP UPGRADES
TALLADEGA, AL

TALLADEGA
At every turn.

PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

ALABAMA REGISTERED No. 30374 PROFESSIONAL ENGINEER GREY A. BROWN
10/15/25

THIS SHEET CONTAINS:
SITE PLAN
MECHANICAL LEGEND, ABBRE., SCHEDULES AND DETAILS

SHEET 12 OF 25

MPL-1

SECTION 15010 – MECHANICAL GENERAL

A. PROVIDE EQUIPMENT, LABOR, MATERIAL, ETC., REQUIRED TO MAKE A COMPLETE WORKING INSTALLATION.
B. INSTALL THE WORK IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS AND THE STANDARDS AND CODES (LATEST EDITION) THAT APPLY TO THIS WORK. IN THE EVENT OF A CONFLICT, INSTALL WORK IN ACCORDANCE WITH THE MOST STRINGENT CODE REQUIREMENTS DETERMINED BY THE ARCHITECT.
C. OBTAIN AND PAY FOR ALL PERMITS AND INSPECTIONS INCLUDING: BUILDING PERMITS, HEALTH DEPARTMENT PERMITS AND SEWER TAP PERMITS. DELIVER TO ARCHITECT CERTIFICATES OF INSPECTION AND APPROVAL ISSUED BY AUTHORITIES.
D. ALL EQUIPMENT AND METHOD SHALL BE INSTALLED AND CONNECTED IN ACCORDANCE WITH THE BEST ENGINEERING PRACTICES AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
E. DISCONNECT, REMOVE AND RE INSTALL MECHANICAL SERVICES LOCATED ON OR CROSSING THROUGH CONTRACT LIMITS, ABOVE OR BELOW GRADE, OBSTRUCTING CONSTRUCTION OF PROJECT OR CONFLICTING WITH COMPLETED PROJECT OR ANY APPLICABLE CODES.
F. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY. WORK CALLED FOR BY ONE IS BINDING AS IF CALLED FOR BY BOTH.
G. DRAWINGS ARE DRAWN TO A SMALL SCALE AND ARE DIAGRAMMATIC ONLY. THE DRAWINGS INDICATE SIZE AND GENERAL ARRANGEMENT OF EQUIPMENT. DO NOT SCALE DRAWINGS FOR EXACT LOCATIONS. FIELD MEASUREMENTS TAKE PRECEDENCE.
H. PROVIDE NECESSARY OFFSETS, ELBOWS AND FITTINGS AS REQUIRED TO AVOID CONFLICT WITH EQUIPMENT OF OTHER DIVISIONS AND TO OBTAIN PROPER HEADROOM AND CLEAR PASSAGEWAYS. THIS SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.
I. WORK UNDER THIS DIVISION SHALL BE FIRST CLASS WITH EMPHASIS ON NEATNESS AND WORKMANSHIP. INSTALL WORK USING COMPETENT MECHANICS, UNDER SUPERVISION OF FOREMAN, ALL DULY CERTIFIED BY LOCAL AUTHORITIES.
J. INSTALLATION SUBJECT TO ARCHITECT'S OR ENGINEER'S OBSERVATION, FINAL APPROVAL AND ACCEPTANCE. ARCHITECT OR ENGINEER MAY REJECT UNSUITABLE WORK.
K. ALL MATERIALS SHALL BE NEW. ALL MATERIALS AND EQUIPMENT FOR WHICH A UL STANDARD, AN AGA APPROVAL, AN AWWA STANDARD, FM LISTING OR ASME REQUIREMENTS IS ESTABLISHED, SHALL BE SO APPROVED AND LABELED OR STAMPED.
L. THE DRAWINGS ARE BASED ON THE USE OF PRODUCTS SPECIFIED AND LISTED FIRST. IF ANY REVISION IN PIPING, CONDUIT WORK, FOUNDATIONS, ANCHOR BOLTS, CONNECTIONS, ETC., IS REQUIRED BY OTHER NAMED PRODUCTS OR APPROVED SUBSTITUTIONS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE SUCH REVISIONS AT NO ADDITIONAL EXPENSE TO THE OWNER.
M. SUBMIT SIX (6) ORIGINAL COPIES OF COMPLETE SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT FURNISHED UNDER DIVISION 15 OF SPECIFICATIONS TO ARCHITECT FOR REVIEW. SHOP DRAWINGS SHALL BEAR THE STAMP OF APPROVAL OF THE CONTRACTOR AS EVIDENCE THAT THE DRAWINGS HAVE BEEN CHECKED BY HIM. DRAWING SUBMITTED WITHOUT THIS STAMP OF APPROVAL WILL NOT BE CONSIDERED AND WILL BE RETURNED FOR PROPER RESUBMISSION.
N. REVIEW OF SHOP DRAWINGS DOES NOT RELIEVE CONTRACTOR OF RESPONSIBILITY FOR ERRORS AND OMISSIONS IN SHOP DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS AND SIZES OF EQUIPMENT. INFORM ARCHITECT IN WRITING OF EQUIPMENT DIFFERING FROM THAT SHOWN.
O. PROVIDE MAINTENANCE AND OPERATING MANUALS BOUND IN 8 1/2" X 11" HARDBACK, THREE POST BINDERS. MANUALS SHALL CONTAIN WRITTEN INSTRUCTIONS FOR EACH SYSTEM, SHOP DRAWINGS, SCHEMATIC DRAWINGS, EQUIPMENT CATALOG CUTS, MANUFACTURER'S INSTRUCTIONS, MANUFACTURERS WARRANTIES, AND VALVE TAG LIST.
P. PROVIDE AS-BUILT PRINTS AT THE COMPLETION OF JOB. KEEP ONE SET OF PRINTS ON JOB AND RECORD DAY TO DAY CHANGES TO CONTRACT DRAWINGS WITH RED PENCIL. INDICATE ACTUAL LOCATION OF PIPING, DUCTWORK, VALVES, DAMPERS, AND EQUIPMENT. TURN OVER PRINTS TO ARCHITECT AT FINAL OBSERVATION.
Q. FURNISH ARCHITECT WRITTEN WARRANTY, STATING THAT IF WORKMANSHIP AND/OR MATERIALS EXECUTED UNDER THIS DIVISION IS PROVEN DEFECTIVE WITHIN ONE (1) YEAR AFTER FINAL ACCEPTANCE, SUCH DEFECTS AND OTHER WORK DAMAGED WILL BE REPAIRED AND/OR REPLACED.

SECTION 15050 – BASIC MATERIALS AND METHODS

A. ACCESS PANELS:
1. ACCESS PANELS SHALL HAVE WELDED STEEL FRAME, ONE PIECE DOORS, AND SELF LATCHING DOOR LOCKS. LOCKS SHALL BE SCREW DRIVER OPERATED WITH CASE HARDENED STEEL CAM. PANELS SHALL BE MILCOR, CESCO, KARP OR EQUAL.
2. PROVIDE ACCESS PANELS IN WALLS AND CEILINGS AS NEEDED TO ALLOW ACCESS TO VALVES, EQUIPMENT, SHOCK ABSORBERS, TRAP PRIMERS, ETC. AND WHERE NOTED.
B. CUTTING AND PATCHING:
1. CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING. CUT WALLS, FLOORS, CEILINGS, PARTITIONS, ETC., REQUIRED FOR THE INSTALLATION OF THIS WORK IN A NEAT AND CAREFUL MANNER. CORE DRILL FOR PIPE SLEEVES AND OTHER OPENINGS THROUGH FLOORS AND WALLS. SAWCUT LARGER OPENINGS. CUTTING SHALL BE KEPT TO A MINIMUM. OBTAIN APPROVAL OF ARCHITECT BEFORE CUTTING OR DRILLING.
2. REPLACE OR REPAIR DUCTWORK, CONDUIT, PIPING, ETC., THAT IS CUT. PATCH AROUND OPENING CUT BY THIS CONTRACTOR OR PROVIDED BY OTHERS FOR HIM. PATCHING SHALL BE DONE BY AN APPROVED QUALIFIED CONTRACTOR, BUT SHALL BE PAID FOR BY THIS CONTRACTOR. FINISHED PATCHING SHALL RETAIN FIRE AND SMOKE RATINGS OF THE ASSEMBLY AND SHALL MATCH SURROUNDING FINISH.
C. ANCHORS:
1. MOUNT ALL EQUIPMENT, BRACKETS, HANGERS, ANCHORS, ETC. TO SAFELY RESIST THE VIBRATION OR THRUST FORCES AND SUPPORT THE UNIT'S WEIGHT.
2. FLOOR MOUNTED ROTATING OR VIBRATING EQUIPMENT SHALL BE ANCHORED TO THE FLOOR USING GROUTED IN PLACE OR CAST IN PLACE ANCHOR BOLTS WITH THREE INCH HOOK AND SLEEVE. ANCHOR BOLTS SHALL BE OF THE SIZE RECOMMENDED BY THE MANUFACTURER.
3. FLOOR MOUNTED STATIC ITEMS, WALL, AND CEILING MOUNTED EQUIPMENT BRACKET AND HANGERS SHALL BE INSTALLED USING DRILLED ANCHORS OR CAST IN PLACE INSERTS. ANCHORS SHALL BE PHILLIPS DRILL COMPANY "RED HEAD" OR MULTI SET II. SIZE ANCHORS AND INSERTS FOR FOUR TIMES THE APPLIED LOAD. BOLTS USED OUTDOORS OR IN A WET ENVIRONMENT SHALL BE HOT DIP GALVANIZED.
D. EQUIPMENT IDENTIFICATION:
1. IDENTIFY EACH PIECE OF EQUIPMENT WITH A 1/8 INCH THICK ENGRAVED MELAMINE PLASTIC LAMINATE NAMEPLATE, LETTERS SHALL BE 1/2 INCH HIGH STANDARD STYLE. NAMES, ABBREVIATIONS, AND NUMBERING SHALL AGREE WITH THE CORRESPONDING EQUIPMENT DESIGNATIONS SHOWN ON THE DRAWINGS. USE BLACK LETTERS CUT IN A WHITE BACKGROUND FOR ALL EQUIPMENT ON STANDARD ELECTRICAL POWER.
2. FASTEN NAMEPLATES TO EQUIPMENT IN A CONSPICUOUS LOCATION USING SELF TAPPING STAINLESS STEEL SCREWS, EXCEPT USE CONTACT EPOXY ADHESIVE WHERE SCREWS CANNOT OR SHOULD NOT PENETRATE SUBSTRATE.

SECTION 15627 – ELECTRIC UNIT HEATERS

A. ELECTRIC UNIT HEATER:
1. SUPPLY AND INSTALL HEAVY-DUTY, WALL-MOUNTED FORCED-AIR ELECTRIC UNIT HEATERS OF THE WATTAGE, VOLTAGE AND PHASE AS INDICATED ON THE PLANS. THE HEATER SHALL SO BE DESIGNED TO PROVIDE AN EVEN DISTRIBUTION OF HEATED AIR TO THE SPACE BY DRAWING RETURN AIR IN THE PERIPHERY OF THE HEATER ACROSS THE ELEMENT WHICH SHALL THEN BE DISCHARGED FROM THE CENTER OF THE HEATER BY MEANS OF AN ELECTRIC MOTOR AND AXIAL FLOW FAN BLADE. HEATERS SHALL BE ETL LISTED.
2. ELECTRIC UNIT BLOWER HEATERS SHALL BE CHROMALOX HD3D SERIES OR APPROVED EQUAL WITH BUILT IN POWER CONTROL COMPONENTS, UL LISTED, CSA CERTIFIED AND CE MARKED FOR USE IN DIRTY AND CORROSIVE ENVIRONMENTS. THE HEATER SHALL BE NEMA 4X RATED FOR HOSE DOWN REQUIREMENTS. HEATERS TO ALLOW MOUNTING POSITIONING FOR HORIZONTAL OR VERTICAL OPERATION. HEATER TO BE OF THE KW RATING, VOLTAGE, PHASE AND CYCLES SPECIFIED IN THE SCHEDULE.
3. HEATING ELEMENTS SHALL BE TYPE 316 STAINLESS STEEL TUBING AND TYPE 316 STAINLESS STEEL FINS FOR MAXIMUM HEAT DISSIPATION. THE HEATERS SHALL BE PROTECTED BY A HIGH TEMPERATURE CUTOUT.
4. THE FAN ASSEMBLY SHALL INCLUDE A UL LISTED AND CSA CERTIFIED, TOTALLY ENCLOSED, EPOXY PAINTED MOTOR WITH PERMANENTLY LUBRICATED BALL BEARINGS DESIGNED TO RESIST MOISTURE AND CORROSION. THE EPOXY COATED ALUMINUM FAN BLADE SHALL BE DYNAMICALLY BALANCED FOR VIBRATION FREE OPERATION.
5. ALL EXPOSED SHEET METAL SURFACES SHALL BE CONSTRUCTED OF TYPE 304 STAINLESS STEEL; THE 20-GAUGE CASE SHALL BE ROLL FORMED WITH BEADED EDGES TO INSURE RIGIDITY. A LOUVERED OUTLET GRILL SHALL BE PAINTED WITH ZINC CHROMATE PRIMER AND TWO COATS OF CORROSION RESISTANT EPOXY PAINT.
6. A NEMA 4X CONTROL ENCLOSURE SHALL CONTAIN THE PRE-WIRED BUILT IN CONTROLS: AUTOMATIC RESET OVER-TEMPERATURE CUTOUT, FAN DELAY RELAY, HEATER CONTACTOR, MOTOR CONTACTOR, TERMINAL BLOCK AND 120V CONTROL TRANSFORMER. (CONTACTORS AND TRANSFORMER OPTIONAL ON 120V, 2 AND 3KW SIZES.)
7. STANDARD MOUNTING HARDWARE SHALL CONSIST OF THREE (3) L SHAPED, 7 GAUGE 304 STAINLESS STEEL MOUNTING BRACKETS FOR MOUNTING THE HEATER DIRECTLY TO A WALL FOR HORIZONTAL AIRFLOW OR CEILING FOR VERTICAL AIRFLOW.

SECTION 15870 – POWER VENTILATORS

A. POWER VENTILATORS WHICH ARE SCHEDULED OR REFERRED TO BY MODEL NUMBER OR CATALOGUE NUMBER ARE INTENDED TO INCLUDE ALL MATERIALS COVERED BY SUCH NUMBER. ANY REQUIRED ACCESSORIES FOR THE INSTALLATION OF THE FAN ARE TO BE BY THE SAME MANUFACTURER UNLESS OTHERWISE NOTED.

B. ALL WIRING AND ELECTRICAL COMPONENTS SHALL COMPLY WITH THE NATIONAL ELECTRIC CODES (NEC). ALL MATERIALS SHALL BE UL LISTED. FANS SHALL BE UL 705. FANS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE. FAN ASSEMBLY SHALL BEAR AN ENGRAVED ALUMINUM NAMEPLATE. FANS WHEELS SHALL BE BALANCED IN ACCORDANCE WITH AMCA STANDARD 204-96.

C. EACH UNIT SHALL HAVE A BIRDSCREEN CONSTRUCTED OF GALVANIZED WIRE MESH WITH 2 IN. OPENINGS MOUNTED VERTICALLY IN THE UNIT DISCHARGE. THE BIRDSCREEN SHALL PRODUCE MINIMAL EFFECT ON AIR AND SOUND PERFORMANCE.

D. INSTALL FAN IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL FANS WITH CLEARANCES FOR SERVICE AND MAINTENANCE. MAKE FINAL DUCT CONNECTIONS TO FANS WITH FLEXIBLE CONNECTORS.

E. BACK DRAFT DAMPER SHALL BE 6063T5 EXTRUDED ALUMINUM FRAME, .025 IN THICK FORMED ALUMINUM BLADES, EXTRUDED VINYL EDGE SEALS, SYNTHETIC BEARINGS, MILL FINISH.

F. WALL MOUNTED PROPELLER EXHAUST FANS – BELT DRIVE
1. A FAN SHALL BE WALL MOUNTED, BELT DRIVEN STELL PROPELLER FAN.
2. THE FAN SHALL BE OF BOLTED AND WELDED CONSTRUCTION UTILIZING CORROSION RESISTANT FASTENERS. THE MOTOR, BEARINGS, AND DRIVES SHALL BE MOUNTED ON A TUBULAR STEEL POWER ASSEMBLY. THE POWER ASSEMBLY SHALL BE BOLTED TO A MINIMUM 14 GAUGE WALL PANEL WITH CONTINUOUSLY WELDED CORNERS AND AN INTEGRAL VENTURI.
3. ALL STEEL FAN COMPONENTS SHALL BE PHENOLIC EPOXY COATED. PAINT MUST EXCEED 1,000 HOUR SALT SPRAY UNDER ASTM B117 TEST METHOD.
4. MOTOR SHALL BE NEMA DESIGN B WITH CLASS B INSULATION RATED FOR CONTINUOUS DUTY AND FURNISHED AT THE SPECIFIED VOLTAGE, PHASE AND ENCLOSURE.
5. BEARINGS SHALL BE DESIGNED AND TESTED SPECIFICALLY FOR USE IN AIR HANDLING APPLICATIONS. CONSTRUCTION SHALL BE HEAVY DUTY REGREASABLE BALL TYPE IN A CAST IRON PILLOW BLOCK HOUSING SELECTED FOR A MINIMUM L50 LIFE IN EXCESS OF 200,000 HOURS AT MAXIMUM CATALOGED OPERATING SPEED.
6. BELTS SHALL BE OIL AND HEAT RESISTANT, STATIC CONDUCTING. DRIVES SHALL BE PRECISION MACHINED CAST IRON TYPE, KEYED AND SECURELY ATTACHED TO THE WHEEL AND MOTOR SHAFTS. DRIVES SHALL BE SIZED FOR 150% OF THE INSTALLED MOTOR HORSEPOWER. THE VARIABLE PITCH MOTOR DRIVE MUST BE FACTORY SET TO THE SPECIFIED FAN RPM.
7. PROVIDE WITH ACCESSORIES NOTED ON SCHEDULES. PROVIDE PHENOLIC EPOXY COATING FOR STEEL CONSTRUCTION ACCESSORIES.
8. FAN SHALL BE THE XMWH AS MANUFACTURED BY LOREN COOK COMPANY. GREENHECK, ACME AND PENN VENTILATOR ARE APPROVED EQUAL.

G. WALL MOUNTED PROPELLER SUPPLY FANS – BELT DRIVE
1. FAN SHALL BE A WALL MOUNTED, BELT DRIVEN STEEL PROPELLER SUPPLY FAN.
2. THE FAN SHALL BE OF BOLTED AND WELDED CONSTRUCTION UTILIZING CORROSION RESISTANT FASTENERS. THE MOTOR, BEARINGS AND DRIVES SHALL BE MOUNTED ON A TUBULAR STEEL POWER ASSEMBLY. THE POWER ASSEMBLY SHALL BE BOLTED TO A MINIMUM 14 GAUGE WALL PANEL WITH CONTINUOUSLY WELDED CORNERS AND AN INTEGRAL VENTURI.
3. ALL STEEL FAN COMPONENTS SHALL BE PHENOLIC EPOXY COATED. PAINT MUST EXCEED 1,000 HOUR SALT SPRAY UNDER ASTM B117 TEST METHOD.
4. PROPELLER SHALL BE A HIGH-EFFICIENCY FABRICATED STEEL DESIGN WITH BLADES SECURELY FASTENED TO A MINIMUM 7 GAUGE HUB. THE HUB SHALL BE KEYED AND LOCKED TO THE FAN SHAFT UTILIZING TWO SETSCREWS.
5. MOTOR SHALL BE NEMA DESIGN B WITH CLASS B INSULATION RATED FOR CONTINUOUS DUTY AND FURNISHED AT THE SPECIFIED VOLTAGE, PHASE AND ENCLOSURE.
6. BEARINGS SHALL BE DESIGNED AND INDIVIDUALLY TESTED SPECIFICALLY FOR USE IN AIR HANDLING APPLICATIONS. CONSTRUCTION SHALL BE HEAVY DUTY REGREASABLE BALL TYPE IN A CAST IRON PILLOW BLOCK HOUSING SELECTED FOR A MINIMUM L50 LIFE IN EXCESS OF 200,000 HOURS AT MAXIMUM CATALOGED OPERATING SPEED.
7. BELTS SHALL BE OIL AND HEAT RESISTANT, STATIC CONDUCTING. DRIVES SHALL BE PRECISION MACHINED CAST IRON TYPE, KEYED AND SECURELY ATTACHED TO THE WHEEL AND MOTOR SHAFTS. DRIVES SHALL BE SIZED FOR 150% OF THE INSTALLED MOTOR HORSEPOWER. THE VARIABLE PITCH MOTOR DRIVE MUST BE FACTORY SET TO THE SPECIFIED FAN RPM.
8. PROVIDE WITH ACCESSORIES NOTED ON SCHEDULES. PROVIDE PHENOLIC EPOXY COATING FOR STEEL CONSTRUCTION ACCESSORIES MOUNTED INDOORS.
9. FAN SHALL BE THE XLWH AS MANUFACTURED BY LOREN COOK COMPANY. GREENHECK, ACME AND PENN VENTILATOR ARE APPROVED EQUAL.

