



DES MOINES METROPOLITAN  
WASTEWATER RECLAMATION AUTHORITY



BLACK & VEATCH

# WRF EFFLUENT PUMPING IMPROVEMENTS

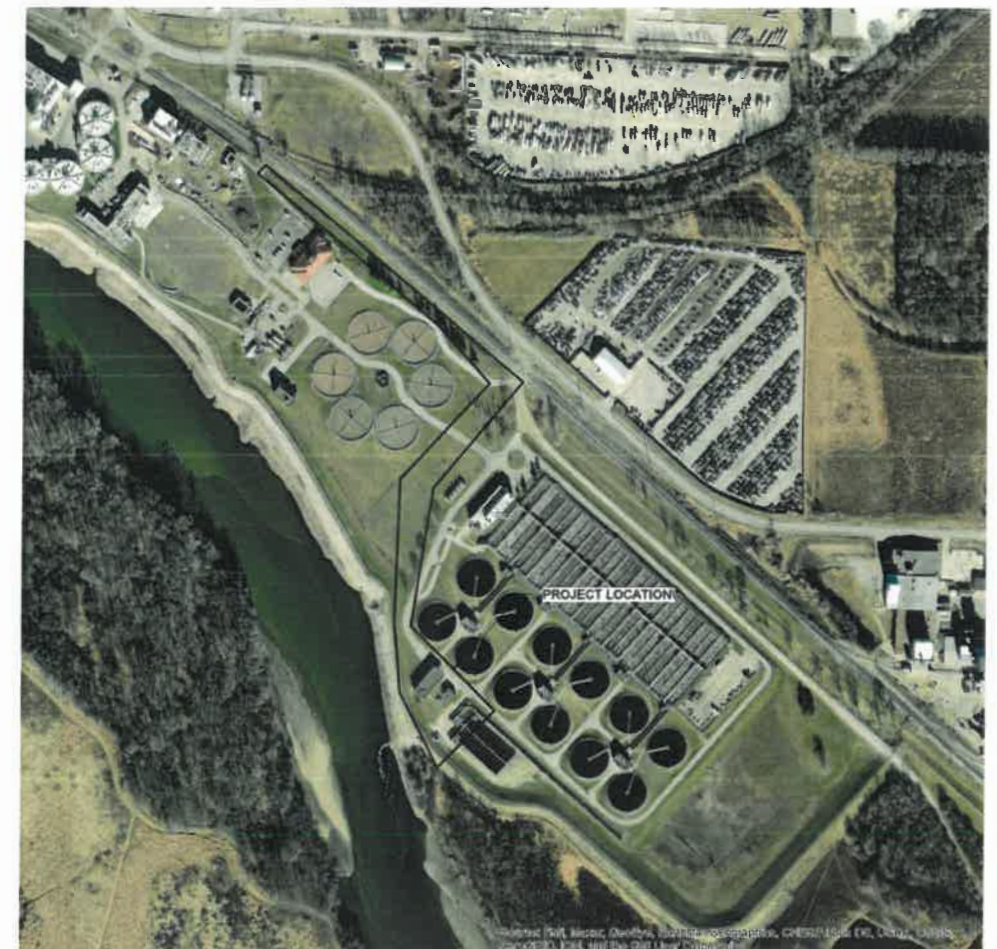
WRA ACTIVITY ID 04-2024-012  
PLAN FILE NO. 664-194/311  
BV PROJECT NO. 410504

AUGUST 2024

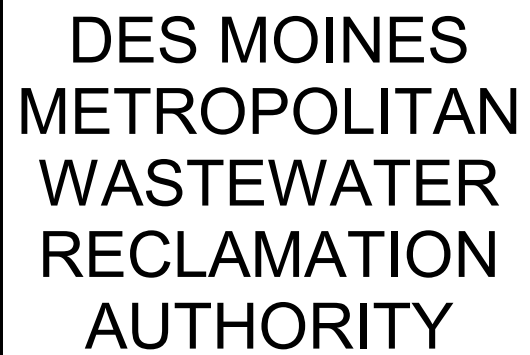
|                                                                                                 |                                                       |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------|
|                | DEPARTMENT OF ENGINEERING<br>CITY OF DES MOINES, IOWA |
| APPROVED:<br> | 9/12/2024                                             |
| CITY ENGINEER, P.E.                                                                             | DATE                                                  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>SUZANNE G. CARPENTER<br>MY LICENSE NUMBER IS: 22989<br>MY LICENSE RENEWAL DATE IS: 12/31/2024<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>O-SHEETS C-SHEETS M-SHEETS D-SHEETS | <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>THOMAS D. HONER<br>MY LICENSE NUMBER IS: 19981<br>MY LICENSE RENEWAL DATE IS: 12/31/2025<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>E-SHEETS                 |
| <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>JEFFREY A. BOOS<br>MY LICENSE NUMBER IS: 24884<br>MY LICENSE RENEWAL DATE IS: 12/31/2025<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>S-SHEETS                                 | <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>RANDY WILLIAM CANTRELL<br>MY LICENSE NUMBER IS: 18135<br>MY LICENSE RENEWAL DATE IS: 12/31/2024<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>P-SHEETS H-SHEETS |
| <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>DUANE HICKS<br>MY LICENSE NUMBER IS: 08228<br>MY LICENSE RENEWAL DATE IS: 06/30/2026<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>A-SHEETS                                     | <br>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.<br><br>JEFFREY V. NICKERSON<br>MY LICENSE NUMBER IS: 20397<br>MY LICENSE RENEWAL DATE IS: 12/31/2024<br>8/16/2024<br>SHEETS COVERED BY THIS SEAL:<br>I-SHEETS            |

IOWA 811  
ONE CALL<sup>SM</sup>







## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JHW                |
| DETAILED:                     | BCS                |
| CHECKED:                      | JCK                |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

## GENERAL

## GENERAL

## SHEET INDEX

PLAN FILE NO. 664-195

00-G-001

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OF  
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| PIPE AND EQUIPMENT TAGGING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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FILL PATTERNS                                                                                                                                                                                                                                                                                                                                             | ELEVATION & GRID CALLOUTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | VIEW CALLOUTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DRAWING NUMBERING SYSTEM                                                                                                                                                                                                                                                                                                                                                                      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| <div><div>PIPE IDENTIFICATION TAG</div><div><div>FIGURE</div><div><div>EXAMPLE</div></div></div><div>PIPE SIZE (IN) 6 INCH</div><div>SERVICE ABBREVIATION BLENDED SLUDGE</div><div><div>EQUIPMENT/INSTRUMENT IDENTIFICATION</div><div><div>FIGURE</div><div><div>EXAMPLE</div></div></div><div>BUILDING OR STRUCTURE NAME BUILDING 70</div><div>SERVICE ABBREVIATION BLENDED SLUDGE</div><div>EQUIPMENT OR INSTRUMENT ABBREVIATION PUMP</div><div>EQUIPMENT OR INSTRUMENT NUMBER PUMP NUMBER 1</div><div><div>SERVICE</div><div>ABBREVIATION</div></div><div><div>WATER/WASTEWATER</div><div>POTABLE WATER W1</div><div>POTABLE WATER - HEATED W1-HOT</div><div>POTABLE WATER - TEMPERED W1-TEMP</div><div>NON-POTABLE WATER W2</div><div>NON-POTABLE WATER-HOT W2-HOT</div><div>PLANT EFFLUENT REUSE W3</div><div>FIRE WATER FIRE</div><div>FLUSH WATER FW</div><div>SEAL WATER SW</div><div>RAW WASTEWATER RAW</div><div>GRIT GR</div><div>PRIMARY EFFLUENT PE</div><div>SECONDARY EFFLUENT SE</div><div>FINAL EFFLUENT FE</div><div>PLANT RECYCLE RCY</div><div>BELT FILTER PRESS FILTRATE BFPP</div><div>ROTARY DRUM THICKENER FILTRATE RDTF</div><div>DRAIN DRN</div><div>OVERFLOW OV</div><div>SANITARY SAN</div><div>SUMP PUMP DISCHARGE SPD</div><div>STORM STM</div><div><div>SLUDGES</div><div>PRIMARY SLUDGE PSL</div><div>PRIMARY SCUM PSC</div><div>P-RELEASE RECYCLE PRCY</div><div>P-RELEASE WASTE SLUDGE PWSL</div><div>P-RELEASE EFFLUENT PRE</div><div>MIXED LIQUOR ML</div><div>WASTE ACTIVATED SLUDGE WSL</div><div>RETURN ACTIVATED SLUDGE RSL</div><div>FINAL CLARIFIER SCUM FSC</div><div>BLENDED SLUDGE BSL</div><div>HAULED WASTE HW</div><div>HAULED WASTE MIXING HWM</div><div>DIGESTED SLUDGE DSL</div><div>RECIRCULATED SLUDGE RCSL</div><div><div>CHEMICAL</div><div>BELT FILTER PRESS POLYMER BFPP</div><div>ROTARY DRUM THICKENER POLYMER RDTP</div><div>FERROUS CHLORIDE FECL</div><div>CHLORINE CL</div><div>SODIUM HYPOCHLORITE SHY</div><div>SODIUM BISULFITE SB</div><div>MAGNESIUM CHLORIDE MGCL</div><div>SODIUM HYDROXIDE NAOH</div><div>CITRIC ACID CITRIC</div><div>ANTI-FOAM AF</div><div><div>GASES</div><div>CARBON DIOXIDE CO2</div><div>COMPRESSED AIR CA</div><div>PROCESS AIR ALP</div><div>DIGESTER GAS DG</div><div>NATURAL GAS NG</div><div>RENEWABLE NATURAL GAS RNG</div><div>REJECT GAS RG</div><div>TAIL GAS TG</div><div><div>HVAC/MECHANICAL</div><div>FOUL AIR DUCT FAD</div><div>AIR SUPPLY DUCT AIR SUPPLY</div><div>AIR RETURN DUCT AIR RETURN</div><div>AIR EXHAUST DUCT AIR EXHAUST</div><div>HOT WATER SUPPLY HWS</div><div>HOT WATER RETURN HWR</div><div>HOT WATER SUPPLY-GLYCOL HWS-GLY</div><div>HOT WATER RETURN-GLYCOL HWR-GLY</div><div>REFRIGERANT LIQUID REF-LIQ</div><div>REFRIGERANT SUCTION REF-SUC</div><div>REFRIGERANT GAS REF-GAS</div><div><div>OTHER</div><div>VENT VT</div><div>VENT FOR CHEMICAL PIPES "CHEMICAL TAG"-VT</div><div>SAMPLE FOR PROCESS PIPES "PROCESS TAG"-SMP</div><div>STRUVITE STV</div><div>ENGINE RADIATOR RELATED VARIOUS</div><div>LUBE OIL LO</div></div></div></div></div></div></div></div></div> |  | <div><div>EARTH OR GRADE</div><div>BEDROCK</div><div>GRANULAR FILL (CRUSHED ROCK OR GRAVEL)</div><div>SAND</div><div>CONCRETE</div><div>ENGINEERED FILL</div><div>RIPRAP</div><div>STONE</div><div>BRICK</div><div>CMU</div><div>FACE BLOCK</div><div>CHECKERED PLATE</div><div>GRATE</div><div>STEEL</div><div>ALUMINUM</div><div>DEMOLITION</div></div> | <div><div>ELEVATION CALLOUTS</div><div><div>LEVEL NAME<br/>X.XX</div>PLAN ELEVATION (SECTIONS &amp; ELEVATIONS)</div><div><div>EL X.XX</div>FLOOR ELEVATION (PLAN VIEWS)</div><div><div>EL X.XX</div>SPOT ELEVATION (SECTIONS &amp; ELEVATIONS)</div><div><div>N XXX<br/>E XXX<br/>EL XXX</div>SPOT COORDINATE (PLAN VIEWS)</div><div><div>EL X.XX</div>WATER SURFACE ELEVATION</div></div> <div><div>GRID/COLUMN CALLOUTS</div><div><div>TYPICAL GRID/COLUMN LAYOUT</div><div><div>ASCENDING ALPHANUMERIC SEQUENCE</div><div>ASCENDING NUMERIC SEQUENCE</div></div></div></div> | <div><div>SECTION CALLOUTS</div><div><div>CALLOUT DESIGNATION<br/>LETTER OR NUMBER</div><div>SHEET REFERENCE WHERE<br/>SECTION IS SHOWN</div></div><div><div>CALLOUT DESIGNATION<br/>LETTER OR NUMBER</div><div>SHEET REFERENCE WHERE<br/>SECTION IS SHOWN</div></div></div> <div><div>DETAIL/ENLARGED PLAN AREA CALLOUTS</div><div><div>CALLOUT DESIGNATION<br/>LETTER OR NUMBER</div><div>SHEET REFERENCE WHERE<br/>SECTION IS CUT</div></div><div><div>CALLOUT DESIGNATION<br/>LETTER OR NUMBER</div><div>SHEET REFERENCE WHERE<br/>SECTION IS SHOWN</div></div><div><div>CALLOUT DESIGNATION<br/>LETTER OR NUMBER</div><div>SHEET REFERENCE WHERE<br/>SECTION IS SHOWN</div></div><div><div>CALLOUT BOUNDARY</div></div></div> | <div><div>DRAWING NUMBERING SYSTEM</div><div><div>00-M-1-01</div><div>SHEET SEQUENTIAL NUMBER</div><div>SHEET TYPE DESIGNATOR</div><div>DISCIPLINE DESIGNATOR</div><div>FACILITY/AREA DESIGNATION CODE</div></div><div><div>DISCIPLINE DESIGNATORS</div><div>A ARCHITECTURAL</div><div>C CIVIL</div><div>D DEMOLITION</div><div>E ELECTRICAL</div><div>F FIRE PROTECTION</div><div>G GENERAL</div><div>H HVAC/BUILDING MECHANICAL</div><div>I INSTRUMENTATION AND CONTROLS</div><div>L LANDSCAPE</div><div>M PROCESS MECHANICAL</div><div>P PLUMBING</div><div>S STRUCTURAL</div></div><div><div>AREA/FACILITY DESIGNATION CODES</div><div>REFER TO THE PROJECT SITE PLAN FOR AREA OR FACILITY DESIGNATIONS.</div></div><div><div>SHEET TYPE DESIGNATORS</div><div>0 GENERAL (SYMBOLS, LEGENDS, NOTES, ETC.)</div><div>1 PLANS (ARRANGEMENT PLANS, PARTIAL PLANS)</div><div>2 ELEVATIONS</div><div>3 SECTIONS</div><div>4 LARGE SCALE VIEWS (ENLARGED PLANS, STAIR SECTIONS OR SECTIONS THAT ARE NOT DETAILS)</div><div>5 DETAILS</div><div>6 SCHEDULES &amp; DIAGRAMS</div><div>7 SCHEMATICS (ONE-LINES, BLOCK DIAGRAMS)</div><div>8 USER DEFINED</div><div>9 3D MODEL (PERSPECTIVES, ISOMETRICS, PHOTOGRAPHS)</div></div></div> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                                                                                                                                                                                                                                                                                           | <div><div>NORTH ARROW</div><div><div></div><div>NORTH ARROW<br/>(PLANT GRID NORTH)</div></div><div><div></div><div>NORTH ARROW<br/>(TRUE NORTH)</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                | <div><div>SECTION &amp; DETAIL VIEW TITLES</div><div><div><div>SECTION</div><div>XX-X-XXX 1/8" = 1'-0"</div><div>SHEET REFERENCE<br/>WHERE SECTION IS USED</div></div><div><div>DETAIL</div><div>XX-X-XXX 1/8" = 1'-0"</div><div>SHEET REFERENCE<br/>WHERE DETAIL IS USED</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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                                                                                                                                                                                                                                                                                                                                                      | <div><div>BREAKS</div><div><div></div><div>PLAN, ELEVATION, AND SECTION BREAKS</div></div><div><div></div><div>PIPE BREAK</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <div><div>ANNOTATION</div><div><div><div>SHEET NOTES</div><div><div></div><div>SHEET KEYNOTE</div></div><div><div></div><div>REFERENCE KEYNOTE (KEYNOTE LIST)</div></div></div><div><div>REVISIONS</div><div><div></div><div>REVISION TAG</div></div><div><div></div><div>REVISION CLOUD</div></div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                          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                                                                                                                                                                                                                                                                                                                                                      | <div><div>LINE STYLES</div><div><div>EXISTING FACILITY</div><div>NEW FACILITY</div><div>OTHER DISCIPLINE NEW FACILITY BACKGROUND</div><div>GRID LINE OR CENTERLINE</div><div>MATCH LINE</div><div>EXAMPLE BOUNDARY LINE (SEE CIVIL LEGEND)</div></div></div>                                                                                                                                                                                                                                                                                                                     |                                                                                               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Black & Veatch Corporation  
Des Moines, Iowa

DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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 IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JHW                |
| DETAILED:                     | BCS                |
| CHECKED:                      | TDA                |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

GENERAL

GENERAL

ANNOTATION &  
 SYMBOLS LEGEND

PLAN FILE NO. 664-196

00-G-002

3  
 OF  
 118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4







CIVIL LEGENDS AND NOTES

EXISTING FACILITY LEGEND

|  |              |                                    |
|--|--------------|------------------------------------|
|  | CE/L         | CONSTRUCTION EASEMENT LINE         |
|  | E/L          | EASEMENT LINE                      |
|  | PE/L         | PERMANENT EASEMENT LINE            |
|  | PL           | PROPERTY LINE                      |
|  | R/W          | RIGHT-OF-WAY LINE                  |
|  | S/L          | SURVEY LINE<br>SECTION LINE        |
|  | TE/L         | TEMPORARY EASEMENT LINE            |
|  | UE/L         | UTILITY EASEMENT LINE              |
|  | 326          | EXISTING GRADE CONTOUR             |
|  |              | EXISTING PIPING                    |
|  |              | CENTERLINE                         |
|  | OHE          | ELECTRICAL (OVERHEAD)              |
|  | E            | ELECTRICAL (UNDERGROUND)           |
|  | X            | FENCE                              |
|  | G            | GAS LINE                           |
|  |              | RAILROAD, EACH TRACK               |
|  | T            | TELEPHONE (OVERHEAD)               |
|  | T            | TELEPHONE (UNDERGROUND)            |
|  | W            | WATER LINE                         |
|  | (G)<br>(WV)  | WATER OR GAS VALVE                 |
|  | (WM)<br>(GM) | WATER OR GAS METER                 |
|  | S SD         | SEWER OR STORMDRAIN MANHOLE        |
|  |              | VALVE                              |
|  |              | UTILITY POLE WITH GUY ANCHOR       |
|  |              | FIRE HYDRANT                       |
|  | Y            | YARD HYDRANT                       |
|  |              | STREET LIGHT POLE                  |
|  |              | HEDGE, BRUSH, SHRUBS, WOODS        |
|  | 10"          | DECIDUOUS TREE AND TRUNK DIAMETER  |
|  | 4"           | CONIFEROUS TREE AND TRUNK DIAMETER |
|  |              | SWAMP                              |
|  | 4562.6       | SPOT ELEVATION                     |

LEGENDS NOTES:

- REFER TO PROCESS MECHANICAL LEGENDS FOR VALVE, PIPE JOINT, AND PIPE FITTING SYMBOLS.
- LEGEND SYMBOLS AND ABBREVIATIONS SHOWN IN THIS DRAWING ARE BASED ON A TEMPLATE THAT IS NOT PROJECT SPECIFIC. SOME LEGEND SYMBOLS AND ABBREVIATIONS ARE NOT USED ON THIS SPECIFIC PROJECT, BUT ARE SHOWN TO PROVIDE A DICTIONARY FOR SYMBOLS AND ABBREVIATIONS THAT MAY ALSO BE USED DURING THE PROJECT CONSTRUCTION PHASE.

NEW FACILITY LEGEND

|  |            |                                           |
|--|------------|-------------------------------------------|
|  | 2183       | DESIGN POINT                              |
|  | 1.5%       | PERCENT SLOPE                             |
|  | 2+50       | STATION                                   |
|  | 3:1        | SLOPE RUN : RISE                          |
|  | C-26       | CURVE NUMBER                              |
|  | 4562.63    | SPOT ELEVATION                            |
|  |            | SURFACED STREET, ROAD OR DRIVE            |
|  |            | SURFACED STREET, ROAD OR DRIVE WITH CURBS |
|  | CB         | CATCH BASIN                               |
|  | S SD       | SEWER OR STORMDRAIN MANHOLE               |
|  |            | DRAINAGE COURSE OR FLOW LINE              |
|  | 326        | FINISHED GRADE CONTOUR                    |
|  | TOP<br>TOE | BANK OR SLOPE LINES                       |
|  | B3 TH5     | BORE HOLE OR TEST HOLE AND NUMBER         |
|  |            | SURVEY LINE WITH PI, PT, OR POT           |
|  |            | CONCRETE ENCASEMENT - PLAN VIEW           |
|  |            | CULVERT                                   |
|  |            | NEW PIPING                                |
|  |            | NEW PIPING IN PROFILE                     |
|  |            | BUILDINGS, STRUCTURES                     |
|  |            | STRUCTURES UNDERGROUND                    |
|  |            | FUTURE BUILDINGS, STRUCTURES              |
|  | X          | FENCE                                     |
|  |            | CENTERLINE                                |
|  |            | FIRE HYDRANT                              |
|  | Y          | YARD HYDRANT                              |
|  |            | STREET LIGHT POLE                         |
|  |            | TO BE DEMOLISHED                          |
|  |            | WHEELCHAIR ACCESSIBILITY<br>MARKER        |
|  |            | EARTH OR GRADE                            |
|  |            | BEDROCK                                   |
|  |            | GRANULAR FILL (CRUSHED ROCK OR GRAVEL)    |
|  |            | SAND                                      |
|  |            | AC PAVEMENT                               |
|  |            | CONCRETE                                  |
|  |            | ENGINEERED FILL                           |
|  |            | RIPRAP                                    |
|  |            | CHECKERED PLATE                           |
|  |            | BAR GRATING (LINES IN DIRECTION OF SPAN)  |

GENERAL NOTES

- HORIZONTAL CONTROL: COORDINATES ARE BASED ON IOWA STATE PLANE SOUTH COORDINATE SYSTEM. COORDINATES ON STRUCTURES DEPICT THE EXTERIOR FACE OF THE CONCRETE SUBSTRUCTURE FOUNDATION WALL OR FOOTING WALL.
- VERTICAL CONTROL: ELEVATIONS ARE BASED ON CITY OF DES MOINES DATUM (0.00 DMCD = 773.84 NGVD). BENCHMARKS AND/OR STRUCTURE ELEVATIONS FROM EXISTING SURVEYS OR REFERENCE DRAWINGS MAY RESULT IN VARIANCES WITH ELEVATIONS INDICATED ON THE DRAWINGS FOR EXISTING FACILITIES. THE PROJECTED 100 YEAR FLOOD ELEVATION IS 18.54 AND THE PROJECTED 500 YEAR FLOOD ELEVATION IS 20.56.
- EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATIONS, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED. OVERHEAD UTILITIES ARE NOT INDICATED IN ARCHITECTURAL ELEVATIONS, PROFILE OR SECTION DRAWINGS. THE ENGINEERING INVESTIGATIONS, LOCATION, AND DESIGNATION OF SUBSURFACE UTILITIES INDICATED IN THESE CONTRACT DOCUMENTS HAS BEEN PERFORMED TO QUALITY LEVEL C IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES AS OUTLINED IN ASCE STANDARD AND GUIDELINE BULLETIN C/ASCE 38-02 UNLESS OTHERWISE DESIGNATED. WHERE SUCH ACTIVITIES HAVE BEEN PERFORMED TO A HIGHER LEVEL OF QUALITY, THE HIGHER QUALITY LEVEL FOR THE AFFECTED AREAS IS INDICATED IN THE CONTRACT DOCUMENTS.
- "SCREENED" (LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES. "SCREENED" INFORMATION WAS TAKEN FROM EXISTING CONSTRUCTION DRAWINGS AND DATA AND SURVEYS, IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. "BOLD" DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
- CONTRACTOR'S STAGING, PARKING AND MATERIAL STORAGE SHALL BE LIMITED TO THE SPACE(S) DESIGNATED ON THE DRAWINGS. PROVIDING ADDITIONAL STORAGE OR PARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- CALL BEFORE YOU DIG. CONTRACTOR SHALL DETERMINE ACCURATE LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES, WHETHER INDICATED ON THE DRAWINGS OR NOT, IN THE FIELD IN ADVANCE OF EXCAVATING, BY CONTACTING ALL UTILITIES AND OTHER AGENCIES, AND BY PROSPECTING. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL, DEMOLITION, RECONSTRUCTION, AND RECONNECTION OF EXISTING FACILITIES AS REQUIRED TO COMPLETE THE WORK. IF REQUIRED AFTER FIELD LOCATION AND VERIFICATION, CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE ANY NECESSARY MODIFICATIONS TO THE DESIGN OF NEW WORK.
- BEFORE CONSTRUCTION IS STARTED, CONTRACTOR SHALL COORDINATE WITH THE OWNER OF EACH UTILITY AND DEFINE THE REQUIREMENTS AND METHODS TO ACCOMMODATE THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT, OR RELOCATION OF ANY UTILITIES AFFECTED BY THE PROPOSED NEW WORK.
- THE PROJECT REQUIRES AN IOWA DNR GENERAL PERMIT #2, A STORMWATER POLLUTION PREVENTION PLAN (SWPPP), THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE GENERAL PERMIT #2 AND PREPARING AND UPDATING THE SWPPP THROUGHOUT CONSTRUCTION. EROSION CONTROL MEASURES SHALL BE INSTALLED AS REQUIRED BY THE SWPPP AND AS DIRECTED BY THE OWNER OR ENGINEER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL PROPERTY CORNER AND SURVEYING CONTROL MARKERS AND MONUMENTS. MONUMENTS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REESTABLISHED BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF IOWA.
- THE LOCATION OF BORINGS, AND TEST HOLES INDICATED ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT FOR ACTUAL BORINGS AND TEST HOLE LOCATIONS AND THE FINDINGS OF THE GEOTECHNICAL INVESTIGATIONS.
- CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS, UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL INSTALL ALL PIPELINES, PAVING, WALKWAYS, AND CURB AND GUTTER AT A UNIFORM GRADE BETWEEN ELEVATIONS DEPICTED ON THE DRAWINGS.
- FOR ALL SITE GRADING, SMOOTH PARABOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE, UNLESS NOTED OTHERWISE IN THE DRAWINGS. PARABOLIC ROUNDING SHALL APPLY TO ALL CUT AND FILL SECTIONS.
- FINISHED GRADE ELEVATION AT THE BUILDING FACE, WHERE NOT ADJACENT TO PAVEMENT, SHALL BE APPROXIMATELY 6 INCHES BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED. FINISHED GRADE ELEVATION ADJACENT TO BASINS SHALL BE APPROXIMATE AS INDICATED BY CONTOURS, OR AS REQUIRED TO MEET STAIR LANDINGS.
- THE CONTRACTOR'S CONSTRUCTION OPERATIONS SHALL CONFORM TO FEDERAL, STATE, AND LOCAL AGENCY SAFETY AND HEALTH RULES AND REGULATIONS FOR EXCAVATION AND TRENCHING, CONFINED SPACE ENTRY, WORK IN HAZARDOUS LOCATIONS, WORK AT HEIGHTS, AIR QUALITY CONTROL, NOISE CONTROL, TRAFFIC CONTROL, AND ANY OTHER POTENTIALLY HAZARDOUS CONDITIONS.
- ALL PRESSURIZED OR SURCHARGED PIPELINES, PIPE FITTINGS, COUPLINGS, JOINTS, EXPANSION JOINTS, TANK CONNECTIONS, AND CHANNEL CONNECTIONS SHALL BE PROVIDED WITH THRUST RESTRAINT BASED ON SPECIFIED PRESSURES AND TEMPERATURES.
- THE DRAWINGS INDICATE TYPES OF PIPE SUPPORT SYSTEMS AT VARIOUS LOCATIONS. HOWEVER, ALL PIPE SUPPORTS, HANGERS, BRACKETS, INSERTS OR BRACES ARE NOT SHOWN. CONTRACTOR SHALL REFER TO THE SPECIFICATIONS AND PROVIDE A COMPLETE SUPPORT SYSTEM AS REQUIRED.
- THE TERM "PROPOSED" AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS DESIGNED OR PLANNED TO BE PROVIDED BY OWNER OR OTHERS SEPARATE FROM THIS CONTRACT. THE TERM "FUTURE" AS INDICATED ON THE DRAWINGS REFERS TO THE ENGINEER'S INTERPRETATION OF THE ITEM FOR THE FUTURE, BASED ON AVAILABLE INFORMATION.
- THE EXISTING PROCESS FACILITIES SHALL REMAIN IN OPERATION CONTINUOUSLY THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES. INDIVIDUAL PROCESS FACILITIES CAN BE TAKEN OUT OF SERVICE FOR LIMITED PERIODS OF TIME TO FACILITATE CONSTRUCTION AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- STRUCTURES SUCH AS CURBS AND GUTTERS, CONCRETE AND ASPHALT DRIVES AND WALKWAYS, PAVING BRICKS, FENCING, RETAINING WALLS, ETC., CROSSED BY PIPELINES ARE NOT ALL INDICATED IN PROFILE. CONTRACTOR SHALL RESTORE ANY EXISTING STRUCTURES THAT ARE DISTURBED, DAMAGED, OR REMOVED BY CONSTRUCTION.
- CONTRACTOR SHALL REPLACE EXISTING PIPE CULVERTS THAT ARE REMOVED TO INSTALL NEW PIPELINES WITH NEW PIPE CULVERTS OF THE SAME SIZE, MATERIAL AND CONSTRUCTION AT THE SAME LOCATION AND INVERT ELEVATION AS THOSE THAT WERE REMOVED, AND SHAPE THE DITCH TO DRAIN WITH THE REPLACED CULVERT. CONTRACTOR SHALL PROVIDE ANY TEMPORARY CULVERTS THAT MAY BE REQUIRED FOR CONTRACTOR'S OPERATIONS. CONTRACTOR SHALL COORDINATE REMOVAL AND REPLACEMENT OF ANY CULVERTS WITHIN PUBLIC RIGHT-OF-WAY WITH THE REGULATING AGENCY.
- HORIZONTAL STATIONING ALONG PIPELINE ALIGNMENTS IS A HORIZONTAL MEASUREMENT. FOR MEASUREMENT AND PAYMENT FOR PIPELINES, CONTRACTOR SHALL PROVIDE THE ACTUAL PIPE LENGTH DETERMINED ACCOUNTING FOR THE SLOPE OR VERTICAL CURVE ON WHICH PIPELINES ARE INSTALLED.
- UNLESS OTHERWISE SPECIFIED, INDICATED ON THE DRAWINGS, OR DIRECTED BY THE ENGINEER, INSTALL PIPELINES SLOPING DOWNWARD FROM AN AIR VALVE. HIGH POINTS IN PIPELINES WILL NOT BE PERMITTED EXCEPT AT LOCATIONS OF AIR VALVES AS INDICATED ON THE DRAWINGS. REVIEW PIPELINE PROFILE REQUIREMENTS WITH THE ENGINEER PRIOR TO PREPARING LAYING SCHEDULES AND PERFORMING FIELD CONSTRUCTION STAKING.
- PROVIDE A MINIMUM 5 FEET COVER FOR ALL PIPELINES, INCLUDING BLOW-OFFS, BASED ON FINISHED GRADE.
- AIR RELEASE VALVES AND ISOLATION VALVES SHALL BE INSTALLED BELOW THE LEVEL IDENTIFIED ABOVE FOR REQUIRED MINIMUM COVER.
- CONTRACTOR SHALL DETERMINE ACCURATE LOCATION, ELEVATION, AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES BASED ON ACTUAL CONDITIONS IN THE FIELD, INCLUDING EXPOSING EXISTING PIPING, PRIOR TO FABRICATING NEW PIPING. CONTRACTOR SHALL PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES, AND HARNESSSED MECHANICAL COUPLING; ROTATE FITTINGS; DEFLECT JOINTS; AND MODIFY EXISTING PIPING AS APPLICABLE AND AS REQUIRED TO MAKE CONNECTIONS, INCLUDING ADJUSTMENTS FOR ANY OFFSETS IN CENTERLINE ELEVATIONS BETWEEN PIPELINES. CONTRACTOR SHALL PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION, WHERE APPLICABLE. CONTRACTOR SHALL COORDINATE MAKING EACH CONNECTION WITH THE OWNER.
- PROVIDE BURIED POTABLE WATER PIPELINE HORIZONTAL AND VERTICAL SEPARATION FROM SANITARY SEWER AND OTHER PIPELINES AS REQUIRED BY IOWA DEPARTMENT OF NATURAL RESOURCES RULES AND REGULATIONS.



Black & Veatch Corporation  
Des Moines, IA



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
FACILITY

WRF EFFLUENT PUMPING  
IMPROVEMENTS

08/16/2024 ISSUED FOR BIDDING  
REVISIONS AND RECORD OF ISSUE

DESIGNED: JHW  
DETAILED: GLC  
CHECKED: JCK  
APPROVED: SGC  
DATE: 08/16/2024  
PROJECT NO.: 410504

CIVIL

CIVIL LEGENDS AND  
GENERAL NOTES

PLAN FILE NO. 664-198

00-C-001

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OF  
118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4







1. THIS SITE SHALL BE MAINTAINED IN COMPLIANCE WITH ALL CITY CODES APPLICABLE ON THE DATE OF SITE PLAN APPROVAL.
2. ANY NEW ROOFTOP MECHANICAL EQUIPMENT MUST BE SCREENED FROM STREET LEVEL VIEW.
3. TRANSFORMERS, JUNCTION BOXES, AIR CONDITIONER OVER 3 FEET IN HEIGHT, OR OTHER SUCH ITEMS MAY NOT BE LOCATED IN REQUIRED SETBACK AREAS.
4. ANY AMENDMENTS OR CHANGES TO THE PROJECT SITE THAT DO NOT MEET WHAT IS SHOWN ON THE SITE PLAN NEED TO BE APPROVED WITH THE PERMIT AND DEVELOPMENT CENTER PRIOR TO INSTALLATION/CONSTRUCTION.
5. EXTERIOR LIGHTING MUST BE LOW GLARE CUT OFF TYPE FIXTURES TO REDUCE THE GLARE OF LIGHT POLLUTION ON SURROUNDING PROPERTIES.
6. THE REQUIRED LANDSCAPING, BOTH EXISTING AND PROPOSED, SHALL BE MAINTAINED FOR THE LIFE OF THE CERTIFICATE OF OCCUPANCY.
7. ALL DISTURBED AREAS SHOULD BE RESTORED BY SEEDING OR SODDING.
8. ALL CONSTRUCTION MATERIALS, DUMPSTERS, DETACHED TRAILERS, OR SIMILAR ITEMS ARE PROHIBITED ON PUBLIC STREETS OR WITHIN THE PUBLIC RIGHT OF WAY.
9. THE 2023 EDITION OF THE SUDAS STANDARD SPECIFICATIONS, THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDE (IN PROWAG) AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.
10. NO PERMANENT DUMPSTER WILL BE PROVIDED ON SITE WHICH WOULD REQUIRE THE NEED FOR A DUMPSTER ENCLOSURE.
11. ELEVEN SHADE OR OVERSTORY TREES REQUIRED IN ACCORDANCE WITH DES MOINES MUNICIPAL CODE, CHAPTER 135, ARTICLE 7. ACCEPTABLE TREES SHALL BE: BLACK WALNUT, HONEYLOCUST (THORNLLESS), LINDEN (AMERICAN), OAK (RED), OAK (SWAMP WHITE), AND OAK (WHITE). CONTRACTOR SHALL PLANT A DIVERSE SPECIES OF TREES THAT SHALL BE ACCEPTABLE TO OWNER AND ENGINEER, OF THE ELEVEN REQUIRED TREES. CONTRACTOR SHALL NOT PLANT ANY MORE THAN TWO OF ONE TYPE OF SPECIES. FOLLOW SPACING REQUIREMENTS AS INDICATED IN DES MOINES MUNICIPAL CODE, CHAPTER 135, ARTICLE 7. TREES TO BE PLANTED IN ACCORDANCE WITH SUDAS SPECIFICATION SECTION 9030.
12. TREE MITIGATION IS REQUIRED FOR ALL TREES WITH DIAMETERS GREATER THAN 12" AT A HEIGHT OF 4.5 FEET ABOVE GROUND IN ACCORDANCE WITH SECTION 42, ARTICLE X OF THE DES MOINES CITY CODE OF ORDINANCES. ALL EXISTING TREES SHALL BE PROTECTED DURING THE CONSTRUCTION PROCESS UNLESS NOTED OTHERWISE. ANY TREES IDENTIFIED IN THE PLANS FOR REMOVAL SHALL BE REPLACED ON SITE AT THE RATIOS SPECIFIED IN SECTION 42, ARTICLE X. ANY MATURE TREES THAT NEED TO BE REMOVED IN ADDITION TO WHAT IS INDICATED HEREIN SHALL REQUIRE ADDITIONAL TREE PLANTING IN ACCORDANCE WITH SECTION 42, ARTICLE X AND AT THE APPROVAL OF ENGINEER XX. MECHANICAL EQUIPMENT SHALL NOT BE LOCATED IN THE FRONT YARD OR STREET SIDE YARD AND SHALL BE SCREENED FROM VIEW FROM ANY PUBLIC WAY WITH LANDSCAPING, FENCING, OR WALLS CONSISTENT WITH THE BUILDING DESIGN, COLORS, AND MATERIALS.
13. MECHANICAL EQUIPMENT SHALL NOT BE LOCATED IN THE FRONT YARD OR STREET SIDE YARD AND SHALL BE SCREENED FROM VIEW FROM ANY PUBLIC WAY WITH LANDSCAPING, FENCING, OR WALLS CONSISTENT WITH THE BUILDING DESIGN, COLORS, AND MATERIALS.
14. ALL PLANTING BEDS SHALL INCLUDE NON-LIVING PERMEABLE MATERIALS SUCH AS MULCH AND NOT INCLUDING ROCK.
15. ANY NEW CABLE, UTILITY, ELECTRIC, OR OTHERWISE TRANSMISSION SYSTEMS SHALL BE INSTALLED UNDERGROUND.
16. CONTACT THE MUNICIPAL FORESTRY DIVISION PRIOR TO PLANTING AT 513-283-4950.
17. ALL WIRE, TWINE AND BURLAP SHALL BE REMOVED FROM THE ROOTBALL OF TREES PRIOR TO PLANTING.



- STEP 1 - PEEL BACK ROPE/BURLAP/GAGE AND REMOVE SUFFICIENT SOIL TO EXPOSE ROOT FLARE.
- STEP 2 - MEASURE FROM ROOT FLARE TO BOTTOM OF ROOT BALL.
- STEP 3 - DIG HOLE TO DEPTH WHERE TOP MOST ROOTS ARE BURIED 1-2 INCHES AND THE ROOT FLARE SITS SLIGHTLY ABOVE GROUND LEVEL. DIG A HOLE 2-3 TIMES WIDER THAN THE DIAMETER OF THE BALL WITH SLOPING SIDES TO ALLOW FOR PROPER ROOT GROWTH.
- STEP 4 - REMOVE LOWER THIRD OF WIRE CAGE.
- STEP 5 - SET TREE IN HOLE, SUPPORT WITH SOME SOIL. ENSURE THAT IT'S STRAIGHT, THEN REMOVE ENTIRE WIRE CAGE AND TOP TWO-THIRDS OF BURLAP.
- STEP 6 - BACKFILL WITH TWO-THIRDS OF LOOSE NATIVE SOIL (UNLESS IT'S ALL CALY) AND USE TO SETTLE. DO NOT TAMP OR STEP ON SOIL.
- STEP 7 - BACKFILL BALANCE AND WATER AGAIN, EXCESS SOIL MAY BE USED TO CREATE A BERM/SAUCER OUTSIDE OF ROOT BALL.
- STEP 8 - ADD 2-4 INCHES OF WOOD MULCH, LEAVING A 1- TO 2-INCH CLEARANCE BETWEEN THE MULCH AND THE TRUNK.
- STEP 9 - WATER A FINAL TIME.
- STEP 10 - IF NECESSARY, PLACE TWO OPPOSING STEEL T-STAKES OUTSIDE THE ROOT BALL WITH ARBOR TRE SECURING TREE. TIES PREFERRED ON LOWER HALF OF TRUNK TO ALL MOVEMENT.



DES MOINES  
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## WRF EFFLUENT PUMPING IMPROVEMENTS

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## SITework

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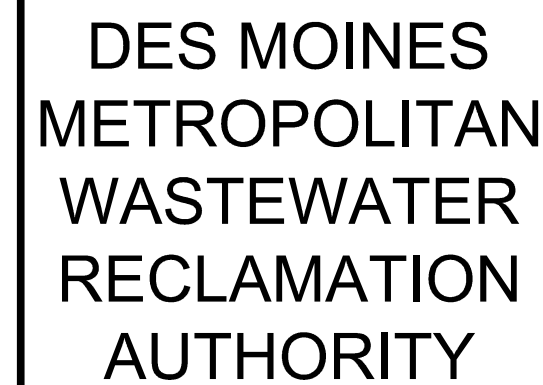
## LANDSCAPING NOTES AND DETAILS

PLAN FILE NO. 664-200

00-C-003

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## WRF EFFLUENT PUMPING IMPROVEMENTS

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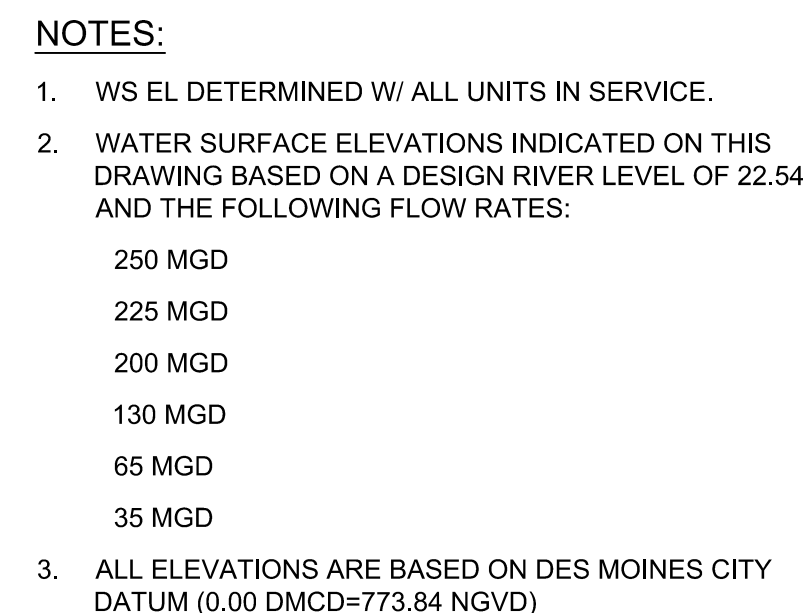
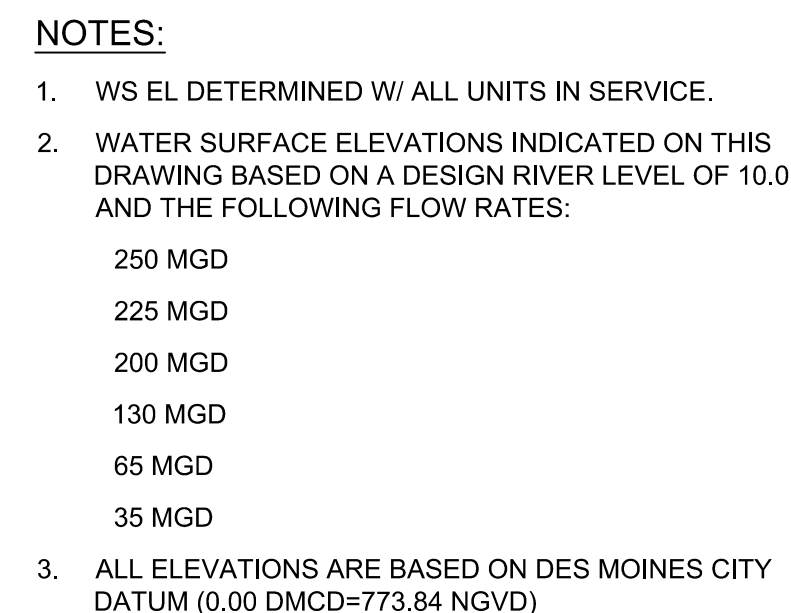
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### PARTIAL HYDRAULIC PROFILE

PLAN FILE NO. 664-201

00-C-004

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118





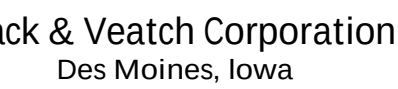




|        |                                    |       |       |                               |
|--------|------------------------------------|-------|-------|-------------------------------|
| ADDL   | ADDITIONAL                         | H     | H     | HORIZONTAL REACTION           |
| AFF    | ABOVE FINISH FLOOR                 | HC    | H     | HOLLOW CORE                   |
| AHR    | ANCHOR                             | HCA   | H     | HEADED CONCRETE ANCHOR        |
| ALT    | ALTERNATE                          | HEX   | H     | HEXAGONAL                     |
| ALUM   | ALUMINUM                           | HGR   | H     | HANGER                        |
| APPROX | APPROXIMATE                        | HORIZ | H     | HORIZONTAL                    |
| ARCH   | ARCHITECTURAL                      | HP    | H     | HIGH POINT                    |
| AROD   | ANCHOR ROD                         | HSS   | H     | HOLLOW STRUCTURAL SECTION     |
| ASSY   | ASSEMBLY                           |       |       |                               |
| AWG    | AMERICAN WIRE GAUGE                |       |       |                               |
|        |                                    |       | I     |                               |
| B      |                                    | ID    | I     | INSIDE DIAMETER               |
| BLDG   | BUILDING                           | IF    | I     | INSIDE FACE                   |
| BM     | BENCHMARK, BEAM                    | IN    | I     | INCHES                        |
| BO     | BOTTOM OF                          | INT   | I     | INTERIOR, INTERNAL            |
| BOT    | BOTTOM                             | INV   | I     | INVERT                        |
| BRDG   | BRIDGING                           |       | J     |                               |
| BRG    | BEARING                            |       | JT    | JOINT                         |
| BTWN   | BETWEEN                            |       |       |                               |
| C      |                                    |       | K     |                               |
| C      | CAMBER                             |       | K     | KIPS (1000 LBS)               |
| CANTIL | CANTILEVER                         | KSF   | K     | KIPS PER SQUARE FOOT          |
| CHKD   | CHECKERED                          | KSI   | K     | KIPS PER SQUARE INCH          |
| CHKDPL | CHECKERED PLATE                    |       |       |                               |
| CIP    | CAST-IN-PLACE                      |       | L     |                               |
| CJ     | CONTRACTION JOINT                  |       | L     | LENGTH, ANGLE                 |
| CJP    | COMPLETE JOINT PENETRATION         |       | LAB   | LABORATORY                    |
| CL     | CENTERLINE                         |       | LB(S) | POUND, POUNDS                 |
| CLR    | CLEAR                              |       | Id    | DEVELOPMENT LENGTH            |
| CMU    | CONCRETE MASONRY UNIT              |       | LE    | LEFT END                      |
| COL    | COLUMN                             |       | LIN   | LINES                         |
| CONC   | CONCRETE                           |       | LLBB  | LONG LEG BACK TO BACK         |
| CONN   | CONNECTION                         |       | LLH   | LONG LEG HORIZONTAL           |
| CONSTR | CONSTRUCTION                       |       | LLV   | LONG LEG VERTICAL             |
| CONT   | CONTINUOUS, CONTINUATION, CONTROL  |       | LONG  | LONGITUDINAL                  |
| COORD  | COORDINATE                         |       | LP    | LOW POINT                     |
| COV    | COVER                              |       | LSH   | LONG SIDE HORIZONTAL          |
| CRNR   | CORNER                             |       | LSHP  | LONG SLOTTED HOLE PARALLEL    |
| CSJ    | CONSTRUCTION JOINT                 |       | LSLT  | LONG SLOTTED HOLE TRANSVERSE  |
| CTRD   | CENTERED                           |       | LSV   | LONG SIDE VERTICAL            |
| CTRS   | CENTERS                            |       | LWC   | LIGHTWEIGHT CONCRETE          |
| D      |                                    |       | M     |                               |
| db     | BAR DIAMETER                       |       | M     | MOMENT                        |
| DBA    | DEFORMED BAR ANCHOR                |       | MAS   | MASONRY                       |
| DET    | DETAIL                             |       | MATL  | MATERIAL                      |
| DIA    | DIAMETER                           |       | MAX   | MAXIMUM                       |
| DIAG   | DIAGONAL                           |       | MC    | MOMENT CONNECTION, MECHANICAL |
| DIM    | DIMENSION                          |       | MECH  | MECHANICAL                    |
| DN     | DOWN                               |       | MEZZ  | MEZZANINE                     |
| DWA    | DEFORMED WIRE ANCHOR               |       | MFR   | MANUFACTURE(R)                |
| DWG(S) | DRAWING, DRAWINGS                  |       | MIN   | MINIMUM                       |
| DWL(S) | DOWEL, DOWELS                      |       | MISC  | MISCELLANEOUS                 |
|        |                                    |       | MTL   | METAL                         |
| E      |                                    |       | N     |                               |
| E      | EAST                               |       | N     | NORTH                         |
| EA     | EACH                               |       | N/A   | NOT APPLICABLE                |
| EE     | EACH END                           |       | NIC   | NOT IN CONTRACT               |
| EF     | EACH FACE                          |       | NO.   | NUMBER                        |
| EJ     | EXPANSION JOINT                    |       | NOM   | NOMINAL                       |
| EL     | ELEVATION                          |       | NS    | NEAR SIDE                     |
| EMBED  | EMBEDMENT                          |       | NTS   | NOT TO SCALE                  |
| EMER   | EMERGENCY                          |       | NWC   | NORMAL WEIGHT CONCRETE        |
| ENGR   | ENGINEER                           |       |       |                               |
| EQ     | EQUAL                              |       | O     |                               |
| EQUIP  | EQUIPMENT                          |       | OC    | ON CENTER                     |
| EQUIV  | EQUIVALENT                         |       | OD    | OUTSIDE DIAMETER              |
| EW     | EACH WAY                           |       | OF    | OUTSIDE FACE                  |
| EXIST  | EXISTING                           |       | OPER  | OPERATING                     |
| EXP    | EXPANSION                          |       | OPH   | OPPOSITE HAND                 |
| EXT    | EXTERIOR                           |       | OPNG  | OPENING                       |
|        |                                    |       | OPP   | OPPOSITE                      |
|        |                                    |       | OVS   | OVERSIZED HOLE                |
|        |                                    |       | OZ    | OUNCE                         |
| F      |                                    |       | P     |                               |
| FAB    | FABRICATE                          |       | P     | AXIAL LOAD                    |
| fc     | 28 DAY CONCRETE STRENGTH =         |       | PAF   | POWDER ACTUATED FASTENER      |
| FD     | FLOOR DRAIN                        |       | PAR   | PARALLEL                      |
| FDN    | FOUNDATION                         |       | PCC   | PRECAST CONCRETE              |
| FIN    | FINISH(ED)                         |       | PCF   | POUNDS PER CUBIC FOOT         |
| FLR    | FLOOR                              |       | PEMB  | PRE-ENGINEERED METAL BUILDING |
| FS     | FAR SIDE                           |       | PERP  | PERPENDICULAR                 |
| FT     | FOOT                               |       | PJP   | PARTIAL JOINT PENETRATION     |
| FTG    | FOOTING                            |       | PL    | PLATE                         |
| FUT    | FUTURE                             |       | PLCS  | PLACES                        |
| FV     | FIELD VERIFY                       |       |       | POUNDS PER LINEAR FOOT        |
| Fy     | STRUCTURAL STEEL YIELD STRENGTH =  |       |       |                               |
| fy     | REINFORCING STEEL YIELD STRENGTH = |       |       |                               |
| G      |                                    |       |       |                               |
| GA     | GAUGE                              |       |       |                               |
| GALV   | GALVANIZED                         |       |       |                               |
| GEN    | GENERAL                            |       |       |                               |
| GR     | GRADE                              |       |       |                               |

Figure 1: Symbols for the various types of chamfers and fillets. The symbols are arranged in a 9x2 grid, showing different chamfer and fillet profiles and their corresponding dimensioning symbols.

| Symbol Description                          | Dimensioning Symbols |
|---------------------------------------------|----------------------|
| FINISH (Left), FINISH (Right)               | ASIZ, APIT, OPIT     |
| FILLET (Left), FILLET (Right)               | ASIZ, APIT, OPIT     |
| NOTE (Left), NOTE (Right)                   | ASIZ, APIT, OPIT     |
| OFFSET FILLET (Left), OFFSET FILLET (Right) | ASIZ, APIT, OPIT     |
| SQUARE (BUTT) (Left), SQUARE (BUTT) (Right) | ASIZ, APIT, OPIT     |
| BEVEL (Left), BEVEL (Right)                 | ASIZ, APIT, OPIT     |
| FLARE BEVEL (Left), FLARE BEVEL (Right)     | ASIZ, APIT, OPIT     |
| FLARE V (Left), FLARE V (Right)             | ASIZ, APIT, OPIT     |
| BACK (Left), BACK (Right)                   | ASIZ, APIT, OPIT     |
| J (Left), J (Right)                         | ASIZ, APIT, OPIT     |
| SLOT (Left), SLOT (Right)                   | ASIZ, APIT, OPIT     |
| U (Left), U (Right)                         | ASIZ, APIT, OPIT     |



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# WRF EFFLUENT PUMPING IMPROVEMENTS

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| DETAILED:    | VVS        |
| CHECKED:     | MZL        |
| APPROVED:    | JAB        |
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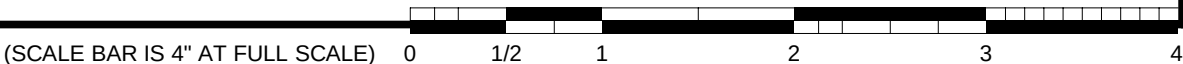
## GENERAL

STRUCTURAL

## ABBREVIATIONS AND LEGEND

PLAN FILE NO. 664-203

00-S-002

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THE APPLICABLE BUILDING CODE IS THE 2018 INTERNATIONAL BUILDING CODE (IBC)

- 400 PSF

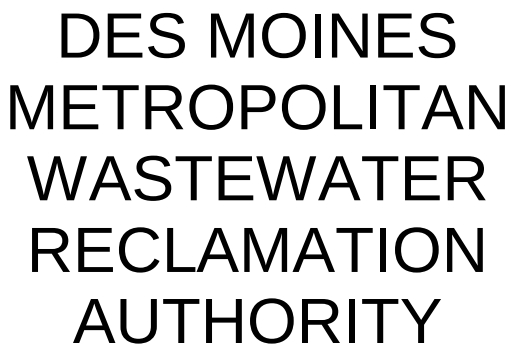
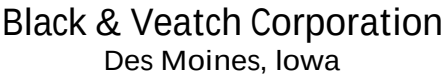
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|                                    |          |
|------------------------------------|----------|
| INTERNAL PRESSURE COEFFICIENT..... | ±0.55    |
| DIMENSION "a" FOR WALLS.....       | 3.00 FT  |
| DIMENSION "h" FOR ROOF.....        | 25.75 FT |
| ROOF TYPE.....                     | 1        |

NOTES:

- |                                    |         |
|------------------------------------|---------|
| INTERNAL PRESSURE COEFFICIENT..... | ±0.55   |
| DIMENSION "a".....                 | 3.00 FT |
| ROOF TYPE.....                     | 2       |

4. SOFFITS BELOW ROOF OVERHANGS ARE DESIGNED FOR THE PRESSURE ON THE WALL BELOW THE SOFFIT
5. PARAPET PRESSURES ARE THE TOTAL OF THE WINDWARD AND LEEWARD PARAPET FACE VALUES.



# WRF EFFLUENT PUMPING IMPROVEMENTS

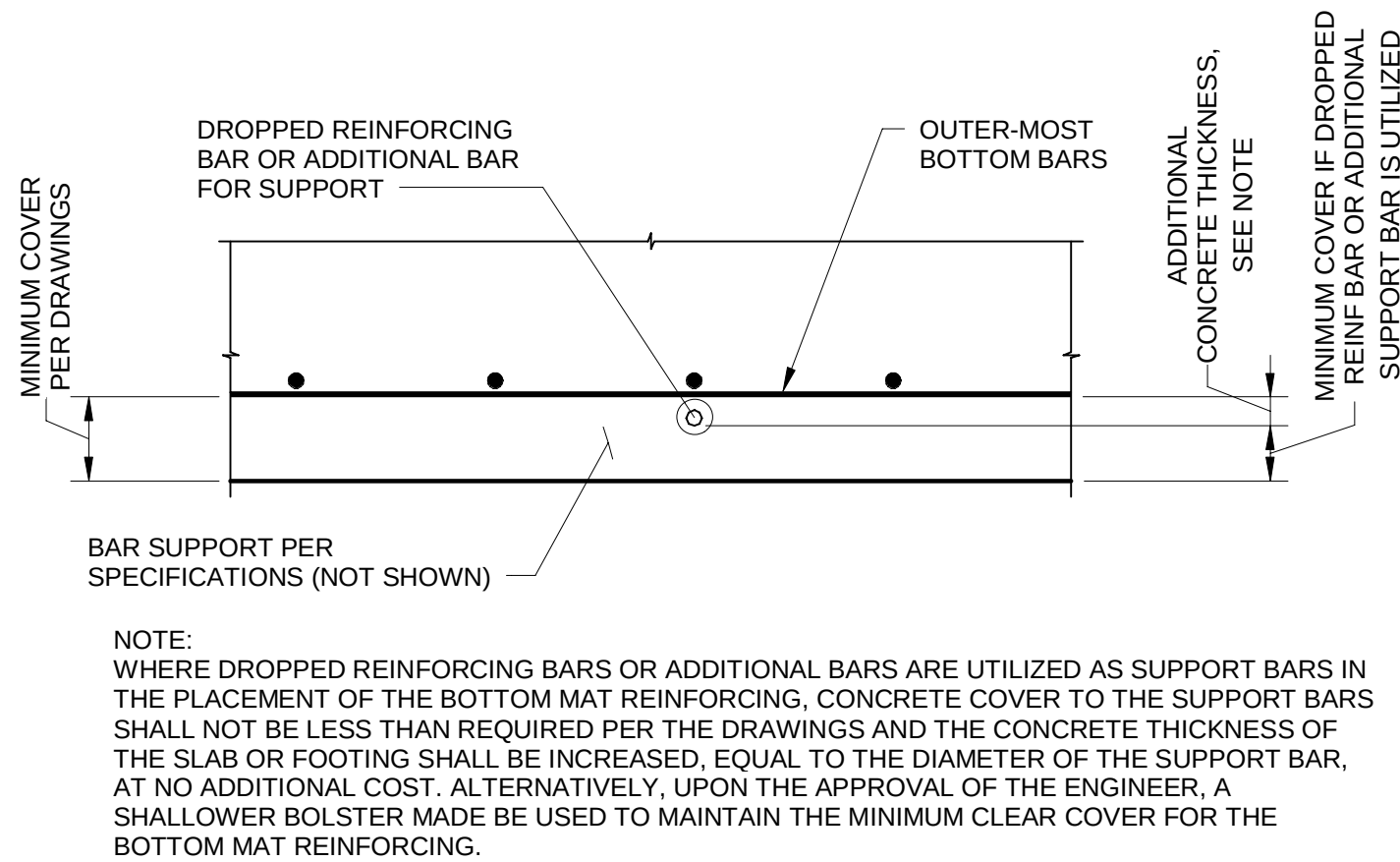
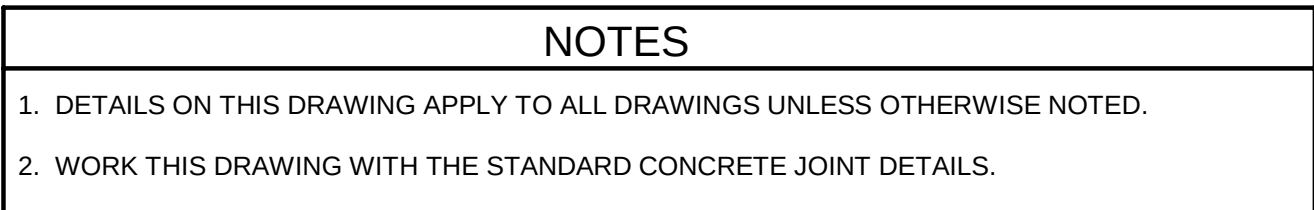
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## STRUCTURAL

PLAN FILE NO. 664-204

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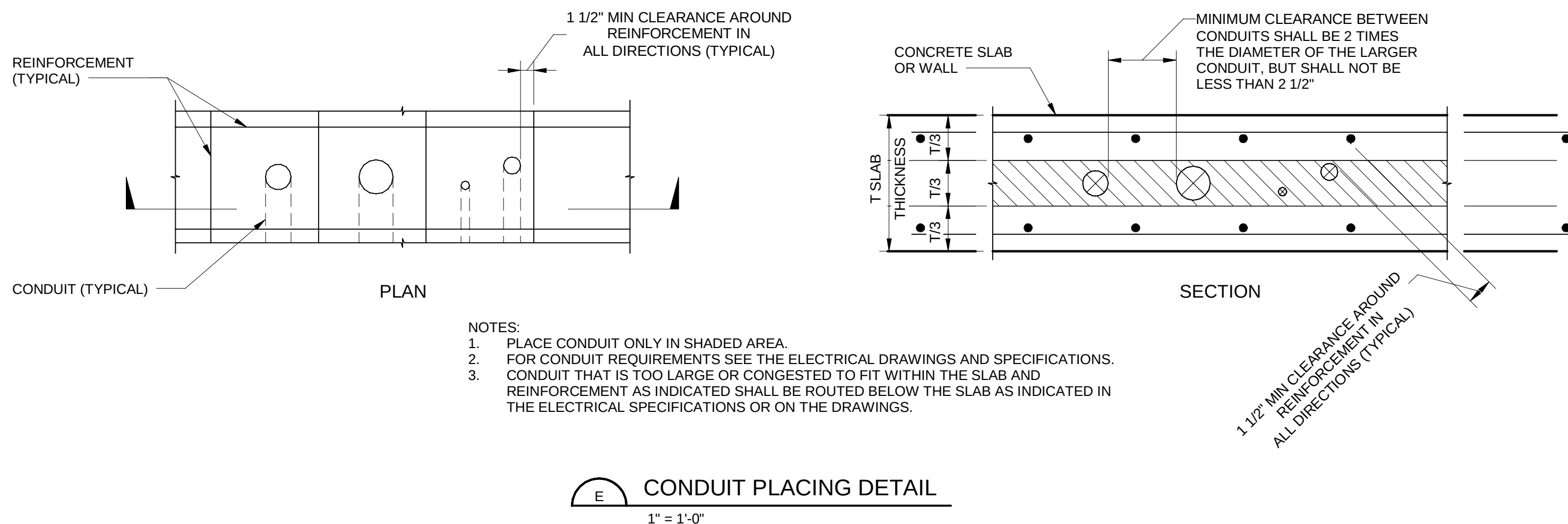
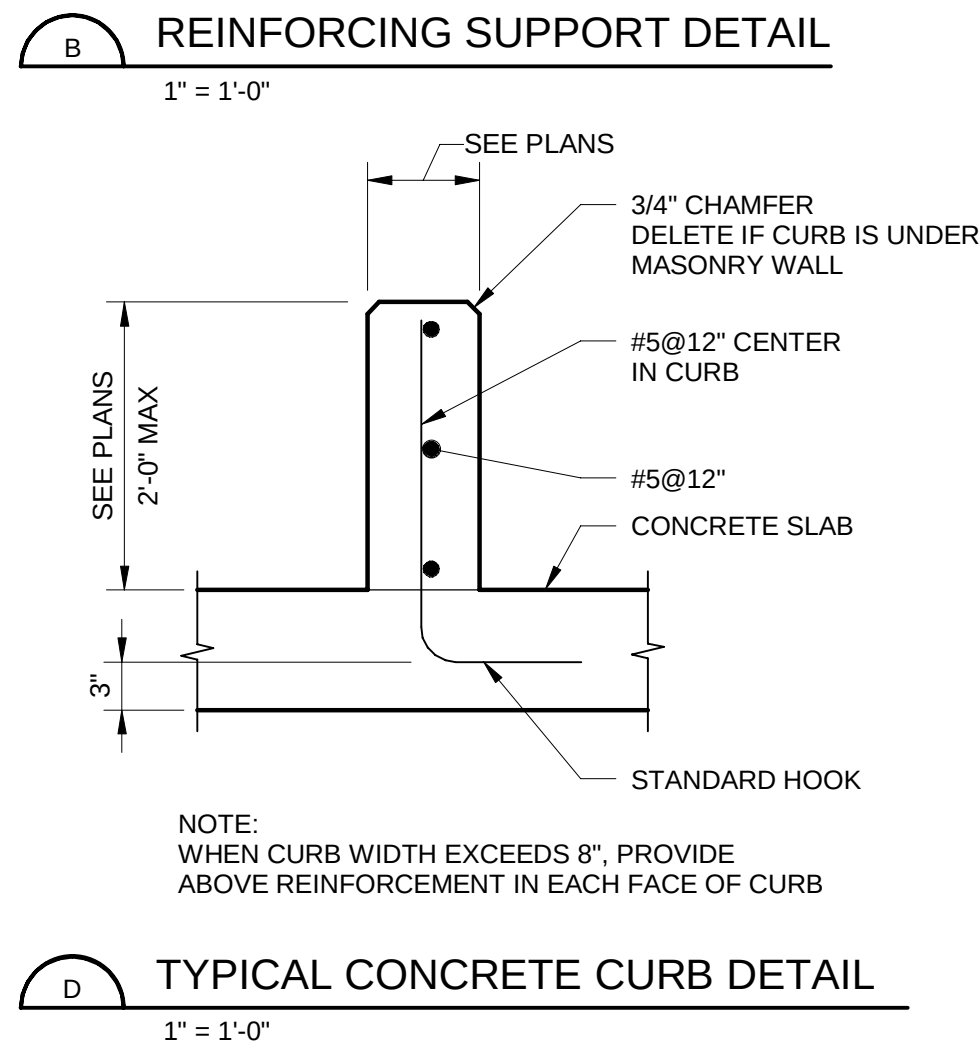
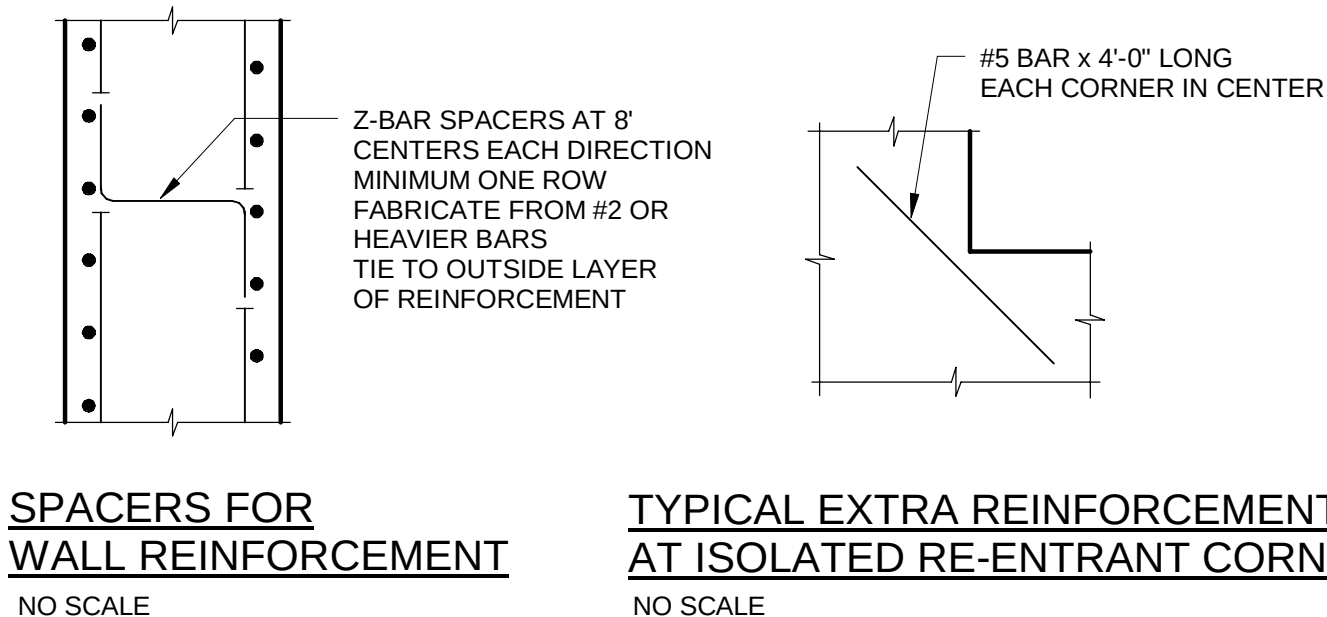
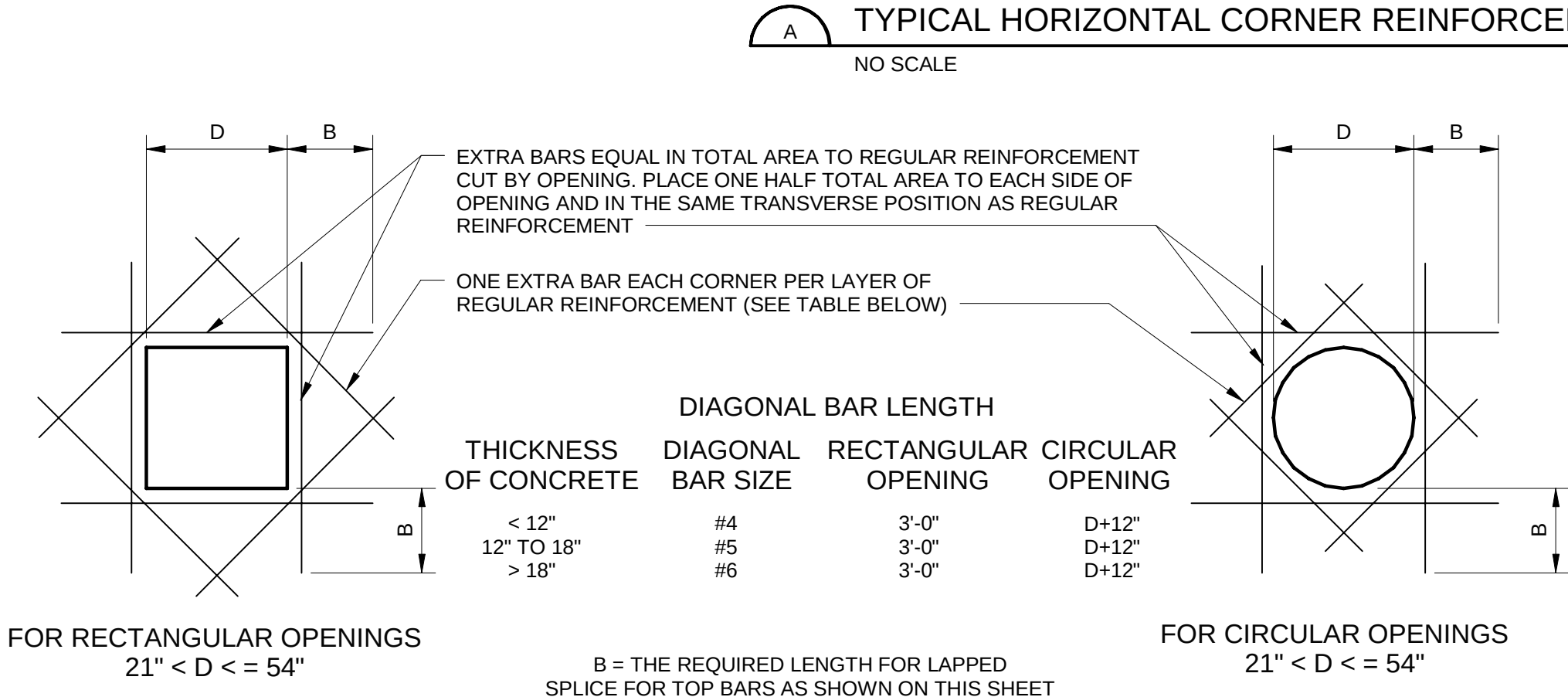
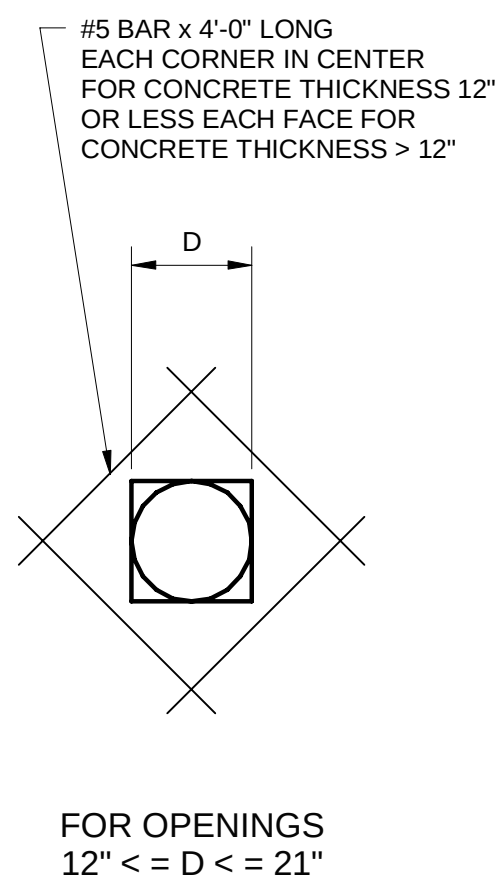




## MAIN REINFORCEMENT FOR ALL STRUCTURES

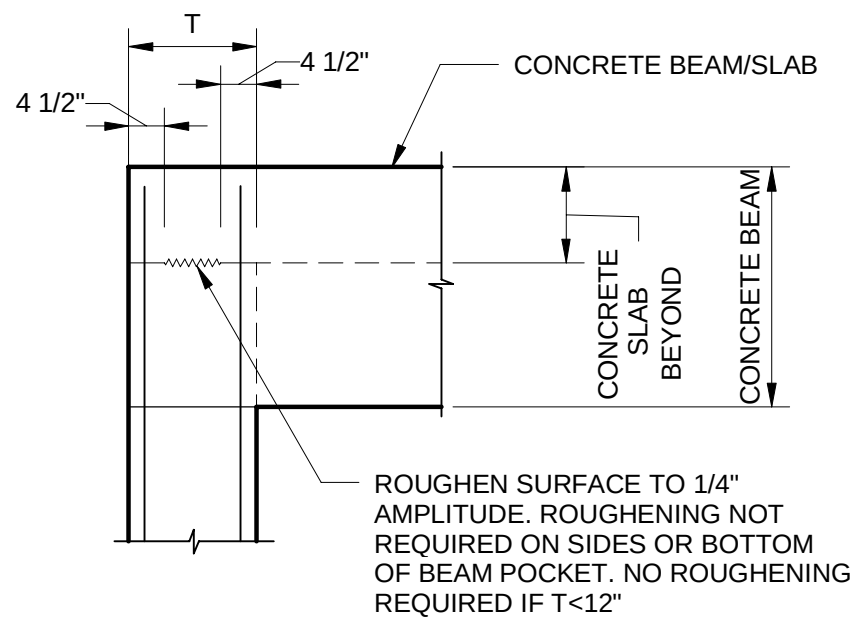
- NOTES:
1. VERTICAL REINFORCEMENT IS NOT SHOWN.
  2. THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

ADDITIONAL REINFORCEMENT WHERE SPECIFICALLY NOTED ON THE DRAWINGS

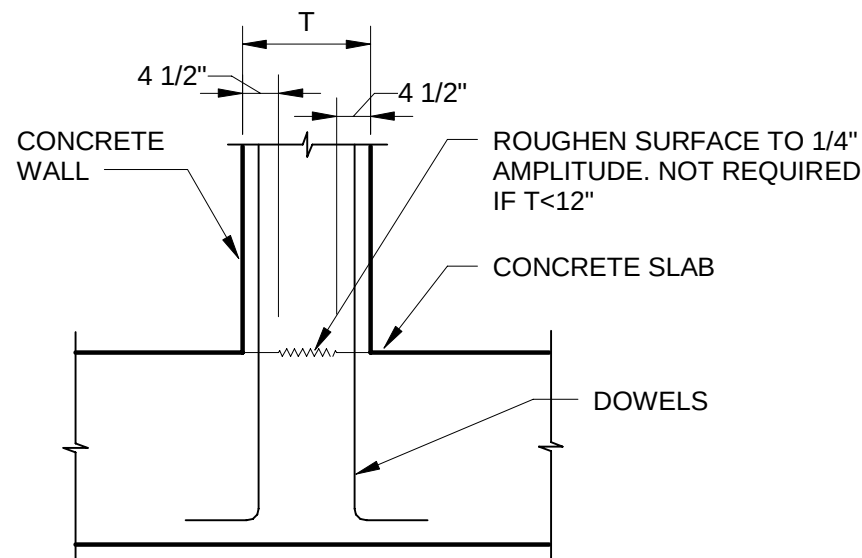


| LENGTH OF LAPPED SPICES<br>FOR REINFORCEMENT (INCHES)                                                                                                                                                                                                                                                                                                                                                 |                 |        |               |        |                  | CONCRETE COVER FOR REINFORCEMENT                                                                                                                                                                                     |                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|---------------|--------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| UNLESS NOTED OTHERWISE ON THE DRAWINGS                                                                                                                                                                                                                                                                                                                                                                |                 |        |               |        |                  | UNLESS NOTED OTHERWISE ON THE DRAWINGS                                                                                                                                                                               |                 |
| BAR<br>SIZE<br>*                                                                                                                                                                                                                                                                                                                                                                                      | BEAMS & COLUMNS |        | WALLS & SLABS |        | BAR<br>SIZE<br>* | LOCATION                                                                                                                                                                                                             | SPECIFIED COVER |
|                                                                                                                                                                                                                                                                                                                                                                                                       | **TOP BARS      | OTHERS | **TOP BARS    | OTHERS |                  |                                                                                                                                                                                                                      |                 |
| #3                                                                                                                                                                                                                                                                                                                                                                                                    | 16              | 16     | 16            | 16     | #3               | UNFORMED SURFACES ADJACENT TO EXCAVATION.....                                                                                                                                                                        | 3"              |
| #4                                                                                                                                                                                                                                                                                                                                                                                                    | 19              | 16     | 19            | 16     | #4               | SURFACES INSIDE OF OZONE CONTACTORS EXPOSED<br>TO OZONE IN WATER OR AIR.....                                                                                                                                         | 3"              |
| #5                                                                                                                                                                                                                                                                                                                                                                                                    | 24              | 18     | 24            | 18     | #5               | TOP SURFACES OF SLABS THAT ARE SUBMERGED.....                                                                                                                                                                        | 3"              |
| #6                                                                                                                                                                                                                                                                                                                                                                                                    | 33              | 26     | 29            | 22     | #6               | FORMED SURFACES THAT ARE SUBMERGED, AND FORMED<br>OR TOP SURFACES EXPOSED TO WEATHER, SATURATED<br>AIR, OR EARTH.....                                                                                                | 2"              |
| #7                                                                                                                                                                                                                                                                                                                                                                                                    | 55              | 42     | 48            | 37     | #7               | OTHER LOCATIONS:                                                                                                                                                                                                     |                 |
| #8                                                                                                                                                                                                                                                                                                                                                                                                    | 69              | 53     | 60            | 46     | #8               | BEAMS AND GIRDERS.....                                                                                                                                                                                               | 1 1/2"          |
| #9                                                                                                                                                                                                                                                                                                                                                                                                    | 84              | 65     | 74            | 57     | #9               | SLABS, WALLS AND JOISTS:<br>#6 AND LARGER.....                                                                                                                                                                       | 1 1/2"          |
| #10                                                                                                                                                                                                                                                                                                                                                                                                   | 103             | 79     | 91            | 70     | #10              | #5 AND SMALLER.....                                                                                                                                                                                                  | 1"              |
| #11                                                                                                                                                                                                                                                                                                                                                                                                   | 122             | 94     | 108           | 83     | #11              |                                                                                                                                                                                                                      |                 |
| <p>* LAP SPICE LENGTH FOR BARS OF DIFFERENT SIZES SHALL BE THE GREATER OF THE SMALL BAR LAP LENGTH OR 0.75x THE LARGER BAR LAP LENGTH.</p> <p>** TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS.</p> |                 |        |               |        |                  | <p>NOTES:</p> <p>1. COVER IS MEASURED TO NEAREST BAR, STIRRUP, TIE, OR SPIRAL, AS APPLICABLE.</p> <p>2. TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACING OF REINFORCEMENT SHALL CONFORM TO ACI 117.</p> |                 |



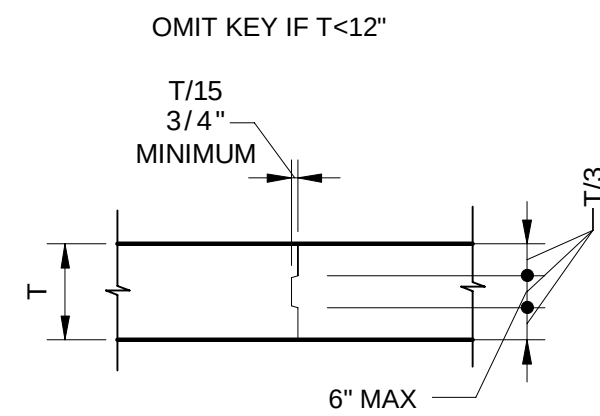


TOP OF WALL TO BEAM/SLAB

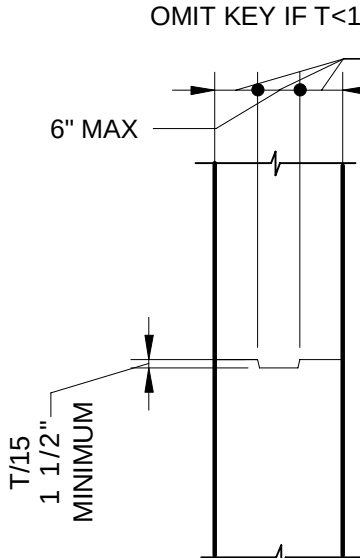


SLAB TO BOTTOM OF WALL

JOINTS WITHOUT WATERSTOPS



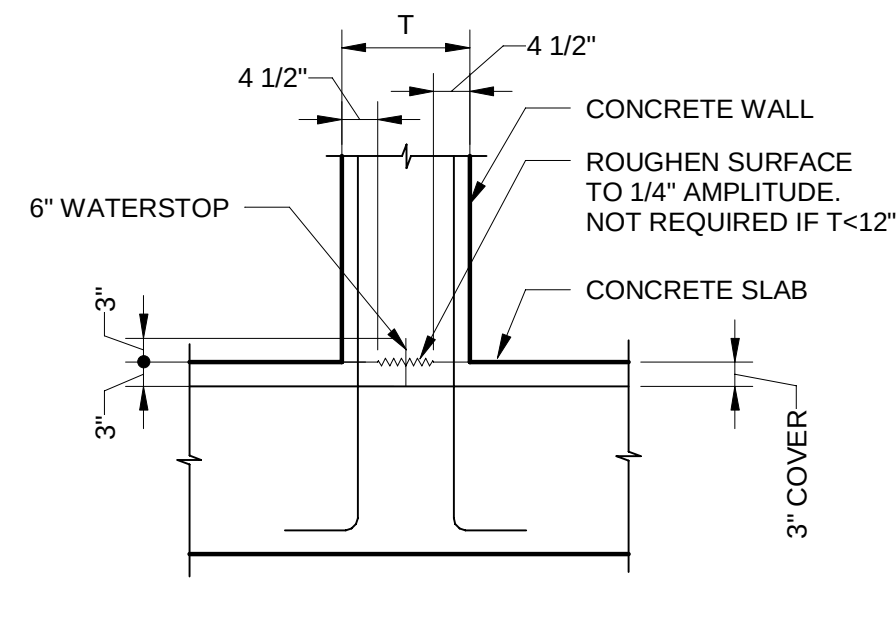
SLAB TO SLAB



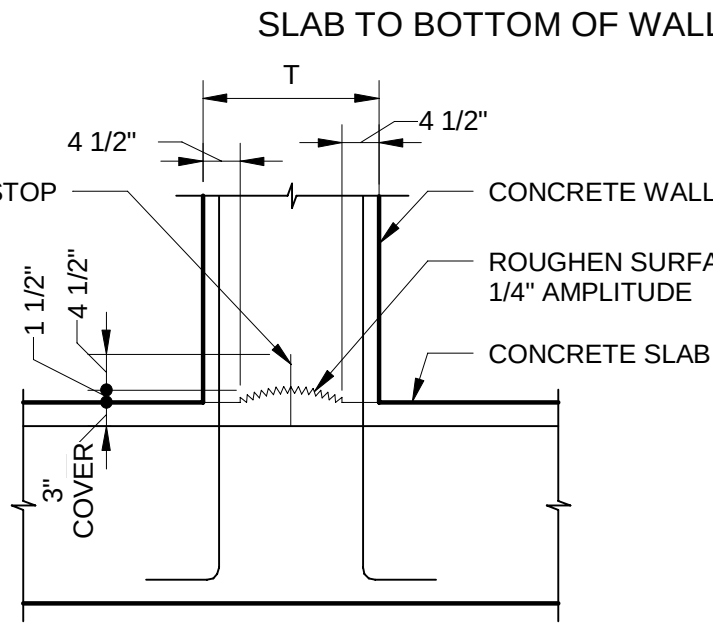
WALL TO WALL

NOTES:

1. REINFORCEMENT STEEL IS CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS.
2. "CSJ W/ WS" - CONSTRUCTION JOINT WITH WATERSTOP.
3. "CSJ" - CONSTRUCTION JOINT WITHOUT WATERSTOP.
4. UNLESS NOTED OTHERWISE, WATERSTOPS MAY BE STEEL OR PVC.
5. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS 18" OR LESS IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".