H. SQUARE INLINE EXHAUSTER – DIRECT DRIVE:

1. THE FAN SHALL BE OF BOLTED AND WELDED CONSTRUCTION UTILIZING CORROSION RESISTANT FASTENERS. HOUSING SHALL BE MINIMUM 18 GAUGE STEEL WITH AIRFLOW STRAIGHTENING VANES, INTEGRAL DUCT FLANGES AND HINGED ACCESS DOOR.
2. FAN WHEEL SHALL BE CENTRIFUGAL BACKWARD INCLINED, CONSTRUCTED OF 100% ALUMINUM, INCLUDING A PRECISION MACHINED CAST ALUMINUM HUB. WHEEL INLET SHALL OVERLAP AN AERODYNAMIC ALUMINUM INLET CONE.
3. MOTOR SHALL BE HEAVY DUTY TYPE WITH PERMANENTLY LUBRICATED SEALED BALL BEARINGS AND FURNISHED AT THE SPECIFIED VOLTAGE, PHASE AND ENCLOSURE.
4. FAN SHALL BE MODEL SQN-D AS MANUFACTURED BY LOREN COOK COMPANY. GREENHECK, ACME AND PENN VENTILATOR ARE APPROVED EQUAL.

SECTION 15990 – TESTING, ADJUSTING AND BALANCING

A. THE TEST AND BALANCE CONTRACTOR SHALL BE AN INDEPENDENT CONTRACTOR THAT REGULARLY PERFORMS AIR AND WATER SYSTEMS TESTING AND BALANCING. MINIMUM QUALIFICATIONS FOR ACCEPTANCE SHALL BE GENERAL MEMBERSHIP IN NEBB OR AABC, EXCEPT THAT AFFILIATION WITH MANUFACTURERS, INSTALLING CONTRACTORS, OR ENGINEERING FIRMS MAY NOT PRECLUDE ACCEPTANCE.
B. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN ASHRAE APPLICATIONS HANDBOOK, AABC OR NEBB NATIONAL STANDARDS.
C. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR THE INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES. AFTER TESTING AND BALANCING, CLOSE PROBE HOLES AND PATCH INSULATION WITH NEW MATERIALS IDENTICAL TO THOSE REMOVED. RESTORE VAPOR BARRIER AND FINISH ACCORDING TO THE INSULATION SPECIFICATIONS FOR THIS PROJECT.
D. MARK EQUIPMENT SETTINGS WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL, INCLUDING DAMPER-CONTROL POSITIONS, VALVE INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS.
E. WITHIN 90 DAYS OF COMPLETING TESTING, ADJUSTING, AND BALANCING, PERFORM ADDITIONAL TESTING AND BALANCING TO VERIFY THAT BALANCED CONDITIONS ARE BEING MAINTAINED THROUGHOUT AND TO CORRECT UNUSUAL CONDITIONS. IF INITIAL TESTING, ADJUSTING, AND BALANCING PROCEDURES WERE NOT PERFORMED DURING NEAR-PEAK SUMMER AND WINTER CONDITIONS, PERFORM ADDITIONAL INSPECTIONS, TESTING, AND ADJUSTING DURING NEAR-PEAK SUMMER AND WINTER CONDITIONS.
F. THE MECHANICAL CONTRACTOR'S RESPONSIBILITIES: FURNISH THE TEST AND BALANCE CONTRACTOR ONE COMPLETE SET OF ACCEPTED EQUIPMENT DATA AND ONE COMPLETE SET OF ACCEPTED MECHANICAL SHOP DRAWINGS. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ADVISING THE TEST AND BALANCE CONTRACTOR OF ANY CHANGE(S) MADE TO THE SYSTEM(S) DURING THE CONSTRUCTION PROCESS. MECHANICAL CONTRACTOR SHALL PROVIDE DRAWINGS, SPECIFICATIONS, SHOP DRAWINGS, CONTROL DIAGRAMS, ETC. DETAILING THE CHANGE(S) TO THE TEST AND BALANCE CONTRACTOR. REPLACE AND/OR INSTALL PULLEYS, BELTS, DAMPERS AND TRIM PUMP IMPELLERS AS REQUIRED FOR THE CORRECT BALANCE AS DIRECTED BY THE TEST AND BALANCE CONTRACTOR. ALLOCATE TIME IN THE CONSTRUCTION SCHEDULE FOR TEST AND BALANCE PROCEDURE, ASSIST THE TEST AND BALANCE CONTRACTOR IN COORDINATING WORK WITH THE OTHER TRADES, AND PREPARE THE SYSTEM FOR TESTING AND BALANCING.

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CONSTRUCTION PLANS FOR:
TALLADEGA MAIN WWTP PUMP UPGRADES
TALLADEGA, AL

TALLADEGA
At every turn.

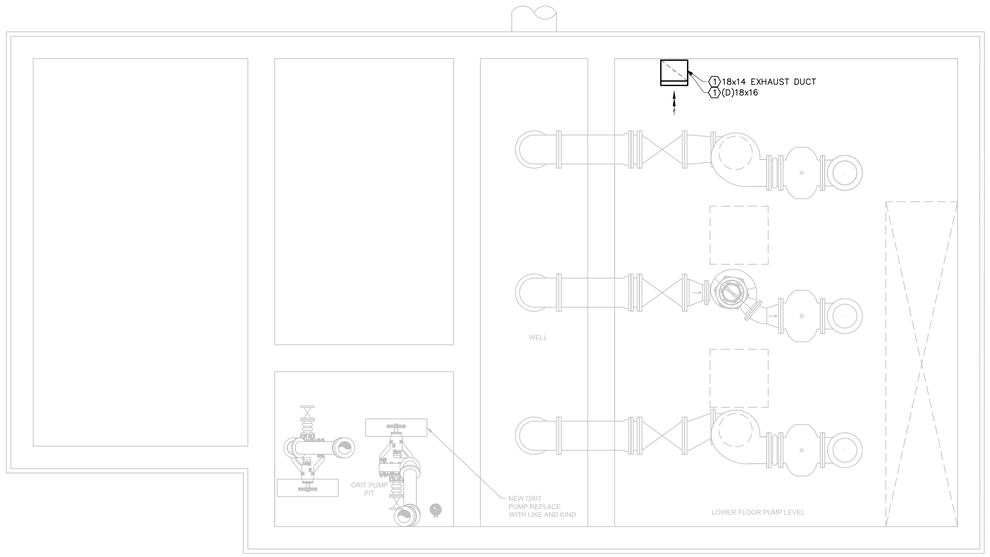
PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

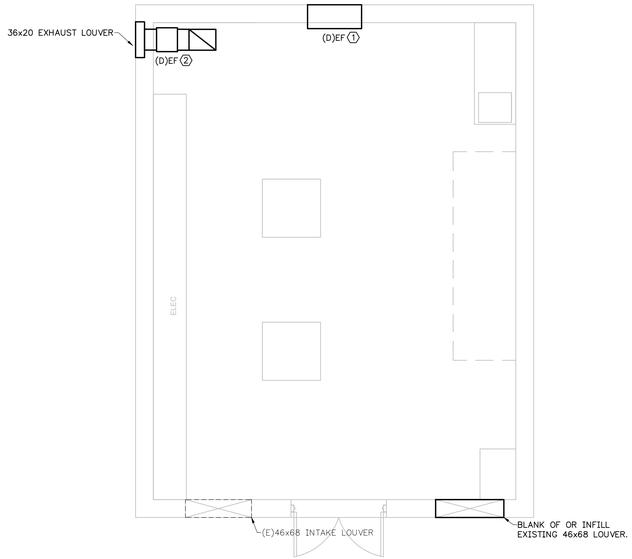
ALABAMA REGISTERED No. 30374 PROFESSIONAL ENGINEER FREY A. BOSWELL
10/15/25

THIS SHEET CONTAINS:
SITE PLAN
MECHANICAL LEGEND, ABBRE., SCHEDULES AND DETAILS

SHEET 13 OF 25

MPL-2





LOWER LEVEL FLOOR PLAN
MECHANICAL – DEMOLITION

NORTH

0 1 2 3 4 8

GRAPHIC SCALE (FEET)

DEMOLITION LEGEND

- EXISTING
- DEMOLITION

DEMOLITION NOTES:

1. VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.

DRAWING NOTES:

1. DEMOLISH EXISTING 18x16 EXHAUST DUCT. PREPARE EXISTING CEILING PENETRATION FOR NEW WORK. SEE NEW WORK, SHEET M-2.

MAIN LEVEL FLOOR PLAN
MECHANICAL – DEMOLITION

NORTH

0 1 2 3 4 8

GRAPHIC SCALE (FEET)

DEMOLITION LEGEND

- EXISTING
- DEMOLITION

DEMOLITION NOTES:

1. VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.

DRAWING NOTES:

1. DEMOLISH EXISTING WALL MOUNTED EXHAUST FAN. PREPARE EXISTING WALL PENETRATION FOR NEW WORK. SEE NEW WORK, SHEET M-2.
2. DEMOLISH EXISTING INLINE EXHAUST FAN. EXPAND EXISTING WALL PENETRATION TO ACCOMMODATE EXHAUST NEW LOUVER. SEE NEW WORK, SHEET M-2.

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CONSTRUCTION PLANS FOR:

TALLADEGA MAIN WWTP PUMP UPGRADES

TALLADEGA, AL

TALLADEGA
At every turn.

PROJECT INFO:

INSITE - HOOVER

INSITE JOB No. 10033.00

PLOTTED: 10/15/25

ALABAMA REGISTERED No. 30374 PROFESSIONAL ENGINEER FREY A. BOLTON

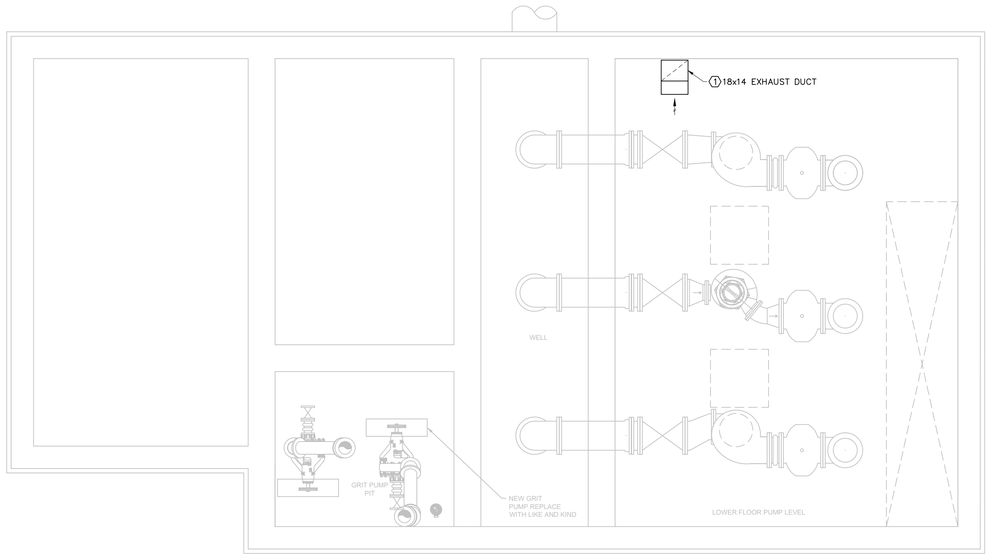
10/15/25

THIS SHEET CONTAINS:

SITE PLAN
FLOOR PLAN
MECHANICAL
DEMOLITION

SHEET 14 OF 25

MPL-3



NORTH

FLOOR PLAN
MECHANICAL – NEW WORK

0 1 2 3 4 8

GRAPHIC SCALE (FEET)

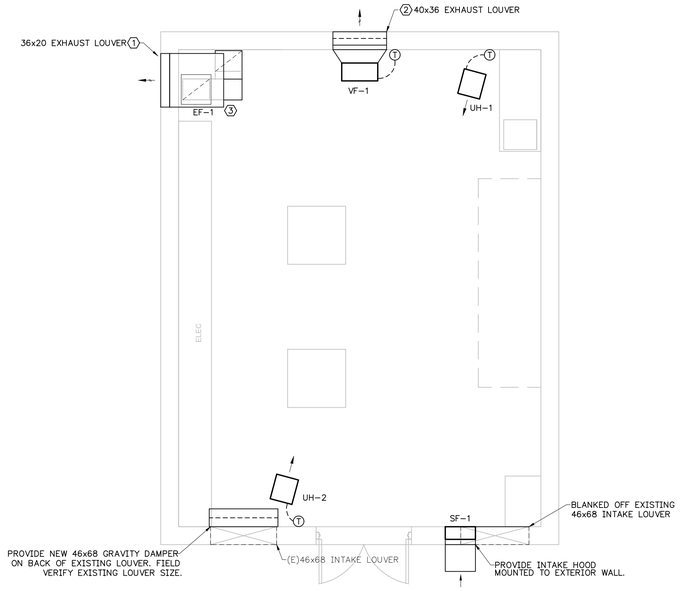
NEW WORK LEGEND	
- - - - - - - - - -	EXISTING
————————	NEW WORK

GENERAL NOTES:

1. VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
2. PROVIDE NECESSARY OFFSETS IN PIPING, ELECTRICAL CONDUIT, AND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW WORK. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL DETAILS NOR CHANGES IN DUCTWORK ELEVATIONS NECESSARY FOR COMPLETE INSTALLATION.
3. DUCTWORK SHALL BE RUN TIGHT TO STRUCTURE. AVOID CROSSING OVER LIGHTS AND OTHER DUCTS DUE TO TIGHT CLEARANCES.

DRAWING NOTES:

1. ROUTE NEW 18x14 EXHAUST DOWN FROM FIRST FLOOR. PROVIDE OPEN ENDED ELBOW ON BOTTOM OF DUCT. TERMINATE BOTTOM OF DUCT AT 12" AFF.



NORTH

FLOOR PLAN
MECHANICAL – NEW WORK

0 1 2 3 4 8

GRAPHIC SCALE (FEET)

NEW WORK LEGEND	
- - - - - - - - - -	EXISTING
————————	NEW WORK

GENERAL NOTES:

1. VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
2. PROVIDE NECESSARY OFFSETS IN PIPING, ELECTRICAL CONDUIT, AND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW WORK. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL DETAILS NOR CHANGES IN DUCTWORK ELEVATIONS NECESSARY FOR COMPLETE INSTALLATION.
3. DUCTWORK SHALL BE RUN TIGHT TO STRUCTURE. AVOID CROSSING OVER LIGHTS AND OTHER DUCTS DUE TO TIGHT CLEARANCES.
4. COORDINATE EXACT SIZE, LOCATION, AND COLOR OF WALL MOUNTED LOUVERS WITH ARCHITECT PRIOR TO ORDERING.
5. MOUNT TEMPERATURE CONTROLS 48" ABOVE FINISHED FLOOR. COORDINATE EXACT LOCATION WITH ARCHITECT.
6. VERIFY THAT EXISTING EQUIPMENT TO BE REUSED IS IN PROPER WORKING ORDER. NOTIFY ARCHITECT IN WRITING PRIOR TO BEGINNING WORK OF ANY EQUIPMENT WHICH IS NOT WORKING PROPERLY.

DRAWING NOTES:

1. EXPAND EXISTING WALL PENETRATION TO ACCOMMODATE NEW LOUVER SIZE.
2. INSTALL NEW EXHAUST LOUVER IN EXISTING WALL PENETRATION. FIELD VERIFY EXISTING OPENING SIZE.
3. IN LINE EXHAUST FAN MOUNTED TO WALL. TERMINATE DUCT INTO BOTTOM OF NEW EXHAUST PLENUM. PROVIDE FULL SIZE PLENUM ON BACK OF LOUVER.

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PROJECT INFO:

INSITE - HOOVER

INSITE JOB No. 10033.00

PLOTTED: 10/15/25

ALABAMA REGISTERED No. 30374 PROFESSIONAL ENGINEER FREY A. BOLTON

10/15/25

THIS SHEET CONTAINS:

SITE PLAN
FLOOR PLAN
MECHANICAL
NEW WORK

SHEET 15 OF 25

MPL-4

GENERAL ELECTRICAL LEGEND

$x — SWITCH OUTLET - MANUAL MOTOR STARTER - TOGGLE TYPE - 2 POLE - SQUARE "D" TYPE K01 WITH ENCLOSURE AS REQUIRED BY APPLICATION - PROVIDE LOCK-OFF HARDWARE.

$3x — SWITCH OUTLET - MANUAL MOTOR STARTER - TOGGLE TYPE - 3 POLE - SQUARE "D" TYPE K02 WITH ENCLOSURE AS REQUIRED BY APPLICATION - PROVIDE LOCK-OFF HARDWARE.

DUPLEX — WALL OUTLET - RECEPTACLE - 20A - 125V - 2P - 3W - GROUNDING - "GFI" TYPE - WEATHER RESISTANT - NEMA 5-20R - SINGLE PLATE.

OUTLET DESIGNATIONS (APPLY TO ALL OUTLETS, DEVICES & EQUIPMENT):

- VL — VERIFY EXACT OUTLET LOCATION WITH OWNER PRIOR TO ROUGH-IN.
- W — WEATHER PROOF - OUTLET SHALL BE INSTALLED WITH WEATHERPROOF, IN-USE, CAST COVER.

J — FLOOR OR SURFACE-MOUNTED OUTLET - JUNCTION BOX.

J — WALL OUTLET - JUNCTION BOX - FLUSH MOUNTED.

J — CEILING OUTLET - JUNCTION BOX.

BRANCH/FEEDER CIRCUIT - CONCEALED IN WALLS OR CEILING.

BRANCH/FEEDER CIRCUIT - EXPOSED ON WALLS OR CEILING.

BRANCH/FEEDER CIRCUIT - CONCEALED IN FLOOR SLAB OR DIRT FILL.

BRANCH/FEEDER CIRCUIT - OVERHEAD BETWEEN POLES.

BRANCH/FEEDER CIRCUIT - HOMERUN - CAN BE USED WITH OTHER BRANCH/FEEDER TYPES.

BRANCH/FEEDER CIRCUIT MODIFIERS:

- : 2#12 & 1#12G UNLESS NOTED OTHERWISE.
- : 3#12 & 1#12G, ETC. UNLESS NOTED OTHERWISE (TICK MARKS INDICATE CONDUCTOR QUANTITY NOT INCLUDING GROUND WIRE).
- 10 : 2#10 & 1#10G UNLESS NOTED OTHERWISE (NUMBER INDICATES WIRE AWG).
- CDS : CABLING AS DIRECTED BY SUPPLIER IN CONDUIT(S) SIZED AT 150% OF N.E.C. MINIMUM SIZE.
- RP-A — CONNECTED PANEL.
- (1) NSV **** 20/2 BKR(S)
  - INDICATED BREAKER AMPACITY AND NUMBER OF POLES - BREAKER SHALL BE 20/1 IF THIS INFORMATION IS OMITTED OR NOTED OTHERWISE IN HOMERUN MARK.
  - BREAKER TYPE - BREAKER SHALL BE OF STANDARD TYPE IF THIS INFORMATION IS OMITTED OR NOTED WITH ONE OF THE FOLLOWING DESCRIPTIONS BELOW:
    - GFI — GFI-TYPE (5mA TRIP).
    - GFIE — GFI-EPD TYPE (30mA TRIP).
    - LOFF — WITH LOCK-OFF HARDWARE.
    - LON — WITH LOCK-ON HARDWARE.
  - INDICATES THAT A CIRCUIT SHALL BE CONNECTED TO A "NEW, SPARE OR VACATED" BREAKER OF RATED TYPE AND AMPACITY IN EXISTING PANEL AS SHOWN ABOVE.
  - TOTAL QUANTITY OF BREAKERS.

SIZE CONDUIT PER N.E.C. UNLESS INDICATED OTHERWISE.

POWER DISTRIBUTION EQUIPMENT.

LIGHTING PANEL - SURFACE MOUNTED.

T — TRANSFORMER - POWER.

PLC-* **-**-** — TYPICAL SCADA CONTROL & INSTRUMENTATION WIRING MARK (WHERE **** REPRESENTS A UNIQUE IDENTIFIER CONSISTING OF LETTERS AND NUMBERS) - SEE SCADA CONTROL & INSTRUMENTATION WIRING SCHEDULES.

DISCONNECT SWITCH - NONFUSED.

DISCONNECT SWITCH - FUSED.

DISCONNECT SWITCH - INTEGRAL TO EQUIPMENT.

MOTOR STARTER.

M — MOTOR OUTLET - SIZE AS SHOWN.

LS — LIMIT SWITCH.

PS — PRESSURE SWITCH.

SV — SOLENOID VALVE.

T AC — THERMOSTAT - AIR CONDITIONING - LOW VOLTAGE - LABEL FUNCTION WITH ENGRAVED NAMEPLATE.

T C — THERMOSTAT - COOLING - SINGLE STAGE - LOW VOLTAGE - WALL MOUNTED AT 48" A.F.F. - LABEL FUNCTION WITH ENGRAVED NAMEPLATE.

T H — THERMOSTAT - HEATING - SINGLE STAGE - LOW VOLTAGE - WALL MOUNTED AT 48" A.F.F. - LABEL FUNCTION WITH ENGRAVED NAMEPLATE.

UH — UNIT HEATER - ELECTRICAL - ARROW INDICATES DIRECTION.

FAN OFF BEACON ALARM - FEDERAL SIGNAL MODEL SLM100 - WITH WALL-MOUNT HARDWARE - 120VAC - RED LENS COLOR - IP66 RATED - MOUNT AT EXACT LOCATION AS DIRECTED BY CIVIL ENGINEER - INTERCONNECT TO NFPA820 DECLASSIFICATION CONTROL PANEL AS REQUIRED TO ILLUMINATE DURING ALARM CONDITION - PROVIDE RED ENGRAVED NAMEPLATE WITH 1/2" WHITE TEXT TO READ "FAN OFF ALARM".

A / E-1 — DETAIL DESIGNATOR - "A" INDICATED DETAIL MARK - "E-1" INDICATED SHEET NUMBER WHERE DETAIL IS LOCATED (TYPICAL).

GENERAL ABBREVIATIONS:

- (EX) — EXISTING TO REMAIN.
- (EX-R) — EXISTING TO BE REMOVED - REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING CONNECTIONS TO OTHER ELECTRICAL ITEMS.
- (EX-RL) — EXISTING TO BE RELOCATED - REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING AT EXISTING LOCATION. RELOCATE ITEM TO NEW LOCATION SHOWN ON ELECTRICAL PLANS.
- (EX-RP) — EXISTING TO BE REPLACED - EXTEND AND RECONNECT EXISTING CONDUIT AND WIRING TO REPLACED ITEM.

E-*** — DETAIL DESIGNATOR - REFERENCE MARK (WHERE ****** REPRESENTS A UNIQUE IDENTIFIER CONSISTING OF LETTERS & NUMBERS) - SEE DETAIL SHEETS CONTAINED WITHIN THIS SET OF ELECTRICAL DRAWINGS FOR THE CORRESPONDING DETAIL.

DETAIL DESIGNATOR NOTES:

1. DETAIL DESIGNATORS FOUND WITHIN THIS SET OF DRAWINGS ARE TYPICAL (ARE FOR GENERAL REFERENCE ONLY) AND ARE NOT INTENDED TO MARK EVERY INSTANCE WHERE DETAILS ARE APPLICABLE.
2. DESIGN DETAILS REPRESENT THE CHARACTER AND NATURE OF WORK REQUIRED THROUGHOUT THE PROJECT. ALL ASSOCIATED WORK SHALL BE IN ACCORDANCE WITH THE DESIGN DETAILS WHETHER THE DETAILS ARE SPECIFICALLY REFERENCED OR NOT.

ELECTRICAL ABBREVIATIONS:

A	AMPERES.	NSV	NEW, SPARE OR VACATED.
AIC	AMPERES INTERRUPTING CAPACITY.	OC	ON CENTER.
AFF	ABOVE FINISHED FLOOR.	P	POLES.
AL	ALUMINUM.	PF	POWER FACTOR.
ATS	AUTOMATIC TRANSFER SWITCH.	Ø	PHASE.
AWG	AMERICAN WIRE GAUGE.	PVC	POLYVINYL CHLORIDE.
C	CONDUIT.		
CU	COPPER.	SLD	SINGLE LINE DIAGRAM.
EC	EMPTY CONDUIT. OR ELECTRICAL CONTRACTOR	SS	STAINLESS STEEL.
		UL	UNDERWRITERS LABORATORY.
FPN	FUSE PER NAMEPLATE.	UNO	UNLESS NOTED OTHERWISE.
G	GROUND CONDUCTOR.	V	VOLTS.
KVA	KILOVOLT-AMPERES.	W	WIRES.
KW	KILOWATT.		
LV	LOW VOLTAGE.	CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED.
MCM	THOUSAND CIRCULAR MILS.		
MV	MEDIUM VOLTAGE.	CFOI	CONTRACTOR FURNISHED, OWNER INSTALLED.
N	NEUTRAL.		
NEC	NATIONAL ELECTRICAL CODE.	OFOI	OWNER FURNISHED, OWNER INSTALLED.
NEMA	NATIONAL ELECTRICAL MANUFACTURER ASSOCIATION.	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED.
NIC	NOT IN CONTRACT.		

TYPICAL CIRCUITRY DESIGNATIONS:

2 SETS OF 4#3/0 & 1#3G - 2 1/2"C

- CONDUIT SIZE.
- GROUND CONDUCTOR WIRE GAUGE.
- QUANTITY OF GROUND CONDUCTORS (PER SET)
- PHASE/NEUTRAL CONDUCTOR WIRE GAUGE.
- QUANTITY OF PHASE/NEUTRAL CONDUCTORS (PER SET).
- QUANTITY OF PARALLEL SETS OF THE PHASE/NEUTRAL CONDUCTORS, GROUND CONDUCTOR AND CONDUIT SPECIFIED.

MULTI-CONDUCTOR CONTROL 600V TRAY CABLE DESIGNATIONS:

(2) 4C#14 W/G - 1 1/4"C

- CONDUIT SIZE.
- "W/G" = WITH ADDITIONAL INTEGRAL GROUND CONDUCTOR WITH GREEN INSULATION IN EACH CABLE SHEATH.
- WIRE GAUGE.
- QUANTITY OF CONDUCTORS IN EACH CABLE SHEATH (NOT INCLUDING GROUND).
- QUANTITY OF MULTI-CONDUCTOR CABLES OF THE TYPE SPECIFIED WITHIN THE SPECIFIED CONDUIT.

TWISTED, SHIELDED INSTRUMENTATION CABLE DESIGNATIONS:

(2) #16TSP - 1"C

- CONDUIT SIZE.
- "TSP" = TWISTED SHIELDED PAIR.
- WIRE GAUGE.
- QUANTITY OF INSTRUMENTATION CABLES IN THE SPECIFIED CONDUIT.

GENERAL ELECTRICAL NOTES

1. SPECIAL ATTENTION IS CALLED TO THE FACT THAT THE REQUIRED WORK IS AT OPERATING FACILITIES, AND AS SUCH, NO UNNECESSARY SHUTDOWNS WILL BE ALLOWED. ANY NECESSARY SHUTDOWNS SHALL BE APPROVED IN WRITING BY THE PLANT MANAGER A MINIMUM OF TWO (2) WEEKS IN ADVANCE, AND SHALL BE SCHEDULED AT SUITABLE TIMES FOR THE PROCESS (WITH LOWER PROCESS FLOWS/ETC.) AS DETERMINED BY OWNER. NO INDIVIDUAL SHUTDOWNS SHALL EXCEED 12 HOURS IN LENGTH. TEMPORARY/PORTABLE PUMPING PROVISIONS (AND OTHER TEMPORARY PROVISIONS AS REQUIRED FOR OPERATION OF THE EXISTING SYSTEMS) SHALL BE PROVIDED BY THE CONTRACTOR IF OWNER-MANDATED MAXIMUM SHUTDOWN PERIODS ARE ANTICIPATED OR ARE POSSIBLE.
2. ELECTRICAL PLANS & DETAILS INDICATE TYPICAL WIRING REQUIREMENTS FOR PROCESS EQUIPMENT. VERIFY EXACT WIRING REQUIREMENTS & ALL DEVICE LOCATIONS WITH APPROVED MANUFACTURERS SHOP DRAWINGS PRIOR TO ROUGH-IN. NO ADDITIONAL COMPENSATION WILL BE PAID FOR MINOR CIRCUITRY ADJUSTMENTS REQUIRED TO COMPLY WITH MANUFACTURERS INSTALLATION DETAILS.
4. CONTRACTOR SHALL VISIT THE SITE OF THE WORK PRIOR TO SUBMITTING BID TO EXAMINE CAREFULLY LOCAL CONDITIONS AND DIFFICULTIES TO BE ENCOUNTERED. ANY DISCREPANCY BETWEEN PLANS AND EXISTING CONDITIONS SHALL IMMEDIATELY BE CALLED TO THE ATTENTION OF THE ENGINEER.
5. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH NEC.
6. NEW EXPOSED HVAC POWER OR CONTROL CIRCUITRY INSTALLED BY THIS CONTRACTOR SHALL BE INSTALLED TO MEET DIVISION 26 SPECIFICATIONS (EXTERIOR EMT/ETC. WILL NOT BE ALLOWED, ETC.).
7. EXISTING PANEL DIRECTORY CARDS MODIFIED BY THIS RENOVATION SHALL BE RETYPED TO INDICATE CONNECTED CIRCUITS.
8. THIS CONTRACTOR SHALL FURNISH ALL MATERIALS AND LABOR NECESSARY TO EXTEND CIRCUITS AND MAKE RECONNECTIONS TO ANY ACTIVE ELECTRICAL DEVICES ON WHICH THE BRANCH CIRCUIT IS INTERRUPTED BY THIS ALTERATION. CARE SHALL BE TAKEN TO INSURE THAT EXISTING PANEL AND FEEDER RATINGS ARE NOT EXCEEDED.

ELECTRICAL DEMOLITION NOTES

1. THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL SCOPE OF DEMOLITION WORK TO BE ACCOMPLISHED UNDER THIS CONTRACT. IT IS NOT THE INTENT OF THESE PLANS TO DETAIL ALL ELECTRICAL ITEMS THAT MUST BE REMOVED. THE ELECTRICAL CONTRACTOR SHALL REFER TO ALL OTHER PLANS IN THIS SET OF DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO EXTENT AND SCOPE OF DEMOLITION WORK. REFER TO ELECTRICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. VERIFY ALL REQUIREMENTS AT JOB SITE PRIOR TO BID.
2. EXISTING SALVAGEABLE MATERIALS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO OWNER'S DESIGNATED STORAGE FACILITY. ANY MATERIALS REMOVED THAT THE OWNER DOES NOT WISH TO RETAIN SHALL BE DISPOSED OF BY THE CONTRACTOR.
3. NO EXISTING ELECTRICAL ITEMS SHALL BE REMOVED WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER. THE EXISTING PLANT SHALL BE KEPT OPERATIONAL THROUGHOUT THE CONSTRUCTION PROCESS UNTIL THE ASSOCIATED REPLACEMENT/NEW PLANT SYSTEMS ARE IN SERVICE AND PROPERLY TESTED AND DEEMED RELIABLE/ACCEPTABLE FOR PERMANENT SERVICE.
4. ALL EXISTING FEEDER WIRING MADE OBSOLETE BY THIS PROJECT SHALL BE DEMOLISHED COMPLETELY. SEE ELECTRICAL DEMOLITION NOTE 3.
5. WHERE EXISTING MCC-MOUNTED BREAKERS, STARTERS, ETC. BECOME OBSOLETE AS A RESULT OF THIS PROJECT (FOR EXAMPLE, WHERE ASSOCIATED MOTOR LOADS ARE DEMOLISHED), THE EXISTING MCC-MOUNTED UNITS SHALL BE RELABELED AS SPARES UNLESS NOTED OTHERWISE.

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CONSTRUCTION PLANS FOR:

TALLADEGA MAIN WWTP PUMP UPGRADES

TALLADEGA, AL

TALLADEGA At every turn.

PROJECT INFO:

INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK 10/15/2025

THIS SHEET CONTAINS:

ELECTRICAL LEGEND AND NOTES

SHEET 16 OF 25

GNE-1

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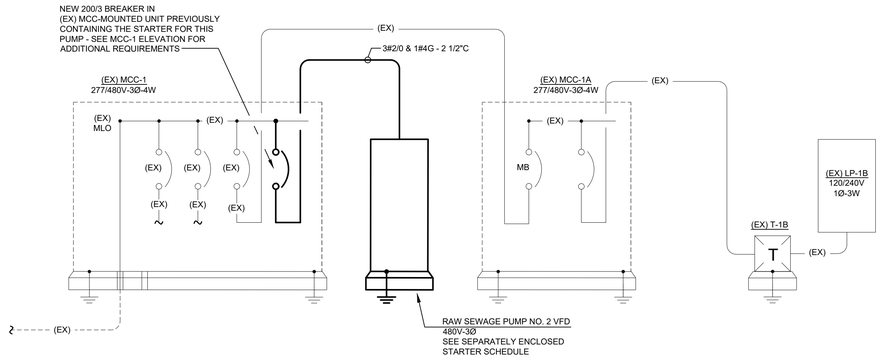


PARTIAL SINGLE LINE DIAGRAM

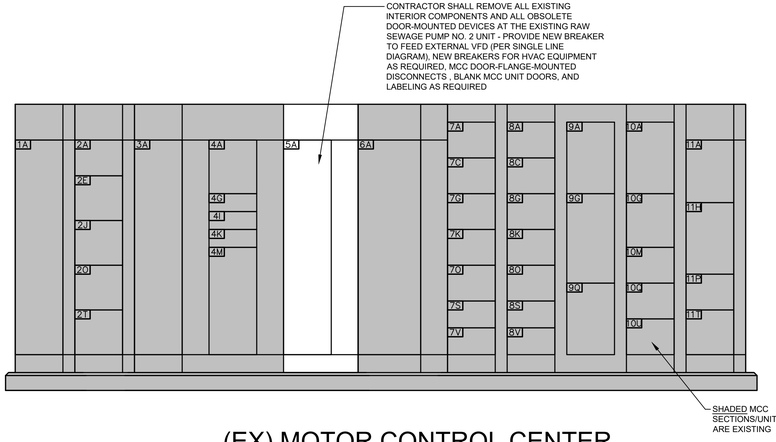
SCALE : NONE

DIAGRAM NOTES
1. THIS DIAGRAM IS INTENDED TO BE A PARTIAL DIAGRAM SHOWING NEW EQUIPMENT & FEEDERS ONLY. EXISTING UNAFFECTED EQUIPMENT & FEEDERS ARE NOT INTENDED TO BE SHOWN ON THIS DIAGRAM.

SEPARATELY ENCLOSED STARTERS SCHEDULE

"FED FROM" EQUIPMENT	NAMEPLATE DESCRIPTION	UNIT DESCRIPTION	MOUNTING/ENCLOSURE	LOCATION	ELECTRICAL CHARACTERISTICS					STARTER CONTINUOUS AMP RATING	ASSOCIATED ELEM. DIAG.	WIRE & COND. SIZE	KAIC RATING
					V	P	HP	KW	AMPS				
MCC-1	RAW WATER PUMP NO. 2	COMBINATION LOW-HARMONIC ACTIVE FRONT END (AFE) VARIABLE TORQUE VFD - SEE NOTE 2	SEPARATE NEMA 12 ENCLOSURE	RAW SEWAGE PUMP STATION	480	3	85			124 AMPS	1	SEE PLANS	42KAIC

NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. VFD SHALL BE FURNISHED WITH MCP, LINE ISOLATION CONTACTOR, SPD, LONG-LEAD DVDT MOTOR FILTER & ACCESSORIES PER SPECS.



(EX) MOTOR CONTROL CENTER MCC-1 ELEVATION

SCALE : 1/2" = 1'-0"

ELEVATION NOTES
1. ANY MODIFICATIONS BY ELECTRICAL CONTRACTOR TO EXISTING MOTOR CONTROL CENTERS SHALL BE MADE IN STRICT CONFORMANCE WITH ORIGINAL MANUFACTURER'S RECOMMENDATIONS, USING HARDWARE/DEVICES MANUFACTURED BY THE ORIGINAL EQUIPMENT SUPPLIER TO ENSURE THAT ALL MODIFICATIONS MEET ALL APPLICABLE N.E.C. AND UL REQUIREMENTS .