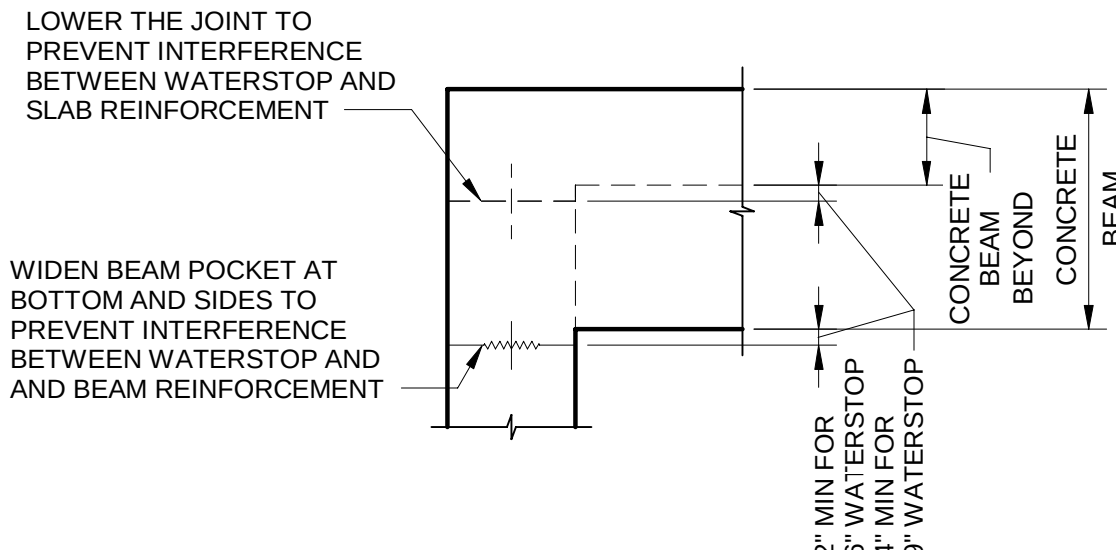
FOR T < 18"



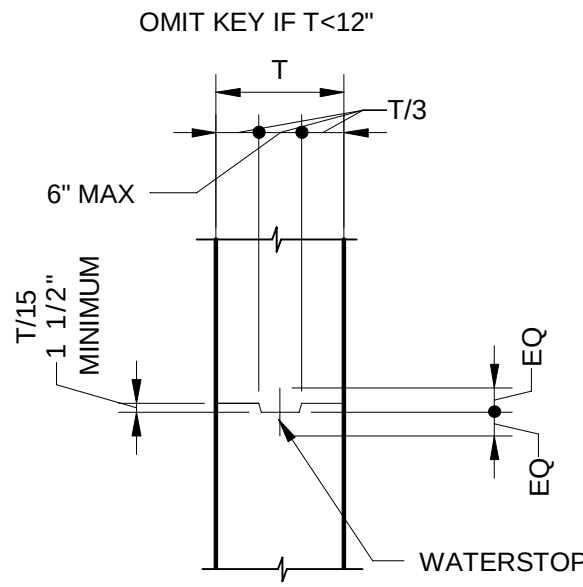
FOR T >= 18"

SLAB TO BOTTOM OF WALL

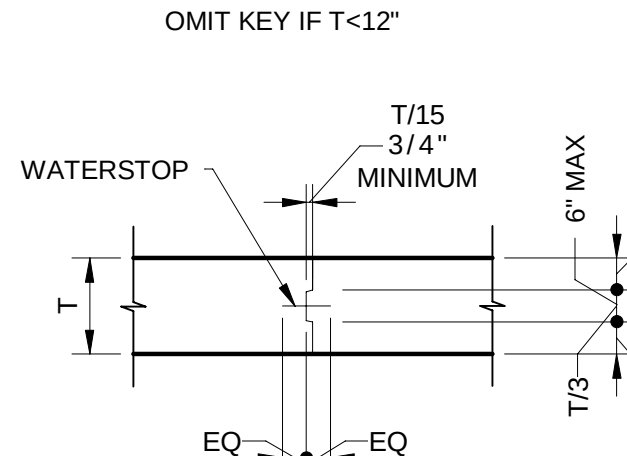
JOINTS WITH WATERSTOPS



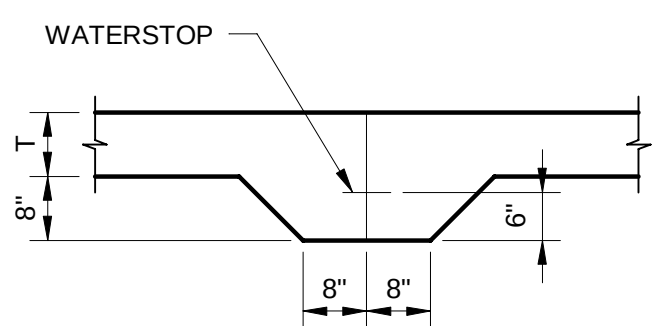
TOP OF WALL TO BEAM/SLAB



WALL TO WALL

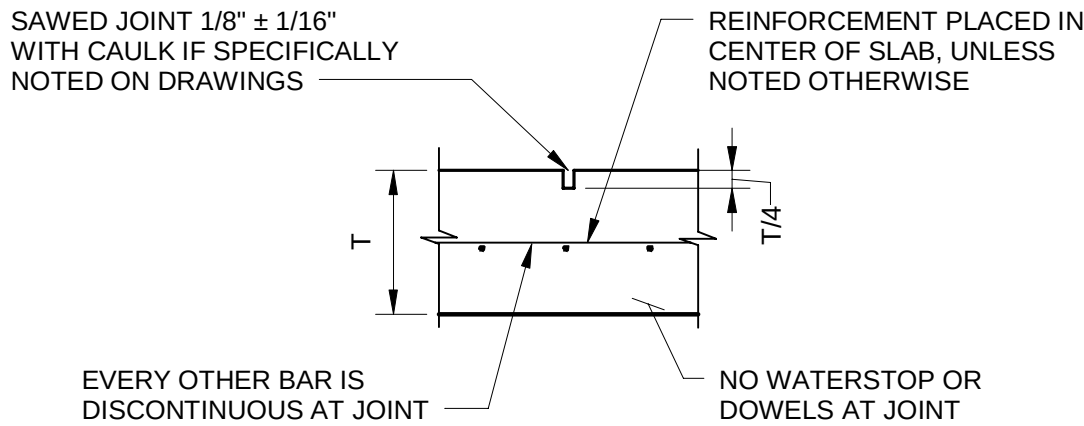


SLAB TO SLAB (T >= 12")

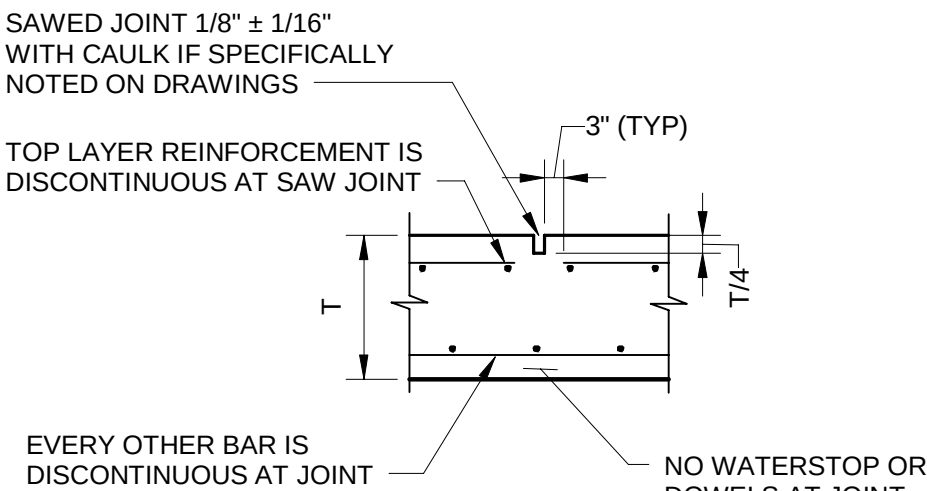


SLAB TO SLAB (T < 12")

- NOTES
1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS NOTED OTHERWISE.
  2. WORK THIS DRAWING WITH THE STANDARD CONCRETE REINFORCEMENT DETAILS.
  3. AT WALL JOINTS AND AT WALL BASE JOINTS, SECURE ALL ELASTOMERIC WATERSTOPS IN THE CORRECT POSITION USING HOG RINGS OR GROMMETS SPACED AT 12 INCHES ALONG THE LENGTH OF THE WATERSTOP AND WIRE TIE TO ADJACENT REINFORCING STEEL.
  4. AT SLAB JOINTS AND FOOTING JOINTS, ENSURE SPACE BENEATH AND AROUND WATERSTOP IS COMPLETELY FILLED WITH CONSOLIDATED CONCRETE. DURING OPERATION, MAKE VISUAL INSPECTION OF ENTIRE WATERSTOP AREA. LIMIT CONCRETE PLACEMENT TO ELEVATION OF WATERSTOP IN FIRST LIFT. RAISE ELASTOMERIC WATERSTOPS TO CONFIRM FULL CONSOLIDATION WITHOUT VOIDS. PLACE REMAINING CONCRETE TO FULL DEPTH OF SLAB.



SINGLY REINFORCED SLABS

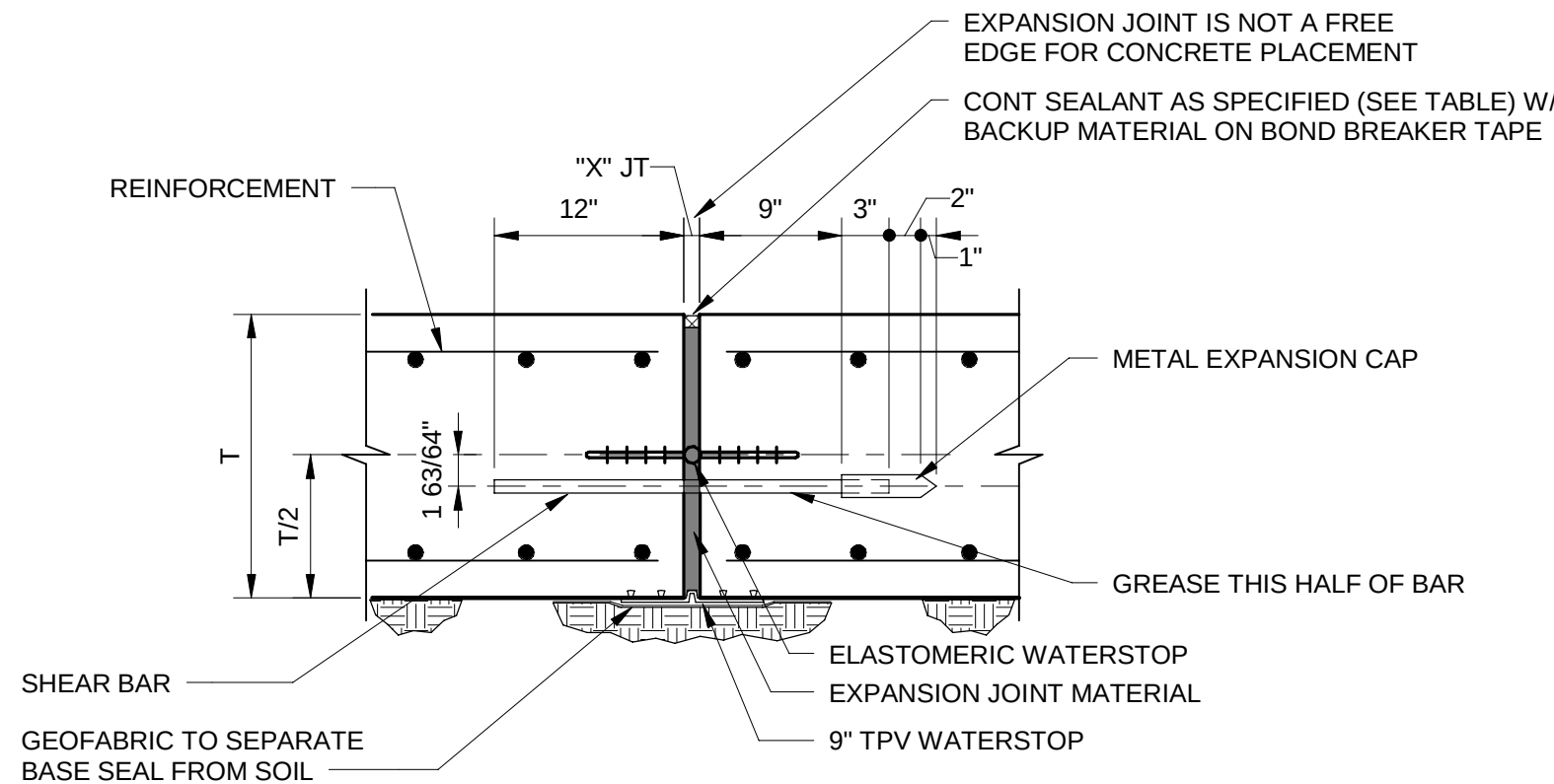


DOUBLY REINFORCED SLABS

NOTES:

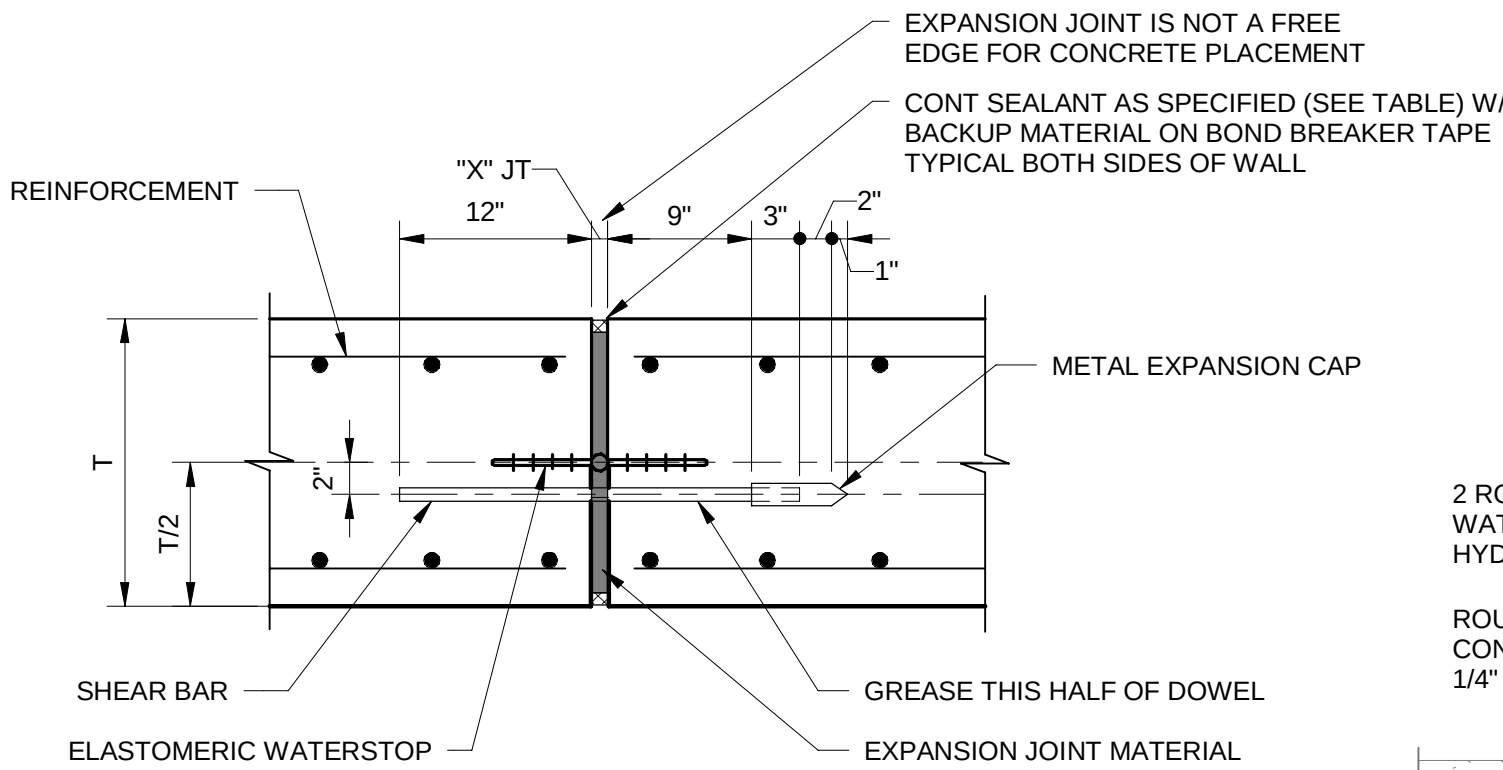
1. TYPICAL CONTROL JOINT NOTES NOT APPLICABLE FOR SAWED CONTRACTION JOINT.
2. "SJ" SAWED JOINT WITH NO WATERSTOP.
3. JOINT FORMED WITH TOOL OR INSERT STRIP MAY BE SUBSTITUTED FOR SAWED TYPE ONLY WITH PRIOR ACCEPTANCE BY THE ENGINEER.
4. SAWED CONTRACTION JOINTS TO BE USED AS INDICATED ON DRAWINGS.

SAWED CONTRACTION JOINT - SLAB ON GRADE



SLAB EXPANSION JOINT - TYPE A

| SEALANT TYPE                | EJ SPACING      | EJ SIZE "X" | SEALANT DEPTH |
|-----------------------------|-----------------|-------------|---------------|
| POLYURETHANE OR POLYSULFIDE | <100 FT         | 3/4"        | 3/8"          |
|                             | 101 FT - 150 FT | 1"          | 1/2"          |



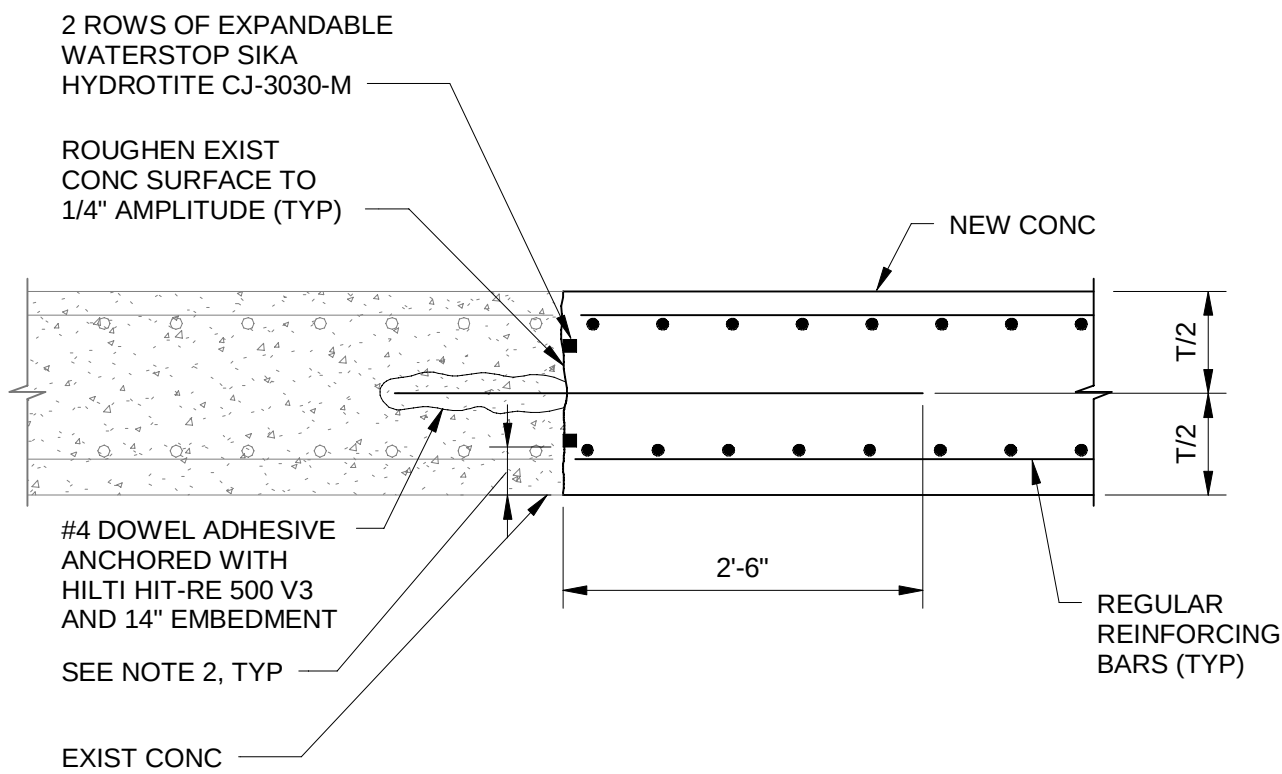
WALL EXPANSION JOINT - TYPE A

| SEALANT TYPE                | EJ SPACING      | EJ SIZE "X" | SEALANT DEPTH |
|-----------------------------|-----------------|-------------|---------------|
| POLYURETHANE OR POLYSULFIDE | <100 FT         | 3/4"        | 3/8"          |
|                             | 101 FT - 150 FT | 1"          | 1/2"          |

NOTES:

1. PROVIDE 3/4" DIAMETER SHEAR BARS @ 1'-6" CENTERS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE. SHEAR BARS SHALL BE SMOOTH FREE FROM RUST OR SCALE, AND GREASED TO PREVENT BOND (ONE HALF BAR ONLY).
3. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS LESS THAN 18" IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".
4. "EJ W/ WS" - EXPANSION JOINT WITH ELASTOMERIC WATERSTOP
5. "EJ" - EXPANSION JOINT WITHOUT WATERSTOP

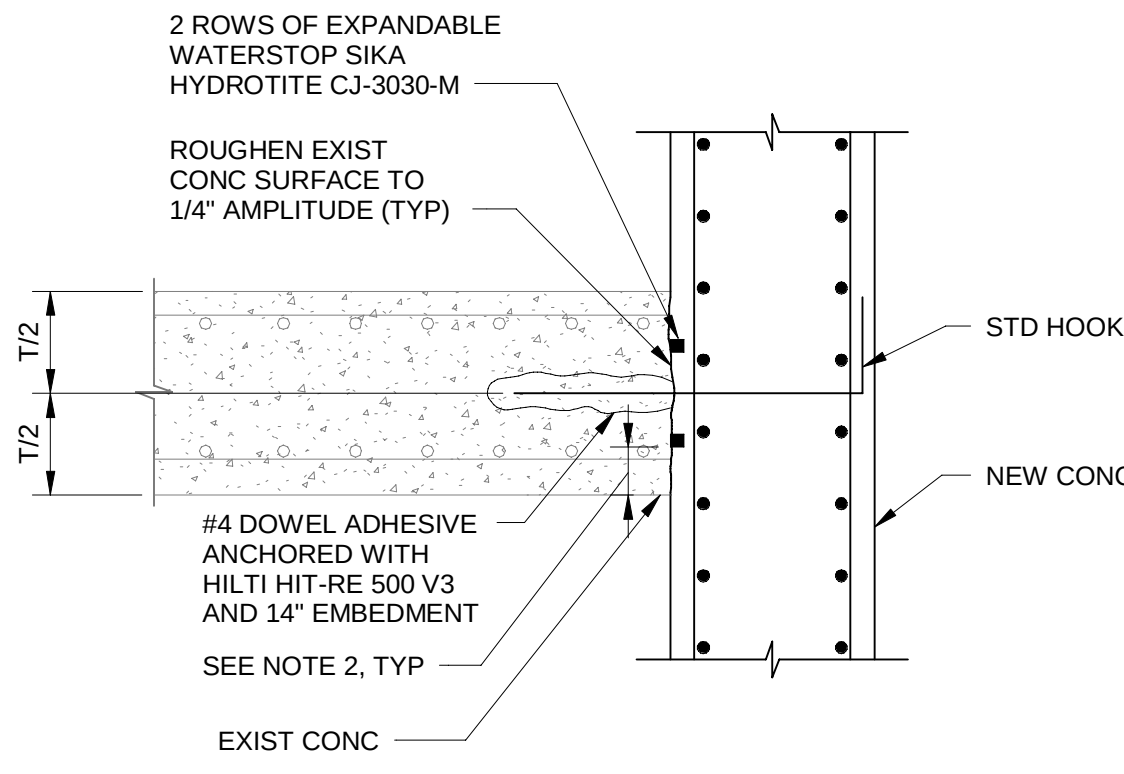
TYPICAL EXPANSION JOINT NOTES



ANCHORAGE TO PARALLEL WALL/SLAB

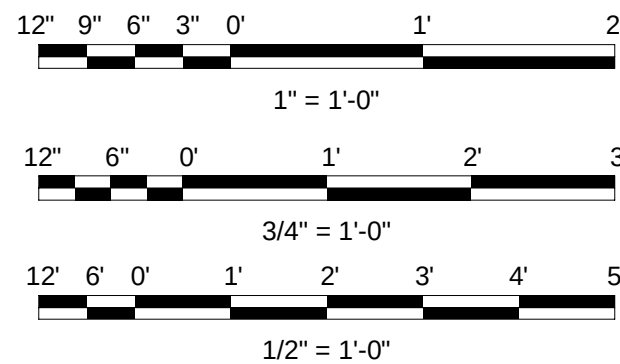
NOTE:

1. PROVIDE #4 POST-INSTALLED REINFORCING BAR @ 6" UNLESS NOTED OTHERWISE.
2. EXPANDABLE WATERSTOPS SHALL BE LOCATED ON EACH SIDE OF THE POST-INSTALLED DOWELS AND SHALL HAVE A MINIMUM OF 4" CLEAR COVER.



ANCHORAGE TO PERPENDICULAR WALL/SLAB

SLAB AND WALL RETROFIT



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|              |                    |
|--------------|--------------------|
| 08/16/2024   | ISSUED FOR BIDDING |
| DESIGNED:    | KB                 |
| DETAILED:    | VVS                |
| CHECKED:     | MZL                |
| APPROVED:    | JAB                |
| DATE:        | 08/16/2024         |
| PROJECT NO.: | 410504             |

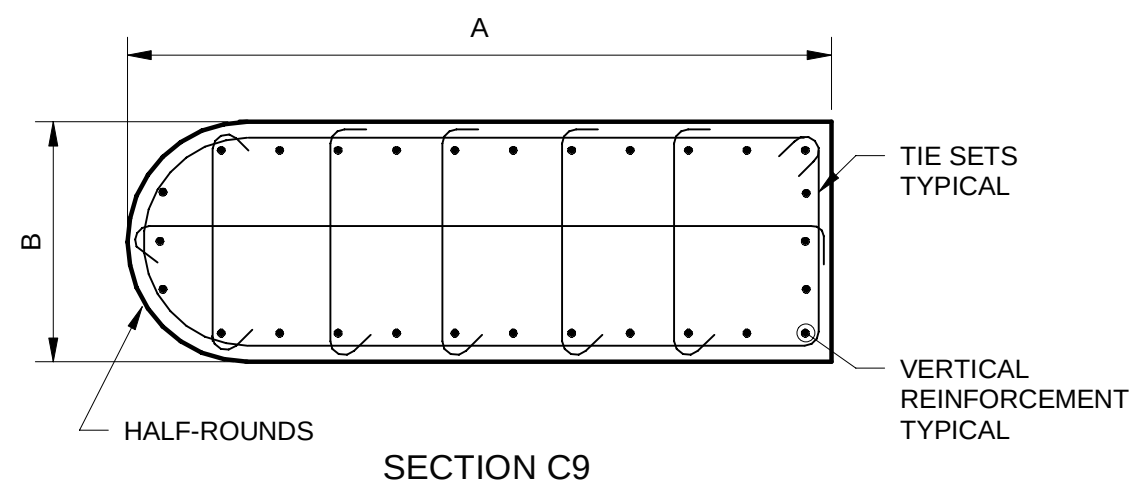
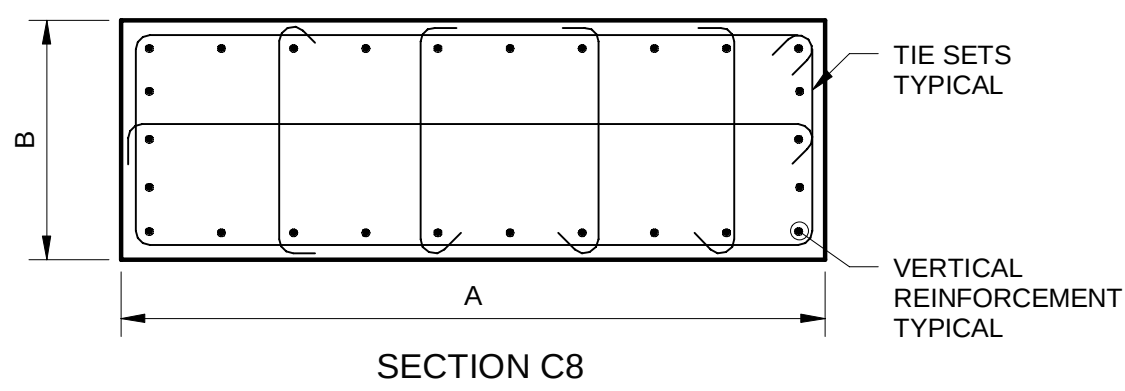
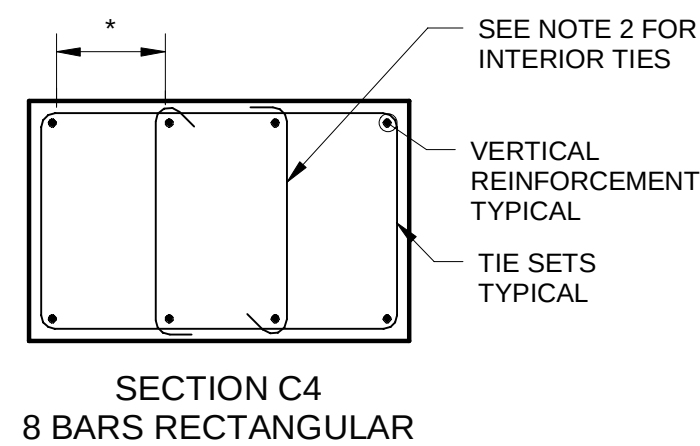
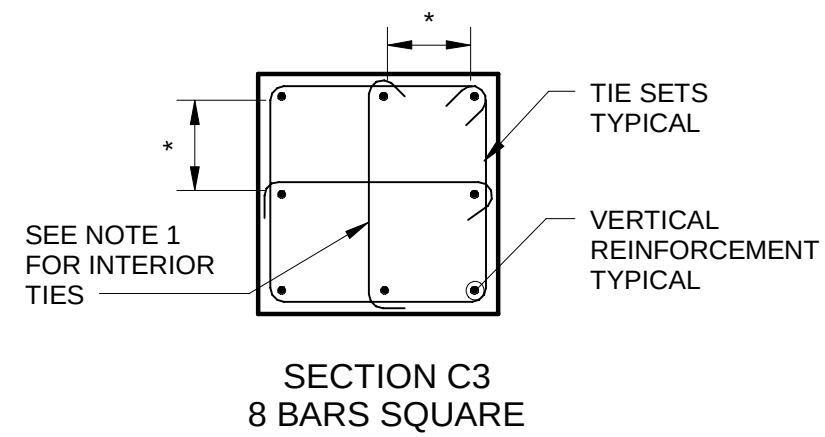
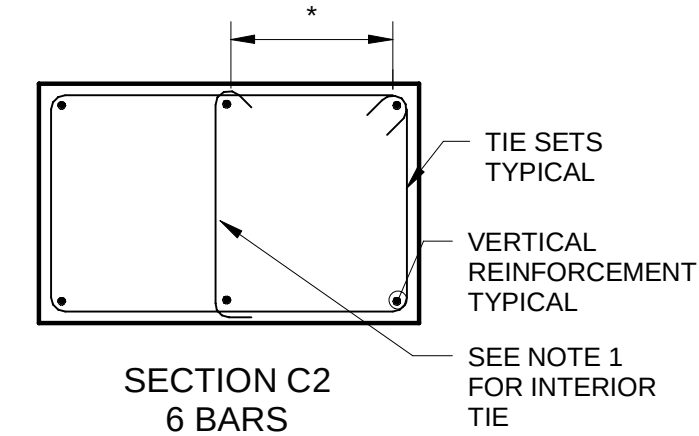
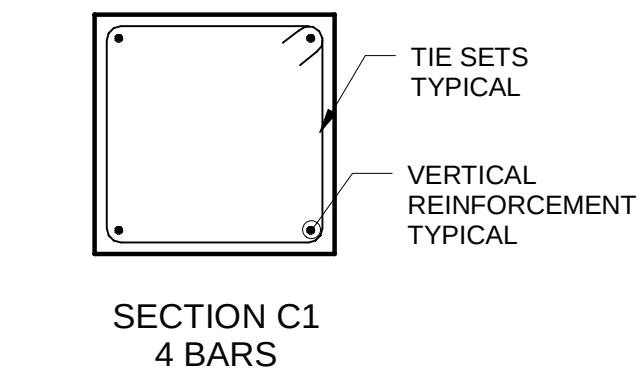
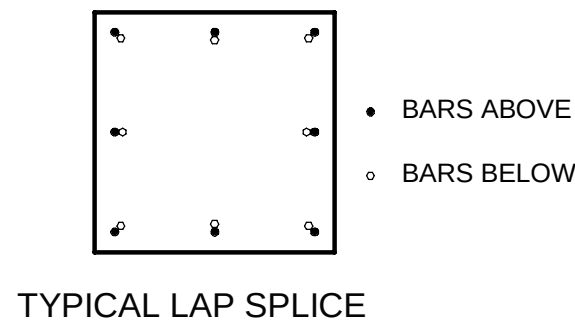
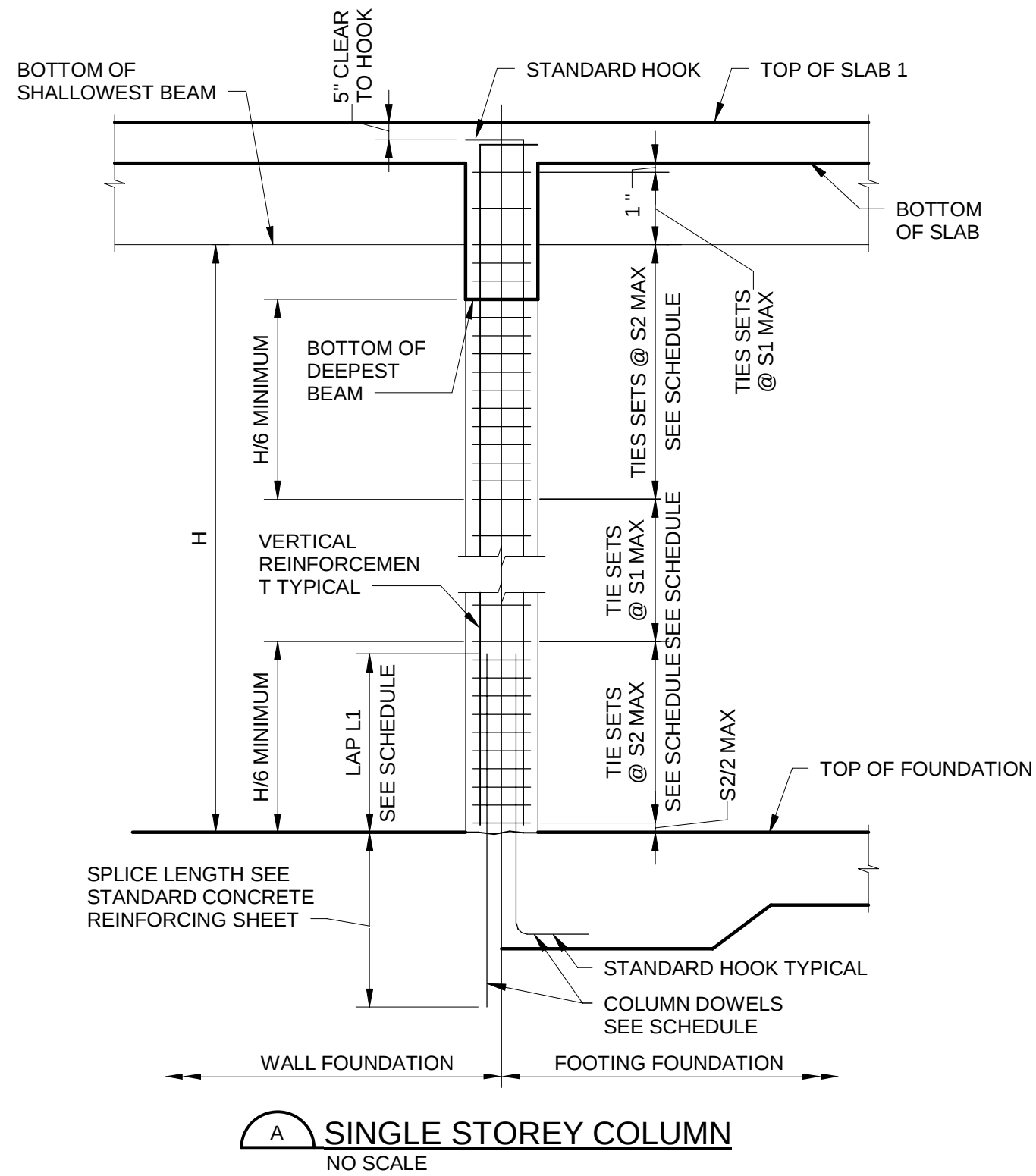
GENERAL

STRUCTURAL

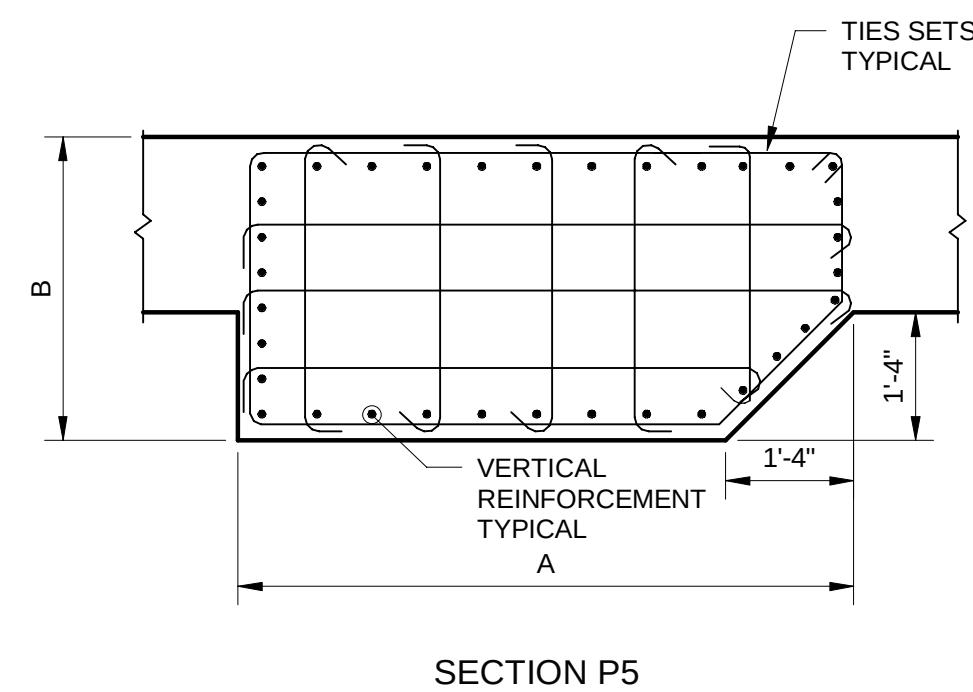
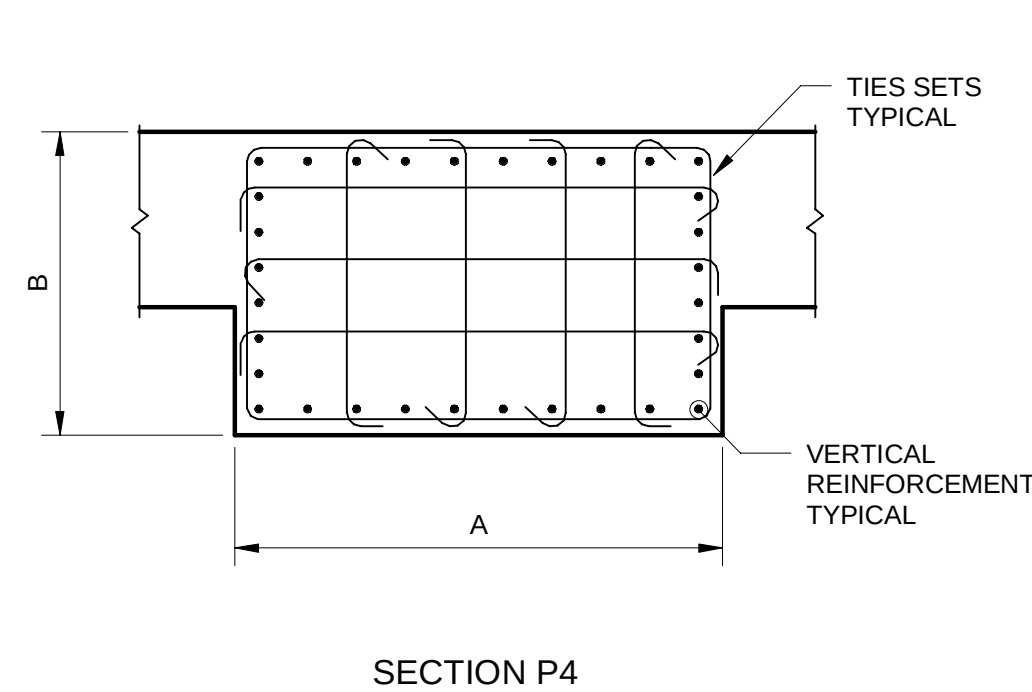
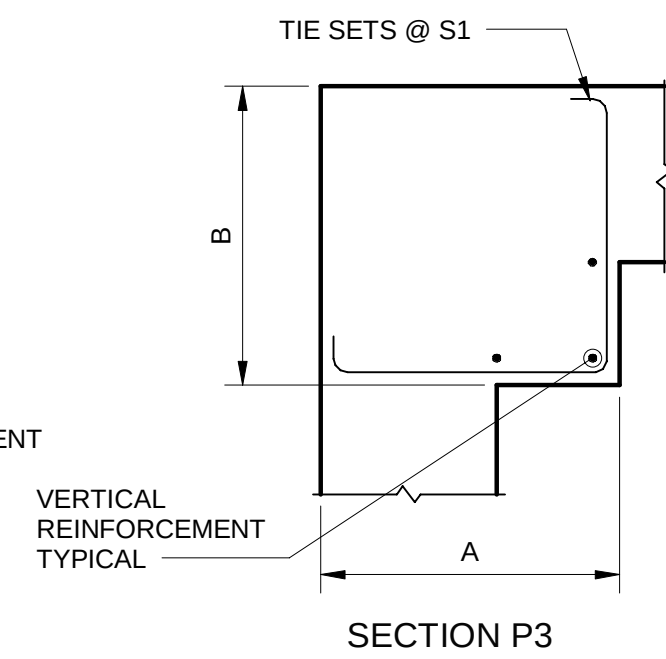
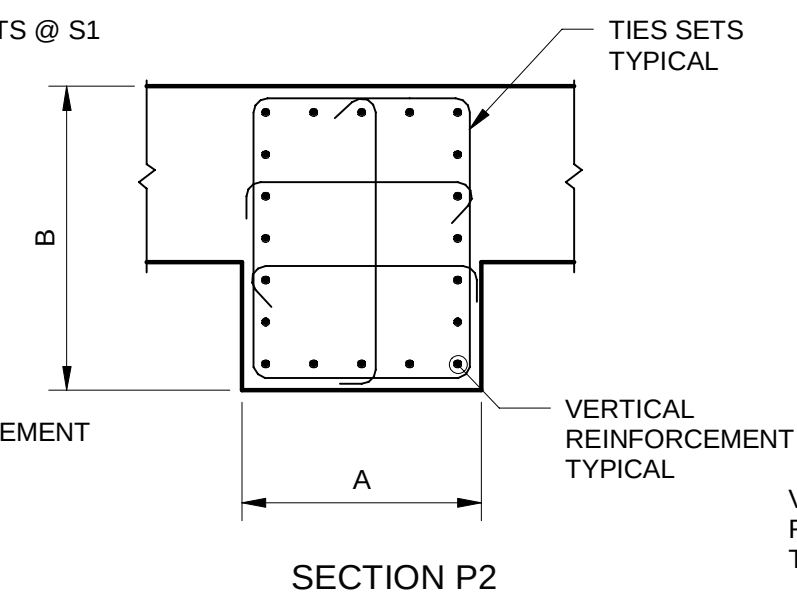
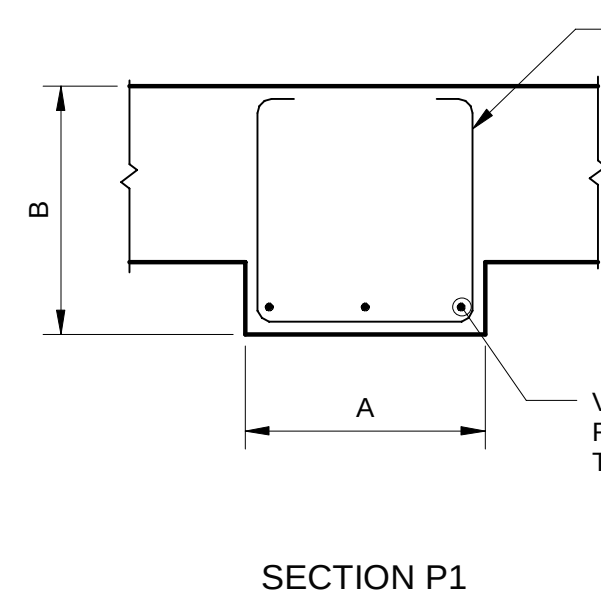
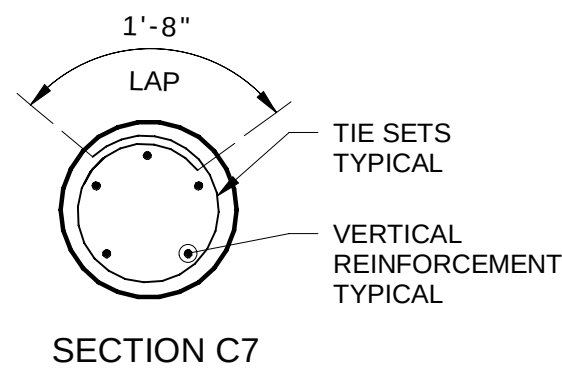
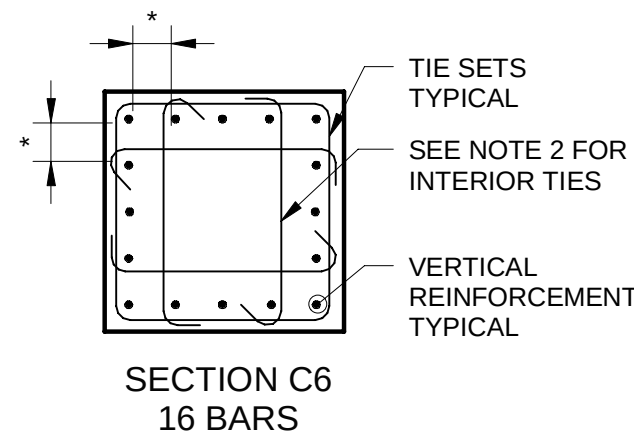
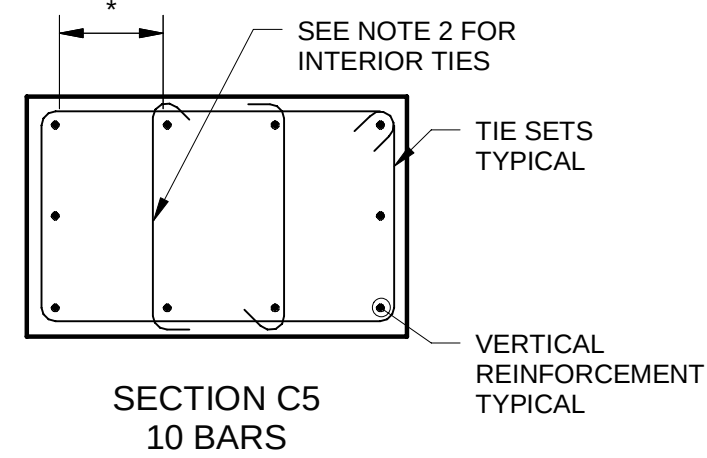
STANDARD CONCRETE  
JOINT DETAILS



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 D11000



- NOTES:
1. ALTERNATE LOCATIONS OF TIE HOOKS FOR CONSECUTIVE (VERTICAL AND HORIZONTAL) TIES.
  2. INTERIOR AND EXTERIOR TIES SHALL HAVE IDENTICAL SIZE AND SPACING.



- NOTES:
1. PILASTER SIZES IN REINFORCING SCHEDULE ARE CALLED OUT AS A x B.
  2. TYPICAL HORIZONTAL AND VERTICAL WALL REINFORCING IS CONTINUOUS THROUGH PILASTERS.



| CONCRETE COLUMN AND PILASTER SCHEDULE |   |       |       |       |       |       |         |
|---------------------------------------|---|-------|-------|-------|-------|-------|---------|
| COLUMN ROW                            | 1 | 2     | 3     | 4     | 5     | 6     | REMARKS |
| C                                     |   | 69-C1 | 69-C2 | 69-C2 | 69-C2 | 69-C1 |         |
| C.2                                   |   | 69-C3 | 69-C4 | 69-C4 | 69-C4 | 69-C3 |         |

| CONCRETE COLUMN AND PILASTER REINFORCING SCHEDULE |              |              |              |              |
|---------------------------------------------------|--------------|--------------|--------------|--------------|
| COLUMN AND PILASTER MARK                          | 69-C1        | 69-C2        | 69-C3        | 69-C4        |
| TOP OF SLAB 1 ELEVATION                           | 26.17'       | 26.17'       |              |              |
| SECTION                                           | P4           | C8           |              |              |
| SIZE (A x B)                                      | 56"x40"      | 56"x28"      |              |              |
| VERTICAL REINFORCEMENT                            | 32-#8        | 26-#8        |              |              |
| ELEVATION                                         | -0.33'       | -0.33'       | 3.5'         | 3.5'         |
| SECTION                                           | P5           | C9           | P2           | C6           |
| SIZE (AxB)                                        | 72"x40"      | 70"x28"      | 24"x40"      | 24"x28"      |
| VERTICAL REINFORCEMENT                            | 36-#8        | 28-#8        | 20-#8        | 16-#8        |
| TIE SETS @ S1                                     | #4@6"        | #4@6"        | #4@6"        | #4@6"        |
| TIE SETS @ S2                                     | #4@6"        | #4@6"        | #4@6"        | #4@6"        |
| LAP L1                                            | SEE 00-S-501 | SEE 00-S-501 | SEE 00-S-501 | SEE 00-S-501 |
|                                                   |              |              |              |              |
| TOP OF FOUNDATION ELEVATION                       | -6.33'       | -6.33'       | -6.33'       | -6.33'       |
| FOUNDATION TYPE                                   | MAT FDN      | MAT FDN      | MAT FDN      | MAT FDN      |
| DOWELS                                            | 36-#8        | 28-#8        | 20-#8        | 16-#8        |
|                                                   |              |              |              |              |
| COMMENTS                                          |              |              |              |              |



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | KB                 |
| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

GENERAL

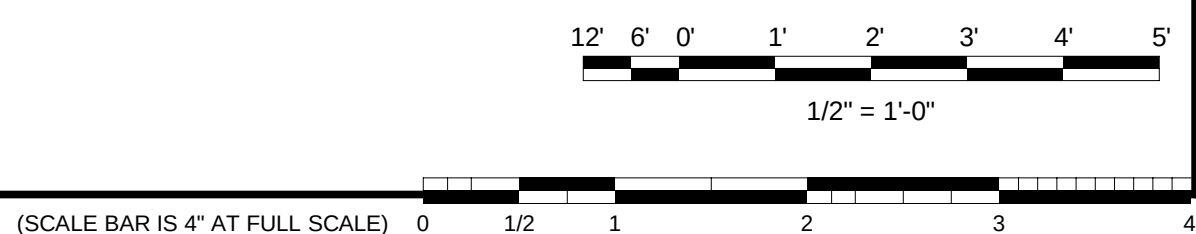
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STANDARD CONCRETE  
COLUMN AND PILASTER  
SCHEDULE AND DETAILS

PLAN FILE NO. 664-207

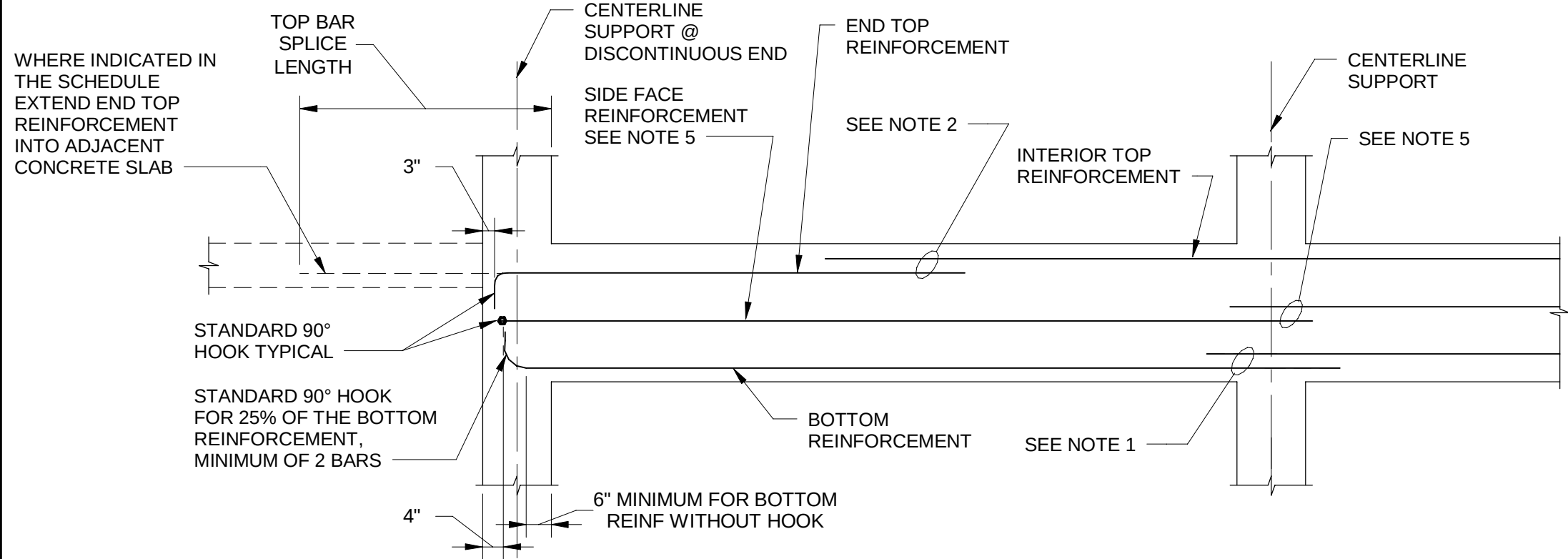
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14  
OF  
118

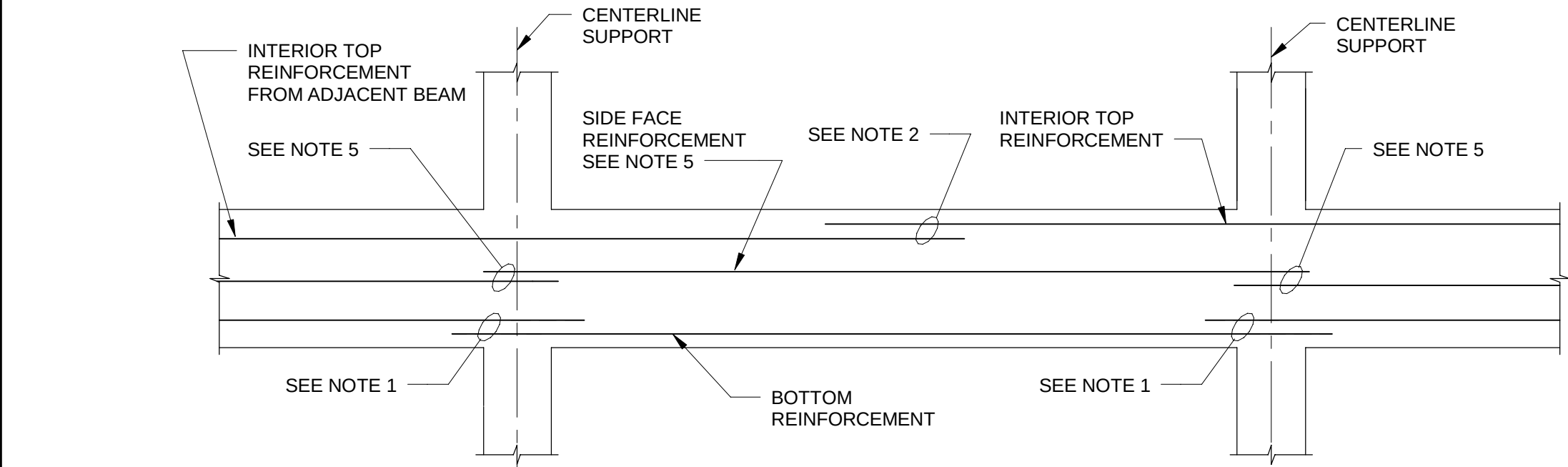




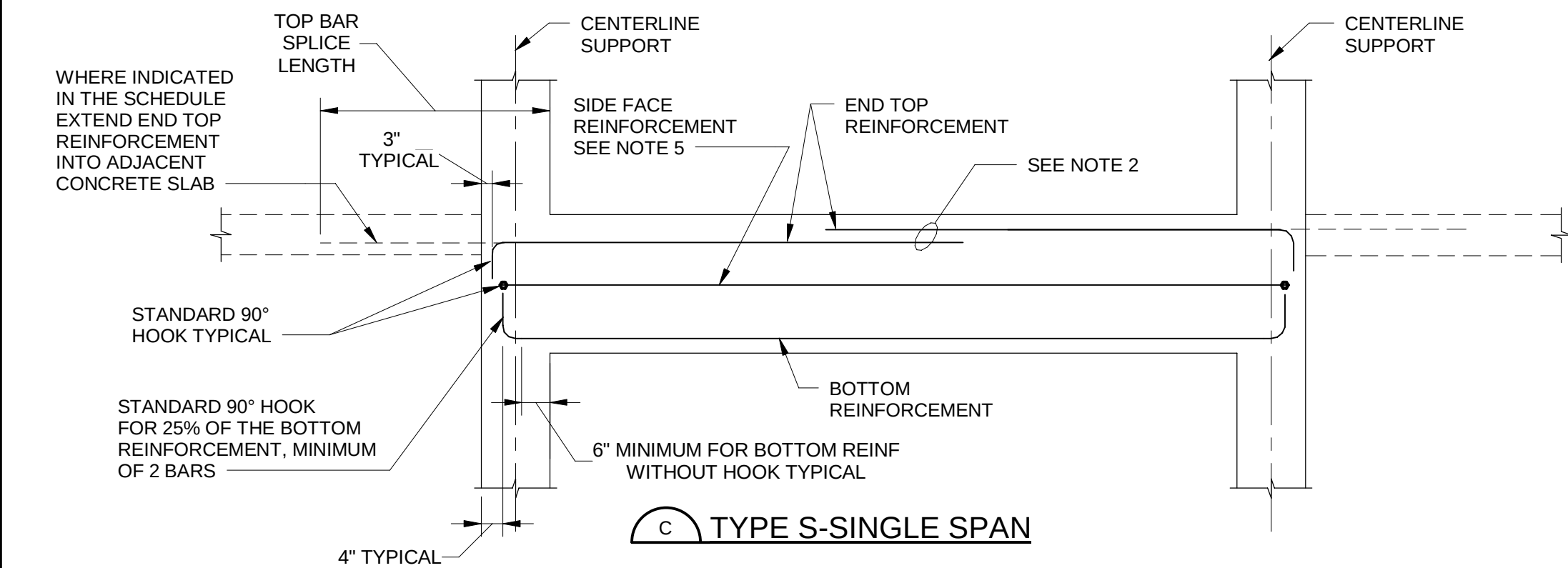
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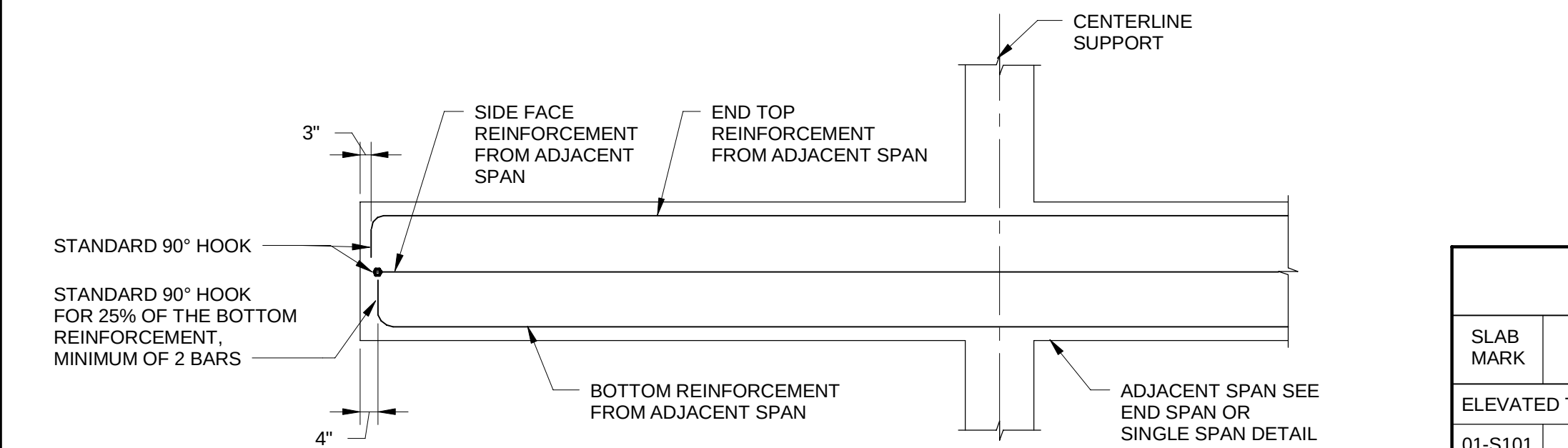
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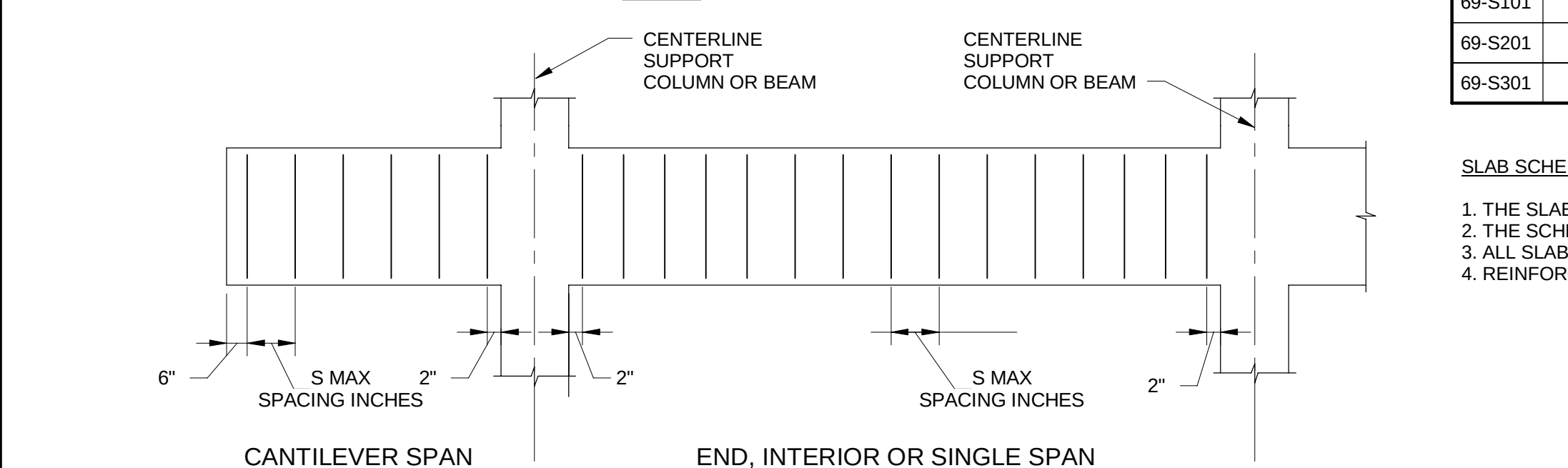
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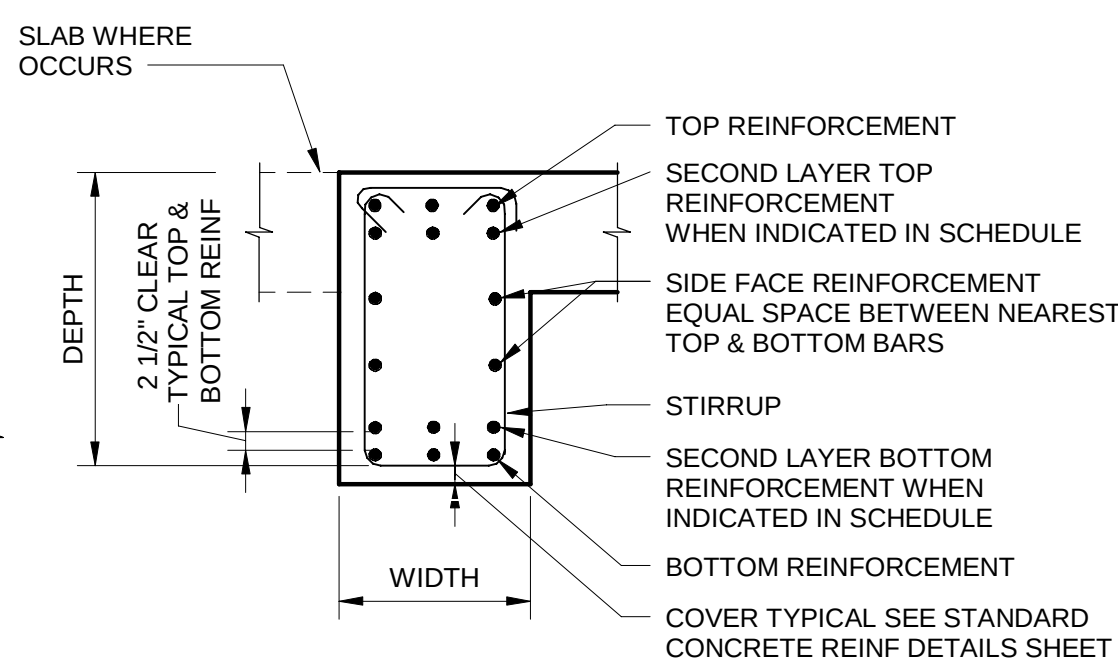
C TYPE S-SINGLE SPAN



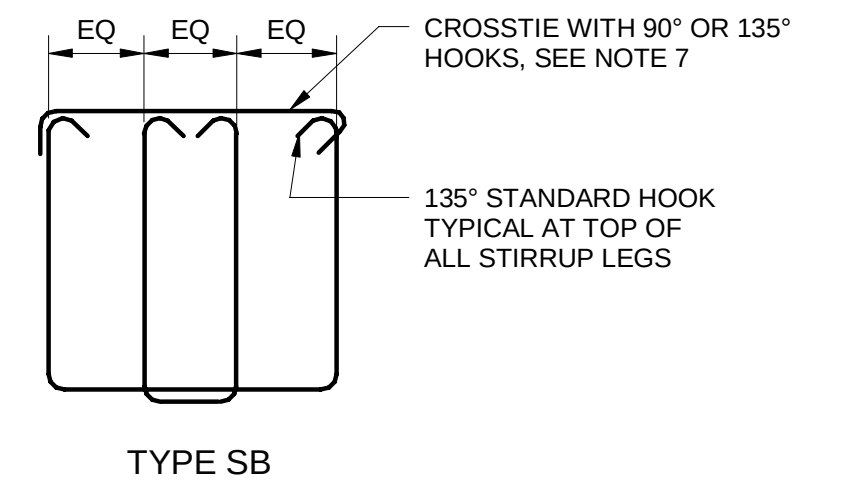
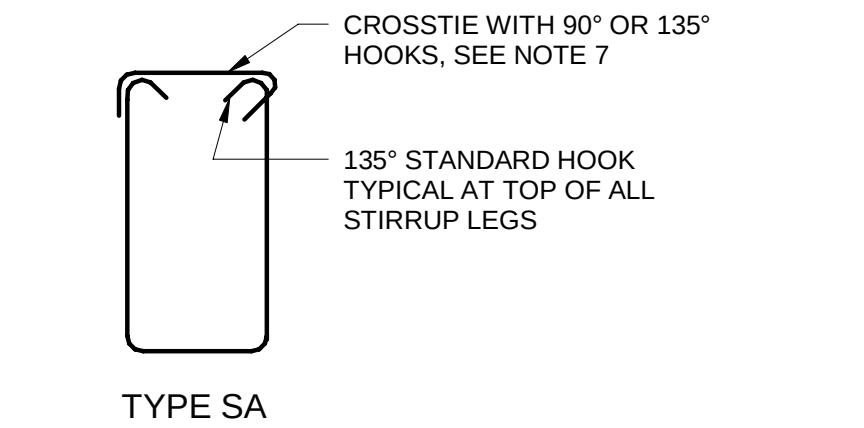
D TYPE C-CANTILEVER SPAN



E STIRRUP SPACING LAYOUT



TYPICAL BEAM SECTION



TYPE SB  
STIRRUP DETAILS

| SLAB SCHEDULE                 |     |                       |         |                         |         |          |
|-------------------------------|-----|-----------------------|---------|-------------------------|---------|----------|
| SLAB MARK                     | T   | PRIMARY REINFORCEMENT |         | SECONDARY REINFORCEMENT |         | COMMENTS |
|                               |     | TOP                   | BOTTOM  | TOP                     | BOTTOM  |          |
| ELEVATED TRANSFORMER PLATFORM |     |                       |         |                         |         |          |
| 01-S101                       | 12" | #6 @ 6"               | #6 @ 6" | #6 @ 6"                 | #6 @ 6" |          |
| EFFLUENT PUMP STATION         |     |                       |         |                         |         |          |
| 69-S101                       | 12" | #6 @ 6"               | #6 @ 6" | #6 @ 6"                 | #6 @ 6" |          |
| 69-S201                       | 12" | #6 @ 6"               | #6 @ 6" | #6 @ 6"                 | #6 @ 6" |          |
| 69-S301                       | 12" | #6 @ 6"               | #6 @ 6" | #6 @ 6"                 | #6 @ 6" |          |

SLAB SCHEDULE NOTES:

1. THE SLAB CALL-OUTS XX-SXXX SHOWN ON THE PLANS INDICATE THE DIRECTION OF PLACEMENT OF THE PRIMARY REINFORCEMENT.
2. THE SCHEDULE INDICATES MAXIMUM SLAB THICKNESS. SEE PLUMBING SHEETS FOR THICKNESS REDUCTIONS AT FLOOR DRAINS.
3. ALL SLAB DETAILS TYPICAL FOR BOTH PRIMARY AND SECONDARY REINFORCEMENT.
4. REINFORCING IN SLABS MAY BE CONTINUOUS.

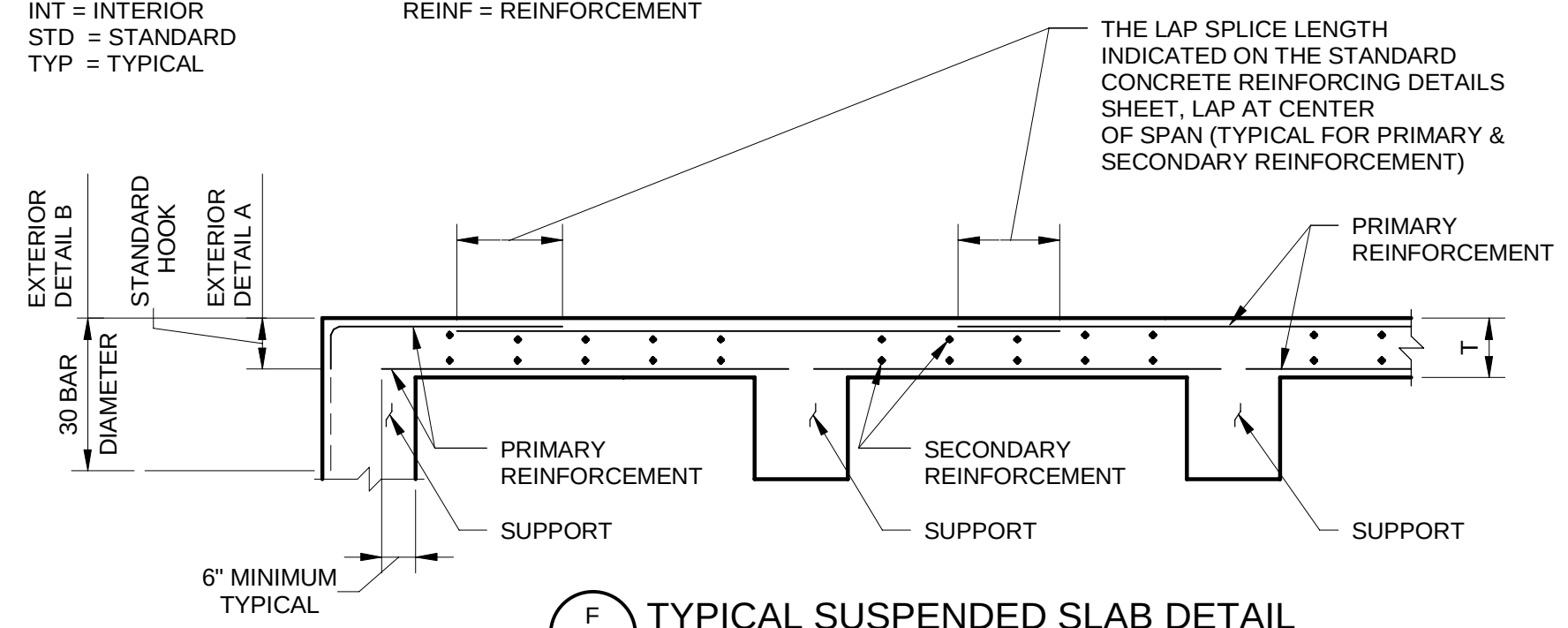
BEAM SCHEDULE

| MARK                          | TYPE | BEAM SIZE |       | BOTTOM REINF | END TOP REINF | INT TOP REINF | SIDE FACE REINF EF | STIRRUPS |      |    | REMARKS                                   |
|-------------------------------|------|-----------|-------|--------------|---------------|---------------|--------------------|----------|------|----|-------------------------------------------|
|                               |      | WIDTH     | DEPTH |              |               |               |                    | TYPE     | SIZE | S  |                                           |
| ELEVATED TRANSFORMER PLATFORM |      |           |       |              |               |               |                    |          |      |    |                                           |
| 01-B101                       | S    | 30"       | 32"   | 10-#8        | 10-#8         | -             | 2-#6               | SA       | #4   | 6" | PROVIDE BOTTOM & TOP REINF. IN TWO LAYERS |
| 01-B102                       | S    | 12"       | 12"   | 2-#6         | 2-#6          | -             | -                  | SA       | #4   | 8" |                                           |
| EFFLUENT PUMP STATION         |      |           |       |              |               |               |                    |          |      |    |                                           |
| 69-B101                       | E    | 24"       | 34"   | 4-#8         | 4-#8          | 4-#8          | 2-#6               | SA       | #4   | 6" |                                           |
| 69-B102                       | I    | 24"       | 34"   | 4-#8         | -             | 4-#8          | 2-#6               | SA       | #4   | 6" |                                           |
| 69-B201                       | S    | 24"       | 30"   | 10-#8        | 10-#8         | -             | 2-#6               | SA       | #4   | 6" | PROVIDE BOTTOM & TOP REINF IN TWO LAYERS  |
| 69-B202                       | S    | 56"       | 36"   | 9-#8         | 9-#8          | -             | 4-#6               | SB       | #4   | 6" |                                           |
| 69-B203                       | S    | 24"       | 30"   | 10-#8        | 10-#8         | -             | 2-#6               | SA       | #4   | 6" | PROVIDE BOTTOM & TOP REINF IN TWO LAYERS  |
| 69-B204                       | S    | 24"       | 30"   | 5-#8         | 5-#8          | -             | 2-#6               | SA       | #4   | 6" |                                           |
| 69-B205                       | S    | 16"       | 24"   | 3-#6         | 3-#6          | -             | 1-#6               | SA       | #4   | 6" |                                           |
| 69-B301                       | S    | 12"       | 24"   | 2-#8         | 2-#8          | -             | 1-#6               | SA       | #4   | 6" |                                           |
| 69-B302                       | E    | 12"       | 18"   | 2-#6         | 2-#6          | 2-#6          | 1-#6               | SA       | #4   | 6" |                                           |
| 69-B303                       | I    | 12"       | 18"   | 2-#6         | -             | 2-#6          | 1-#6               | SA       | #4   | 6" |                                           |

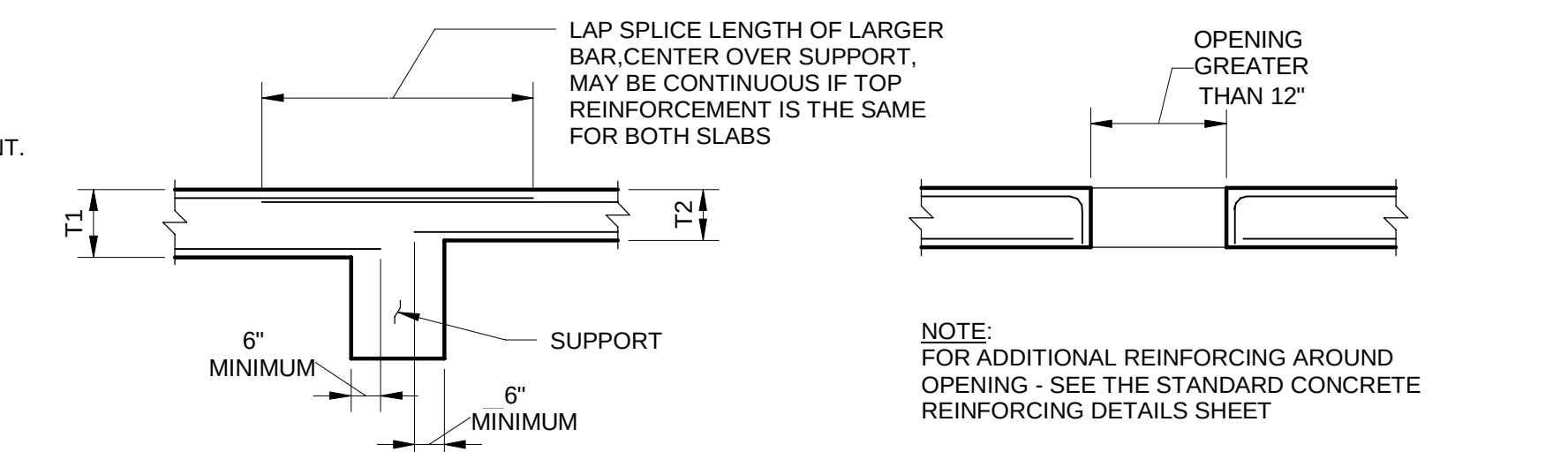
BEAM SCHEDULE NOTES:

1. UNLESS INDICATED OTHERWISE IN BEAM SCHEDULE, BOTTOM REINFORCEMENT SHALL HAVE LAP SPLICES CENTERED ON THE CENTERLINE OF THE SUPPORT USING THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER BOTTOM BAR IF BAR SIZES IN ADJACENT SPANS DIFFER. AT THE CONTRACTOR'S OPTION, BOTTOM REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, ACROSS THE SUPPORT IF BARS IN THE ADJACENT SPAN ARE EQUAL IN SIZE AND QUANTITY.
2. END AND INTERIOR TOP REINFORCEMENT SHALL BE LAPPED AT MID SPAN BETWEEN SUPPORTS USING THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER TOP BAR, IF THE BAR SIZES EACH SIDE OF MID SPAN DIFFER. AT THE CONTRACTOR'S OPTION, TOP REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, IF THE TOP BARS EACH SIDE OF MID SPAN ARE EQUAL IN SIZE AND QUANTITY.
3. TOP AND BOTTOM BARS SHALL BE PLACED IN THE BEAM SECTION SUCH THAT ONE OF THE BARS IS LOCATED IN EACH CORNER OF THE BEAM STIRRUPS.
4. ALL TOP AND BOTTOM BARS SHALL BE PLACED IN ONE LAYER UNLESS INDICATED OTHERWISE. WHERE MORE THAN ONE LAYER IS NOTED, PROVIDE 2.5 INCHES CLEAR BETWEEN LAYERS, AND PLACE HALF OF THE BARS IN EACH LAYER.
5. SIDE FACE REINFORCEMENT SHALL BE CONTINUOUS WITH LAP SPLICES CENTERED AT THE CENTERLINE OF THE SUPPORT. A 90° STANDARD HOOK SHALL BE PROVIDED AT THE EXTERIOR ENDS OF END SPANS AND AT BOTH ENDS OF SINGLE SPANS. SIDE FACE REINFORCEMENT SHALL BE SPACED EQUALLY ON EACH FACE.
6. PROVIDE MINIMUM #5 STIRRUP SUPPORT BARS IN ALL CORNERS OF STIRRUPS WHEN TOP OR BOTTOM BARS ARE NOT PRESENT. LAP #5 BARS 1'-8" MINIMUM TO SCHEDULED REINFORCEMENT.
7. UNLESS INDICATED OTHERWISE, CONSECUTIVE STIRRUP CROSSTIES SHALL HAVE THEIR 90° HOOK PLACED ON OPPOSITE SIDES. IN THE EVENT THAT A SLAB FRAMES INTO ONLY ONE SIDE OF A BEAM, THEN THE 90 DEGREE HOOK SHALL BE PLACED ON THE SLAB SIDE CONSISTENTLY. IN THE EVENT A BEAM IS NOT CONFINED BY A SLAB ON EITHER SIDE, THE STIRRUP CROSSTIE SHALL HAVE TWO 135° HOOKS AND NO 90° HOOK.
8. HEADED REINFORCEMENT IN ACCORDANCE WITH ACI 318 MAY BE USED INSTEAD OF STD. HOOKS.