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ALABAMA LICENSED
No. 27420
PROFESSIONAL
PHILIP D. BLACK
10/15/2025

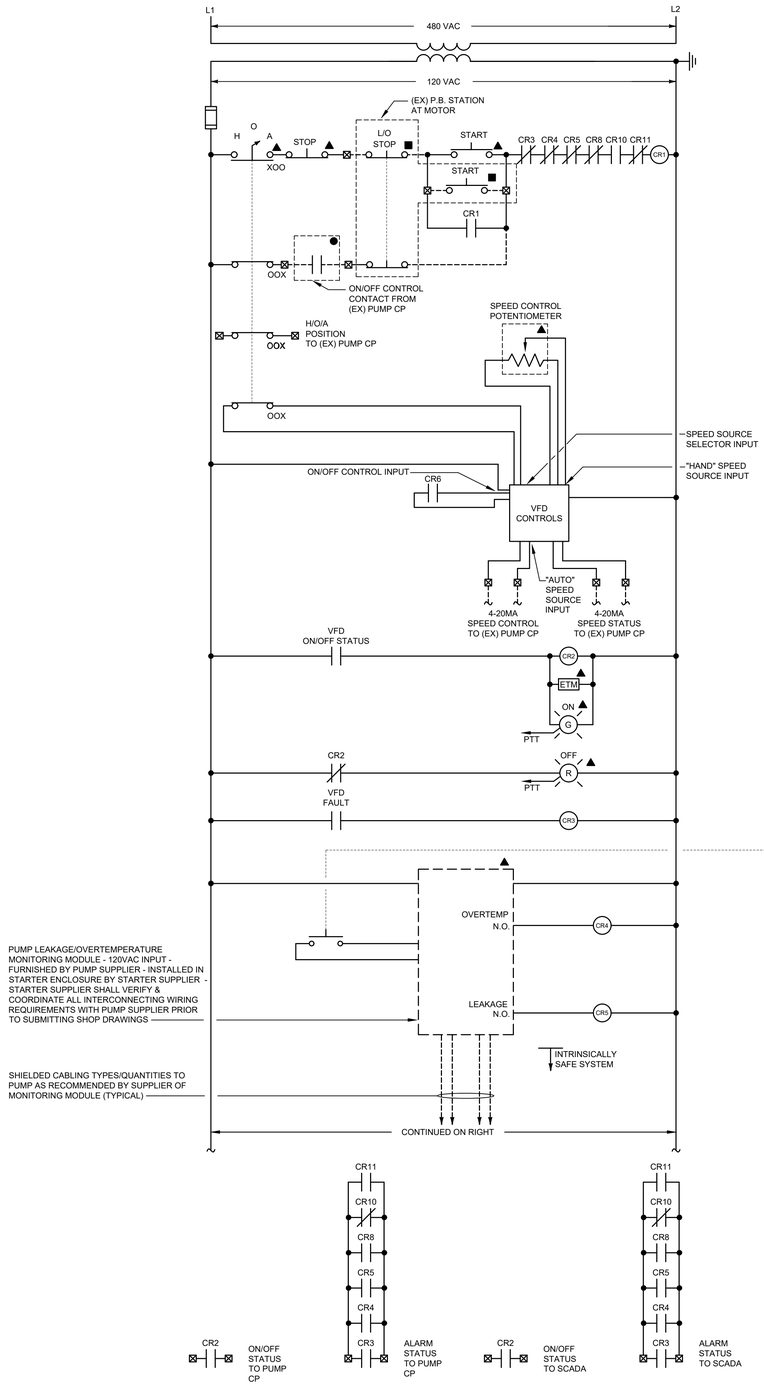
THIS SHEET CONTAINS:
DIAGRAMS & SCHEDULES

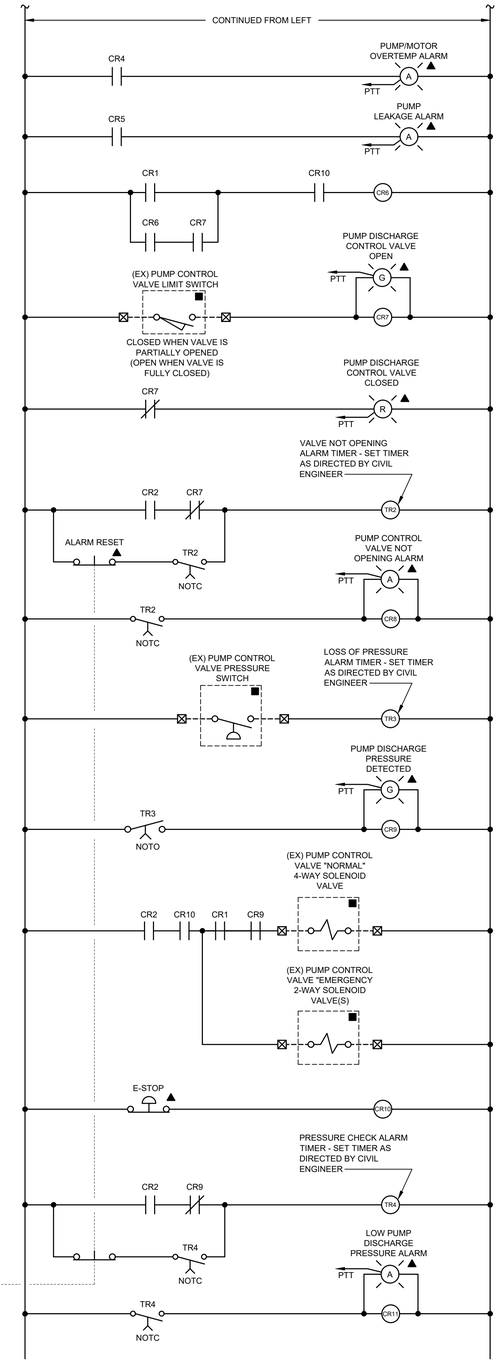
SHEET 17 OF 25

GNE-2

ELEMENTARY DIAGRAM LEGEND

START	PUSHBUTTON - START - NORMALLY OPEN - MOMENTARY CONTACT.
STOP	PUSHBUTTON - STOP - NORMALLY CLOSED - MOMENTARY CONTACT.
E-STOP	PUSHBUTTON - EMERGENCY STOP - NORMALLY CLOSED - MAINTAINED CONTACT - MUSHROOM HEAD.
H O A / XOO	SELECTOR SWITCH - HAND-OFF-AUTOMATIC - MAINTAINED CONTACT - "XOO" INDICATES THAT CONTACT IS ONLY CLOSED IN THE FIRST (HAND) POSITION (MAY BE USED WITH OTHER COMBINATIONS OF "X" & "O").
OFF ON / OX	SELECTOR SWITCH - ON-OFF - MAINTAINED CONTACT - "XO" INDICATES - THAT CONTACT IS ONLY CLOSED IN THE FIRST (ON) POSITION (MAY BE USED WITH OTHER COMBINATIONS OF "X" & "O").
M	MOTOR STARTER COIL.
BP	BYPASS MOTOR STARTER COIL.
OL	OVERLOAD RELAY CONTACT.
CR	CONTROL RELAY COIL.
	CONTROL CONTACT - NORMALLY OPEN.
	CONTROL CONTACT - NORMALLY CLOSED.
	INDICATOR LIGHT - COLOR AS SHOWN.
	CONTROL TRANSFORMER.
ETM	ELAPSED TIME METER.
▲	DEVICE LOCATED ON STARTER DOOR.
■	DEVICE LOCATED ADJACENT TO MOTOR.
●	DEVICE LOCATED REMOTE - SEE PLAN.
⊠	TERMINAL BLOCK WITHIN STARTER UNIT.
	FLOAT SWITCH - CLOSES ON RISING LEVEL.
	FLOAT SWITCH - CLOSES ON FALLING LEVEL.
	PRESSURE SWITCH - CLOSES ON INCREASE PRESSURE.
	PRESSURE SWITCH - CLOSES ON DECREASE PRESSURE.
	LIMIT SWITCH - NORMALLY OPEN - HELD CLOSED.
	LIMIT SWITCH - NORMALLY CLOSED - HELD OPEN.
TR	TIME DELAY RELAY COIL.
	TIME DELAY RELAY CONTACT - NORMALLY CLOSED, TIME OPEN.
	TIME DELAY RELAY CONTACT - NORMALLY OPEN, TIME CLOSED.
	TIME DELAY RELAY CONTACT - NORMALLY OPEN, TIME OPEN.
	TIME DELAY RELAY CONTACT - NORMALLY CLOSED, TIME CLOSED.
	SOLENOID VALVE.
	THERMOSTAT - NORMALLY CLOSED, OPENS ON HIGH TEMP.
	THERMOSTAT - NORMALLY OPEN, CLOSES ON HIGH TEMP.





ELEMENTARY DIAGRAM NO. 1

RAW SEWAGE PUMP NO. 2: SEPARATELY ENCLOSED VFD

DIAGRAM NOTES

1. THIS DIAGRAM IS BASED ON GENERAL/TYPICAL PUMP DISCHARGE CONTROL VALVE COMPONENTS. CONTRACTOR SHALL VERIFY ALL PUMP DISCHARGE CONTROL VALVE COMPONENT TYPES, CONTROL REQUIREMENTS, AND N.O./N.C. CONTACT TYPES PRIOR TO SUBMITTING SHOP DRAWINGS FOR THIS STARTER TYPE.

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ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
MOTOR CONTROL CENTER ELEVATION & ELEMENTARY DIAGRAM

SHEET 18 OF 25

GNE-3

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ELECTRICAL SPECIFICATIONS

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

A. General Requirements:
1. Carefully examine General Conditions, other specification sections, and other drawings (in addition to Electrical) in order to be fully acquainted with their effect on electrical work.
2. Do all work in compliance with all applicable codes, laws, and ordinances, the National Electrical Safety Code, the National Electrical Code (hereinafter referred to as "Code"), International Building Code (IBC), International Fire Code (IFC) and the regulations of the local utility companies.
3. Obtain and pay for any and all required permits, inspections, certificates of inspections and approval, and the like.
4. Cooperate with other trades and contractors at job. Perform work in such manner and at such times as not to delay work of other trades. Complete all work as soon as the structure and installations of equipment will permit. Patch, in a satisfactory manner and by the proper craft, any work damaged by electrical workmen.
5. Electrical contracting firm shall be licensed as an electrical contractor in the state where work will be performed

B. General Scope of Electrical Work (Refer to drawings for other specific scope items)
1. Furnish all labor and materials to complete electrical work as shown on drawings and/or herein specified.
2. Remove all existing electrical equipment and wiring made obsolete by this project and remove or relocate all electrical services located on or crossing through the project property, either above or below grade, which would obstruct the construction of the project or conflict in any manner with the completed project or any code pertaining thereto. Dispose of salvageable materials as directed by the Architect.
3. Furnish and install complete power, telephone and other electrical services and all electrical systems as shown on drawings and/or specified herein.
4. Pay all electrical utility company service charges (if any) in connection therewith, including permanent meter deposit. Meter deposits will be refunded to Contractor at time of Owner's acceptance.
5. Procure and pay for permits and certificates as required by local and state ordinances and fire underwriter's certificate of inspection.
6. Complete field testing, adjustment & startup of all systems listed above as shown on drawings and/or specified herein.

C. Approved Materials and Devices:
1. Where not otherwise specified, provide only new, standard, first-grade materials throughout, conforming to standards established by Underwriter's Laboratories, Inc., and so marked or labeled, together with manufacturer's brand or trademark. All equipment subject to approval of Architect before installation. All like items and associated equipment shall be of one manufacturer.

D. Submittals:
1. All submittals to the design team shall be accompanied by a letter summarizing all proposed deviations from specified products or pre-approved substitutions. The absence of such a letter shall be understood to indicate that the contractor intends to meet all contract requirements, regardless of cut-sheets/data-sheets provided within the submittal.
2. Submit to Prime Consultant ten (10) days prior to bid date three (3) copies of any items and/or manufacturers which are proposed as substitutes for those specified.
3. Submit to Prime Consultant promptly after award of Contract and prior to purchasing, the number of copies required by the contract. All drawings of a specific item or system shall be made in one submittal, and within thirty (30) days after award of Contract. Shop drawings shall be submitted on all power distribution, lighting and auxiliary systems.
4. The contractor shall fully review, comment upon and correct all shop drawings as required to assure compliance with contract documents prior to submittal to Architect. The failure of the contractor to properly review and correct shop drawings prior to submittal will result in rejection of shop drawings by the engineer. Review by the Architect will be for general conformance with contract documents. The contractor shall be fully responsible for correctness of all submitted dimensions, details, quantities and locations.

E. Site Visit:
1. The Contractor shall visit the site to determine existing dimensions and conditions affecting electrical work. Failure to do so in no way relieves Contractor of his responsibility under Contract.

F. Clearance with Utilities:
1. It shall be the responsibility of this Contractor, prior to bid, to reaffirm with the utility companies involved, that the locations, arrangement (and with power company voltage, phase, and metering required) and connections to utility service are in accordance with their regulations and requirements. If their requirements are at variance with these drawings and specifications, the Contract price shall include any additional cost necessary to meet those requirements without extra cost to Owner after a contract is entered into.
2. Arrange with utility companies for such services as shown or herein specified and installation of meter where shown. Furnish with shop drawings a signed document from utility companies describing the location and type of services to be furnished and any requirements they may have. This document shall be signed for each utility company by a person responsible for granting such service.

G. Workmanship:
1. All work shall be in accordance with the latest editions of NFPA 70 (National Electrical Code), NFPA 101 (Life Safety Code), National Electric Safety Code, International Building Code and the rules and regulations of State and Local Authorities Having Jurisdiction.
2. All work shall be executed in a workmanlike manner and shall present a neat and mechanical appearance upon completion.
3. All items shall be installed straight and plumb in a workmanlike manner and care shall be exercised so that like items are mounted the same position, heights and general location.
4. Keep site clean of accumulation of cartons, trash and debris.

H. Safety
1. The contractor is solely responsible for all job safety. Architect assumes no responsibility for job safety. Maximum consideration shall be given to job safety and only such methods as will reasonably insure the safety of all persons shall be employed. The codes and regulations of OSHA shall be given strict compliance as well as such other codes, laws, and regulations as may be applicable.

I. Contract Documents:
1. Contract documents indicate diagrammatically, extent, general character and approximate location of work. Where work is indicated but minor details omitted, furnish and install it complete so as to perform its intended functions. For details and mechanical equipment, follow drawings provided by other disciplines (Architectural, Mechanical, Structural, Civil, etc.) and fit electrical work thereto.
2. Contract documents consist only of the hardcopy documents issued by the Prime Consultant. Electronic documents issued directly by the electrical engineer to the contractor and/or its sub-contractors/vendors are issued for convenience only (electronic documents are not formal contract documents).
3. Take finish dimensions at job in preference to scaled dimensions.
4. Except as above noted, make no changes in or deviations from work as shown or specified except on written order of Architect.

J. Equipment Storage
1. Store all electrical equipment in dry, covered locations as directed by equipment manufacturers. Contractor shall be responsible for replacing or repairing improperly-stored equipment as directed by Architect.

K. Roof Penetrations:
1. Furnish roof flashing for all equipment installed under Division 16 that penetrates through the roof. Appropriate flashing shall be provided as specified by the roofing supplier and/or architect.

L. Installation of Equipment - General:
1. Care shall be exercised in exact routing and location of all items so as not to obstruct access to equipment, personnel walkways, or expose it to potential mechanical damage.
2. Items shall be securely anchored and/or fastened. All construction shall meet the seismic design requirements of the building code. Items (especially transformers, light fixtures, equipment racks, freestanding gear, etc.) installed in seismic zones C, D, E or F shall be supported and braced per applicable codes and standards.
3. All control cabinets, panels, motor control centers and other electrical cabinets and enclosures shall have all trash removed and be vacuumed clean. All foreign paint, etc., shall be removed from exterior and all scratches in finish touched up with same color and material as original. Any rusted areas shall be sanded, primed and repainted.

M. Circuits and Branch Circuits:
1. Outlets shall be connected to branch circuits as indicated on drawings by circuit numbers. No more outlets than are indicated shall be connected to a circuit.
2. Branch circuit homeruns shall be installed as shown on drawings. Multiple homerun conduits shall not be combined by contractor into larger, single homerun conduits unless specific permission is granted by the Engineer.

N. Lug/Terminal Ratings:
1. All lug/terminal ratings, sizes, locations, types, etc. shall be coordinated with the associated conductor sizes, types, routings, etc. by the contractor.

O. Outlet Locations:
1. Symbols shown on drawings and mounting heights indicated on drawings and in specifications are approximate only. The exact locations and mounting height must be determined on the job and it shall be the Contractor's responsibility to coordinate with other trades to insure correct installation.

P. Acceptance Testing:
1. Upon completion of work, the entire electrical system installed within this project shall be tested and shall be shown to be in perfect working condition, in accordance with the intent of the specifications and drawings. It shall be the responsibility of the Electrical Contractor to have all systems ready for operation and to have an electrician available to operate same in accordance with and under the supervision of the observation representative(s) of the Consultant. The Electrician shall be available to assist in removal of panel fronts, etc., to permit inspection as required.
2. The electrical sub-contractor shall include in bid price start-up assistance and training from a certified representative of the manufacturer for applicable systems.

Q. Operations and Maintenance ("O&M") Data:
1. One set of marked "AS BUILT" drawings, three (3) sets of all equipment catalog and maintenance data and three (3) sets of all final shop drawings, on all equipment requiring same shall be turned over to owner. These items shall be bound in hard back book. Contractor shall explain and demonstrate all systems to Owner's representative.

R. Guarantee-Warranty:
1. Furnish a written Guarantee-Warranty, countersigned and guaranteed by General Contractor, stating:
   a. That all work executed under this section will be free from defects of workmanship and materials for a period of one (1) year from date of final acceptance of this work.
   b. Above parties further agree that they will, at their own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the Guaranty-Warranty.

SECTION 16060 - GROUNDING

A. All equipment, building steel, and main service shall be effectively and permanently grounded with a conductor cross section as required by the National Electrical Code and of capacity sufficient to insure continued effectiveness of the ground connections for fault current. Ground conductors shall be as short and straight as possible, protected from mechanical injury and, if practicable, without splice or joint.

B. All grounding connections shall be installed in accordance with the National Electrical Code and all local codes and requirements. Such codes shall be considered minimum requirements and the installation of the grounding system shall insure freedom from dangerous shock voltage exposure and provide a low impedance ground fault path to permit proper operation of overcurrent and ground fault protective devices.

SECTION 16075 - ELECTRICAL IDENTIFICATION

A. Wiring and Cabling:
1. General:
   a. Where cabling is exposed (such as within cable trays), provide two wire ties per cable (one on either end of marker plate to provide a flush installation). Where cabling is concealed (such as within pullboxes/wireways), one wire tie per cable will be acceptable.
2. Intermediate Locations:
   a. Thermal transfer labels shall be securely fastened to all wiring and cabling in the following locations:
      1) Wireways
      2) Pullboxes/Junction boxes larger than 4-11/16"
      3) Pullboxes/Junction boxes through 4-11/16" where wires and cables are not easily identifiable via the color coding and box labeling
      4) Vaults & Manholes
      5) Approximately every 50 feet within cable trays (especially at locations where cables exit or diverge). Labels within cable trays shall be grouped (rather than being pre-labeled on cables and pulled into cable trays).
      6) Other similar intermediate locations.
   b. Labels shall be stamped or printed with the following data so that the feeder or cable can be readily identified and traced:
      1) From where the circuit originates (including panel designation and circuit number):
         a) Ex: "FROM: PP-A CIR. 3 (IN MAIN ELEC ROOM)"
      2) To where the circuit extends (using the common name of the equipment):
         a) Ex: "TO: RTU-6 (ON ROOF)"
      3) The purpose of the circuit:
         a) Ex: "POWER"
      4) The set number (If parallel power feeds are used).
         a) Ex: "SET NO. 3 OF 4"
3. Circuit/Cable Termination Locations:
   a. Where multiple termination points exist within a circuit origination point (panelboard, switchboard, MCC, starter, etc.) or other similar circuit endpoint (control panel, etc.), labels shall be securely fastened to all ungrounded and neutral conductors to clearly identify the terminal and/or circuit number associated with each conductor. For example, within lighting panels, each phase and neutral conductor shall be labeled near the terminals at a clearly visible location with the associated circuit number(s), so that if all conductors were unterminated, the labels would clearly indicate which conductor was associated with each circuit.

B. Electrical Distribution & Utilization Equipment:
1. General:
   a. All new and existing equipment modified by this project shall include arc-flash warning labels in accordance with NEC article 110.16.
2. All Panels, Motor Control Centers, Switchboards, Switchgear, Transformers, Etc.:
   a. Engraved nameplates identifying name of equipment, nominal voltage and phase of the equipment and where the equipment is fed from shall be installed on front surface of all panels, motor control centers, switchboards, switchgear, transformers, etc.:
      1) Ex: First Line: "NAME: RP-A", Second Line: "120/208V-3Ø-4W", Third Line: "FED FROM: PP-A CIR. 4 (IN MAIN ELEC ROOM)"
   b. Refer to Panelboard Specification Sections for additional labeling requirements (circuit directory cards, permanent circuit labels, permanent circuit numbers, etc.) required inside panelboards.

C. Safety/Disconnect Switches and Utilization Equipment (HVAC Equipment, Control Panels, Starters, Etc.)::
1. Engraved nameplates identifying equipment being fed and where the equipment is fed from shall be installed on front surface of all disconnect switches (including both visible blade type switches and toggle-type switches) and on utilization equipment (where not clearly identified by immediately adjacent local disconnect switch):
   a. Ex: First Line: "RTU-6", Second Line: "FED FROM: PP-A CIR. 5"
2. Where safety/disconnect switches are installed on the load side of variable frequency drives, the safety/disconnect switch shall be furnished with an additional engraved nameplate to read: "WARNING: TURN OFF VFD PRIOR TO OPENING THIS SWITCH".
3. Safety/Disconnect switches feeding equipment that is fed from multiple sources (such as motors with integral overtemperature contacts that are monitored via a control system) and Utilization Equipment fed from multiple sources shall be furnished with an additional BLACK-ON-YELLOW engraved nameplate to read: "WARNING: ASSOCIATED EQUIPMENT FED FROM MULTIPLE SOURCES - DISCONNECT ALL SOURCES PRIOR TO OPENING COVER".

D. Services:
1. All Service Equipment:
   a. Engraved nameplates identifying maximum available fault current, including date the fault current calculation was performed, in accordance with NEC article 110.24.
      1) Ex: First Line: "AVAILABLE FAULT CURRENT: 16,154 AMPS", Second Line: "DATE CALCULATED: JULY 9, 2013"
2. Where a building or structure is supplied by more than one service (or any combination of branch circuits, feeders and services), a permanent plaque or directory shall be installed at each service disconnect location denoting all other services, feeders & branch circuits supplying that building or structure and the area served by each, per NEC requirements.

E. Pullboxes & Junction Boxes:
1. Engraved nameplates identifying name of pullbox/junction box shall be installed on front surface of all pullboxes & junction boxes that are named on contract documents.
2. Front covers of all concealed, non-named pullboxes and junction boxes shall be labeled with permanent black marker the circuits contained:
   a. Ex: "RP-A Cir. 1,2 & 3"

SECTION 16110 - RACEWAYS

A. Minimum Diameter: 3/4-inch.
1. Raceway Type: Raceway types shall be as specified below, unless indicated otherwise on drawings:
   a. Exterior, Exposed: Rigid Aluminum unless otherwise noted.
   b. Exterior, Used for Instrumentation Circuits: See Below.
   c. Other Exterior (Concrete-Encased or Direct Earth Buried): Schedule 40 PVC. PVC conduit shall convert to metallic conduit prior to exiting concrete-encasement or direct earth burial. See "transition" items below for additional requirements. Conduits shall be left exposed until after Engineer's observation.
   d. Interior, Exposed:
      1) Hazardous Locations: Rigid Aluminum .
      2) Wet Locations (including, but not limited to, Pump Rooms, Areas with exposed piping, Dewatering Rooms, Wet Wells, Underground Vaults, and other similar locations): Rigid Aluminum .
      3) Dry Locations: Rigid Aluminum.
      4) Extremely Corrosive Locations (Chlorine Storage Rooms, Fluoride Storage Rooms and other similar areas): Schedule 80 PVC.
2. Raceways used for Instrumentation Circuits:
   a. Typical Dry or Wet Locations: Rigid Aluminum .
   b. Underground or Locations Embedded inside Poured Concrete: PVC-Coated Rigid Steel.
   c. Extremely Corrosive Locations (Chlorine Storage Rooms, Fluoride Storage Rooms and other similar areas): PVC-Coated Rigid Steel.
3. Terminations at motors, transformers and other equipment which has moving or vibrating parts:
   a. Liquidtight Flexible Metallic Conduit (shall generally not exceed 24 inches in length) with watertight fittings.
4. Terminations at instruments:
   a. Liquidtight Flexible Metallic Conduit (shall generally not exceed 12 inches in length) with watertight fittings.
5. Transition from underground or concrete-encased to exposed:
   a. Convert PVC to PVC-Coated Rigid Steel utilizing PVC-Coated Rigid Steel 90 degree bends (and vertical conduits as required by application) prior to exiting concrete/grade (except at outdoor pull boxes and under freestanding electrical equipment, where terminations shall be by PVC end bells installed flush with top of slab). Exposed portions of these coated conduits shall extend a minimum of 6" above floor level, and shall be installed at uniform heights.

B. Raceway installation
1. Follow methods which are appropriate and approved for the location and conditions involved. Where not otherwise shown, specified, or approved in a particular case, run all raceways concealed.
2. Where conduit crosses a structural expansion joint an approved conduit expansion fitting shall be installed.
3. A #10 aluminum pull wire shall be installed in all empty conduits.
4. All metallic conduit installed below grade or within concrete shall be PVC-Coated Rigid Steel.
5. Install ground wire sized per N.E.C. Table 250.122 in all conduits.
6. Conduits shall be sized in accordance with latest National Electrical Code except when size shown on drawings. 1/2-inch conduit shall not contain conductors larger than No. 12 or more than four (4) No. 12 conductors.
7. Exposed, field-cut threads on all metal conduits shall be painted with zinc primer (for Galvanized Rigid or I.M.C.) or urethane paint (for PVC-Coated Rigid Steel) as recommended by conduit manufacturer .

C. Routing/Locating:
1. Exposed conduit runs shall be run level and plumb and shall, on interior of buildings, be run parallel and/or at right angles to building walls and/or partitions.
2. Conduit with an external diameter larger than 1/3 the thickness of a concrete slab shall not be placed in the slab. Conduits in slab shall not be spaced closer than 3 diameters on center.
3. Conduit run in ceiling spaces shall be run as high as possible, all at same level, and shall be supported from building structure. Do not support conduit from any other installation.
4. Install conduit runs to avoid proximity to steam or hot water pipes. In no place shall a conduit be run within 6" of such pipes except where crossing is unavoidable, then conduit shall be kept at least 3" from the covering of the pipe crossed.
5. Before installing raceways for motors, HVAC equipment and other fixed equipment, check location of all equipment connections/terminal boxes with equipment supplier and locate and arrange raceways appropriately.
6. A minimum of 12" of clearance shall be provided between the finished lines of exterior, underground conduit runs and exterior, underground utilities (gas, water, sewer, etc.).

D. Bends:
1. Do not make bends (in any raceway, including flexible conduits) that exceed allowable conductor bending radius of cable to be installed or that significantly restrict conductor flexibility.
2. All bends within concrete-encased ductbanks installed in exterior locations shall be long radius bends (24" minimum bending radius - varies with conduit diameter).
3. Where numerous exposed bends or grouped together, all bends shall be parallel, with same center and shall be similar in appearance
4. All PVC elbows, bends, etc., shall be either factory bends or made with an approved heat bender.

E. Support:
1. Anchor conduit securely in place by means of approved conduit clamps, hangers, supports and fastenings. Arrangement and methods of fastening all conduits shall be subject to Engineer's direction and approval. All conduits shall be rigidly supported (wire supports may not be used in any location). Use only approved clamps on exposed conduit.
2. Raceways installed on top of flat roofing shall be supported a minimum of 3 ½" above roof with rubber block supports (Cooper B-Line Dura-Blok or equal). Installation shall be in strict accordance with support manufacturer's instructions and recommendations.
3. All supports, hardware, etc. shall be of corrosion-resistant stainless steel materials.

F. Terminations:
1. All conduit connections to sheet metal cabinets or enclosures located in exterior or wet locations shall terminate by use of rain tight hubs.
2. Where rigid or I.M.C. conduits enter sheet metal boxes, they shall be secured by approved lock nuts and bushings.
3. Where metal conduits enter outdoor pull boxes, manholes, under freestanding electrical equipment or other locations where direct metal-to-metal contact does not exist between enclosure and conduit, grounding bushings shall be installed. Each grounding bushing shall be connected to the enclosure ground and all other grounding bushings with properly sized grounding conductors.
4. Where PVC enters outdoor pull boxes, manholes or under freestanding electrical equipment, PVC end bells shall be installed.
5. Conduit ends shall be carefully plugged during construction.
6. Permanent, removable caps or plugs shall be installed on each end of all empty raceways with fittings listed to prevent water and other foreign matter from entering the conduit system.

G. Penetrations:
1. All fire barrier penetrations shall be made in accordance with a U.L. listed assembly. Refer to drawings and other specifications for additional requirements.
2. All penetrations shall be at right angles unless shown otherwise.
3. Structural members (including footings and beams) shall not be notched or penetrated for the installation of electrical raceways unless noted otherwise without specific approval of the structural engineer.
4. Dry-packed non-shrink grout or watertight seal devices shall be used to seal openings around conduits at all penetrations through concrete walls, ceilings or aboveground floors.
5. All raceways entering structures shall be sealed (at the first box or outlet) with polyurethane grout compound that expands to form a flexible foam seal that prevents the entrance of gases or liquids from one area to another (Prime Resins Prime-Flex or equal).

H. Underground electrical raceways shall be installed to meet the minimum cover requirements listed in NEC Table 300.5. Refer to drawings for more stringent requirements.

SECTION 16120 - WIRES AND CABLES

A. General: Conductors shall have current carrying capacities as per N.E.C. and with 600 volt insulation, #12 minimum except for controls and fixture wire. Conductors shall be copper.

B. General Application (see below for exceptions):
1. #8 or larger conductors and ALL motor power conductors (unless noted otherwise): XHHW or RHH/RHW/USE stranded.
2. #10 or smaller conductors (excluding circuits terminating at motors): THHN/THWN or XHHW solid.

C. General Installation:
1. All wires and cables shall be installed in conduit unless specifically noted otherwise.
2. All joints and splices on wire shall be made with solderless connectors, and covered so that insulation is equal to conductor insulation.
3. No splices shall be pulled into conduit.
4. No conductor shall be pulled until conduit is cleaned of all foreign matter.
5. Wire and cable shall be neatly formed, bundled and tied in all panelboards, wireways, disconnect switches, pullboxes, junction boxes, cabinets and other similar electrical enclosures.
6. All wires and cables installed in underground or other wet locations shall be rated by the manufacturer for wet locations.
7. Network cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

D. Low Voltage Cabling:
1. All low voltage wires and cables shall be installed in conduit unless specifically noted otherwise. Low voltage control and/or network cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:
   a. Cabling shall be plenum-rated, multi-conductor.
   b. Cabling shall be supported with J-hook supports on intervals not to exceed 5'-0" on center. Cabling shall be supported solely from the j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
   c. Cabling shall be properly bundled with plenum-rated Velcro straps on intervals not to exceed 30" on center.
   d. Properly-sized conduit(s) shall be provided wherever cabling enters an inaccessible or exposed area. End bushings shall be provided on both ends of all raceway terminations.

E. A color coding system shall be followed throughout the network of branch power circuits, identifying unique colors for Phase A, Phase B & Phase C, Common Neutral (Shared between phases), Neutral A, Neutral B, Neutral C, and Ground per NEC requirements and standard local conventions.

SECTION 16130 - OUTLET BOXES, JUNCTION BOXES & WIREWAYS

A. All boxes and wireways shall be of sufficient size to provide free space for all enclosed conductors per NEC requirements. Fill calculations shall be performed by contractor per NEC requirements.

B. All boxes installed exposed in exterior or wet areas shall be stainless steel (NEMA 4X).

C. All others shall be oil tight JIC box not less than 16 gauge.

SECTION 16140 - WIRING DEVICES

A. Switches shall be AC type, extra-heavy duty industrial grade (unless otherwise shown) of ratings shown on drawings. Switches shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

B. Receptacles shall have blade configuration and shall be extra-heavy duty industrial grade (unless otherwise shown) of current and voltage rating as shown on drawings. Receptacles shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

C. All wiring devices (switches, receptacles, etc.) shall be colored to match the coverplates described below. For instance, all items covered by stainless steel, aluminum or malleable iron plates shall be gray in color.

D. Coverplates for exposed electrical items (switches, receptacles, telephone outlets, etc.) shall be of same material as exposed boxes (see Outlet Box Specification for required material type) and shall have beveled edges.

E. Coverplates for receptacles in wet locations shall be metallic, in-use type, rated for wet locations per NEC requirements.

F. Symbols on drawings and mounting heights are approximate. The exact locations and mounting heights shall be determined on the job, and it shall be the Contractor's responsibility to coordinate with all trades to secure correct installation. For example, Contractor shall coordinate exact mounting heights over counters, in or above backsplashes, in block walls, and at other specific construction features.

G. Devices and associated plates shall not be used as support; outlet boxes shall be rigidly supported from structural members.

H. Mount all straight-blade receptacles vertically with ground pole up (unless specifically noted otherwise).

I. Unless otherwise shown or required by local handicap codes, outlet boxes shall be the following distances above the finished floor unless otherwise noted.
1. Receptacles and telephone outlets in offices and other finished areas: 1'-6" to the center of the box.
2. Receptacles and telephone outlets in equipment rooms and other unfinished areas: 4'-0" to the center of the box.
3. Receptacles over counters: As Noted
4. Switches, general: 4'-0" to the top of the box.
5. Push-button, etc., general: 4'-0" to the top of the box.

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CONSTRUCTION PLANS FOR:
TALLADEGA MAIN WWTP PUMP UPGRADES
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PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
ELECTRICAL SPECIFICATIONS

SHEET 19 OF 25

GNE-4

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SECTION 16269 - VARIABLE FREQUENCY DRIVES

A. GENERAL
1. SCOPE OF WORK
   a. This section provides specification requirements for adjustable frequency drives, variable speed drives or herein identified as VFD's.
   b. The manufacturer shall furnish, field test, adjust and certify all installed VFD's for satisfactory operation.
   c. Any exceptions or deviations to this specification shall be indicated in writing and submitted to the engineer for approval a minimum of ten (10) days prior to bid.
2. REFERENCES
   1) ANSI®/NFPA® 70 - National Electrical Code® (NEC®)
   2) CSA® C22.2 No. 14-M91 - Industrial Control Equipment
   b. IEC 61000 - Electromagnetic Compatibility
   c. NEMA 250 Enclosures for Electrical Equipment
   d. NEMA ICS7 - Industrial Control and Systems Adjustable Speed Drives
   e. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection Installation and Operation of Adjustable Speed Drives
      1) UL® 50 - Enclosures for Electrical Equipment
   f. UL 98 - Disconnect Switches
   g. UL 507 - Electric Fans
   h. UL 508 - Industrial Control Equipment
   i. UL 508C - Power Conversion Equipment
   j. UL 991 - Safety Tests for Safety Related Controls employing Solid State Devices
      1) OSHA® 1910.95 - VFD Controller Acoustical Noise
3. QUALITY ASSURANCE
   a. The manufacturer of the VFD shall be a certified ISO 9001 facility.
   b. The VFD and all associated optional equipment shall be UL Listed according to UL508C Power Conversion Equipment. A UL label shall be attached inside each enclosure as verification.
   c. The VFD shall be designed constructed and tested in accordance with UL, CSA, NEMA and NEC standards.
   d. Quality Assurance documentation shall be furnished to verify successful completion upon written request of the engineer.
4. Submittals
   a. Submittals shall be furnished in accordance with Specification Section 16050.
   b. Provide the following for each VFD:
      1) A job-specific, custom wiring diagram
         a) The wiring diagram shall clearly show all control components connected to the starter (whether the components are mounted internal or external to the VFD enclosure).
         b) All wires and terminal blocks shall be clearly labeled.
         c) Diagram shall be in accordance with NEMA/ICS standards.
      2) Size, type and rating of all system components.
      3) Enclosure frontal elevation and dimension drawings.
      4) Internal component layout diagrams.
      5) Available conduit entry and exit locations.
      6) Manufacturer's product data sheets for all components.
   c. Standard catalog sheets showing voltage, horsepower, maximum current ratings and recommended replacement parts with part numbers shall be furnished for each different horsepower rated VFD shall be provided.
5. WARRANTY
   a. An 18-month parts warranty shall be provided on materials and workmanship from the date of owner acceptance/substantial completion after completion of startup.