9. ABBREVIATIONS USED:
- |                 |                       |
|-----------------|-----------------------|
| CL = CENTERLINE | DEG = DEGREE          |
| EF = EACH FACE  | EQ = EQUAL            |
| INT = INTERIOR  | REINF = REINFORCEMENT |
| STD = STANDARD  |                       |
| TYP = TYPICAL   |                       |



F TYPICAL SUSPENDED SLAB DETAIL



G SLAB INTERACTION DETAIL

H DETAIL AT OPENINGS



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

GENERAL

STRUCTURAL

STANDARD CONCRETE  
BEAM AND SLAB  
SCHEDULE AND NOTES

PLAN FILE NO. 664-208

00-S-504

15  
OF  
118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITYWRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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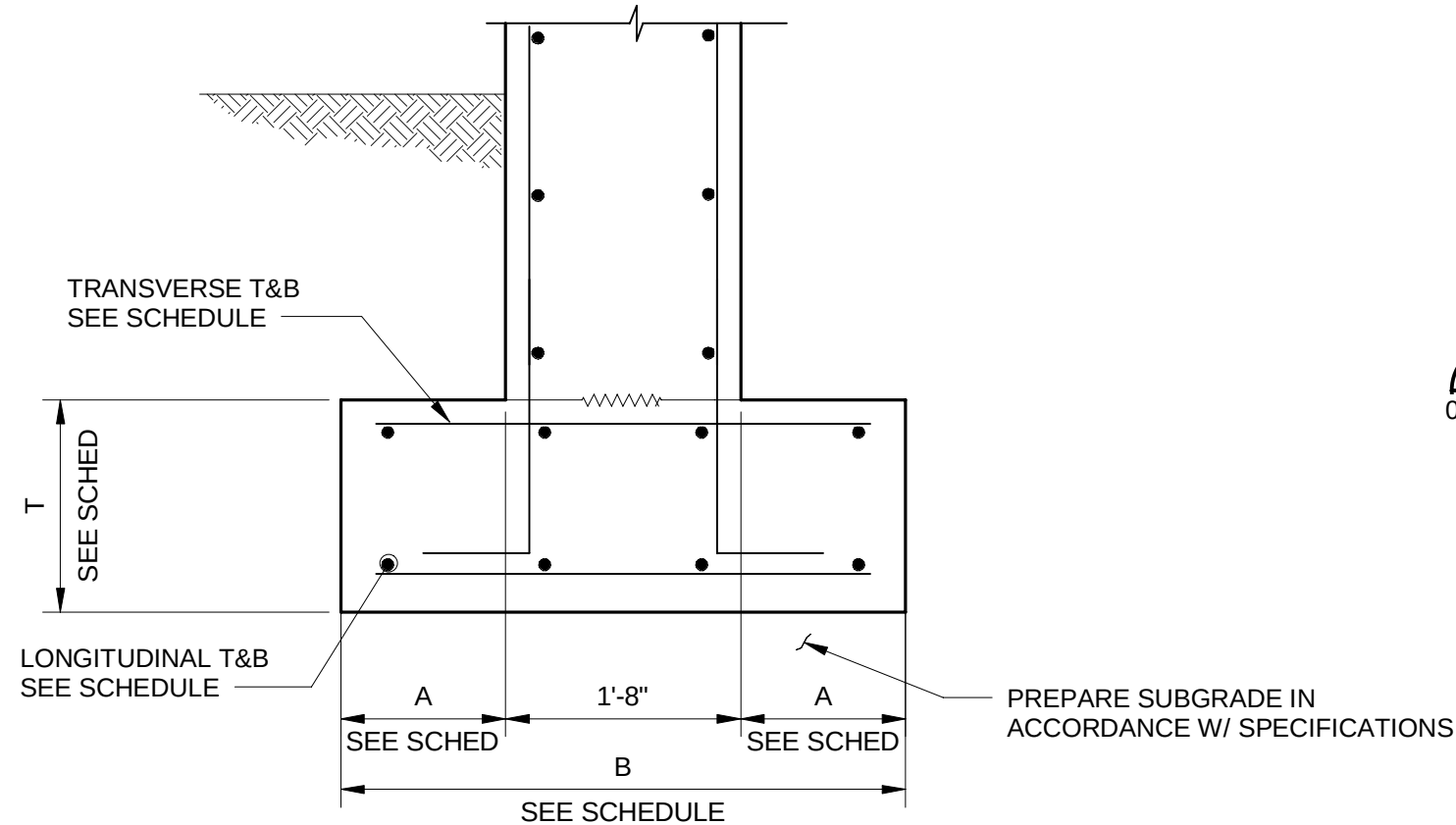
GENERAL

STRUCTURAL

FOOTING DETAILS AND  
SCHEDULE

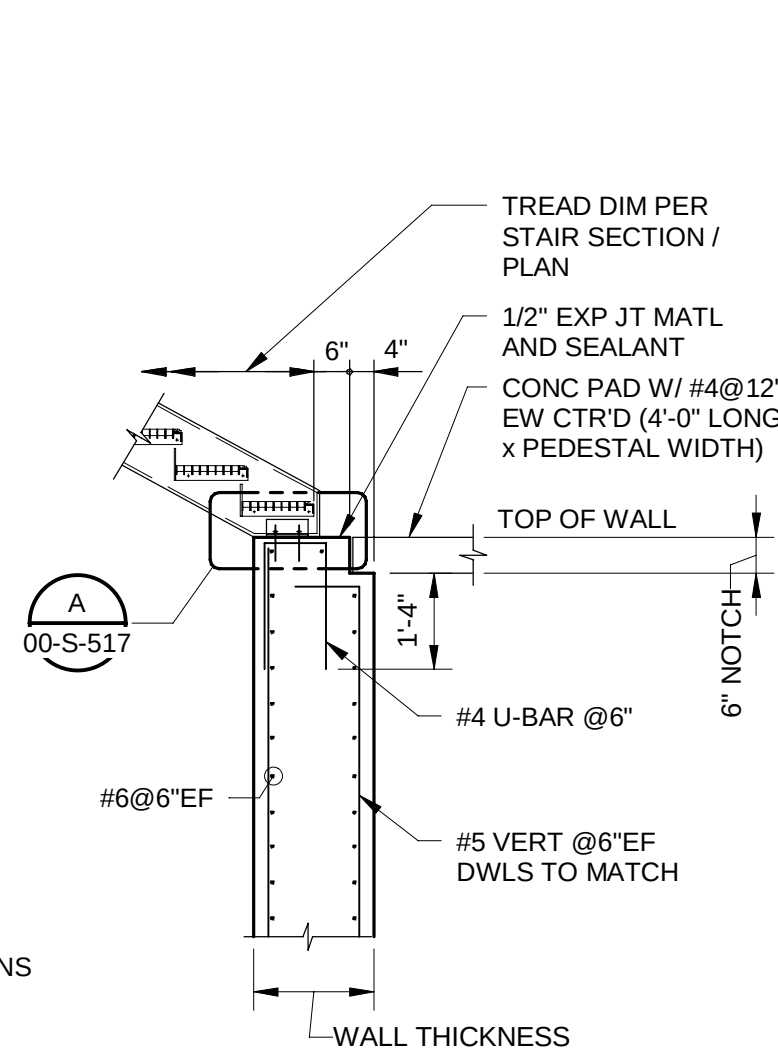
PLAN FILE NO. 664-209

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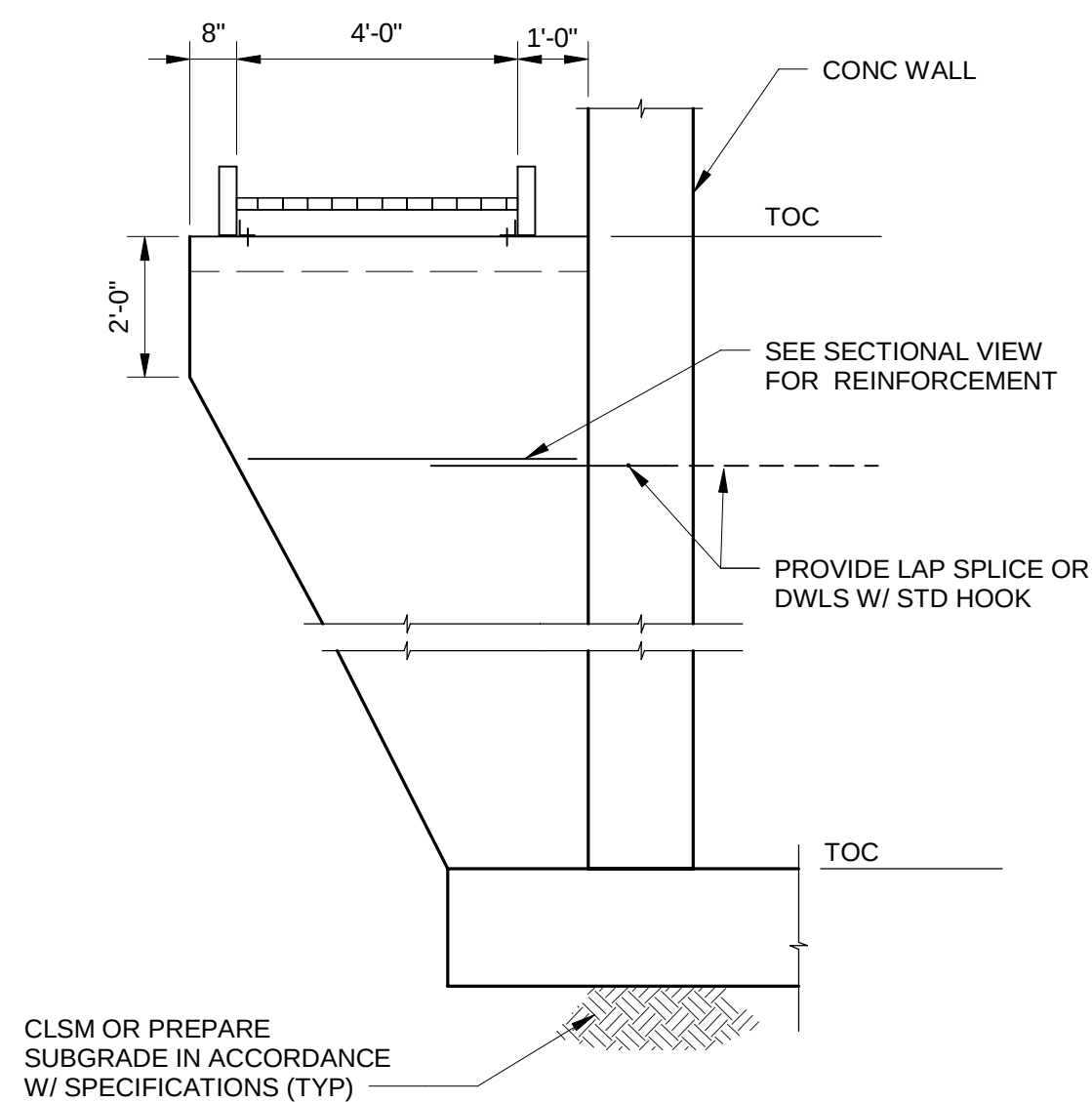
16  
OF  
118FOOTING DETAIL  
3/4" = 1'-0"

| FOOTING SCHEDULE |                     |       |       |       |                        |                          |
|------------------|---------------------|-------|-------|-------|------------------------|--------------------------|
| TYPE             | TOP OF FOOTING ELEV | A     | B     | T     | TRANSVERSE REINFORCING | LONGITUDINAL REINFORCING |
| WF1              | EL 14.00'           | 2'-0" | 5'-8" | 2'-0" | #6@6"EF                | #6@6"EF                  |

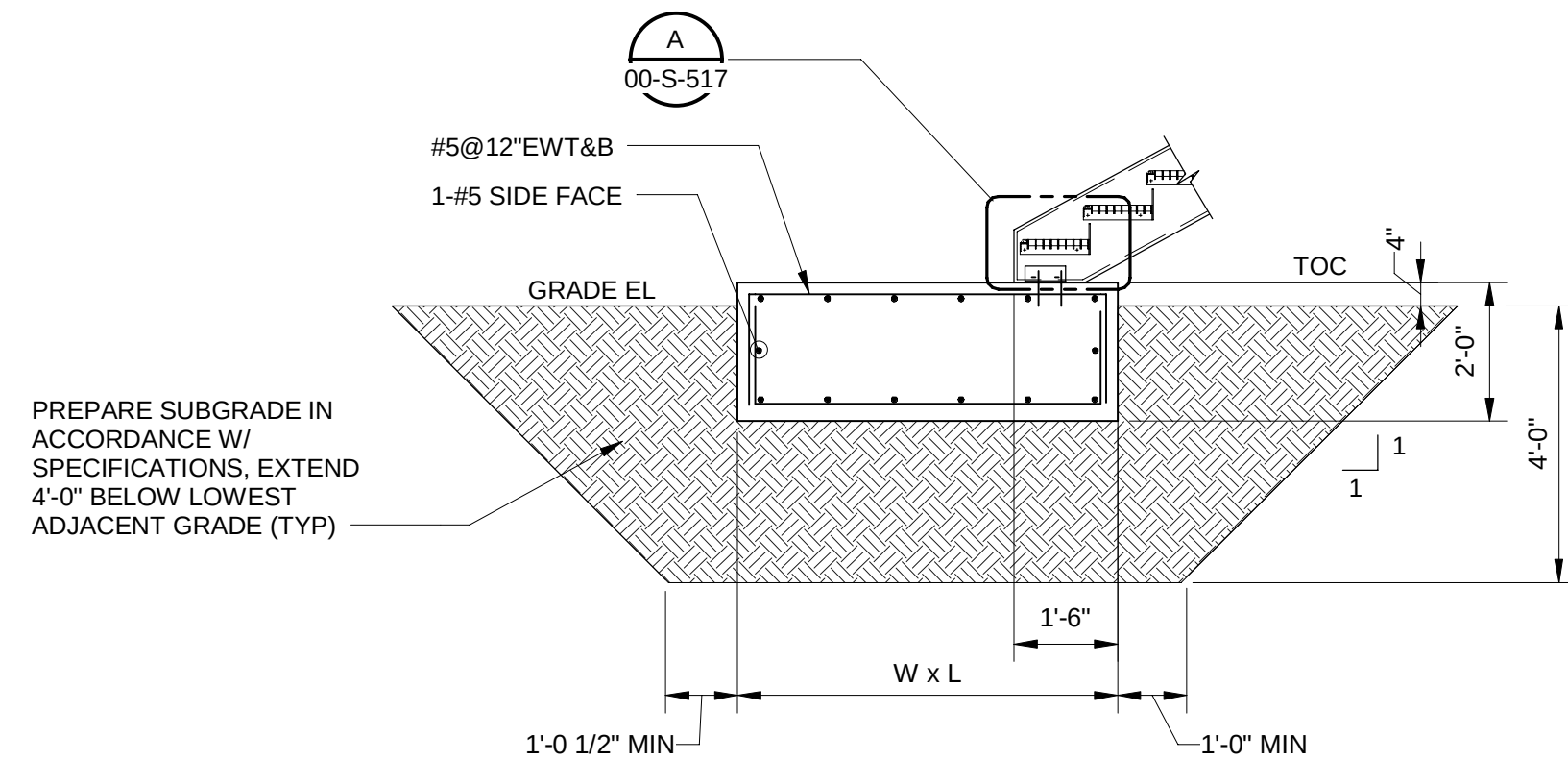
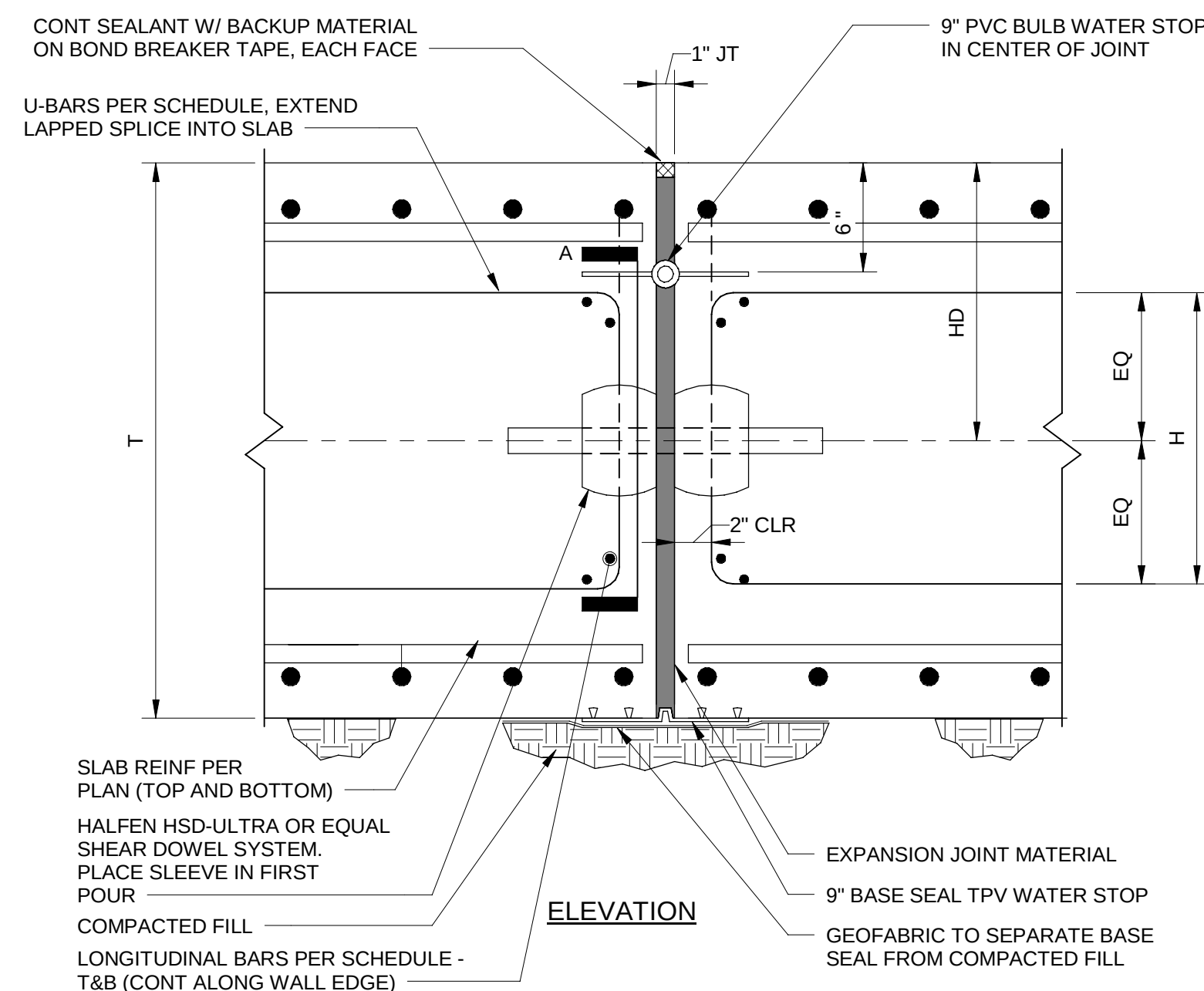
FOOTING SCHEDULE



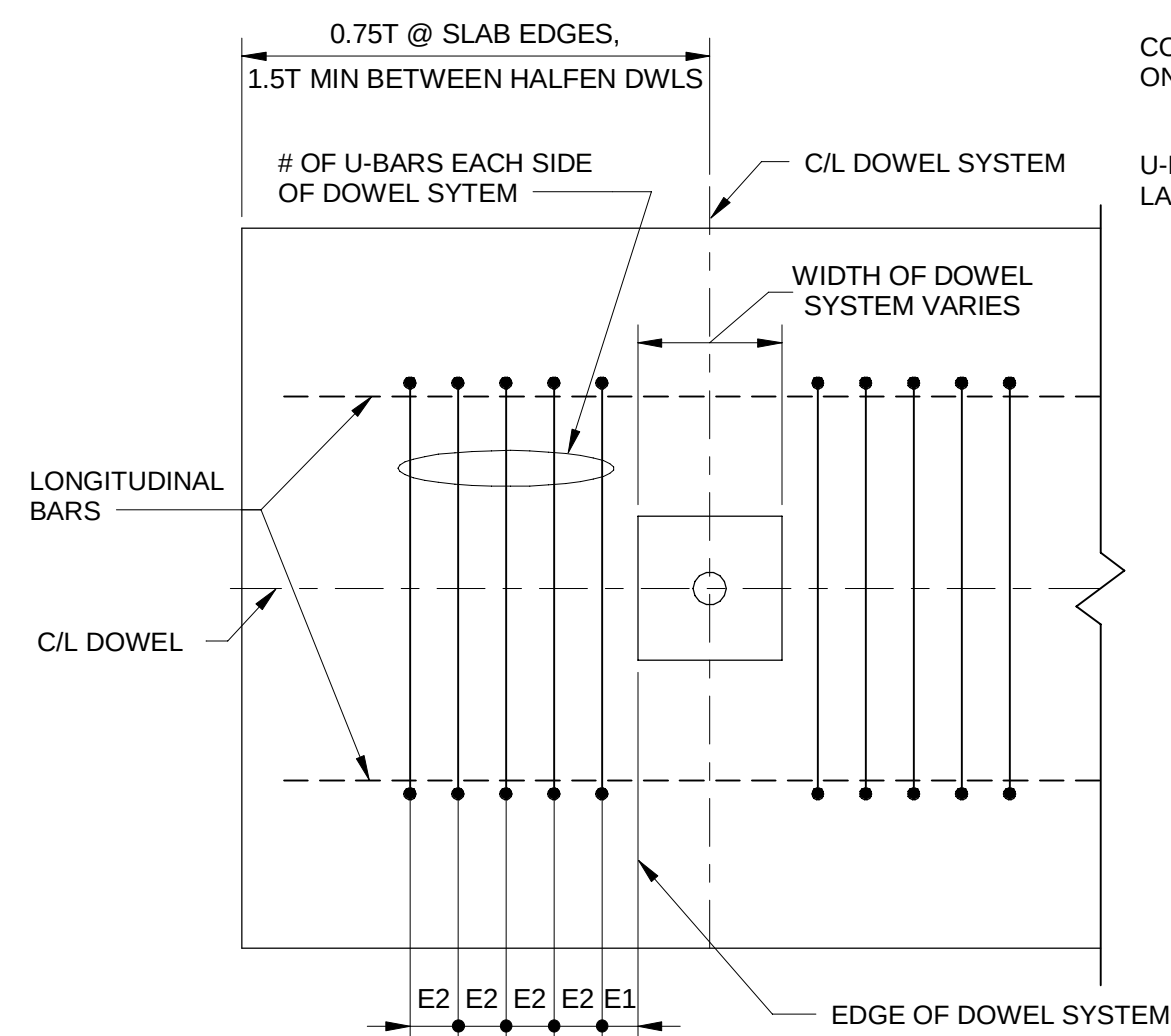
SECTION



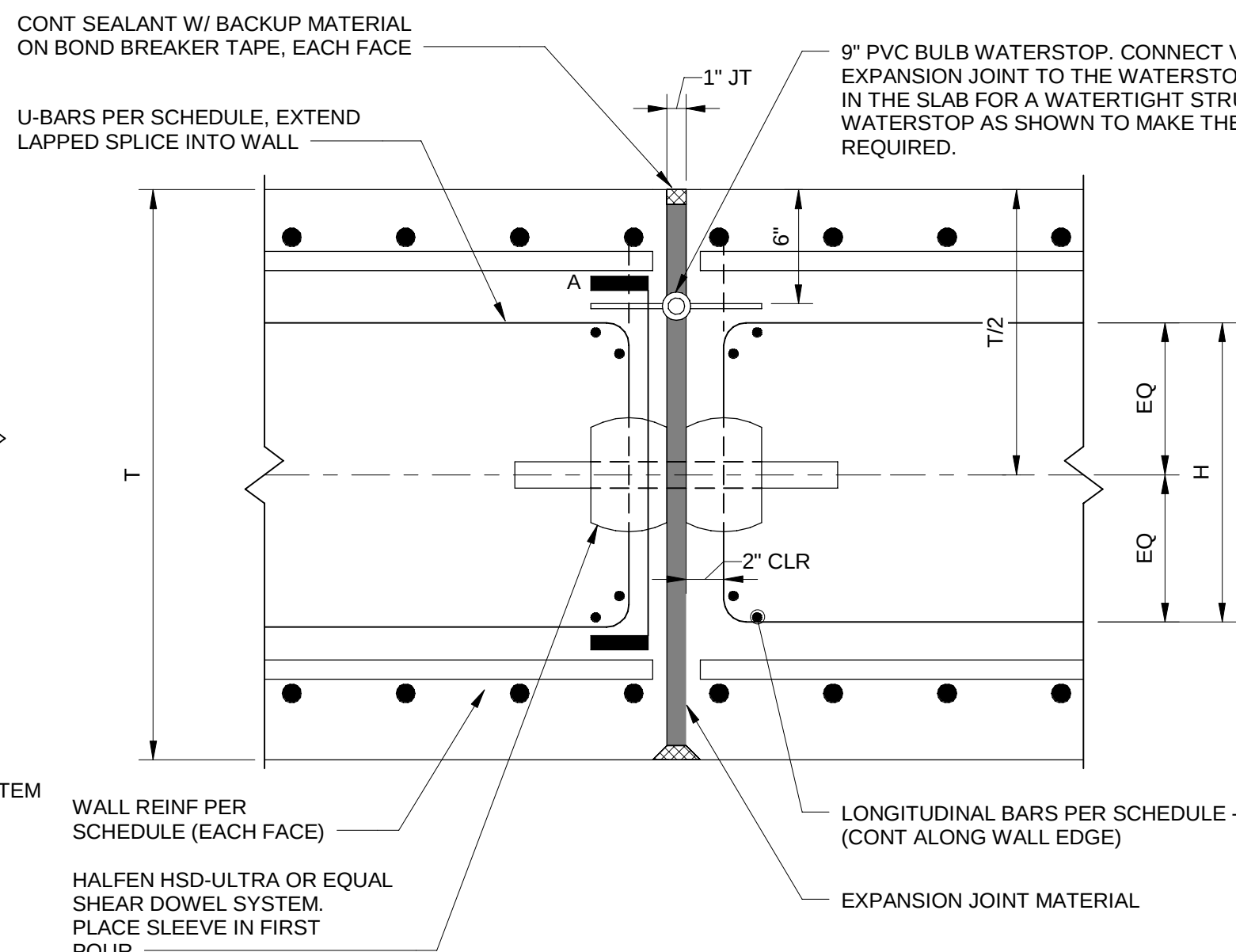
ELEVATION

STAIR PEDESTAL DETAIL  
3/8" = 1'-0"STAIR FOUNDATION DETAIL  
3/8" = 1'-0"

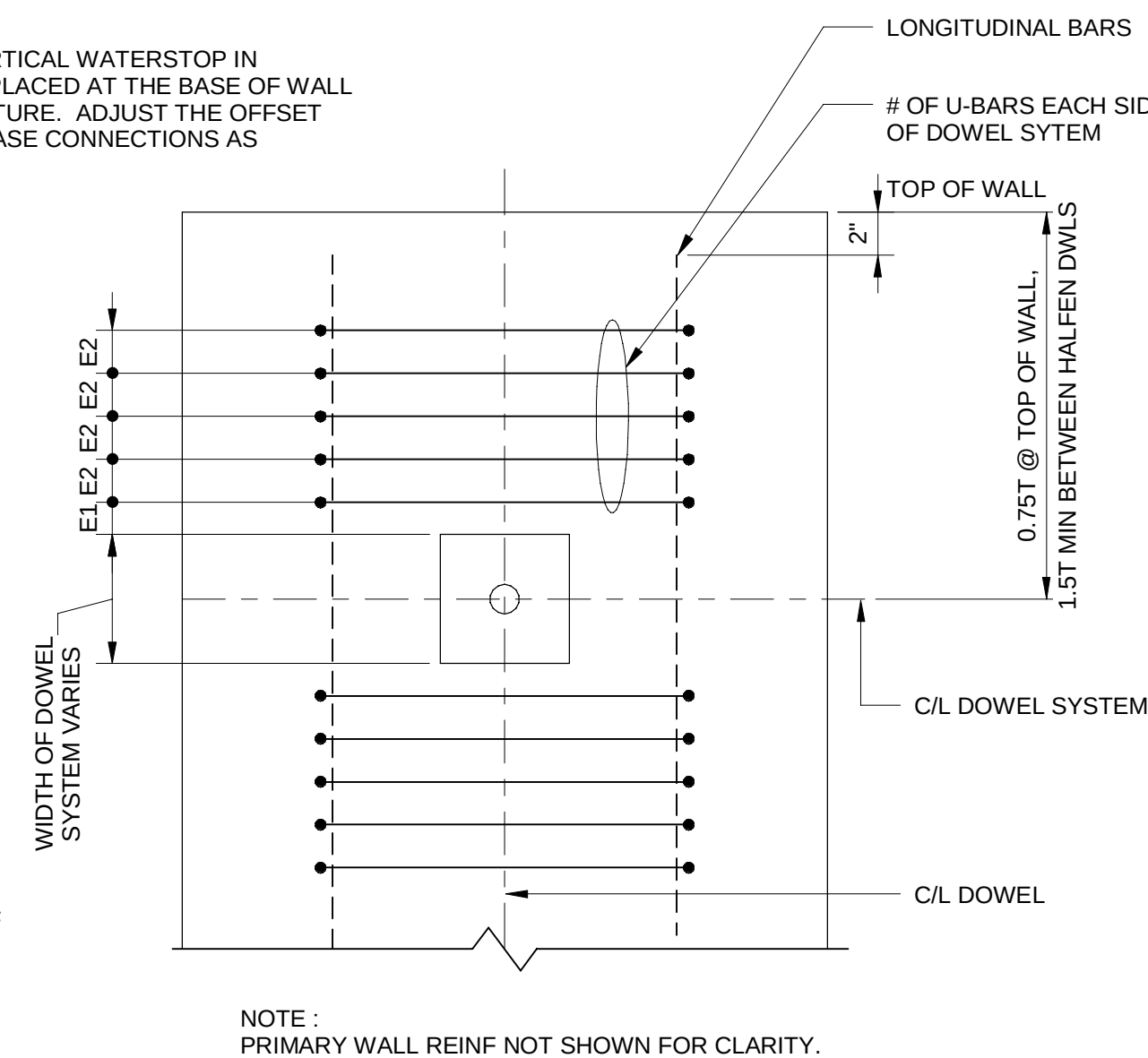
ELEVATION



SECTION A

NOTE :  
WATERSTOP AND PRIMARY SLAB REINF  
NOT SHOWN FOR CLARITY.

PLAN VIEW



SECTION A

NOTE :  
PRIMARY WALL REINF NOT SHOWN FOR CLARITY.

| DOWEL SCHEDULE |                     |                        |                         |                           |                                 |                        |               |               |                                   |
|----------------|---------------------|------------------------|-------------------------|---------------------------|---------------------------------|------------------------|---------------|---------------|-----------------------------------|
| DESIGNATION    | SLAB THICKNESS<br>T | DOWEL<br>TYPE          | HEIGHT TO<br>DOWEL "HD" | DOWEL SPACING<br>"DS" UNO | # & TYPE OF U-BARS<br>(EA SIDE) | HEIGHT OF<br>U-BAR "H" | E1<br>SPACING | E2<br>SPACING | LONGITUDINAL BARS<br>TOP & BOTTOM |
| T22            | 22"                 | HSD-ULTRA -30 OR EQUAL | 11"                     | 2'-9"                     | 5 - #4                          | 8"                     | 2 3/4"        | 2"            | 3 - #5                            |

SLAB EXPANSION JOINT - TYPE B  
NO SCALE

| DOWEL SCHEDULE |                  |                        |                    |                              |                     |            |            |                             |
|----------------|------------------|------------------------|--------------------|------------------------------|---------------------|------------|------------|-----------------------------|
| DESIGNATION    | WALL THICKNESS T | DOWEL TYPE             | DOWEL SPACING "DS" | # & TYPE OF U-BARS (EA SIDE) | HEIGHT OF U-BAR "H" | E1 SPACING | E2 SPACING | LONGITUDINAL BARS EACH FACE |
| T20            | 20"              | HSD-ULTRA -30 OR EQUAL | 2'-6"              | 5 - #4                       | 5"                  | 2 3/4"     | 2"         | 3 - #4                      |

WALL EXPANSION JOINT - TYPE B  
NO SCALEEXPANSION JOINT DETAIL  
NO SCALE12" 0' 1' 2' 3' 4' 5' 6' 7'  
3/8" = 1'-0"12" 6" 0' 1' 2' 3'  
3/4" = 1'-0"

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITYWRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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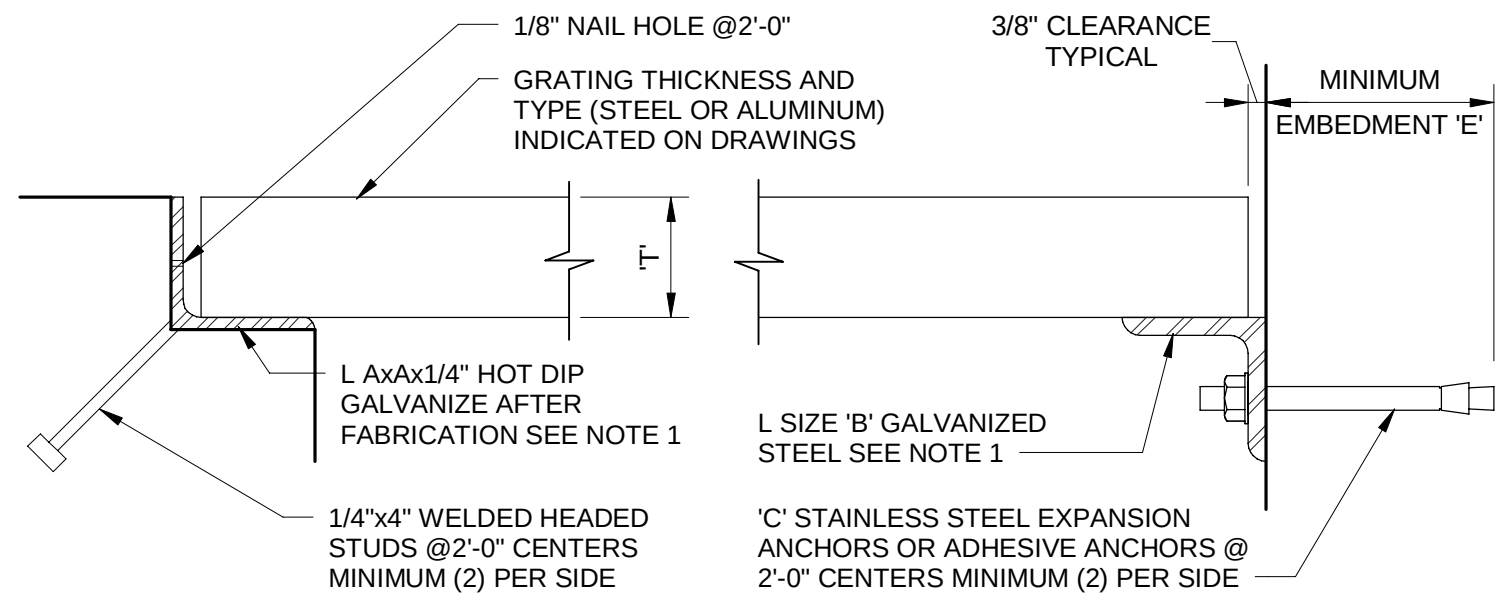
GENERAL

STRUCTURAL

MISCELLANEOUS  
DETAILS

PLAN FILE NO. 664-210

00-S-506

17  
OF  
118

| GRATING THICKNESS 'T' | L SIZE<br>AxAx1/4 INCHES | L SIZE<br>'B' INCHES | 'C' ANCHOR |         |
|-----------------------|--------------------------|----------------------|------------|---------|
|                       |                          |                      | DIA        | MIN 'E' |
| 1"                    | 1 3/4 x 1 3/4"           | 2 1/2x2 1/2x1/4      | 1/2"       | 3 1/4"  |
| 1 1/4"                | 1 3/4 x 1 3/4"           | 2 1/2x2 1/2x1/4      | 1/2"       | 3 1/4"  |
| 1 1/2"                | 1 3/4 x 1 3/4            | 2 1/2x2 1/2x1/4      | 1/2"       | 3 1/4"  |
| 1 3/4"                | 2x2                      | 3x3x3/8              | 3/4"       | 4 3/4"  |
| 2"                    | 2 1/2x2 1/2"             | 3x3x3/8              | 3/4"       | 4 3/4"  |
| 2 1/4"                | 2 1/2x2 1/2              | 3x3x3/8              | 3/4"       | 4 3/4"  |
| 2 1/2"                | 3x3"                     | 3x3x3/8              | 3/4"       | 4 3/4"  |

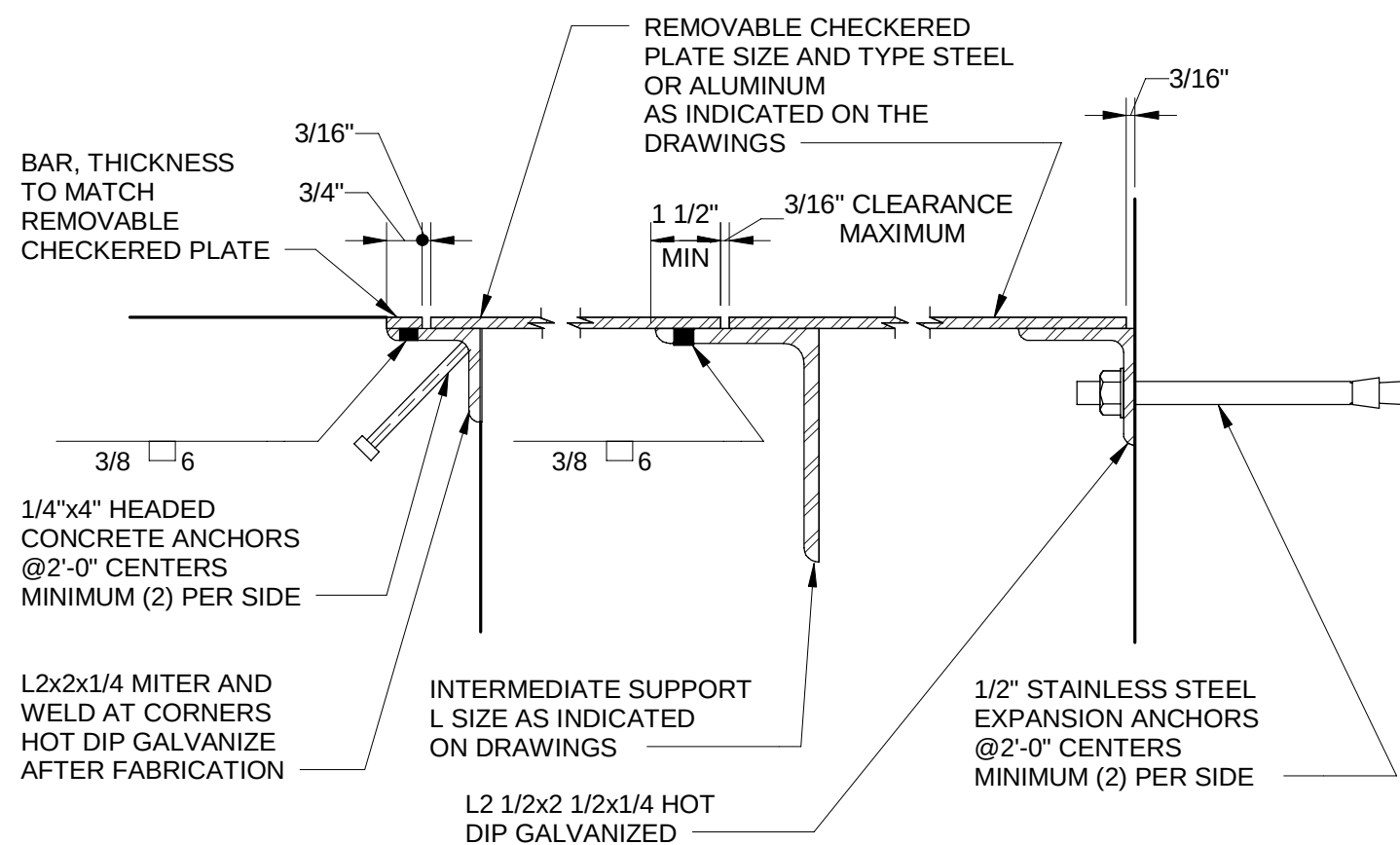
\* TRIM AND BEVEL UPSTANDING LEG TO FIT

NOTE:

- ALL GRATING SUPPORTED ON CONCRETE SHALL HAVE AN EMBEDDED ANGLE RECESSED AS SHOWN UNLESS NOTED OTHERWISE. GRATING SUPPORTED BY THE FACE MOUNTED ANGLE SHALL BE USED WHERE THE CONCRETE EXTENDS ABOVE THE TOP OF THE GRATING OR AT EXISTING STRUCTURES.

## A METAL GRATING SUPPORT

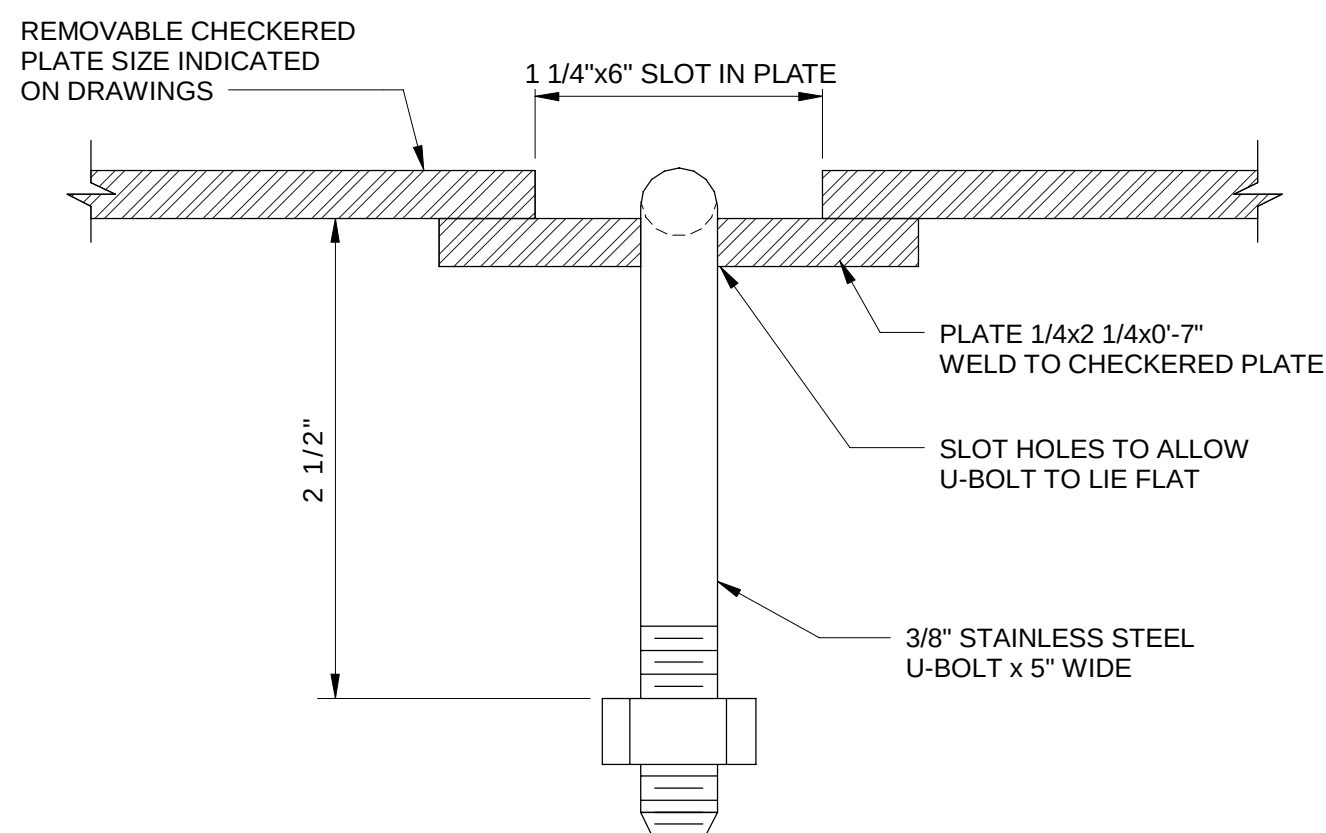
3" = 1'-0"

NOTE: WHERE CHECKERED PLATE IS REQUIRED TO BE STAINLESS STEEL,  
SUPPORT ANGLES SHALL ALSO BE STAINLESS STEEL.

## CHECKERED PLATE SUPPORT

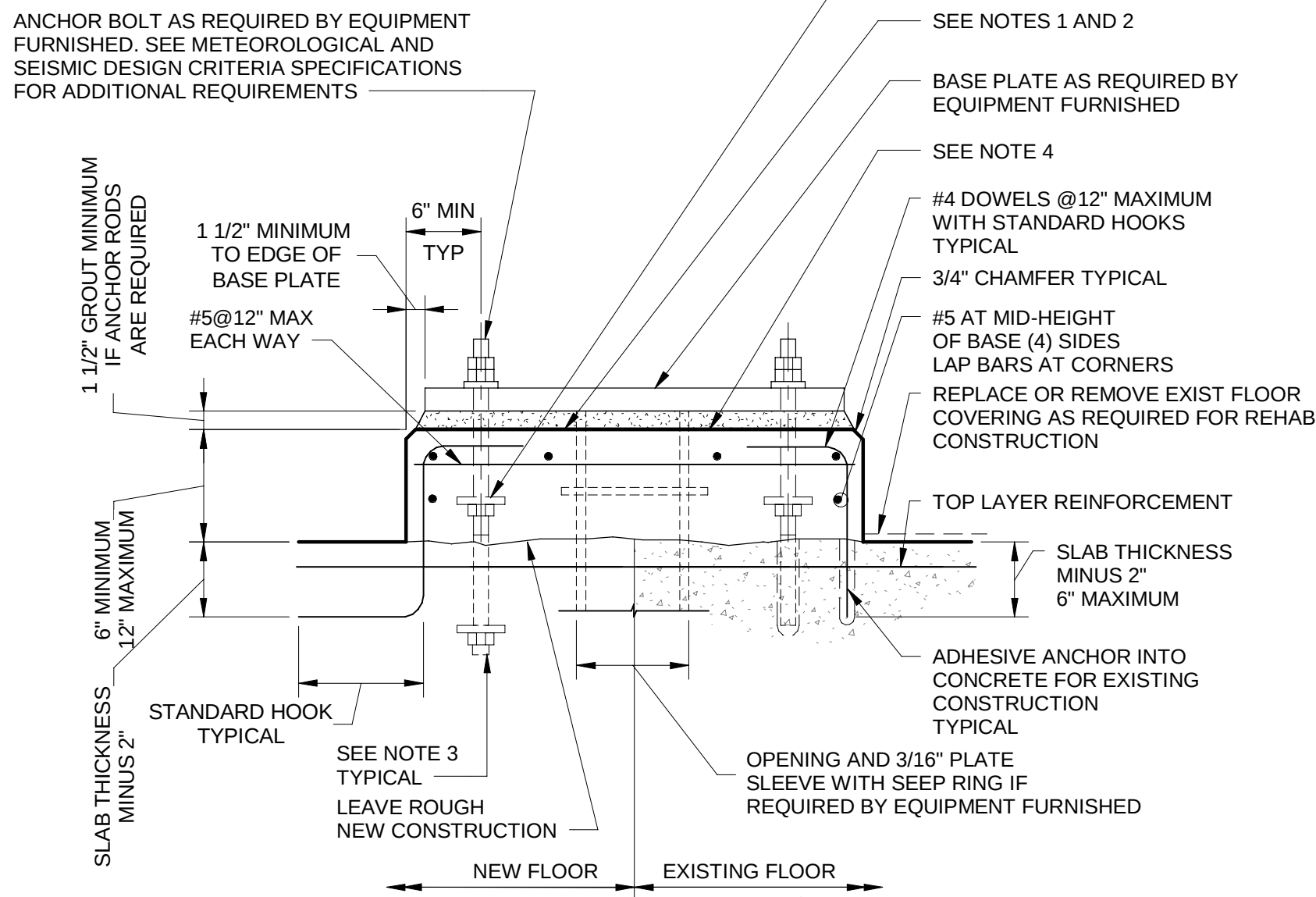
## D CHECKERED FLOOR PLATE

3" = 1'-0"



## E CHECKERED PLATE LIFTING HANDLE

6" = 1'-0"

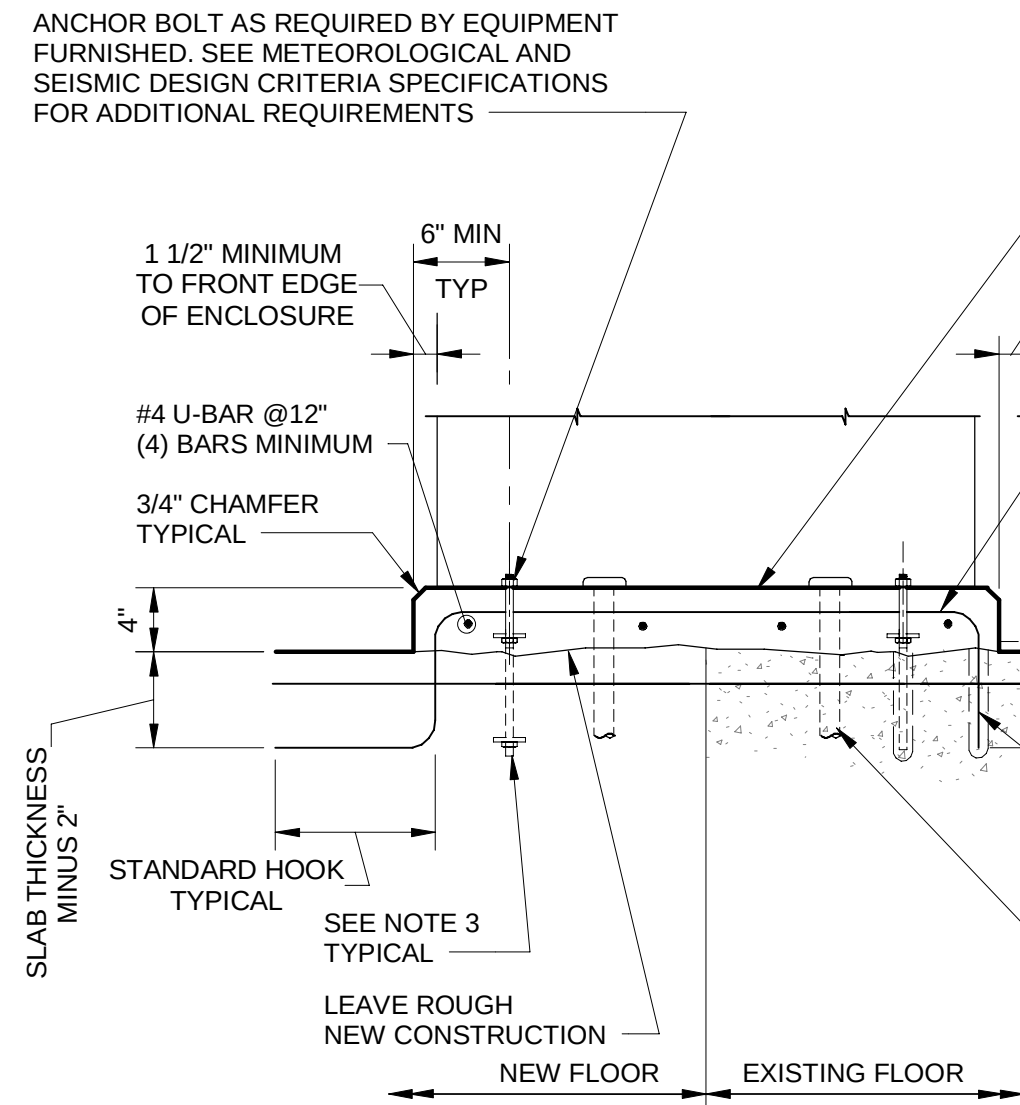


NOTES:

- EQUIPMENT MANUFACTURER TO INDICATE REQUIRED FLATNESS WHERE NO GROUT IS SPECIFIED. TOLERANCES SHALL BE IN CONFORMANCE WITH ACI 117 - SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION.
- CONTRACTOR AND SUPPLIER SHALL COORDINATE FINAL LOCATION AND SIZE OF PADS WITH EQUIPMENT FURNISHED. COORDINATE ANCHOR BOLT REQUIREMENTS FOR REQUIRED EMBEDMENT DEPTHS AND CONCRETE EDGE DISTANCES.
- WHERE THE DESIGN ANCHOR BOLT EMBEDMENT IS GREATER THAN THE CONCRETE EQUIPMENT BASE THICKNESS, THEN THE REQUIRED DEPTH OF EMBEDMENT SHALL BE MEASURED FROM THE TOP OF STRUCTURAL SLAB AND NOT THE TOP OF THE EQUIPMENT BASE.
- EQUIPMENT BASE SHALL USE STRUCTURAL CONCRETE AS INDICATED IN THE CAST-IN-PLACE CONCRETE SPECIFICATION.
- ANCHOR BOLTS AND REINFORCING WILL BE INSPECTED IN ACCORDANCE WITH THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SPECIFICATION.

## B EQUIPMENT BASE DETAIL

1" = 1'-0"

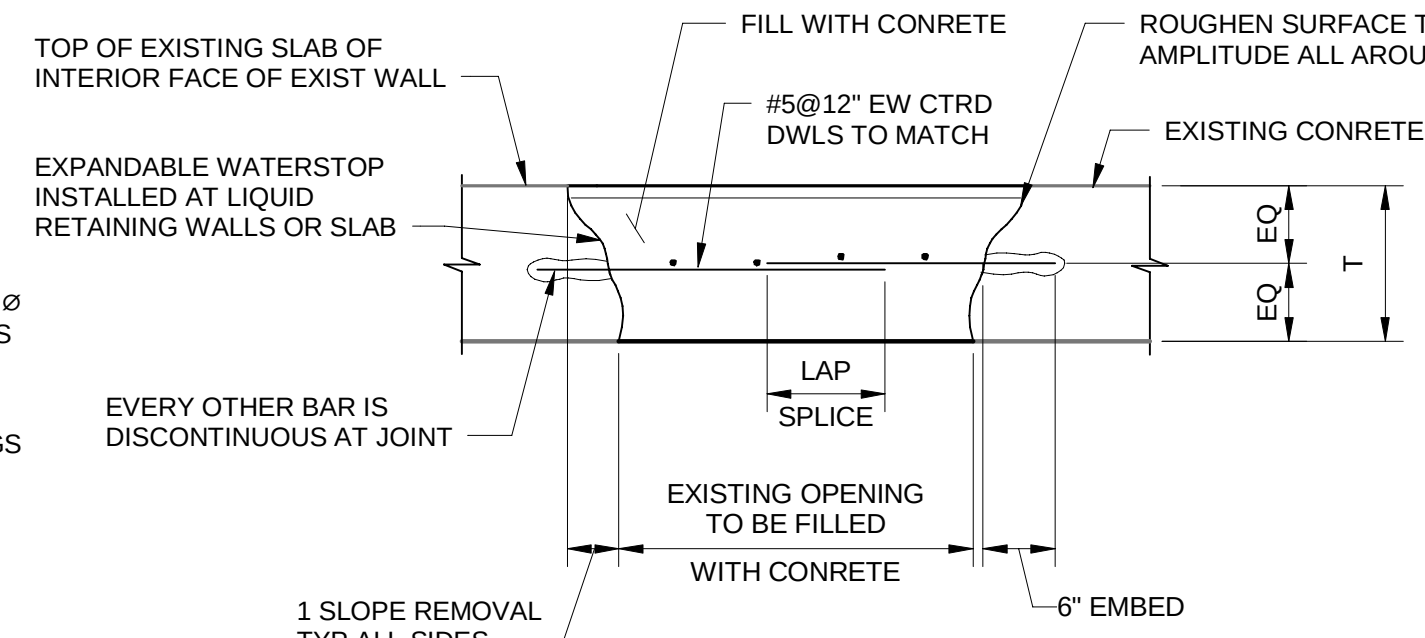


NOTES:

- UNLESS OTHERWISE NOTED, ALL INDOOR FLOOR MOUNTED ELECTRICAL EQUIPMENT, INCLUDING SWITCHGEAR, SWITCHBOARDS, MOTOR CONTROL CENTERS, ADJUSTABLE FREQUENCY DRIVES, INSTRUMENT CABINETS, ECT., SHALL BE PROVIDED WITH EQUIPMENT BASES.
- CONTRACTOR AND SUPPLIER SHALL COORDINATE FINAL LOCATION AND SIZE OF PADS WITH EQUIPMENT FURNISHED. COORDINATE ANCHOR BOLT REQUIREMENTS FOR REQUIRED EMBEDMENT DEPTHS AND CONCRETE EDGE DISTANCES.
- WHERE THE DESIGN ANCHOR BOLT EMBEDMENT IS GREATER THAN THE CONCRETE EQUIPMENT BASE THICKNESS, THEN THE REQUIRED DEPTH OF EMBEDMENT SHALL BE MEASURED FROM THE TOP OF STRUCTURAL SLAB AND NOT THE TOP OF THE EQUIPMENT BASE.
- EQUIPMENT BASE SHALL USE STRUCTURAL CONCRETE AS INDICATED IN THE CAST-IN-PLACE CONCRETE SPECIFICATION.
- ANCHOR BOLTS AND REINFORCING WILL BE INSPECTED IN ACCORDANCE WITH THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SPECIFICATION.

## C ELECTRICAL EQUIPMENT BASE

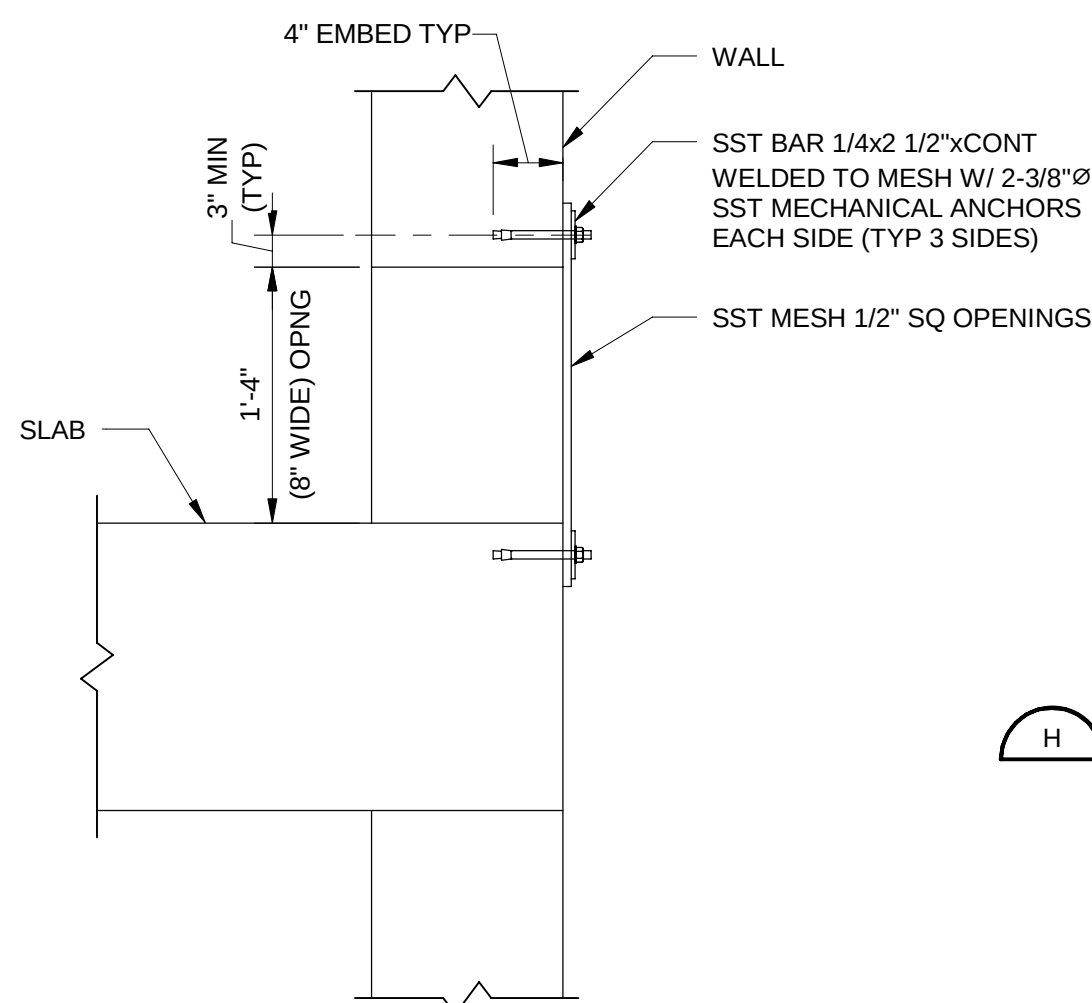
1" = 1'-0"



NOTE: FIELD VERIFY OPENING SIZE PRIOR TO REBAR FABRICATION

## H INFILL DETAIL FOR EXISTING WALL OR SLAB OPENING &gt;12" AND &lt;48"

NO SCALE

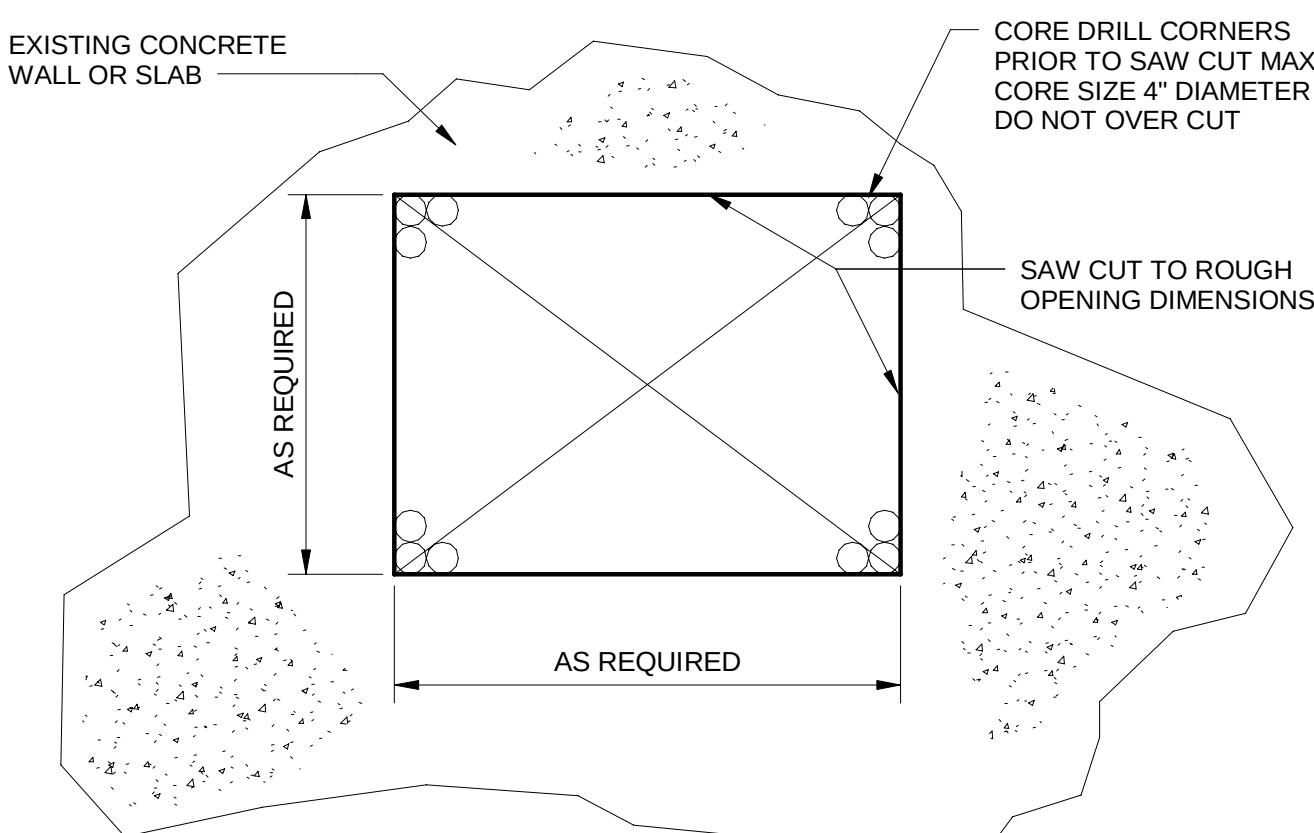
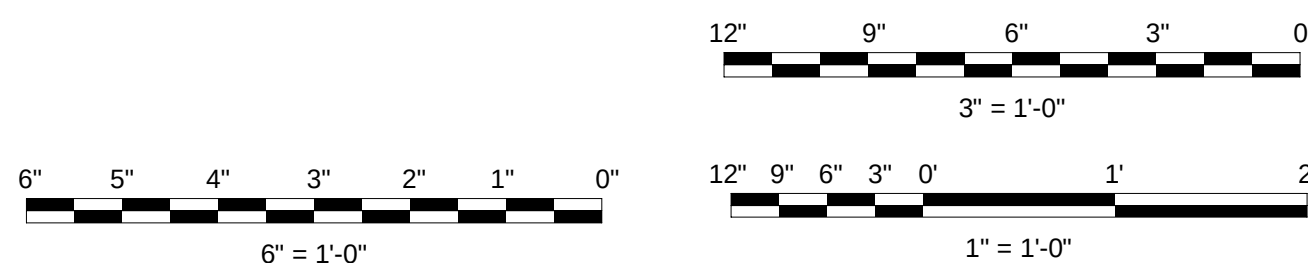


## G TYPICAL DRAIN HOLE DETAIL

1" = 1'-0"

01-S-101  
01-S-301F PROCEDURE FOR CUTTING OR ENLARGING OPENINGS IN  
EXISTING CONCRETE SLABS OR WALLS

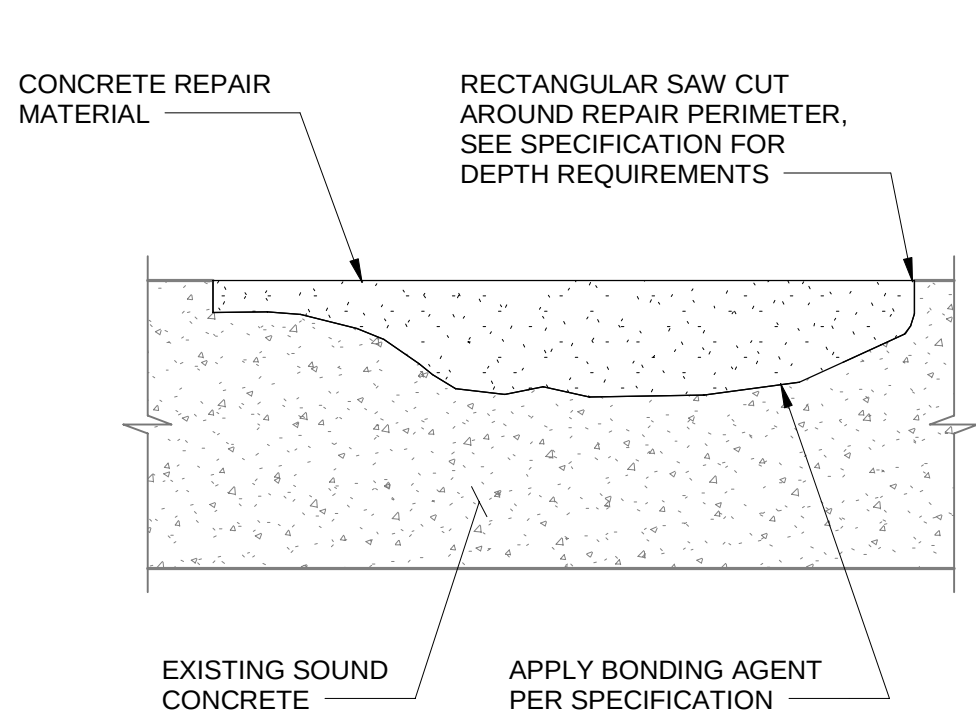
1" = 1'-0"

NOTE:  
SIZES AND LOCATIONS OF ALL OPENINGS MUST BE APPROVED BY  
ENGINEER PRIOR TO BEGINNING CORING OR CUTTING OPERATIONS.

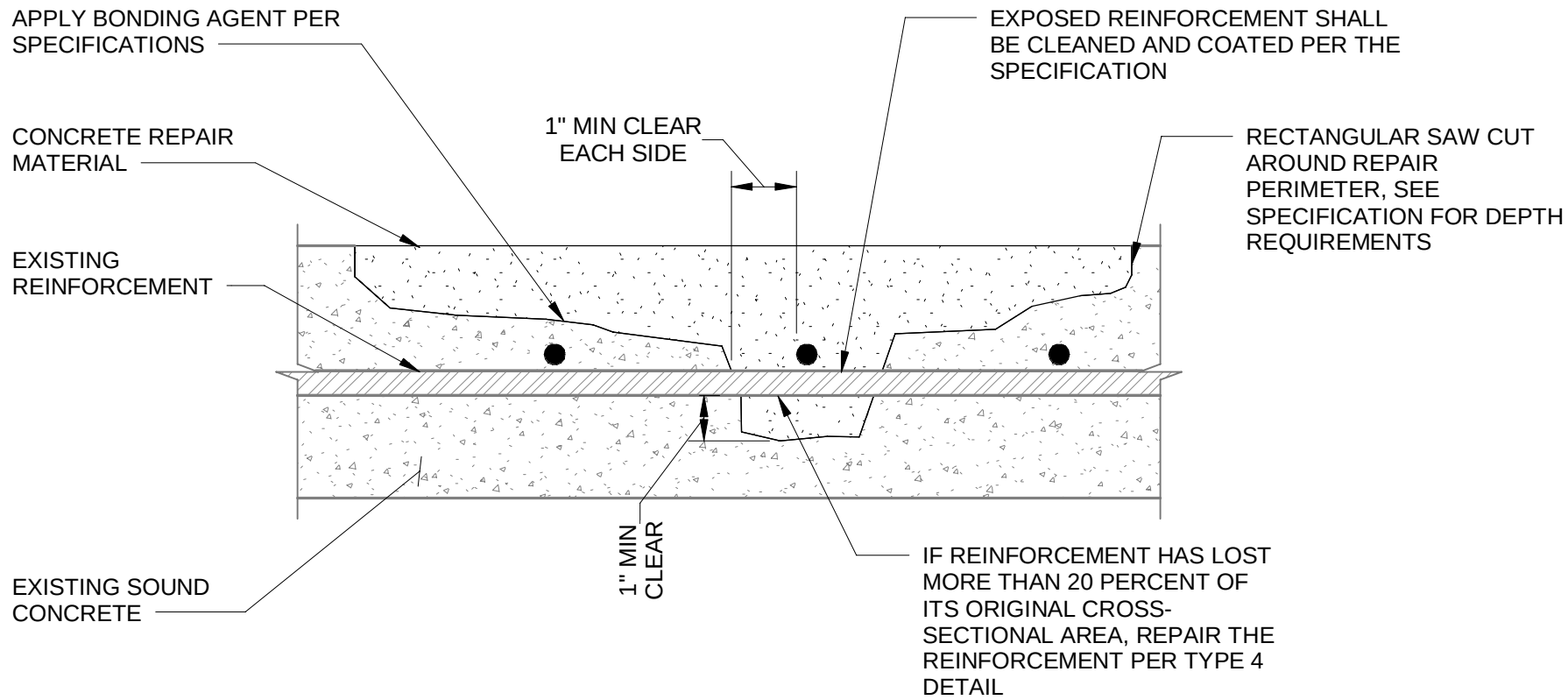
(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



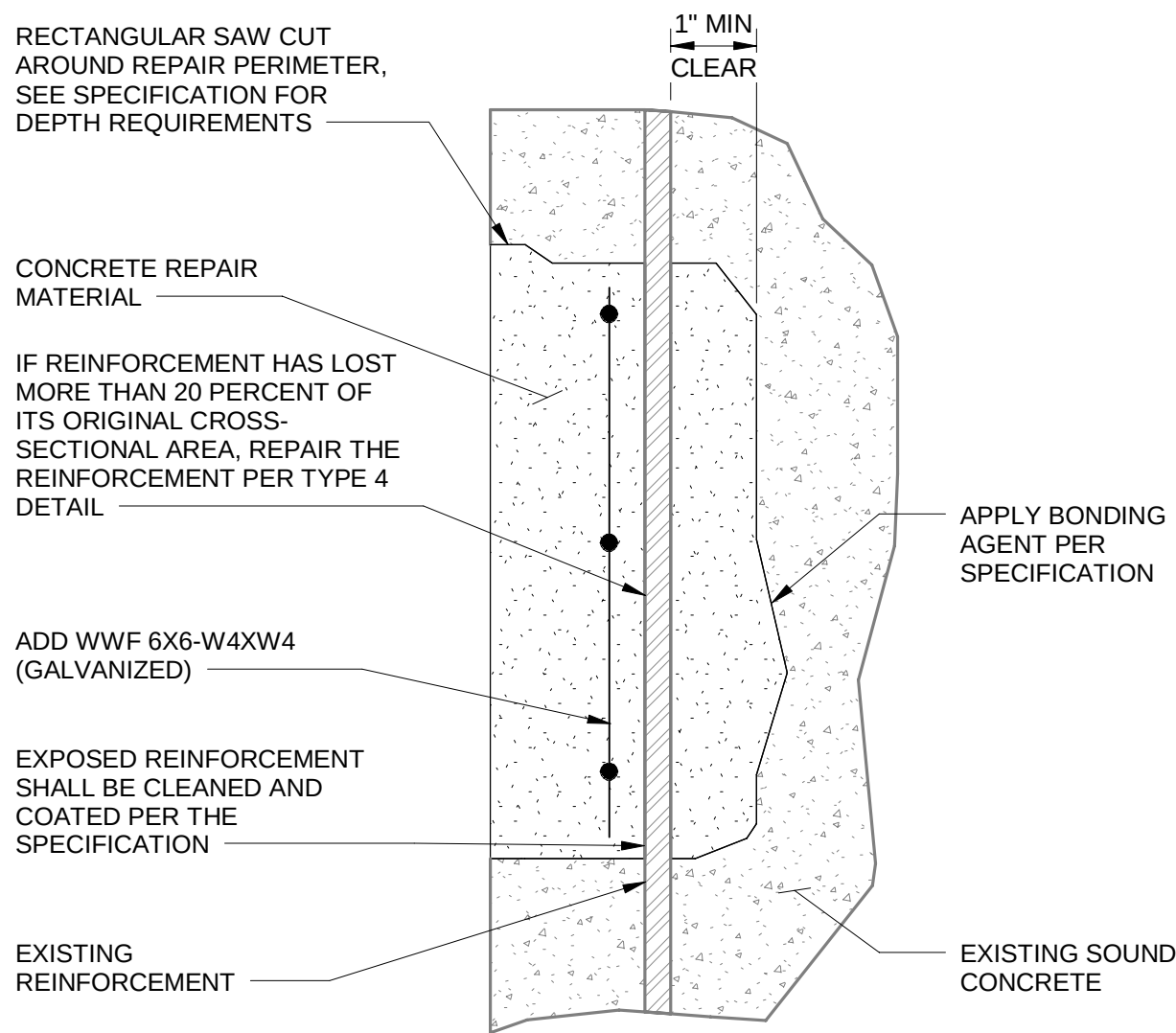
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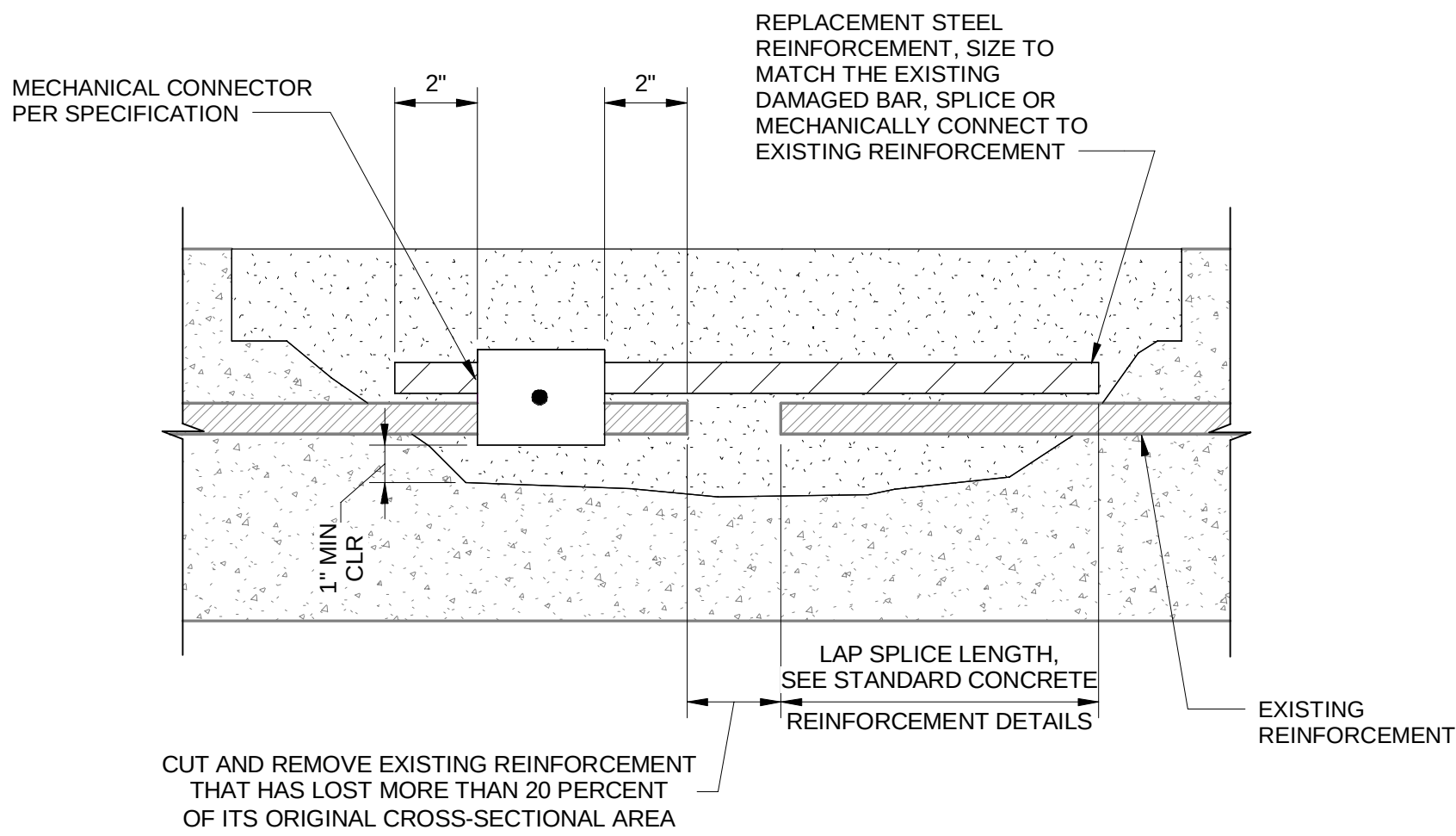
TYPE 1 - NO EXPOSED REINFORCEMENT



TYPE 2 - MINOR EXPOSED REINFORCEMENT

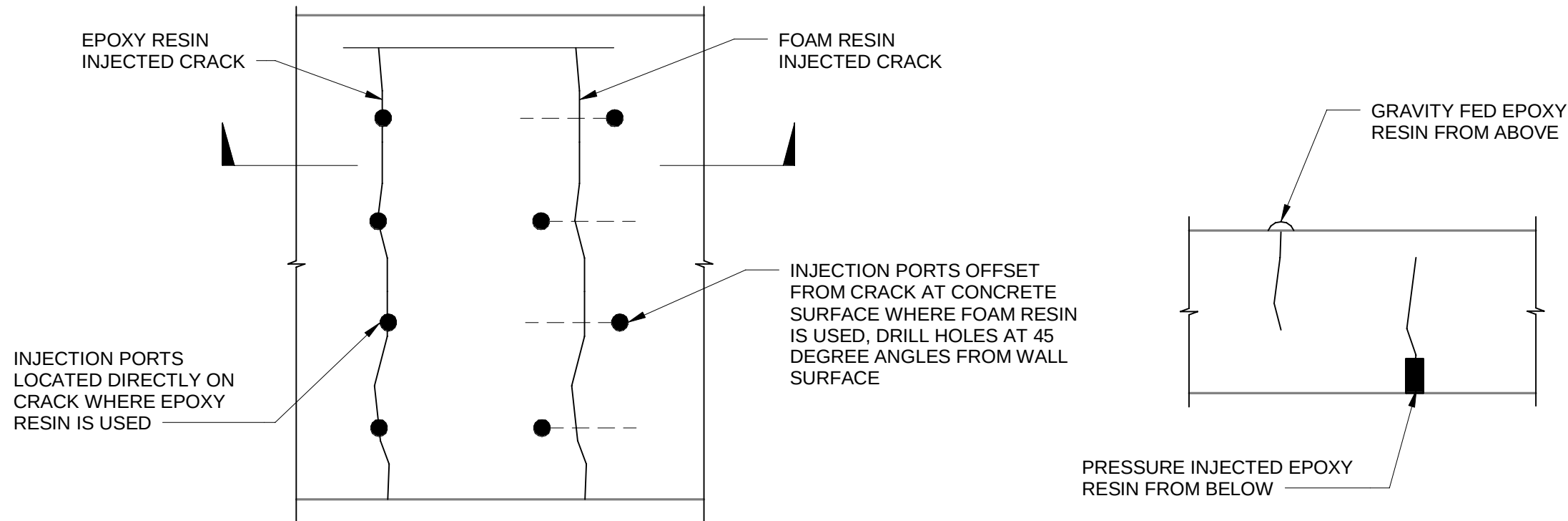


TYPE 3 - MAJOR EXPOSED REINFORCEMENT



TYPE 4 - REINFORCEMENT REPAIR

**CONCRETE SURFACE REPAIR**  
3" = 1'-0"



WALL ELEVATION

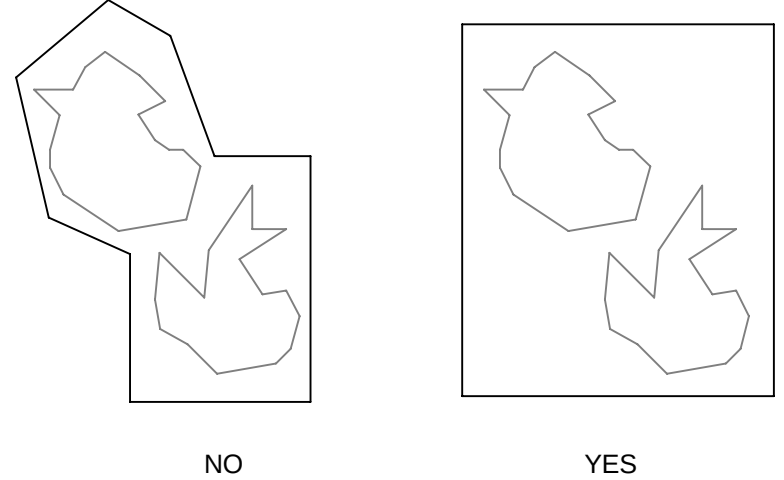
SLAB SECTION

INJECTION PORT SPACING AND ARRANGEMENT SHALL BE AS RECOMMENDED BY THE MATERIAL MANUFACTURER.

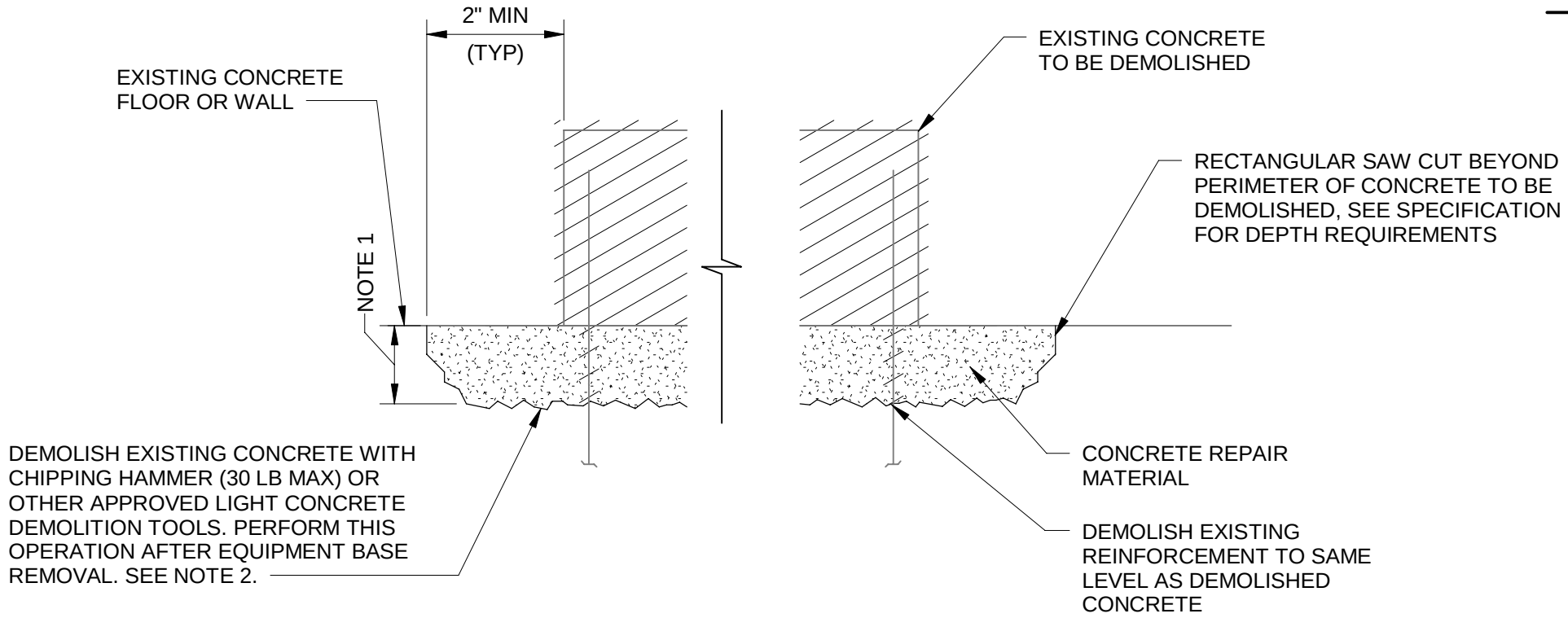
**CONCRETE CRACK REPAIR**  
1 1/2" = 1'-0"

**GENERAL REPAIR NOTES**

- REPAIR PRODUCTS SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
- REPAIR ACTIVITIES SUCH AS CLEANING, SURFACE PREPARATION, PRODUCT APPLICATION, AND CURING SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
- THE CONCRETE SURFACE REPAIR DETAILS ARE APPLICABLE TO EXISTING CONCRETE THAT IS DAMAGED. SURFACE DEFECTS IN NEW CONCRETE CONSTRUCTED AS PART OF THIS PROJECT SHALL BE REPAIRED IN ACCORDANCE WITH THE CAST-IN-PLACE CONCRETE SPECIFICATIONS.
- SURFACE REPAIR AREAS LESS THAN 2 FEET APART SHALL BE COMBINED INTO ONE LARGER RECTANGULAR REPAIR AREA WITH NO IRREGULAR SHAPES. SEE FIGURE.
- IF CRACK REPAIR AND SURFACE REPAIR ARE REQUIRED IN A COMMON AREA, THE CRACK REPAIR PROCEDURE SHALL BE PERFORMED FIRST.



**FIGURE**  
NO SCALE



**NOTES:**

- DEPTH OF CONCRETE DEMOLITION SHALL BE THE LESSER OF 2" OR THE DEPTH OF CONCRETE COVER OVER THE EXISTING REINFORCEMENT. DO NOT DAMAGE EXISTING REINFORCEMENT PARALLEL TO REPAIRED SURFACE.
- CARE SHALL BE TAKEN TO AVOID DAMAGING CONCRETE SUBSTRATE DURING CHIPPING OPERATION.