B. PRODUCT
1. MANUFACTURERS
   a. The VFD equipment shall be:
      1) Square 'D', Eaton/Cutler Hammer, or ABB
      2) Or pre-approved equal meeting the detailed requirements of this specification. Note that all "named" Manufacturers are obligated to meet the detailed requirements of this specification. Any proposed exceptions shall be clearly stated at bid time, citing the reason for noncompliance, and the cost for providing a conforming product. Failure to provide a detailed list of proposed exceptions may cause a bid to be deemed non-responsive. The Engineer will be the sole determiner of the acceptability of a proposed exception.
   b. Alternate control techniques other than pulse width modulated (PWM) are not acceptable.
2. GENERAL DESCRIPTION
   a. The VFD shall convert the input AC mains power to an adjustable frequency and voltage as defined below and indicated on the drawings or motor control schedules.
      1) The VFD manufacturer shall supply a Low Harmonic Active-Front-End drive design equal to Square D Altivar ATV680, with the following characteristics:
         a) The VFD shall be a 3-level Active Front End (AFE) AC drive that is designed to comply with standard IEEE 519-2014 when installed in a system that is already in compliance with the standard. A 3-level design shall be used to provide a low harmonic current load to the power system and to avoid introducing additional common mode noise to the motor. Passive harmonic filters shall be acceptable for motors less then 150hp in size provided the TDD is shown to be less than limits established by IEE 519-2014. The 2-level type design shall not be acceptable due to the additional common mode noise output from the VFD to the motor. Input THDi of less than 5% at 80% load.
         b) "Stop and Go" function to de-energize active front end while not in use to reduce energy consumption and to provide isolation in standby mode
         c) Embedded power measurement and energy dashboard
         d) Performance Drift Monitoring
         e) The power section shall be insensitive to phase rotation of the AC line.
   b. The output power section shall convert fixed DC voltage to adjustable frequency AC voltage. This section shall use insulated gate bipolar transistors (IGBT) or intelligent power modules (IPM) as required by the current rating of the motor.
   c. The VFD shall be furnished with a long lead motor protection RCL filter system to reduce peak voltage spike conditions at the motor terminals. Filters shall be MTE Series A dV/dT Filters, TCI V1K filter or equal, with amperage rating equal to, or exceeding, that of the corresponding VFD. The exact filter type and ratings shall be selected to coordinate with the proposed VFD and the associated frequency range.
3. CONSTRUCTION
   a. Refer to Specification Section 16480 (Manufactured Control Panels) as applicable for additional requirements (for enclosure, component types, etc.).
   b. The VFD shall be provided complete with a main circuit breaker disconnect means for Type 1 short circuit overcurrent protection as follows:
      1) Short circuit withstand rating shall be equal to or greater than the AIC rating listed on the plans for the distribution equipment (motor control center, panelboard, switchboard, etc.) that feeds the VFD.
      2) Where the VFD installed within a motor control center, refer to Motor Control Centers Specification Section 16443.
      3) Sized by manufacturer per NEC requirements for corresponding motor load.
   c. A mechanical interlock shall prevent an operator from opening the VFD door when the disconnect is in the on position. Another mechanical interlock shall prevent an operator from placing the disconnect in the on position while the VFD door is open. It shall be possible for authorized personnel to defeat these interlocks.
   d. Provisions shall be provided for locking all disconnects in the off position with up to three padlocks.
   e. Provisions shall be made for accepting a padlock to lock the enclosure door.
   f. A seismic qualification label shall be provided for all wall and floor mount units to comply with the latest IBC and NFPA 5000 guidelines.
4. MOTOR DATA
   a. Each VFD shall be sized to operate the AC motors defined to match load schedules and other specification documents as follows:
      1) Motor Horsepower and voltage rating(s) - See electrical drawings and schedules.
      2) Minimum full load amperage rating of VFD - See electrical drawings and schedules.
      3) Motor full load amperes, RPM and service factor ratings - See individual motor specification documents.
   b. The VFD manufacturer shall be responsible for verifying each exact motor amperage, horsepower, voltage, RPM and service factor with motor equipment supplier prior to submitting shop drawings.
5. APPLICATION DATA
   a. The VFD shall be sized to operate either a Variable Torque or Constant Torque load (unless specifically stated otherwise on drawings). The exact load type shall be as determined by the motor supplier and shall be coordinated by the VFD supplier prior to submitting shop drawings.
   b. The speed range shall be from a minimum speed of 0.1Hertz to a maximum speed of 60 Hertz.
6. ENVIRONMENTAL RATINGS
   a. The VFD shall meet IEC 60664-1 and NEMA ICS-1 Annex A standards.
   b. The VFD itself shall be designed to operate without derating in an ambient temperature from 0 to + 40 degrees C (+32 to 104 degrees F). Where temperatures exceed these limitations, the VFD manufacturer shall properly derate the unit as required and shall clearly submit this derating calculation with the submittal package. See Specification Section 16480 (Manufactured Control Panels) as applicable for additional requirements (for thermal controls required within VFD outer enclosures).
   c. The storage temperature range shall be -25 to +65 degrees C (-13 to +149 degrees F).
   d. The maximum relative humidity shall be 95 percent at 40 degrees C non-condensing or dripping water conforming to IEC 60068-2-3.
   e. The VFD shall be rated to operate at altitudes less than or equal to 3,300 feet (1000 meters) without derating. For altitudes above 3,300 feet, de-rating factors shall apply by the manufacturer.
   f. The VFD shall conform to IEC 600721-3-3-3M3 amplitude for Operational Vibration Specifications.
7. ELECTRICAL RATINGS
   a. The VFD shall be designed to operate from the rated input voltage plus or minus 10 percent.
   b. The VFD shall operate from an input voltage frequency range of 57 to 63 Hertz.
   c. The displacement power factor shall not be less than 0.95 lagging under any speed or load condition.
   d. The efficiency of the VFD at 100 percent speed and load shall not be less than 96 percent.
   e. The VFD unit amperage shall be the greater of the following:
      1) 110% of the NEC amperage rating associated with the horsepower rating shown on the plans (for constant torque loads).
      2) 100% of the unit amperage rating shown on the plans (for constant torque loads).
   f. The rated VFD overcurrent capacity shall be 150 percent of the constant torque rating (or 110 percent of the variable torque rating where applicable) for one minute.
   g. The VFD shall have a coordinated short circuit rating equal to or in excess of the minimum value listed on the piece of distribution equipment that feeds the VFD. When a power distribution system electrical study (including short circuit study, etc.) is a part of the project, contractor shall further verify that all proposed equipment is properly rated (per the results of the study) prior to submitting shop drawings. This rating shall be listed on the nameplate.
   h. The output carrier frequency of the VFD shall be randomly modulated depending on Drive rating for low noise operation. No VFD with an operable carrier frequency above 10 kHz shall be allowed.
   i. The output frequency shall be from 0.1 to 200 Hertz.
   j. The VFD shall be able to develop rated motor torque at 0.5 Hertz (60 Hertz base) in a sensorless flux vector (SVC) mode using a standard induction motor without an encoder feedback signal.
8. PROTECTION
   a. Upon power-up shall automatically test for valid operation of memory, option module, loss of analog reference input, loss of communication, dynamic brake failure, DC to DC power supply, control power and the pre-charge circuit.
   b. Protection against short circuits, between output phases and ground; and the logic and analog outputs.
   c. Minimum AC undervoltage power loss ride-through of 200 milliseconds. The VFD shall have the user-defined option of frequency fold-back to allow motor torque production to continue to increase the duration of the powerloss ride-through.
   d. Selectable ride through function that shall allow the logic to maintain control for a minimum of one second without faulting.
   e. For a fault condition other than a ground fault, short circuit or internal fault, an auto restart function shall provide programmable restart attempts. The programmable time delay before restart attempts shall be unlimited.
   f. Deceleration mode programmable for normal and fault conditions. The stop modes shall include free-wheel stop, fast stop and DC injection braking.
   g. Upon loss of the analog process follower reference signal, shall fault and/or operate at a user-defined speed set between software programmed low-speed and high-speed settings.
      1) Solid state I^2t protection that is UL Listed and meets UL 508C as a Class 10 overload protection and meets IEC 60947. The minimum adjustment range shall be from 20 to 150 percent of the nominal output current rating of the VFD.
   h. Thermal switch with a user selectable pre-alarm that shall provide a minimum of 60 seconds delay before overtemperature fault.
   i. Use bonded fin heatsink construction for maximum heat transfer.
   j. Fold-back function that shall automatically anticipate a controller overload condition and fold back the frequency to avoid a fault condition.
   k. The output frequency shall be software enabled to fold back when the motor is overloaded.
   l. There shall be three skip frequency ranges with hysteresis adjustment that can each be programmed independently, back to back or overlapping.
9. ADJUSTMENTS AND CONFIGURATIONS
   a. The VFD shall self-configure to the main operating supply voltage and frequency. No operator adjustments shall be required.
   b. Upon power-up, automatically send a signal to the connected motor. The stator resistance data shall be measured at rated current. The VFD shall automatically optimize the operating characteristics according to the stored data.
   c. The VFD shall be factory pre-set to operate most common applications.
   d. A choice of four types of acceleration and deceleration ramps shall be available in the VFD software; linear, S curve, U curve and custom.
   e. The acceleration and deceleration ramp times shall be adjustable from 0.01 to 3,200 seconds.
   f. The volts per frequency ratios shall be user selectable to meet variable torque loads, normal and high-torque machine applications.
   g. The exact acceleration ramp time/type, current limitation, overload protection type and motor current shall be set in the field by the startup technician prior to equipment startup as recommended/approved by the motor supplier.
   h. The memory shall retain and record run status and fault type of the past eight faults.
   i. Slip compensation shall be adjustable from 0 to 150%.
   j. The software shall have an "Energy Saving" function that shall reduce the voltage to the motor when selected for variable torque loads. A constant volts/Hertz ratio shall be maintained during acceleration. The output voltage shall then automatically adjust to meet the torque requirement of the load.
   k. The VFD shall offer programmable DC injection braking that shall brake the AC motor by injecting DC current and creating a stationary magnetic pole in the stator. The level of current shall be adjustable between 10 and 110 percent of rated current and available from 0.1 to 30 seconds continuously. For continuous operation after 30 seconds, the current shall be automatically reduced to 50 percent of the nameplate current of the motor.
   l. Sequencing logic shall coordinate the engage and release thresholds and time delays for the sequencing of the VFD output, mechanical actuation and DC injection braking in order to accomplish smooth starting and stopping of a mechanical process.
   m. The VFD shall offer a programmable "Deragging" feature (to allow the drive to cycle the motor forward and reverse for a few cycles to clear a pump of rags). This feature shall only be used where requested by the civil engineer or owner in the construction phase, or where required by the application. All programming shall be provided by the factory-trained startup personnel, to engineer's and owner's satisfaction.
10. GRAPHIC TERMINAL DISPLAY INTERFACE
   a. The graphic display terminal shall provide 8 lines of 240 by 160 pixels in plain English to control, adjust and configure the VFD. All electrical values, bar charts, configuration parameters, I/O assignments, application and activity function access, faults, local control, adjustment storage, self-test and diagnostics. There shall be a standard selection of six additional languages built-in to the operating software as standard.
   b. The VFD model number, torque type, software revision number, horsepower, output current, motor frequency and motor voltage shall all be listed on the drive identification display as viewed on the graphic display terminal.
   c. As a minimum the selectable outputs shall consist of speed reference, output frequency, output current, motor torque, output power, output voltage, line voltage, DC voltage, motor thermal state, drive thermal state, elapsed time, motor speed, machine speed reference and machine speed.
   d. The graphic display terminal shall consist of programmable function keys. The functions shall allow both operating commands and programming options to be preset by the operator. A hardware selector switch shall allow the graphic display terminal to be locked out from unauthorized personnel.
   e. The graphic display terminal shall offer a simply smart to advanced user menu consisting of parameter setting, I/O map, fault history, and drive configuration. A software lock shall limit access to the main menu.
   f. The navigation wheel shall provide the ability to scroll through menus and screens, select or activate functions or increase the value of a selected parameter.
   g. An escape key shall allow a parameter to return the existing value if adjustment is not required and the value is displayed. The escape function shall also return to a previous menu display.
   h. A RUN key and a STOP key shall command a normal starting and stopping as programmed when the VFD is in keypad control mode. The STOP key shall be active in all control modes.
      1) A user interface shall be available that is a WINDOWS® based personal computer, serial communication link or detachable graphic terminal display.
   i. The keypad and all door mounted controls shall be Type 12 rated.
11. CONTROL
   a. External pilot devices shall be able to be connected to a terminal strip for starting/stopping the VFD, speed control and displaying operating status. All control inputs and outputs shall be software assignable.
   b. 2-wire or 3-wire control strategy shall be defined within the software. 2-wire control allows automatic restart of the VFD without operator intervention after a fault or loss of power. 3-wire control requires operator intervention to restart the VFD after a fault or loss of power.
   c. The internal power supply shall incorporate an automatic current fold-back that protects the internal power supply if incorrectly connected or shorted. The transistor logic outputs shall be current limited and shall not be damaged if shorted or excess current is pulled. See below for external power supply requirements.
   d. All logic connections shall be furnished on pull apart terminal strips.
   e. There shall be (2) two software assignable analog inputs with interference filtering. The analog inputs shall be software selectable and consisting of user defined configurations: 4-20 mA or 0-10 V.
   f. There shall be five software assignable logic inputs that shall be selected and assigned in the software. The selection of assignments shall consist of forward, reverse, jog, plus/minus speed (2 inputs required), setpoint memory, preset speeds (up to 8 inputs), auto/manual control, controlled stop, terminal or keypad control, output contactor when applicable (2 inputs required), motor switching, and fault reset.
   g. There shall be a minimum of two (2) software assignable analog outputs with interference filtering (see plans for additional requirements). The analog outputs can be selected and assigned in the software. The analog output assignments shall be proportional to the following motor characteristics: frequency, current, power torque, voltage and thermal state. The output signal shall be user defined configurations: 4-20 mA or 0-10 V.
   h. A minimum of two voltage-free Form C relay output contacts shall be provided. One of the contacts shall indicate VFD fault status. The other contact shall be user assignable. Refer to plans for additional requirements.
   i. There shall be a hardware input/output extension module available that also provides interlocking and sequencing capabilities. The module shall be fully isolated and housed in a finger-safe enclosure with pull apart terminal strips. The module shall add logic inputs, analog inputs, relay outputs, and analog outputs as required by wiring diagrams shown on plans. All of the I/O shall be user assignable in the software as previously defined.
   j. The VFD shall have a control power source from the 120V CPT.
   k. The peripheral VFD control circuitry shall be operated at 120 Vac 60 Hz from a control power transformer included within the enclosure.
   l. Operator devices shall be door mounted, functions/types as shown on drawings.
   m. All operator devices shall be remote-mounted using supplied 120 Vac control logic. Clearly labeled terminals shall be provided for field installation.
   n. All wiring shall be clearly identified on each end to match the wiring diagram(s) provided with the VFD.
   o. Refer to Specification Section 16443 (Motor Control Centers) or Specification Section 16480 (Manufactured Control Panels) as applicable for all operator device and control component requirements (for pushbuttons, indicator lights, selector switches, relays, control wiring, etc).
12. COMMUNICATIONS
   a. The VFD shall be able to be connected to communication network type(s) as indicated on plans or required by the SCADA Integrator (exact network/protocol type(s) required shall be as directed by the facility SCADA Integrator). Where no specific network connections are specified on plans or required by the SCADA Integrator, the VFD shall be provided with at least one of the following network communication options:
      a) Ethernet TCP/IP
      b) Ethernet IP
   b. The communication shall be able to provide access to the control, to the adjustment and to the supervision of the VFD.
   c. No additional compensation will be granted to provide gateways, network components, etc. to properly communicate with the facility SCADA system. Equipment supplier is responsible for verifying all network connection requirements with the SCADA Integrator prior to bid.
13. Isolation Contactor
   a. Where specified on plans/schedules/etc., an IEC or NEMA-rated isolation contactor shall be provided that opens when the motor is stopped or when the VFD detects a fault condition.
   b. The isolation contactor shall be located on the line side of the associated VFD.
   c. When an input isolation contactor is provided, the 120V CPT shall be powered from upstream of the input isolation contactor such that 120V controls and control power to the VFD are maintained when the input isolation contactor is opened.
14. Input Surge Protection
   a. Each drive that does not have an upstream isolation contactor, and is not mounted within an MCC that has its own main bus surge protection shall be provided with a 3-phase, line-side surge protection device rated 80kA (per phase) or greater. The lead length between the surge protection device and the drive terminals shall be 12" or less. The surge protection device shall be designed / located / isolated such as to prevent / limit potential physical damage to other components within the enclosure if the surge protection device fails.

C. EXECUTION
1. TESTING
   a. All incoming material shall be inspected and/or tested for conformance to quality assurance specifications.
   b. All subassemblies shall be inspected and/or tested for conformance to quality assurance specifications.
   c. Each completed unit shall be functionally tested prior to shipment to assure conformance to the specifications.
2. DELIVERY, STORAGE AND HANDLING
   a. Handling and shipment of the equipment shall be in such a manner to prevent internal component damage, breakage, and denting and scoring of the enclosure finish.
   b. Equipment shall be stored indoors in a clean, dry environment as directed by the equipment supplier. Energize anti-condensation space heaters if so required.
   c. Verify that the location is ready to receive work and the dimensions are as indicated.
   d. Do not install VFD equipment until the building environment can be maintained within the service conditions required by the manufacturer.
3. INSTALLATION
   a. Installation shall comply with manufacturer's instructions, drawings and recommendations.
   b. A job-specific, custom wiring diagram for each VFD unit shall be provided to the contractor prior to installation for making the appropriate electrical connections. The wiring diagram shall clearly show all control components connected to the VFD (whether the components are mounted internal or external to the VFD enclosure). All wires and terminal blocks shall be clearly labeled. A laminated copy of the final wiring diagram for each unit shall be installed inside the door of the associated unit.
   c. Operations and Maintenance Manuals shall be provided to the owner for all VFD components, control wiring, etc.
   d. Operations and Maintenance Manuals shall include hardcopy printouts of all device settings and programming.
   e. For safety, reliability, and continuity of warranty, any modifications, alterations, etc. required to conform to the requirements of this specification shall be performed by the VFD manufacturer only. Distributor modifications, third party packaging, etc. of a manufacturer's standard product are specifically disallowed.
4. Start-up and TRAINING
   a. The services of a qualified manufacturer's service representative shall be provided to install, test, and start up all VFD's furnished under this specification. The schedule of the startup(s) shall be determined by the contractor.
   b. Services shall include a minimum of eight (8) hours of field/classroom training for owner's personnel on routine operation and maintenance of the specified units.
5. SPARE PARTS
   a. The following spare parts shall be provided at no extra cost to the Owner:
      1) One of each type and size of control fuse.
      2) Three of each type and size of power fuse.

SECTION 16289 - SURGE PROTECTIVE DEVICES

A. Manufacturer:
1. Integral Devices: Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.), or by Surge Suppression Inc. if all of the performance of this specification are met and all UL listing of the equipment manufacturer are met.
2. External Devices (where specifically specified on plans): Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.) or Surge Suppression Inc.

B. Each Surge Protective Device shall:
1. Be internal to the associated distribution equipment (without violating any applicable UL listings) unless specifically shown otherwise on plans.
2. Be UL 1449 3rd edition listed.
3. Have short-circuit current rating complying with UL 1449 3rd edition, that matches or exceeds the short-circuit rating of the associated distribution equipment.
4. Be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.
5. Have fuses, rated at 200-kA interrupting capacity.
6. Have a minimum UL 1449 Nominal Discharge Current (I_n) Rating of 20kA.

C. The SPD system manufacturer shall warranty the entire SPD system against defective materials and workmanship for a period of ten (10) years from the date of substantial completion. This warranty is in effect as long as the unit is installed in compliance with the manufacturer's installation, operation, and maintenance manual, UL Listing requirements, and any applicable national or local electrical codes.

SECTION 16410 - SAFETY SWITCHES AND FUSES

A. Safety switches shall be quick-make, quick-break, NEMA heavy duty type HD, fused or nonfused as shown. Switch blades shall be fully visible in the off position.
B. Fused switches shall have provisions for class R, rejection type fuses.
C. Safety switches shall be as manufactured by Square 'D', G.E., Siemens or Cutler Hammer.
D. Locations shown for safety switches on plans are diagrammatical only. Exact locations shall be field coordinated by contractor as required to provide code-required clearances.
E. Switch enclosures shall be rated NEMA I indoors in dry locations and NEMA 4X SS outdoors and in wet areas.
F. Adequate support shall be provided for mounting safety switches. Safety switches shall not be mounted to the associated equipment (unless the safety switch is furnished with the equipment).
G. Service entrance switches shall be provided with barrier such that no uninsulated, ungrounded service busbar or service terminal is exposed to accidental contact.
H. Fuses shall be sized as shown on drawings, unless a smaller size is required by the associated equipment supplier, in which case the contractor shall provide fuses sized as directed by the associated equipment supplier at no additional cost.
I. Provide not less than one spare set of fuses for each size used. Provide an additional spare set for each five sets of same size fuses used.

SECTION 16442 - POWER AND LIGHTING PANELBOARDS

A. Enclosure:
1. Panelboards shall be dead front type and shall be in accordance with Underwriter's Laboratories, Inc., standard of panelboards and enclosing cabinets and so labeled.
2. A metal framed circuit directory card holder with clear plastic covering shall be factory-mounted on the inside of door.
3. For lighting panelboards, provide hinged trim with piano-hinge down full length of one side to allow access to wiring without complete removal of outer trim.
4. Each section of multi-section panelboards shall be of matching heights and depths.

B. Bussing/Lugs:
1. All bussing and associated connectors shall be tin-plated aluminum or tin-plated copper.
2. All panelboards shall contain ground buss.
3. Top/bottom feed arrangement and lug sizes/quantities shall be coordinated by the contractor.
4. Entire panelboard assembly, including all bussing, shall have SCCR ratings meeting or exceeding the minimum AIC ratings listed on the plans for the panel. All ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.
5. Service entrance panelboards shall be provided with barrier such that no uninsulated, ungrounded service busbar or service terminal is exposed to accidental contact.

C. Breaker arrangement and numbering:
1. Breaker numbers shall be permanently attached to trim.
2. Breakers shall be arranged exactly as indicated on plans.

D. Panelboards installed in exterior or wet locations shall have NEMA 4X SS enclosures.
E. Panelboards shall be as manufactured by Square 'D', G.E., Siemens or Cutler Hammer.
F. All panelboard dimensions and clearances shall be carefully checked and coordinated with the proper trades to insure proper mounting space and support prior to roughing in equipment. In no case shall any circuit breaker be located above 6'-7" A.F.F..
G. Wiring in panelboard wireways shall be done in a neat and workmanlike manner. Wiring shall be grouped into neat bundles and secured with approved tie wraps.

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CONSTRUCTION PLANS FOR:
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PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
ELECTRICAL SPECIFICATIONS

SHEET 20 OF 25

GNE-5

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SECTION 16480 - MANUFACTURED CONTROL PANELS

A. General
1. Scope
   a. This section describes control stations, PLC panels, motor control panels, manufactured control panels, and other similar panels specified herein. Specifications herein are intended as an extension of requirements in other Divisions of these specifications where reference is made to Electrical Specifications.
2. Definitions
   a. “Control Stations”: Enclosures (with all required accessories) containing only door-mounted pushbuttons, indicator lights and/or selector switches (no electronic components or starter/controller equipment).
   b. “Control Panels”: Enclosures (with all required accessories) containing equipment/devices other than door-mounted pushbuttons, indicator lights and/or selector switches (such as electronic components, starter/controller equipment, etc.).
3. Submittals
   a. Provide the following for each control panel:
      1) A job-specific, custom wiring diagram
         a) The wiring diagram shall clearly show all components (whether the components are mounted internal or external to the control panel enclosure).
         b) All wires and terminal blocks shall be clearly labeled.
         c) Diagram shall be in accordance with NEMA/ICS standards.
      2) Size, type and rating of all system components.
      3) Unit frontal elevation and dimension drawings.
      4) Internal component layout diagrams.
      5) Manufacturer's product data sheets for all components.
   b. A Bill of Materials shall be included with catalog information on all components.
   c. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.
   d. The following calculations shall be submitted:
      1) Thermal calculations showing amount of panel cooling/ventilating/heating required for each control panel, per ambient requirements listed below and operating temperature limitations of all equipment/devices within each control panel. See Part 2 below for requirements for forced air ventilation rather than air conditioning. Panel shall be oversized, interior equipment/devices shall be derated, and solar shielding shall be provided, etc, as required to allow the use of forced air ventilation as the cooling method. Air conditioning, ventilation, and/or heating equipment shall each have ratings/capacities at least 20% larger than required by calculations below unless noted otherwise:
         a) Thermal calculations used for sizing cooling/ventilation systems for each control panel located in exterior or non-conditioned spaces shall assume:
            (1) Ambient exterior air temperature ranges of -5 degrees F to 115 degrees F.
            (2) Full solar contact where applicable (not applicable where enclosures are fully protected from solar contact using solar shields separated from panel enclosure with standoffs or similar).
            (3) No wind.
            (4) Heat loss from interior equipment (electronics, etc.) per equipment supplier's information.
         b) Thermal calculations used for sizing heating systems for each control panel shall assume:
            (1) Ambient exterior air temperature ranges of -5 degrees F to 115 degrees F.
            (2) No heat loss by interior components of control panel.
            (3) No solar gain on exterior of control panel.
            (4) Doubling of heating wattage required to account for wind where control panels are located outdoors.
            (5) Minimum temperature difference (due to heating) of 10 degrees F to prevent condensation, regardless of equipment temperature limitations.
      2) Load calculations showing the sizing of all power supplies provided (with spare capacity as specified). Power supplies shall each have ratings/capacities at least 20% larger than required by load calculations unless noted otherwise.
      3) Load calculations showing the sizing and anticipated runtime of all Uninterruptible Power Supply systems provided (with spare capacity as specified).