**CONCRETE FLOOR OR WALL REPAIR FOLLOWING DEMOLITION**  
3" = 1'-0"

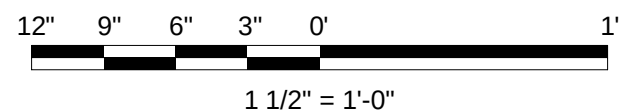
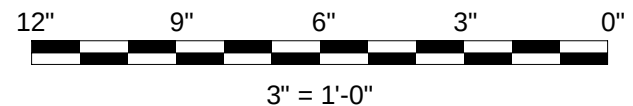
**EFFLORESCENCE REPAIR NOTES:**

- EFFLORESCENCE IS DEFINED AS A GENERALLY WHITE DEPOSIT FORMED WHEN WATER-SOLUBLE COMPOUNDS EMERGE IN SOLUTION FROM CONCRETE OR MASONRY AND PRECIPITATE BY REACTION SUCH AS CARBONATION OR CRYSTALLIZE BY EVAPORATION.
- EFFLORESCENCE SALTS SHALL BE REMOVED WITH A STIFF BRUSH, WIRE BRUSH OR SCRAPER. IF THE EFFLORESCENCE IS SLIGHT, BRUSHING WITH WATER MAY REMOVE IT. IF NOT, BRUSHING WITH DILUTE ACID SUCH AS MURIATIC OR SULFAMIC ACID IS RECOMMENDED. IF THE CONCRETE IS PIGMENTED, IT IS RECOMMENDED THAT SULFAMIC ACID IN THE 5 TO 10% CONCENTRATION RANGE SHALL BE USED. NOTE THAT STRONGER ACIDS MAY ALTER THE COLOR.
- A PRESSURE WASHER SHALL NOT BE USED FOR REMOVING THE EFFLORESCENCE SALTS.

**CRAZING REPAIR NOTES:**

- CRAZING IS DEFINED AS A PATTERN OF FINE RANDOM CRACKS OCCURRED ON A CONCRETE SURFACE.
- ROUGHEN THE CRAZING AREA ON THE CONCRETE SURFACE TO A 1/4" AMPLITUDE AND APPLY AN APPROVED SURFACE REPAIR MORTAR.
- SURFACE PREPARATION, MIXING, APPLICATION AND CURING SHALL BE PERFORMED PER MANUFACTURER'S RECOMMENDATIONS.

**TYPICAL MISCELLANEOUS REPAIR NOTES**  
NO SCALE



(SCALE BAR IS 4" AT FULL SCALE)



**DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY**

**WRF EFFLUENT  
PUMPING  
IMPROVEMENTS**

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**GENERAL**

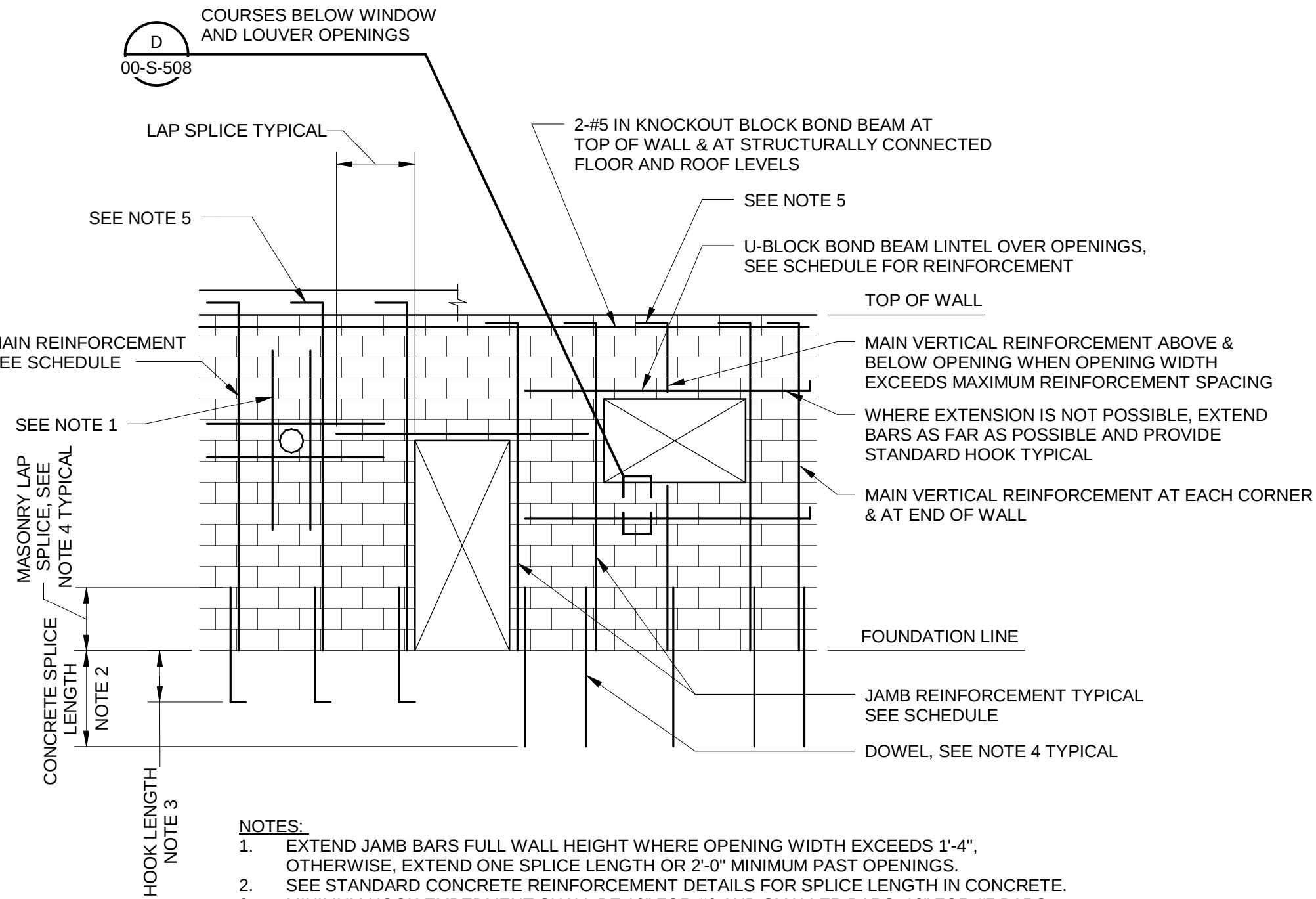
**STRUCTURAL**

**TYPICAL CONCRETE  
CRACK AND SURFACE  
REPAIR DETAILS AND  
NOTES**

PLAN FILE NO. 664-211

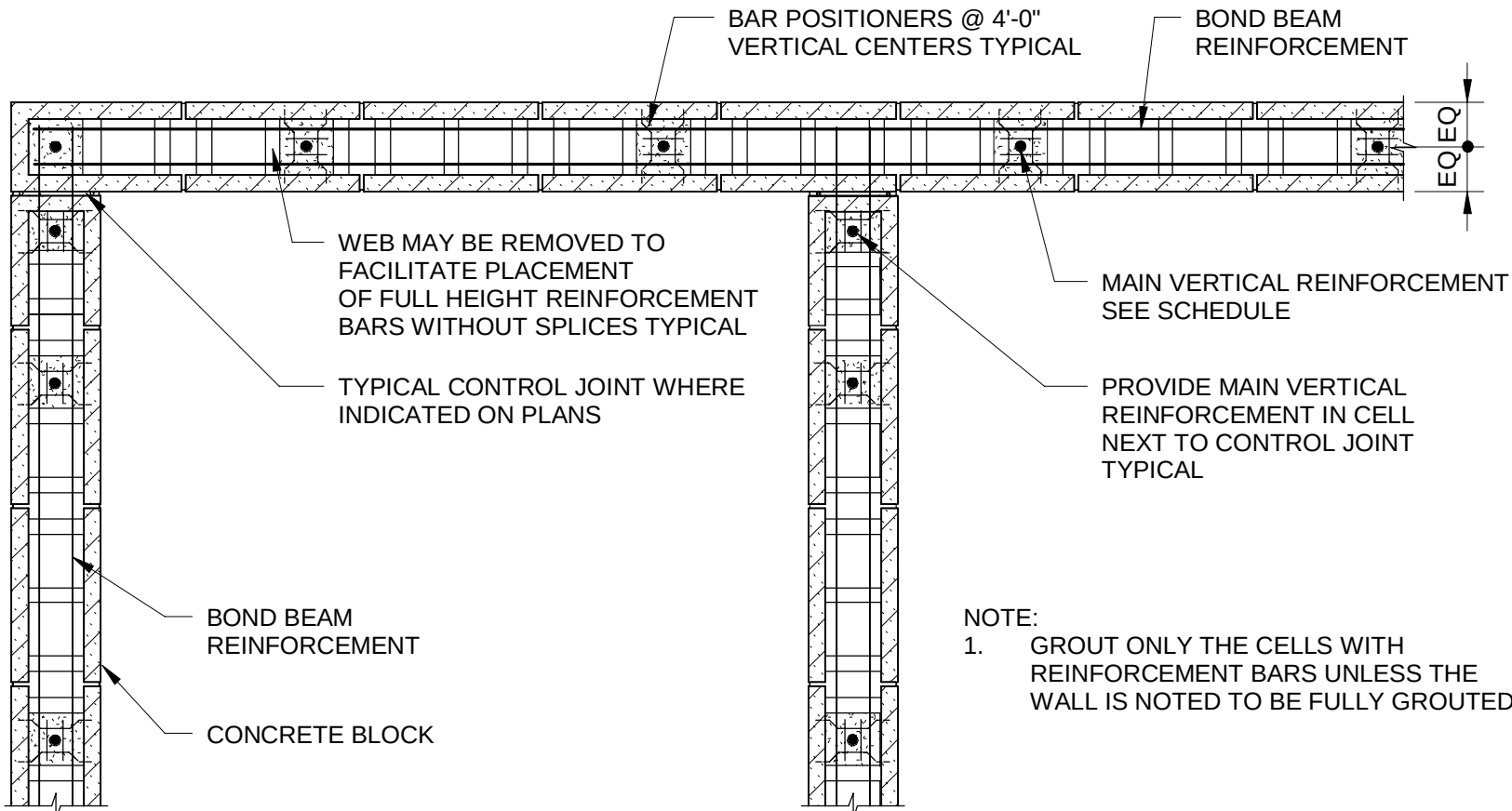
**00-S-507**



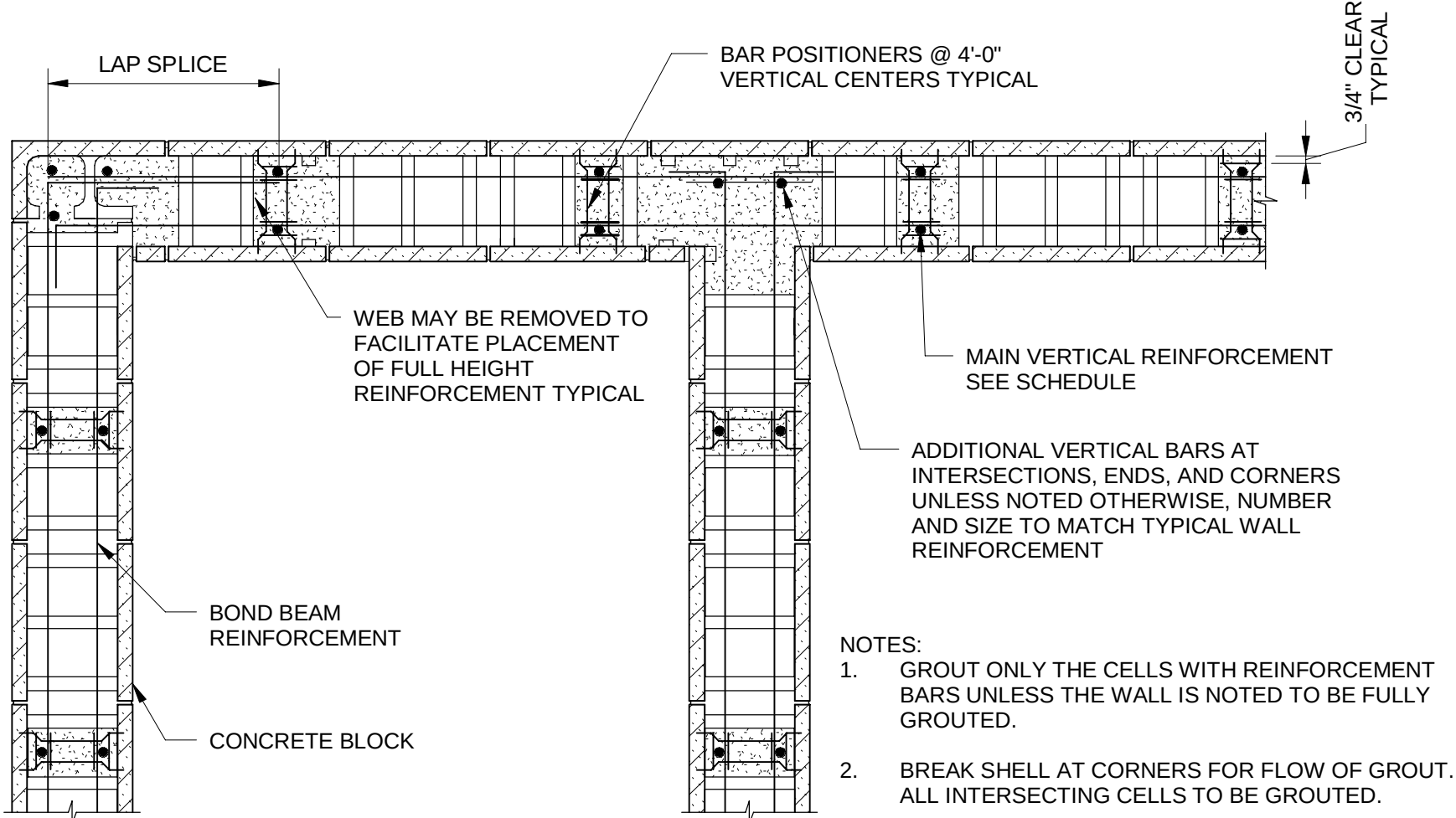


B  
 1/4" = 1'-0"

TYPICAL MASONRY REINFORCEMENT ELEVATION



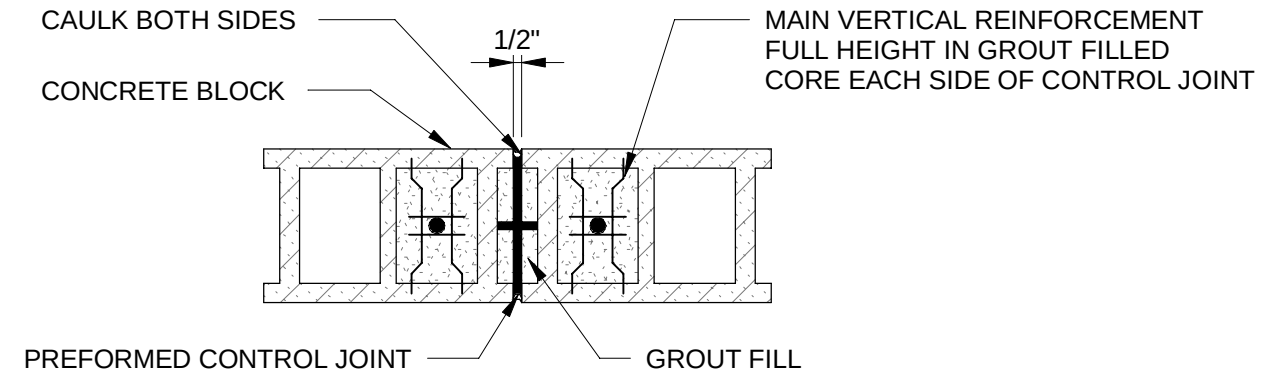
TYPICAL REINFORCEMENT WITH CORNER CONTROL JOINTS  
 SINGLE CURTAIN VERTICAL REINFORCEMENT SHOWN.  
 DOUBLE CURTAIN SIMILAR EXCEPT BARS POSITIONED EACH FACE, SEE ADJACENT DETAIL.



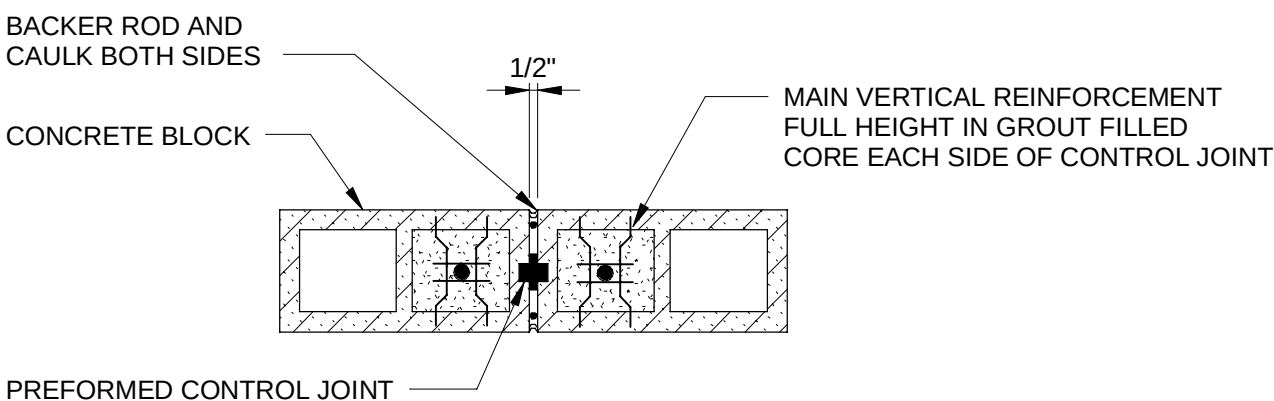
TYPICAL REINFORCEMENT WITHOUT CORNER CONTROL JOINTS  
 DOUBLE CURTAIN VERTICAL REINFORCEMENT SHOWN.  
 SINGLE CURTAIN SIMILAR EXCEPT BARS CENTERED IN WALL, SEE ADJACENT DETAIL.

A  
 3/4" = 1'-0"

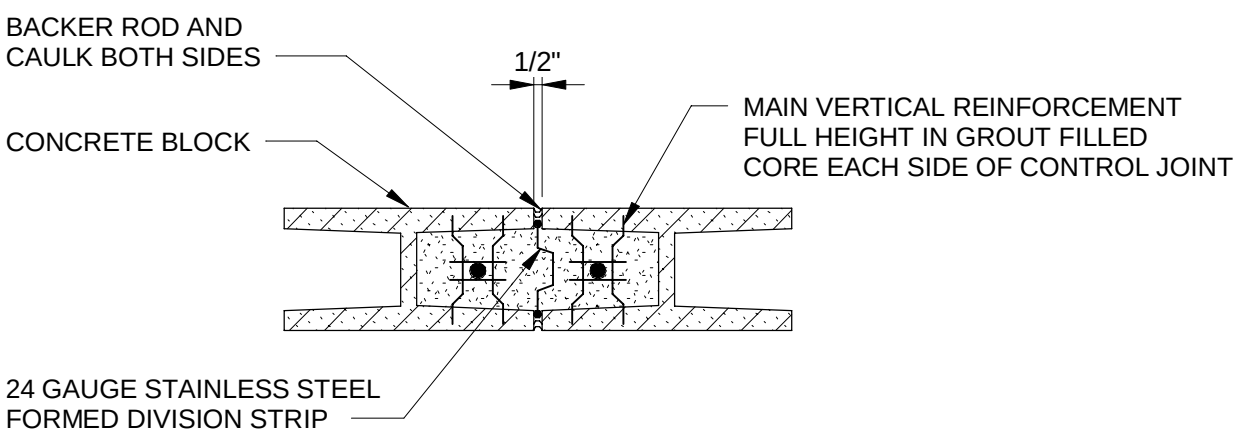
TYPICAL MASONRY REINFORCEMENT PLANS



STRETCHER BLOCK TYPE



SASH BLOCK TYPE



H-BLOCK TYPE

- NOTES:
1. LADDER TYPE JOINT REINFORCEMENT IS DISCONTINUOUS AT CONTROL JOINT.
  2. BOND BEAM REINFORCEMENT IS DISCONTINUOUS THROUGH CONTROL JOINT, EXCEPT REINFORCEMENT SHALL BE CONTINUOUS AT CONTROL JOINTS WHERE BOND BEAMS ARE LOCATED AT ROOF AND FLOOR JOIST BEARING.
  3. CONTROL JOINT IS CONTINUOUS FULL WALL HEIGHT.
  4. CONTROL JOINT LOCATIONS SHALL BE AS INDICATED ON THE PLANS.
  5. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF VENEER CONTROL OR EXPANSION JOINTS. CONTROL JOINTS IN CMU BACKUP AND VENEER DO NOT ALIGN.

C  
 1" = 1'-0"

TYPICAL CMU CONTROL JOINT

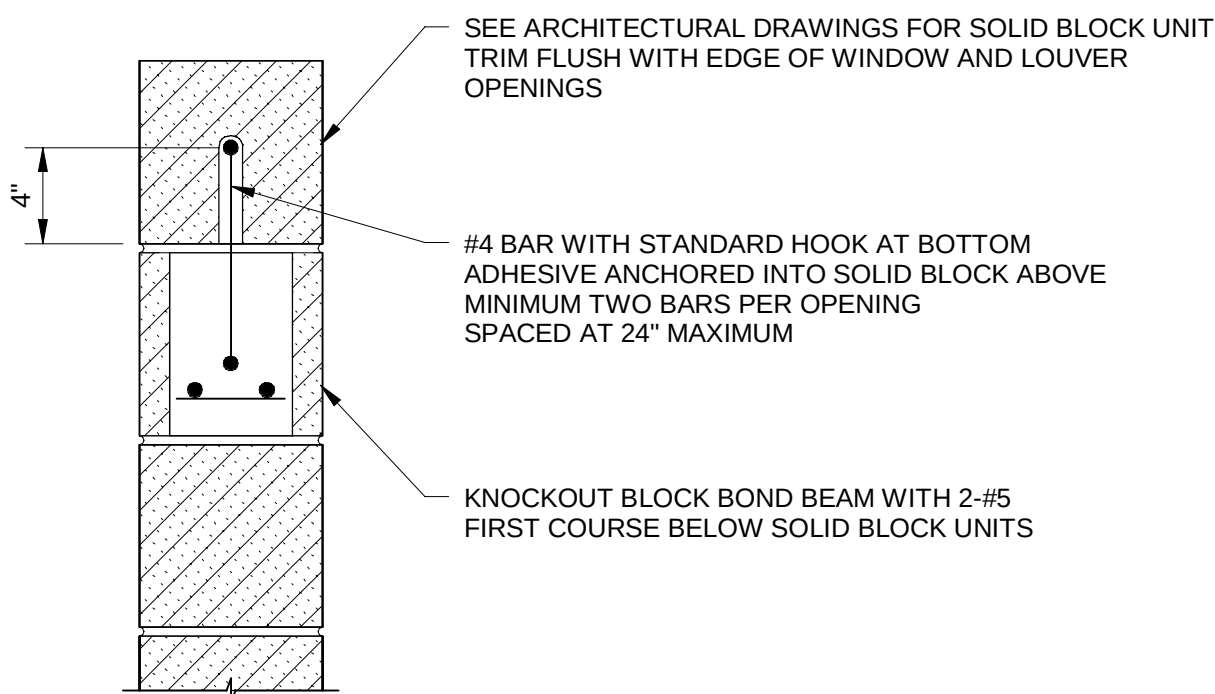
| CMU WALL AND MAIN REINFORCEMENT SCHEDULE |       |                 |                   |                                   |          |                                       |                                                |                     |
|------------------------------------------|-------|-----------------|-------------------|-----------------------------------|----------|---------------------------------------|------------------------------------------------|---------------------|
| BUILDING                                 | WALL  | BLOCK THICKNESS | GROUTING (NOTE 1) | MAIN VERTICAL REINFORCEMENT       |          |                                       | MAIN HORIZONTAL REINFORCEMENT                  | WALL CONTROL JOINTS |
|                                          |       |                 |                   | BARS PER REINFORCED CELL (NOTE 2) | BAR SIZE | MAX SPACING OF VERTICAL REINFORCEMENT |                                                |                     |
| ELECTRICAL ROOM (PUMP STATION)           | NORTH | 12"             | F                 | 1                                 | #5       | 24"                                   | PROVIDE 8" DEEP BOND BEAM WITH 2-#5 @ 2'-0" OC | NOT REQUIRED        |
|                                          | SOUTH | 12"             | F                 | 1                                 | #5       | 24"                                   |                                                |                     |
|                                          | EAST  | 12"             | F                 | 1                                 | #5       | 24"                                   |                                                |                     |
|                                          | WEST  | 12"             | F                 | 1                                 | #5       | 24"                                   |                                                |                     |

- NOTES:
1. "F" INDICATES A FULLY GROUTED WALL, "R" INDICATES TO GROUT ONLY THE REINFORCED CELLS.
  2. "1" INDICATES A SINGLE BAR CENTERED IN WALL. "2" INDICATES DOUBLE CURTAIN REINFORCEMENT, WITH ONE BAR EACH FACE OF CELL.
  3. SEE THE OTHER STRUCTURAL DRAWINGS FOR ADDITIONAL REINFORCEMENT DETAILS AT CONNECTIONS, TOPS OF WALLS, JAMBS, LINTELS, ETC.
  4. CMU = CONCRETE MASONRY UNIT

| LENGTH OF LAP SPLICES FOR REINFORCEMENT (INCHES) |                          |                      |                           |                      |
|--------------------------------------------------|--------------------------|----------------------|---------------------------|----------------------|
| (F <sub>m</sub> 2500 PSI, IBC 2012, 2015 & 2018) |                          |                      |                           |                      |
| BAR SIZE                                         | 8" CONCRETE MASONRY UNIT |                      | 12" CONCRETE MASONRY UNIT |                      |
|                                                  | SINGLE REINFORCEMENT     | DOUBLE REINFORCEMENT | SINGLE REINFORCEMENT      | DOUBLE REINFORCEMENT |
| 4                                                | 12                       | 20                   | 12                        | 17                   |
| 5                                                | 18                       | 32                   | 12                        | 27                   |
| 6                                                | 34                       | -                    | 21                        | 51                   |
| 7                                                | 47                       | -                    | 29                        | (71)                 |
| 8                                                | (71)                     | -                    | 45                        | (110)                |

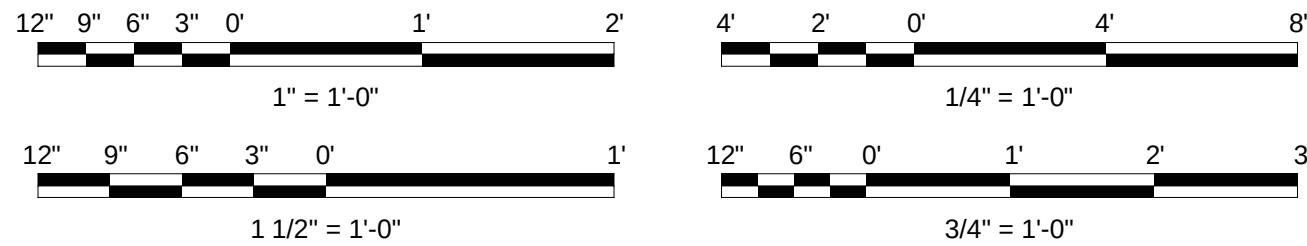
1. NON-CONTACT LAP SPLICES SHALL NOT BE USED.  
 2. ( ) BRACKETED SPLICE LENGTHS NOT RECOMMENDED. USE MECHANICAL CONNECTORS OR A FULL HEIGHT REINFORCEMENT BAR.

| GENERAL NOTES |                                                                                                                                                                                                                    |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.            | THE DETAILS ON THIS SHEET ARE APPLICABLE TO ALL CONCRETE MASONRY CONSTRUCTION. SPECIAL NOTES, SECTIONS AND DETAILS SPECIFICALLY NOTED ON THE DESIGN DRAWINGS SHALL BE APPLICABLE IN LIEU OF THESE TYPICAL DETAILS. |
| 2.            | FOR MISCELLANEOUS APPURTENANCES INCLUDING EMBEDMENTS, BRACING, STEEL OR PRECAST LINTELS, VENEER, FLASHING, WEEPS, INSULATION, SEALING, CAULKING AND EMBEDDED PIPE AND ELECTRICAL CONDUIT, SEE THE DESIGN DRAWINGS. |
| 3.            | WORK THIS DRAWING WITH THE STANDARD CONCRETE MASONRY LINTEL & JAMB REINFORCEMENT DETAILS DRAWING.                                                                                                                  |



D  
 00-S-508 1 1/2" = 1'-0"

COURSES BELOW WINDOW AND LOUVER OPENING



DES MOINES  
 METROPOLITAN  
 WASTEWATER  
 RECLAMATION  
 AUTHORITY

WRF EFFLUENT  
 PUMPING  
 IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

GENERAL

STRUCTURAL

STANDARD CONCRETE  
 MASONRY  
 REINFORCEMENT  
 DETAILS

PLAN FILE NO. 664-212

00-S-508

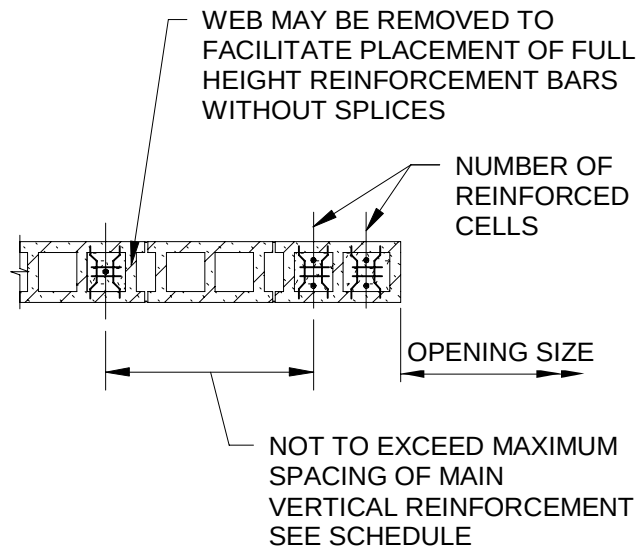
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 OF  
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| JAMB SCHEDULE   |      |                 |                |                            |                         |          |
|-----------------|------|-----------------|----------------|----------------------------|-------------------------|----------|
| BUILDING        | WALL | BLOCK THICKNESS | OPENING SIZE   | JAMBS                      |                         |          |
|                 |      |                 |                | NUMBER OF REINFORCED CELLS | BAR PER REINFORCED CELL | BAR SIZE |
| ELECTRICAL ROOM | EAST | 12"             | 4'-0" TO 8'-0" | 2                          | 2 EF                    | #5       |
|                 | WEST | 12"             | <4'-0"         | 1                          | 2 EF                    | #5       |

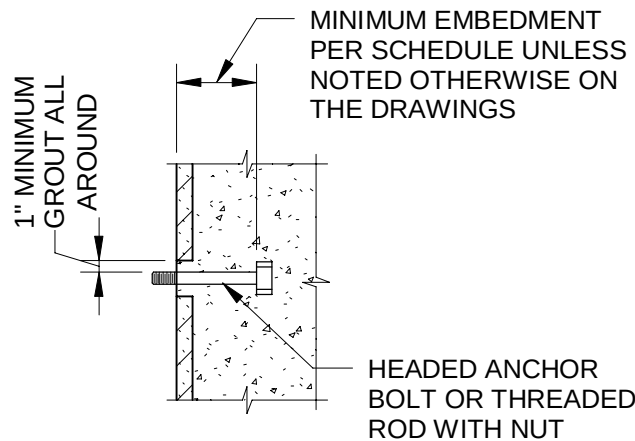
NOTES:

- AN INTERIOR WALL IS A WALL IN WHICH NO PORTION OF THE WALL IS EXPOSED TO THE EXTERIOR.
- REINFORCE JAMBS AS INDICATED UNLESS NOTED OTHERWISE ON THE DRAWINGS.



JAMB - PLAN

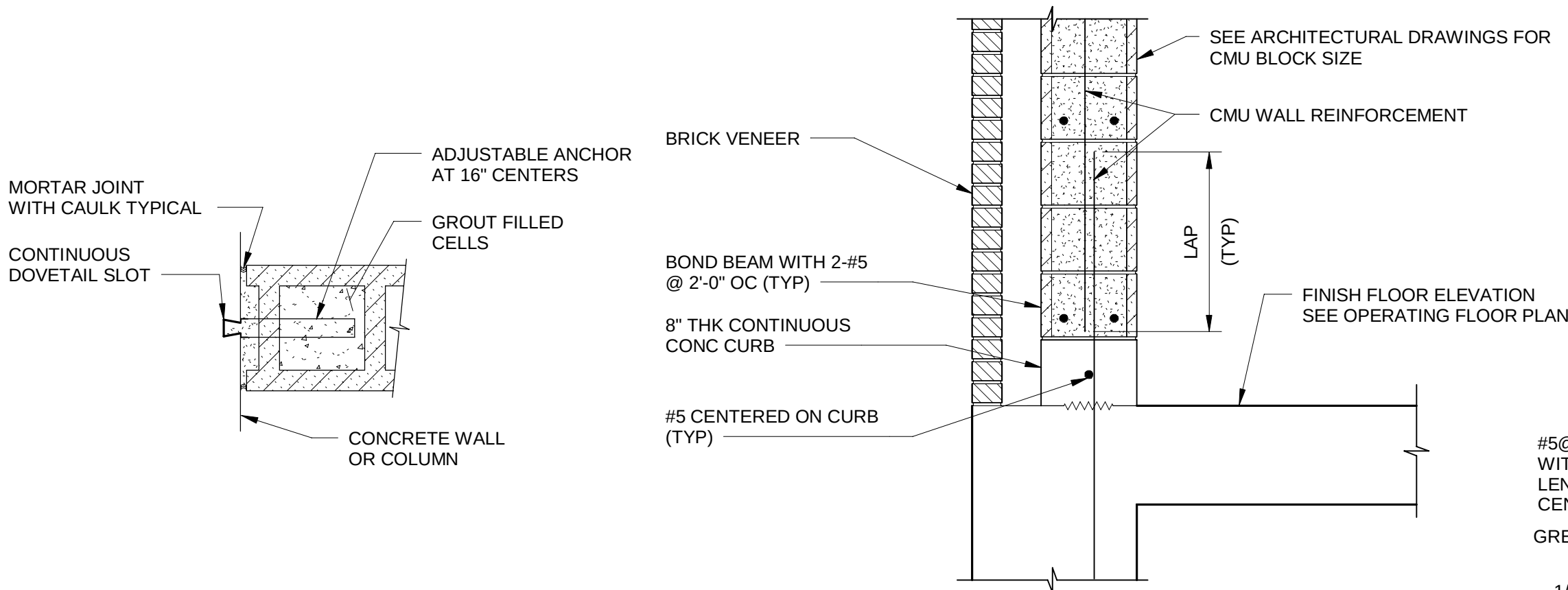
**A** TYPICAL MASONRY JAMB SCHEDULE AND PLAN  
1/2" = 1'-0"



| BOLT EMBEDMENT SCHEDULE UNLESS NOTED OTHERWISE |       |
|------------------------------------------------|-------|
| BOLT SIZE                                      | EMBED |
| 1/2"                                           | 4"    |
| 5/8"                                           | 4"    |
| 3/4"                                           | 5"    |
| 7/8"                                           | 6"    |
| 1"                                             | 7"    |

NOTE: MINIMUM BOLT SPACING SHALL BE (12) BOLT DIAMETERS WITH A MINIMUM EDGE DISTANCE OF (6) BOLT DIAMETERS AND WITH A MINIMUM OF 6" TO END OF WALL, UNLESS NOTED OTHERWISE.

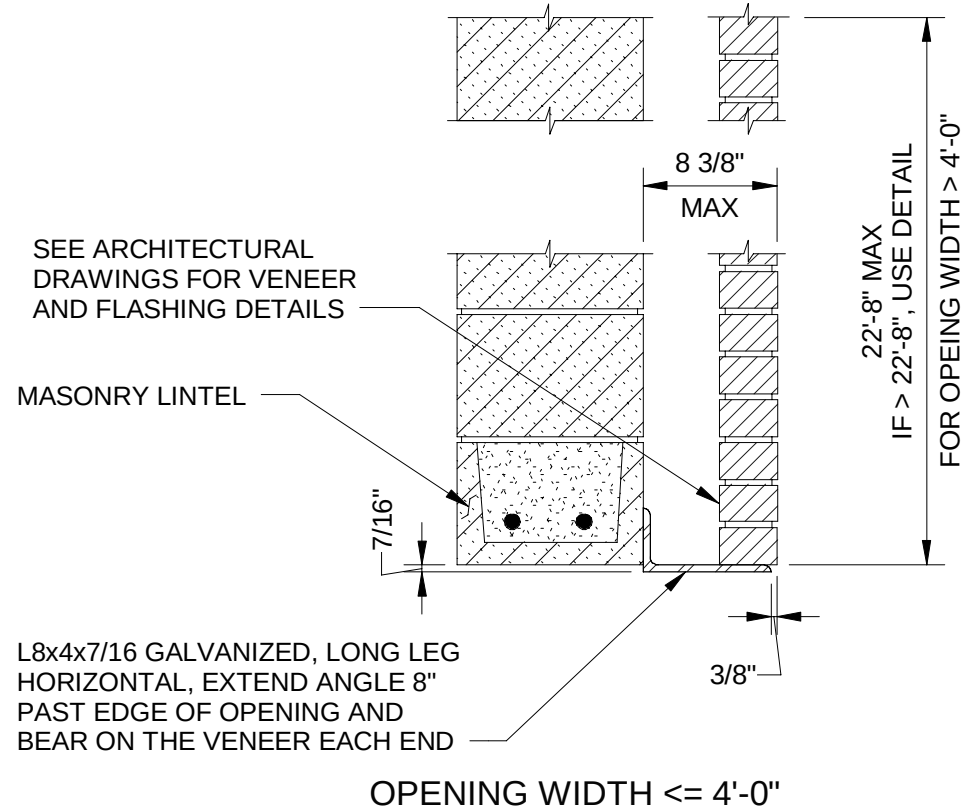
**C** TYPICAL MASONRY ANCHOR BOLT DETAIL  
3/4" = 1'-0"



TYPICAL MASONRY WALL AT CONCRETE WALL OR COLUMN

1 1/2" = 1'-0"

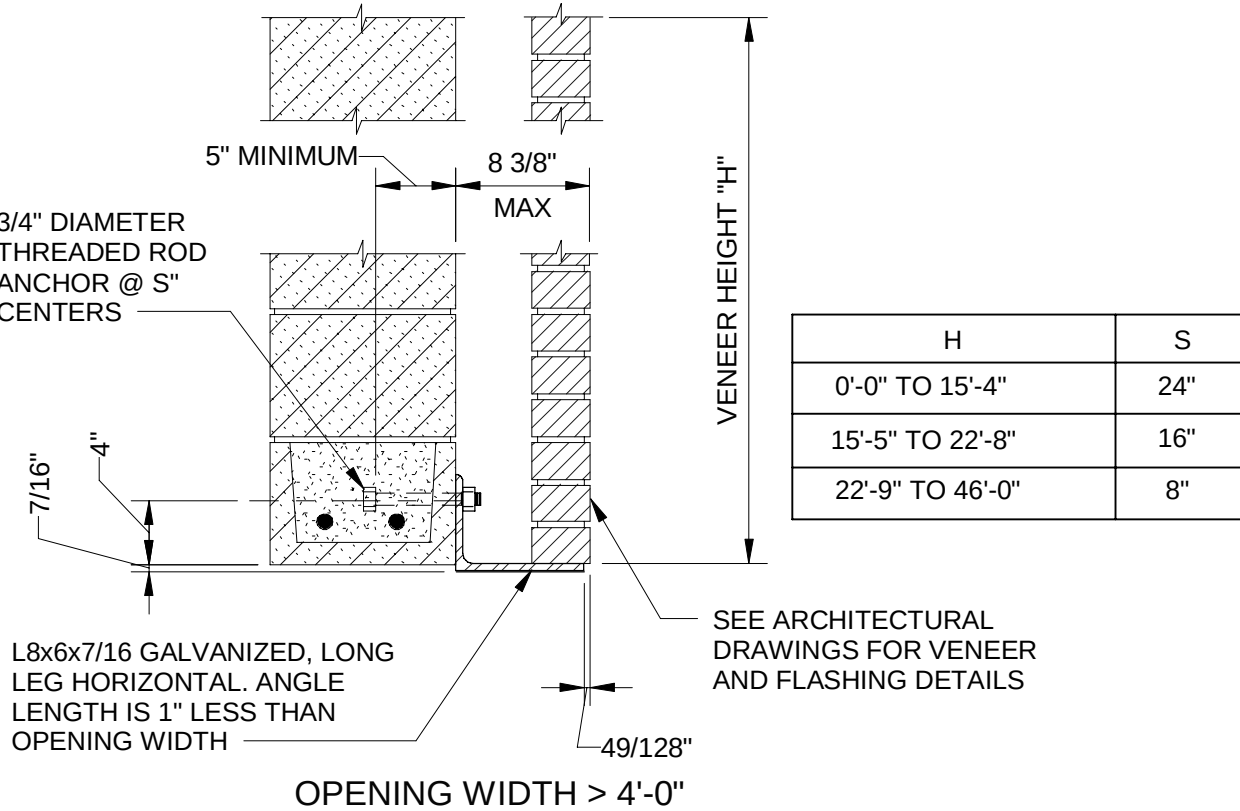
**F** BASE DETAIL  
3/4" = 1'-0"



OPENING WIDTH <= 4'-0"

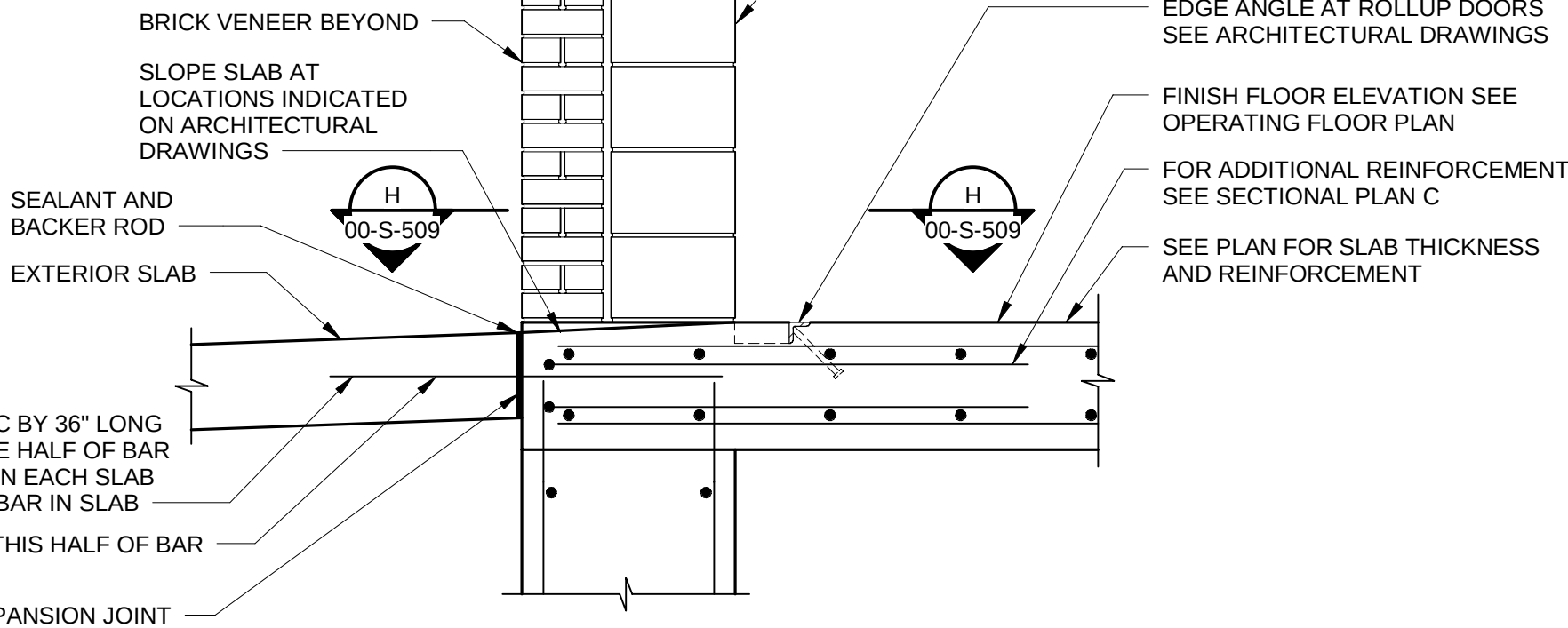
- NOTE:
- WHERE DIMENSION FROM FACE OF CMU TO OUTER FACE OF VENEER IS LESS THAN 8-3/8", TRIM HORIZONTAL ANGLE LEG TO MAINTAIN 3/8" INSET FROM VENEER, AND GRIND SMOOTH. GALVANIZE AFTER HORIZONTAL LEG IS TRIMMED.

**D** VENEER SUPPORT AT OPENING  
1" = 1'-0"



OPENING WIDTH > 4'-0"

**G** DETAIL AT WALL OPENING  
3/4" = 1'-0"



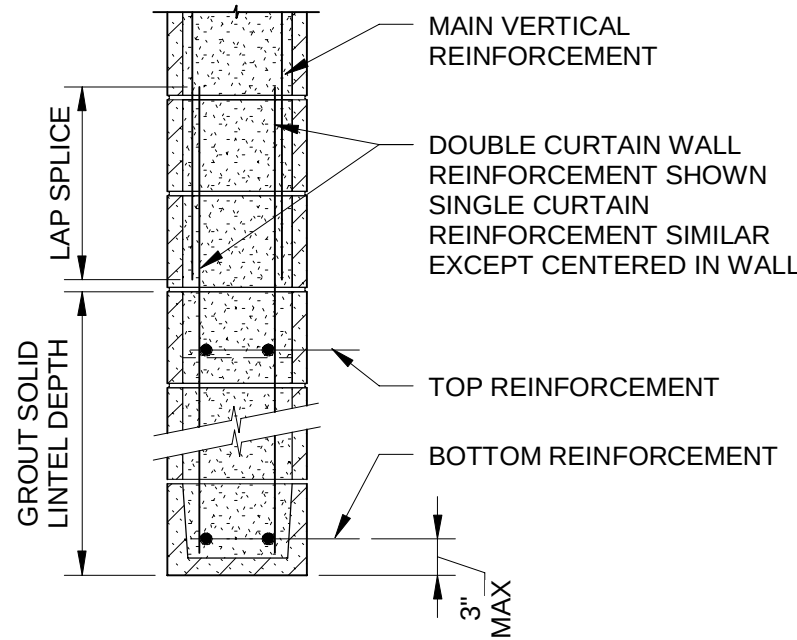
DETAIL AT WALL OPENING

| LINTEL SCHEDULE |      |                 |                |         |                      |                   |         |
|-----------------|------|-----------------|----------------|---------|----------------------|-------------------|---------|
| BUILDING        | WALL | BLOCK THICKNESS | OPENING SIZE   | LINTELS |                      |                   | REMARKS |
|                 |      |                 |                | DEPTH   | BOTTOM REINFORCEMENT | TOP REINFORCEMENT |         |
| ELECTRICAL ROOM | EAST | 12"             | 4'-0" TO 8'-0" | 2'-0"   | 2-#5                 | 2-#5              | -       |
|                 | WEST | 12"             | <4'-0"         | 1'-4"   | 2-#5                 | -                 | -       |

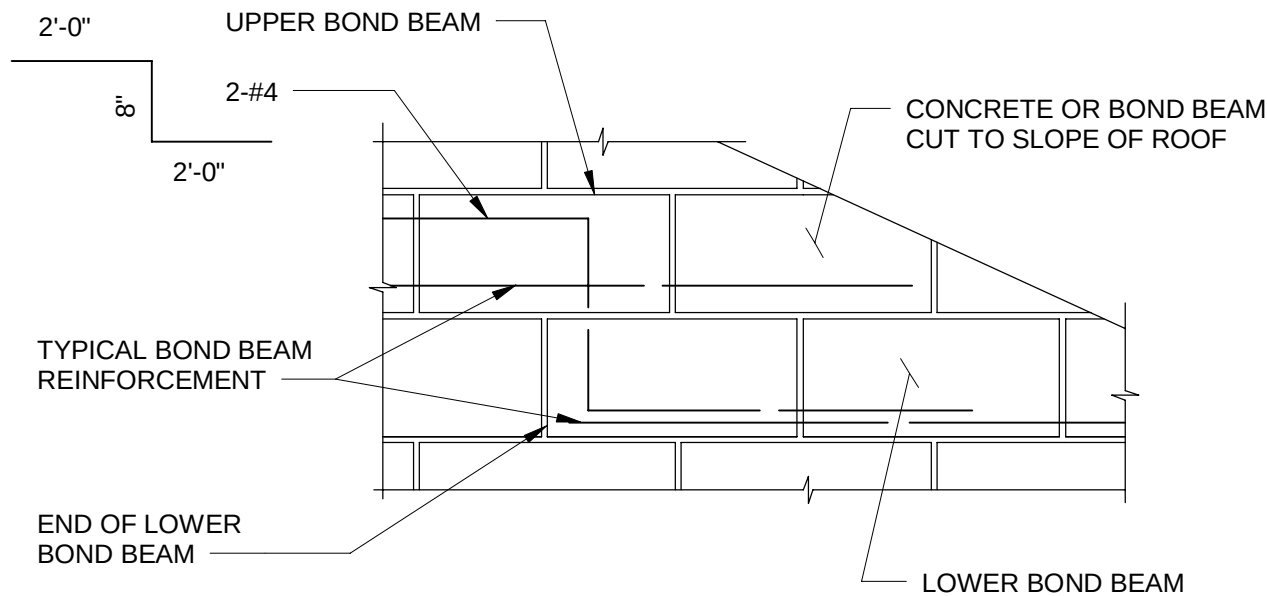
NOTES:

- BEAR ALL LINTELS A MINIMUM 2'-0" AT EACH END.
- REINFORCED LINTELS AS INDICATED UNLESS NOTED OTHERWISE ON THE DRAWINGS.

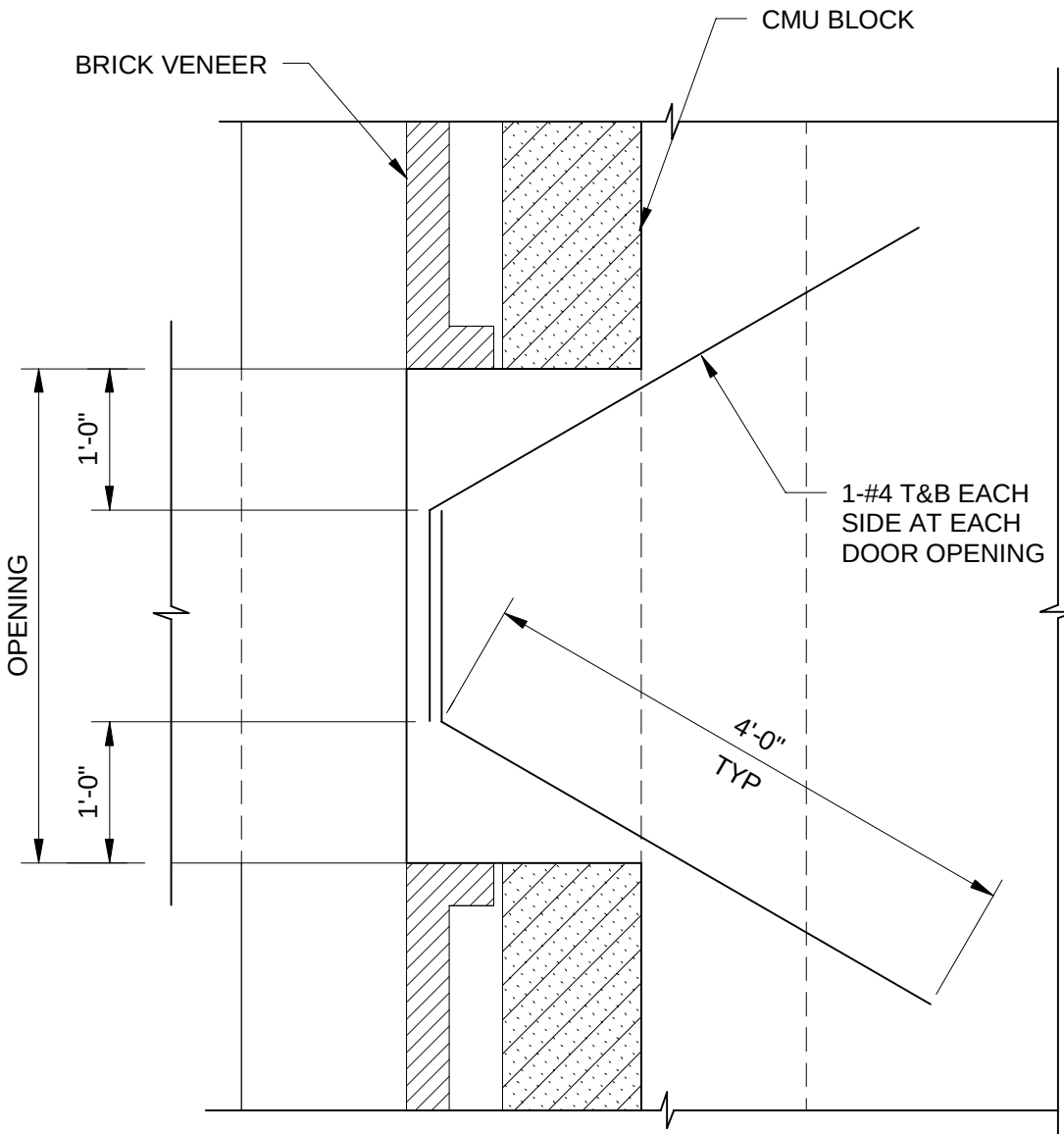
**B** TYPICAL MASONRY LINTEL SCHEDULE AND SECTION  
3/4" = 1'-0"



LINTEL - SECTION



**E** BOND BEAM STEP DETAIL  
1" = 1'-0"

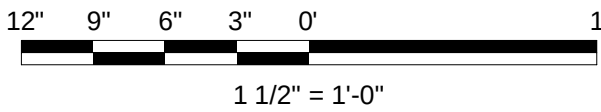
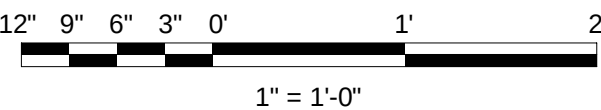
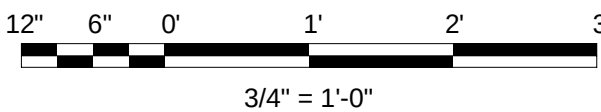
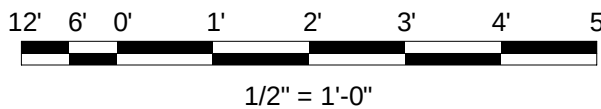


SECTIONAL PLAN AT OPENING

**H** DETAIL AT WALL OPENING  
00-S-509 3/4" = 1'-0"

### GENERAL NOTES

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- WORK THIS DRAWING WITH THE STANDARD CONCRETE MASONRY WALL REINFORCEMENT DETAILS.



(SCALE BAR IS 4" AT FULL SCALE)





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |            |
|-------------------------------|------------|
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| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | KB         |
| DETAILED:                     | VVS        |
| CHECKED:                      | MZL        |
| APPROVED:                     | JAB        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

GENERAL

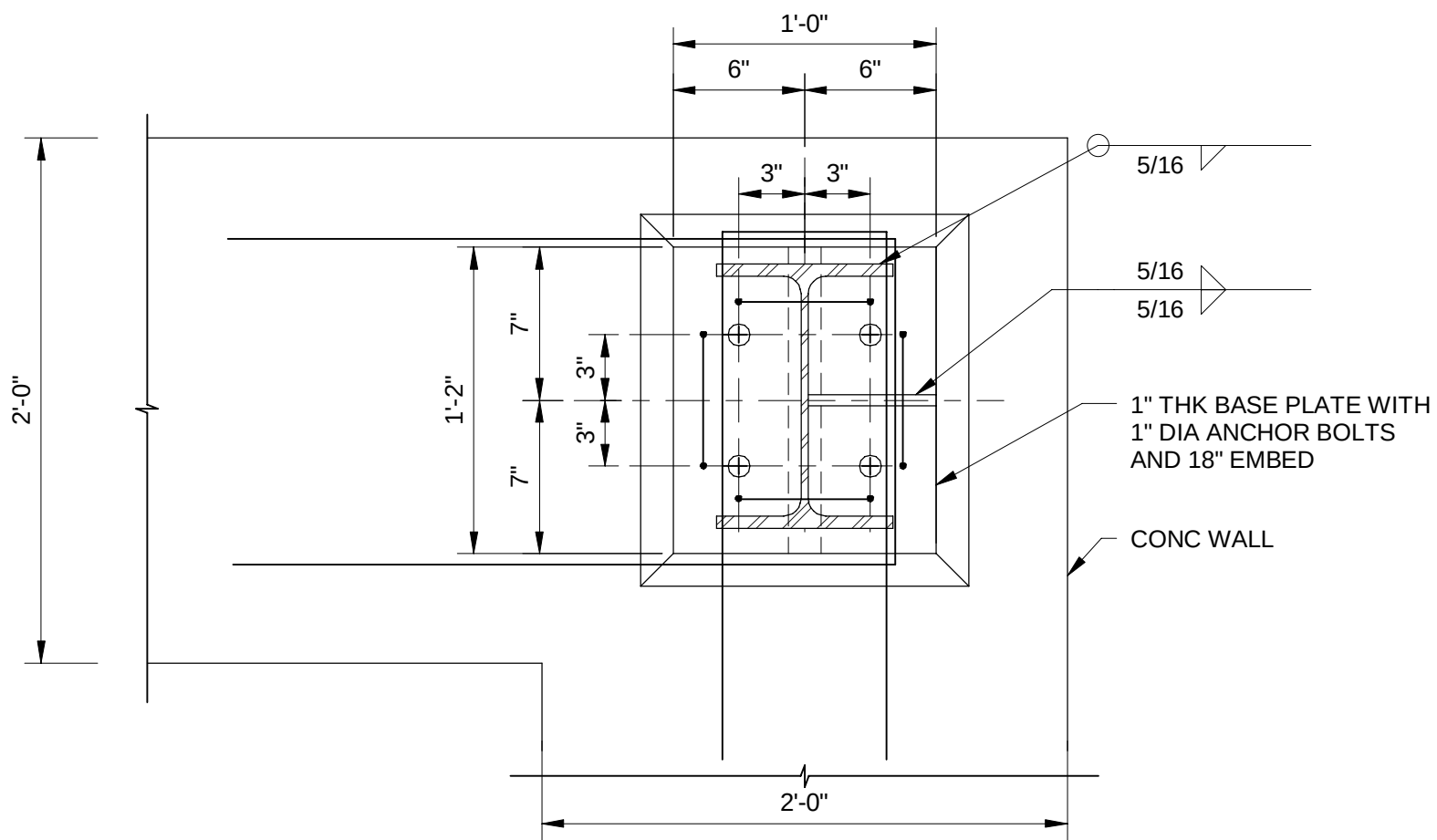
STRUCTURAL

STANDARD STEEL  
COLUMN BASEPLATE  
DETAILS

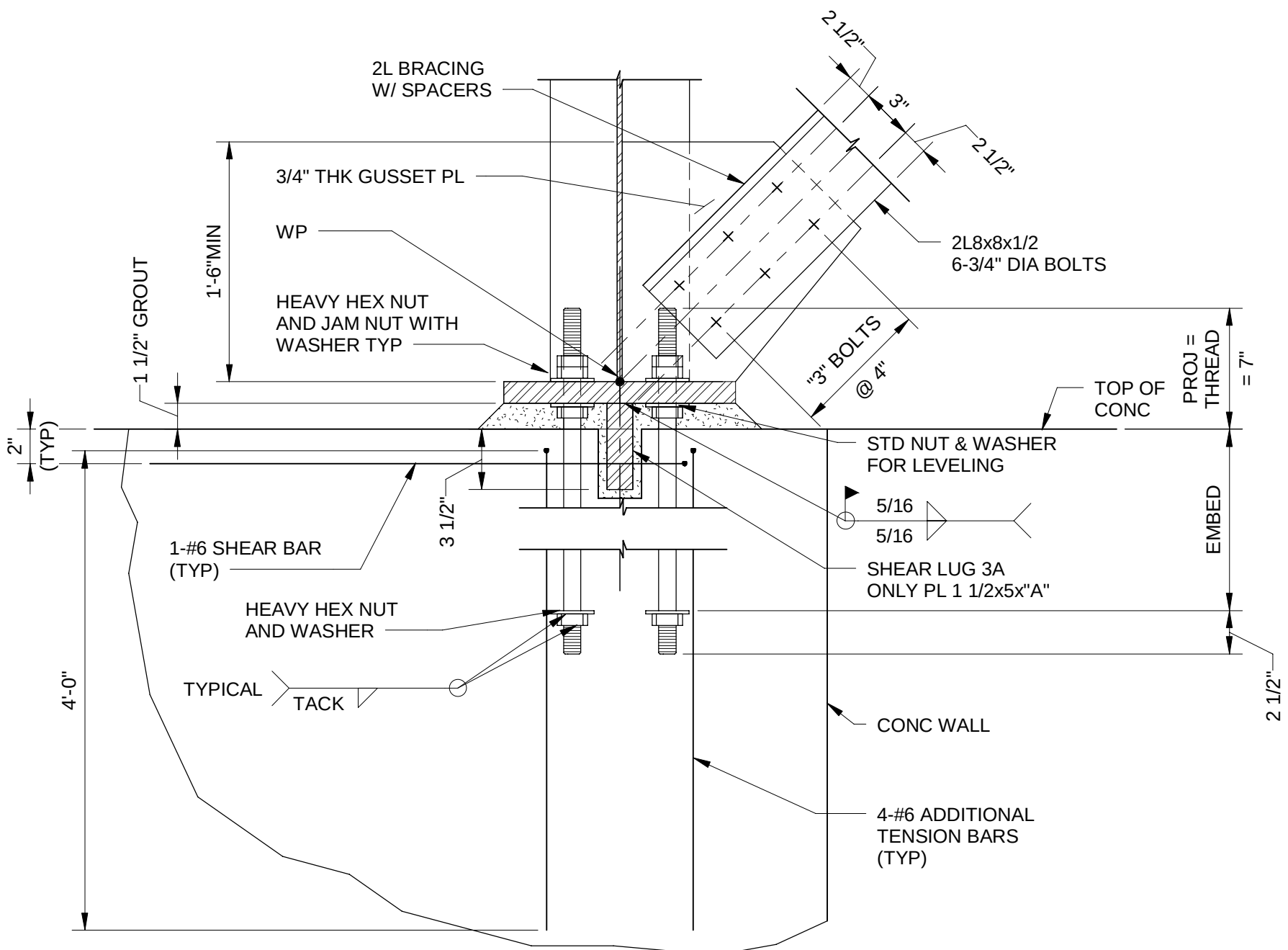
PLAN FILE NO. 664-214

00-S-510

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OF  
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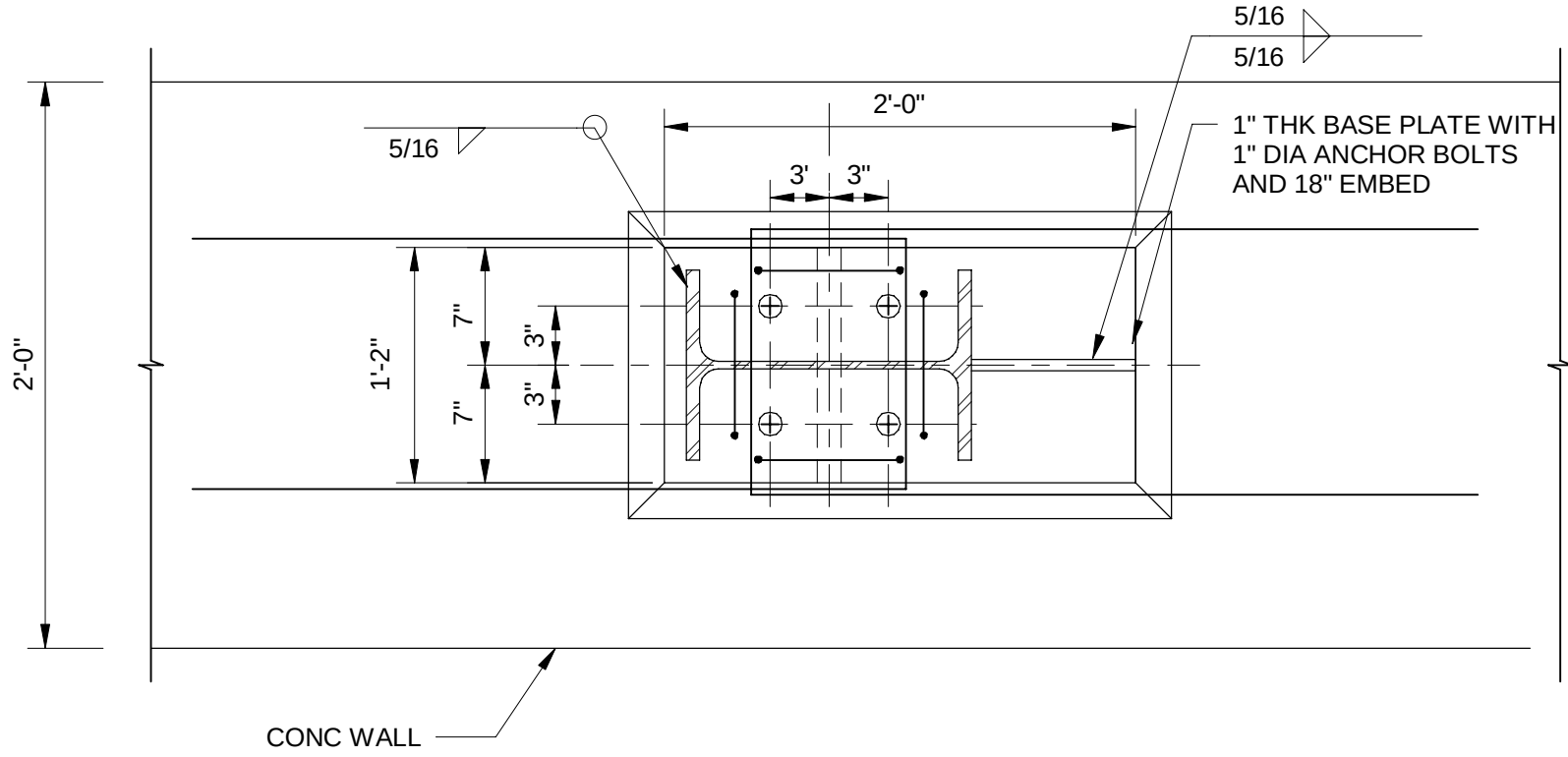
PLAN



ELEVATION

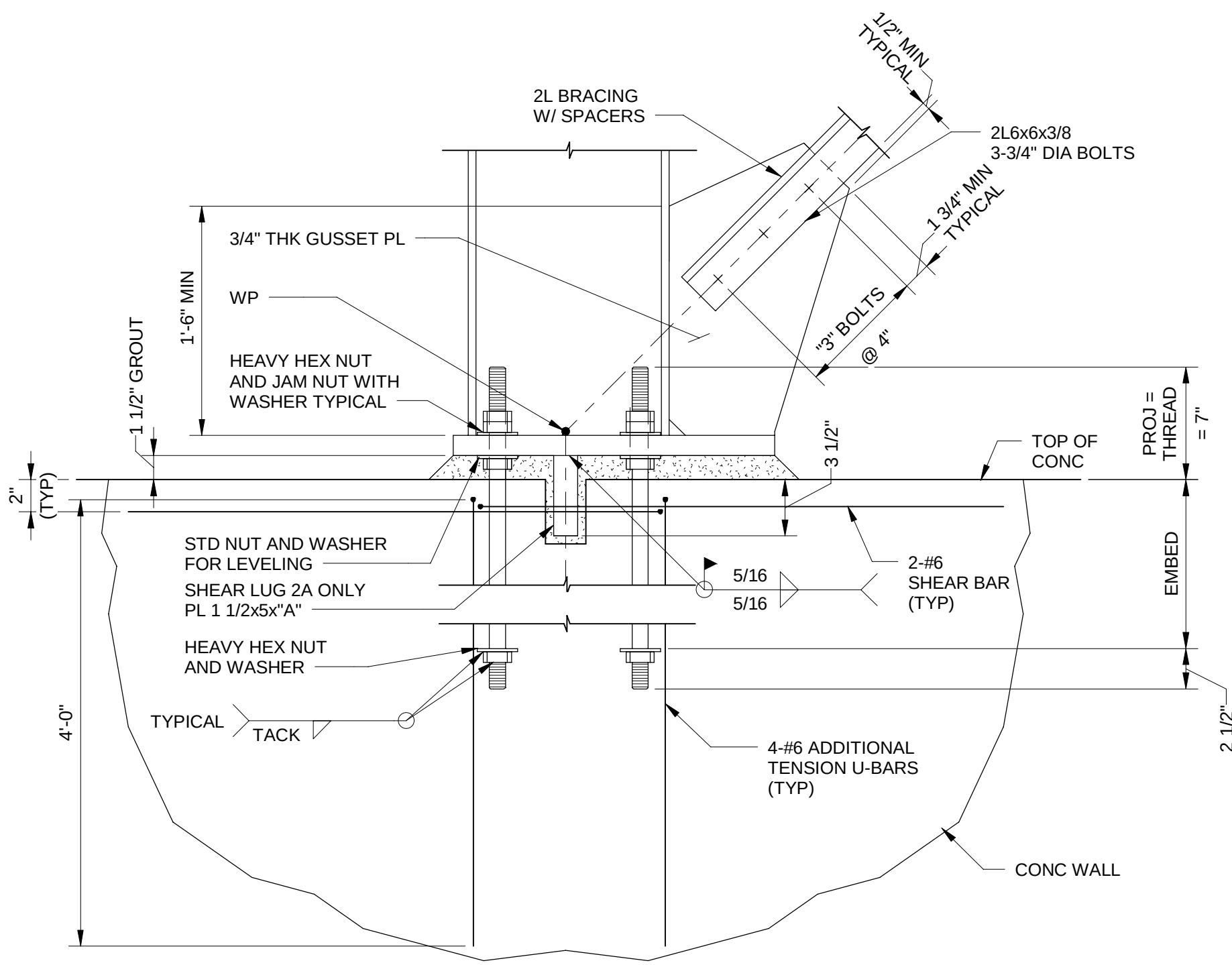
TYPE 3 & 3A  
1 1/2"=1'-0"

- NOTES
- GROUT SHALL BE FILLED IN SHEAR KEY AND WORKED AROUND SHEAR LUG AND BASE PLATE TO ENSURE NO VOIDS OR AIR POCKETS OCCUR. BLOCKOUT FOR SHEAR LUG SHALL BE 1" LARGER THAN THE SHEAR LUG SIZE MINIMUM.
  - U-BARS, INCLUDING U-BAR VERTICAL LEGS TO BE PLACED WITHIN 2 INCHES OF THE ANCHOR BOLT.



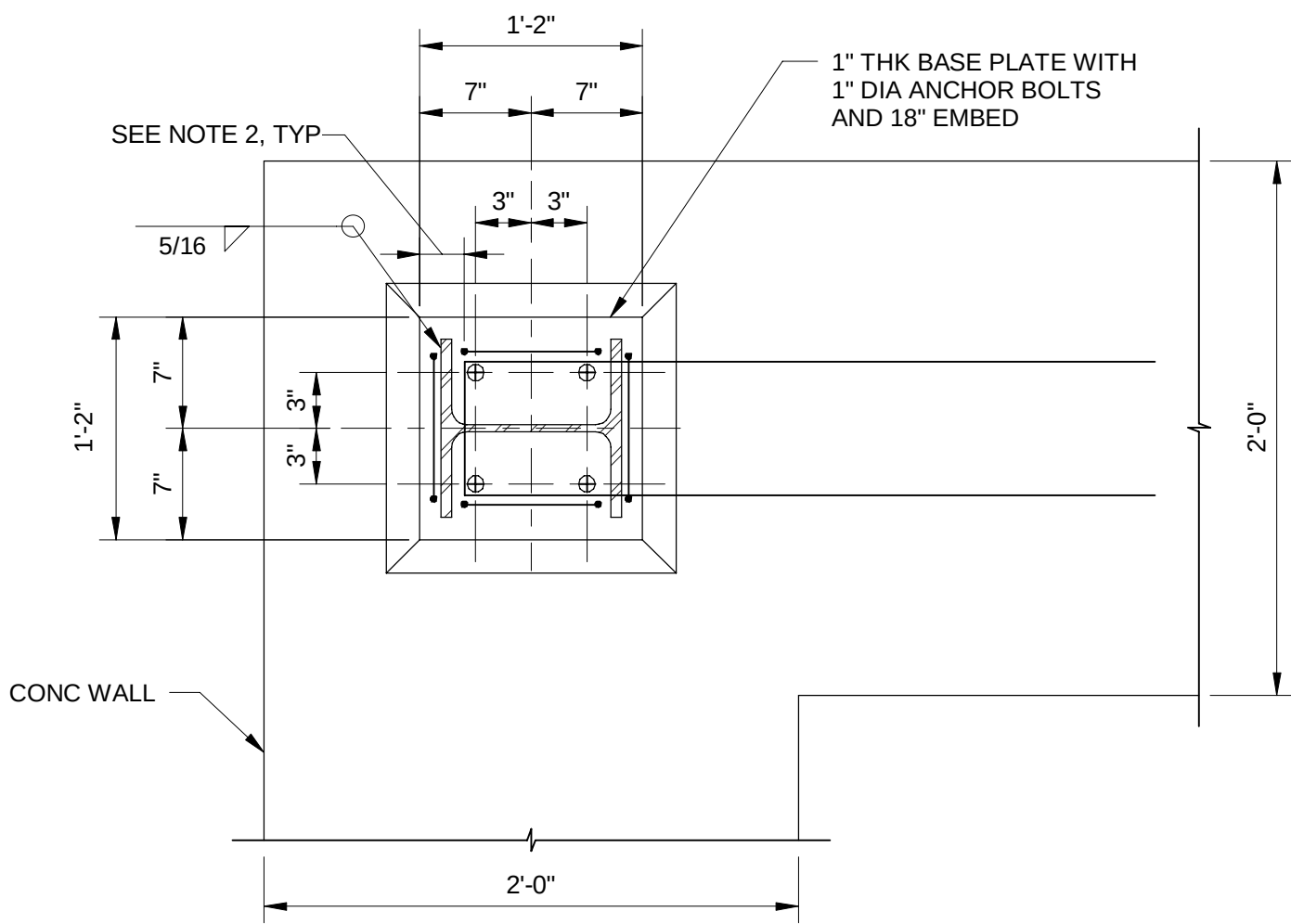
PLAN

(SEE ELEVATION DWG)

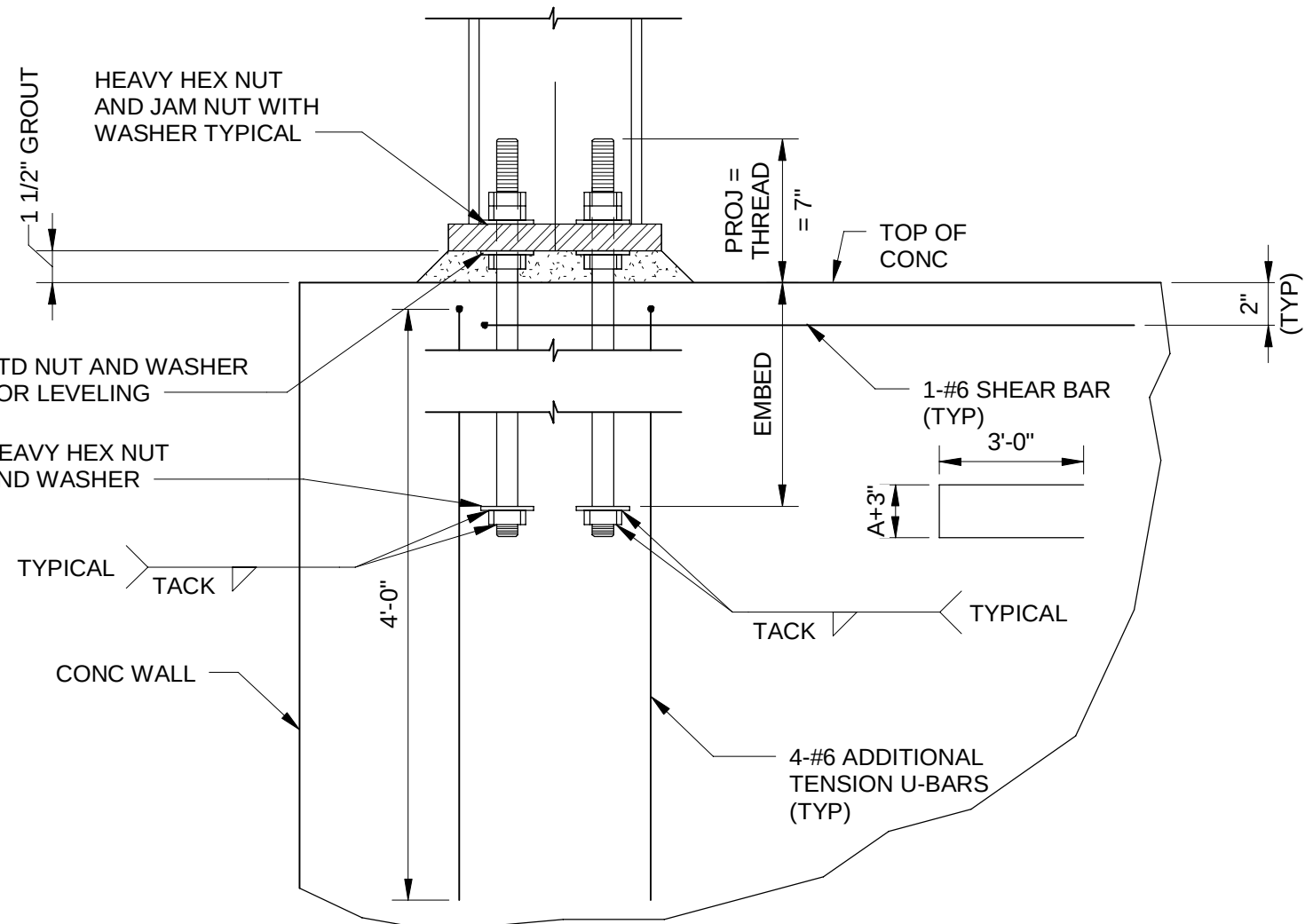


ELEVATION

TYPE 2 & 2A  
1 1/2"=1'-0"

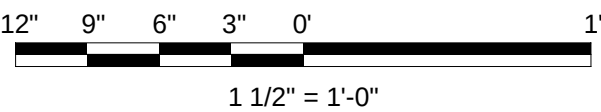


PLAN



ELEVATION

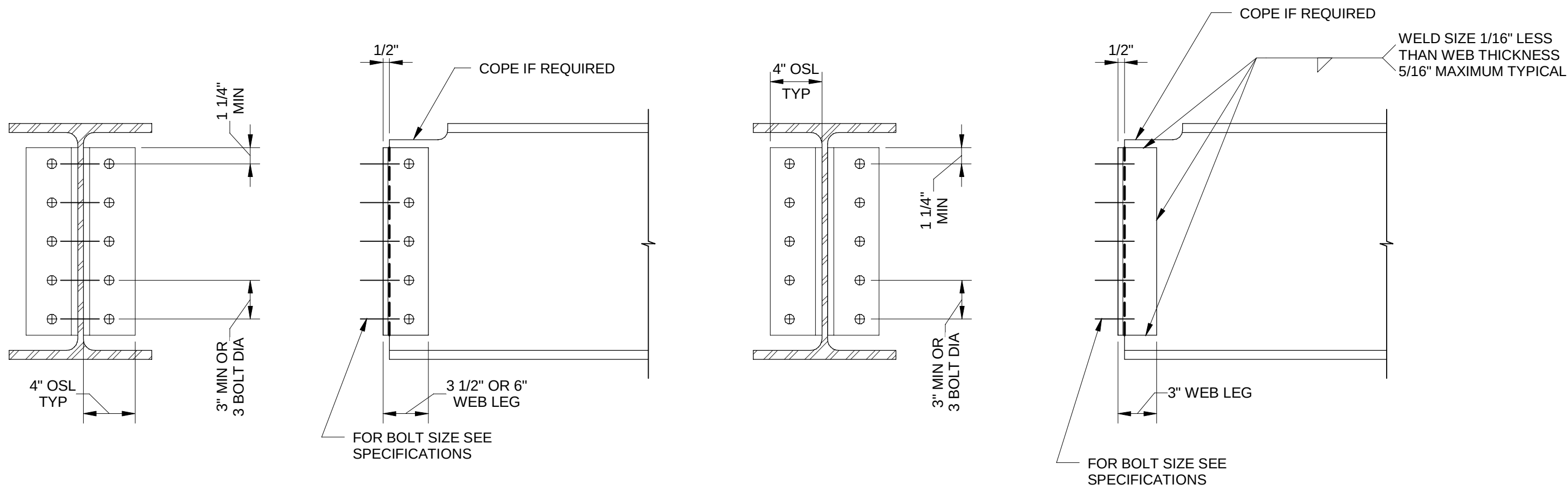
TYPE 1  
1 1/2"=1'-0"



(SCALE BAR IS 4" AT FULL SCALE)



PLOTTED: 8/20/2024 9:32:50 AM  
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 D11000

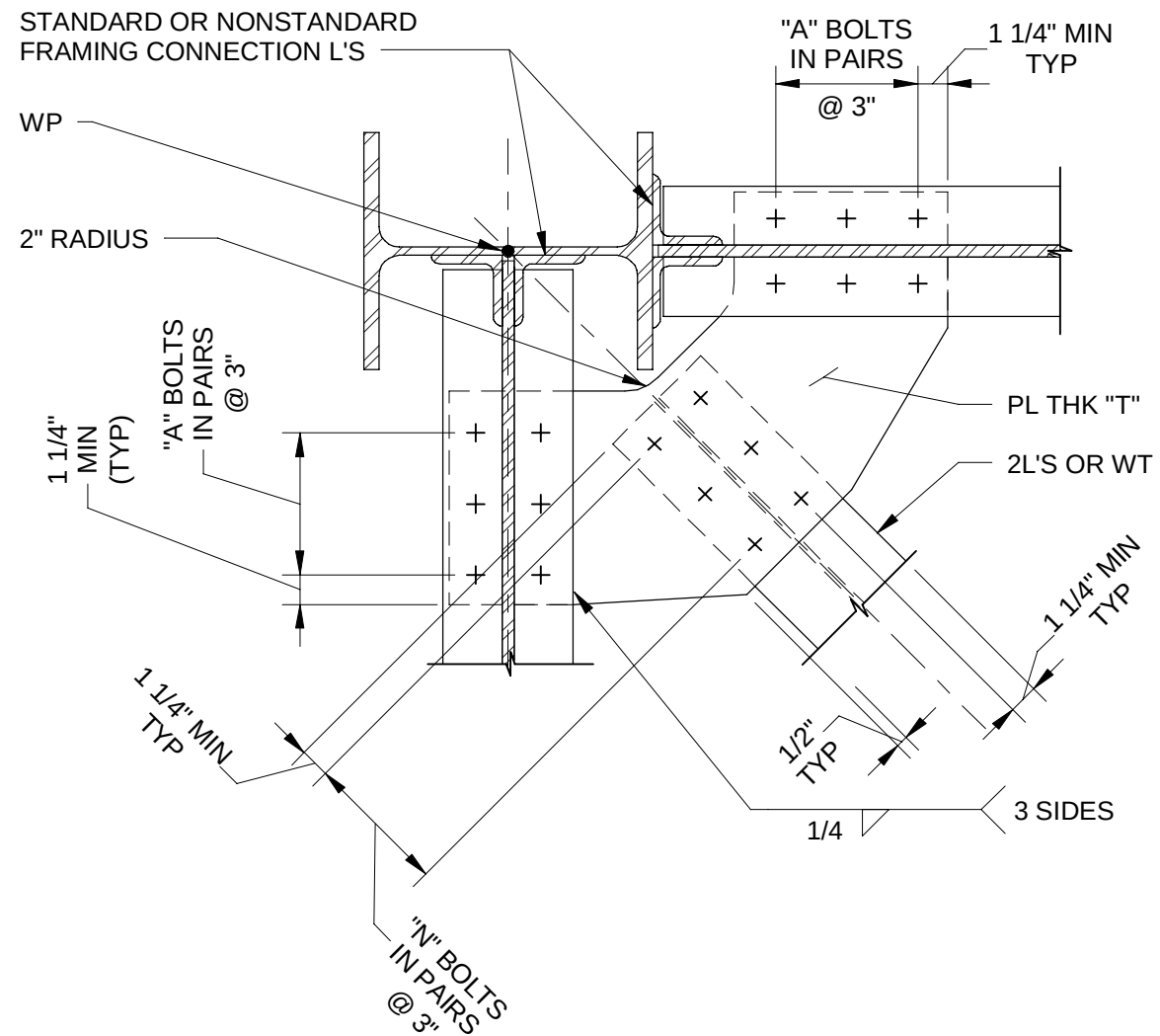


| SHOP BOLTED - FIELD BOLTED                                  |             |        |                  |
|-------------------------------------------------------------|-------------|--------|------------------|
| BEAM SIZE<br>(ALL WEIGHTS)                                  | NO OF BOLTS |        | ANGLE SIZE       |
|                                                             | OSL         | IN WEB |                  |
| W12 & W14, M12 & M14, S12, C12, MC12 & MC13                 | 6           | 3      | 2L'S 4x3 1/2x3/8 |
| W8 & W10, M8 & M10, S8 & S10, C8, C9 & C10, MC8, MC9 & MC10 | 4           | 2      | 2L'S 4x3 1/2x3/8 |
| W6, M6, S6 & S7, C6 & C7, MC6 & MC7                         | 2           | 2      | 2L'S 6x4x3/8     |

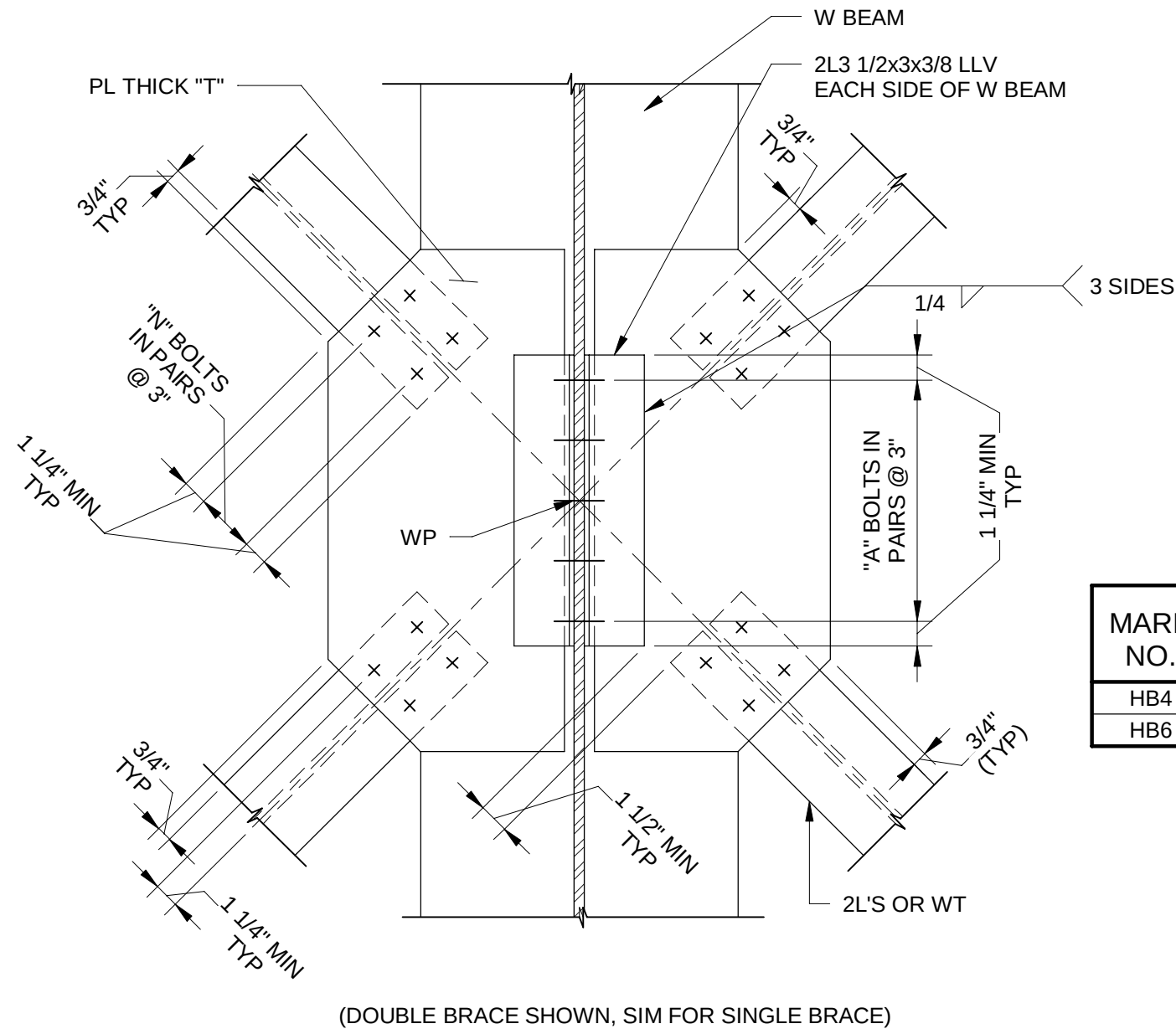
| SHOP WELDED - FIELD BOLTED                                  |                       |              |
|-------------------------------------------------------------|-----------------------|--------------|
| BEAM SIZE<br>(ALL WEIGHTS)                                  | NO OF BOLTS<br>IN OSL | ANGLE SIZE   |
| W12 & W14, M12 & M14, S12, C12, MC12 & MC13                 | 6                     | 2L'S 4x3x3/8 |
| W8 & W10, M8 & M10, S8 & S10, C8, C9 & C10, MC8, MC9 & MC10 | 4                     | 2L'S 4x3x3/8 |
| W6, M6, S6 & S7, C6 & C7, MC6 & MC7                         | 2                     | 2L'S 4x3x3/8 |

- NOTES:
- FABRICATOR SHALL PROVIDE ADDITIONAL CLIPS, SEATS, BOLTS, ETC. AS REQUIRED TO COMPLY WITH OSHA SAFETY STANDARDS FOR STEEL ERECTION.
  - OSL = OUTSTANDING LEG.
  - SEE AISC MANUAL FOR WORKABLE GAGES IN ANGLE LEGS.