B. Products
1. General
   a. Control panels shall be Underwriters' Laboratories labeled by the panel manufacturer. Control panel manufacturers not capable of applying the U.L. label to their products are unacceptable.
   b. All human interface equipment/devices (indicator lights, selector switches, pushbuttons, time switches, displays, keypads, and other similar items used for control, adjustments or monitoring) shall be mounted on the non-energized side of enclosure door(s) in such a way as to be accessible without exposing the user to energized parts.
2. Ratings
   a. All Control Panels shall have short circuit current ratings at least equal to the lesser of the following, unless noted otherwise on plans:
      1) The short circuit current rating of the electrical distribution equipment that feeds the Control Panel.
      2) 150% of the available fault current at the Control Panel as determined by a Short Circuit Current study prepared by a licensed professional electrical engineer.
   b. All equipment/devices installed within control panels shall be rated to operate in ambient temperatures of 50 degrees C (122 degrees F) or higher.
3. Enclosures
   a. All enclosures (with any required accessories or auxiliary items) shall fit within the space shown on the Plans. Any costs associated with furnishing equipment which exceeds the available space shall be borne by the Contractor.
   b. Enclosures (with any required accessories or auxiliary items) shall be suitable for the environment where installed.
   c. Enclosure materials shall be as follows unless noted otherwise:
      1) Control Stations:
         a) Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
         b) Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
         c) Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 of die cast zinc/aluminum construction.
      2) Control Panels:
         a) Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
         b) Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
         c) Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 or 12.
   d. Control Panel Enclosure Construction:
      1) Non-metallic control panel enclosure material, where specified, shall be reinforced polyester resin or equivalent, with a minimum thickness of 3/16 inch for all surfaces except those requiring reinforcement. Panels shall be precision molded to form a one piece unit with all corners rounded. Exterior surfaces shall be gel-coated to provide a corrosion-resistant maintenance-free satin finish which shall never need painting. Color pigments shall be molded into the resin. Color shall be grey.
      2) Metallic control panel enclosures, where specified, shall be fabricated using a minimum of 14 gauge steel for wall or frame mounted enclosures and a minimum of 12 gauge for freestanding enclosures. Continuously weld all exterior seams and grind smooth. Reinforce sheet steel with steel angles where necessary support equipment and ensure rigidity and preclude resonant vibrations.
      3) Use pan-type construction for doors.
      4) Door widths shall not exceed 36-inches.
      5) Mount doors with full length, heavy duty piano hinge with hinge pins.
      6) Provide gasket completely around each door opening.
      7) Mount and secure all internal components to removable back plate assembly.
      8) For NEMA 1 or 12 enclosures, provide handle-operated key-lockable three point stainless steel latching system for each door.
      9) For NEMA 4X enclosures, provide provisions for padlocking all doors and provide clamps on three (3) sides of each door.
   e. Control panel enclosures (and associated backpanels and other similar accessories) shall be manufactured by Hoffman Engineering Co., or Saginaw Control & Engineering.
4. Control Panel Accessories:
   a. Panel ventilation systems shall be provided if so required by the application to maintain temperatures within the acceptable ranges of the interior equipment. In no case (regardless of temperature ratings of internal equipment) shall maximum temperatures within control panels be allowed to exceed 50 degrees C (122 degrees F). Panel Air Conditioners or Heat Exchangers (to satisfy the specified thermal calculation requirements) are generally NOT acceptable unless specifically stated otherwise in these specifications, and shall not be provided for panels without specific written direction from the engineer PRIOR to submission of panel shop drawings. Panels shall be oversized, provided with standoffs/shields, and/or ventilated as required to meet the contract requirements. Thermostats shall be provided to control cooling without need of manual operation. Thermostat setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Cooling units shall be as manufactured by Hoffman Engineering Co., Rittal or approved equal and shall be thermostatically controlled.
   b. Space heaters shall be provided for condensation and temperature control. Thermostats AND hygrostats (or combination hygrotherm controllers) shall be provided to control heating requirements (based on temperature and relative humidity within enclosure) without need of manual operation. Setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Space heaters and associated control devices shall be as manufactured by Hoffman Engineering Co., Rittal, Stego or approved equal.
   c. NEMA 4X control panels shall be provided with vapor-phase corrosion inhibitor(s) (chemical combinations that vaporize and condense on all surfaces in the enclosed area, to protect metal surfaces/devices within the enclosed area from corrosion). Corrosion inhibitor shall be Hoffman #AHCI series (sized as required by the enclosure volume to be protected) or equal.
   d. For outdoor panels, stainless steel solar shields for front, top and each side of panel, supported to associated panel face with standoffs as required (to allow free air flow between solar shield and panel enclosure), shall be provided where required to limit solar loading on panel to allow use of a ventilated panel design rather than an air-conditioned panel design.
   e. Provide a sun shield over all LCD displays in exterior-mounted panels. Sun shield shall be collapsible to fully protect LCD display from UV light when not in use, shall provide side and top shielding when in use, shall be constructed of stainless steel and shall be installed such as to maintain NEMA 4X ratings of enclosures.
   f. Provide a clear polycarbonate gasketted hinged door or window to encompass all indicators, controllers, recorders, etc. mounted on NEMA 4 and 4X enclosures.
   g. Provide interior mounting panels and shelves constructed of minimum 12 gauge steel with white enamel finish. Provide metal print pocket with white enamel finish on inside of door.
   h. Provide interior LED light kit, mounted at top of interior of panel, and switched to turn “ON” when door is opened for the following control panels:
      1) Control panels with outer dimensions greater than 20” wide or 30” high.
      2) Control panels containing PLCs or other similar programmable devices.
   i. Control panels containing VFDs or Reduced Voltage Soft Starters shall include a door mounted digital keypad for adjusting the starter parameters and viewing process values and viewing the motor and starter statuses without opening the enclosure deadfront door.
5. Control Components
   a. General:
      1) All pushbuttons, pilot lights, selector switches and other control devices shall be separate, standard size (full 30mm) and shape, heavy duty oil-tight units.
         a) Devices in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.) shall be of non-metallic construction.
         b) Devices in other areas shall be of chrome-plated construction.
      2) All components and devices so that connection can be easily made and so there is ample room for servicing each item.
      3) Door-mounted indicators, recorders, totalizers and controllers shall be located between 48” and 72” above finished floor level.
      4) Door-mounted indicator lights, selector switches and pushbuttons shall be located between 36” and 80” above finished floor level.
      5) All devices and components shall be adequately supported to prevent movement. Mounting strips shall be used to mount relays, timers and other devices suitable for this type of mounting.
   b. Pilot Lights:
      1) All pilot lights to be cluster LED type & push to test.
   c. Pushbuttons:
      1) All STOP operators within control stations located at equipment shall be provided with padlockable lockout provisions and a minimum of two (2) sets of contact blocks.
      2) Emergency shutoff pushbutton devices shall be as follows unless noted otherwise:
         a) 44mm diameter, mushroom-style, maintained contact push buttons
         b) With a minimum of one (1) normally open dry contact and three normally closed dry contacts.
         c) Connections made such that pushing “in” the button will shutoff the associated equipment.
         d) Provided with a red engraved nameplate with ½” lettering to read “Emergency Shutoff”.
         e) Provided with padlockable lockout provisions
   d. Relays:
      1) Control relays shall have the following characteristics, unless noted otherwise:
         a) General purpose, plug-in type.
         b) Minimum mechanical life of 10 million operations.
         c) Coil voltage as indicated or required by application.
         d) Single-break contacts rated 12 amperes, resistive at 240 volts.
         e) Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each individual relay shall have 3PDT contacts. Where required, multiple control relays shall be provided (to provide the required quantities of contacts) for each “relay” function shown on plans/diagrams.
         f) Furnished with RC transient suppressor to suppress coil-generated transients to 200% of peak voltage.
         g) LED on/off indicator light and manual operator.
         h) Industry standard wiring and pin terminal arrangements.
         i) Equal to Square D 8501KP series with matching plug-in socket.
      2) Interposing/isolation relays used to isolate discrete output field wiring (and where required for voltage translation for other discrete signals) to/from PLC inputs/outputs shall be terminal-block style. Terminal-block style relays shall have the following characteristics, unless noted otherwise:
         a) Minimum mechanical life of 10 million operations.
         b) Single-break contacts rated 6 amperes, resistive at 120 volts.
         c) One (1) N.O. contact per relay.
         d) Furnished with integral transient protection.
         e) LED on/off indicator light.
         f) DIN-rail mounted.
         g) Equal to Square D type Zelio RSL.
      3) Timer relays shall be electronic, adjustable plug-in devices meeting the following characteristics, unless noted otherwise:
         a) General purpose, plug-in type.
         b) Minimum mechanical life of 10 million operations.
         c) Single-break contacts rated 10 amperes, resistive at 240 volts.
         d) Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each relay shall have DPDT contacts (2 N.O. & 2N.C.). Where required, multiple timer or control relays shall be provided (to provide the required quantities of contacts) for each “relay” function shown on plans/diagrams.
         e) Rotary-thumbwheel adjustments for time value, timing range and function.
         f) Time value adjustments from .05 seconds to 999 hours
         g) Selectable Timing Functions, including the following:
            (1) On Delay
            (2) Interval
            (3) Off Delay
            (4) One Shot
            (5) Repeat Cycle-Off
            (6) Repeat Cycle-On
            (7) On/Off Delay
            (8) One Shot Falling Edge
            (9) Watchdog
            (10) Trigger On Delay
         h) Accuracy shall be ± 2% and repeatability shall be ± 0.1%.
         i) Furnished with integral transient protection.
         j) LED indicator light(s) for “timing” and “on/off status”
         k) Held in place with hold-down spring
         l) Equal to Square D type JCK with matching plug-in socket.
6. DC Power Supplies
   a. DC Power supplies shall be provided where specified elsewhere, or as required by design of system. Power supplies shall be industrial type, AC-to-DC switching, output voltage as required, 120vac input, size as required for the initial application plus 50% spare capacity.
   b. Power supply output shall be protected by secondary overcurrent protection device(s).
   c. The power distribution from multiloop supplies shall be selectively fused so that a fault in one instrument loop will be isolated from the other loops being fed from the same supply.
   d. Each power supply shall meet the following requirements.
      1) Regulation, line: 0.4% for input from 105 to 132vac.
      2) Regulation, load: 0.8%
      3) Ripple/Noise: 15mV RMS / 200 mV peak to peak
      4) Operating temperature range: 0 deg C - 60 deg C
      5) Overvoltage protection
      6) Overload Protection
      7) Output shall remain within regulation limits for a least 16ms after loss of AC power at full load.
      8) Output status indicator.
      9) UL listing
   e. Power supplies shall be manufactured by Puls, Sola, Phoenix Contact or equal.
7. Disconnects
   a. A main disconnect switch or circuit breaker shall be supplied integral to all control panels. The main disconnect or circuit breaker shall be accessible/operable without exposing the operator to energized sections of the control panel(s), and shall be lockable in the open/off position.
   b. Individual circuit breakers shall be provided integral to the manufactured control panel for each separate power circuit originating within the control panel.
   c. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated (or can be adjusted to is 1200A or higher, breakers shall be electronic trip and shall be provided with arc energy-reducing maintenance switching (with local status indicator) to reduce arc flash energy per NEC 240.87 requirements.
8. Combination Starters
   a. All combination starters shall utilize a unit disconnect. Magnetic starters shall be furnished in all combination starter units unless specifically shown otherwise. All starters shall utilize full NEMA/EEMAC rated contactors (size 1 minimum).
   b. Starters shall be provided with a three-pole, external (door mounted) manual reset, solid state overload relay. Solid state overload relay shall have switch-selectable trip class and shall provide protection from:
      1) Overload.
      2) Phase Unbalance.
      3) Phase Loss.
      4) Ground Fault (Class II detection).
   c. Unless specifically shown otherwise, each combination starter or each group of starters shall be furnished with a control circuit transformer including two primary protection fuses and one secondary fuse (in the non-ground secondary conductor). The transformer shall be sized to accommodate the contactor(s) and all connected control circuit loads (including motor space heaters and other similar loads where specified). The transformer rating shall be fully visible from the front when the unit door is opened. Unless otherwise indicated, control voltage shall be 120V AC. Control power shall be provided by individual unit control power transformers.
   d. When a unit control circuit transformer is not provided, the disconnect shall include an electrical interlock for disconnection of externally powered control circuits.
   e. Auxiliary control circuit interlocks shall be provided where indicated. Auxiliary interlocks shall be field convertible to normally open or normally closed operation.
   f. NEMA/EEMAC Size 1-4 starters shall be mounted directly adjacent to the wireway so that power wiring (motor leads) shall connect directly to the starter terminals without the use of interposing terminals. Larger starters shall be arranged so that power wiring may exit through the bottom of the starter cubical without entering the vertical wireway.
   g. Each starter shall be equipped with a minimum of the following control devices:
      1) Door-mounted reset button.
      2) Two (2) field-reversible (N.O./N.C.) auxiliary contacts
      3) For reversing and two-speed starters: Four (4) field-reversible (N.O./N.C.) auxiliary contacts
      4) Additional control devices as indicated on plans.
   h. Control Wiring Terminal Blocks
      1) Terminal blocks shall generally be:
         a) Feed-thru, screw-in type
         b) DIN rail mounted
         c) Furnished with the stationary portion of the block secured to the unit bottom plate
         d) Furnished with unit-mounted control terminal blocks for each field wire.
         e) Rated for the voltage and current of the proposed application per UL/NEC standards.
         f) Sized (by supplier) for the associated wire gauges/types/quantities.
         g) Phoenix Contact UT-4 series, Weidmuller WDU-4 series (or equivalent) unless required otherwise by application.
   i. Nameplates
      1) Each unit shall be properly labeled with an engraved phenolic nameplate with a white background and black letters.
      2) Each pilot device shall be properly labeled with a legend plate or an engraved phenolic nameplate.
   j. Manufacturers:
      1) Square 'D', Eaton/Cutler Hammer, Allen Bradley or ABB.
9. Wiring
   a. All wiring shall be identified on each end with hot stamped, shrink tube type, or self-laminating vinyl permanent wire markers to correspond with numbering shown on wiring diagrams.
   b. All connections shall be made on terminals with no splices.
   c. All wiring runs shall be along horizontal or vertical routes to present a neat appearance. Angled runs will not be acceptable. Group or bundle parallel runs of wire in plastic wire duct where practical.
   d. All wiring runs shall be securely fastened to the panel or wire duct by means of plastic wire ties. Adequately support and restrain all wire runs to prevent sagging or movement.
   e. AC power wiring and instrumentation/analog wiring shall be run separate.
   f. Color code all internal wiring (not field wiring) as follows:
      1) Line and load circuits: Black (B)
      2) AC control wiring: Red (R)
      3) Externally-Powered control wiring: Yellow (Y)
      4) Neutral wiring: White (W)
      5) Low voltage DC(+)pos: Blue (BL)
      6) Low voltage DC(-)neg: Blue/White Tracer (BL/W)
      7) Grounding: Green (G)
   g. Terminal strips shall be provided for all input and output wiring. No more than two (2) wires shall be connected to one (1) terminal block.
10. Electrical Surge and Transient Protection
   a. General
      1) Function: Protect the system against damage due to electrical surges.
   b. Application: As a minimum, provide surge and transient protection (with proper grounding) at the following locations as described below:
      1) Power Input High Frequency Noise Filtering:
         a) 120VAC Control panels with integral UPSs, PLCs, or other electronic/microprocessor equipment that is susceptible to failure or improper operation due to high frequency/harmonic input transients shall be provided with series-connected high-frequency noise filters on the line input (downstream of any panel main disconnects/breakers). Filters shall be as manufactured by Edco/Emerson/Islatrol or equal (exact type(s) as required by application).
      2) Power Input Surge Protection:
         a) Provide surge protection device at any connection of 120VAC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:
            (1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
            (2) Be of two-part (base and SPD), DIN-rail mountable construction.
            (3) Have 15kA total nominal discharge current per line (based on 8/20μs waveform).
            (4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
            (5) Visually indicate operational status.
            (6) Be Dehn DEHNguard series or equal by MTL Technologies or Phoenix Contact, or may be combined with the High Freqency Noise Filtering device required above.
         b) Provide surge protection device at any connection of multi-pole AC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:
            (1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
            (2) Provide protection for all phases.
            (3) Have 40kA (per phase) peak surge current rating.
            (4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
            (5) Visually indicate operational status.
            (6) Be Square D SDSA or HWA series or equal.
      3) Analog I/O Panel Terminations Surge Protection:
         a) Provide surge protection device at the PLC (or similar) panel connection of each analog I/O signal. Device shall:
            (1) Be mounted internal to the associated panel.
            (2) Be of two-part (base and SPD), DIN-rail mountable construction.
            (3) Have the following nominal discharge current ratings:
               (a) D1 Lightning impulse current (10/350 μs) per line: 1 kA
               (b) C2 Total nominal discharge current (8/20 μs): 20 kA
               (c) C2 Nominal discharge current (8/20 μs) per line: 10 kA
            (4) Have maximum continuous operating voltage (MCOV) rating as required by the associated signal.
            (5) Manufacturer and Model:
               DEHN BSP M4 BE 24 (926 324) with 920300 base.
               Phoenix Contact 2801263 with included base.
               Weidmuller 1093400000 with 8951710000 base.
      4) Discrete I/O Panel Terminations Surge Protection:
         a) Provide isolation relay at the PLC (or similar) panel connection of each discrete output signal (within the associated panel). See above for isolation relay requirements.
      5) Low Voltage Power Supply Load Side Surge Protection:
         a) Provide surge protection device at the PLC (or similar) panel on the load side of each low voltage power supply that has low voltage connections extending external to the panel. Device shall:
            (1) Be mounted internal to the associated panel.
            (2) Be of two-part (base and SPD), DIN-rail mountable construction.
            (3) Have 10kA total nominal discharge current per line (based on 8/20μs waveform).
            (4) Have maximum continuous operating voltage (MCOV) rating as required by the associated utilization voltage.
            (5) Be as manufactured by Dehn, MTL Technologies, or Phoenix Contact.