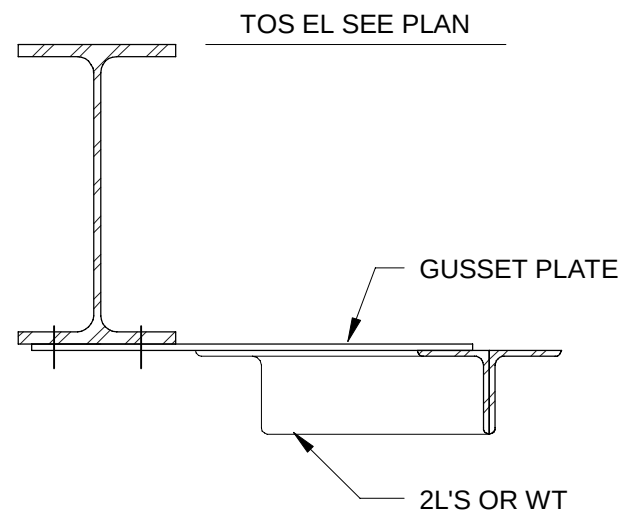
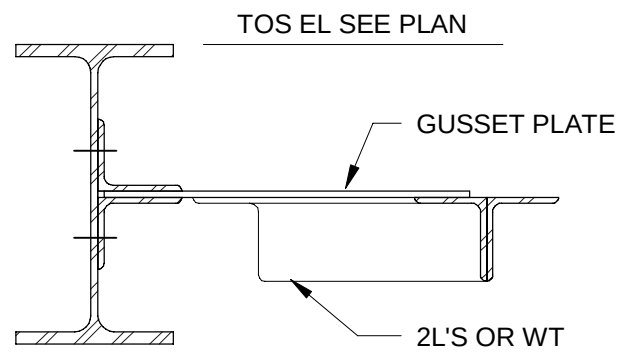
### STANDARD FRAMING CONNECTIONS NO SCALE



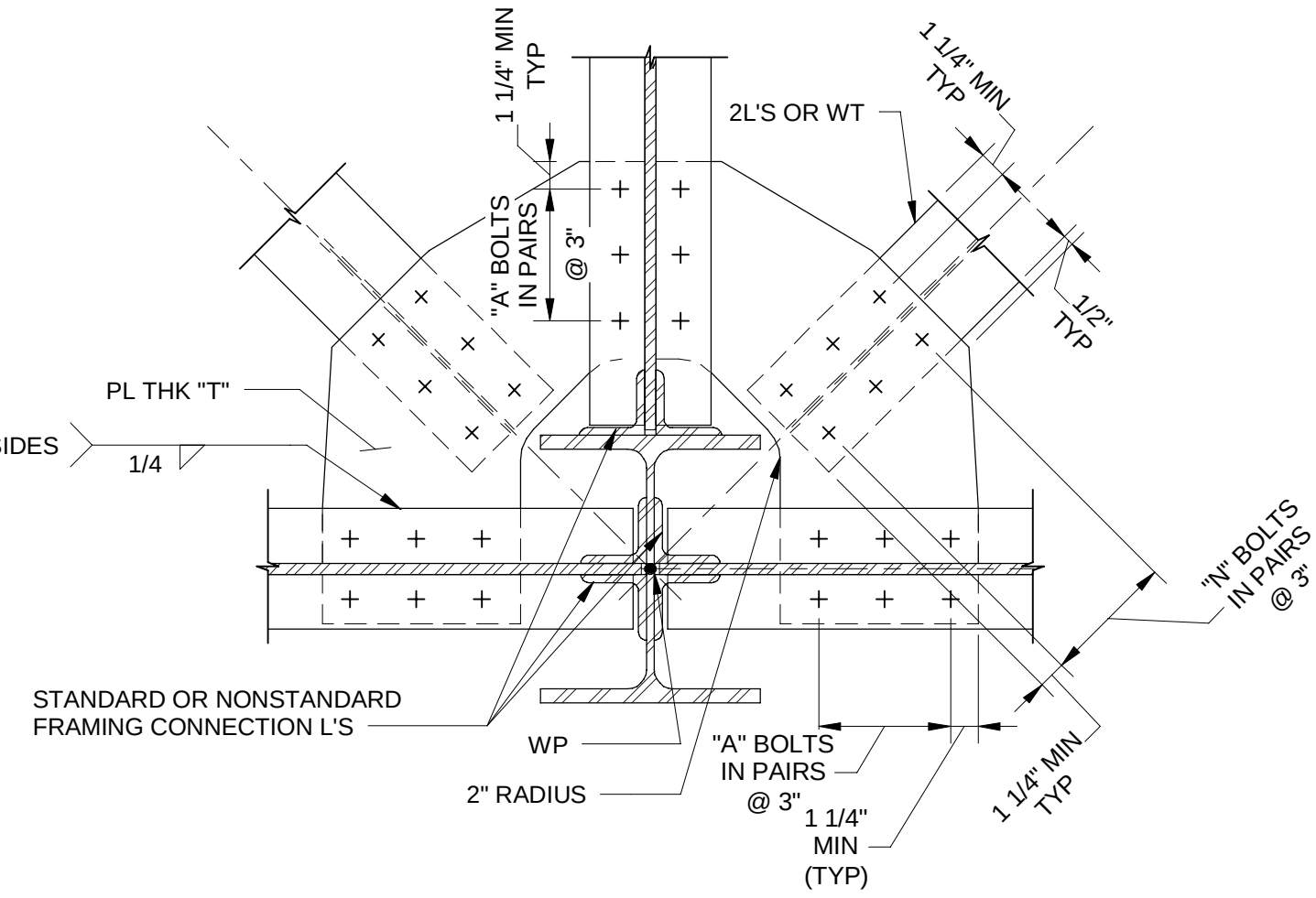
TYPE HA CONNECTION  
 1 1/2" = 1'-0"



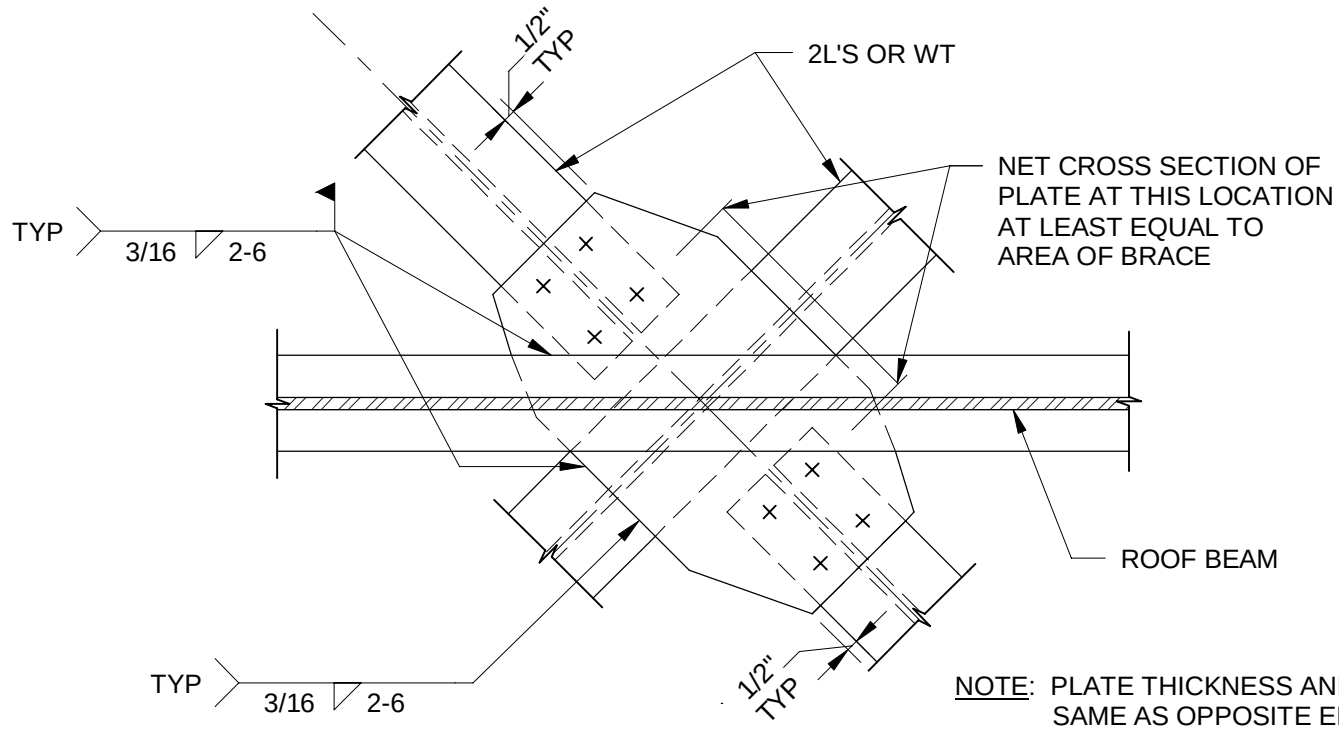
TYPE HB CONNECTION  
 1 1/2" = 1'-0"



HORIZONTAL BRACING SECTIONS  
 1 1/2" = 1'-0"

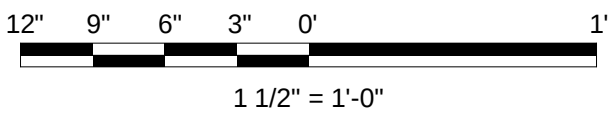


TYPE HC CONNECTION  
 1 1/2" = 1'-0"



INTERSECTION HORIZONTAL BRACES  
 1 1/2" = 1'-0"

- NOTES
- BOLTS SHALL BE ASTM A325, SLIP CRITICAL, 3/4 INCH DIAMETER UNLESS NOTED OTHERWISE.
  - PROVIDE SAME CONNECTION ON OPPOSITE SIDE IF BRACE IS INDICATED EACH SIDE ON PLANS.
  - COLUMN ORIENTATION MAY VARY FROM THAT SHOWN.
  - WHERE REQUIRED TO AVOID INTERFERENCE W/ VERTICAL BRACING, GUSSET PLATE SHALL EXTEND OVER ONLY 1/2 OF THE BEAM FLANGE (1/2"). THE CONNECTION TO THE W-BEAM FLANGE SHALL HAVE THE TOTAL "A" BOLTS IN A SINGLE ROW.
  - ALL DOUBLE ANGLES USED AS HORIZONTAL BRACING SHALL HAVE LONG LEGS DOWNSTANDING AND BACK TO BACK UNLESS NOTED OTHERWISE. HORIZONTAL ANGLE ASSEMBLIES SHALL BE FABRICATED WITH NO BACK TO BACK SEPARATION AND SHALL BE CONNECTED TO ONE ANOTHER IN ACCORDANCE WITH AISC SPECIFICATIONS.
  - WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH LAWS AND AISC WELDING PROCEDURES AND CODES AS OUTLINED IN THE SPECIFICATIONS.
  - ALL STRUCTURAL STEEL WELDING SHALL BE PERFORMED WITH FILLER METAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.
  - ALL HORIZONTAL BRACING CONNECTIONS SHALL BE DETAILED FOR A MINIMUM OF TWO BOLTS AT EACH CONNECTED PIECE UNLESS NOTED OR DESIGNATED OTHERWISE.
  - HORIZONTAL BRACING MARK NO (NUMBER) SHOWN ON PLANS THUS:  
Hxx REFER TO TABLES ON THIS SHEET
  - SCHEDULED "A BOLTS IN PAIRS" AND "N BOLTS IN PAIRS" REPRESENT TOTAL NUMBER OF BOLTS AT THE DESIGNATED LOCATION. EXAMPLE: "6-A BOLTS IN PAIRS" INDICATES 3 PAIRS WITH 2 BOLTS PER PAIR.
  - ABBREVIATIONS USED THIS SHEET:  
ASTM = AMERICAN SOCIETY FOR TESTING AND MATERIALS  
AISC = AMERICAN INSTITUTE OF STEEL CONSTRUCTION  
AWS = AMERICAN WELDING SOCIETY  
LLV = LONG LEG VERTICAL  
KSI = THOUSAND POUNDS PER SQUARE INCH  
WP = WORK POINT



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



Black & Veatch Corporation  
 Des Moines, Iowa



DES MOINES  
 METROPOLITAN  
 WASTEWATER  
 RECLAMATION  
 AUTHORITY

WRF EFFLUENT  
 PUMPING  
 IMPROVEMENTS

| REVISIONS AND RECORD OF ISSUE |
|-------------------------------|
| DESIGNED: KB                  |
| DETAILED: VVS                 |
| CHECKED: MZL                  |
| APPROVED: JAB                 |
| DATE: 08/16/2024              |
| PROJECT NO.: 410504           |

GENERAL

STRUCTURAL

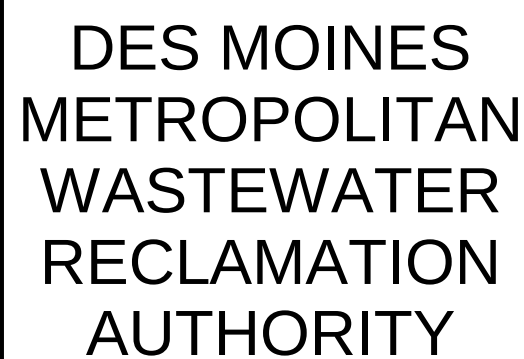
STANDARD STEEL  
 FRAMING CONNECTION  
 AND STEEL HORIZONTAL  
 BRACING DETAILS

PLAN FILE NO. 664-215

00-S-511

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 OF  
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## WRF EFFLUENT PUMPING IMPROVEMENTS

|                                      |                    |
|--------------------------------------|--------------------|
|                                      |                    |
|                                      |                    |
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|                                      |                    |
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| <b>REVISIONS AND RECORD OF ISSUE</b> |                    |
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| PROJECT NO. :                        | 410504             |

## GENERAL

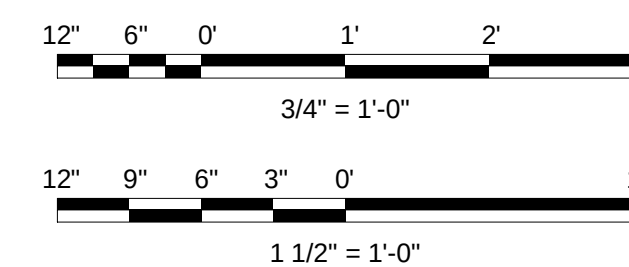
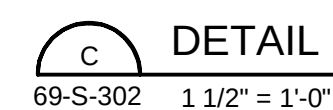
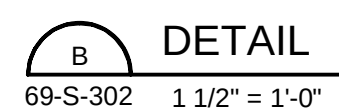
STRUCTURAL

## MISCELLANEOUS CONNECTION DETAILS

PLAN FILE NO. 664-216

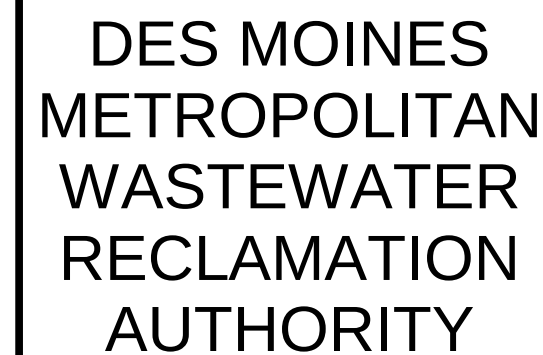
00-S-512

23  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

## GENERAL

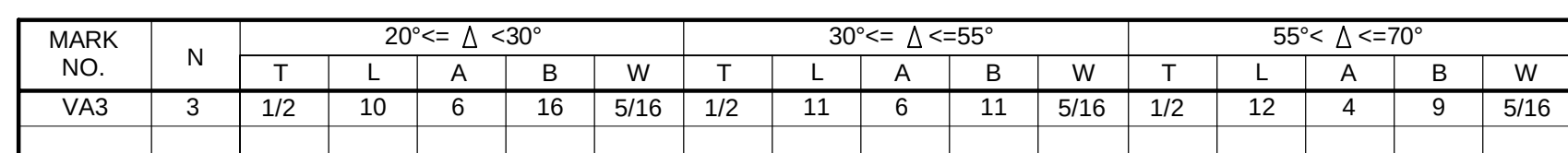
STRUCTURAL

## STANDARD STEEL VERTICAL BRACING DETAILS

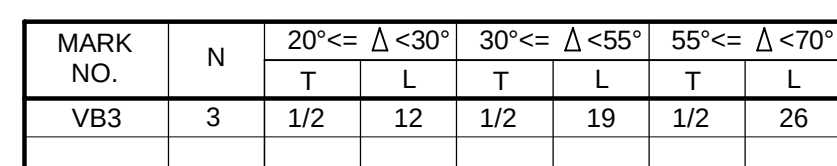
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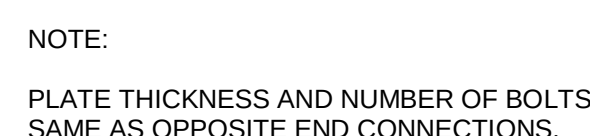
24  
OF  
118



 TYPE VA CONNECTION  
1 1/2"  $\equiv$  1'-0"

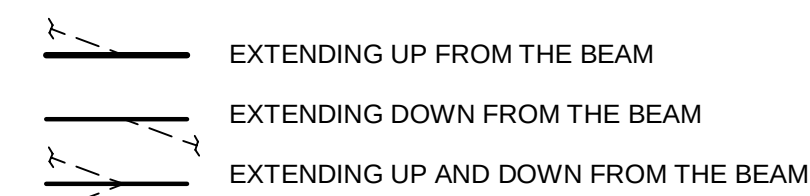


 TYPE VB CONNECTION



 STANDARD STEEL VERTICAL BRACING DETAILS  
1 1/2" = 1'-0"

- ## NOTES
1. ALL DOUBLE ANGLES USED AS VERTICAL BRACING SHALL HAVE LONG LEGS DOWNSTANDING AND BACK TO BACK UNLESS OTHERWISE NOTED. ALL DOUBLE ANGLES USED AS VERTICAL BRACING SHALL HAVE INTERMITTENT FILLERS OF THE SAME THICKNESS AS THE GUSSET PLATES AND SPACED IN ACCORDANCE WITH AISC SPECIFICATIONS.
  2. BRACING CONNECTION BOLTS SHALL BE ASTM A325, SLIP CRITICAL, 3/4 INCH DIAMETER UNLESS NOTED OTHERWISE.
  3. WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS AND AISC WELDING PROCEDURES AND CODES AS OUTLINED IN THE SPECIFICATIONS.
  4. ALL STRUCTURAL STEEL WELDING SHALL BE PERFORMED WITH FILLER METAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.
  5. "L" MIN LISTED ARE MINIMUM GUSSET PLATE LENGTHS AS SHOWN IN THE DETAILS. THE STEEL FABRICATOR SHALL DETERMINE THE LENGTHS REQUIRED FOR THE CONNECTION FIT AND INDICATED WELDS SHALL BE PROVIDED FULL LENGTH OF THE GUSSET PLATE.
  6. ALL VERTICAL BRACING CONNECTIONS SHALL BE DETAILED FOR A MINIMUM OF TWO BOLTS IN DOUBLE SHEAR OR FOUR BOLTS IN SINGLE SHEAR UNLESS NOTED OR DESIGNATED OTHERWISE.
  7. VERTICAL BRACING IS SHOWN ON PLANS THUS:



VERTICAL BRACING MARK NO (NUMBER) IS SHOWN ON ELEVATIONS THUS:

**Vxx** REFER TO TABLES ON THIS SHEET

8. SCHEDULED "A BOLTS IN PAIRS" REPRESENT THE TOTAL NUMBER OF BOLTS AT THE DESIGNATED LOCATION.  
EXAMPLE: "6-A BOLTS IN PAIRS" INDICATES 3 PAIRS WITH 2 BOLTS PER PAIR.
9. ABBREVIATIONS USED THIS SHEET:

9. ABBREVIATIONS USED THIS SHEET:

CONN = CONNECTION

L = ANGLE

$$\text{MIN} = \text{MINIM}$$

PI = PI ATP

STD = STAN

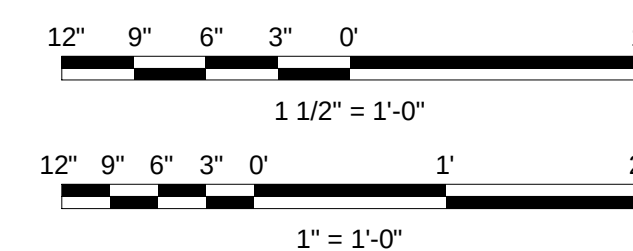
SYM = SYMMETRIC

THK = THICK OR THICKNESS

TYP = TYPICAL

WP = WORK POINT

ASTM = AMERICAN SOCIETY FOR  
TESTING AND MATERIALS  
AISC = AMERICAN INSTITUTE OF  
STEEL CONSTRUCTION  
AWS = AMERICAN WELDING SOCIETY  
KSI = THOUSAND POUNDS PER  
SQUARE INCH



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITYWRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
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| REVISIONS AND RECORD OF ISSUE |                    |
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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

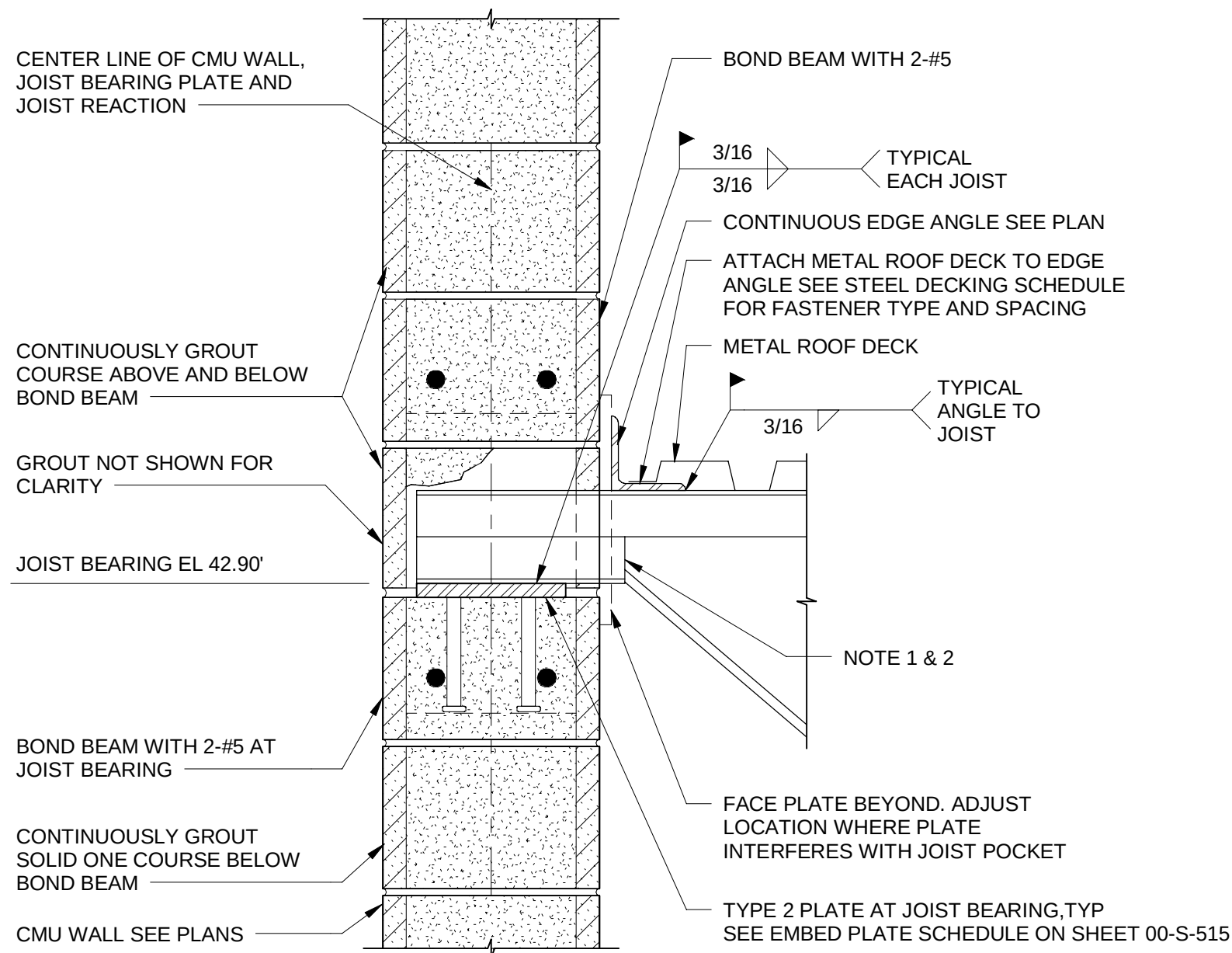
GENERAL

STRUCTURAL

STEEL FLAT ROOF TO 12"  
CMU WALL CONNECTION  
DETAILS

PLAN FILE NO. 664-218

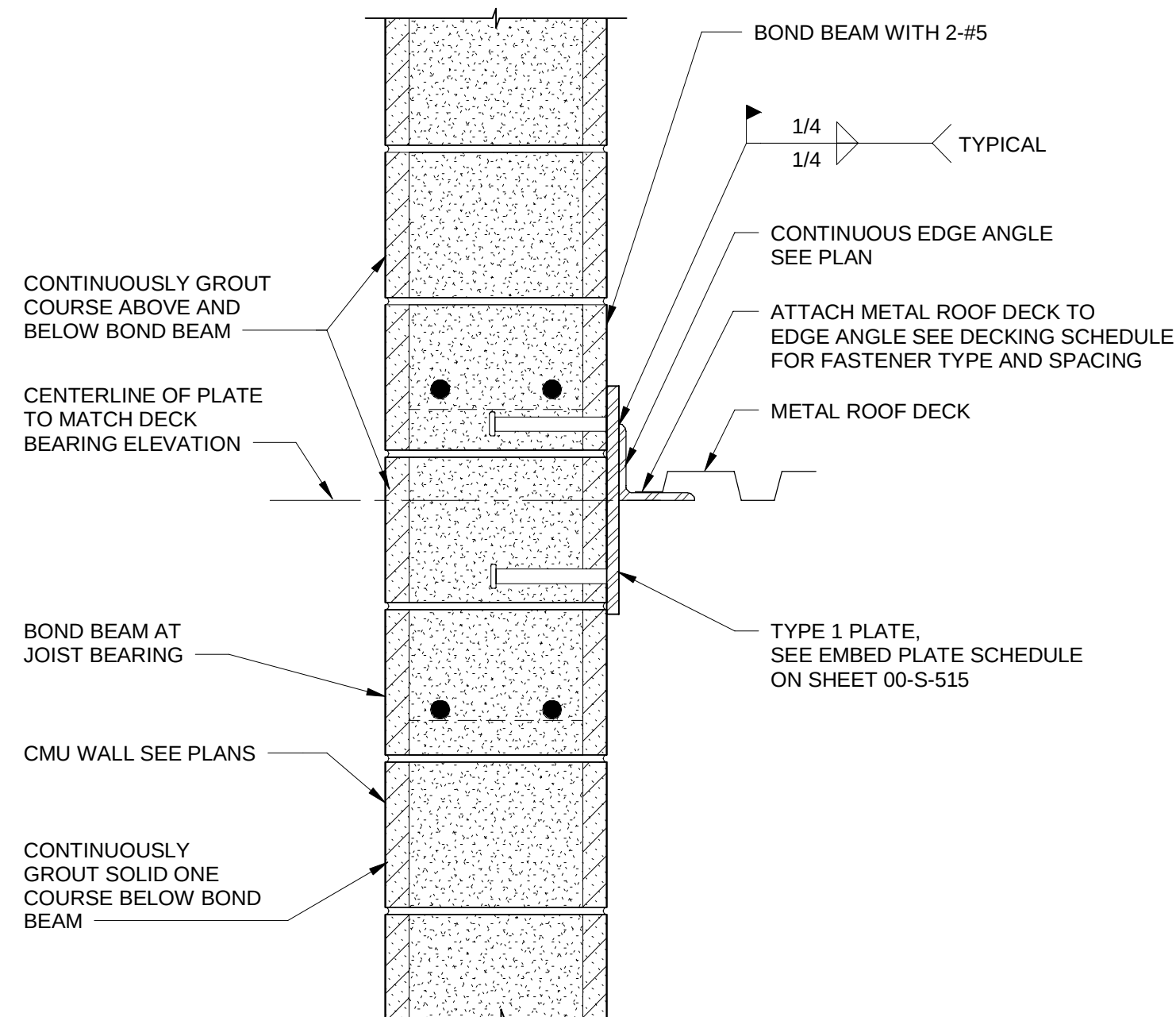
00-S-514

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OF  
118

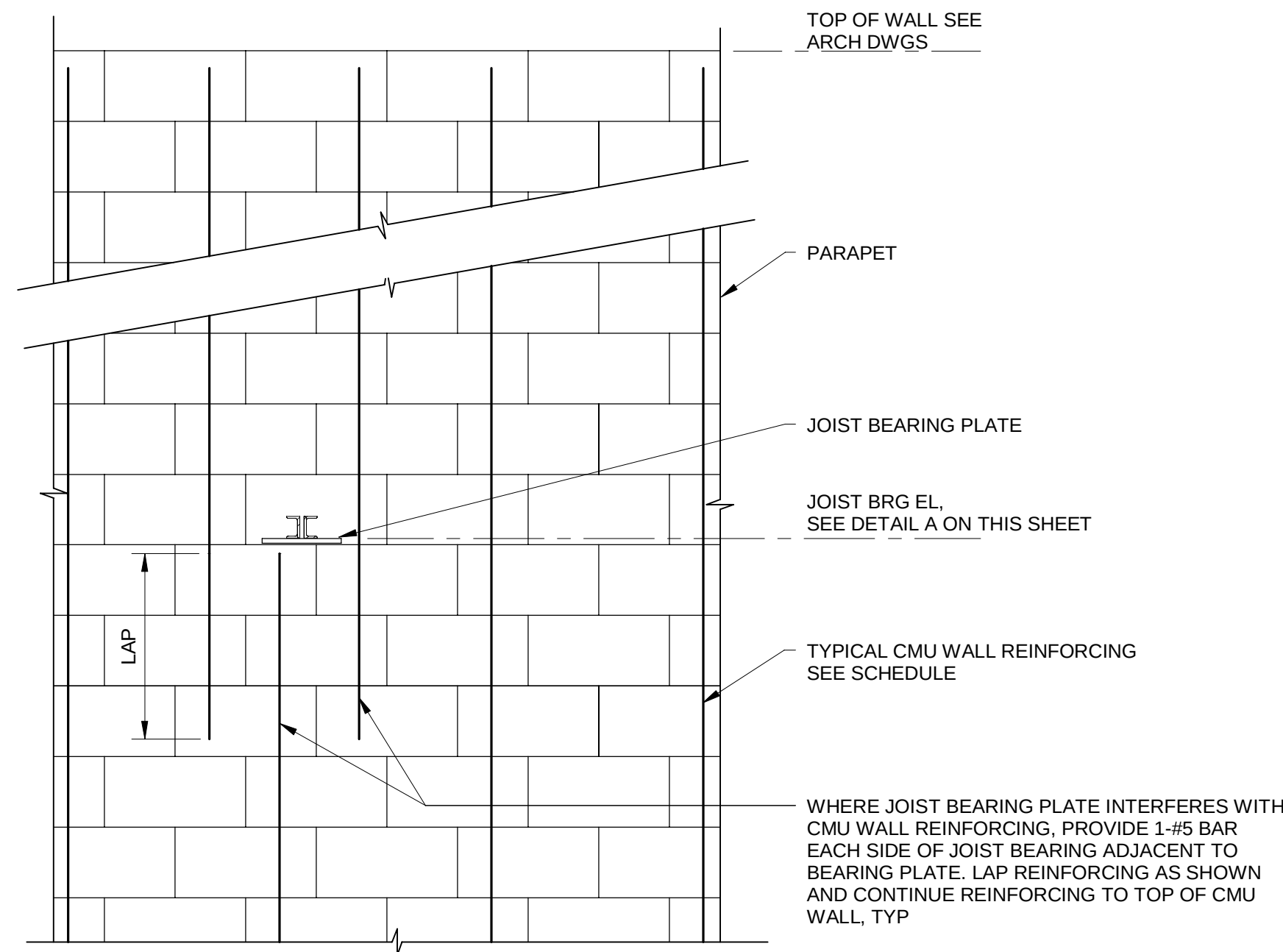
## NOTES:

- BEARING DETAIL TO BE USED WITH K SERIES JOIST WITH 5" DEEP JOIST SEAT, LH AND DLH JOIST. JOIST MANUFACTURER TO STRENGTHEN JOIST SEATS AS REQUIRED FOR ECCENTRICITY OF THE JOIST PANEL WORK POINT TO THE CENTER OF THE JOIST BEARING.
- WHERE JOIST POCKETS ARE USED, POCKET LENGTH SHALL NOT EXCEED 16". FILL POCKET WITH GROUT AFTER JOIST INSTALLATION.

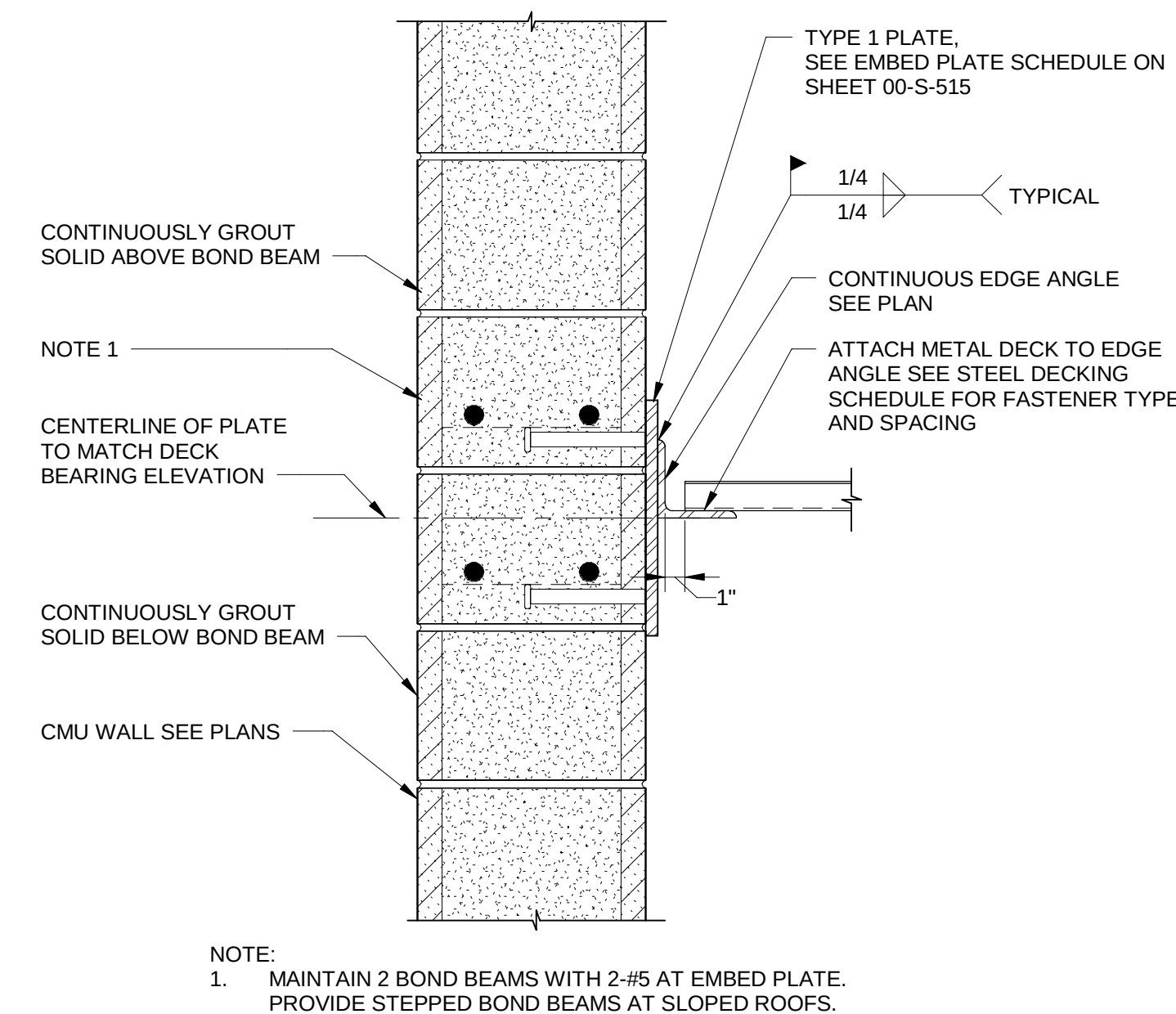
**A** STEEL JOIST BEARING ON CMU WALL (12" CMU)  
1 1/2" = 1'-0"



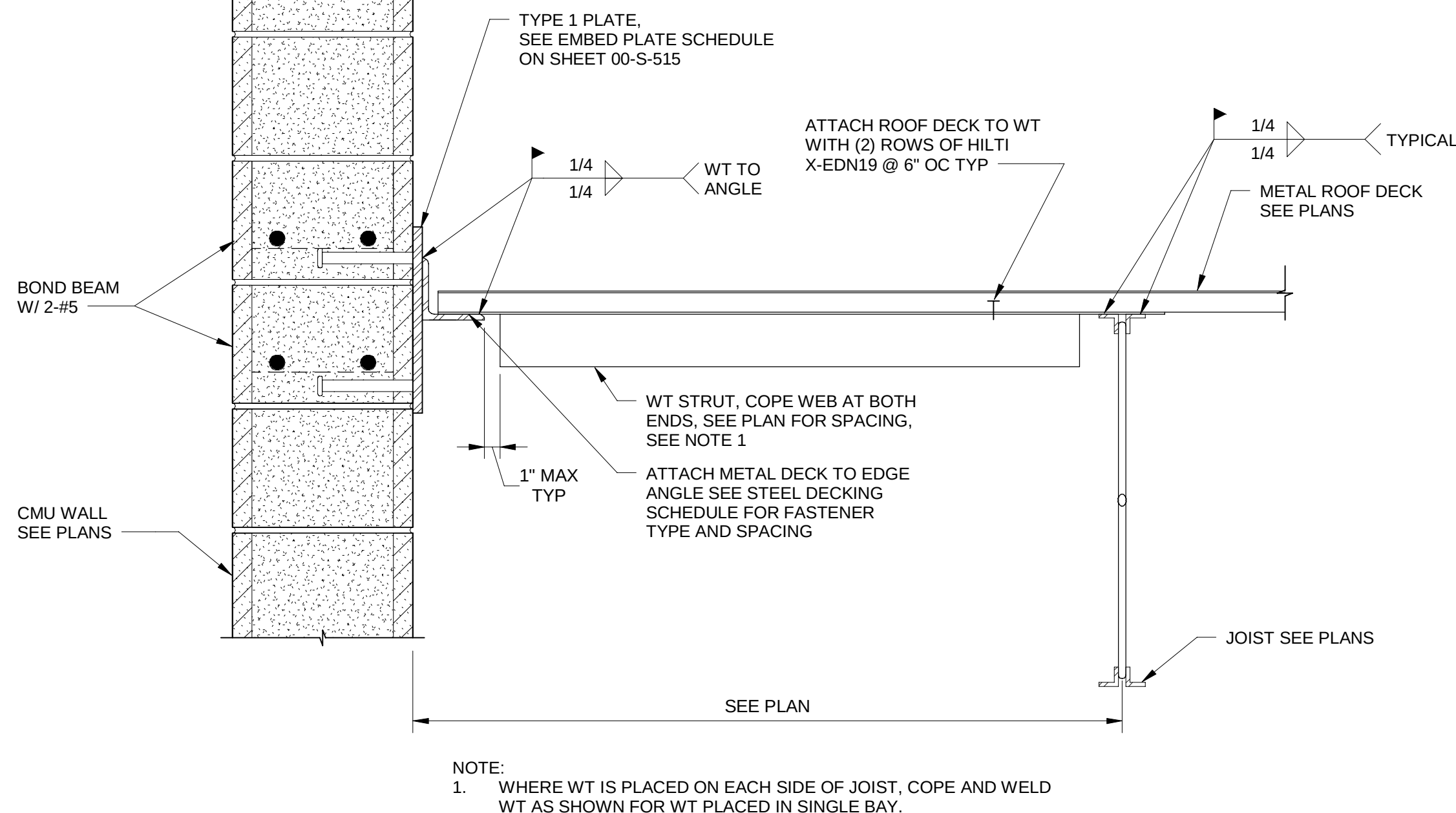
**B** STEEL DECKING EDGE SUPPORT BETWEEN JOISTS (12" CMU)  
1 1/2" = 1'-0"



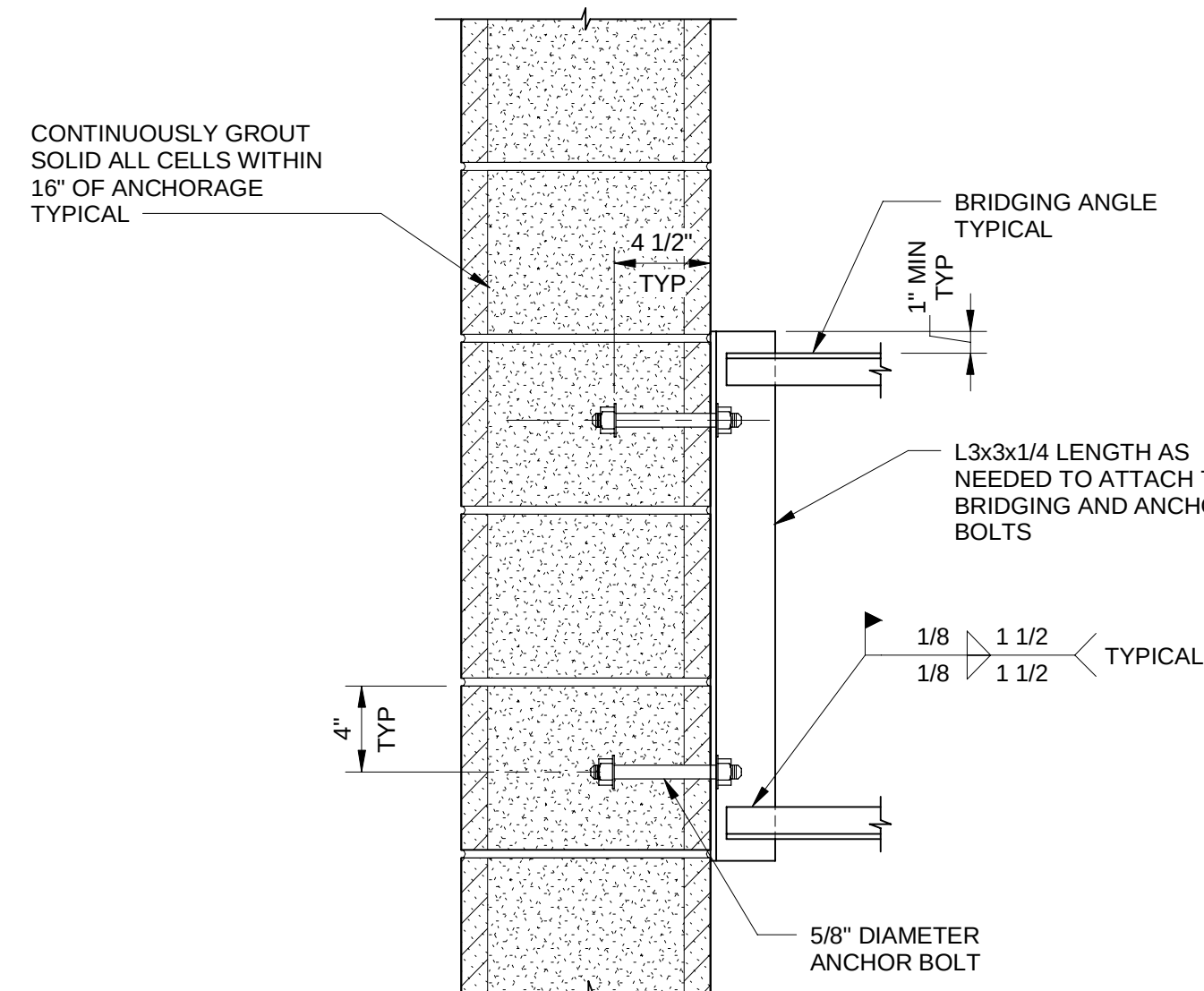
**C** TYPICAL WALL REINFORCING AT JOIST BEARING PLATE  
3/4" = 1'-0"



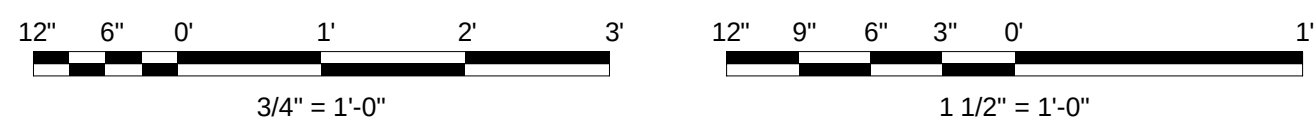
**D** STEEL DECKING EDGE SUPPORT (12" CMU)  
1 1/2" = 1'-0"



**E** STRUT CONNECTION DETAIL (12" CMU)  
1 1/2" = 1'-0"



**F** STEEL JOIST BRIDGING END SUPPORT (12" CMU)  
1 1/2" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE)



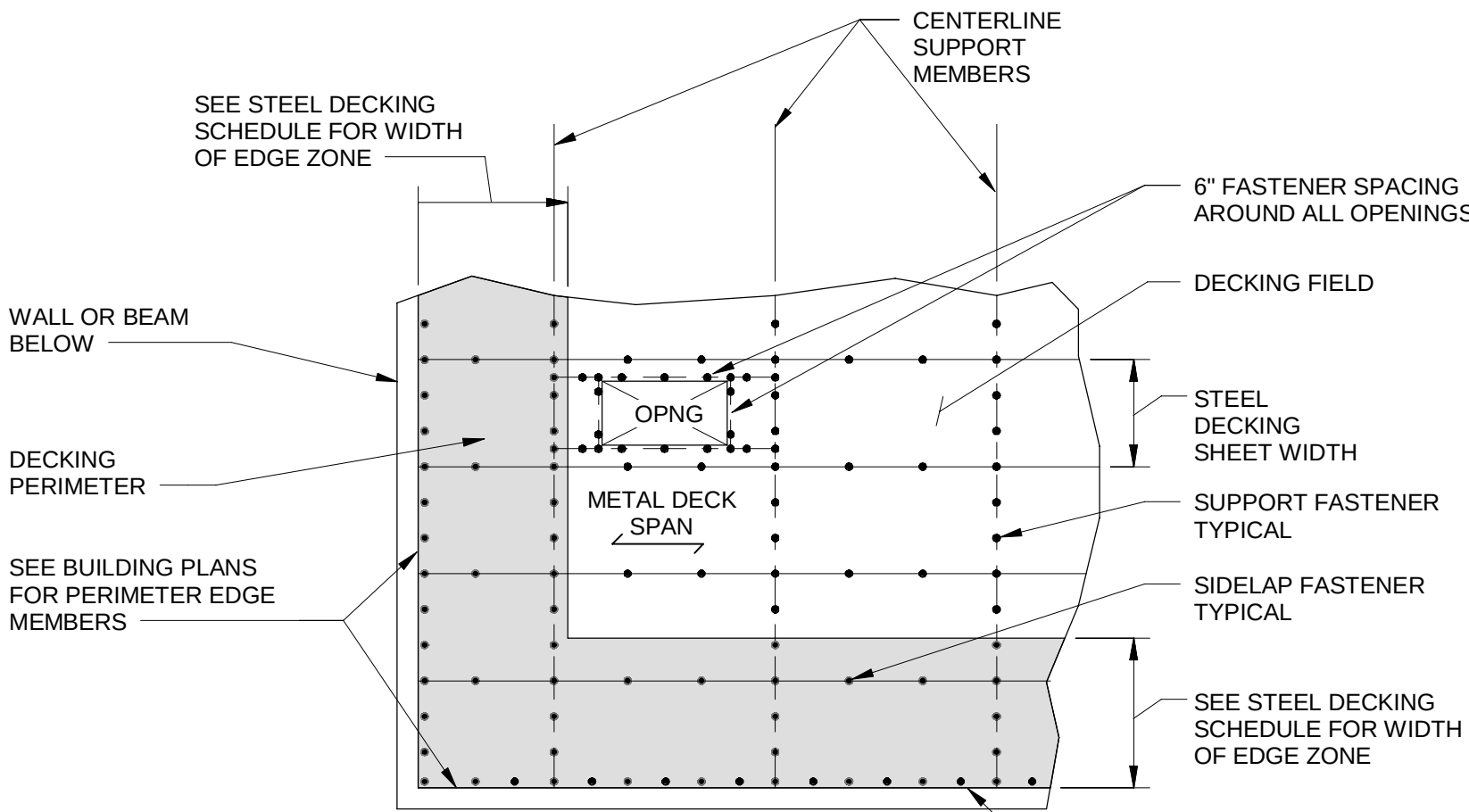
| STEEL DECKING SCHEDULE |          |         |             |       |                     |                  |                   |               |                   |                   |               |                   |                 |                                                     |
|------------------------|----------|---------|-------------|-------|---------------------|------------------|-------------------|---------------|-------------------|-------------------|---------------|-------------------|-----------------|-----------------------------------------------------|
| BUILDING               | LOCATION | DECKING |             |       |                     |                  | SUPPORT FASTENERS |               |                   | SIDELAP FASTENERS |               |                   | EDGE ZONE WIDTH | PERIMETER ATTACHMENTS PARALLEL TO SIDELAP FASTENERS |
|                        |          | DEPTH   | TYPE NOTE 1 | GAUGE | SHOP COATING NOTE 2 | MIN SPANS NOTE 3 | TYPE NOTE 4       | FIELD PATTERN | PERIMETER PATTERN | TYPE NOTE 4       | FIELD SPACING | PERIMETER SPACING |                 |                                                     |
| ELECTRICAL ROOM        | ROOF     | 1 1/2"  | B           | 18    | G90                 | 3                | 5/8" PUDDLE WELD  | 36/4          | 36/4              | #10 TEK SCREWS    | 6" OC         | 6" OC             | NA              | #12 TEK SCREWS @ 6"                                 |

NOTES:

- DECKING TYPE THAT INCLUDES "A" SHALL BE ACOUSTICAL DECKING.
- "G60" AND "G90" INDICATE GALVANIZING THICKNESS, "PRIME" INDICATES PRIME PAINTING. SEE STEEL DECKING SPECIFICATION.
- DECKING SHEETS SHALL BE CUT TO COVER AT LEAST THE NUMBER OF SPANS INDICATED.
- "SCREWS", "POWER-ACTUATED", AND "PUNCHED" SHALL BE AS DESCRIBED IN THE STEEL DECKING SPECIFICATION.

STEEL DECKING SCHEDULE

NO SCALE



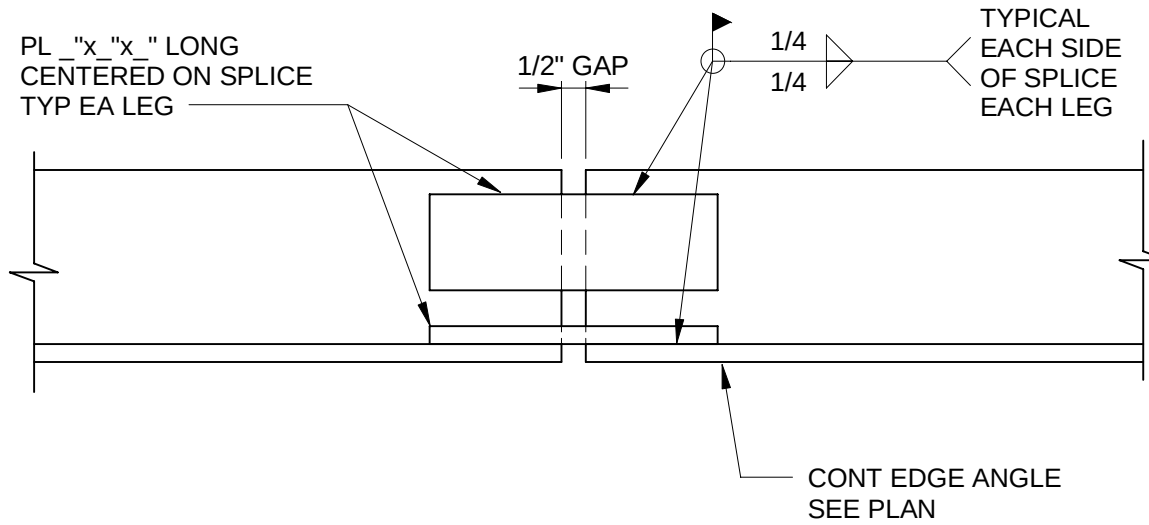
NOTE:

SEE STEEL DECKING SCHEDULE FOR TYPE AND SPACING OF SUPPORT FASTENERS AND SIDELAP FASTENERS.



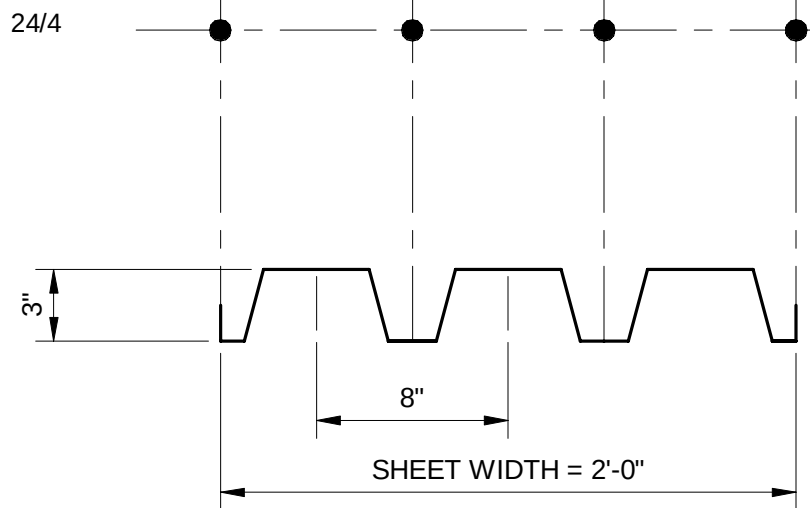
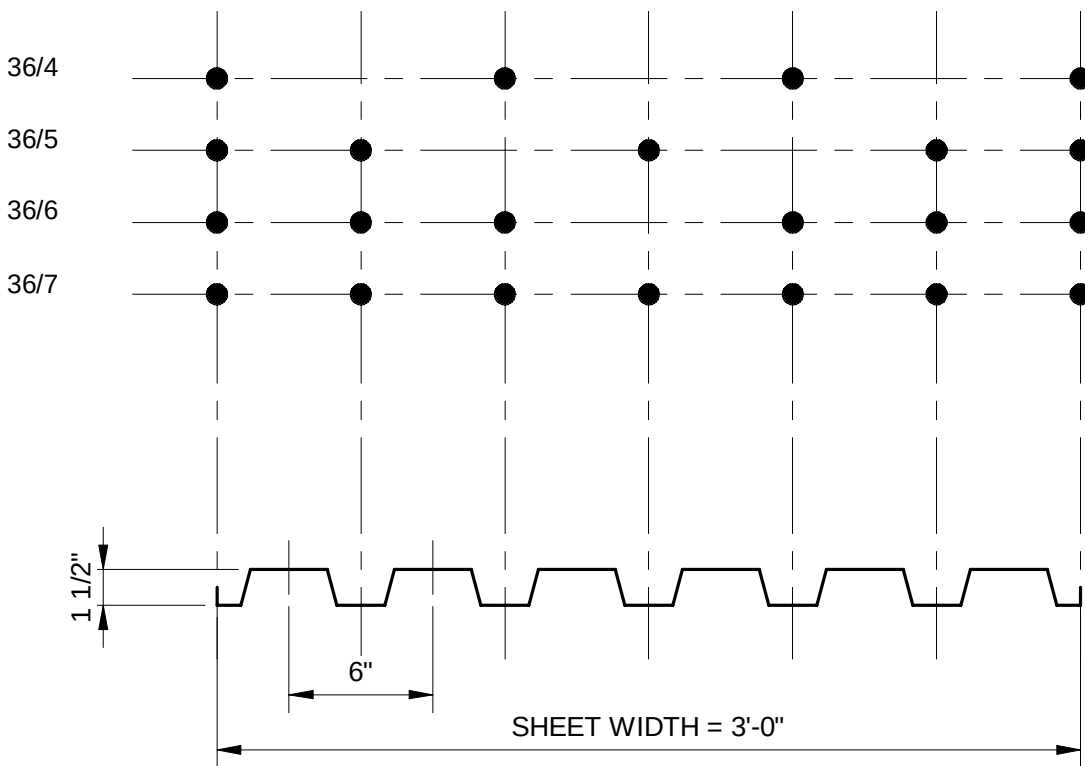
STEEL DECKING FASTENER DETAIL

1/2" = 1'-0"



EDGE ANGLE SPLICE DETAIL

3" = 1'-0"



METAL DECK ATTACHMENT DETAIL

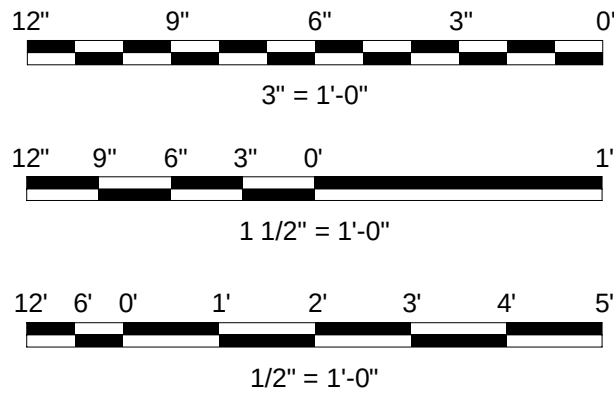
1 1/2" = 1'-0"

| EMBED PLATE SCHEDULE |                    |              |                                  |
|----------------------|--------------------|--------------|----------------------------------|
| TYPE                 | CMU WALL THICKNESS | PLATE DETAIL | MAXIMUM PLATE SPACING            |
| 1                    | 8" OR 12"          |              | ELECTRICAL ROOM<br><br>3'-0" C/C |
| 2                    | 12"                |              | SEE ROOF PLANS                   |
| 3                    | 12"                |              | SEE ROOF PLANS                   |

SEE SPECIFICATIONS FOR MATERIAL REQUIREMENTS OF BEARING PLATES AND HEADED CONCRETE ANCHORS.

EMBED PLATE SCHEDULE

1 1/2" = 1'-0"







DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

GENERAL

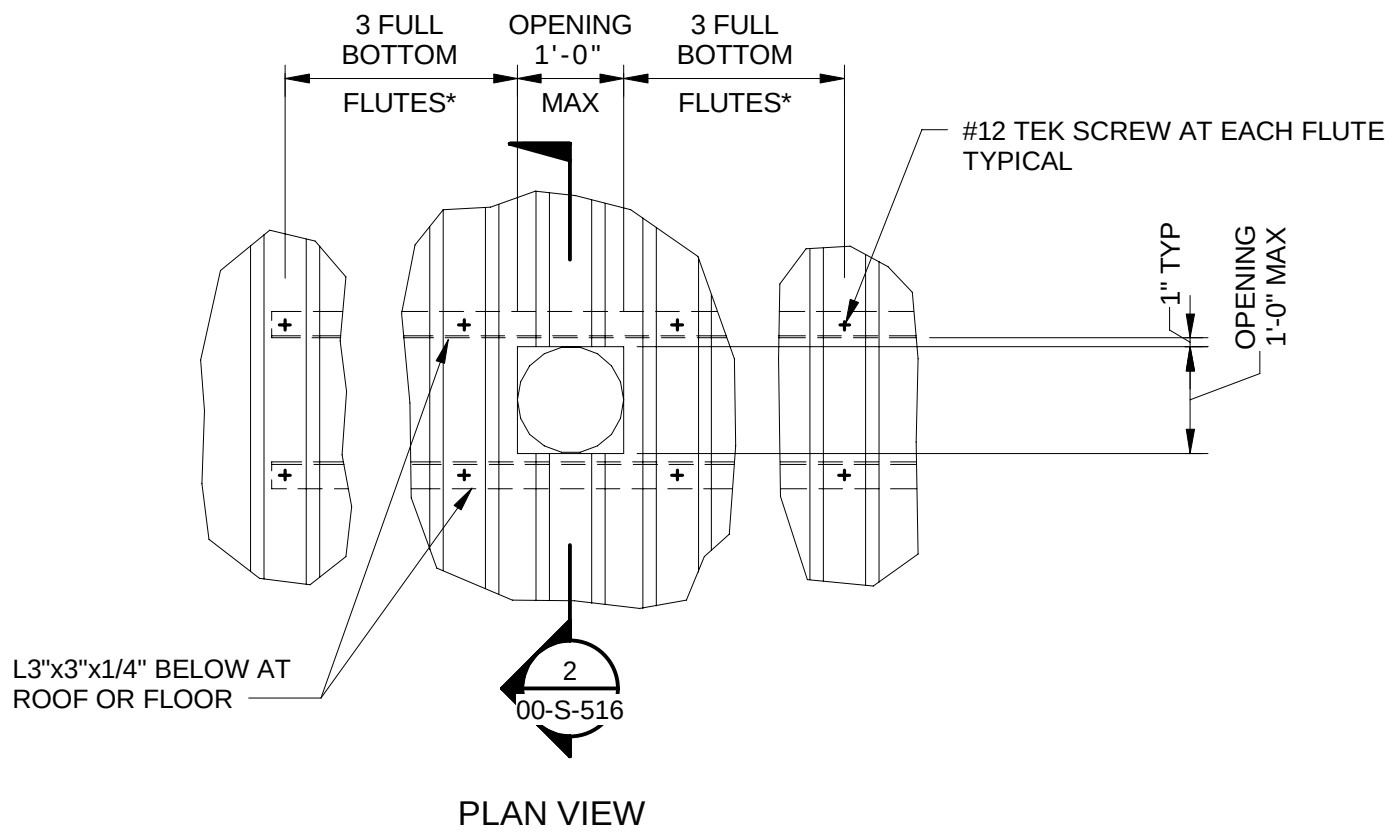
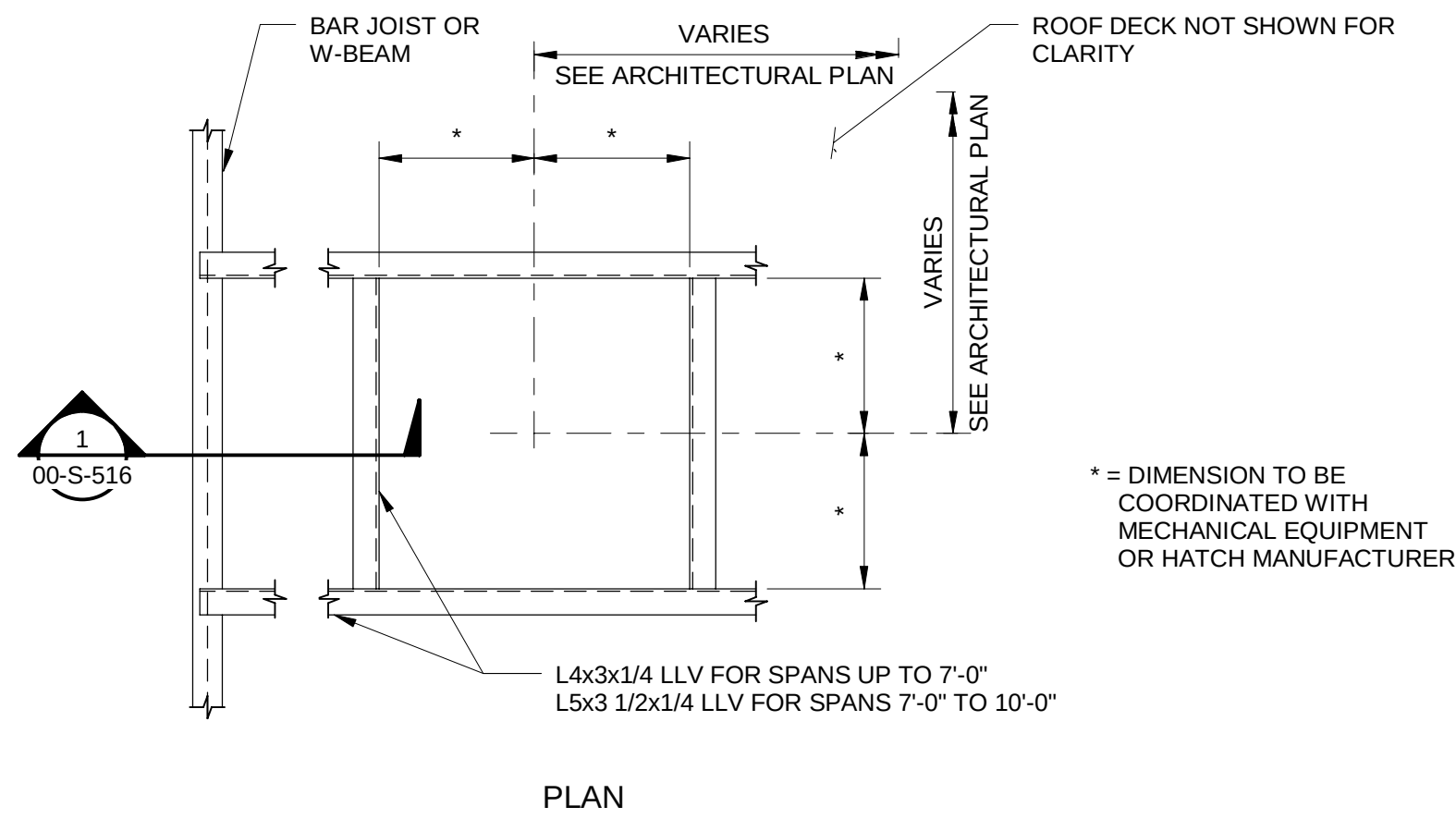
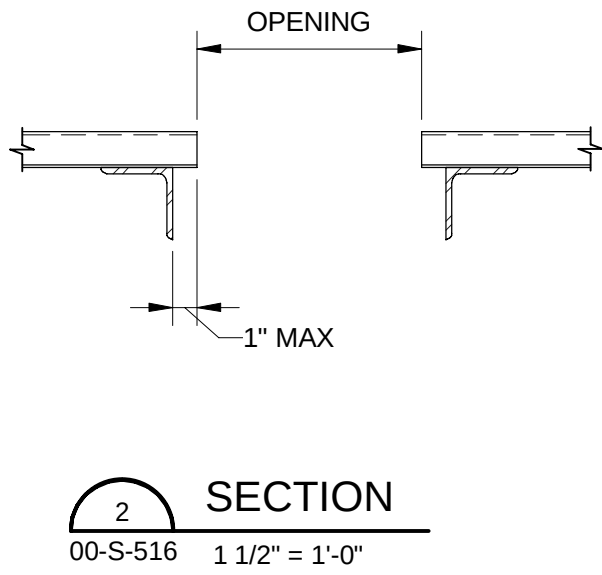
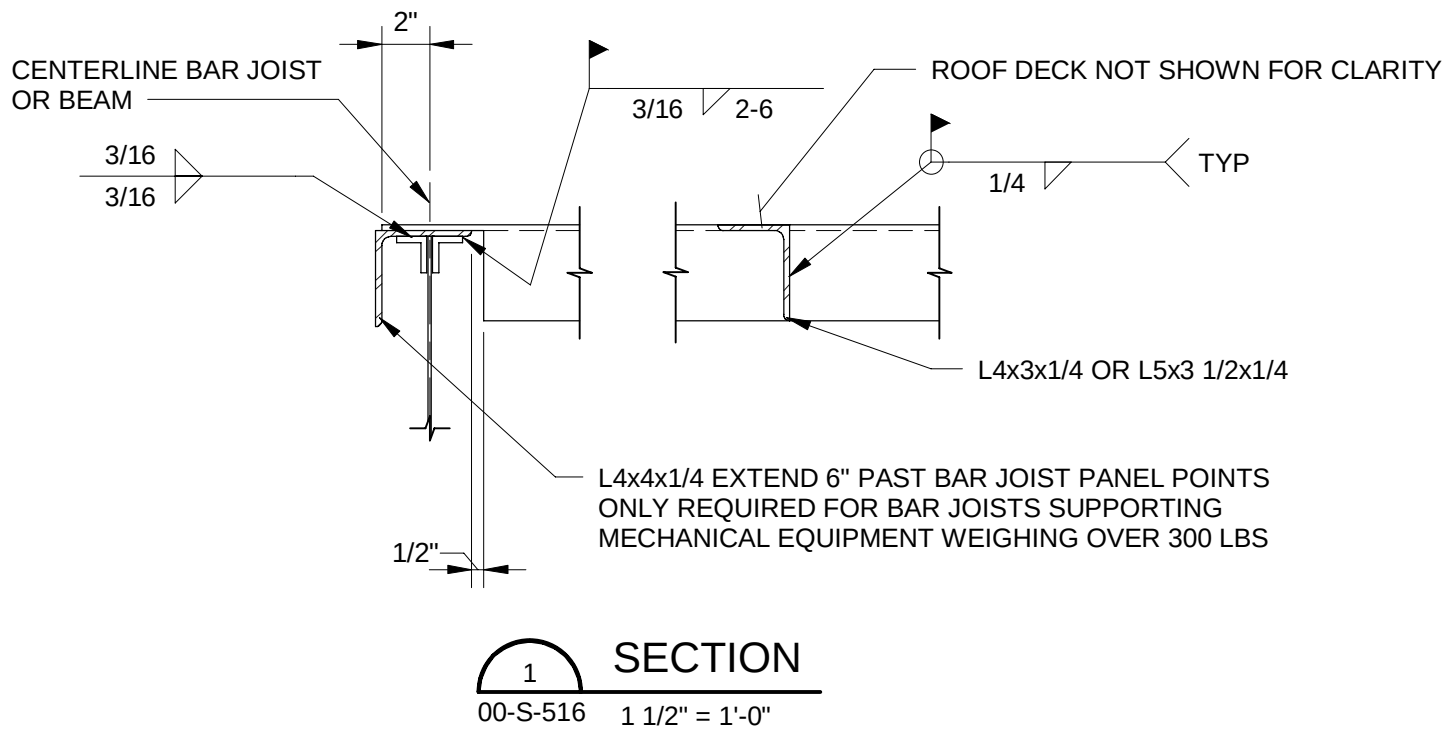
STRUCTURAL

TYPICAL METAL DECK  
OPENING AND CURB  
FRAMING DETAILS

PLAN FILE NO. 664-220

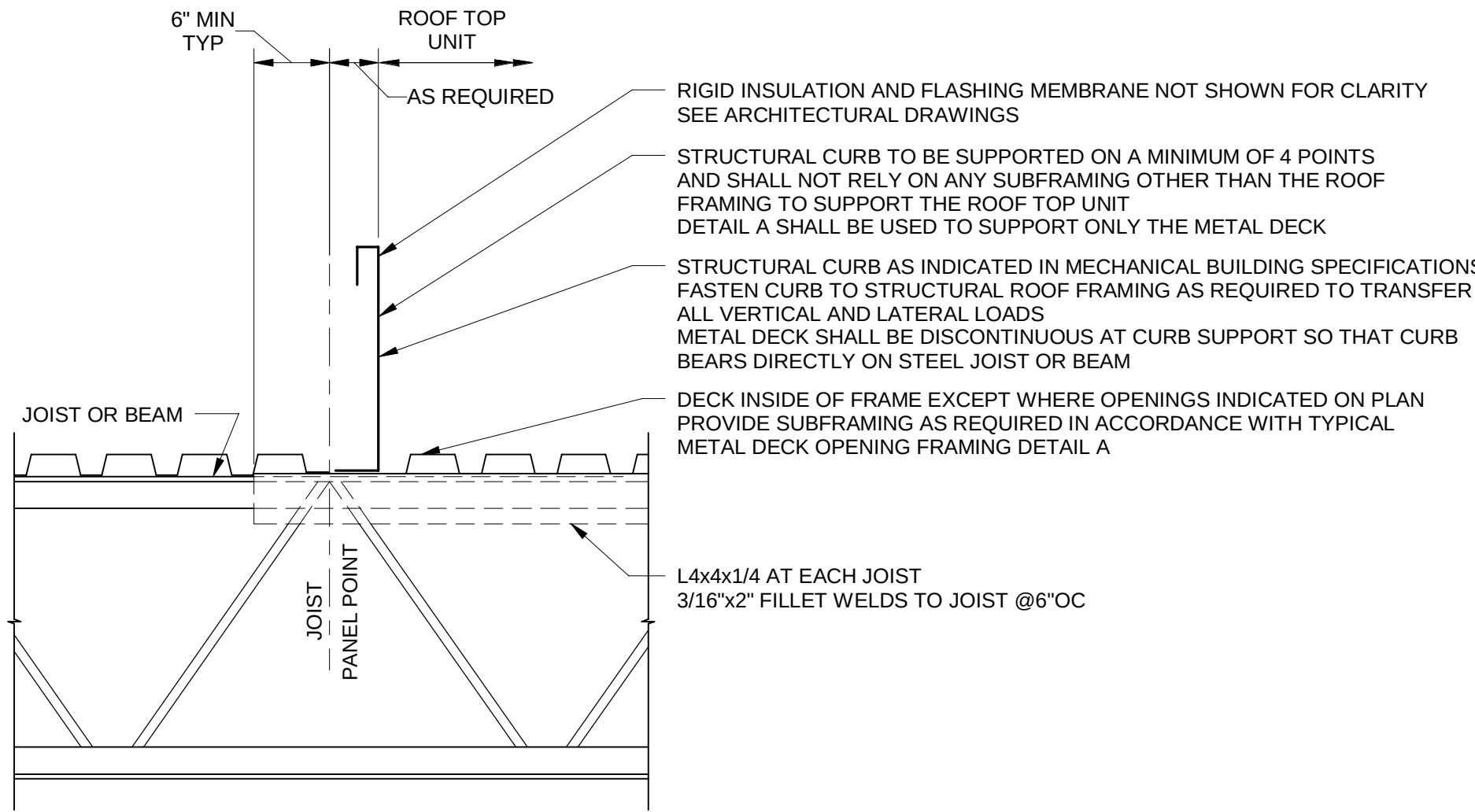
00-S-516

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OF  
118

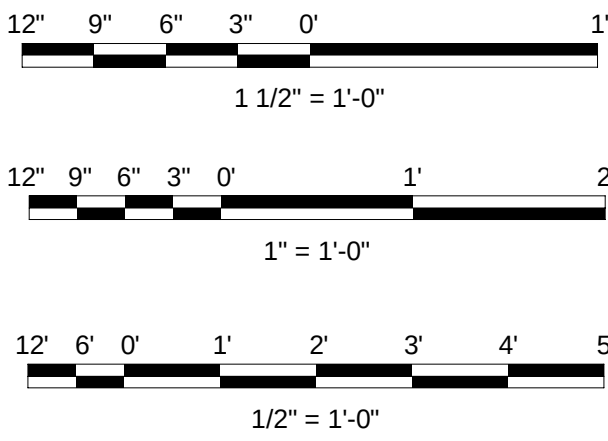


- NOTES:
- SEE ARCHITECTURAL, PROCESS MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATION OF OPENINGS.
  - SEE ARCHITECTURAL DRAWINGS FOR FLASHING DETAILS.
  - \* DENOTES TO CONNECT TO BEAM.

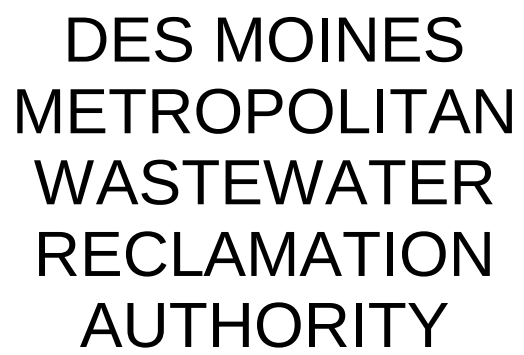
FRAMING FOR ROOF OPENING  $\leq$  1'-0"x1'-0"  
WITHOUT EQUIPMENT WEIGHT



NOTE: SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR SMALL EQUIPMENT CURBS.







## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
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| CHECKED:                      | MZL                |
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## GENERAL

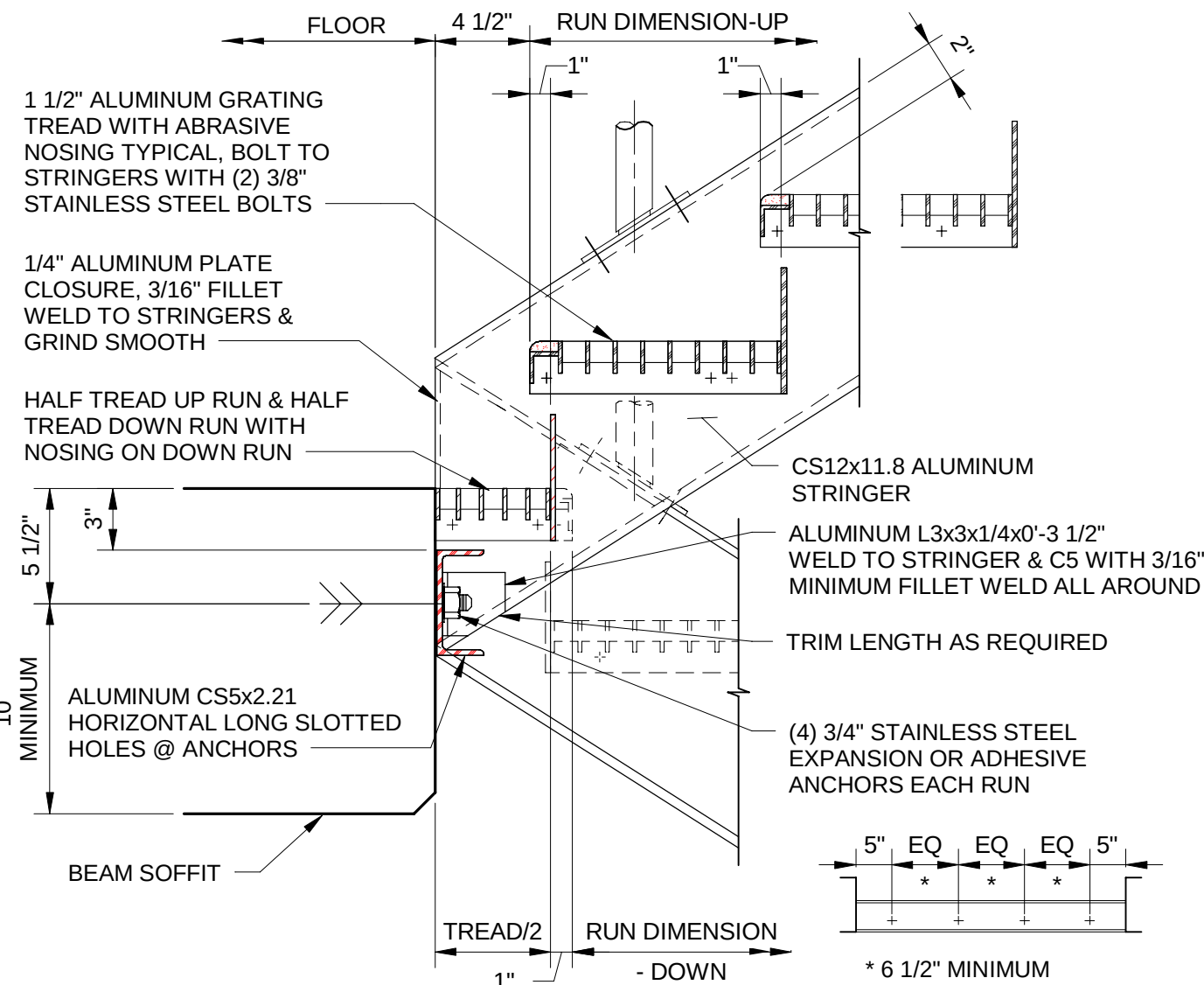
STRUCTURAL

## STANDARD ALUMINUM GRATING STAIR DETAILS

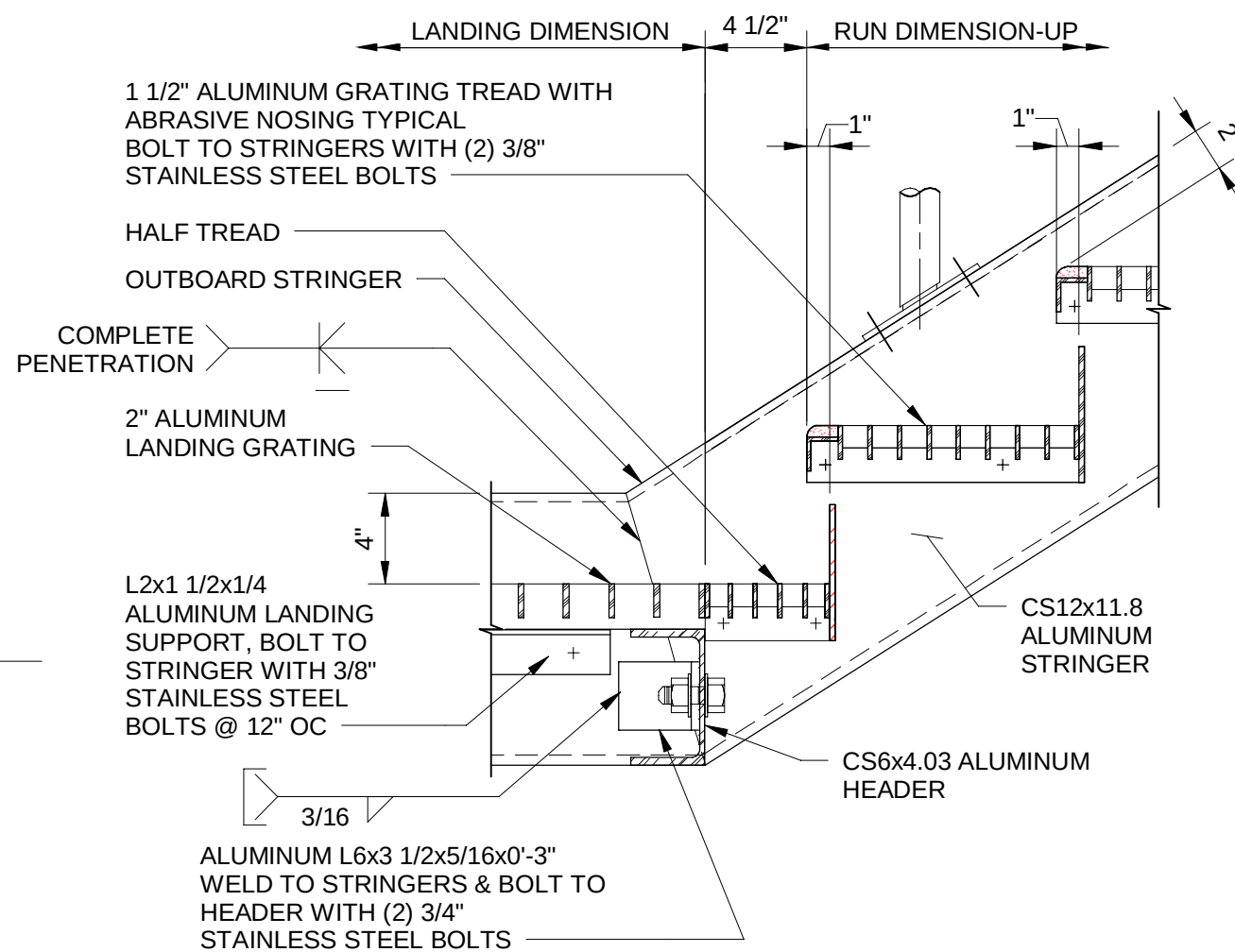
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00-S-517

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OF  
118



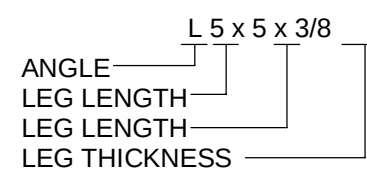
 DETAIL



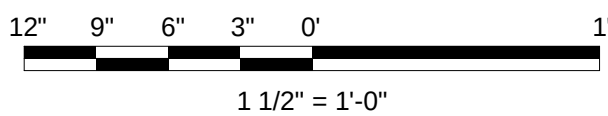
## DETAIL



1. ALL ALUMINUM SHAPES SHALL BE ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES
2. DESIGNATION LEGEND FOR ALUMINUM SHAPES:



3. WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.



STAIR DESIGN NOTES:

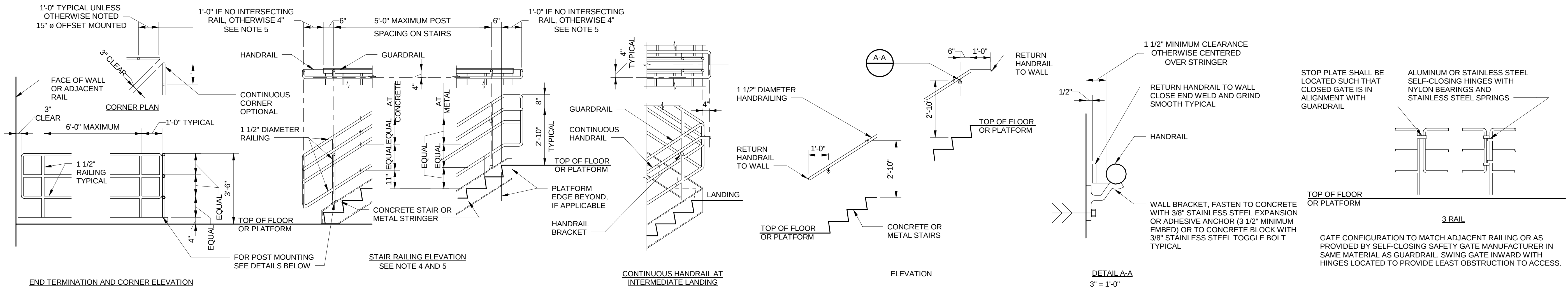
1. STAIRS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE, ANSI A117.1 AND OSHA.
2. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, SEALED CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT THE LOADS AND DEFLECTION CRITERIA INDICATED IN THE STRUCTURAL METALS SPECIFICATION.
4. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE RAILING SPECIFICATIONS.
5. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE AISC MANUAL AND ACI 318. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.

## TYPICAL LANDING BRACING

$$1\frac{1}{2}'' = 1'-0''$$

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





**THREE RAIL GUARDRAIL**  
3/8" = 1'-0"

**WALL MOUNTED HANDRAIL**  
3/8" = 1'-0"

**SELF-CLOSING SWING GATE**  
3/8" = 1'-0"

**NOTES:**

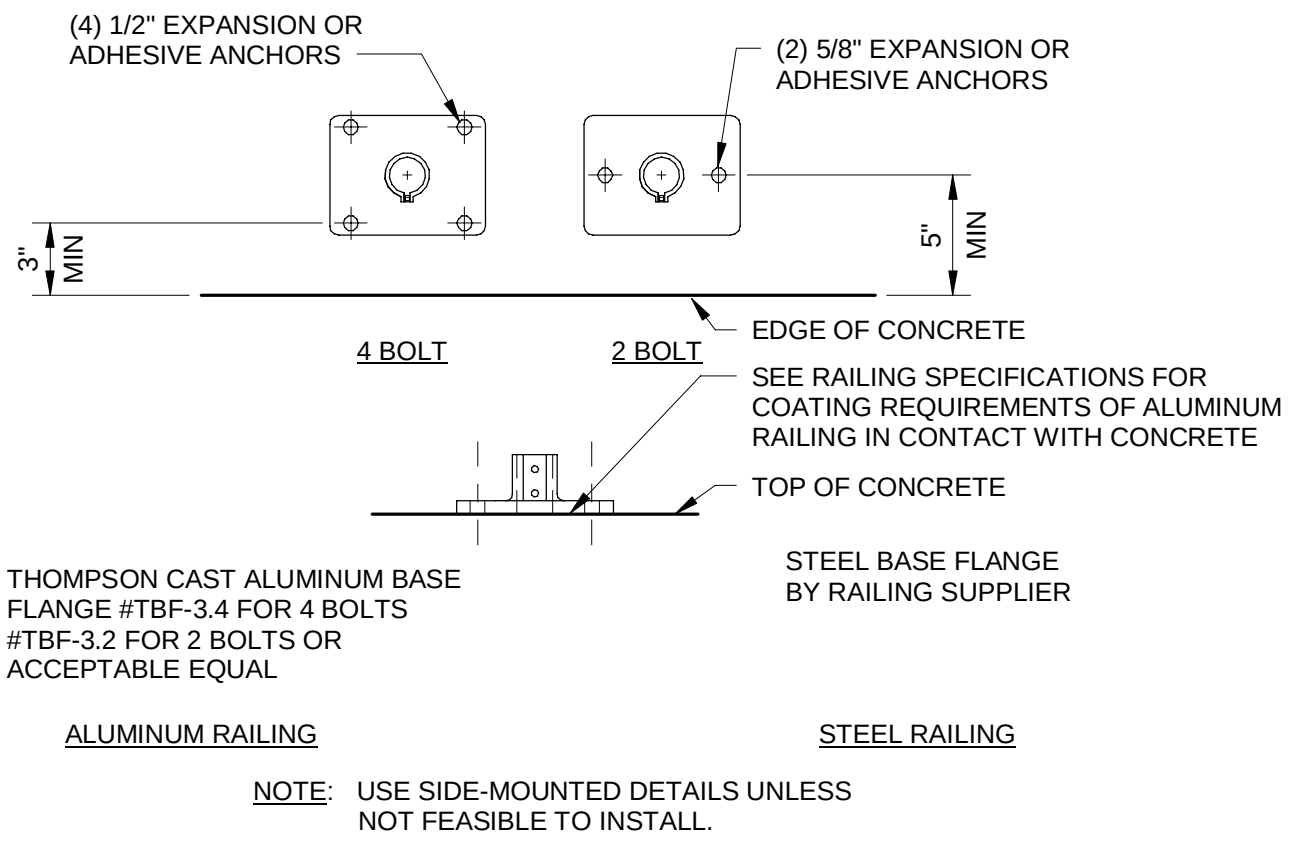
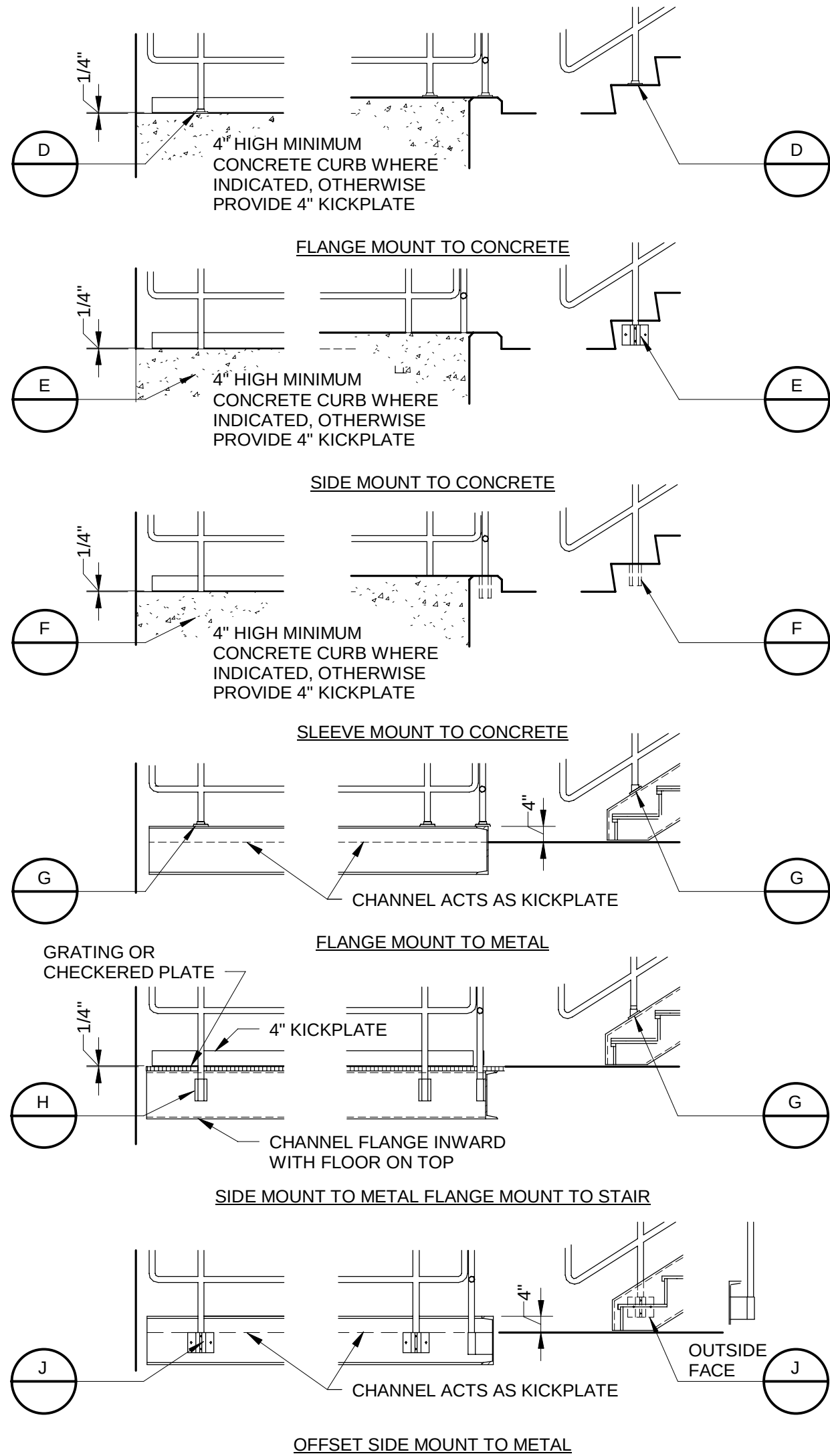
- RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR HANDRAILING AND GUARDRAILING.
- ALL RAILING AND MOUNTINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF THE RAILING SPECIFICATIONS, THE APPLICABLE LOCAL BUILDING CODE AND ALL PERTINENT OSHA AND LOCAL SAFETY REGULATIONS.
- GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.

- GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.
- THE INBOARD HANDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.
- THE GUARDRAIL AND HANDRAIL CONFIGURATIONS ON THIS SHEET WILL NOT SATISFY ADA REQUIREMENTS FOR HANDICAPPED ACCESSIBILITY. AT LOCATIONS ON THE DESIGN DRAWINGS WHERE CONFORMANCE WITH ADA REQUIREMENTS IS SPECIFICALLY NOTED, THE RAILING SUPPLIER SHALL MODIFY THE CONFIGURATIONS TO COMPLY WITH THE MOST STRINGENT REQUIREMENTS OF ANSI 117.1 UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND THE ACCESSIBILITY STANDARDS OF THE AMERICANS WITH DISABILITIES ACT (ADA).

- AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:

\* RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT WEIGH NO MORE THAN 50 LBS. EACH PIECE SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.

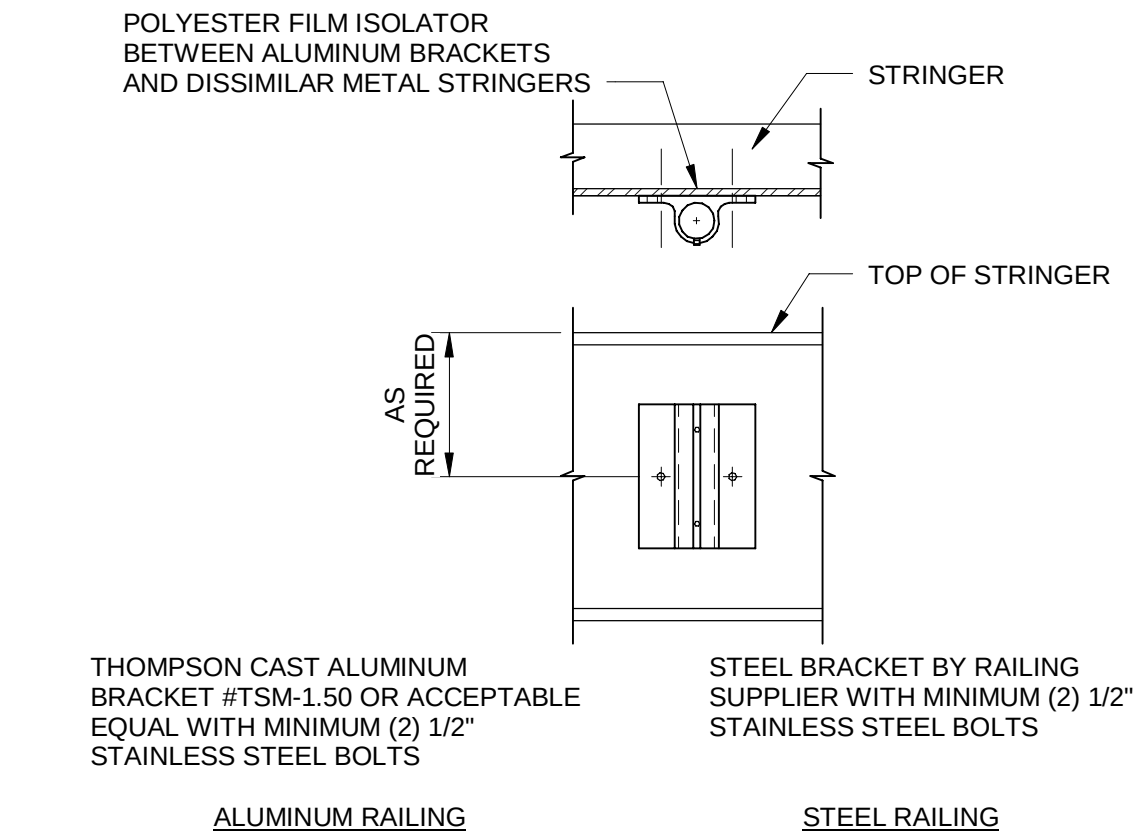
\* MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.



**BASE FLANGE MOUNT**  
1 1/2" = 1'-0"

**SIDE MOUNT**  
1 1/2" = 1'-0"

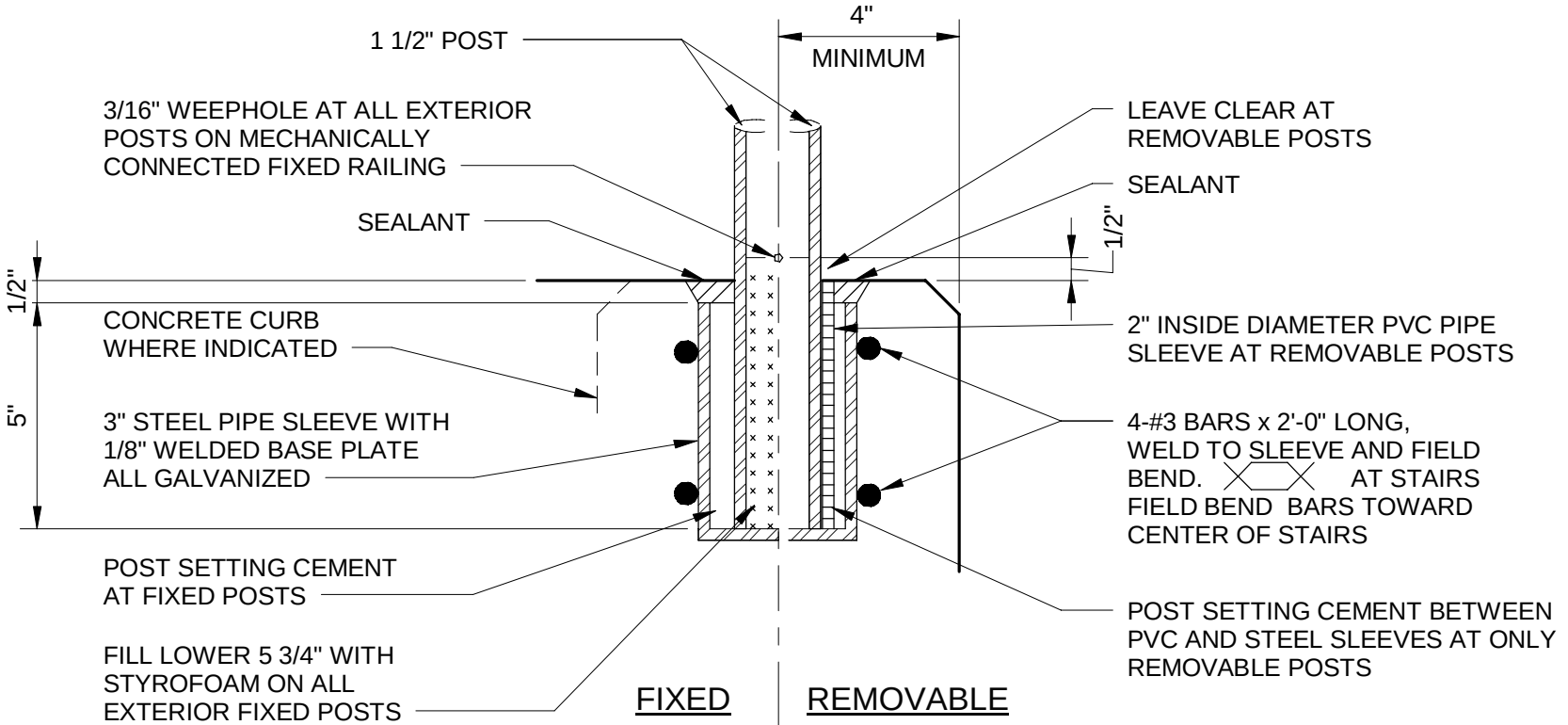
**POST MOUNTED TO CONCRETE**



**BASE FLANGE MOUNT**  
1 1/2" = 1'-0"

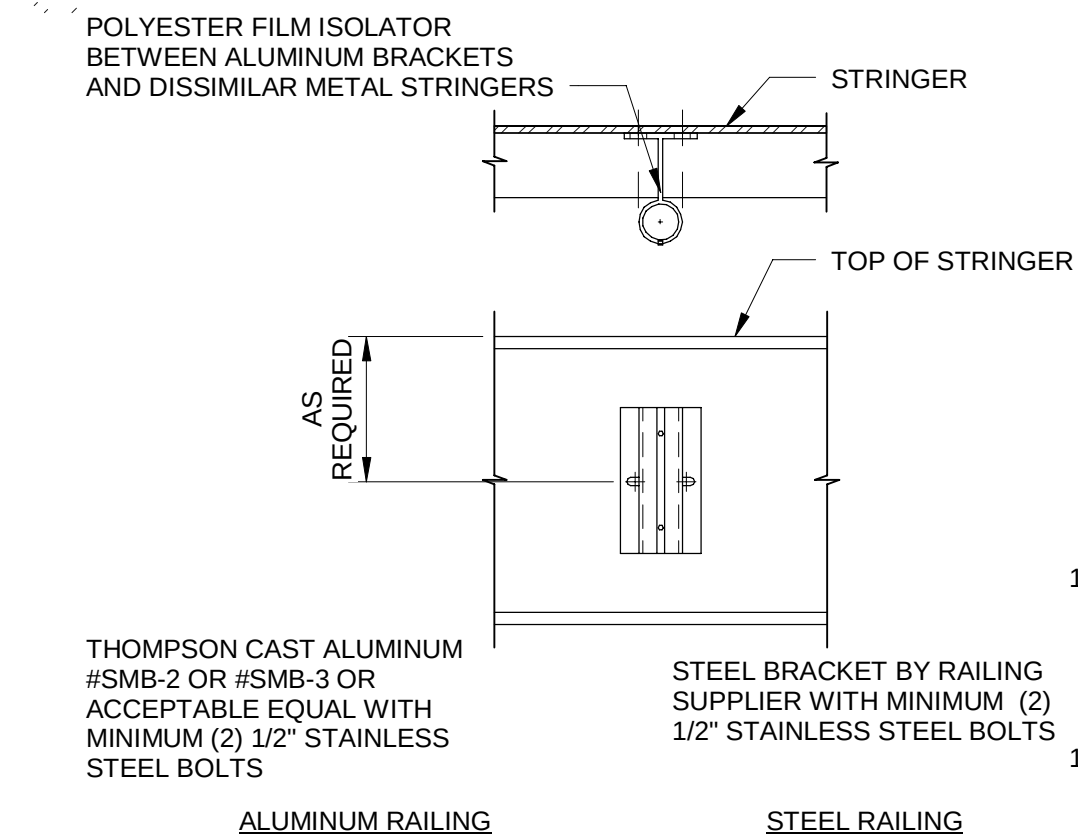
**SIDE MOUNT**  
1 1/2" = 1'-0"

**POST MOUNTED TO METAL**

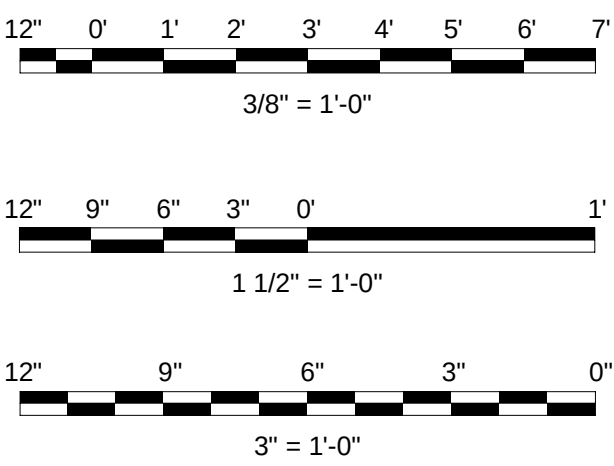


- FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.
- THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

**SLEEVE MOUNT**  
3" = 1'-0"



**OFFSET SIDE MOUNT**  
1 1/2" = 1'-0"



**DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY**

**WRF EFFLUENT  
PUMPING  
IMPROVEMENTS**

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| PROJECT NO.:                  | 410504             |

**GENERAL**

**STRUCTURAL**

**STANDARD 3-RAIL  
GUARDRAIL & HANDRAIL  
DETAILS**

PLAN FILE NO. 664-222

**00-S-518**







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| HVAC LEGEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | MECHANICAL ABBREVIATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| <div><div><div><div><div><div></div></div></div><div>DIFFUSER FOR FLEXIBLE DUCT</div></div><div><div><div><div><div></div></div></div><div>DUCTWORK DIMENSIONS, THE FIRST DIMENSION IS THE SIDE SEEN OR SIDE THE LEADER LINE TOUCHES. SEE GENERAL MECHANICAL NOTES.</div></div><div><div><div><div><div></div></div></div><div>FLEXIBLE CONNECTION</div></div><div><div><div><div><div></div></div></div><div>FLEXIBLE DUCTWORK</div></div><div><div><div><div><div></div></div></div><div>INCLINED RISE (UP) OR DROP (DN) IN RESPECT TO DIRECTION OF AIRFLOW</div></div><div><div><div><div><div></div></div></div><div>NEGATIVE PRESSURE DUCT</div></div><div><div><div><div><div></div></div></div><div>POSITIVE PRESSURE DUCT</div></div><div><div><div><div><div></div></div></div><div>REGISTER, GRILLE OR DIFFUSER</div></div><div><div><div><div><div></div></div></div><div>ROUND OR FLEXIBLE DUCT TAKEOFF</div></div><div><div><div><div><div></div></div></div><div>ROUND TO SQUARE TRANSITION</div></div><div><div><div><div><div></div></div></div><div>TURNING VANES</div></div></div></div></div></div></div></div></div></div></div></div></div></div> |  | <div><div><div><div><div><b>A</b><div><div>A</div><div>ALARM</div></div><div><div>AC</div><div>AIR COMPRESSOR</div></div><div><div>AD</div><div>ACCESS DOOR</div></div><div><div>AF</div><div>AIR FLOW, AIRFOIL</div></div><div><div>AFD</div><div>ADJUSTABLE FREQUENCY DRIVE</div></div><div><div>AFF</div><div>ABOVE FINISH FLOOR</div></div><div><div>AFM</div><div>AIR FLOW MONITOR</div></div><div><div>AHU</div><div>AIR HANDLING UNIT</div></div><div><div>ALUM</div><div>ALUMINUM</div></div><div><div>AP</div><div>ACCESS PANEL</div></div><div><div>APPROX</div><div>APPROXIMATE</div></div><div><div>AS</div><div>AIR SEPARATOR</div></div><div><div>ATU</div><div>AIR TERMINAL UNIT</div></div><div><div>AUTO</div><div>AUTOMATIC</div></div><div><div>AVG</div><div>AVERAGE</div></div></div><div><div><b>B</b><div><div>B</div><div>BELT DRIVE, BLOW THROUGH</div></div><div><div>BDD</div><div>BACKDRAFT DAMPER</div></div><div><div>BF</div><div>BLIND FLANGE</div></div><div><div>BFF</div><div>BELOW FINISH FLOOR</div></div><div><div>BFP</div><div>BACKFLOW PREVENTER</div></div><div><div>BH</div><div>BASEBOARD HEATER</div></div><div><div>BI</div><div>BACKWARD INCLINED, BUILT-IN THERMOSTAT</div></div><div><div>BL</div><div>BOTTOM LEVEL</div></div><div><div>BLDG</div><div>BUILDING</div></div><div><div>BLR</div><div>BLOWER</div></div><div><div>BOD</div><div>BOTTOM OF DUCT ELEVATION</div></div><div><div>BOT</div><div>BOTTOM</div></div><div><div>BTUH</div><div>BRITISH THERMAL UNITS PER HOUR</div></div><div><div>BU</div><div>BELL-UP</div></div><div><div>BV</div><div>BALL VALVE</div></div></div><div><div><b>C</b><div><div>C</div><div>CHANNEL, CONVECTOR, COOLING, COOLING (MAKE ON RISE)</div></div><div><div>CB</div><div>CENTRIFUGAL BLOWER</div></div><div><div>CBD</div><div>COUNTERBALANCE BACKDRAFT DAMPER</div></div><div><div>CC</div><div>COOLING COIL</div></div><div><div>CD</div><div>CONTROL DAMPER</div></div><div><div>CDWP</div><div>CONDENSER WATER PUMP</div></div><div><div>CDWTR</div><div>CENTRIFUGAL CABINET FAN</div></div><div><div>CF</div><div>CUBIC FEET PER MINUTE</div></div><div><div>CH</div><div>CONVECTION HEATER</div></div><div><div>C/L</div><div>CENTERLINE</div></div><div><div>CO</div><div>CLEANOUT</div></div><div><div>CONC</div><div>CONCRETE</div></div><div><div>CONN</div><div>CONNECTION</div></div><div><div>CONT</div><div>CONTINUATION</div></div><div><div>CS</div><div>CONTROL STATION</div></div><div><div>CT</div><div>COOLING TOWER</div></div><div><div>CU</div><div>CONDENSING UNIT</div></div><div><div>CV</div><div>CHECK VALVE, CONTROL VALVE</div></div><div><div>CWP</div><div>CHILLED WATER PUMP</div></div></div><div><div><b>D</b><div><div>D</div><div>DIRECT DRIVE, DRAW-THRU</div></div><div><div>DB</div><div>DRY BULB</div></div><div><div>DDC</div><div>DIRECT DIGITAL CONTROL</div></div><div><div>DEH</div><div>DEHUMIDIFIER</div></div><div><div>DF</div><div>DUCT FAN</div></div><div><div>DIA</div><div>DIAMETER</div></div><div><div>DM</div><div>DUCT MOUNTED</div></div><div><div>DN</div><div>DOWN</div></div><div><div>DX</div><div>DIRECT EXPANSION</div></div></div><div><div><b>E</b><div><div>E</div><div>ELECTRIC, ELECTRIC OPERATOR, EXHAUST</div></div><div><div>EA</div><div>EACH, EXHAUST AIR</div></div><div><div>EAT</div><div>ENTERING AIR TEMPERATURE</div></div><div><div>EC</div><div>ECONOMIZER, EVAPORATIVE COOLER</div></div><div><div>ECH</div><div>ELECTRIC CABINET HEATER</div></div><div><div>ECP</div><div>EQUIPMENT CONTROL PANEL</div></div><div><div>EDH</div><div>ELECTRIC DUCT HEATER</div></div><div><div>EF</div><div>EXHAUST FAN</div></div><div><div>EFF</div><div>EFFICIENCY</div></div><div><div>EGS</div><div>EMERGENCY GAS SCRUBBER</div></div><div><div>EIH</div><div>ELECTRIC INFRARED HEATER</div></div><div><div>EL</div><div>ELEVATION</div></div><div><div>EP</div><div>EXPLOSION PROOF</div></div><div><div>EQUIP</div><div>EQUIPMENT</div></div><div><div>ES</div><div>EMERGENCY SWITCH</div></div><div><div>ESP</div><div>EXTERNAL STATIC PRESSURE</div></div><div><div>ET</div><div>EXPANSION TANK</div></div><div><div>EUIH</div><div>ELECTRIC UNIT HEATER</div></div><div><div>EV</div><div>EXHAUST VALVE</div></div><div><div>EVS</div><div>EMERGENCY VENTILATION SWITCH</div></div><div><div>EWT</div><div>ENTERING WATER TEMPERATURE</div></div><div><div>EXIST</div><div>EXISTING</div></div></div><div><div><b>F</b><div><div>F</div><div>DEGREES FAHRENHEIT</div></div><div><div>FBD</div><div>FACE AND BYPASS DAMPER</div></div><div><div>FC</div><div>FORWARD CURVE, FAN COIL</div></div><div><div>FD</div><div>FIRE DAMPER</div></div><div><div>FDB</div><div>DEGREES FAHRENHEIT DRY BULB</div></div><div><div>FEF</div><div>FUME EXHAUST FAN</div></div><div><div>FLEX</div><div>FLEXIBLE</div></div><div><div>FM</div><div>FLOW METER</div></div><div><div>FPM</div><div>FEET PER MINUTE</div></div><div><div>FR</div><div>FUNNEL RECEPTOR</div></div><div><div>FRP</div><div>FIBERGLASS REINFORCED PLASTIC PIPE</div></div><div><div>FS</div><div>FLOW SWITCH</div></div><div><div>FSD</div><div>COMBINATION FIRE/SMOKE DAMPER</div></div><div><div>FT</div><div>FEET, FIN TUBE HEATER</div></div><div><div>FUR</div><div>FURNACE</div></div><div><div>FWB</div><div>DEGREES FAHRENHEIT WET BULB</div></div></div><div><div><b>G</b><div><div>GA</div><div>GAUGE</div></div><div><div>GALV</div><div>GALVANIZED</div></div><div><div>GIH</div><div>GAS INFRARED HEATER</div></div><div><div>GPM</div><div>GALLONS PER MINUTE</div></div><div><div>GUH</div><div>GAS UNIT HEATER</div></div><div><div>GV</div><div>GATE VALVE</div></div></div><div><div><b>H</b><div><div>H</div><div>HAND OPERATOR, HEATING, HEATING (MAKE ON FALL), HEIGHT, HORIZONTAL, HUMIDISTAT</div></div><div><div>HC</div><div>HEATING COIL</div></div><div><div>HCH</div><div>HEATING WATER CABINET HEATER</div></div><div><div>HE</div><div>HEAT EXCHANGER</div></div><div><div>HO</div><div>HAND-OFF</div></div><div><div>HOA</div><div>HAND-OFF-AUTO</div></div><div><div>HP</div><div>HEAT PUMP, HORSEPOWER</div></div><div><div>HR</div><div>HEAT RECOVERY UNIT</div></div><div><div>HUH</div><div>HEATING WATER UNIT HEATER</div></div><div><div>HUM</div><div>HUMIDIFIER</div></div><div><div>HWB</div><div>HEATING WATER BOILER</div></div><div><div>HWP</div><div>HEATING WATER PUMP</div></div><div><div>HZ</div><div>HERTZ</div></div></div><div><div><b>I</b><div><div>I</div><div>INTAKE</div></div><div><div>ID</div><div>INSIDE DIAMETER</div></div><div><div>IN</div><div>INCHES</div></div><div><div>INV</div><div>INVERT</div></div></div><div><div><b>K</b><div><div>KW</div><div>KILOWATT</div></div></div><div><div><b>L</b><div><div>L</div><div>LINED DUCT, LOUVER</div></div><div><div>LAT</div><div>LEAVING AIR TEMPERATURE</div></div><div><div>LBS</div><div>POUNDS</div></div><div><div>LD</div><div>COMBINATION LOUVER/DAMPER</div></div><div><div>LI</div><div>LEVEL INDICATOR</div></div><div><div>LS</div><div>LEVEL SWITCH</div></div><div><div>LWT</div><div>LEAVING WATER TEMPERATURE</div></div></div><div><div><b>M</b><div><div>MAU</div><div>MAKEUP AIR UNIT</div></div><div><div>MAX</div><div>MAXIMUM</div></div><div><div>MCA</div><div>MINIMUM CIRCUIT AMPS</div></div><div><div>ME</div><div>MIST ELIMINATOR</div></div><div><div>MFR</div><div>MANUFACTURER</div></div><div><div>MOCP</div><div>MAXIMUM OVERCURRENT PROTECTION</div></div><div><div>MIN</div><div>MINIMUM</div></div><div><div>MOD</div><div>MODULATING</div></div></div><div><div><b>N</b><div><div>NC</div><div>NORMALLY CLOSED</div></div><div><div>NO</div><div>NORMALLY OPEN, NUMBER</div></div><div><div>NPSHR</div><div>NET POSITIVE SUCTION HEAD REQUIRED</div></div></div><div><div><b>O</b><div><div>OA</div><div>OUTSIDE AIR</div></div><div><div>OD</div><div>OUTSIDE DIAMETER</div></div></div><div><div><b>P</b><div><div>P</div><div>PNEUMATIC</div></div><div><div>PD</div><div>PRESSURE DROP (INCHES OF WATER FOR AIR, FEET OF WATER FOR FLUIDS)</div></div><div><div>PAC</div><div>PACKAGED AIR CONDITIONING UNIT</div></div><div><div>PAH</div><div>PACKAGED AIR HANDLING UNIT</div></div><div><div>PDS</div><div>PRESSURE DIFFERENTIAL SWITCH</div></div><div><div>PF</div><div>PROPELLER FAN</div></div><div><div>PHP</div><div>PACKAGED HEAT PUMP</div></div><div><div>PL</div><div>PLATE</div></div><div><div>POS</div><div>POSITION</div></div><div><div>PPM</div><div>PARTS PER MILLION</div></div><div><div>PROP</div><div>PROPELLER</div></div><div><div>PRS</div><div>PRESSURE REDUCING STATION</div></div><div><div>PRV</div><div>POWER ROOF VENTILATOR, PRESSURE REDUCING VALVE</div></div><div><div>PS</div><div>PRESSURE SWITCH</div></div><div><div>PSI</div><div>POUNDS PER SQUARE INCH</div></div><div><div>PSIA</div><div>POUNDS PER SQUARE INCH ABSOLUTE</div></div><div><div>PSIG</div><div>POUNDS PER SQUARE INCH GAUGE</div></div><div><div>PTAC</div><div>PACKAGED TERMINAL AIR CONDITIONER</div></div></div><div><div><b>R</b><div><div>RA</div><div>REACTIVATION AIR, RETURN AIR</div></div><div><div>RAC</div><div>ROOM AIR CONDITIONER</div></div><div><div>RCS</div><div>REMOTE CONTROL STATION</div></div><div><div>REQD</div><div>REQUIRED</div></div><div><div>RH</div><div>RELATIVE HUMIDITY, ROOF HOOD</div></div><div><div>RSF</div><div>ROOF SUPPLY FAN</div></div></div><div><div><b>S</b><div><div>SA</div><div>SUPPLY AIR</div></div><div><div>SCD</div><div>SMOKE CONTROL DAMPER</div></div><div><div>SCFM</div><div>STANDARD CUBIC FEET PER MINUTE</div></div><div><div>SF</div><div>SQUARE FEET, SUPPLY FAN</div></div><div><div>SH</div><div>SHEET</div></div><div><div>SIM</div><div>SIMILAR</div></div><div><div>SMD</div><div>SMOKE DETECTOR</div></div><div><div>SP</div><div>STATIC PRESSURE (INCHES OF WATER)</div></div><div><div>SPS</div><div>STATIC PRESSURE SENSOR</div></div><div><div>SS</div><div>STAINLESS STEEL</div></div><div><div>STD</div><div>STANDARD</div></div><div><div>SV</div><div>SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE</div></div></div><div><div><b>T</b><div><div>T</div><div>THERMOSTAT</div></div><div><div>TCP</div><div>TEMPERATURE CONTROL PANEL</div></div><div><div>TCV</div><div>TEMPERATURE CONTROL VALVE</div></div><div><div>TE</div><div>TEMPERATURE ELEMENT</div></div><div><div>TL</div><div>TOP LEVEL</div></div><div><div>TS</div><div>TIP SPEED</div></div><div><div>TYP</div><div>TYPICAL</div></div></div><div><div><b>V</b><div><div>V</div><div>VERTICAL</div></div><div><div>VAC</div><div>VACUUM OUTLET</div></div><div><div>VANE</div><div>VANEAXIAL</div></div><div><div>VAV</div><div>VARIABLE AIR VOLUME</div></div><div><div>VCD</div><div>VOLUME CONTROL DAMPER</div></div><div><div>VF</div><div>VANEAXIAL FAN</div></div></div><div><div><b>W</b><div><div>W</div><div>WIDE FLANGE, WIDTH</div></div><div><div>WB</div><div>WET BULB</div></div><div><div>WC</div><div>WATER CHILLER</div></div><div><div>WF</div><div>WATER COLUMN</div></div><div><div>WG</div><div>WALL FAN</div></div><div><div>WH</div><div>WATER GAUGE</div></div><div><div>WH</div><div>WALL HEATER</div></div><div><div>WM</div><div>WALL MOUNTED</div></div><div><div>WST</div><div>WATER STORAGE TANK</div></div><div><div>WT</div><div>WEIGHT</div></div><div><div>WV</div><div>WATER CONTROL VALVE</div></div></div><div><div><b>Z</b><div><div>ZD</div><div>ZONE DAMPER</div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div> |  |  |  | <div><div>1. THIS IS GENERAL LEGEND AND ABBREVIATION SHEET FOR HVAC DRAWINGS. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS SPECIFIC PROJECT.</div><div>2. ALL MECHANICAL HVAC WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES:<br/>2018 INTERNATIONAL BUILDING CODE (IBC)<br/>2018 INTERNATIONAL MECHANICAL CODE (IMC)<br/>2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)</div><div>3. FOR ROOFTOP EQUIPMENT CURBS, FLUES, AND FLASHING DETAILS, SEE ARCHITECTURAL DRAWINGS.</div><div>4. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL EQUIPMENT BASE DETAILS.</div><div>5. "SCREENED" DELINEATION DENOTES EXISTING AND NEW FACILITIES AND IS FOR REFERENCE ONLY. "LIGHT" LINE DELINEATION DENOTES EXISTING MECHANICAL EQUIPMENT AND SYSTEMS. EXISTING FACILITY AND MECHANICAL SYSTEMS INFORMATION WAS TAKEN FROM PREVIOUS DRAWINGS, CONSTRUCTION RECORDS, DATA, AND FIELD SURVEY INFORMATION. ACTUAL LOCATION, ARRANGEMENT, AND DIMENSIONS SHALL BE FIELD VERIFIED AND WORK INSTALLED TO MEET ACTUAL CONDITIONS AND LOCATIONS ENCOUNTERED. "BOLD" (DARK) DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.</div><div>6. ALL MATERIALS, FITTINGS, COVERS, AND EQUIPMENT INSTALLED IN RETURN AIR PLENUMS SHALL BE NONCOMBUSTIBLE AND UL LISTED FOR USE IN RETURN AIR PLENUMS.</div><div>7. ALL PIPE AND DUCT PENETRATIONS THROUGH FIRE RESISTANCE RATED ASSEMBLIES SHALL BE PROVIDED WITH FIRESTOP SYSTEMS, EQUIPMENT AND ACCESSORIES TO RESIST THE PASSAGE OF FIRE, SMOKE AND OTHER GASES. THE ORIGINAL FIRE RESISTANCE RATING OF THE ASSEMBLY PENETRATED SHALL BE MAINTAINED FOR ALL TYPES OF PENETRATIONS. SEE ARCHITECTURAL DRAWINGS FOR RATED ASSEMBLY LOCATIONS.</div><div>8. METAL ROOF DECKING OR BOTTOM CHORD OF BAR JOISTS SHALL NOT BE USED FOR THE SUPPORT OF EQUIPMENT, PIPING, OR DUCTWORK.</div><div>9. ALL HANGERS, BRACKETS, OR BRACES FOR PIPING, DUCTWORK AND EQUIPMENT ARE NOT INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS NOT SHOWN ON THE PLANS.</div><div>10. ALL EQUIPMENT, PIPING AND DUCTWORK FINAL LOCATIONS SHALL BE COORDINATED TO AVOID INTERFERENCES WITH STRUCTURE, OTHER PIPING, EQUIPMENT, DUCTWORK, AND CONDUIT. UNLESS SPECIFICALLY DIMENSIONED, THE PIPE AND DUCTWORK ROUTING SHOWN IS INTENDED TO INDICATE GENERAL LOCATION ONLY. INSTALL DUCTWORK TO ALLOW FOR PIPING TO BE ROUTED NEAR WALLS.</div><div>11. ALL PIPING AND DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITH A MINIMUM HEIGHT OF 8'-0" ABOVE THE WALKING SURFACE UNLESS OTHERWISE INDICATED BY A CENTERLINE OR BOTTOM OF DUCT ELEVATION.</div><div>12. DUCTWORK SHALL BE FABRICATED, REINFORCED, SUPPORTED AND SEALED FOR OPERATING PRESSURES INDICATED IN THE SCHEDULES FOR THE EQUIPMENT IT SERVES. ALL DUCTWORK SHALL HAVE A MINIMUM SMACNA PRESSURE CLASSIFICATION OF ONE INCH.</div><div>13. DUCT SIZES INDICATED ARE CLEAR DIMENSIONS INSIDE THE DUCT OR DUCT LINING. SHEET METAL SIZES ARE LARGER FOR INTERNALLY LINED DUCTWORK.</div><div>14. MINIMUM INSULATION THICKNESSES FOR DUCTWORK SHALL BE AS INDICATED IN THE SPECIFICATIONS UNLESS OTHERWISE INDICATED ON THE PLANS WITH A "L" OR "W" DESIGNATION. WHERE AN INSULATION THICKNESS IS INDICATED ON THE DRAWINGS, IT SHALL GOVERN. THE FOLLOWING DENOTES THE DIFFERENT INSULATION THICKNESSES INDICATED ON THE DRAWINGS:<br/>L11 - 1.5 INCH INTERNALLY LINED      W11 - 1.5 INCH EXTERNALLY WRAPPED<br/>L15 - 1.5 INCH INTERNALLY LINED      W15 - 1.5 INCH EXTERNALLY WRAPPED<br/>L2 - 2 INCH INTERNALLY LINED      W2 - 2 INCH EXTERNALLY WRAPPED</div><div>15. DUCT CONNECTIONS TO EQUIPMENT, PIPING SIZES TO EQUIPMENT, AND EQUIPMENT SUPPORTS SHALL BE VERIFIED AND ADJUSTED TO MATCH ACTUAL EQUIPMENT FURNISHED.</div><div>16. SEISMIC RESTRAINTS/BRACING SHALL BE PROVIDED FOR ALL EQUIPMENT, DUCTWORK, AND ACCESSORIES IN ACCORDANCE WITH THE LATEST SMACNA SEISMIC RESTRAINT MANUAL AND LOCAL BUILDING CODES. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEISMIC SUPPORTS AND ADDITIONAL/MISCELLANEOUS STEEL REQUIRED FOR PROPER INSTALLATION OF SUPPORTS. SUPPORTS AND SEISMIC RESTRAINTS DESIGN SUBMITTALS SHALL BEAR THE STAMP AND SIGNATURE OF A LICENSED ENGINEER.</div><div>17. INSULATION SHALL BE PROVIDED FOR EQUIPMENT, PIPING AND DUCT SYSTEMS AS INDICATED IN THE SPECIFICATIONS.</div></div> |  |  |  |
| AIR INLET & OUTLET IDENTIFICATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <div><div><div><div><div>SIZE-LENGTH BY WIDTH (INCHES)</div><div>24"x10"-10"<br/>SR-I-760</div></div><div><div>FLEXIBLE DUCT DIAMETER (INCHES, IF USED)</div><div></div></div><div><div>CFM THRU DEVICE</div><div></div></div><div><div>DEVICE DESIGNATION</div><div></div></div><div><div>DEVICE GROUP:<br/>R-REGISTER, G-GRILLE,<br/>D-DIFFUSER</div><div></div></div><div><div>DEVICE TYPE:<br/>S-SUPPLY, E-EXHAUST,<br/>R-RETURN, T-TRANSFER</div><div></div></div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                           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| CONTROLS & INSTRUMENTATION LEGEND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | <div><div><div><div><div><div><div></div></div></div><div>CONTROL STATION</div></div><div><div><div><div><div></div></div></div><div>DRAFT GAUGE</div></div><div><div><div><div><div></div></div></div><div>E<sub>EP</sub></div><div>ELECTRIC OPERATOR (EXPLOSION PROOF)</div></div><div><div><div><div><div></div></div></div><div>E<sub>M</sub></div><div>ELECTRIC OPERATOR (MODULATING)</div></div><div><div><div><div><div></div></div></div><div>E</div><div>ELECTRIC OPERATOR (2 POSITION)</div></div><div><div><div><div><div></div></div></div><div>EVS<sub>1</sub></div><div>EMERGENCY VENTILATION SWITCH W/ NUMBER</div></div><div><div><div><div><div></div></div></div><div>FS</div><div>FLOW SWITCH</div></div><div><div><div><div><div></div></div></div><div></div><div>GAUGE ACTIVATOR/ISOLATOR</div></div><div><div><div><div><div></div></div></div><div>H<sub>1</sub></div><div>HUMIDISTAT W/ NUMBER</div></div><div><div><div><div><div></div></div></div><div>LS</div><div>LEVEL SWITCH</div></div><div><div><div><div><div></div></div></div><div>PDS<sub>1</sub></div><div>PRESSURE DIFFERENTIAL SWITCH W/ NUMBER</div></div><div><div><div><div><div></div></div></div><div>P</div><div>PRESSURE GAUGE W/ SHUTOFF VALVE</div></div><div><div><div><div><div></div></div></div><div>PS</div><div>PRESSURE SWITCH</div></div><div><div><div><div><div></div></div></div><div>SMD<sub>1</sub></div><div>SMOKE DETECTOR W/ NUMBER</div></div><div><div><div><div><div></div></div></div><div>S</div><div>SOLENOID OPERATOR</div></div><div><div><div><div><div></div></div></div><div></div><div>THERMOMETER - DIAL TYPE</div></div><div><div><div><div><div></div></div></div><div></div><div>THERMOMETER - STEM TYPE</div></div><div><div><div><div><div></div></div></div><div>TS<sub>1</sub></div><div>TEMPERATURE SENSOR WITH NUMBER</div></div><div><div><div><div><div></div></div></div><div>T<sub>1</sub></div><div>THERMOSTAT WITH NUMBER</div></div><div><div><div><div><div></div></div></div><div>V</div><div>VACUUM GAUGE W/ SHUTOFF VALVE</div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <div><div>PLOTTED: 8/20/2024 9:32:11 AM</div><div>FILE: BIM_360/410504 - WRF Effluent Pump Station/410504 - WRF GENERAL.rvt</div><div>D11000</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <div><div><div><div><div>0</div><div>1/2</div><div>1</div><div>2</div><div>3</div><div>4</div></div><div>(SCALE BAR IS 4" AT FULL SCALE)</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

08/16/2024 | ISSUED FOR BIDDING

REVISIONS AND RECORD OF ISSUE

DESIGNED: VSS

DETAILED: AJP

CHECKED: DV

APPROVED: RWC

DATE: 08/16/2024

PROJECT NO.: 410504

GENERAL

HVAC

LEGEND,  
ABBREVIATIONS, AND  
GENERAL NOTES

PLAN FILE NO. 664-224

00-H-001

31  
OF  
118





| UNIT NUMBER     | LOCATION                | MANUFACTURER | MODEL              | INDOOR FAN       |                |             |       | POWER SUPPLY |       | MINIMUM<br>CIRCUIT<br>AMPACITY | COOLING |       |                 |        | HEATING                   |      |                                        | DISCHARGE<br>DIRECTION | ARI<br>MINIMUM<br>EFFICIENCY | OA (CFM) | FILTER DATA               |         | ECONOMIZER DATA   |                      | APPROX<br>WEIGHT<br>(LBS) | NOTES |               |
|-----------------|-------------------------|--------------|--------------------|------------------|----------------|-------------|-------|--------------|-------|--------------------------------|---------|-------|-----------------|--------|---------------------------|------|----------------------------------------|------------------------|------------------------------|----------|---------------------------|---------|-------------------|----------------------|---------------------------|-------|---------------|
|                 |                         |              |                    | AIRFLOW<br>(CFM) | ESP (IN<br>WG) | MOTOR<br>HP | DRIVE | VOLTS        | PHASE |                                | EAT     |       | CAPACITY (BTUH) |        | MIN<br>CAPACITY<br>STAGES | EAT  | AUXILIARY<br>ELECTRIC<br>CAPACITY (KW) |                        |                              |          | MINIMUM<br>HEAT<br>STAGES | TYPE    | THICKNESS<br>(IN) | TYPE                 |                           |       | CONTROLS      |
|                 |                         |              |                    |                  |                |             |       |              |       |                                | (FDB)   | (FWB) | SENSIBLE        | TOTAL  |                           |      |                                        |                        |                              |          |                           |         |                   |                      |                           |       |               |
| 69-HVAC-AHU-001 | ELECTRICAL<br>ROOM-ROOF | CARRIER      | 50FC-N30A3M6-3W0C0 | 10000            | 1.25           | 7.5         | BELT  | 480          | 3     | 74.1                           | 80.6    | 59.0  | 263500          | 283000 | 2                         | 56.3 | 45.9                                   | 2                      | VERTICAL                     | 10 EER   | 475                       | PLEATED | 2                 | BAROMETRIC<br>RELIEF | FIXED<br>ENTHALPY         | 2500  | 1,2,3,4,5,6,7 |

ELECTRICAL ROOM - 80° F (COOLING)  
- 60° F (HEATING)

# WRF EFFLUENT PUMPING IMPROVEMENTS

32  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4







| ELECTRICAL GENERAL NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  | ELECTRICAL ABBREVIATIONS                                                                                                                                                                                                                                                                        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| <div><div><div>1. SOLID LINES ( ————— ) INDICATE NEW WORK OR EQUIPMENT.</div><div>2. SCREENED LINES ( ————— ) INDICATE EXISTING WORK OR EQUIPMENT.</div><div>3. DASHED LINES ( - - - - - ) INDICATE FUTURE WORK OR EQUIPMENT.</div><div>4. REFER TO INDIVIDUAL DISCIPLINE CONTRACT DRAWINGS FOR ADDITIONAL ABBREVIATIONS, DETAILS, AND GENERAL DESIGN NOTES.</div><div>5. LEGEND SHEETS ARE GENERAL. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.</div><div>6. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE &amp; CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.<div><div>A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.</div><div>B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF THE IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.</div><div>C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.</div><div>D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.</div></div></div></div></div> |  | <div><div><div><div><div><b>A</b></div><div>A<br/>AC<br/>ACB<br/>ACR<br/>AF<br/>AFD<br/>AFRD<br/>AM<br/>ANN<br/>AR<br/>AS<br/>AT<br/>ATS<br/>AUX<br/>AWG</div><div>AMBER, AMPERE, ALARM<br/>ALTERNATING CURRENT<br/>AIR CIRCUIT BREAKER<br/>ACCESS CARD READER<br/>AMPERE FRAME<br/>ADJUSTABLE FREQUENCY DRIVE<br/>ARC-FLASH REDUCTION DEVICE<br/>AMMETER<br/>ANNUNCIATOR<br/>ALARM RELAY<br/>AMMETER SWITCH, AMPERE SENSOR<br/>AMPERE TRIP<br/>AUTOMATIC TRANSFER SWITCH<br/>AUXILIARY<br/>AMERICAN WIRE GAUGE</div></div><div><div><b>B</b></div><div>B<br/>BC<br/>BKR<br/>BR<br/>BT</div><div>BUS<br/>BATTERY CHARGER<br/>BREAKER<br/>BRAKE<br/>BEARING TEMPERATURE</div></div><div><div><b>C</b></div><div>C<br/>CAP<br/>CB<br/>CB"A"<br/>CB"B"<br/>CD<br/>CI<br/>CKT<br/>CL2<br/>COS<br/>CP<br/>CPT<br/>CR<br/>CS<br/>CT<br/>CTC<br/>CTM<br/>2/C<br/>4"C</div><div>CLOSE, COUNTER, CONTACTOR, CONTROL, CCTV CAMERA<br/>CAPACITOR<br/>CIRCUIT BREAKER<br/>CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN)<br/>CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN)<br/>CONTROL DAMPER<br/>CELL INTERLOCK<br/>CIRCUIT<br/>CHLORINE<br/>CABLE OPERATED SWITCH<br/>CONTROL PANEL<br/>CONTROL POWER TRANSFORMER<br/>CURRENT OF CONTROL RELAY, CARD READER<br/>CONTROL STATION<br/>CYCLE TIMER OR CURRENT TRANSFORMER<br/>CYCLE TIMER CLUTCH<br/>CYCLE TIMER MONITOR<br/>2 CONDUCTOR<br/>4" CONDUIT</div></div><div><div><b>D</b></div><div>DC<br/>DI<br/>DM<br/>DPDT<br/>DPST<br/>DPR<br/>DPS<br/>DS<br/>DVLS</div><div>DIRECT CURRENT, DOOR CONTACT<br/>DOOR INTERLOCK<br/>DAMPER MOTOR, DEMAND METER, DIMMER SWITCH<br/>DOUBLE POLE DOUBLE THROW<br/>DOUBLE POLE SINGLE THROW<br/>DIFFERENTIAL PRESSURE REGULATOR<br/>DIFFERENTIAL PRESSURE SWITCH<br/>DISCONNECT SWITCH, DOOR SWITCH, DESKTOP STATION<br/>DISCHARGE VALVE LIMIT SWITCH</div></div><div><div><b>E</b></div><div>E<br/>EC<br/>EDS<br/>EHH<br/>EL<br/>EMH<br/>ER<br/>ES<br/>E-STOP<br/>ETM<br/>EX<br/>EXP</div><div>ELECTRIC OPERATOR FOR CONTROL<br/>DAMPER OR VALVE<br/>EMPTY CONDUIT<br/>ELECTRICAL DOOR STRIKE<br/>ELECTRICAL HANDHOLE<br/>ELEVATION, EMERGENCY LIGHT<br/>ELECTRICAL MANHOLE<br/>ELECTRODE RELAY<br/>END SWITCH, REQUEST TO EXIT SENSOR<br/>EMERGENCY STOP<br/>ELAPSED TIME METER<br/>EXISTING<br/>EXPLOSION PROOF</div></div><div><div><b>F</b></div><div>F<br/>FOC<br/>FPR<br/>FS</div><div>FORWARD, FIELD<br/>FIBER OPTIC CABLE<br/>FEEDER PROTECTION RELAY<br/>FLOW SWITCH</div></div><div><div><b>G</b></div><div>G<br/>GD<br/>GEN<br/>GFCI,GFI<br/>GLS<br/>GPR<br/>GND<br/>#8G</div><div>GREEN, GROUND, GENERATOR, GROUND FAULT<br/>GROUND DETECTOR<br/>GENERATOR<br/>GROUND FAULT CURRENT INTERRUPTOR, GROUND FAULT INTERRUPTOR<br/>GEARED LIMIT SWITCH<br/>GENERATOR PROTECTION RELAY<br/>GROUND<br/>#8 GROUND WIRE</div></div><div><div><b>H</b></div><div>H<br/>HH<br/>HMT<br/>HOA<br/>HOR<br/>HP<br/>HS<br/>HWCO<br/>HZ</div><div>HIGH, HUMIDISTAT<br/>HANDHOLE<br/>HIGH MOTOR TEMPERATURE<br/>HAND-OFF-AUTO<br/>HAND-OFF-REMOTE<br/>HORSEPOWER<br/>HAND STATION<br/>HIGH WATER CUTOFF<br/>HERTZ (CYCLE)</div></div><div><div><b>I</b></div><div>I/O<br/>I<br/>IJB<br/>J<br/>J, JB<br/>K<br/>KAIC<br/>KCMIL<br/>KO<br/>KV<br/>KVA<br/>KVAR<br/>KW<br/>KWH</div><div>INPUT/OUTPUT<br/>INSTANTANEOUS<br/>INTERCOM JUNCTION BOX<br/>JUNCTION BOX<br/>KEY INTERLOCK<br/>THOUSAND AMPERES INTERRUPTING CURRENT<br/>THOUSAND CIRCULAR MIL<br/>KEY OPERATED<br/>KILOVOLT<br/>KILOVOLT AMPERE<br/>KILOVOLT<br/>KILOWATT<br/>KILOWATT HOUR</div></div><div><div><b>L</b></div><div>L<br/>LA<br/>LAN<br/>LC<br/>LCE<br/>LCP<br/>LCS<br/>LOA<br/>LOR<br/>LOS<br/>LP<br/>LS<br/>LTG<br/>LWCO</div><div>LOW, LEVEL, LONG-TIME<br/>LIGHTNING ARRESTER<br/>LOCAL AREA NETWORK<br/>LIGHTING CONTRACTOR<br/>LIGHTING CONTACTOR ENCLOSURE<br/>LIGHTING CONTROL ENCLOSURE<br/>LOCAL CONTROL PANEL<br/>LOCAL CONTROL STATION<br/>LOCAL-OFF-AUTO<br/>LOCAL-OFF-REMOTE<br/>LOCK OUT STOP<br/>LIGHTING PANEL<br/>LIMIT OR LEVEL SWITCH<br/>LIGHTING<br/>LOW WATER CUTOFF</div></div><div><div><b>M</b></div><div>M<br/>MA<br/>MCB<br/>MCC<br/>MCCLU<br/>MD<br/>MDL<br/>MFR<br/>MH<br/>MOV<br/>MPR<br/>MS<br/>MSH<br/>MTS<br/>MV<br/>MVA</div><div>MAGNETIC MOTOR STARTER<br/>MILLIAMPERE<br/>MAIN CIRCUIT BREAKER<br/>MOTOR CONTROL CENTER<br/>MOTOR CONTROL LINEUP<br/>MOISTURE DETECTOR, MOTION DETECTOR<br/>MAGNETIC DOOR LOCK<br/>MANUFACTURER<br/>MANHOLE, MOUNTING HEIGHT<br/>MOTOR OPERATED VALVE<br/>MOTOR PROTECTION RELAY<br/>MANUAL MOTOR STARTER, MOISTURE SWITCH<br/>MOTOR SPACE HEATER, MOISTURE SWITCH HIGH<br/>MANUAL TRANSFER SWITCH<br/>MILLIVOLT, MEDIUM VOLTAGE<br/>MEGAVOLT AMPERE</div></div><div><div><b>N</b></div><div>N<br/>NGR<br/>NGT<br/>NC<br/>NO</div><div>NEUTRAL<br/>NEUTRAL GROUNDING RESISTOR<br/>NEUTRAL GROUNDING TRANSFORMER<br/>NORMALLY CLOSED<br/>NORMALLY OPEN, NUMBER</div></div><div><div><b>O</b></div><div>O<br/>OL<br/>OOA<br/>OOR<br/>OS<br/>O/U</div><div>OPEN<br/>OVERLOAD<br/>ON-OFF-AUTO<br/>ON-OFF-REMOTE<br/>OCCUPANCY SENSOR<br/>OVER/UNDER</div></div><div><div><b>P</b></div><div>P<br/>PCS<br/>PB<br/>PE<br/>PF<br/>PFCC<br/>PH<br/>PL<br/>PLC<br/>PMS<br/>PP<br/>PR<br/>PRS<br/>PS<br/>PT</div><div>PRIMARY, POWER, POLE<br/>PLANT CONTROL SYSTEM<br/>PUSH BUTTON, PULL BOX<br/>PHOTOELECTRIC SENSOR, PHOTOCCELL<br/>POWER FACTOR<br/>POWER FACTOR CORRECTION CAPACITOR<br/>PHASE<br/>PILOT LIGHT<br/>PROGRAMMABLE LOGIC CONTROLLER<br/>PUMP MONITORING SYSTEM<br/>POWER PANEL<br/>PAIR<br/>PROXIMITY SWITCH<br/>PRESSURE SWITCH<br/>POTENTIAL TRANSFORMER, PROGRAM TIMER</div></div><div><div><b>Q</b></div><div>Q</div><div>NOT USED</div></div><div><div><b>R</b></div><div>R<br/>RECP<br/>RES<br/>RH<br/>RT<br/>RTD<br/>RTU<br/>RVSS</div><div>RED, RAISE, RELAY, REVERSE<br/>RECEPTACLE<br/>RESISTOR<br/>REMOTE HANDSET<br/>REPEATING TIMER<br/>RESISTANCE TEMPERATURE DETECTOR<br/>REMOTE TERMINAL UNIT<br/>REDUCED VOLTAGE SOLID STATE STARTER</div></div><div><div><b>S</b></div><div>S<br/>SA<br/>SC<br/>SCADA<br/>SF6<br/>SH<br/>SM<br/>SN<br/>SO<br/>SP<br/>SPD<br/>SPDT<br/>SPST<br/>SS<br/>SSM<br/>SSS<br/>SST<br/>SUPV<br/>SV<br/>SWB,SWBD<br/>SWG,SWGR</div><div>SHORT-TIME, SHIELDED, STARTER<br/>SURGE ARRESTER, SPEAKER AMPLIFIER<br/>SECTIONALIZING CABINET<br/>SUPERVISORY CONTROL AND DATA ACQUISITION<br/>SULFUR HEXAFLOURIDE<br/>SPACE HEATER<br/>SINGLE MODE<br/>SOLID NEUTRAL<br/>SOLENOID OILER<br/>SINGLE POLE<br/>SURGE PROTECTION DEVICE<br/>SINGLE POLE DOUBLE THROW<br/>SINGLE POLE SINGLE THROW<br/>SELECTOR SWITCH, START/STOP, STAINLESS STEEL, SECTIONALIZING SWITCH<br/>SOLID-STATE METERING<br/>SOLID STATE STARTER<br/>SOLID-STATE TRIP<br/>SUPERVISORY CONTROL<br/>SOLENOID VALVE<br/>SWITCHBOARD<br/>SWITCHGEAR</div></div><div><div><b>T</b></div><div>T<br/>TACH<br/>TB<br/>TC<br/>TD<br/>TEMP<br/>TM<br/>TO<br/>TR<br/>TS<br/>TTB</div><div>THERMOSTAT, TIMER, TOTALIZER, TRANSFORMER<br/>TACHOMETER<br/>TERMINAL BLOCK<br/>TIMER CLUTCH<br/>TIME DELAY RELAY<br/>TEMPERATURE<br/>TIMER MOTOR<br/>TORQUE<br/>TIMER RELAY, TRIAD<br/>TEMPERATURE SWITCH<br/>TELEPHONE TERMINAL BOARD</div></div><div><div><b>U</b></div><div>UG<br/>UPS</div><div>UNDERGROUND<br/>UNINTERRUPTIBLE POWER SUPPLY</div></div><div><div><b>V</b></div><div>V<br/>VA<br/>VAR<br/>VFD<br/>VI<br/>VLS<br/>VM<br/>VPI<br/>VS<br/>VSH</div><div>VOLTS, VOLTAGE RESTRAINED<br/>VOLT AMPERE<br/>VARMETER<br/>VARIABLE FREQUENCY DRIVE<br/>VACUUM INTERRUPTER<br/>VALVE LIMIT SWITCH<br/>VOLT/METER<br/>VALVE POSITION INDICATOR<br/>VOLT/METER SWITCH, VIBRATION SWITCH<br/>VIBRATION SWITCH HIGH</div></div><div><div><b>W</b></div><div>W<br/>WH<br/>WM<br/>WP<br/>WPI<br/>WS</div><div>WHITE, WATTS<br/>WATTHOUR METER<br/>WATT METER<br/>WEATHERPROOF<br/>WEATHERPROOF IN-USE<br/>WALL STATION</div></div><div><div><b>X</b></div><div>X<br/>XFMR<br/>XP</div><div>AUXILIARY RELAY<br/>TRANSFORMER<br/>EXPLOSION PROOF</div></div><div><div><b>Y</b></div><div>Y</div><div>YELLOW</div></div><div><div><b>Z</b></div><div>Z<br/>ZS<br/>ZSS</div><div>AUXILIARY RELAY, IMPEDANCE<br/>POSITION SWITCH<br/>ZERO SPEED SWITCH</div></div><div><div><b>1-1PR#16S</b></div><div>1-1PR#16S</div><div>ONE, SINGLE PAIR, TWISTED SHIELDED #16 CABLE</div></div><div><div><b>3-7/C#14</b></div><div>3-7/C#14</div><div>THREE, SINGLE, SEVEN CONDUCTOR #14 MULTICONDUCTOR CONTROL CABLES</div></div></div></div></div> |  |
| AREA DESIGNATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <div><div><div>THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.</div><div><div>AREA TYPE 1A</div><div>CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED SCHEDULE 80 PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES AND ACCESSORIES.</div></div><div><div>AREA TYPE 4</div><div>INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.</div></div><div><div>AREA TYPE 7A</div><div>CLASS I, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.</div></div><div><div>AREA TYPE 7B</div><div>CLASS I, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUITS SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.</div></div><div><div>AREA TYPE 12</div><div>INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| GENERAL REQUIREMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | <div><div><div>1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATIONS.</div><div>2. SPARE WIRES SHALL BE TAPED AND COILED AND LABELED TO INDICATE WHERE OTHER END OF SPARE WIRE IS LOCATED.</div><div>3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMMODATE THE HIGHER VALUE.</div><div>4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.</div><div>5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12 AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM 3/4".</div><div>6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC. NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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Black & Veatch Corporation  
Des Moines, Iowa



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AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

08/16/2024 | ISSUED FOR BIDDING

REVISIONS AND RECORD OF ISSUE

|           |            |
|-----------|------------|
| DESIGNED: | JCK        |
| DETAILED: | EMB        |
| CHECKED:  | SJB        |
| APPROVED: | TDH        |
| DATE:     | 08/16/2024 |

PROJECT NO.: 410504

GENERAL

ELECTRICAL

ABBREVIATIONS &  
NOTES

PLAN FILE NO. 664-227

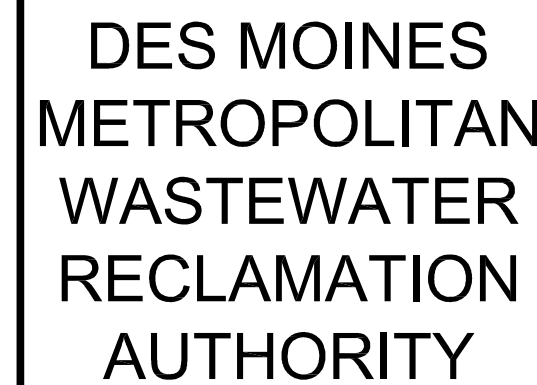
00-E-002

34  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE)



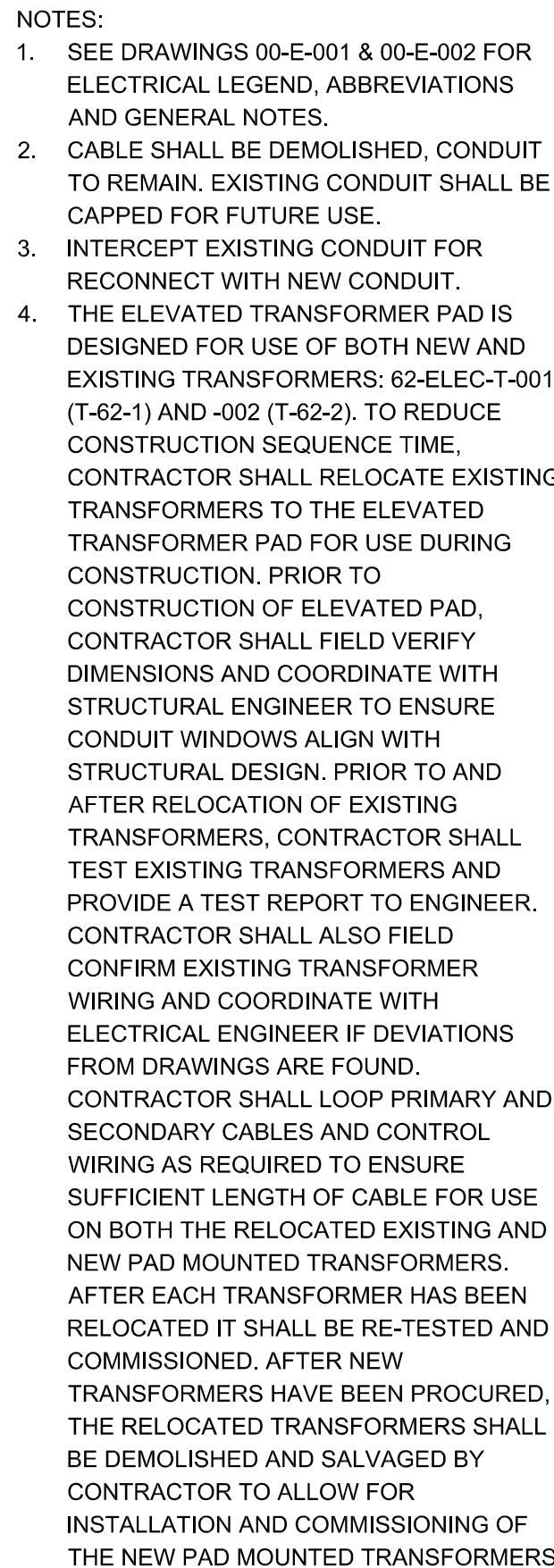


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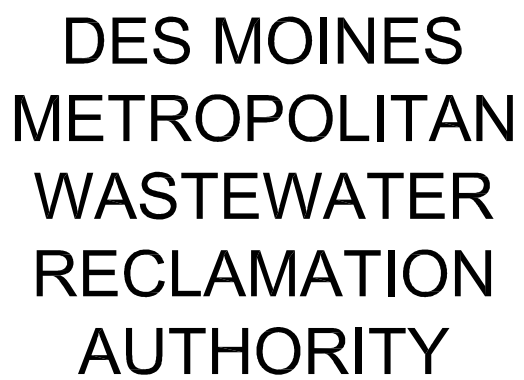
|                                                        |
|--------------------------------------------------------|
| ELECTRICAL                                             |
| POWER DISTRIBUTION<br>FUNCTIONAL DIAGRAM<br>DEMOLITION |

00-E-601

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OF  
118







## WRF EFFLUENT PUMPING IMPROVEMENTS

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| DATE:                       | 02/05/2024         |  |
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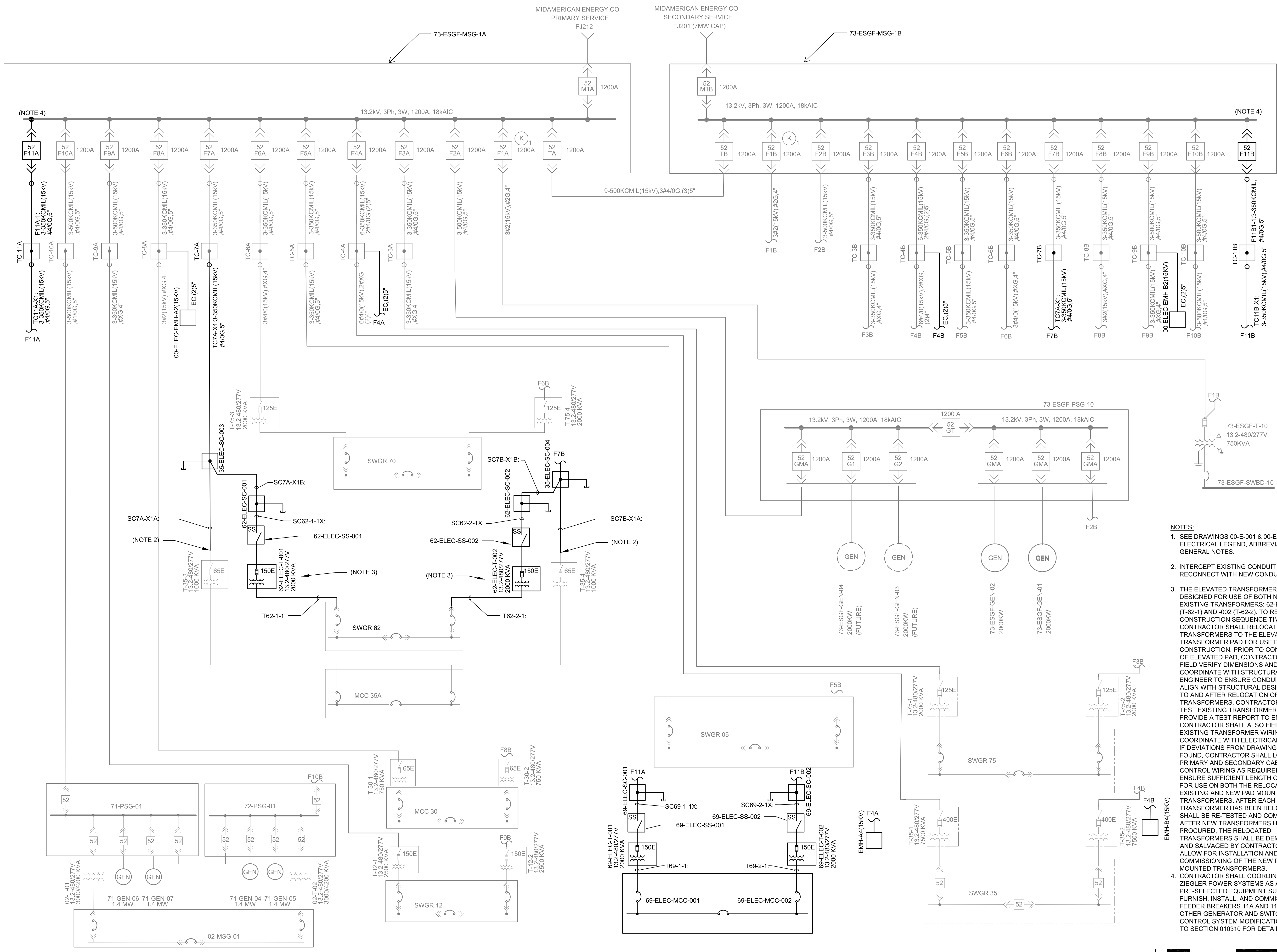
ELECTRICAL

# POWER DISTRIBUTION FUNCTIONAL DIAGRAM NEW WORK

PLAN FILE NO. 664-229

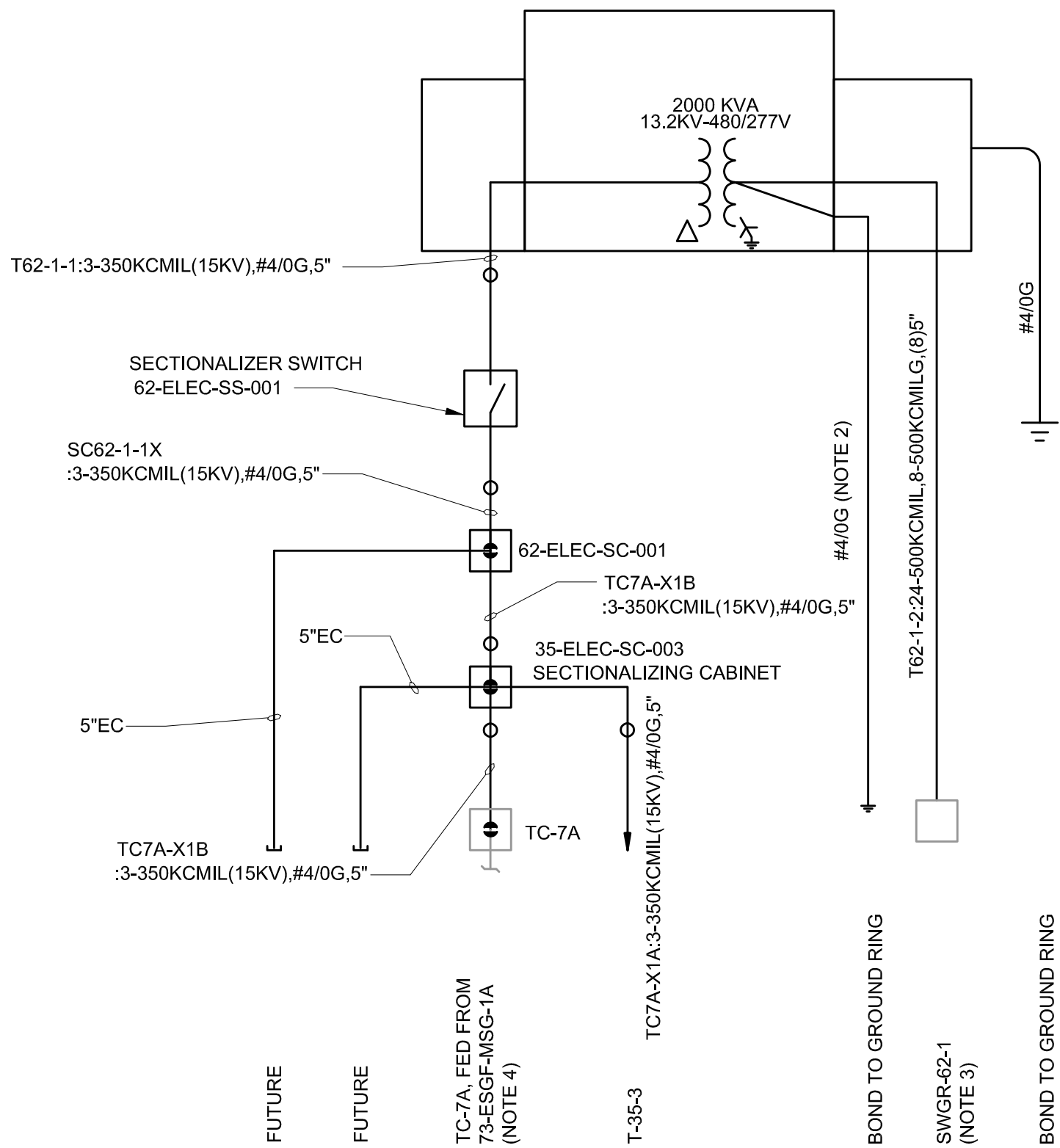
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OF  
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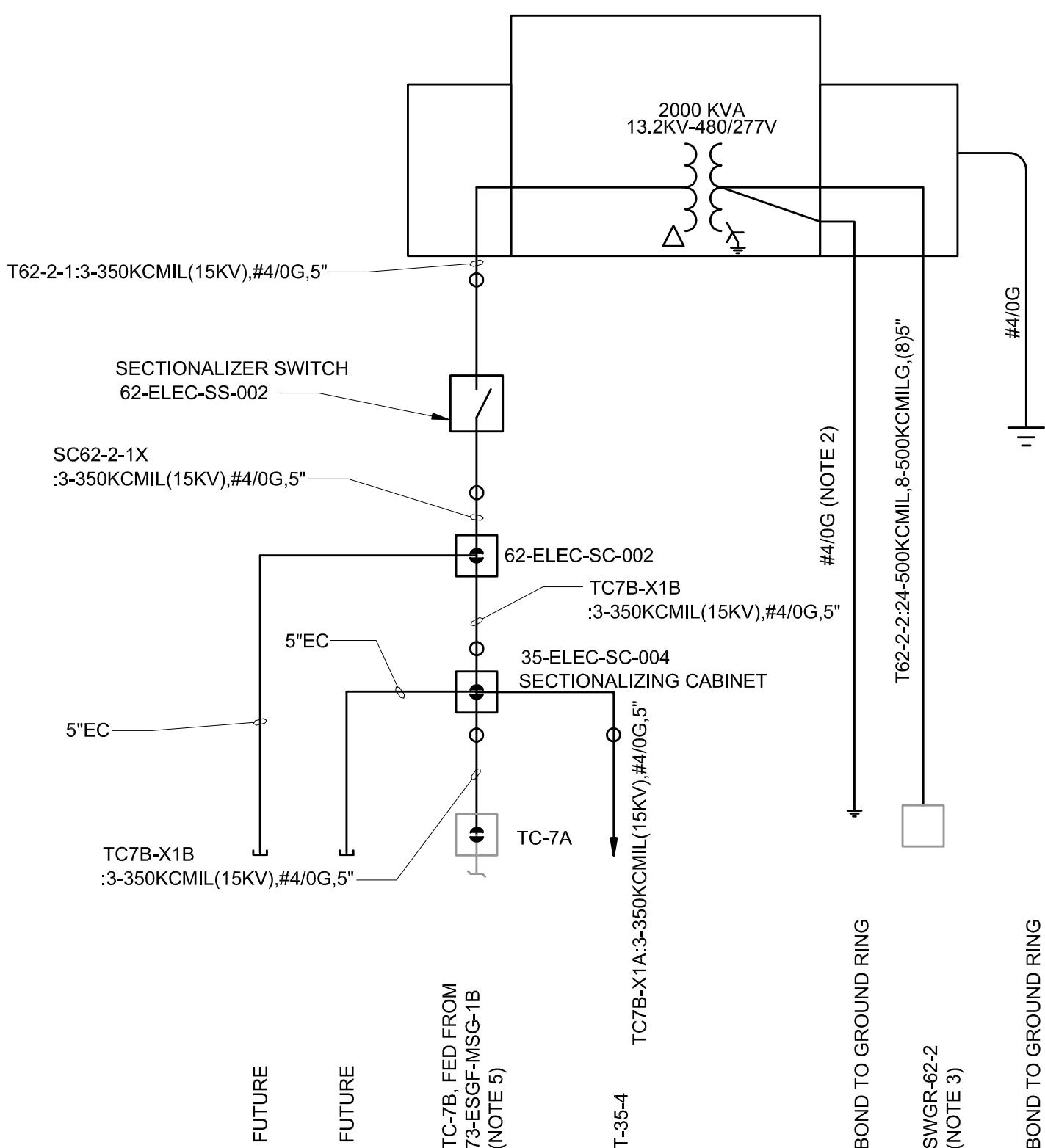




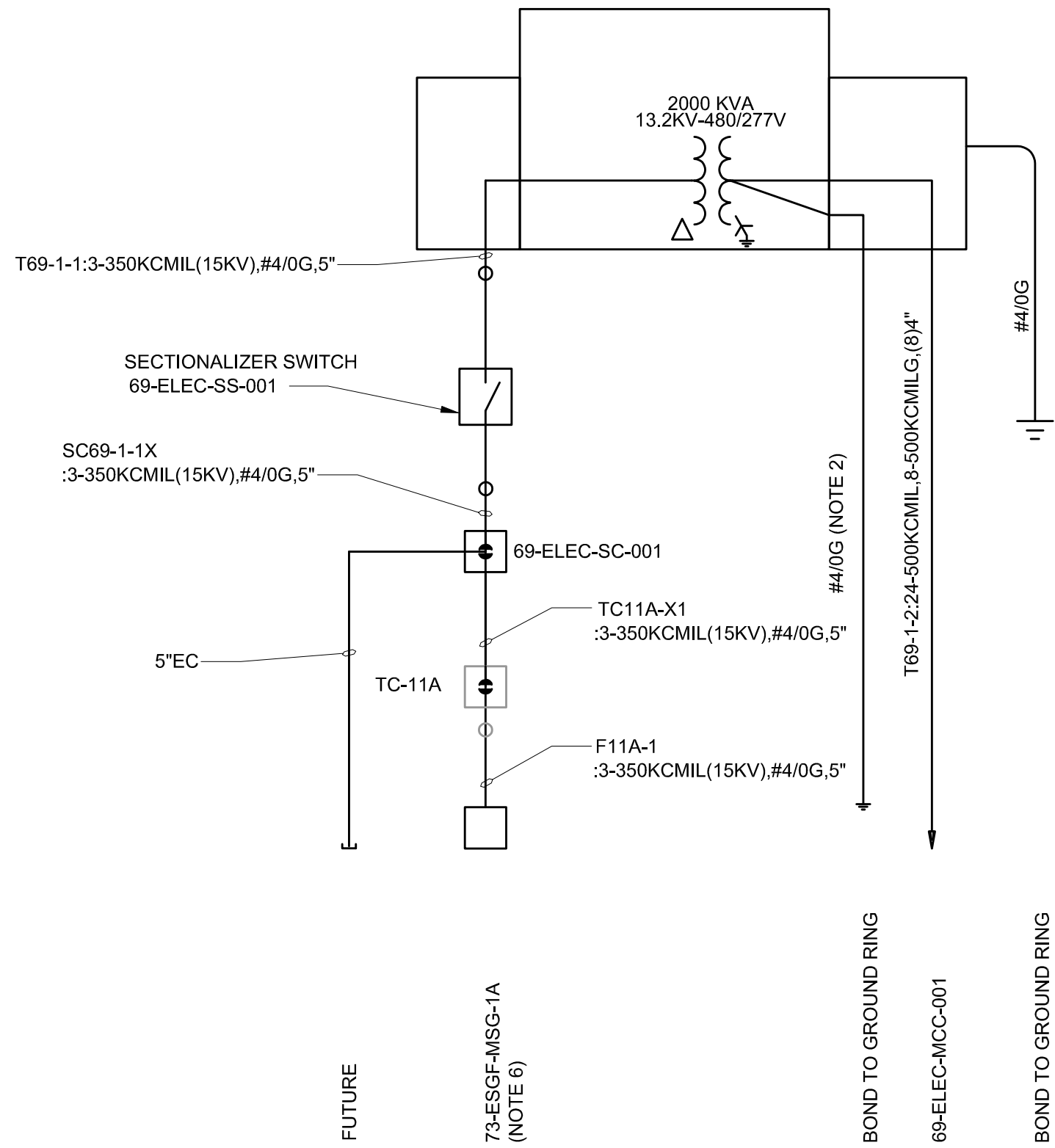
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FD1000  
D11000



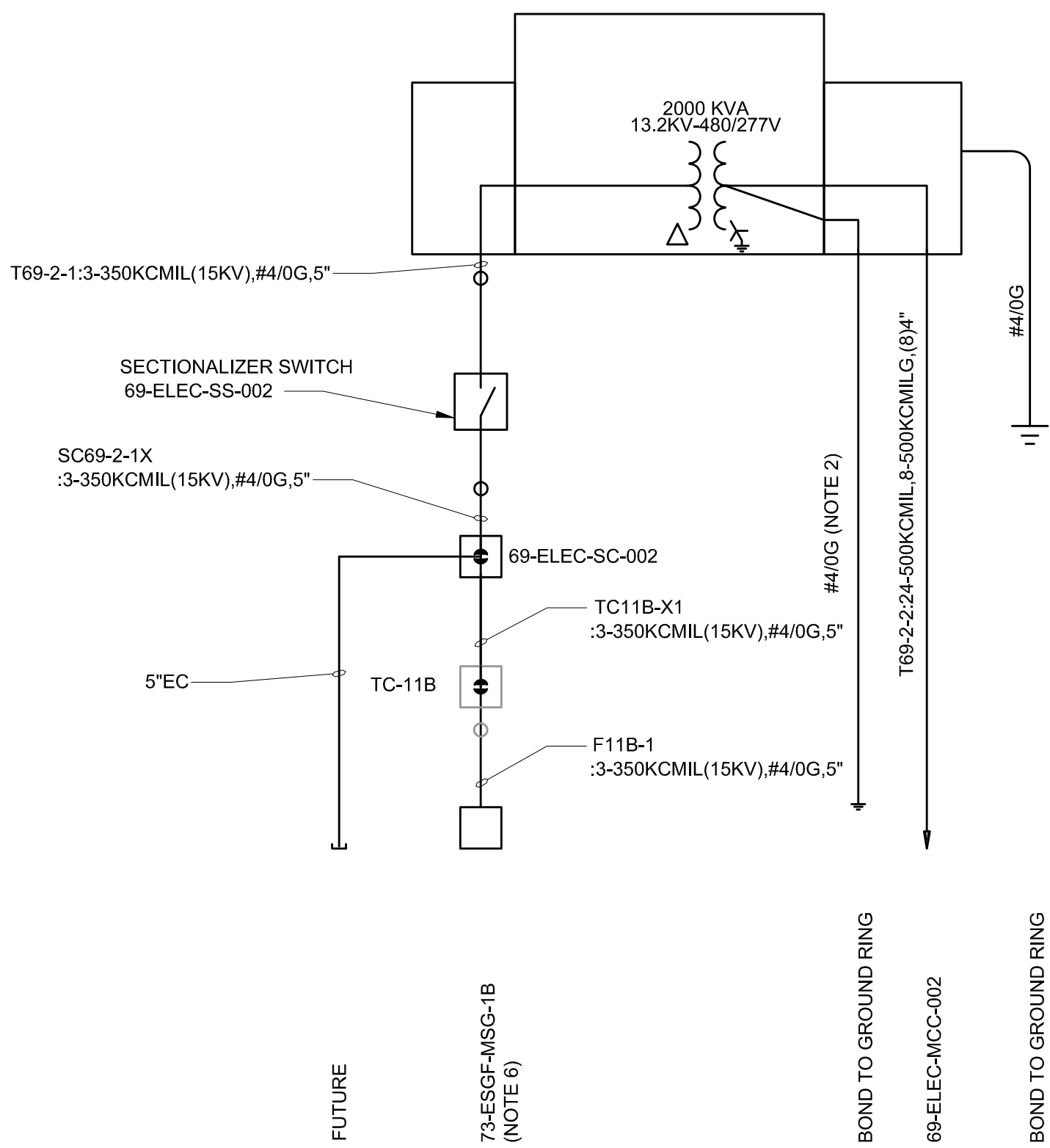
62-ELEC-T-001 ONE-LINE DIAGRAM



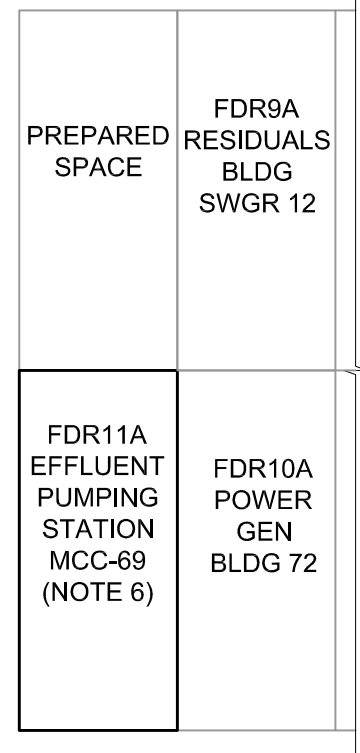
62-ELEC-T-002 ONE-LINE DIAGRAM



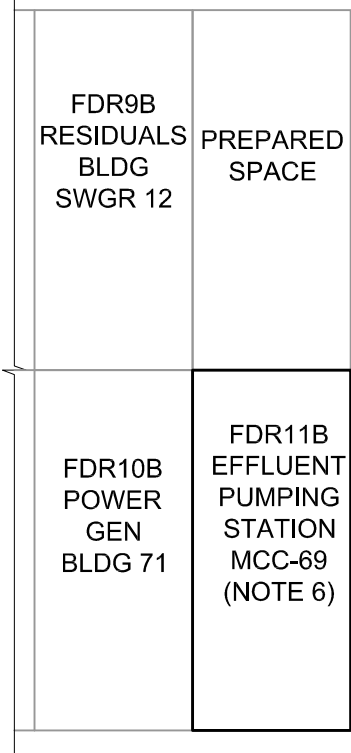
69-ELEC-T-001 ONE-LINE DIAGRAM



69-ELEC-T-002 ONE-LINE DIAGRAM



73-ESGF-MSG-1A PARTIAL FRONT ELEVATION  
(NO SCALE)



73-ESGF-MSG-1B PARTIAL FRONT ELEVATION  
(NO SCALE)

NOTES:

- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND NOTES.
- TRANSFORMER NEUTRAL BUSHING SHALL BE SOLIDLY GROUND.
- CONTRACTOR SHALL UTILIZE EXISTING SWGR-62 MAIN BREAKER AND TERMINATE NEW FEED FOLLOWING DEMOLITION OF EXISTING INCOMING CABLES.
- CONTRACTOR SHALL SPLICE NEW CABLE TO EXISTING CABLE FOR FEED FDR7A AT EXISTING TERMINAL CABINET TC-7A.
- CONTRACTOR SHALL SPLICE NEW CABLE TO EXISTING CABLE FOR FEED FDR7B AT EXISTING TERMINAL CABINET TC-7B.
- CONTRACTOR SHALL COORDINATE WITH ZIEGLER POWER SYSTEMS AS A PRE-SELECTED EQUIPMENT SUPPLIER TO FURNISH, INSTALL, AND COMMISSION FEEDER BREAKERS 11A AND 11B AND OTHER GENERATOR AND SWITCHGEAR CONTROL SYSTEM MODIFICATIONS. REFER TO SECTION 010310 FOR DETAILS.
- THE ELEVATED TRANSFORMER PAD IS DESIGNED FOR USE OF BOTH EXISTING AND NEW TRANSFORMERS: 62-ELEC-T-001(T-62-1) AND -002(T-62-2). TO REDUCE CONSTRUCTION SEQUENCE TIME CONTRACTOR SHALL RELOCATE EXISTING TRANSFORMERS TO THE ELEVATED TRANSFORMER PAD FOR USE DURING CONSTRUCTION. PRIOR TO CONSTRUCTION OF ELEVATED PAD AND PRIOR TO RELOCATION OF EXISTING TRANSFORMERS, CONTRACTOR SHALL TEST EXISTING TRANSFORMERS AND PROVIDE A TEST REPORT TO ENGINEER. CONTRACTOR SHALL ALSO FIELD CONFIRM EXISTING TRANSFORMER WIRING AND COORDINATE WITH ELECTRICAL ENGINEER IF DIFFERENT FROM INDICATED IN THE DRAWINGS. CONTRACTOR SHALL LOOP PRIMARY AND SECONDARY CABLES AND CONTROL WIRING AS REQUIRED TO ENSURE THERE IS SUFFICIENT LENGTH OF CABLE FOR USE ON THE NEW TRANSFORMERS. AFTER EACH TRANSFORMER HAS BEEN RELOCATED IT SHOULD BE RE-TESTED AND COMMISSION. AFTER NEW TRANSFORMERS HAVE BEEN PROCURED THE RELOCATED TRANSFORMERS SHALL BE DEMOLISHED AND SALVAGED BY CONTRACTOR TO ALLOW FOR INSTALLATION AND COMMISSIONING OF THE NEW PAD MOUNTED TRANSFORMERS.