C. Execution
1. Delivery, Storage & Handling
   a. Provide Site and warehouse storage facilities for all equipment.
   b. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.
   c. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.
   d. Cover panels and other elements that are exposed to dusty construction environments.
2. Installation
   a. Provide enclosure mounting supports as required for floor, frame or wall mounting. All supports in exterior, wet or process areas shall be stainless steel unless noted otherwise. All floor-mounted panels or other similar distribution equipment shall be mounted on 6” concrete housekeeping pads unless specifically shown otherwise. The general design intent is that centers of control panels be mounted at heights that are easily accessible. Design intent is that devices on panel fronts (pushbuttons, selector switches, pilot lights, HMIs, ETMs, breaker handles, etc.) generally be mounted as close to 5'-0”a.f.f. as possible, no higher than 6'-7”a.f.f (per NEC requirements) and no lower than 3'-6”a.f.f., where possible, without specific approval of the owner or engineer. Additionally, every effort shall be made to provide a professional, consistent, neat, and workmanlike finished appearance of panel installations. For example, tops of adjacent panels shall be mounted at matching heights where possible/reasonable.
   b. All enclosures used outside shall be solid bottom unless otherwise specified. All cable and piping openings shall be sealed watertight. Cable and piping shall enter the enclosure as shown on drawings or specified herein.
   c. All equipment and components shall be solidly grounded to the control panel. One grounded terminal unit shall be provided in each control panel for connection to plant ground system. Grounding digital and analog components shall be performed in accordance with the instrument supplier's installation recommendations. Signal ground shall be solidly connected to the ground system so as to prevent ground loops
3. Painting
   a. For enclosures other than NEMA 4X stainless steel or fiberglass:
      1) Completely clean all surfaces so that they are free of corrosive residue. Then, phosphatize all surfaces for corrosion protection.
      2) Prime with two (2) coats and finish with one coat of factory finish textured polyurethane. Paint shall be Sherwin-Williams Polane “T' or approved equal.
      3) Color to be selected during shop drawing review phase.
4. Identification & Documentation
   a. Refer to specification section 16075 for additional requirements.
   b. Control panel power supply source, type, voltage, number or circuit ratings shall be identified inside control panels and on drawings.
   c. All interior devices and components shall be identified with thermal transfer labels with black letters on white background. Labels shall be placed on the subpanel and not the component. Marking system shall be a Brother “PTouch II” or equal. Lettering shall be 1/4" high.
   d. All front panel mounted devices such as push buttons shall be identified by the use of engraved bakelite nameplates or legend plates. Nameplates shall be 1/8” thick, white with black core.
   e. Where a panel includes a PLC or other network-connected device that is intended to be connected to another system (such as a plant SCADA system) via a network connection, the panel supplier shall provide an Interface Control Document (ICD) to the other system supplier (such as the SCADA Integrator). This document shall itemize the following for each networked parameter that is capable of being monitored or controlled by the other system:
      1) Parameter Name/Function (ex: Pump No. 1 On/Off Status)
      2) Parameter Type (discrete or analog, input or output)
      3) Parameter register ID/location
   f. Where a panel includes a touchscreen or other programmable HMI display and is to be monitored by another system (such as a plant SCADA system), the panel supplier shall provide copies of the HMI display code and screenshots of all proposed HMI screens to the other system supplier (such as the SCADA Integrator) for their use in duplicating the associated HMI.
   g. A job-specific, custom wiring diagram for each control panel (not including control stations without relays) shall be provided to the contractor prior to installation for making the appropriate electrical connections. The wiring diagram shall clearly show all control components connected to the panel (whether the components are mounted internal or external to the enclosure). All wires and terminal blocks shall be clearly labeled. A laminated copy of the final wiring diagram for each unit shall be installed inside the door of the associated panel, and submitted to the owner with the as-built documentation.
5. Owner Training
   a. Fully train the owner in the proper operation of all control panels/equipment, describing and demonstrating full operation, including function of each door-mounted device.
6. Spare Equipment
   a. Provide the following spare equipment:
      1) Fuses: 10% (minimum of 3) of each size and type utilized, mounted within a pocket within the associated control panel.
      2) Where control panel contains programmable controller (or similar equipment): Flash drive containing copies of all final programs utilized within the control panel, with provisions/cable assemblies as required to connect the flash drive provided to the controller to download the programs. Flash drive shall be attached to retractable cord (long enough to reach the associated port) attached to the inside of the panel door.

END OF ELECTRICAL SPECIFICATIONS

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CONSTRUCTION PLANS FOR:
TALLADEGA MAIN WWTP PUMP UPGRADES
TALLADEGA, AL

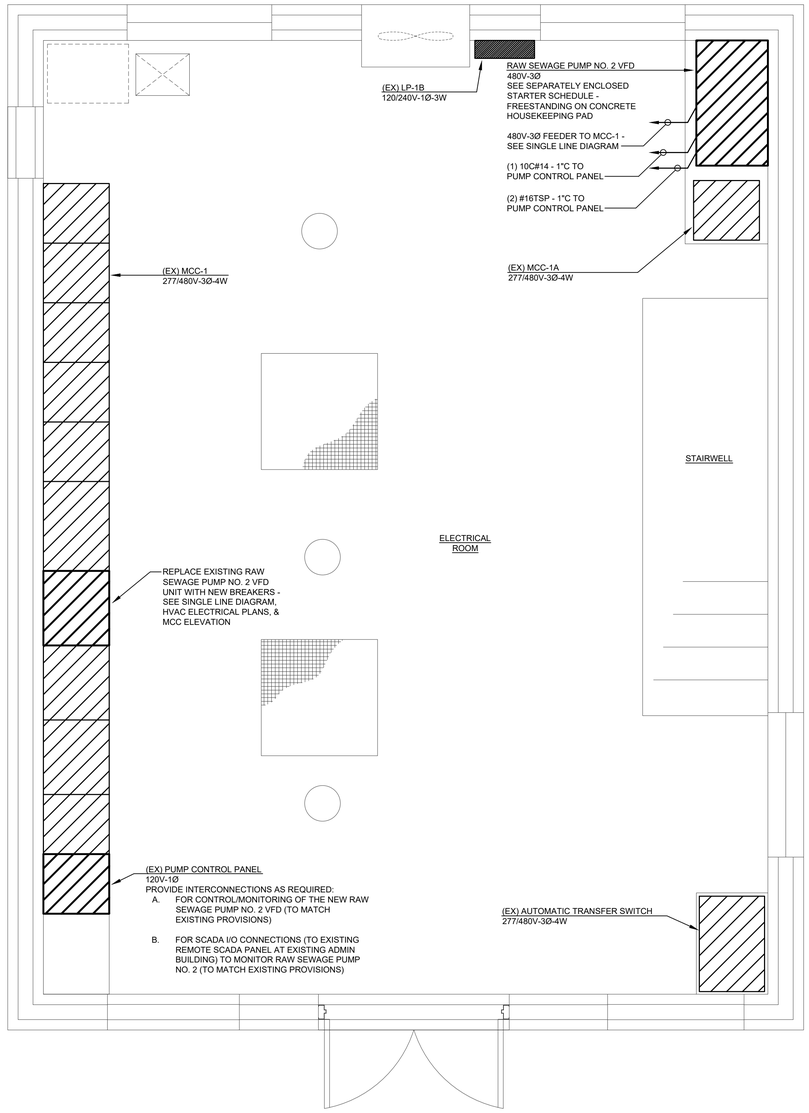
TALLADEGA
At every turn.

PROJECT INFO:
INSITE - HOOVER
INSITE JOB No. 10033.00
PLOTTED: 10/15/25

ALABAMA LICENSED No. 27420 PROFESSIONAL ENGINEER PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
ELECTRICAL SPECIFICATIONS

SHEET 21 OF 25
GNE-6



RAW SEWAGE PUMP STATION TOP FLOOR PROCESS ELECTRICAL PLAN

SCALE : 1/2" = 1'-0"

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10/15/2025

THIS SHEET CONTAINS:

RAW SEWAGE PUMP STATION TOP FLOOR PROCESS ELECTRICAL PLAN

SHEET 22 OF 25

PLE-1

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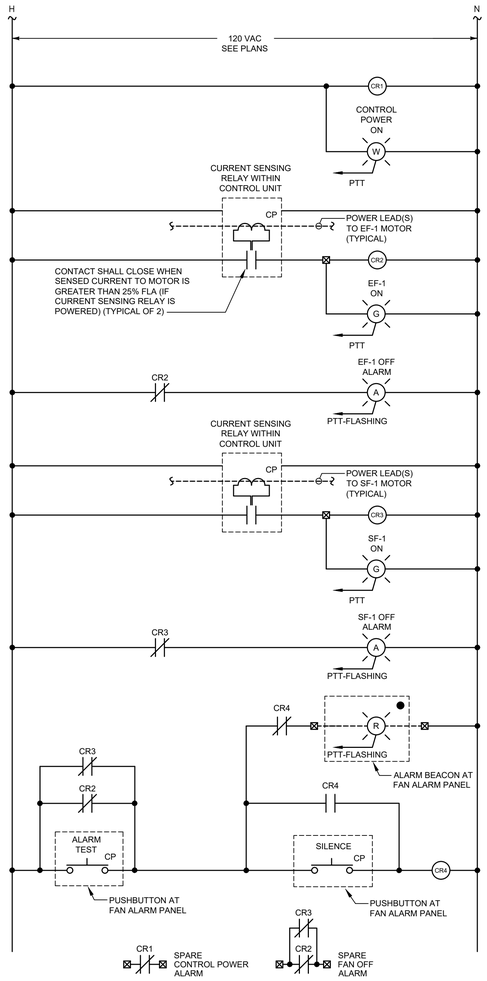
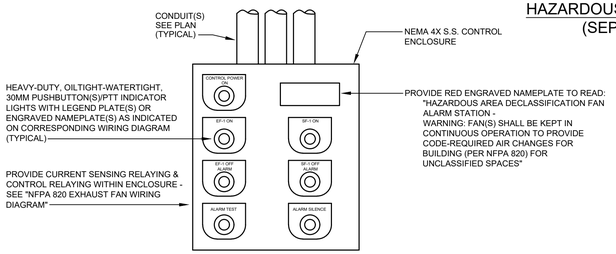
ELEMENTARY DIAGRAM LEGEND

START	PUSHBUTTON - START - NORMALLY OPEN - MOMENTARY CONTACT.
STOP	PUSHBUTTON - STOP - NORMALLY CLOSED - MOMENTARY CONTACT.
M	MOTOR STARTER COIL.
BP	BYPASS MOTOR STARTER COIL.
OL	OVERLOAD RELAY CONTACT.
CR	CONTROL RELAY COIL.
	CONTROL CONTACT - NORMALLY OPEN.
	CONTROL CONTACT - NORMALLY CLOSED.
	INDICATOR LIGHT - COLOR AS SHOWN.
▲	DEVICE LOCATED ON STARTER DOOR.
■	DEVICE LOCATED ADJACENT TO MOTOR.
●	DEVICE LOCATED REMOTE - SEE PLAN.
CP	DEVICE LOCATED AT CONTROL PANEL.
⊠	TERMINAL BLOCK WITHIN STARTER UNIT.
	THERMOSTAT - NORMALLY CLOSED, OPENS ON HIGH TEMP.
	THERMOSTAT - NORMALLY OPEN, CLOSES ON HIGH TEMP.
	ALARM HORN.



NFPA 820 FAN WIRING DIAGRAM

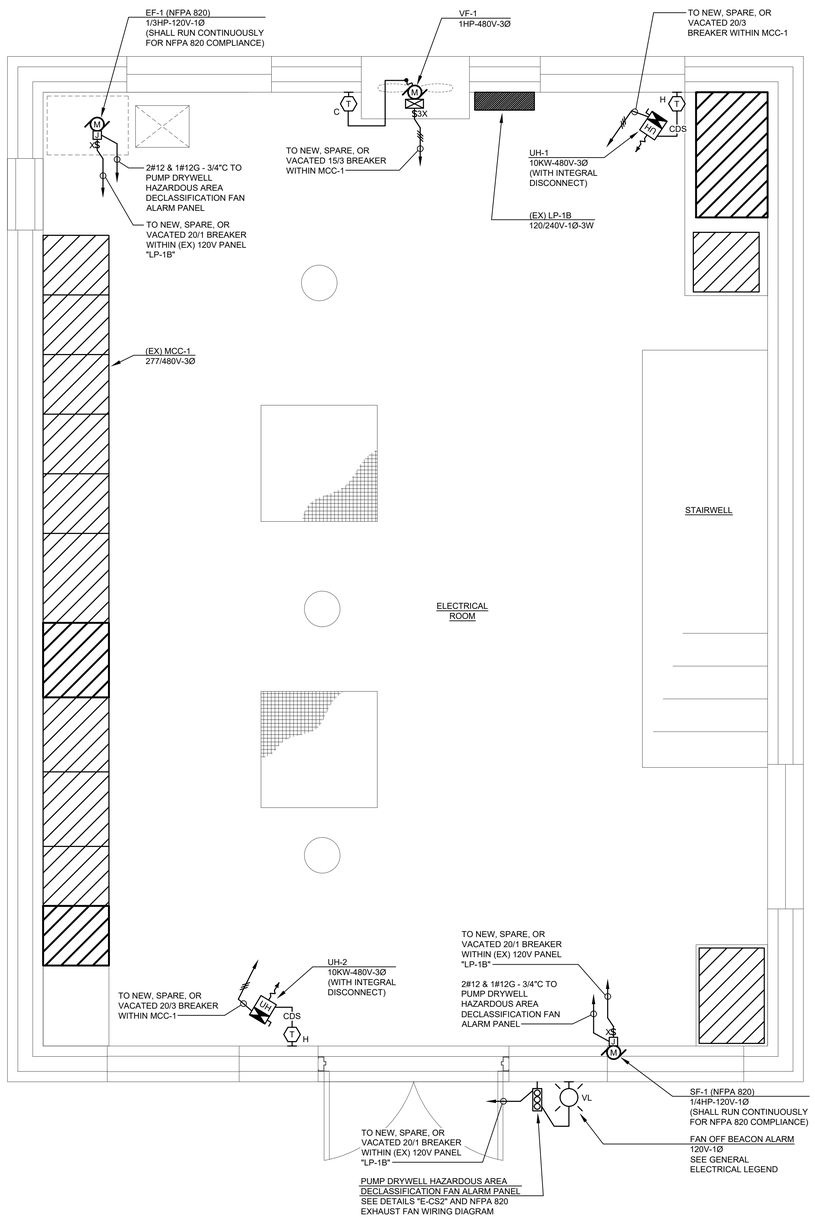
NFPA 820 FAN
HAZARDOUS AREA DECLASSIFICATION FAN ALARM PANEL
(SEPARATELY ENCLOSED CONTROLS UNIT)



DETAIL "E-CS2"
TYPICAL HAZARDOUS AREA DECLASSIFICATION FAN ALARM PANELS

SCALE : NONE

DETAIL NOTES
1. SEE SPECIFICATION SECTION 26 29 00 "MANUFACTURED CONTROL PANELS" FOR ADDITIONAL REQUIREMENTS.



RAW SEWAGE PUMP STATION
TOP FLOOR HVAC
ELECTRICAL PLAN

SCALE : 1/2" = 1'-0"

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TALLADEGA
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10/15/2025

THIS SHEET CONTAINS:
RAW SEWAGE PUMP STATION TOP FLOOR HVAC ELECTRICAL PLAN

SHEET 23 OF 25

PLE-2

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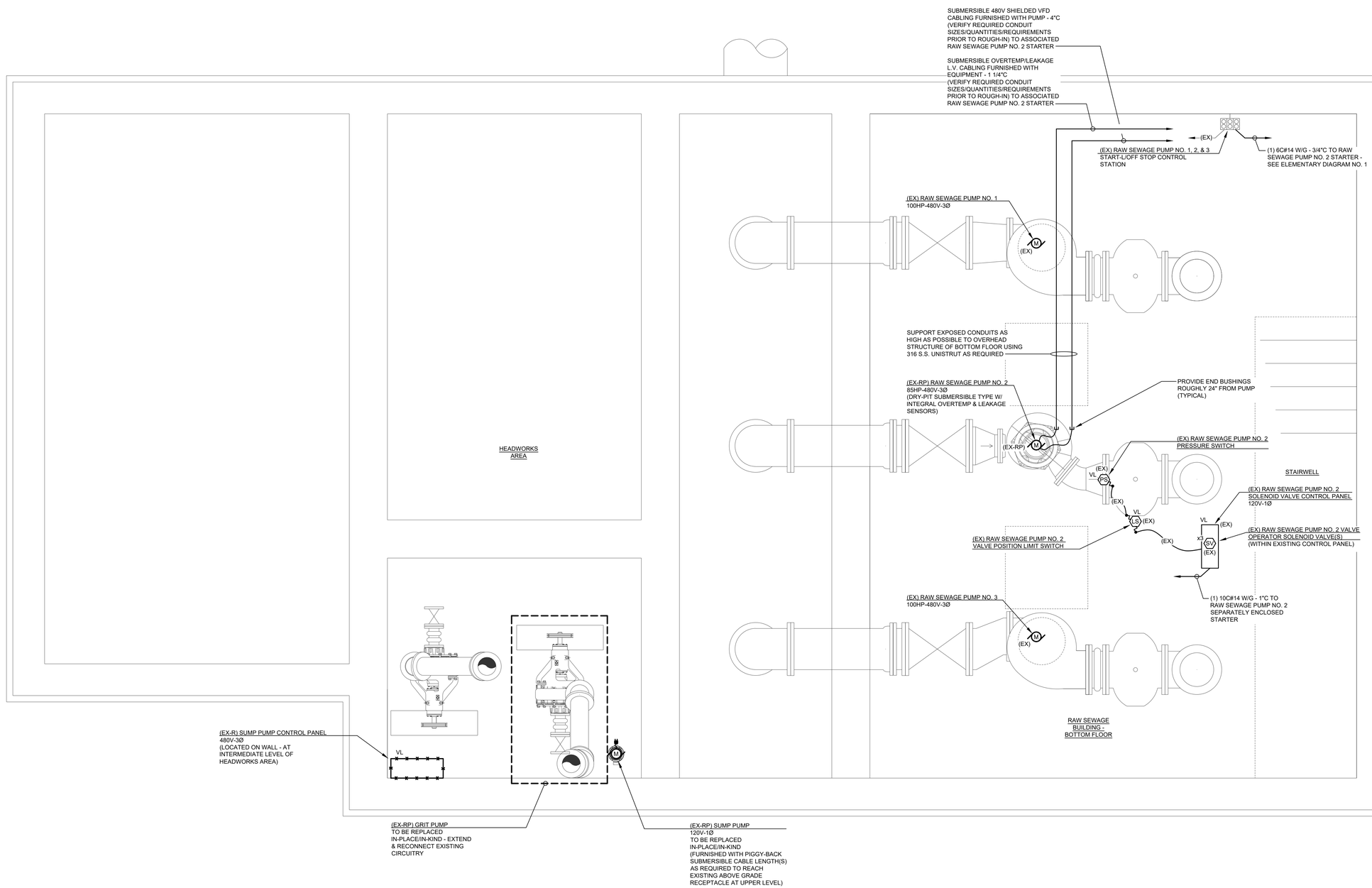

RAW SEWAGE PUMP STATION BOTTOM FLOOR PROCESS ELECTRICAL PLAN

SCALE : 1/2" = 1'-0"

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PROFESSIONAL ENGINEER
PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
RAW SEWAGE PUMP STATION BOTTOM FLOOR PROCESS ELECTRICAL PLAN

SHEET 24 OF 25

PLE-3

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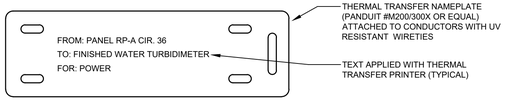
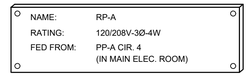


DETAIL "E-CL" TYPICAL CIRCUIT LABEL

SCALE : NONE

NOTES THIS DETAIL ONLY
1. CIRCUIT LABEL TYPES SHOWN ABOVE SHALL BE USED TO IDENTIFY ALL CIRCUITS WITHIN PULLBOXES, HANDHOLES, VAULTS JUNCTION BOXES LARGER THAN 4-11/16", APPROXIMATELY EVERY 50 FEET WITHIN CABLE TRAYS (INCLUDING AT MAJOR CABLE TRAY JUNCTIONS AND BREAKOUT LOCATIONS) AND AT OTHER SIMILAR LOCATIONS. SEE SPECIFICATIONS FOR LABELING REQUIREMENTS IN OTHER AREAS.
2. CIRCUIT NUMBERS SHALL BE IDENTIFIED FOR ALL CIRCUITS FED FROM LIGHTING OR POWER PANELBOARDS.
3. "FROM", "TO" & "FOR" TEXT SHOWN ABOVE ARE FOR EXAMPLE PURPOSES ONLY. NAMES/NUMBERS SHALL BE ADJUSTED TO MATCH ASSOCIATED CIRCUITS/CABLES.
4. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



DETAIL "E-EDL" ELECTRICAL DISTRIBUTION EQUIPMENT LABEL

SCALE : NONE

DETAIL NOTES
1. PANEL NAMES & RATINGS LISTED ABOVE ARE FOR EXAMPLE PURPOSES ONLY. NAMES & RATINGS SHALL BE ADJUSTED TO MATCH ASSOCIATED EQUIPMENT.
2. THE INTENT OF THIS DETAIL IS TO DEMONSTRATE GENERAL ELECTRICAL IDENTIFICATION REQUIREMENTS FOR ELECTRICAL DISTRIBUTION AND UTILIZATION EQUIPMENT. REFER TO SPECIFICATIONS FOR SPECIFIC REQUIREMENTS REGARDING LOCATIONS, CONTENT, MATERIALS, ETC..

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No. 27420
PHILIP D. BLACK
10/15/2025

THIS SHEET CONTAINS:
ELECTRICAL DETAILS

SHEET 25 OF 25

DTE-1