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| DETAILED:                     | JCK                |
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| APPROVED:                     | TDH                |
| DATE:                         | 02/05/2024         |
| PROJECT NO.:                  | 410504             |

ELECTRICAL

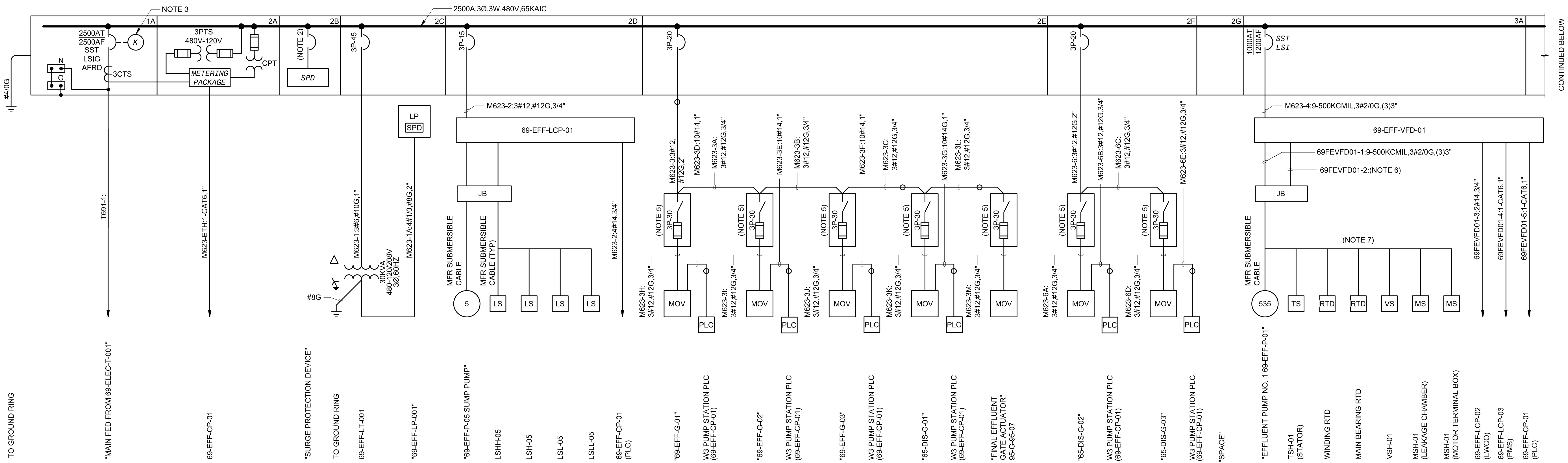
TRANSFORMER ONE-LINE  
DIAGRAMS

PLAN FILE NO. 664-230

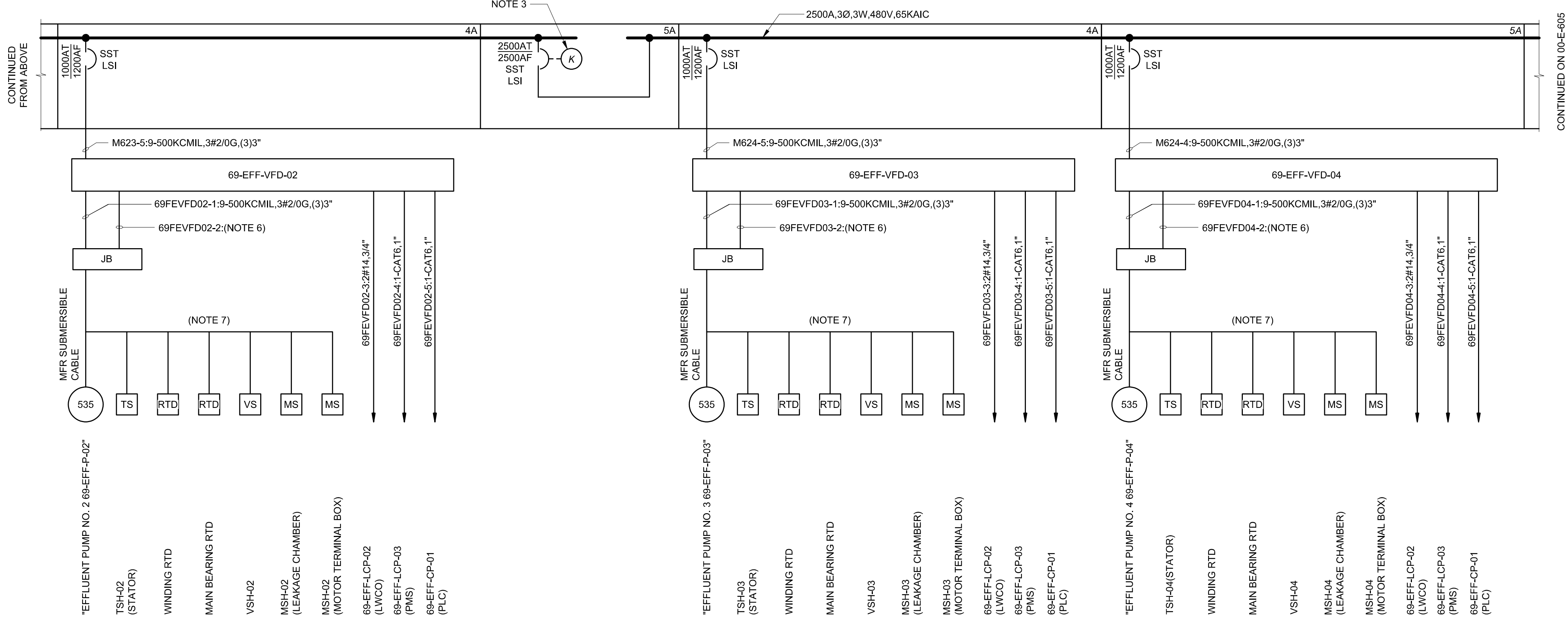
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69-EFF-MCC-001 ONE-LINE DIAGRAM  
(EPS ELECTRICAL ROOM)



69-EFF-MCC-002 ONE-LINE DIAGRAM  
(EPS ELECTRICAL ROOM)

NOTES:

- SEE DRAWINGS 00-E-001 AND 00-E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS & GENERAL NOTES.
- BREAKER SHALL BE SIZED AS RECOMMENDED BY SPD MANUFACTURER.
- MAIN AND TIE BREAKERS SHALL BE INTERLOCKED SUCH THAT ONLY TWO BREAKERS MAY BE CLOSED AT A TIME.
- MCC NAMEPLATE WORDING IS SHOWN IN QUOTATION MARKS(" ") ON THE ONE-LINE DIAGRAM.
- FUSE SHALL BE SIZED AS RECOMMENDED BY THE ACTUATOR MANUFACTURER.
- CONTRACTOR SHALL COORDINATE WITH PUMP MANUFACTURER TO DETERMINE WIRING REQUIRED TO CONTINUE CONTROL SIGNALS FROM MFR SUBMERSIBLE CABLE TO BASE PUMP CONTROL UNIT MOUNTED WITHIN VFD ENCLOSURE. CONTRACTOR SHALL FURNISH AND INSTALL AS REQUIRED.
- MFR SUBMERSIBLE CABLE INCLUDES CONTROL CONDUCTORS FOR PUMP MOTOR INTEGRAL TO CABLE.



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ELECTRICAL

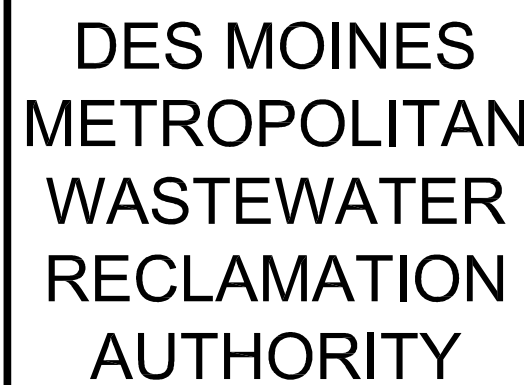
MCC ONE-LINE DIAGRAM

PLAN FILE NO. 664-231

00-E-604

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| DETAILED:                     | JCK                |
| CHECKED:                      | SJB                |
| APPROVED:                     | TDH                |
| DATE:                         | 02/05/2024         |
| PROJECT NO.:                  | 410504             |

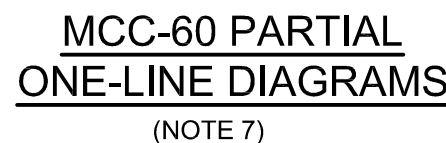
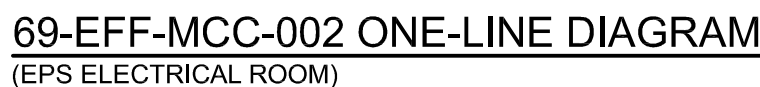
ELECTRICAL

### MCC ONE-LINE DIAGRAM

PLAN FILE NO. 664-232

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OF  
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|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 1A | 2A | 3A | 4A | 5A | 6A | 7A | 8A | 9A |
|    | 2B |    |    |    |    |    | 8B |    |
|    |    |    |    |    |    |    |    |    |
|    | 2C |    |    |    |    |    | 8C |    |
|    | 2D |    |    |    |    |    | 8D |    |
|    | 2E |    |    |    |    |    | 8E |    |
|    | 2F |    |    |    |    |    | 8F |    |
|    |    |    |    |    |    |    |    |    |
|    |    |    |    |    |    |    |    |    |

**69-EFF-MCC-001/002 FRONT ELEVATION**  
(NO SCALE)

NOTES:

1. SEE DRAWINGS 00-E-001 AND 00-E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS & GENERAL NOTES.
2. BREAKER SHALL BE SIZED AS RECOMMENDED BY SPD MANUFACTURER.
3. MAIN AND TIE BREAKERS SHALL BE INTERLOCKED SUCH THAT ONLY TWO BREAKERS MAY BE CLOSED AT A TIME.
4. MCC NAMEPLATE WORDING IS SHOWN IN QUOTATION MARKS(" ") ON THE ONE-LINE DIAGRAM.
5. FUSE SHALL BE SIZED AS RECOMMENDED BY THE ACTUATOR, HOIST, OR EQUIPMENT MANUFACTURER.
6. CONTRACTOR SHALL COORDINATE WITH PUMP MANUFACTURER TO DETERMINE WIRING REQUIRED TO CONTINUE CONTROL SIGNALS FROM MFR SUBMERSIBLE CABLE TO BASE PUMP CONTROL UNIT MOUNTED WITHIN VFD ENCLOSURE. CONTRACTOR SHALL FURNISH AND INSTALL AS REQUIRED.
7. EXISTING CIRCUITS LOCATED IN EFFLUENT PUMP STATION CONSTRUCTION AREA MUST BE RELOCATED. CONTRACTOR SHALL FIELD VERIFY WIRING REQUIREMENTS FOR EXISTING EQUIPMENT AND MODIFY WIRING AS REQUIRED TO MEET FIELD CONDITIONS. INFORMATION PRESENTED HAS BEEN DEVELOPED BASED UPON SEGMENT 5 IMPROVEMENTS PROJECT RECORD DRAWINGS CIRCA 1988.
8. EXISTING I/O SHALL BE RECONNECTED TO MATCH EXISTING CONDITIONS.





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## WRF EFFLUENT PUMPING IMPROVEMENTS

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[illegible]

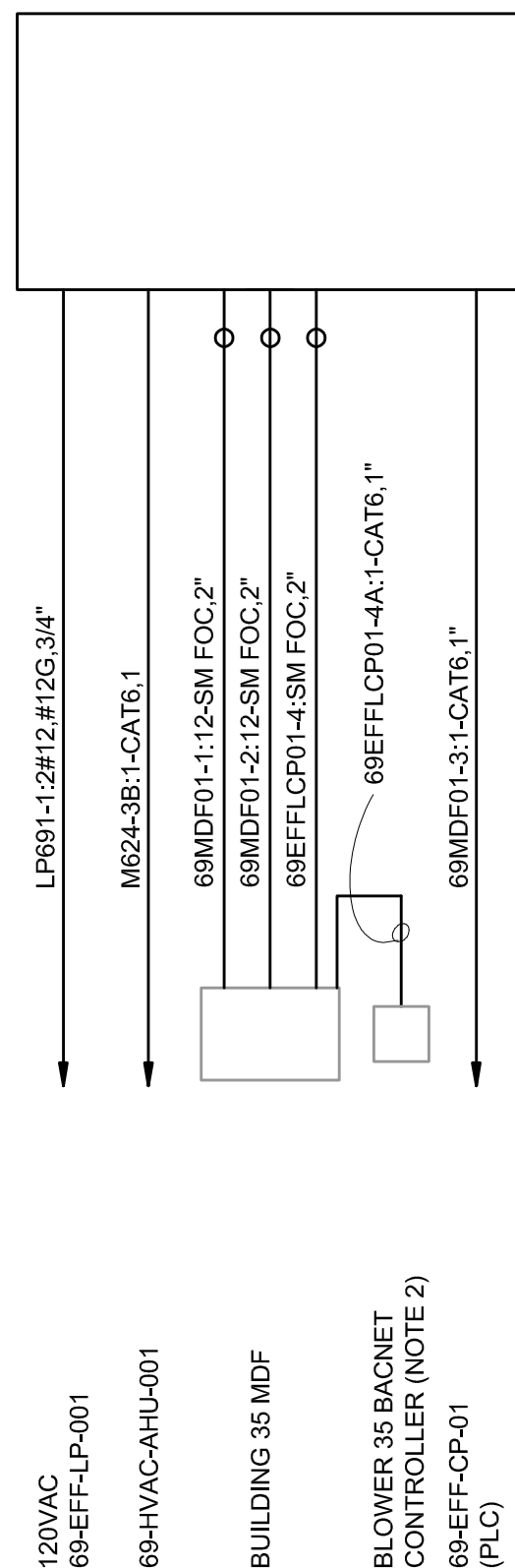
ELECTRICAL

## PLC ONE-LINE DIAGRAM

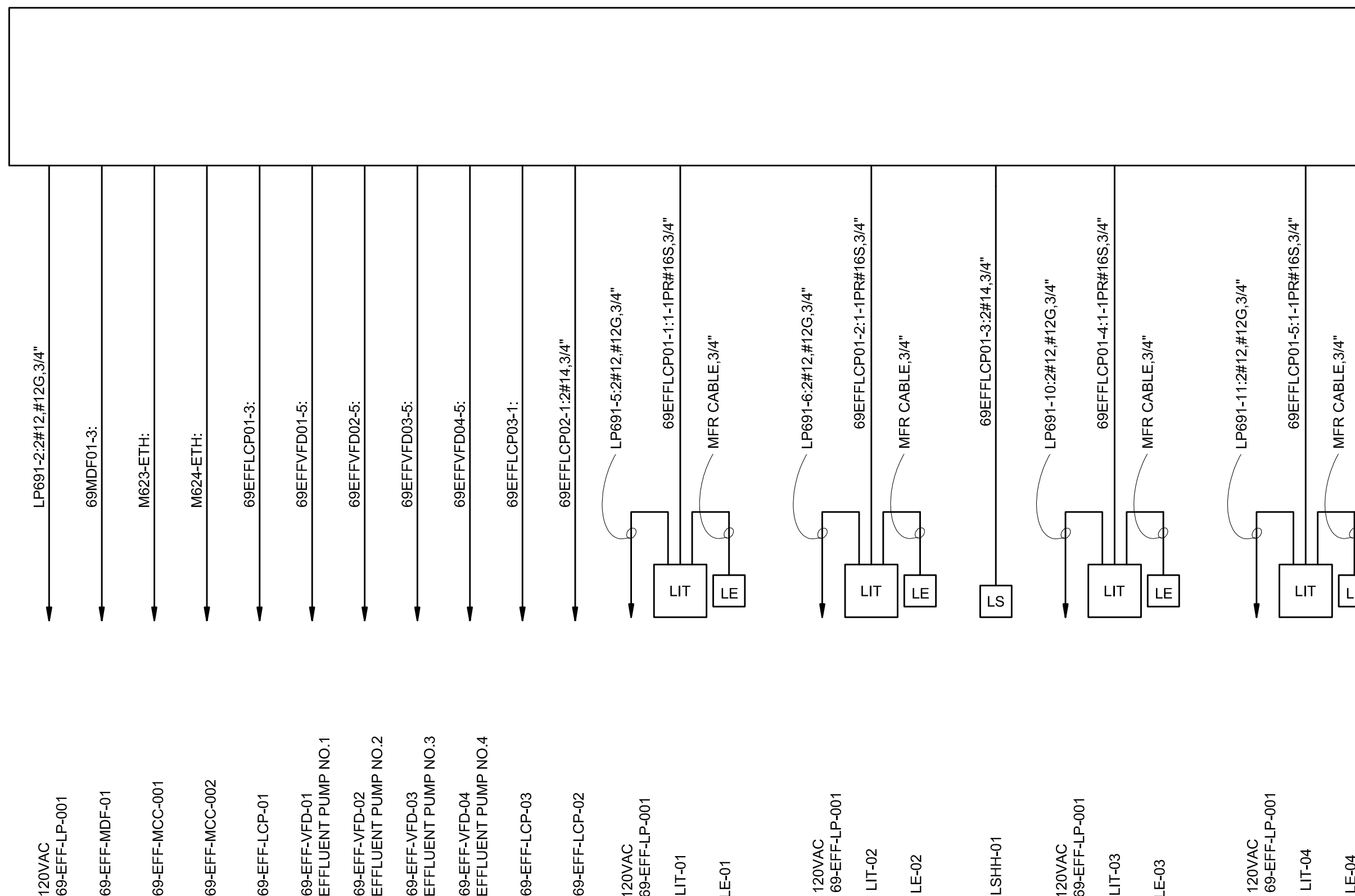
PLAN FILE NO. 664-233

00-E-606

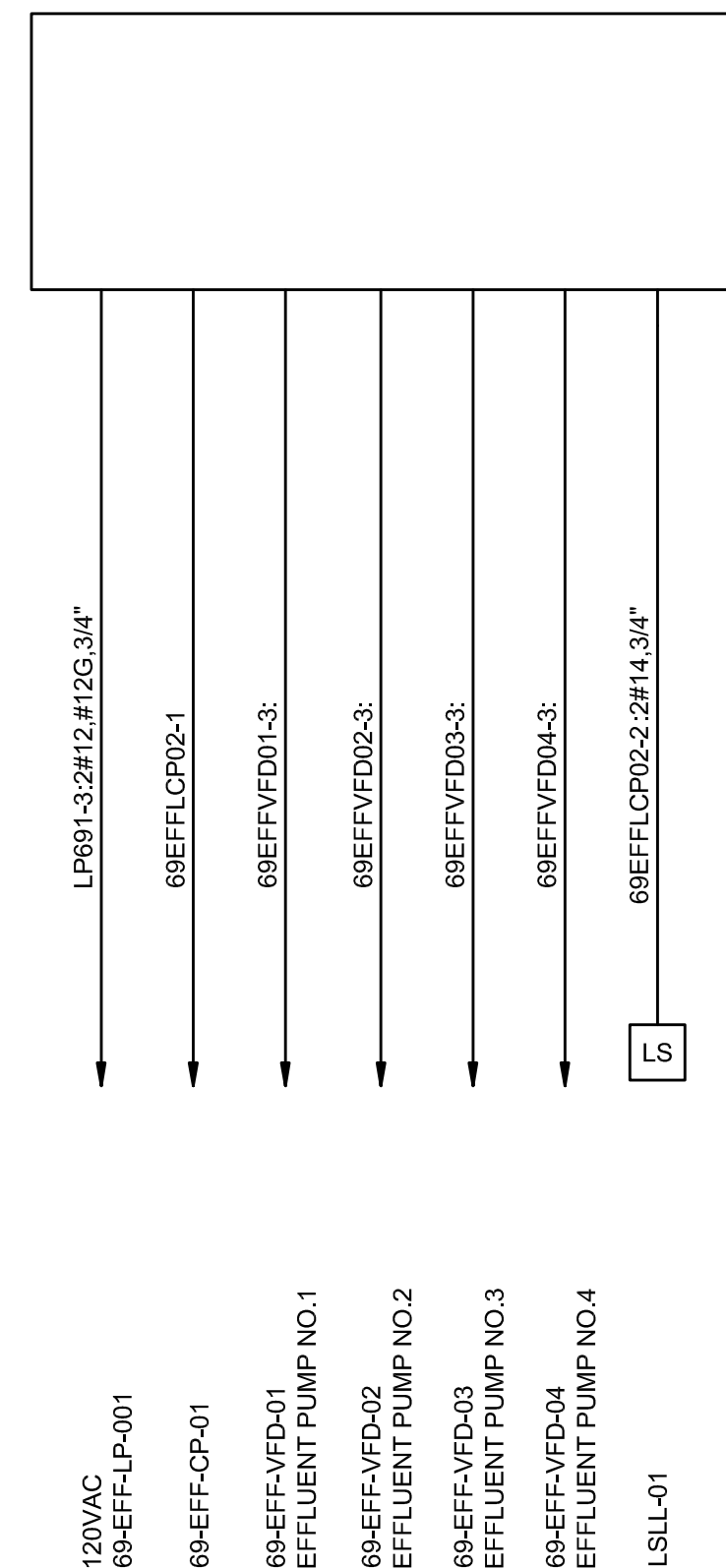
40  
OF  
118



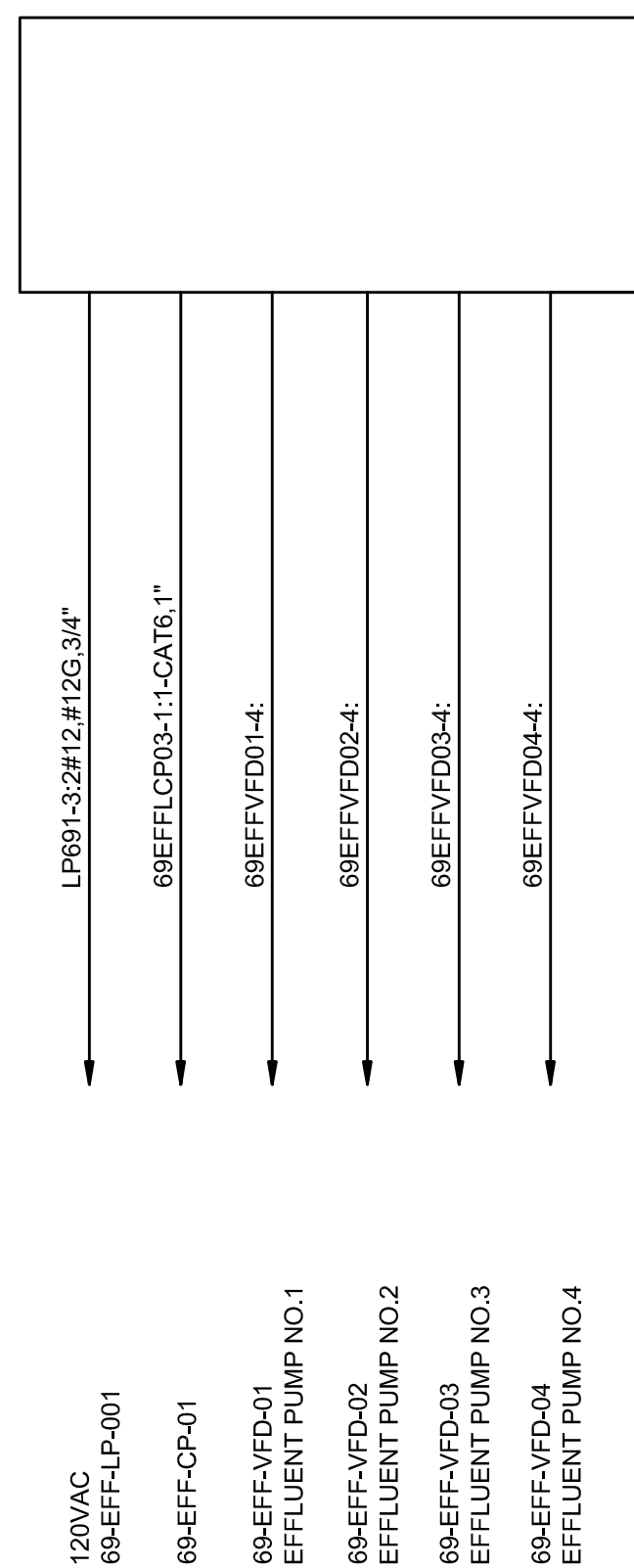
**69-EFF-MDF-01 ONE-LINE DIAGRAM**  
(EPS ELECTRICAL ROOM)



**69-EFF-CP-01 ONE-LINE DIAGRAM**  
(EPS ELECTRICAL ROOM)



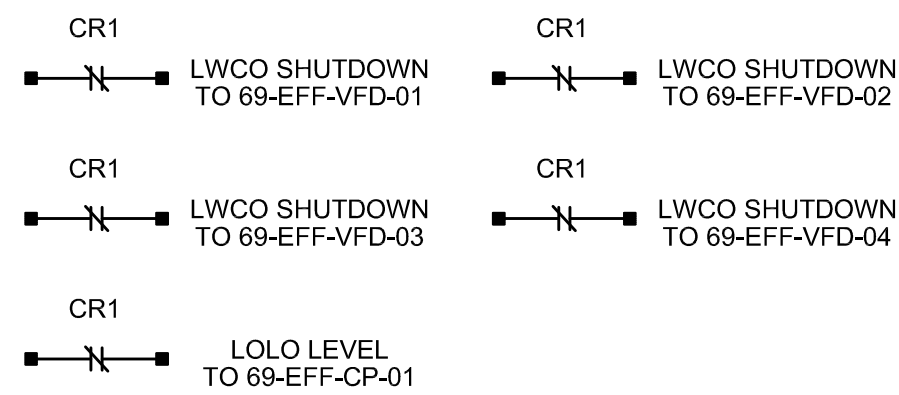
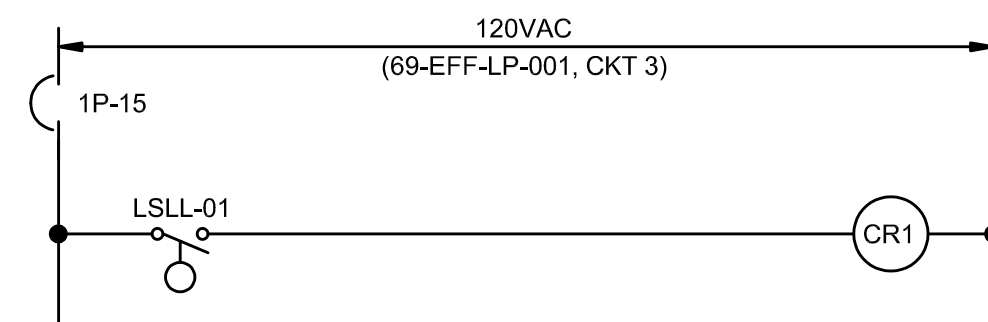
**69-EFF-LCP-02 (LWCO) ONE-LINE DIAGRAM**  
(EPS ELECTRICAL ROOM)



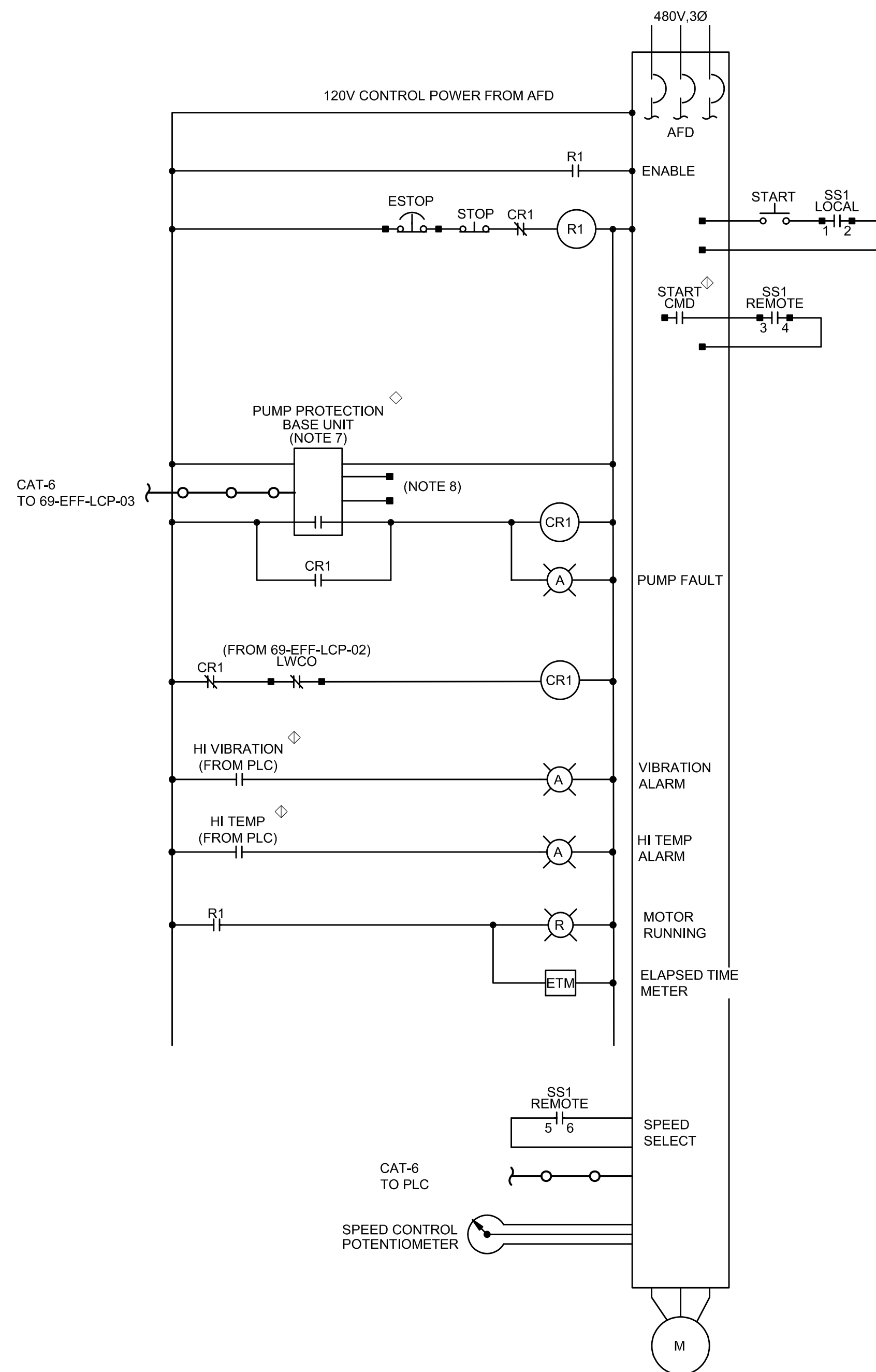
**69-EFF-LCP-03 (PMS) ONE-LINE DIAGRAM**  
(EPS ELECTRICAL ROOM)

- NOTES
1. SEE DRAWINGS 00-E-001 AND 00-E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS & GENERAL NOTES
  2. CONTRACTOR SHALL FIELD VERIFY LOCATION OF BUILDING 35 BACNET CONTROLLER AND SHALL FURNISH AND INSTALL CABLE AND CONDUIT AS REQUIRED.





69-EFF-LCP-02 LWCO RELAY PANEL



69-EFF-VFD-01  
(TYPICAL FOR 69-EFF-VFD-02,03,04)

SWITCH DEVELOPMENT:

| SS1      |          |     |        |
|----------|----------|-----|--------|
| CONTACTS | POSITION |     |        |
|          | LOCAL    | OFF | REMOTE |
| 1-2      | ×        |     |        |
| 3-4      |          |     | ×      |
| 5-6      |          |     | ×      |

DEVICE LOCATION LEGEND:

- ◇ AT DRIVEN EQUIPMENT
- ◆ REMOTE FROM STARTER AND DRIVEN EQUIPMENT
- ◇ AT PLC
- ◆ AT STARTER/VFD

NOTES:

1. SEE DRAWINGS 00-E-001 & 0-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. SPARE CONTACTS SHALL BE PROVIDED FOR EACH STARTER AS DESCRIBED IN THE SPECIFICATIONS.
3. UNLESS OTHERWISE NOTED, DEVICES SHOWN ON THE DRAWING SHALL BE SUPPLIED AS AN INTEGRAL PART OF THE STARTER. DEVICES LOCATED OUTSIDE OR REMOTE FROM THE STARTER SHALL BE IDENTIFIED BY A LOCATION SYMBOL AS DEFINED IN THE SCHEMATIC SYMBOL LEGEND.
4. RELAY AND TIMER DESIGNATIONS APPLY TO INDIVIDUAL SCHEMATIC ONLY.
5. CONTROL SETTINGS, ALARM LIMITS, AND SIMILAR ADJUSTABLE LIMITS ARE INTENDED TO BE FOR INITIAL STARTUP. ADJUSTABLE SETTINGS SHALL BE TESTED AND CHANGED BY THE CONTRACTOR, IF REQUIRED FOR PROPER SEQUENCING AND OPERATION.
6. CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL CONTROL RELAYS REQUIRED TO PROVIDE CONTROL FUNCTIONS AS SHOWN ON SCHEMATIC DRAWINGS.
7. CONTRACTOR SHALL COORDINATE WITH DRIVEN EQUIPMENT SUPPLIER FOR FINAL PUMP PROTECTION DEVICE LAYOUT AND WIRING REQUIREMENTS.
8. CONTRACTOR SHALL COORDINATE WITH PUMP MANUFACTURER, AS INDICATED ON 00-E-604, TO DETERMINE WIRING REQUIREMENTS BETWEEN PUMP PROTECTION BASE UNIT AND DRIVEN EQUIPMENT.

**Black & Veatch Corporation**  
Des Moines, IA



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

PERMIT REVIEW  
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[illegible]

ELECTRICAL

## SCHEMATICS

PLAN FILE NO. 664-234

00-E-607

41  
OF  
118





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WASTEWATER  
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AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

PERMIT REVIEW  
- NOT FOR  
CONSTRUCTION

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |

|              |            |
|--------------|------------|
| DESIGNED:    | EMB        |
| DETAILED:    | EMB        |
| CHECKED:     | SJB        |
| APPROVED:    | TDH        |
| DATE:        | 02/05/2024 |
| PROJECT NO.: | 410504     |

PROJECT NO.: 410504

ELECTRICAL

## SCHEDULES

PLAN FILE NO. 664-235

00-E-608

42  
OF  
118

| LIGHTING FIXTURE SCHEDULE |                               |                      |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                            |
|---------------------------|-------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FIXTURE                   | LAMP                          | MTG HGT              | DESCRIPTION                                                                                                                                                                                                                                                                                        | MANUFACTURER                                                                                                                                                               |
| 1                         | LED<br>49 WATT<br>6325 LUMENS | AS NOTED<br>ON PLANS | 49W LED, PENDANT MOUNTED FIXTURE, CLEAR POLYCARBONATE LENS DIFFUSER, MEDIUM DISTRIBUTION, 0-10V DIMMING DRIVER, 4000K COLOR TEMPERATURE, 80 CRI, 120V.                                                                                                                                             | HOLOPHANE<br>#EVT4 6000LM PCL MD MVOLT GZ10 40K 80CRI                                                                                                                      |
| 1E                        | LED<br>49 WATT<br>6325 LUMENS | AS NOTED<br>ON PLANS | SAME AS FIXTURE 1, WITH EMERGENCY BATTERY BACKUP                                                                                                                                                                                                                                                   | HOLOPHANE<br>#EVT4 6000LM PCL MD MVOLT GZ10 40K 80CRI                                                                                                                      |
| 2                         | LED<br>50 WATT<br>6689 LUMENS | AS NOTED<br>ON PLANS | 50W LED WALL MOUNTED FIXTURE, P3 PERFORMANCE PACKAGE, VISUAL COMFORT WIDE DISTRIBUTION, 4000K COLOR TEMPERATURE, PHOTOELECTRIC CELL, EMERGENCY BATTERY BACKUP, BLACK FINISH, 120V                                                                                                                  | LITHONIA<br>#WST LED P3 40K VW 120 PE E20WH DBLXD                                                                                                                          |
| 3                         | LED<br>58 WATT<br>7028 LUMENS | AS NOTED<br>ON PLANS | PXLH LED, LONG NARROW (GLASS LENS), MVOLT, 4000K COLOR TEMPERATURE, 80CRI, UNIVERSAL MOUNT (HIGH PROFILE TOP CAP), UNIVERSAL ARM FOR STANCHION MOUNT, BLACK SUPER DURABLE (CORROSION RESISTANT)                                                                                                    | HOLOPHANE<br>#PXLH 8000LM LND MVOLT 40K 80CRI UNM UPS DBXD ARM<br>#P3US DBXD CR<br><br>POLE<br>#V65-H-S-C-PM5-LTEE2 SA<br>HANDRAIL MOUNTING KIT<br>#MHK-RTS (TUBULAR RAIL) |
| 4                         | LED<br>58 WATT<br>7028 LUMENS | AS NOTED<br>ON PLANS | PXLH LED, MEDIUM (GLASS LENS), MVOLT, 4000K COLOR TEMPERATURE, 80CRI, UNIVERSAL MOUNT (HIGH PROFILE TOP CAP), UNIVERSAL ARM FOR STANCHION MOUNT, BLACK SUPER DURABLE (CORROSION RESISTANT)                                                                                                         | HOLOPHANE<br>#PXLH 8000LM MD0 MVOLT 40K 80CRI UNM UPS DBXD ARM<br>#P3US DBXD CR<br><br>POLE<br>#V65-H-S-C-PM5-LTEE2 SA<br>HANDRAIL MOUNTING KIT<br>#MHK-RTS (TUBULAR RAIL) |
| 5                         | LED<br>71 WATT<br>8132 LUMENS | AS NOTED<br>ON PLANS | POLE MOUNTED KAD LED AREA LUMINAIRE, IP65 RATED, SINGLE PIECE DIE-CAST ALUMINUM HOUSING, POWDER COAT FINISH, ACRYLIC LENS, TYPE IV MEDIUM DISTRIBUTION OPTICAL PATTERN, 530MA MVOLT DRIVER, 6" MOUNTING ARM, BLACK FINISH, 480V, 60HZ, 4000K, 15 FOOT SQUARE STRAIGHT STEEL POLES, STANDARD BLACK. | LITHONIA<br>#KAD LED 40C 530 40K R4 480 SPD 06 DAD12P DBLXD<br>LITHONIA POLE<br># SSS 15 4C DM19 DBLXD                                                                     |
| EXIT                      | LED<br>0.71 WATT              | AS NOTED<br>ON PLANS | WALL MOUNTED EXIT SIGN, STENCIL FACE TYPE, WHITE HOUSING, SINGLE FACE, RED LETTER COLOR, NICKEL CADMIUM BATTERY, SELF-DIAGNOSTICS, 120V                                                                                                                                                            | LITHONIA<br>#LQM S W 3 R MVOLT EL N SD                                                                                                                                     |

## LIGHTING FIXTURE SCHEDULE

| PHASE   |      |      |                         | PANELBOARD: LP-60-B-01<br>SERVICE: 120/208V, 3PH, 4W, S/N |   |     |      | BUS: COPPER<br>RATING: 100A |    |      |                    | MAINS: 3P-30A MAIN BREAKER<br>LOCATION: SAMPLING SHACK |      |      |  | PHASE |  |  |  |
|---------|------|------|-------------------------|-----------------------------------------------------------|---|-----|------|-----------------------------|----|------|--------------------|--------------------------------------------------------|------|------|--|-------|--|--|--|
| "A"     | "B"  | "C"  | MOUNTING SURFACE        |                                                           | P | BKR | CKT  | BKR                         | P  | LOAD |                    | "A"                                                    | "B"  | "C"  |  |       |  |  |  |
| V.A.    | V.A. | V.A. |                         |                                                           |   |     |      |                             |    |      |                    | V.A.                                                   | V.A. | V.A. |  |       |  |  |  |
|         |      |      | MAIN                    |                                                           | 3 | 30  | 1    | 2                           | 20 | 1    | HEATER             | 1500                                                   |      |      |  |       |  |  |  |
|         |      |      |                         |                                                           | - | -   | 3    | 4                           | 20 | 1    | SAMPLER RECEPTACLE |                                                        | 480  |      |  |       |  |  |  |
|         |      |      |                         |                                                           | - | -   | 5    | 6                           | 20 | 1    | SAMPLER RECEPTACLE |                                                        |      | 480  |  |       |  |  |  |
| 100     |      |      | LIGHTING                |                                                           | 1 | 15  | 7    | 8                           | 15 | 1    | LIGHTING           | 100                                                    |      |      |  |       |  |  |  |
|         | 800  |      | DEHUMIDIFIER RECEPTACLE |                                                           | 1 | 20  | 9    | 10                          | 20 | 1    | MISC RECEPTACLES   |                                                        | 180  |      |  |       |  |  |  |
|         |      |      | SPARE                   |                                                           | 1 | 20  | 11   | 12                          | 20 | 1    | SPARE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPARE                   |                                                           | 1 | 20  | 13   | 14                          | 20 | 1    | SPARE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPARE                   |                                                           | 1 | 15  | 15   | 16                          | 15 | 1    | SPARE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPARE                   |                                                           | 1 | 15  | 17   | 18                          | 15 | 1    | SPARE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 19   | 20                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 21   | 22                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 23   | 24                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 25   | 26                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 27   | 28                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
|         |      |      | SPACE                   |                                                           | - | -   | 29   | 30                          | -  | -    | SPACE              |                                                        |      |      |  |       |  |  |  |
| 100     |      |      | TOTAL "A"               |                                                           |   |     | 1700 |                             |    |      | TOTAL "A"          | 1600                                                   |      |      |  |       |  |  |  |
|         | 800  |      | TOTAL "B"               |                                                           |   |     | 1460 |                             |    |      | TOTAL "B"          |                                                        | 660  |      |  |       |  |  |  |
|         |      | 0    | TOTAL "C"               |                                                           |   |     | 480  |                             |    |      | TOTAL "C"          |                                                        |      | 480  |  |       |  |  |  |
| TOTAL = |      |      |                         |                                                           |   |     | 3640 |                             |    |      |                    |                                                        |      |      |  |       |  |  |  |

LP-60-B-1

NOTE 2

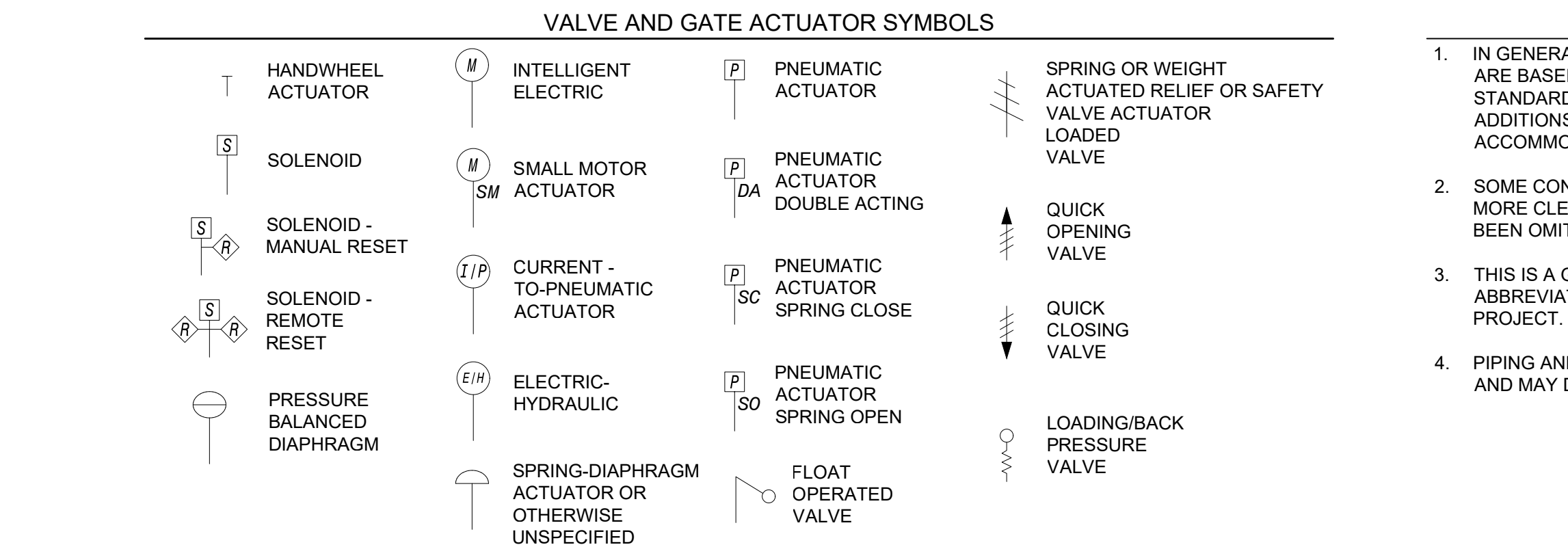
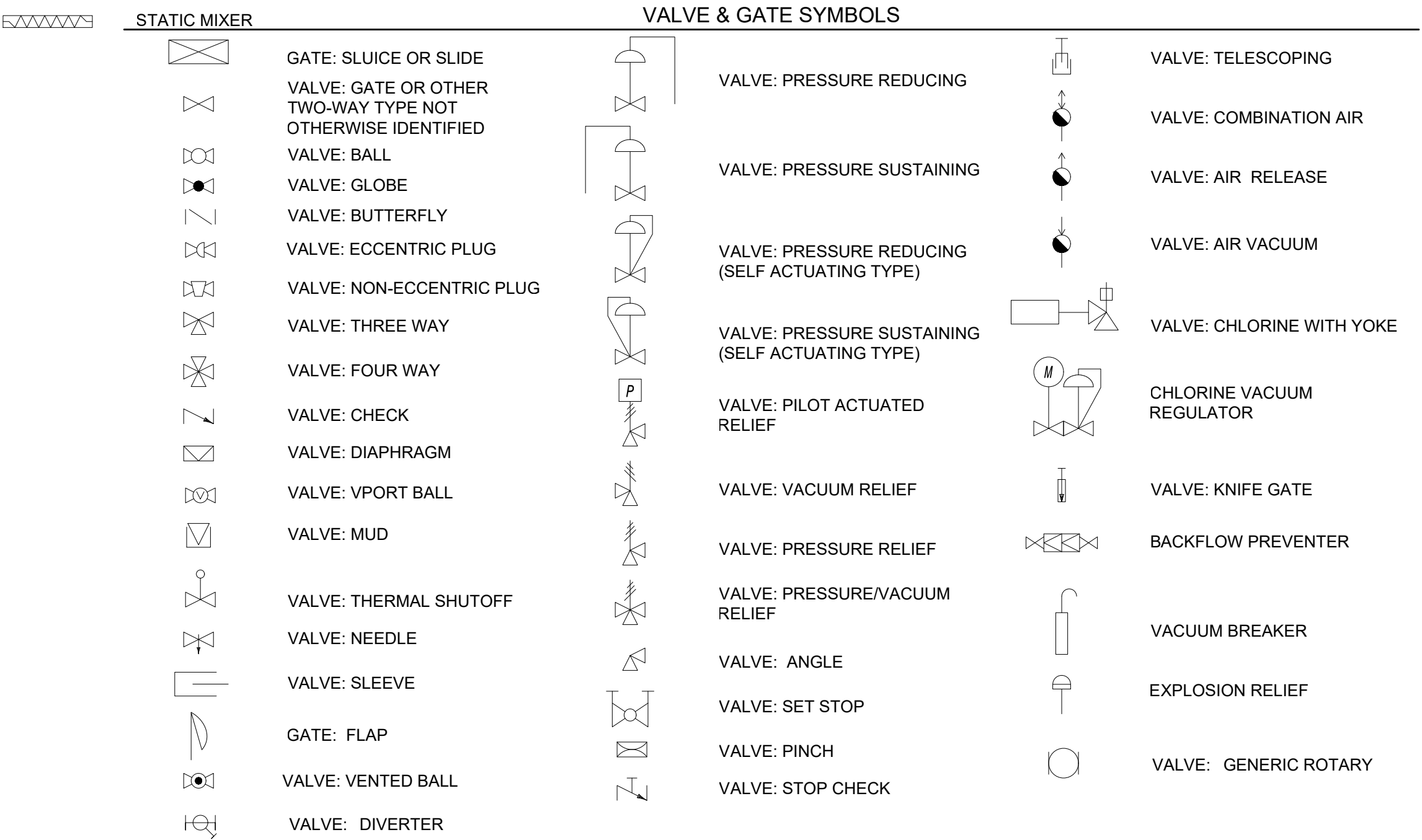
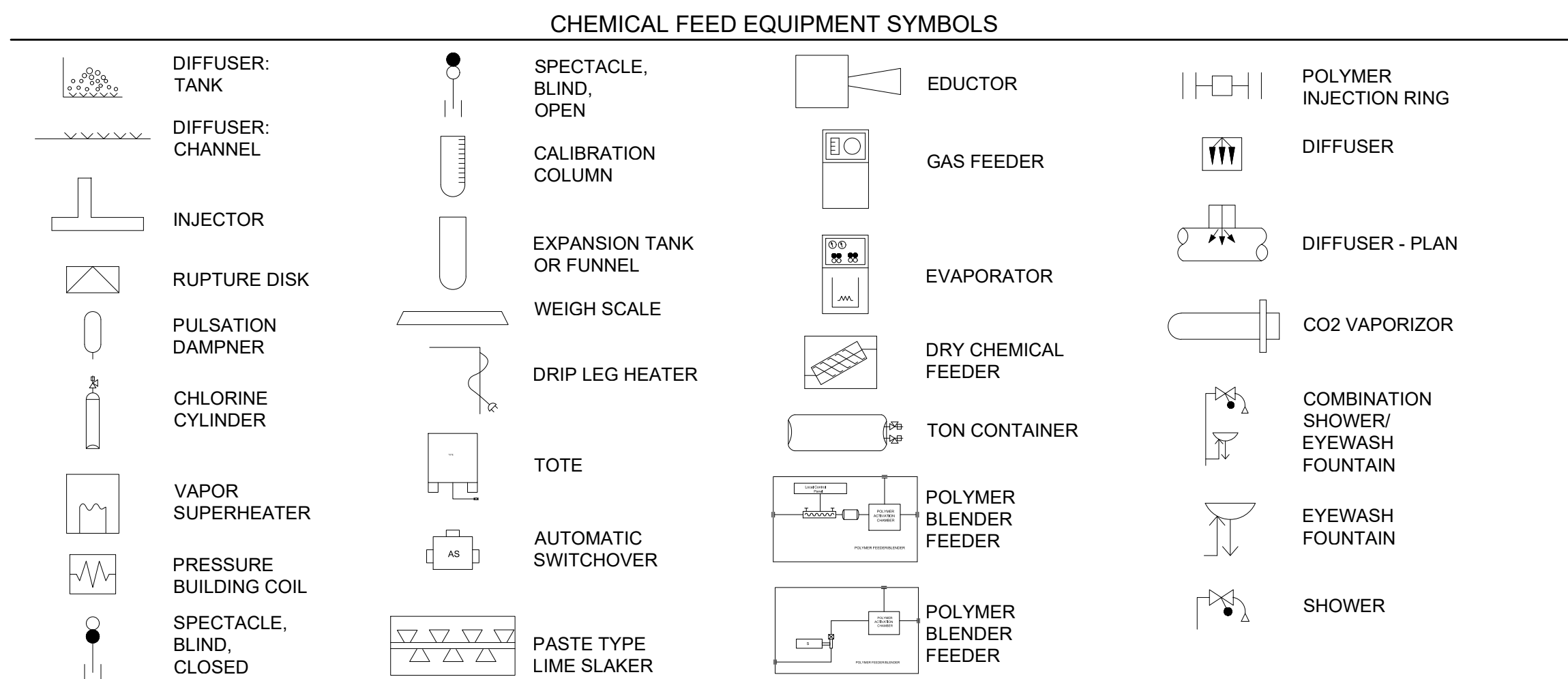
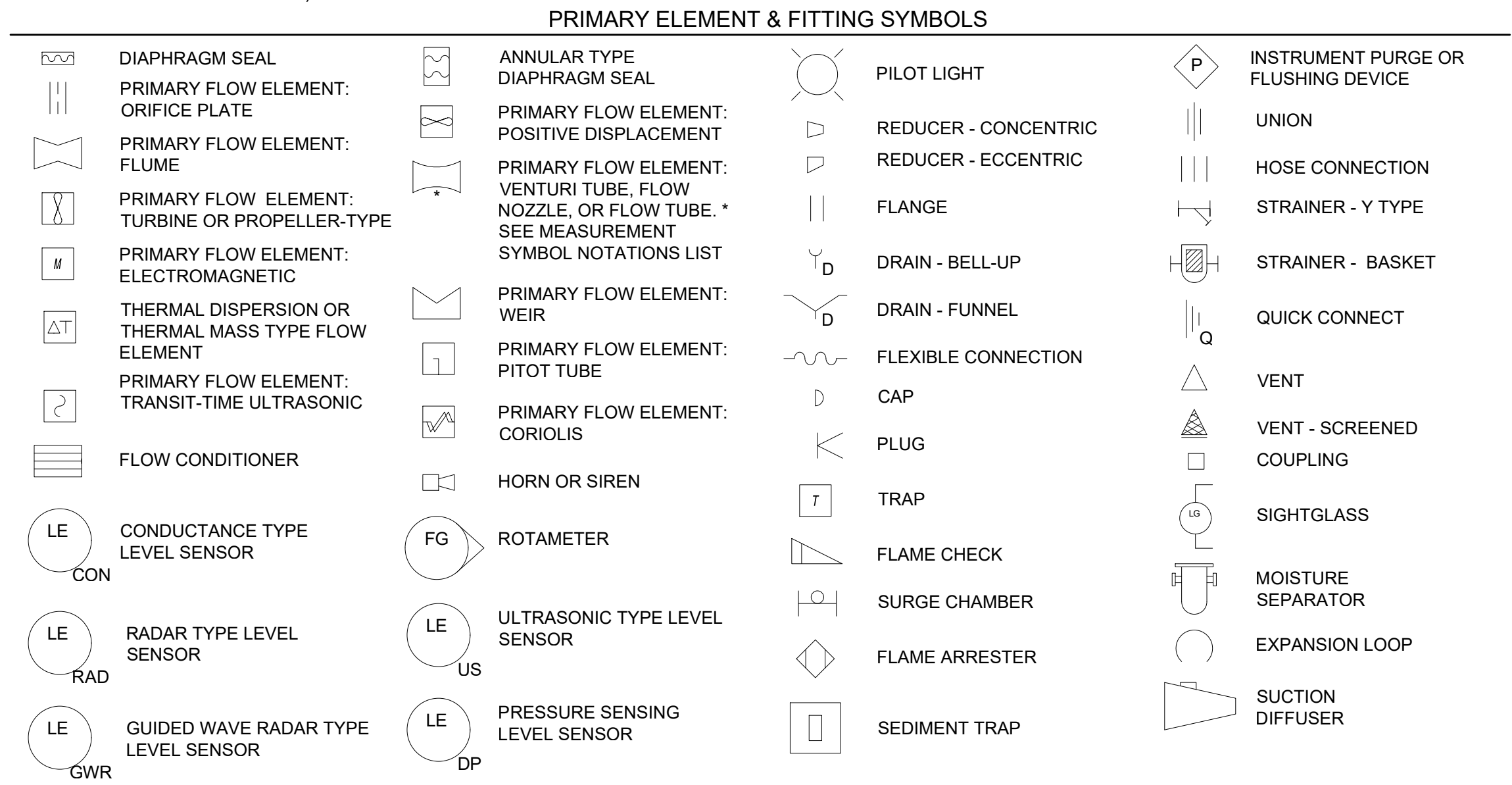
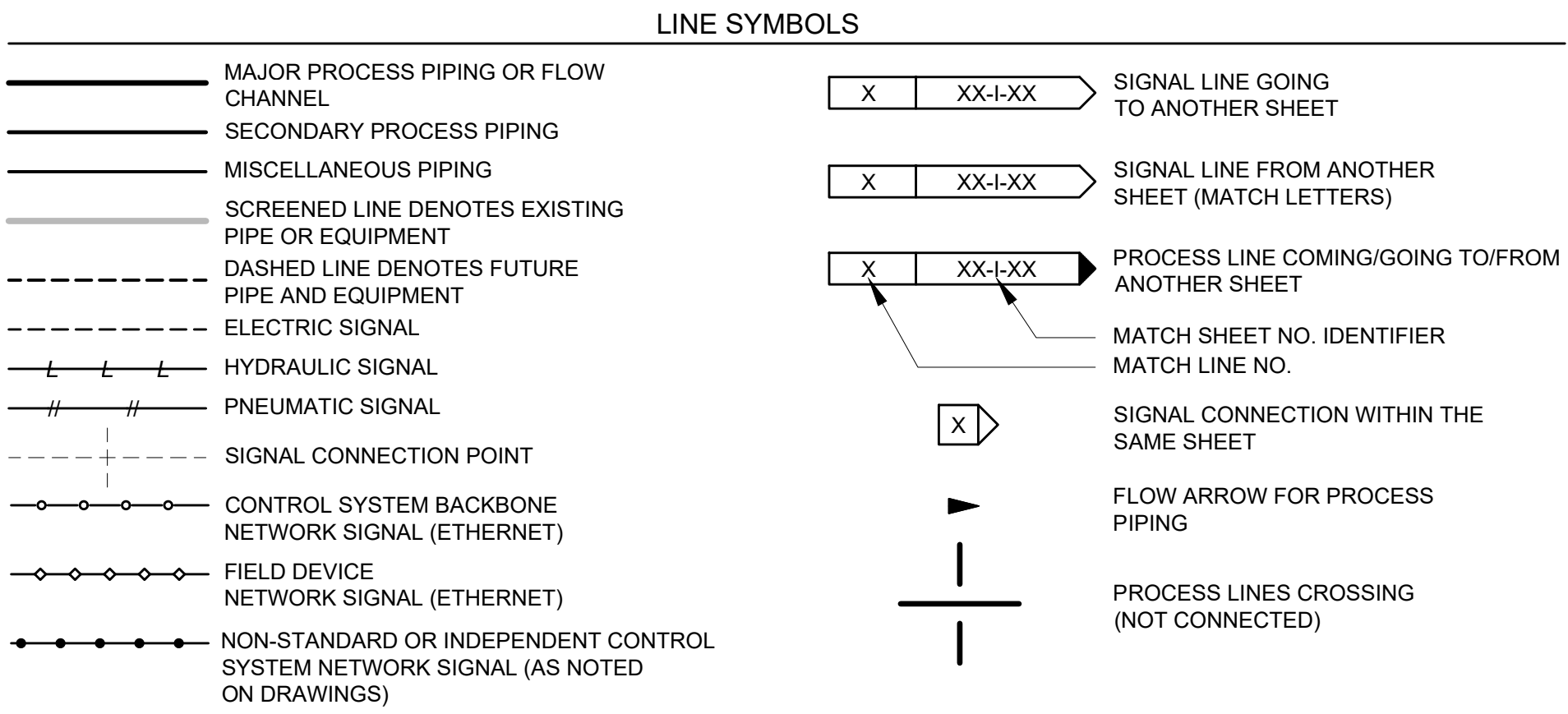
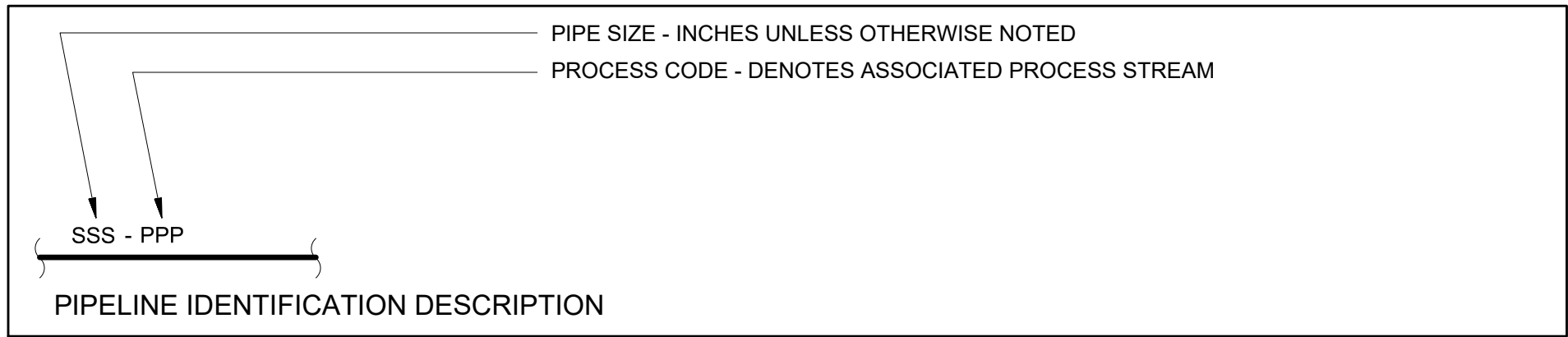
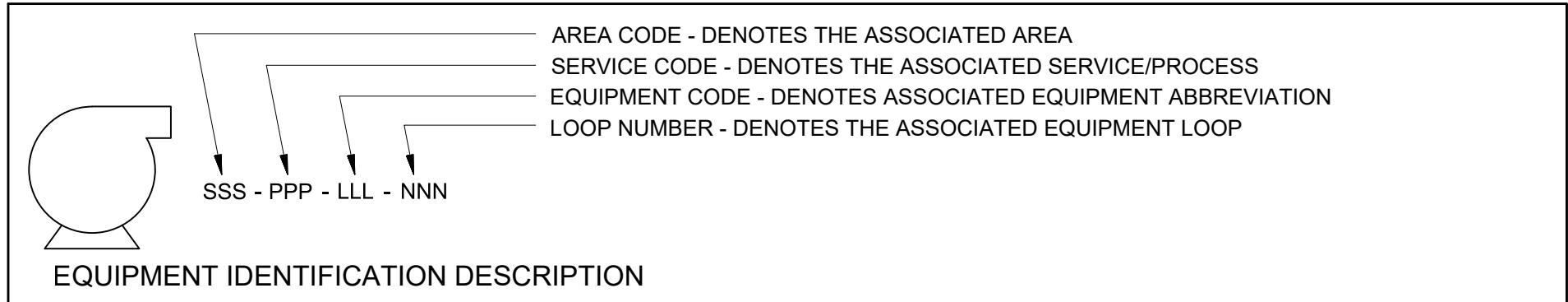
| PHASE   |      |      |  | PANELBOARD: LP-69-01<br>SERVICE, 120/208V, 3PH, 4W, S/N | BUS: COPPER<br>RATING: 225A |     |       |     | MAINS: 3P-100A MAIN BREAKER<br>LOCATION: EFFLUENT PUMP STATION<br>ELECTRICAL ROOM |   |                                   |      | PHASE |      |      |
|---------|------|------|--|---------------------------------------------------------|-----------------------------|-----|-------|-----|-----------------------------------------------------------------------------------|---|-----------------------------------|------|-------|------|------|
| "A"     | "B"  | "C"  |  | MOUNTING SURFACE                                        |                             |     |       |     |                                                                                   |   |                                   |      | "A"   | "B"  | "C"  |
| V.A.    | V.A. | V.A. |  | LOAD                                                    | P                           | BKR | CKT # | BKR | P                                                                                 |   |                                   |      | V.A.  | V.A. | V.A. |
| 500     |      |      |  | 69-FE-MDF-01                                            | 1                           | 20  | 1     | 2   | 20                                                                                | 1 | 69-FE-CP-01                       |      | 1000  |      |      |
|         | 500  |      |  | 69-FE-LCP-02 (LWCO)                                     | 1                           | 20  | 3     | 4   | 15                                                                                | 1 | 69-FE-LCP-03 (PMS)                |      | 500   |      |      |
|         |      | 150  |  | LIT-01                                                  | 1                           | 15  | 5     | 6   | 15                                                                                | 1 | LIT-02                            |      |       | 150  |      |
| 436     |      |      |  | ELECTRICAL ROOM LIGHTING                                | 1                           | 15  | 7     | 8   | 20                                                                                | 1 | ELECTRICAL ROOM RECEPTACLES       |      | 720   |      |      |
|         | 350  |      |  | EXTERIOR BUILDING LIGHTING                              | 1                           | 20  | 9     | 10  | 20                                                                                | 1 | LIT-03                            |      | 150   |      |      |
|         |      | 150  |  | LIT-04                                                  | 1                           | 20  | 11    | 12  | 20                                                                                | 1 | EXTERIOR RECEPTACLES              |      |       | 720  |      |
| 180     |      |      |  | ROOF RECEPTACLES                                        | 1                           | 20  | 13    | 14  | 20                                                                                | 1 | EXTERIOR STANCHION/STAIR LIGHTING |      | 812   |      |      |
|         |      |      |  | SPARE                                                   | 1                           | 15  | 15    | 16  | 15                                                                                | 1 | SPARE                             |      |       |      |      |
|         |      |      |  | SPARE                                                   | 1                           | 15  | 17    | 18  | 15                                                                                | 1 | SPARE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 19    | 20  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 21    | 22  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 23    | 24  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 25    | 26  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 27    | 28  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 29    | 30  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 31    | 32  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 33    | 34  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 35    | 36  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 37    | 38  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 39    | 40  | -                                                                                 | - | SPACE                             |      |       |      |      |
|         |      |      |  | SPACE                                                   | -                           | -   | 41    | 42  | -                                                                                 | - | SPACE                             |      |       |      |      |
| 1116    |      |      |  | TOTAL "A"                                               |                             |     | 3649  |     |                                                                                   |   | TOTAL "A"                         | 2532 |       |      |      |
|         | 850  |      |  | TOTAL "B"                                               |                             |     | 1500  |     |                                                                                   |   | TOTAL "B"                         |      | 650   |      |      |
|         |      | 300  |  | TOTAL "C"                                               |                             |     | 1170  |     |                                                                                   |   | TOTAL "C"                         |      |       | 870  |      |
| TOTAL = |      |      |  |                                                         |                             |     | 6318  |     |                                                                                   |   |                                   |      |       |      |      |

## PANELBOARD SCHEDULE

NOTES:

1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND NOTES.
2. LIGHTING PANEL PROVIDED BY PREFAB BUILDING MANUFACTURER FINAL CIRCUIT SCHEDULE TO BE DETERMINED.





- GENERAL NOTES
- IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2022). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
  - SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM THE P&ID DRAWINGS.
  - THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
  - PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.



DES MOINES  
 METROPOLITAN  
 WASTEWATER  
 RECLAMATION  
 AUTHORITY

WRF EFFLUENT PUMPING  
 IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 8/16/24                       | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | KAP                |
| DETAILED:                     | KAP                |
| CHECKED:                      | JVN                |
| APPROVED:                     | JVN                |
| DATE:                         | 8/16/2024          |
| PROJECT NO.:                  | 410504             |

GENERAL

I&C

P&ID - LEGEND &  
 ABBREVIATIONS -  
 SHEET 1 OF 3



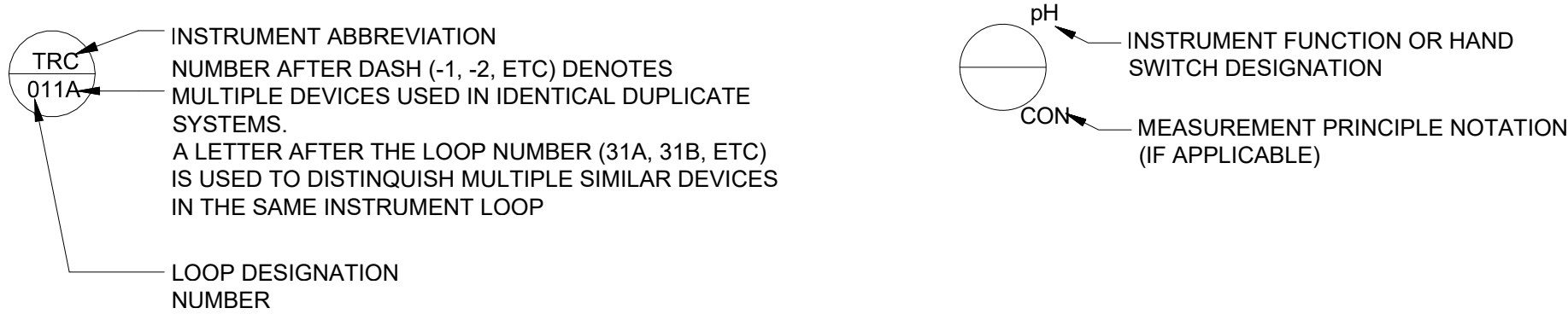
INSTRUMENT AND I/O ABBREVIATIONS  
MEANINGS OF IDENTIFICATION LETTERS

| LETTER | FIRST LETTER                     |                       | SUCCEEDING LETTERS                |                                       |                        |
|--------|----------------------------------|-----------------------|-----------------------------------|---------------------------------------|------------------------|
|        | MEASURED OR INITIATING VARIABLE  | VARIABLE MODIFIER     | READOUT OR PASSIVE FUNCTION       | OUTPUT OR ACTIVE FUNCTION             | FUNCTION MODIFIER      |
| A      | ANALYSIS                         |                       | ALARM                             |                                       |                        |
| B      | BURNER, COMBUSTION               |                       | USER'S CHOICE                     | USER'S CHOICE                         | USER'S CHOICE          |
| C      | USER'S CHOICE                    |                       |                                   | CONTROL                               | CLOSE                  |
| D      | USER'S CHOICE                    | DIFFERENTIAL          |                                   |                                       | DEVIATION              |
| E      | VOLTAGE (EMF)                    |                       | SENSOR, PRIMARY ELEMENT           |                                       |                        |
| F      | FLOW, FLOW RATE                  | RATIO (FRACTION)      |                                   |                                       |                        |
| G      | USER'S CHOICE                    |                       | GLASS, GAUGE, VIEWING DEVICE      |                                       |                        |
| H      | HAND (MANUALLY INITIATED)        |                       |                                   |                                       | HIGH                   |
| I      | CURRENT (ELECTRICAL)             |                       | INDICATE                          |                                       |                        |
| J      | POWER                            |                       | SCAN                              |                                       |                        |
| K      | TIME OR TIME-SCHEDULE            | TIME RATE OF CHANGE   |                                   | CONTROL STATION                       |                        |
| L      | LEVEL                            |                       | LIGHT                             |                                       | LOW                    |
| M      | USER'S CHOICE                    | MOMENTARY             |                                   |                                       | MIDDLE OR INTERMEDIATE |
| N      | USER'S CHOICE                    |                       | USER'S CHOICE                     | USER'S CHOICE                         | USER'S CHOICE          |
| O      | USER'S CHOICE                    |                       | ORIFICE (RESTRICTION)             |                                       | OPEN                   |
| P      | PRESSURE OR VACUUM               |                       | POINT (TEST CONNECTION)           |                                       |                        |
| Q      | QUANTITY                         | INTEGRATE OR TOTALIZE | INTEGRATE OR TOTALIZE             |                                       |                        |
| R      | RADIATION                        |                       | RECORD                            |                                       | RUN                    |
| S      | SPEED OR FREQUENCY               | SAFETY                |                                   | SWITCH                                | STOP                   |
| T      | TEMPERATURE                      |                       |                                   | TRANSMIT                              |                        |
| U      | MULTIVARIABLE                    |                       | MULTIFUNCTION                     | MULTIFUNCTION                         |                        |
| V      | VIBRATION OR MECHANICAL ANALYSIS |                       |                                   | VALVE, DAMPER OR LOUVER               |                        |
| W      | WEIGHT OR FORCE                  |                       | WELL, PROBE                       |                                       |                        |
| X      | UNCLASSIFIED                     | X-AXIS                | ACCESSORY DEVICES OR UNCLASSIFIED | UNCLASSIFIED                          | UNCLASSIFIED           |
| Y      | EVENT, STATE, OR PRESENCE        | Y-AXIS                |                                   | AUXILIARY DEVICES                     |                        |
| Z      | POSITION, DIMENSION              | Z-AXIS                |                                   | DRIVE, ACTUATOR OR FINAL CTRL ELEMENT |                        |

GENERAL NOTES

1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2022). SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS.

INSTRUMENTATION SYMBOLOGY AND DESIGNATIONS



PIPELINE MATERIAL CODE ABBREVIATIONS

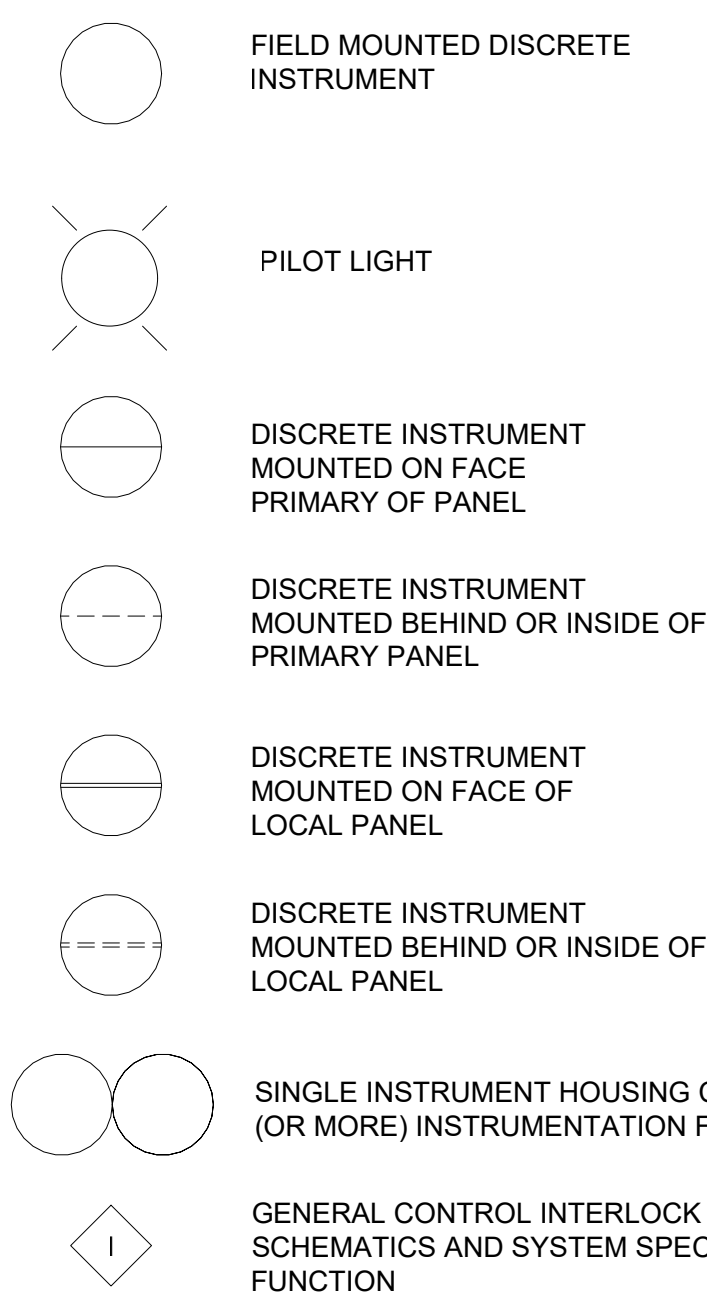
|         |                                                                                               |
|---------|-----------------------------------------------------------------------------------------------|
| PCCP    | SECTION 40 05 39.14, PRESTRESSED CONCRETE CYLINDER PIPE                                       |
| CBWS    | SECTION 40 05 39.16, CONCRETE BAR-WRAPPED, STEEL CYLINDER PIPE                                |
| RCP     | SECTION 40 05 39.24, CONCRETE PIPE                                                            |
| PVC-PP  | SECTION 40 05 19, POLYVINYL CHLORIDE PIPE, 40 05 31.12 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE |
| PVC-SP  | SECTION 40 05 31.18, POLYVINYL CHLORIDE (PVC) SEWER PIPE                                      |
| DIP     | SECTION 40 05 19, DUCTILE IRON PIPE                                                           |
| SP      | SECTION 40 05 24, STEEL PIPE                                                                  |
| SS-XX1  | SECTION 40 05 23, STAINLESS STEEL PIPE, TUBING AND ACCESSORIES                                |
| CSG-XX  | SECTION 40 05 24.43, MISCELLANEOUS STEEL PIPE, TUBING AND ACCESSORIES                         |
| CS-XX   | SECTION 40 05 24.43, MISCELLANEOUS STEEL PIPE, TUBING AND ACCESSORIES                         |
| FRPE-XX | SECTION 40 05 36.11, FIBERGLASS REINFORCED PLASTIC PIPE (EXHAUST AIR SERVICE)                 |
| FRP-XX  | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| PVC-XX  | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| CPVC-XX | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| PE-XX   | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| PP-XX   | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| PVDF-XX | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| RPT-XX  | SECTION 40 05 32, MISCELLANEOUS PLASTIC PIPE, TUBING AND ACCESSORIES                          |
| CI-XX   | SECTION 22 13 17, CAST IRON SOIL PIPE AND ACCESSORIES                                         |
| CU-XX   | SECTION 40 05 17, COPPER TUBING AND ACCESSORIES                                               |
| BR-XX   | SECTION 40 05 41, MISCELLANEOUS PIPEING AND PIPE ASSEMBLY                                     |
| HS-XX   | SECTION 40 05 41, MISCELLANEOUS PIPEING AND PIPE ASSEMBLY                                     |
| TG-XX   | SECTION 40 05 41, MISCELLANEOUS PIPEING AND PIPE ASSEMBLY                                     |
| CRP-XX  | SECTION 40 05 41, MISCELLANEOUS PIPEING AND PIPE ASSEMBLY                                     |
| ALUM    | SECTION 13 34 27, FLAT ALUMINUM BASIN COVER                                                   |
| HST-X   | SECTION 40 05 23, STAINLESS STEEL AND ALLOY PIPE, TUBING AND ACCESSORIES                      |
| FRPM-X  | SECTION 40 05 37, FIBERGLASS REFINOCED POLYMER MORTER PIPE (FRPM)                             |

XX = NUMBERS 01-20

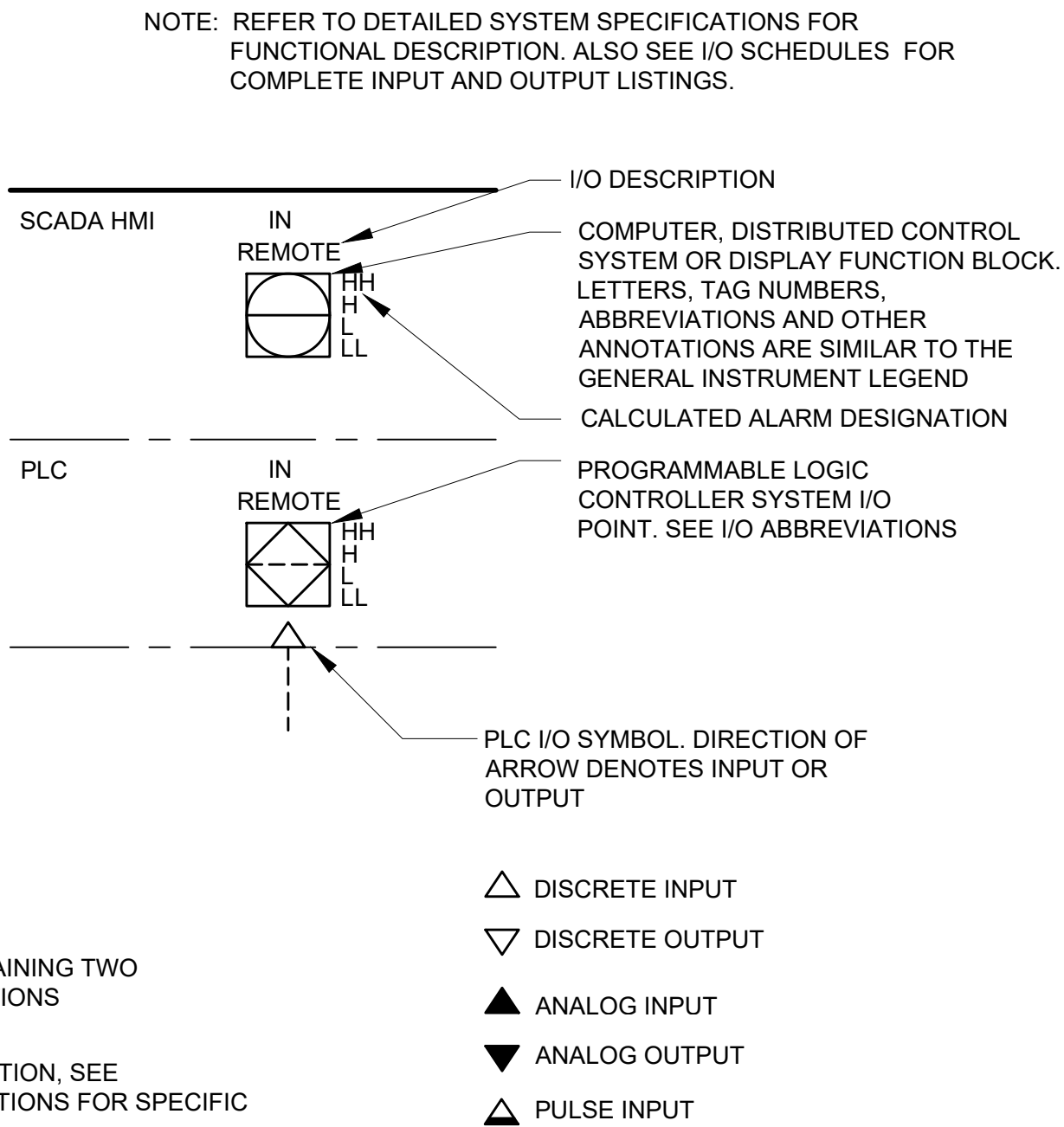
INSTRUMENT AND I/O ABBREVIATION DEFINITIONS

|      |                                                 |       |                                                    |
|------|-------------------------------------------------|-------|----------------------------------------------------|
| AAH  | ANALYZER ALARM HIGH                             | PDIT  | DIFFERENTIAL PRESSURE INDICATING TRANSMITTER       |
| AAHH | ANALYZER ALARM HIGH-HIGH                        | PDAH  | DIFFERENTIAL PRESSURE ALARM HIGH                   |
| AAL  | ANALYZER ALARM LOW                              | PDAHH | DIFFERENTIAL PRESSURE ALARM HIGH-HIGH              |
| AALL | ANALYZER ALARM LOW-LOW                          | PDSH  | DIFFERENTIAL PRESSURE SWITCH HIGH                  |
| AAX  | ALARM HORN                                      | PDSHH | DIFFERENTIAL PRESSURE SWITCH HIGH-HIGH             |
| AAL  | STROBE ALARM LIGHT                              | PDSL  | DIFFERENTIAL PRESSURE SWITCH LOW                   |
| AE   | ANALYZER SENSOR                                 | PDSLL | DIFFERENTIAL PRESSURE SWITCH LOW-LOW               |
| AI   | ANALYZER INDICATION                             | PE    | PRESSURE SENSOR                                    |
| AIT  | ANALYZER INDICATING TRANSMITTER                 | PI    | PRESSURE INDICATOR OR GAUGE                        |
| ASH  | ANALYZER SWITCH HIGH                            | PIT   | PRESSURE INDICATING TRANSMITTER                    |
| ASHH | ANALYZER SWITCH HIGH-HIGH                       | PSL   | PRESSURE SWITCH LOW                                |
| CB   | CONTROL BLOCK REFERENCE (SCADA LEVEL)           | PSH   | PRESSURE SWITCH HIGH                               |
| FAL  | FLOW ALARM LOW                                  | SI    | SPEED INDICATION (LED OR SCREEN)                   |
| FAH  | FLOW ALARM HIGH                                 | SC    | SPEED CONTROL                                      |
| FC   | FLOW CONTROLLER                                 | SIT   | SPEED INDICATING TRANSMITTER                       |
| FI   | FLOW DIGITAL INDICATOR (LED OR SCREEN)          | SSL   | SPEED SWITCH LOW                                   |
| FIC  | FLOW INDICATING CONTROLLER                      | SIT   | SPEED INDICATING TRANSMITTER                       |
| FE   | PRIMARY FLOW ELEMENT/SENSOR                     | TAH   | TEMPERATURE ALARM HIGH                             |
| FG   | FLOW SIGHT GAUGE                                | TAHH  | TEMPERATURE ALARM HIGH-HIGH                        |
| FIT  | FLOW INDICATING TRANSMITTER                     | TAL   | TEMPERATURE ALARM LOW                              |
| FQG  | FLOW TOTALIZING GAUGE                           | TDI   | DIFFERENTIAL TEMPERATURE INDICATOR (LED OR SCREEN) |
| FQIT | FLOW TOTALIZING INDICATING TRANSMITTER          | TDIT  | DIFFERENTIAL TEMPERATURE TRANSMITTER               |
| FSH  | FLOW SWITCH HIGH                                | TE    | TEMPERATURE SENSOR/RESISTANCE                      |
| FSL  | FLOW SWITCH LOW                                 |       | TEMPERATURE DETECTOR                               |
| FY   | FLOW SIGNAL CONVERTER, REPEATER, OR ISOLATOR    | TSH   | TEMPERATURE SWITCH HIGH                            |
| HIC  | HAND INDICATING CONTROLLER                      | TSHH  | TEMPERATURE SWITCH HIGH HIGH                       |
| HMS  | MOMENTARY PUSHBUTTON OR SELECTOR SWITCH         | TSL   | TEMPERATURE SWITCH LOW                             |
| HS   | HAND SWITCH                                     | TG    | TEMPERATURE GAUGE                                  |
| IE   | CURRENT ELEMENT/SENSOR                          | TI    | TEMPERATURE INDICATOR (LED OR SCREEN)              |
| IAH  | CURRENT ALARM HIGH (MOTOR OVERLOAD)             | TIT   | TEMPERATURE INDICATING TRANSMITTER                 |
| ISH  | CURRENT SWITCH HIGH USED TO DETECT HIGH TORQUE) | UA    | MULTIVARIABLE/Common ALARM/Common FAULT            |
| JA   | POWER FAILURE ALARM                             | UCR   | RUN COMMAND                                        |
| JI   | POWER INDICATOR                                 | UCS   | STOP COMMAND                                       |
| JL   | POWER INDICATING LIGHT                          | VAH   | VIBRATION ALARM HIGH                               |
| JIT  | POWER INDICATING TRANSMITTER                    | WE    | PRIMARY WEIGHT SENSOR/LOAD CELL                    |
| KQI  | TIME TOTALIZING INDICATOR                       | WG    | WEIGHT GAUGE                                       |
| LAL  | LEVEL ALARM LOW                                 | WIT   | WEIGHT INDICATING TRANSMITTER                      |
| LALL | LEVEL ALARM LOW-LOW                             | YA    | GENERAL ALARM EVENT                                |
| LAH  | LEVEL ALARM HIGH                                | YI    | EVENT INDICATION (LED OR SCREEN)                   |
| LAHH | LEVEL ALARM HIGH-HIGH                           | YIR   | RUNNING INDICATION                                 |
| LE   | PRIMARY LEVEL ELEMENT/SENSOR                    | YIS   | STOPPED INDICATION                                 |
| LG   | LEVEL SIGHT GAUGE                               | YL    | EVENT INDICATING LIGHT                             |
| LI   | LEVEL INDICATOR (LED OR SCREEN)                 | YLR   | RUNNING INDICATING LIGHT                           |
| LIL  | LEVEL SWITCH LOW                                | YLS   | STOPPED INDICATING LIGHT                           |
| LSLL | LEVEL SWITCH LOW LOW                            | ZI    | POSITION INDICATOR                                 |
| LSH  | LEVEL SWITCH HIGH                               | ZIC   | CLOSED INDICATION                                  |
| LSHH | LEVEL SWITCH HIGH-HIGH                          | ZIO   | OPEN INDICATION                                    |
| LY   | LEVEL SIGNAL CONVERTER, ISOLATOR, OR REPEATER   | ZLC   | CLOSED INDICATING LIGHT                            |
|      |                                                 | ZLO   | OPEN INDICATING LIGHT                              |
| OAH  | TORQUE ALARM HIGH                               | ZSC   | CLOSED POSITION SWITCH                             |
| OAHH | TORQUE ALARM HIGH HIGH                          | ZSO   | OPEN POSITION SWITCH                               |
| OSH  | TORQUE SWITCH HIGH                              | ZIT   | POSITION INDICATING TRANSMITTER                    |
| OSHH | TORQUE SWITCH HIGH-HIGH                         | ZT    | POSITION TRANSMITTER                               |
| PAL  | PRESSURE ALARM LOW                              |       |                                                    |
| PALL | PRESSURE ALARM LOW-LOW                          |       |                                                    |
| PAH  | PRESSURE ALARM HIGH                             |       |                                                    |
| PAHH | PRESSURE ALARM HIGH-HIGH                        |       |                                                    |
| PDG  | DIFFERENTIAL PRESSURE GAUGE                     |       |                                                    |
| PDI  | DIFFERENTIAL PRESSURE INDICATOR (LED OR SCREEN) |       |                                                    |

GENERAL INSTRUMENT SYMBOLS



DIGITAL SYSTEMS INTERFACE SYMBOLS



FUNCTION DESIGNATIONS AND ABBREVIATIONS

| MEASUREMENT PRINCIPLE NOTATIONS |                               | INSTRUMENT FUNCTIONS |                                  | HAND SWITCH DESIGNATIONS |                  |
|---------------------------------|-------------------------------|----------------------|----------------------------------|--------------------------|------------------|
| CON                             | CONDUCTANCE                   | K                    | GAIN OR ATTENUATE (INPUT:OUTPUT) | FR                       | FORWARD-REVERSE  |
| DP                              | DIFFERENTIAL PRESSURE SENSING |                      |                                  | HOA                      | HAND-OFF-AUTO    |
| FLN                             | FLOW NOZZLE                   | -K                   | GAIN AND REVERSE                 | HOR                      | HAND-OFF-REMOTE  |
| FLT                             | FLOW TUBE                     | Σ                    | ADD OR SUM (ADD AND SUBTRACT)    | LOA                      | LOCAL-OFF-AUTO   |
| GWR                             | GUIDED WAVE RADAR             |                      |                                  | LOR                      | LOCAL-OFF-REMOTE |
| RAD                             | RADAR                         | Δ                    | SUBTRACT (DIFFERENCE)            | LR                       | LOCAL REMOTE     |
| US                              | ULTRASONIC                    | √                    | EXTRACT SQUARE ROOT              | OCA                      | OPEN-CLOSE-AUTO  |
| VENT                            | VENTURI TUBE                  | ÷                    | DIVIDE                           | OOA                      | ON-OFF-AUTO      |
|                                 |                               | F(X)                 | CHARACTERIZE SIGNAL              | OC                       | OPEN-CLOSE       |
|                                 |                               | >                    | HIGH-SELECT                      | OO                       | ON-OFF           |
|                                 |                               | <                    | LOW-SELECT                       | OOR                      | ON-OFF-REMOTE    |
|                                 |                               | ×                    | MULTIPLY                         | OSC                      | OPEN-STOP-CLOSE  |
|                                 |                               | ∫                    | INTEGRATE (TIME INTEGRAL)        |                          |                  |
|                                 |                               | CH4                  | METHANE                          |                          |                  |
|                                 |                               | CL2                  | CHLORINE RESIDUAL                |                          |                  |
|                                 |                               | CO2                  | CARBON DIOXIDE                   |                          |                  |
|                                 |                               | DO                   | DISSOLVED OXYGEN                 |                          |                  |
|                                 |                               | H2S                  | HYDROGEN SULFIDE                 |                          |                  |
|                                 |                               | LEL                  | LOWER EXPLOSIVE LIMIT            |                          |                  |
|                                 |                               | MCC                  | MOTOR CONTROL CENTER             |                          |                  |
|                                 |                               | MLSS                 | MIXED LIQUOR SUSPENDED SOLIDS    |                          |                  |
|                                 |                               | O2                   | OXYGEN (PURITY)                  |                          |                  |
|                                 |                               | O3                   | OZONE                            |                          |                  |
|                                 |                               | pH                   | pH                               |                          |                  |
|                                 |                               | TURB                 | TURBIDITY                        |                          |                  |
|                                 |                               | SDI                  | SLUDGE DENSITY                   |                          |                  |

POWER SUPPLY ABBREVIATIONS

|      |                                                                                                       |
|------|-------------------------------------------------------------------------------------------------------|
| AS   | AIR SUPPLY                                                                                            |
| ES   | ELECTRIC SUPPLY                                                                                       |
| GS   | GAS SUPPLY                                                                                            |
| HS   | HYDRAULIC SUPPLY                                                                                      |
| NS   | NITROGEN SUPPLY                                                                                       |
| SS   | STEAM SUPPLY                                                                                          |
| WS   | WATER SUPPLY                                                                                          |
| 120V | 120VAC                                                                                                |
| 480V | 480VAC                                                                                                |
| 120V | POWER SUPPLY SOURCE LABEL. USED ONLY WHERE NECESSARY TO HELP CLARIFY AN INSTRUMENT OR SYSTEM FUNCTION |



Black & Veatch Corporation  
Des Moines, IA



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMPING  
IMPROVEMENTS

8/16/24 ISSUED FOR BIDDING

REVISIONS AND RECORD OF ISSUE

DESIGNED: KAP

DETAILED: KAP

CHECKED: JVN

APPROVED: JVN

DATE: 8/16/2024

PROJECT NO.: 410504

GENERAL

I&C

P&ID - LEGEND &  
ABBREVIATIONS -  
SHEET 2 OF 3

PLAN FILE NO. 664-237

00-I-002

44  
OF  
118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



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| PROCESS CODE ABBREVIATIONS |                                       |      |                                |
|----------------------------|---------------------------------------|------|--------------------------------|
| ACE                        | ACETIC ACID                           | FLC  | FLOCCULATION                   |
| ACT                        | ACETYLENE                             | GOX  | GASEOUS OXYGEN                 |
| GAC                        | ACTIVATED CARBON - GRANULAR           | GSL  | GASOLINE                       |
| AIR                        | AERATION AIR/PROCESS AIR              | GRS  | GREASE                         |
| AER                        | AERATION SYSTEM                       | GRT  | GRIT                           |
| ARW                        | AIR WASH                              | HEL  | HELIUM                         |
| ALS                        | ALUMINUM SULFATE                      | HFL  | HYDRAULIC FLUID                |
| NSQ4                       | AMMONIUM SULFATE                      | HCL  | HYDROCHLORIC ACID              |
| NH3                        | ANHYDROUS AMMONIA                     | HFS  | HYDROFLUOSILIC ACID (FLUORIDE) |
| AS                         | ANTI-SEALANT                          | HYD  | HYDROGEN                       |
| NHOH                       | AQUA AMMONIA                          | PER  | HYDROGEN PEROXIDE              |
| ARG                        | ARGON                                 | INC  | INCINERATION                   |
| ASH                        |                                       | INFP | INFLUENT PUMPING               |
| BWH                        | BACKWASH - MEMBRANE/FILTER            | INT  | INTAKE                         |
| BAL                        | BALLASTED FLOCCULATION                | LAG  | LAGOON STORAGE                 |
| BIO                        | BIOSOLIDS                             | LAP  | LAND APPLICATION               |
| BIT                        | BIOTOWER                              | CAH  | LIME - HYDRATED                |
| BLS                        | BLENDED SLUDGE                        | CAO  | LIME - QUICKLIME               |
| BNR                        |                                       | LIM  | LIME STABILIZATION             |
| BRN                        | BRINE                                 | LOX  | LIQUID OXYGEN                  |
| CACL                       | CALCIUM HYPOCHLORITE                  | LPG  | LP GAS OR PROPANE GAS          |
| CATS                       | CALCIUM THIOSULFATE                   | MGOH | MAGNESIUM HYDROXIDE            |
| C02                        | CARBON DIOXIDE                        | MEM  | MEMBRANE                       |
| CAS                        | CARBON SLURRY                         | MEG  | METHANE GAS                    |
| HCO3                       | CARBONIC ACID                         | MTH  | METHANOL                       |
| CEN                        | CENTRATE                              | MXL  | MIXED LIQUOR                   |
| CEB                        | CHEMICAL ENHANCED BACKWASH - MEMBRANE | NG   | NATURAL GAS                    |
| CL                         | CHLORINE                              | NIT  | NITROGEN                       |
| CLO2                       | CHLORINE DIOXIDE                      | NIO  | NITROUS OXIDE                  |
| CA                         | CITRIC ACID                           | ODC  | ODOR CONTROL                   |
| CIP                        | CLEAN IN PLACE                        | OIL  | OIL                            |
| COA                        | COAGULATION                           | FO   | OIL - FUEL                     |
| CAI                        | COMPRESSED AIR - INSTRUMENT           | OZN  | OZONE                          |
| CMS                        | COMPRESSED AIR - SERVICE              | OZD  | OZONE DESTRUCT                 |
| CUS                        | COPPER SULFATE                        | PPP  | PHOSPHATE                      |
| CI                         | CORROSION INHIBITOR                   | PO4  | PHOSPHORIC ACID                |
| DCL                        | DECHLORINATION                        | PCL  | POLYALUMINUM CHLORIDE          |
| DET                        | DETERGENT                             | POLF | POLYMER                        |
| DWT                        | DEWATERING                            | KMN  | POTASSIUM PERMANGANATE         |
| FUE                        | DIESEL FUEL                           | PAC  | POWDERED ACTIVATE CARBON       |
| DGG                        | DIGESTER GAS                          | PAR  | PRE-AERATION                   |
| DGM                        | DIGESTER GAS MIXING                   | PSD  | PRESEDIMENTATION               |
| DGS                        | DIGESTER SLUDGE                       | PRC  | PRIMARY CLARIFICATION          |
| DIS                        | DISINFECTION                          | PSC  | PRIMARY SCUM                   |
| DCB                        | DISINFECTION CONTACT BASIN            | PRS  | PRIMARY SLUDGE                 |
| DAF                        | DISSOLVED AIR FLOTATION               | WWP  | RAW WASTEWATER PUMPING         |
| DRN                        | DRAINAGE                              | RWP  | RAW WATER PUMPING              |
| EFF                        | EFFLUENT                              | RWS  | RAW WATER STORAGE              |
| EPS                        | EFFLUENT PUMP STATION                 | RCS  | RECIRCULATED SLUDGE            |
| EXH                        | ENGINE EXHAUST                        | RCW  | RECLAIMED WATER                |
| EOB                        | EQUALIZATION BASIN                    | REF  | REFRIGERANT                    |
| FEC                        | FERRIC CHLORIDE                       |      |                                |
| FES                        | FERRIC SULFATE                        |      |                                |
| FRC                        | FERROUS CHLORIDE                      |      |                                |
| FRS                        | FERROUS SULFATE                       |      |                                |
| FLT                        | FILTRATION                            |      |                                |

|      |                                  |
|------|----------------------------------|
| RES  | RESIDUALS                        |
| RAS  | RETURN ACTIVATED SLUDGE          |
| ROS  | REVERSE OSMOSIS                  |
| SCR  | SCREENINGS                       |
| SE   | SECONDARY EFFLUENT               |
| SCL  | SECONDARY CLARIFICATION          |
| SSC  | SECONDARY SCUM                   |
| SEP  | SEPTAGE                          |
| SET  | SETTLED WATER                    |
| SEW  | SEWAGE                           |
| NAC  | SODA ASH                         |
| NAL  | SODIUM ALUMINATE                 |
| NAM  | SODIUM ALUMINATE                 |
| NBC  | SODIUM BICARBONATE               |
| NHS  | SODIUM BISULFITE                 |
| NCL  | SODIUM CHLORIDE                  |
| NCL2 | SODIUM CHLORITE                  |
| NAF  | SODIUM FLUORIDE                  |
| NAX  | SODIUM HEXAMETAPHOSPHATE         |
| NAOH | SODIUM HYDROXIDE                 |
| NOCL | SODIUM HYPOCHLORITE              |
| NASF | SODIUM SILICOFLUORIDE            |
| STM  | STEAM                            |
| STS  | STORM SEWER                      |
| STW  | STORM WATER                      |
| SO2  | SULFUR DIOXIDE                   |
| HSO4 | SULFURIC ACID                    |
| SW   | SURFACE WASH                     |
| TERT | TERTIARY TREATMENT               |
| TPRS | THICKENED PRIMARY SLUDGE         |
| TWAS | THICKENED WASTE ACTIVATED SLUDGE |
| THCK | THICKENING                       |
| TW   | TREATED WATER                    |
| TF   | TRICKLING FILTER                 |
| UV   | ULTRAVIOLET                      |
| VAC  | VACUUM                           |
| WW   | WASH WATER                       |
| WAS  | WASTE ACTIVATED SLUDGE           |
| WWW  | WASTE WASH WATER                 |
| CDW  | WATER - CONDENSATE               |
| COLW | WATER - COOLING                  |
| DW   | WATER - DISTILLED WATER          |
| FW   | WATER - FIRE                     |
| IRW  | WATER - IRRIGATION               |
| OZW  | WATER - OZONATED                 |
| SWT  | WATER - SEAL                     |
| HW   | WATER - WATER HEATING            |
| DEW  | WATER DEIONIZED                  |
| NPW  | WATER NON-POTABLE                |
| PEW  | WATER PLANT EFFLUENT             |
| PW   | WATER POTABLE                    |
| RW   | WATER RAW                        |
| WWT  | WET WEATHER TREATMENT            |
| ZOP  | ZINC ORTHOPHOSPHATE              |

EQUIPMENT CODE ABBREVIATIONS

|      |                                  |       |                                   |      |                                     |       |                                    |      |                                 |
|------|----------------------------------|-------|-----------------------------------|------|-------------------------------------|-------|------------------------------------|------|---------------------------------|
| ACMB | ACTIVATION CHAMBER               | DWS   | DEWATERING SCREW                  | GEN  | GENERATOR, ENGINE (BACKUP POWER)    | SC    | SCALE, WEIGHT                      | VFD  | VARIABLE FREQUENCY DRIVE        |
| AFD  | ADJUSTABLE FREQUENCY DRIVE       | DPS   | DIAPHRAGM SEAL                    | GBT  | GRAVITY BELT THICKENER              | SCRHT | SCREEN, HORIZONTAL                 | VB   | VACUUM BREAK                    |
| ACD  | AERATOR, COARSE BUBBLE DIFFUSED  | DIF   | DIFFUSER, CHANNEL                 | GVT  | GRAVITY THICKENER                   | SCRI  | SCREEN, INLINE SLUDGE              | VRG  | VACUUM REGULATOR                |
| AEFD | AERATOR, FINE PORE DIFFUSED      | DFB   | DIFFUSER BANK                     | GRD  | GRINDER PULVERIZER                  | SCRA  | SCREEN, MANUAL OR MECH CLEANED BAR | AVR  | VALVE, AIR RELEASE              |
| AFS  | AERATOR, FLOATING SURFACE        | DIP   | DIFFUSER, PIPELINE                | GRB  | GRIT BASIN, VORTEX TYPE             | SCRS  | SCREEN, STEP                       | AVRV | VALVE, AIR-VACUUM               |
| AES  | AERATOR, SURFACE                 | DIR   | DIFFUSER, TANK                    | GRV  | GRIT SCREW CONCENTRATOR             | SCT   | SCREEN, TRAVELLING WATER           | VAG  | VALVE, ANGLE                    |
| AFC  | AFTERCOOLER                      | DGE   | DIGESTER, AEROBIC                 | HEX  | HEAT EXCHANGER                      | SCR   | SCREEN, VIBRATORY                  | VBM  | VALVE, AWWA BALL                |
| AD   | AIR DRYER                        | DGAP  | DIGESTER, ANAEROBIC PRIMARY       | HST  | HOIST                               | SCU   | SCRUBBER                           | VBF  | VALVE, AWWA BUTTERFLY           |
| AF   | AIR FILTER                       | DGAS  | DIGESTER, ANAEROBIC SECONDARY     | HSC  | HOIST, CHAIN                        | SMC   | SCUM COLLECTOR                     | VBFP | VALVE, BACKFLOW PREVENTER       |
| AR   | AIR RECEIVER OR REGULATOR        | DSUV  | DISINFECTION UNIT, UV             | HSE  | HOIST, WIRE ROPE                    | SCW   | SCUM WEIR - ROTATING               | VBK  | VALVE, BALL MISCELLANEOUS       |
| AS   | AIR SEPARATOR                    | DAF   | DISSOLVED AIR FLOTATION THICKENER | HYDF | HYDRANT, FIRE                       | SEP   | SEPARATOR, MOISTURE OR CYCLONE     | VCK  | VALVE, CHECK                    |
| AST  | AIR STRIPPER                     | DUC   | DUST COLLECTOR                    | HYDW | HYDRANT, WALL                       | SGT   | SIGHT GLASS - TALL                 | VCN  | VALVE, CONE                     |
| BFP  | BACKFLOW PREVENTER               | EDC   | EDUCTOR                           | HYC  | HYDROCYCLONE                        | SG    | SIGHT GAUGE                        | VDG  | VALVE, DIAPHRAGM OPERATED       |
| BSNA | BASIN, AERATION                  | EQPE  | ELECTRICAL EQUIPMENT, GENERAL     | INJ  | INJECTOR, CHEMICAL                  | SIL   | SILENCER                           | VDG  | VALVE, DOUBLE DISC GATE         |
| BSNX | BASIN, ANOXIC/OXIC               | EWSH  | EMERGENCY EYE WASH FOUNTAIN       | LS   | LIME SLAKER                         | SLC   | SLUDGE COLLECTOR, CIRCULAR         | VPE  | VALVE, ECCENTRIC PLUG           |
| BNR  | BASIN, BNR                       | ESH   | EMERGENCY SHOWER                  | LCP  | LOCAL CONTROL PANEL                 | GCLR  | SLUDGE COLLECTOR, CROSS            | VER  | VALVE, EXPLOSION RELIEF         |
| BSNC | BASIN, CHLORINE CONTACT          | EMEW  | EMERGENCY SHOWER & EYEWASH        | MMF  | MEMBRANE                            | SFC   | SLUDGE COLLECTOR, FLOC-CLARIFYING  | VFW  | VALVE, FOUR WAY                 |
| BSNO | BASIN, OXIC                      | EQBP  | EQUIPMENT, BUILDING SERVICES      | MBMF | MEMBRANE, MICROFILTRATION           | SCS   | SLUDGE COLLECTOR, SEC CLARIFIERS   | VG   | VALVE, GATE                     |
| RBSN | BASIN, RECTANGULAR SEDIMENTATION | EQPT  | EQUIPMENT, GENERAL OR UNSPECIFIED | MBNF | MEMBRANE, NANOFILTRATION            | SSC   | SLUDGE COLLECTOR, SOLIDS CONTACT   | V    | VALVE, GENERAL OR UNSPECIFIED   |
| BFPS | BELT FILTER PRESS                | EV    | EVAPORATOR                        | MBRO | MEMBRANE, REVERSE OSMOSIS           | SLCS  | SLUDGE COLLECTOR, STRAIGHT LINE    | VGL  | VALVE, GLOBE                    |
| B    | BIN (STORAGE - ALL TYPES)        | EXC   | EXPANSION CHAMBER                 | MBUF | MEMBRANE, ULTRAFILTRATION           | GRD   | SLUDGE GRINDER, INLINE OR CHANNEL  | VBI  | VALVE, INDUSTRIAL BUTTERFLY     |
| BA   | BIN ACTIVATOR                    | FAX   | FAN, AXIAL FLOW                   | MXC  | MIXER, CARBON                       | SBL   | SOLIDS BLENDER-INLINE              | VKG  | VALVE, KNIFE GATE               |
| BLC  | BLOWER, CENTRIFUGAL              | FAN   | FAN, CENTRIFUGAL                  | FLM  | MIXER, FLOCCULATION                 | STR   | STRAINER                           | VMR  | VALVE, MATERIAL HANDLING ROTARY |
| BL   | BLOWER, POSITIVE DISPLACEMENT    | FST   | FENCE STIRRER                     | M    | MOTOR                               | STR   | STRAINER BASKET TYPE               | VMD  | VALVE, MUD                      |
| BLR  | BOILER                           | FTSP  | FILTER GAS PARTICULATE            | MXI  | MIXER, IN-LINE                      | STRY  | STRAINER Y TYPE                    | VND  | VALVE, NEEDLE                   |
| BDZ  | BULLDOZER                        | FLC   | FILTER, CARTRIDGE TYPE            | MXPG | MIXER, PUGMILL                      | SRCH  | SURGE CHAMBER                      | PTV  | VALVE, PILOT                    |
| CCLM | CALIBRATION COLUMN               | FLT   | FILTER, UNDERDRAINS OR PRESSURE   | MXR  | MIXER, RAPID                        | TSA   | TANK, ABOVE GROUND STORAGE         | VPN  | VALVE, PINCH                    |
| CFG  | CENTRIFUGE                       | FSW   | FILTER, SURFACE WASH EQUIPMENT    | MXS  | MIXER, STATIC                       | TCN   | TANK, AMMONIA STORAGE              | VPO  | VALVE, PISTON OPERATED          |
| CHF  | CHEMICAL FEEDER                  | FTTNG | FITTING, MISCELLANEOUS            | MXP  | MIXER, SUBMERSIBLE, PROP OR BLENDER | DCT   | TANK, CRYOGENIC STORAGE            | VPL  | VALVE, NON-ECCENTRIC PLUG       |
| CGS  | CHLORINE GAS SCRUBBER            | FAR   | FLAME ARRESTER                    | MM   | MUFFIN MONSTER                      | TW    | TANK, DOUBLE WALL                  | VPC  | VALVE, PRESSURE REDUCING        |
| PCLR | CLARIFIER, PRIMARY               | FC    | FLAME CHECK                       | ORD  | OVERFLOW ROOF DRAIN                 | TSE   | TANK, ELEVATED STORAGE             | VPC  | VALVE, PRESSURE SUSTAINING      |
| SCLR | CLARIFIER, SECONDARY             | FLCH  | FLOCCULATOR, HORIZONTAL           | ODU  | OZONE DESTRUCT UNIT                 | TX    | TANK, EXPANSION                    | VSP  | VALVE, PRESSURE RELIEF          |
| CGR  | CLASSIFIER, GRIT                 | FLCV  | FLOCCULATOR, VERTICAL             | OGEN | OZONE GENERATOR                     | TNK   | TANK, FRP CHEMICAL STORAGE         | VSPV | VALVE, PRESSURE/VACUUM RELIEF   |
| CW   | CLEARWELL                        | FD    | FLOOR DRAIN                       | PSU  | OZONE POWER SUPPLY UNIT             | TNK   | TANK, GENERAL OR UNSPECIFIED       | VP   | VALVE, PROCESS                  |
| CMP  | COMPRESSOR                       | FS    | FLOW SPLITTER                     | PP   | PACKAGED PLANT                      | TCP   | TANK, METHANOL                     | VGR  | VALVE, RESILIENT SEATED GATE    |
| CMB  | COMPRESSOR, LIQUID RING          | FE    | FLUME, PARSHALL                   | PCN  | PARTICLE COUNTER                    | SMPT  | TANK, SAMPLER                      | VS   | VALVE, SAFETY                   |
| CMR  | COMPRESSOR, ROTARY SCREW         | FMSP  | FOAM SEPARATOR                    | PLT  | PELLETIZER                          | TCS   | TANK, CHLORINE CONTACTOR           | VSLV | VALVE, SLEEVE                   |
| CMPS | COMPRESSOR, STEAM                | FL    | FORKLIFT                          | PS   | PUMP                                | TSW   | TANK, FLAT TOP STEEL WATER         | VSL  | VALVE, SOLENOID                 |
| CTR  | CONTAINER, PROCESS               | CHF   | GAS FEEDER                        | PIPE | PIPE                                | TRP   | TRAP, DRIP                         | VTV  | VALVE, TELESCOPING              |
| COB  | CONVEYOR, BELT                   | GF    | GAS FLARE                         | PSE  | PLATE SETTLER                       | TPRS  | TRAP, SEDIMENT                     | VTS  | VALVE, THERMAL SHUTOFF          |
| COS  | CONVEYOR, SCREW                  | GWH   | GAS WATER HEATER                  | INJ  | POLYMER INJECTOR RING               | TRK   | TRUCK                              | VTW  | VALVE, THREE WAY                |
| CFA  | COVER, ALUMINUM DOME BASIN       | G     | GATE                              | PBC  | PRESSURE BUILDING COIL              | TB    | TURBINE                            | VVB  | VALVE, VACUUM BREAKER           |
| GFD  | COVER, FIXED DIGESTER            |       |                                   | PD   | PULSATION DAMPNER                   | TBC   | TURBINE COMPRESSOR                 | VSV  | VALVE, VACUUM RELIEF            |
| GFL  | COVER, FLOATING DIGESTER         |       |                                   | P    | PUMP                                | TBG   | TURBINE ENGINE                     | VVP  | VALVE, V-PORT BALL              |
| DCG  | COVER, GAS HOLDER                |       |                                   | RSV  | RESERVOIR                           | UPS   | UNINTERRUPTABLE POWER SUPPLY       | VAP  | VAPORIZER                       |
| DCM  | COVER, MEMBRANE                  |       |                                   | RCO  | RESIDUAL COLLECTOR                  | UVE   | UV REACTOR                         | VSLB | VESSEL, BOOT                    |
| CRN  | CRANE                            |       |                                   | RM   | ROTAMETER                           | UVL   | UV REACTOR, HORIZONTAL OR VERTICAL | WC   | WEIR, CIPOLETTI                 |
| CRG  | CRANE, GANTRY                    |       |                                   | RD   | RUPTURE DISK                        |       |                                    | WR   | WEIR, RECTANGULAR               |
| CRJ  | CRANE, JIB                       |       |                                   | SAMP | SAMPLER                             |       |                                    | WV   | WEIR, V-NOTCH                   |
| CRP  | CRANE, PORTABLE GANTRY           |       |                                   | SCL  | SCALE                               |       |                                    | WLHC | WELL, HORIZONTAL COLLECTOR      |
| CRT  | CRANE, TRAVELLING BRIDGE         |       |                                   |      |                                     |       |                                    | WLV  | WELL, VERTICAL                  |
| CYL  | CYLINDER, CHLORINE               |       |                                   |      |                                     |       |                                    |      |                                 |
| CYG  | CYLINDER, GAS                    |       |                                   |      |                                     |       |                                    |      |                                 |



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GENERAL

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P&ID - LEGEND &  
 ABBREVIATIONS -  
 SHEET 3 OF 3

PLAN FILE NO. 664-238

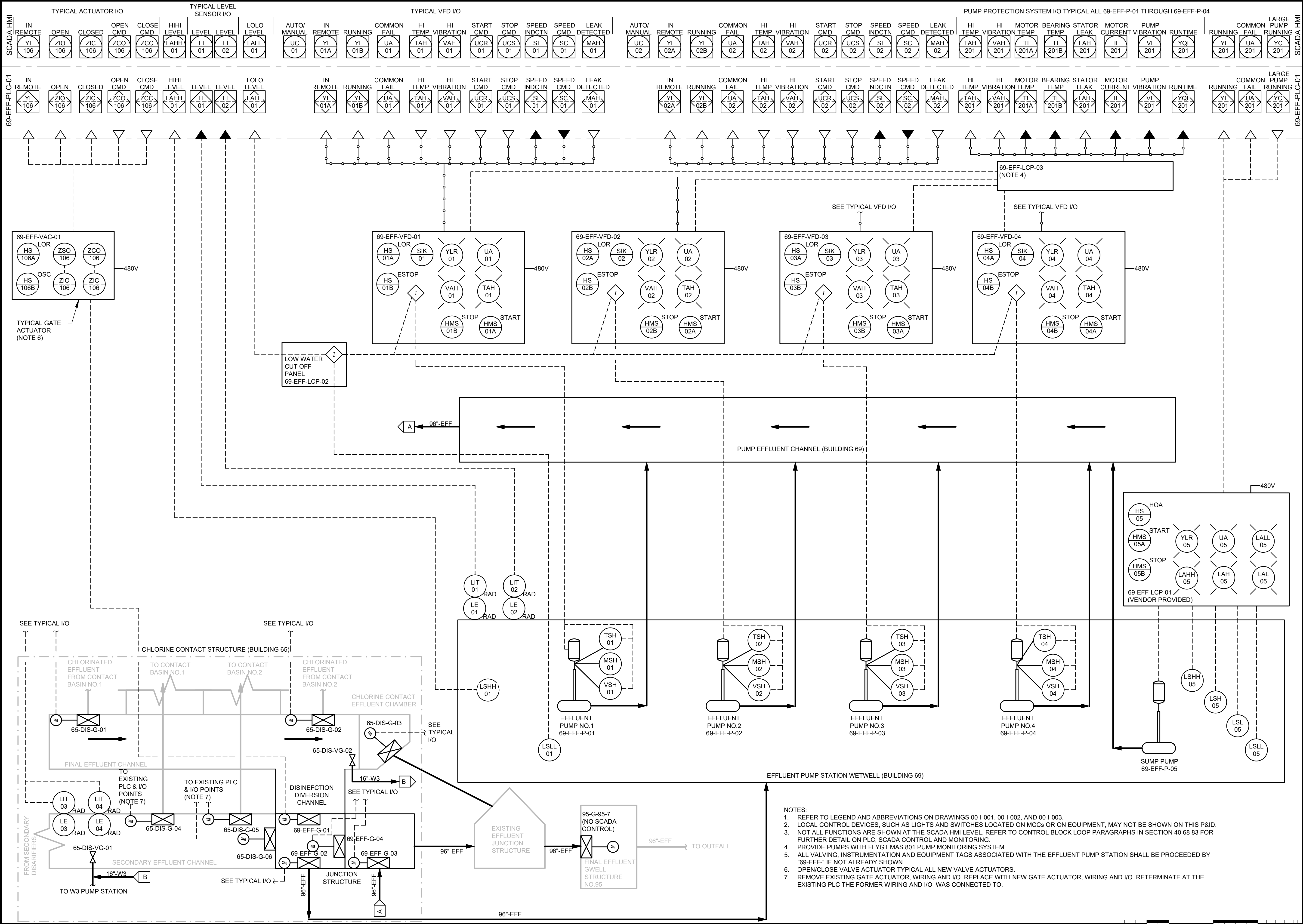
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P&ID - EFFLUENT PUMP  
STATION

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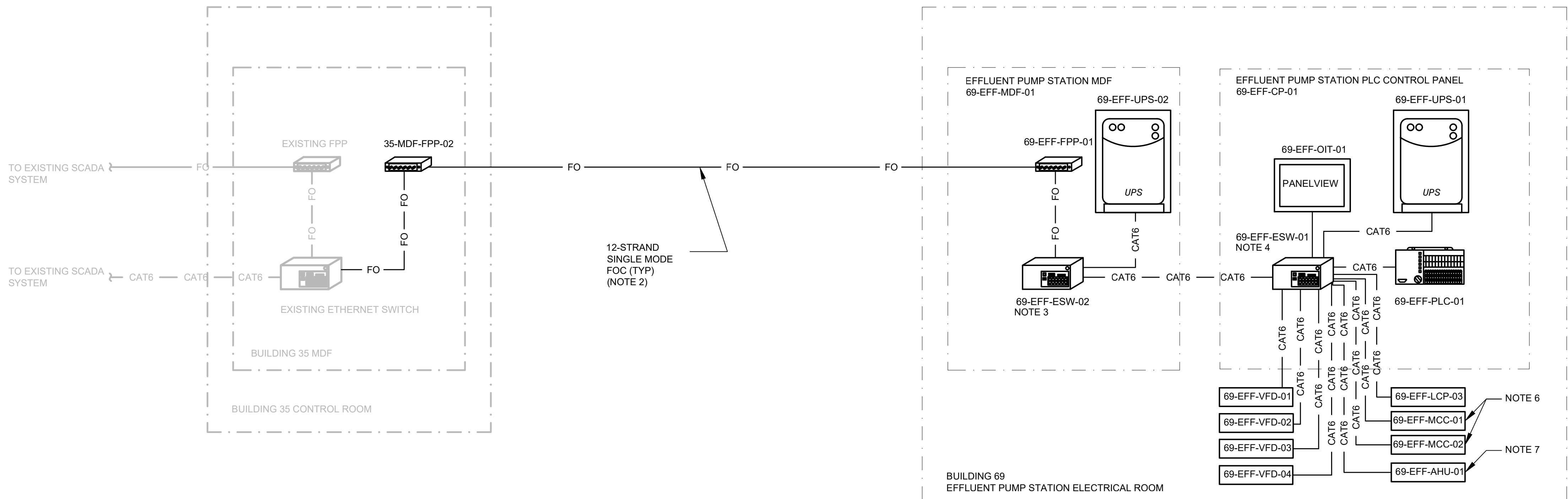
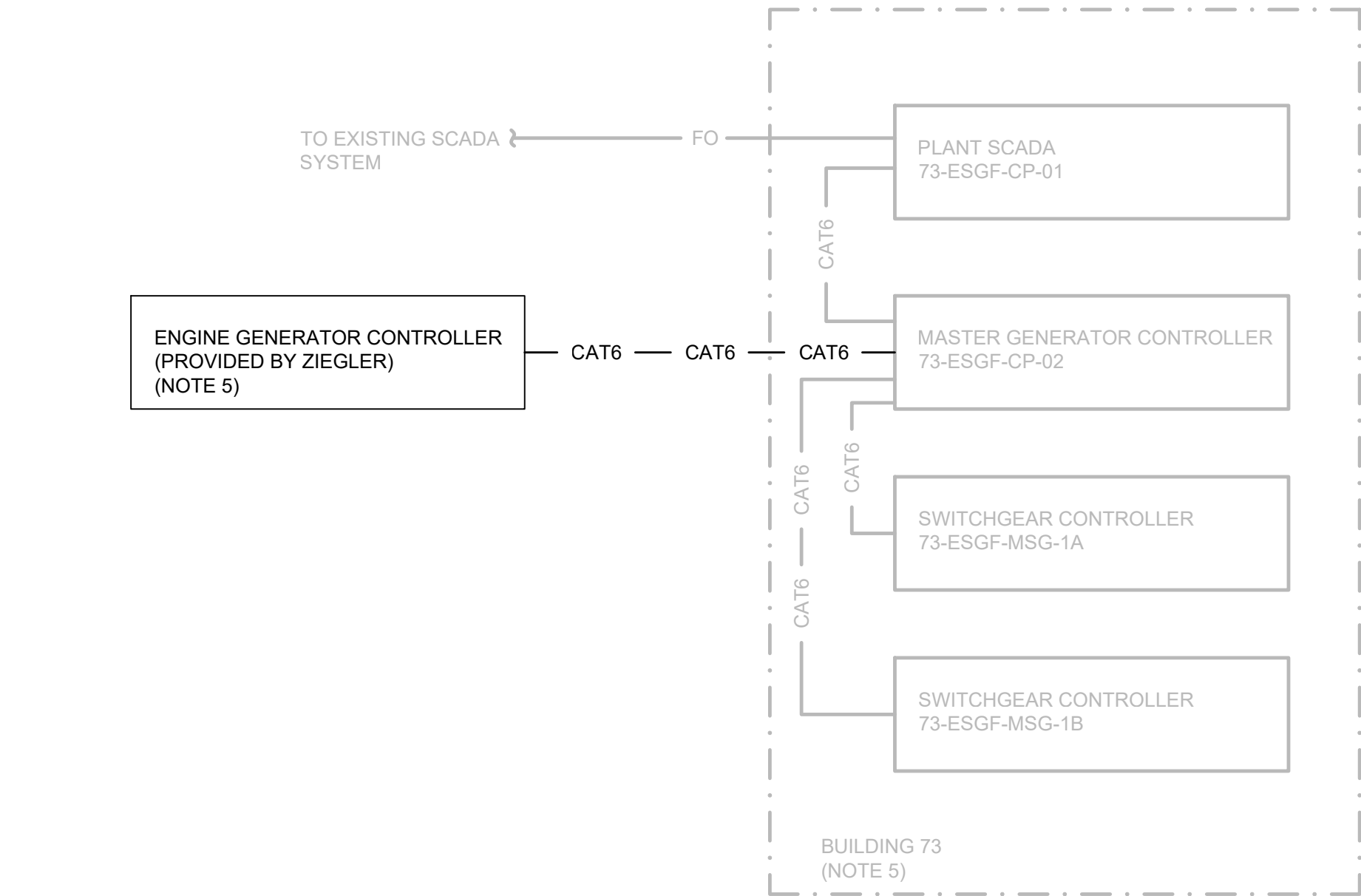
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- NOTES:
1. REFER TO LEGEND AND ABBREVIATIONS ON DRAWINGS 00-I-001, 00-I-002, AND 00-I-003.
  2. CONTRACTOR SHALL PROVIDE TWO RUNS OF 12-STRAND FIBER. CONTRACTOR SHALL FULLY TERMINATE ALL FIBER STRANDS.
  3. OWNER PROVIDED. SWITCH SHALL HAVE A MINIMUM OF 6 ETHERNET PORTS AND 2 SFP SINGLE-MODE FIBER PORTS.
  4. OWNER PROVIDED. SWITCH SHALL HAVE A MINIMUM OF 16 ETHERNET PORTS.
  5. GENERATOR CONTROLLER SHALL BE PROVIDED BY ZIEGLER. GENERATOR/SWITCHGEAR PLC HARDWARE AND SOFTWARE MODIFICATIONS SHALL BE BY ZIEGLER. REFER TO SECTION 010310 - PRESELECTED EQUIPMENT AND SERVICES.
  6. REFER TO SECTION 262423 - 600 VOLT CLASS MOTOR CONTROL CENTERS FOR MINIMUM POWER METERING MONITORING REQUIREMENTS. SYSTEM INTEGRATOR SHALL BE RESPONSIBLE FOR PROVIDING POWER MONITORING SCREENS AT SCADA HMI.
  7. REFER TO HVAC DRAWINGS. AHU SHALL SEND A FIRE ALARM SIGNAL TO THE SCADA HMI WHEN THE SMOKE DETECTOR IS ALARMED. SYSTEM INTEGRATOR SHALL BE RESPONSIBLE FOR SMOKE DETECTOR MONITORING AT SCADA HMI.



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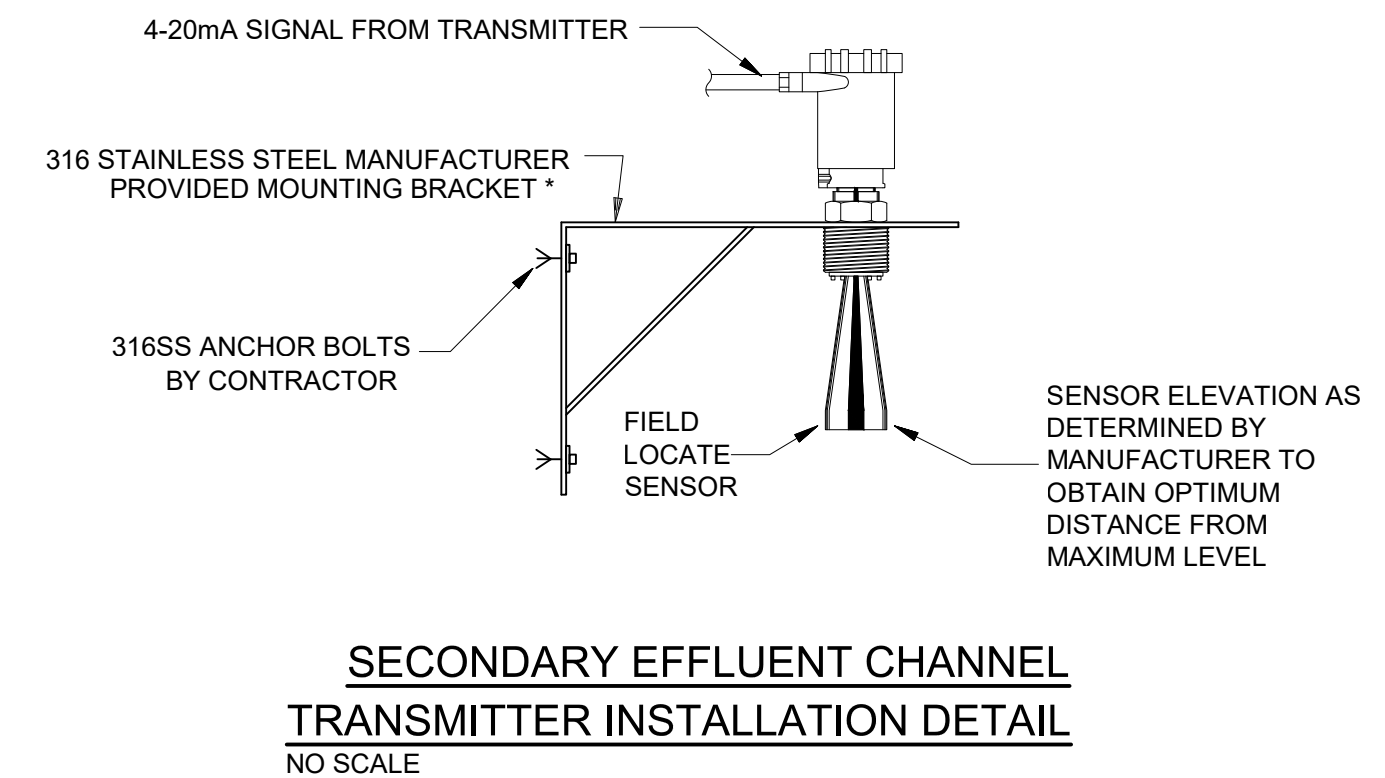
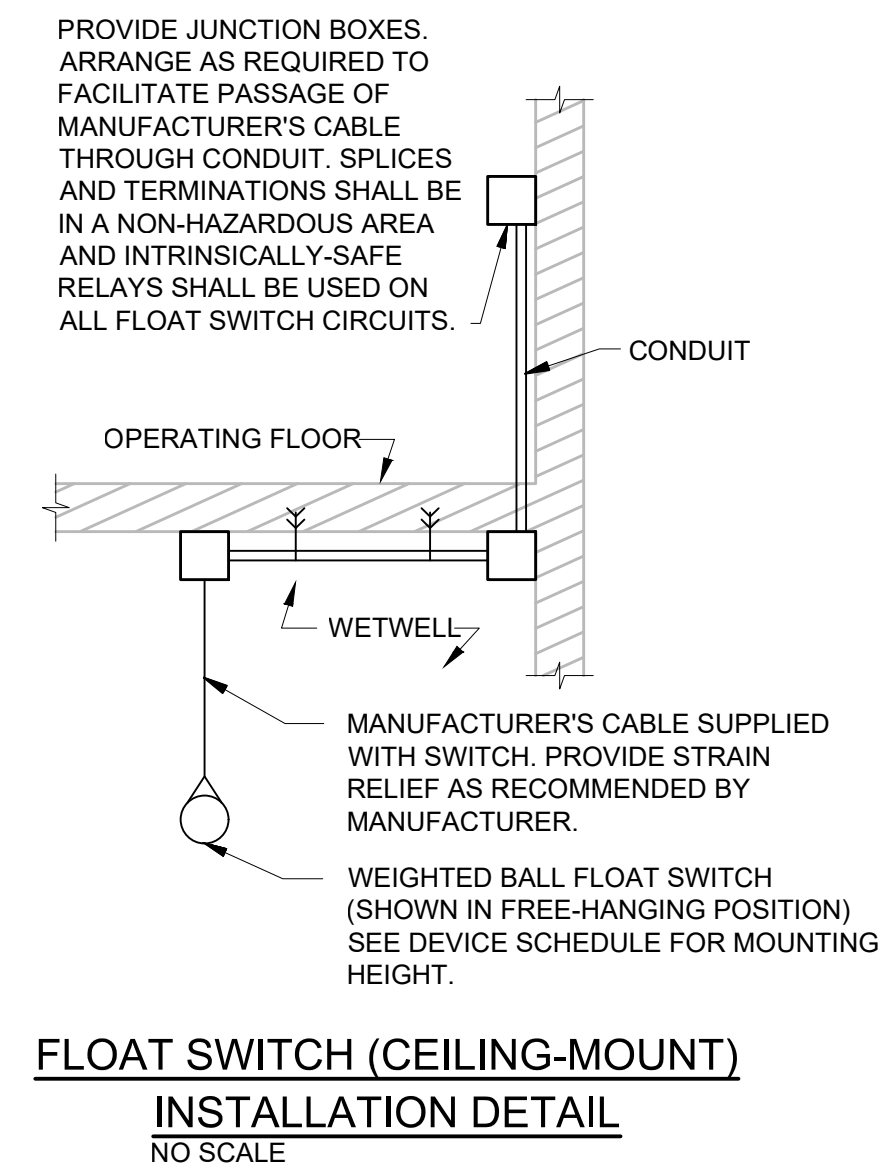
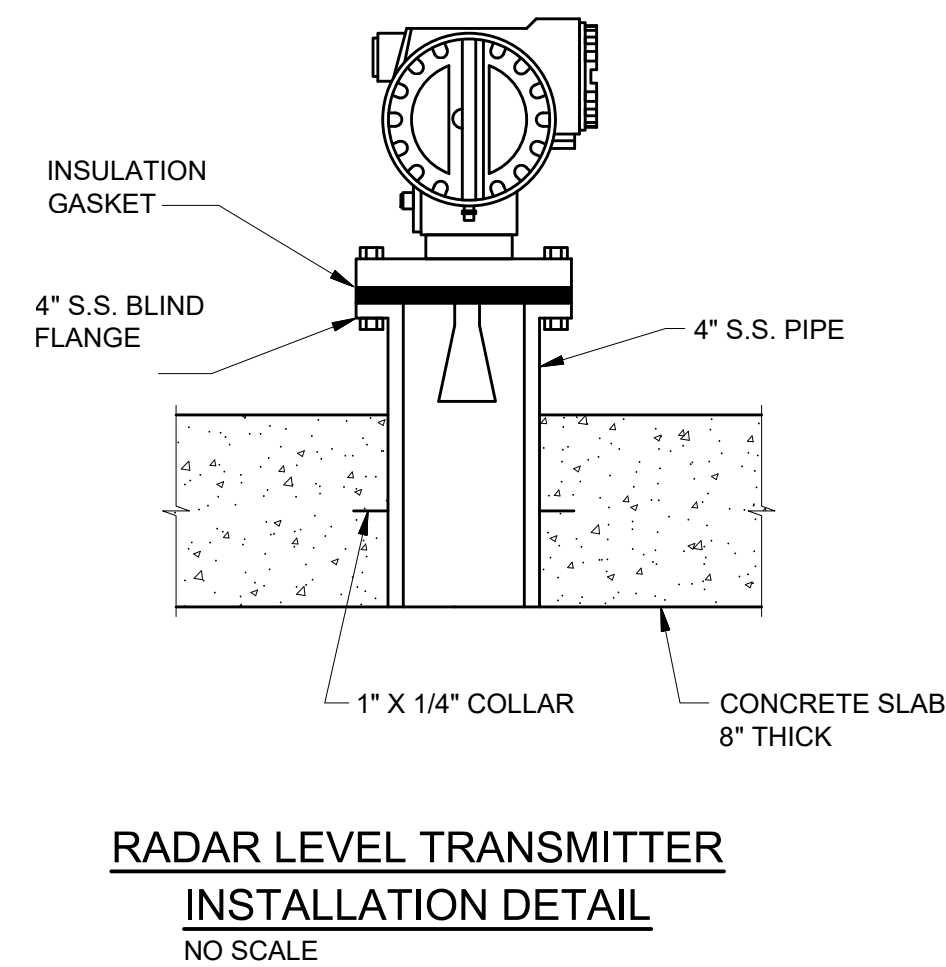
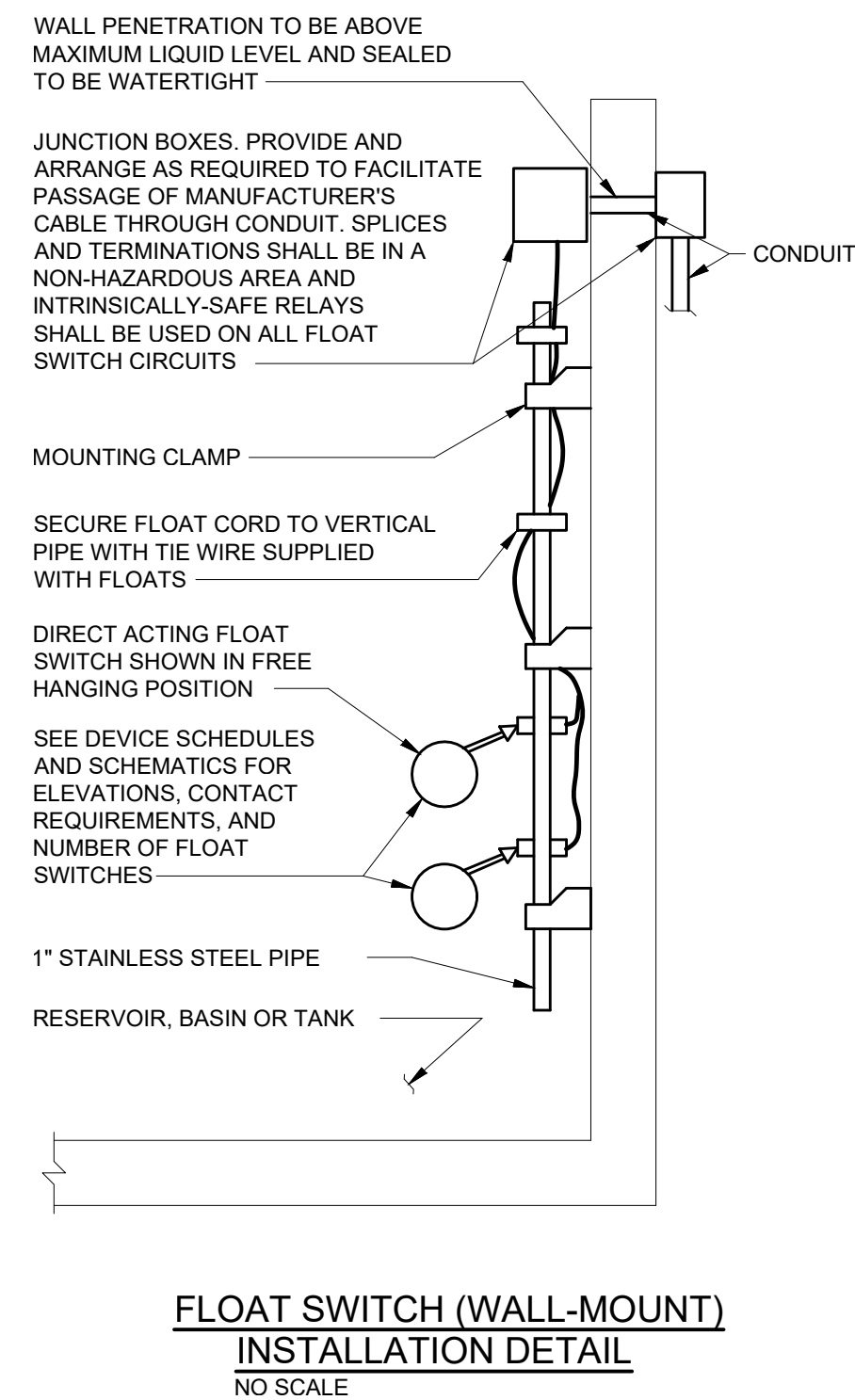
CONTROL SYSTEM BLOCK  
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PLAN FILE NO. 664-240

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## WRF EFFLUENT PUMPING IMPROVEMENTS

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# INSTRUMENTATION INSTALLATION STANDARD DETAILS

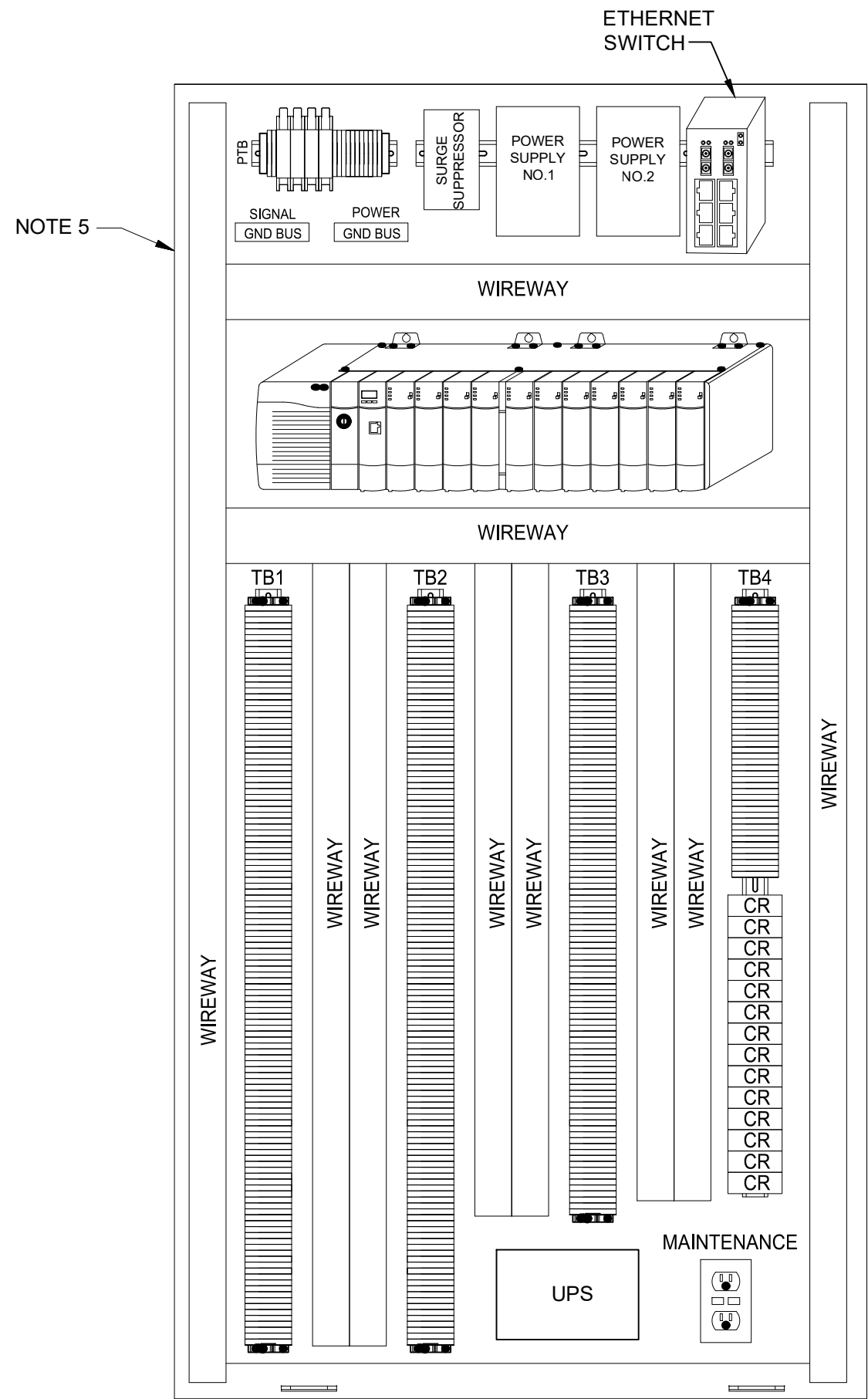
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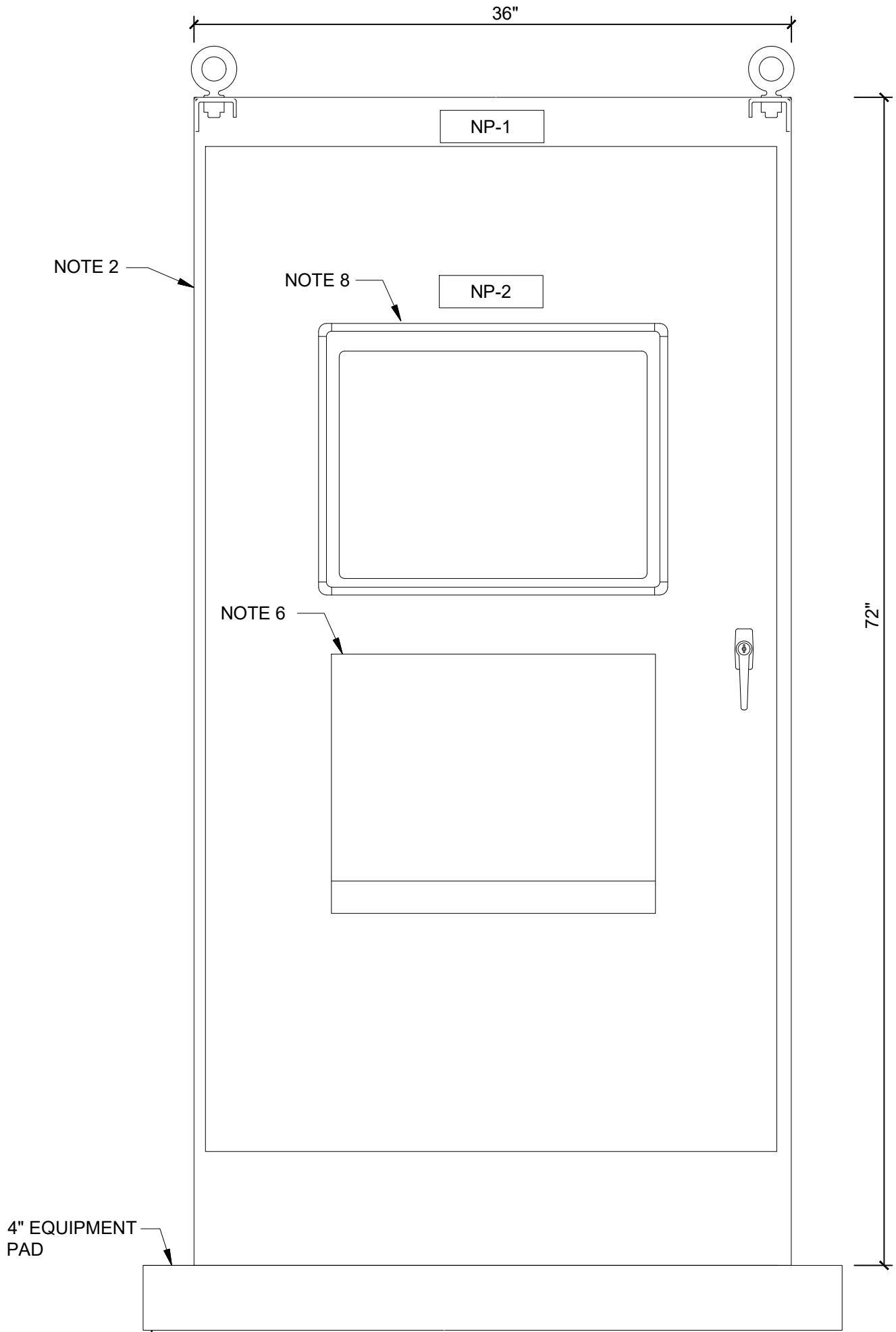
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69-EFF-CP-01 CONTROL PANEL  
INTERIOR FRONT ELEVATION



69-EFF-CP-01 CONTROL PANEL  
FRONT ELEVATION

| NAMEPLATE LEGEND |                   |               |                                                     |
|------------------|-------------------|---------------|-----------------------------------------------------|
| NP #             | 1ST LINE TEXT     | 2ND LINE TEXT | 3RD LINE TEXT                                       |
| NP-1             | PLC CONTROL PANEL | 69-EFF-CP-01  | 120V, 3PH; FED FROM LP-69-01 IN EFF ELECTRICAL ROOM |
| NP-2             | SCADA WORKSTATION | 69-EFF-OIT-01 | 24V, 1PH; FED FROM POWER SUPPLY IN 69-EFF-69-01     |

- NOTES:
- COMPONENTS ARE SHOWN TO PROVIDE A GENERAL GUIDE ON PANEL LAYOUT AND DO NOT REELECT EVERY COMPONENT NECESSARY FOR A COMPLETE INSTALLATION. SYSTEM SUPPLIER SHALL PROVIDE ADDITIONAL COMPONENTS AS NECESSARY FOR A COMPLETE INSTALLATION. SEE SPECIFICATIONS FOR ADDITIONAL DETAILS.
  - PANEL SHALL BE RATED NEMA 12 WITH A MINIMUM SIZE OF 36"W x72"H x20"D. PROVIDE HOFFMAN A367220FSD OR EQUAL.
  - NOT ALL INSTRUMENTS AND DEVICES MAY BE SHOWN. REFER TO P&IDS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
  - SEE STRUCTURAL DRAWINGS FOR DETAILS ON THE EQUIPMENT PAD.
  - INSTRUMENTS, DEVICES AND WIREWAY SHALL BE MOUNTED TO A BACK OR SIDE SUB-PANEL.
  - ENCLOSURE SHALL BE PROVIDED WITH A FOLD DOWN SHELF ON THE INTERIOR OF THE DOOR THAT IS CAPABLE OF SUPPORTING A PORTABLE LAPTOP COMPUTER.
  - 23" PANEL MOUNTED OPERATOR WORKSTATION TO BE ERGONOMICALLY CORRECT FOR OPERATOR STANDING IN FRONT OF PANEL.



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PLC PANEL

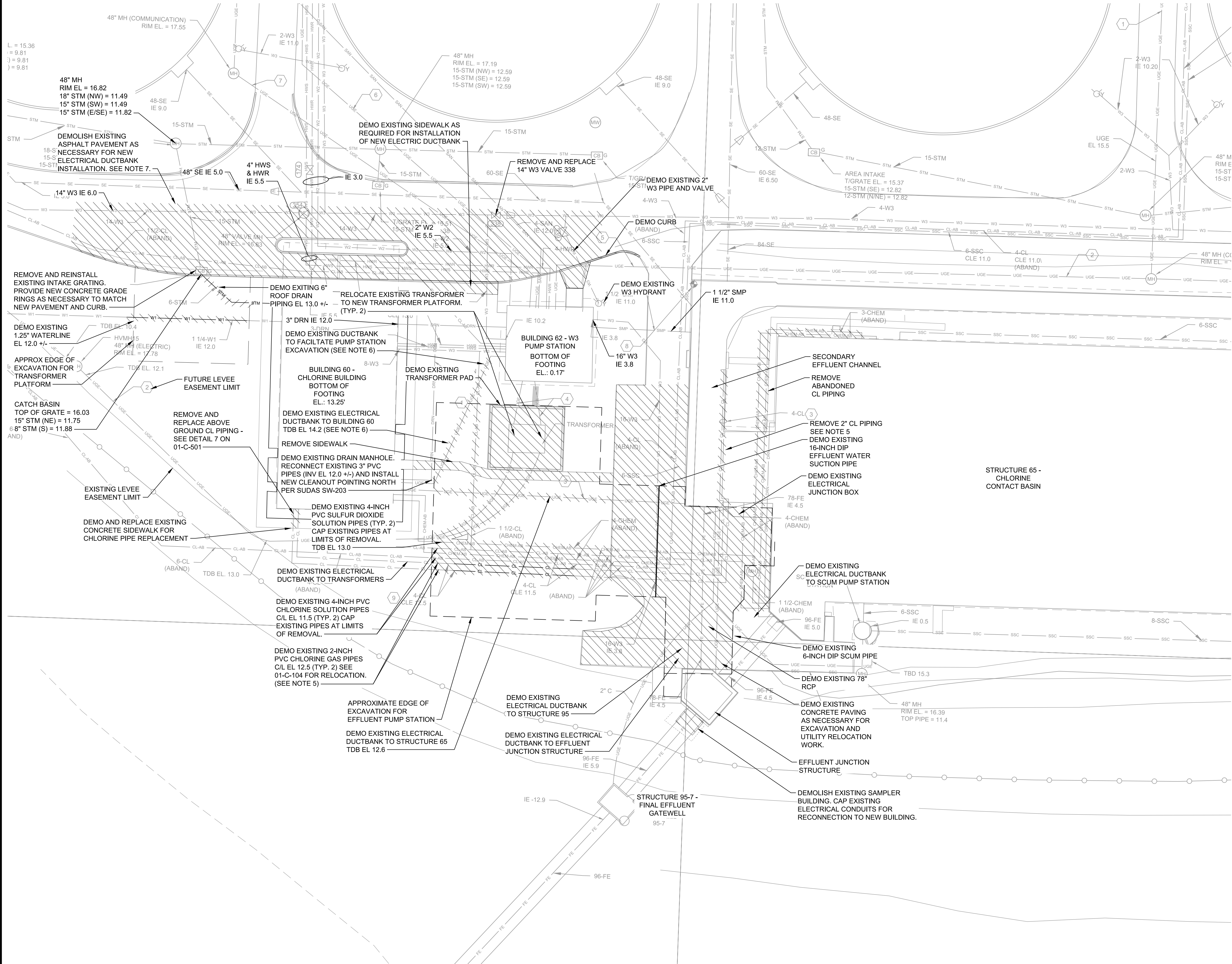
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20' 10' 0 20' 40'  
HORIZONTAL SCALE 1"=20'

GENERAL NOTES:

- CONTRACTOR SHALL CONSTRUCT NEW TRANSFORMER PLATFORM AND ELECTRICAL DUCTBANK PRIOR TO RELOCATING EXISTING TRANSFORMERS IN ORDER TO MAINTAIN FACILITY OPERATION. SEE SPECIFICATION SECTION 01 1113 FOR PHASING DETAILS.
- UTILITIES SHOWN ON THIS SHEET TO BE DEMOLISHED FOR PUMP STATION EXCAVATION. SEE SHEET 01-C-104 FOR UTILITY REINSTALLATION. ALL PIPES, CONDUITS, ETC. SHALL BE TEMPORARILY OR PERMANENTLY CAPPED AT LIMITS OF REMOVAL.
- DEMOLITION OF CHLORINE PIPES MUST OCCUR WHEN DISINFECTION FACILITY IS NOT IN OPERATION (NOVEMBER 15 TO MARCH 15). REINSTALLATION OF NEW CHLORINE PIPES MUST OCCUR PRIOR TO DISINFECTION FACILITY OPERATION.
- CONTRACTOR SHALL MAINTAIN ACCESS TO BUILDING 60 FOR CHLORINE DELIVERIES WHILE DISINFECTION FACILITY IS IN OPERATION (MARCH 15 THROUGH NOVEMBER 15).
- EXISTING 2-CL PIPES CONTAIN CHLORINE GAS. CONTRACTOR SHALL COORDINATE SHUTDOWN WITH OWNER AND AIR PURGE ALL LINES PRIOR TO EXCAVATION FOR LOCATING THESE LINES.
- ENGINEER HAS REVIEWED THE EXISTING RECORD DRAWINGS AND HAS SHOWN KNOW CONDUITS AND CABLES TO BE REROUTED. CONTRACTOR SHALL FIELD INVESTIGATE AND RELOCATE AND REPLACE EXISTING CABLES AND CONDUITS BETWEEN BUILDING 62 AND BUILDING 60 AND OTHER STRUCTURES AS REQUIRED TO ACCOMMODATE CONSTRUCTION OF NEW EFFLUENT PUMP STATION.
- CONTRACTOR SHALL PROTECT ALL UNDERGROUND UTILITIES AND PIPING DURING REMOVAL OF ASPHALT PAVEMENT AND INSTALLATION OF NEW ELECTRICAL DUCTBANK.



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| PROJECT NO.:                  | 410504     |

SITework

CIVIL

SITE DEMOLITION PLAN

PLAN FILE NO. 664-243

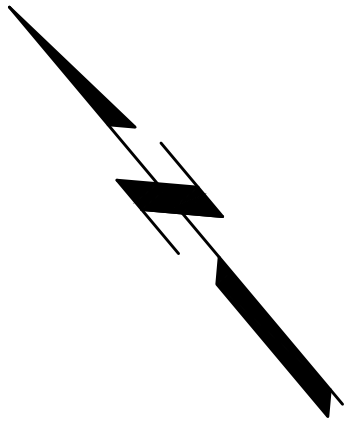
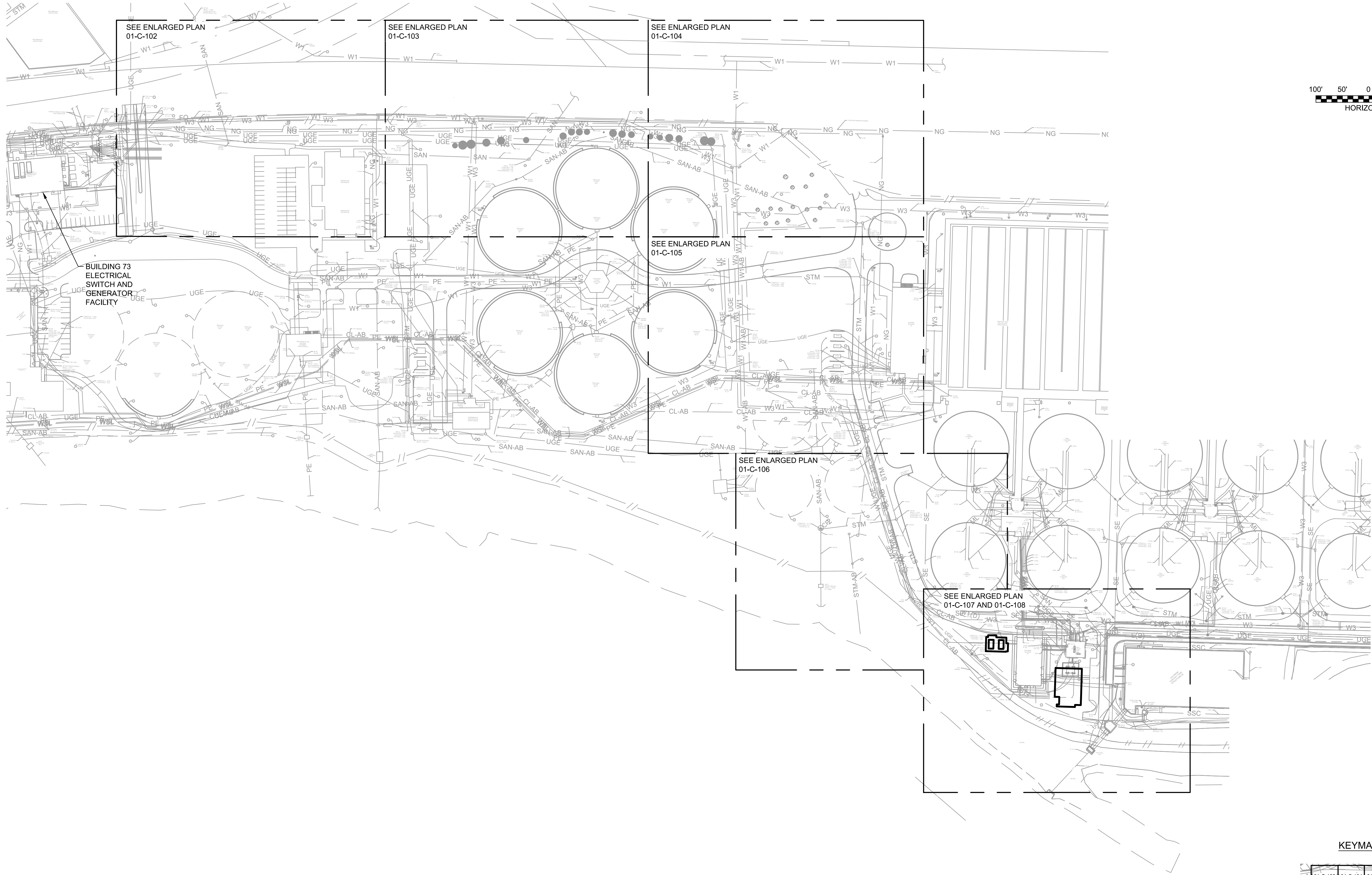
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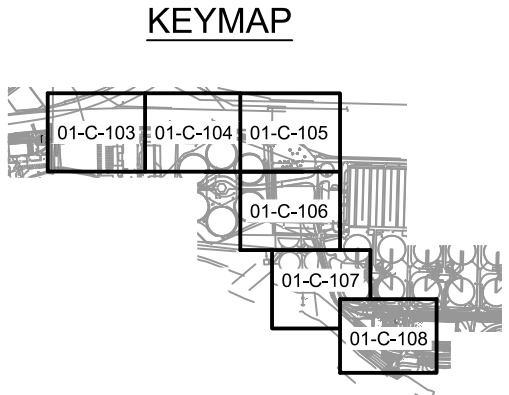
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100' 50' 0 100' 200'  
HORIZONTAL SCALE 1"=100'



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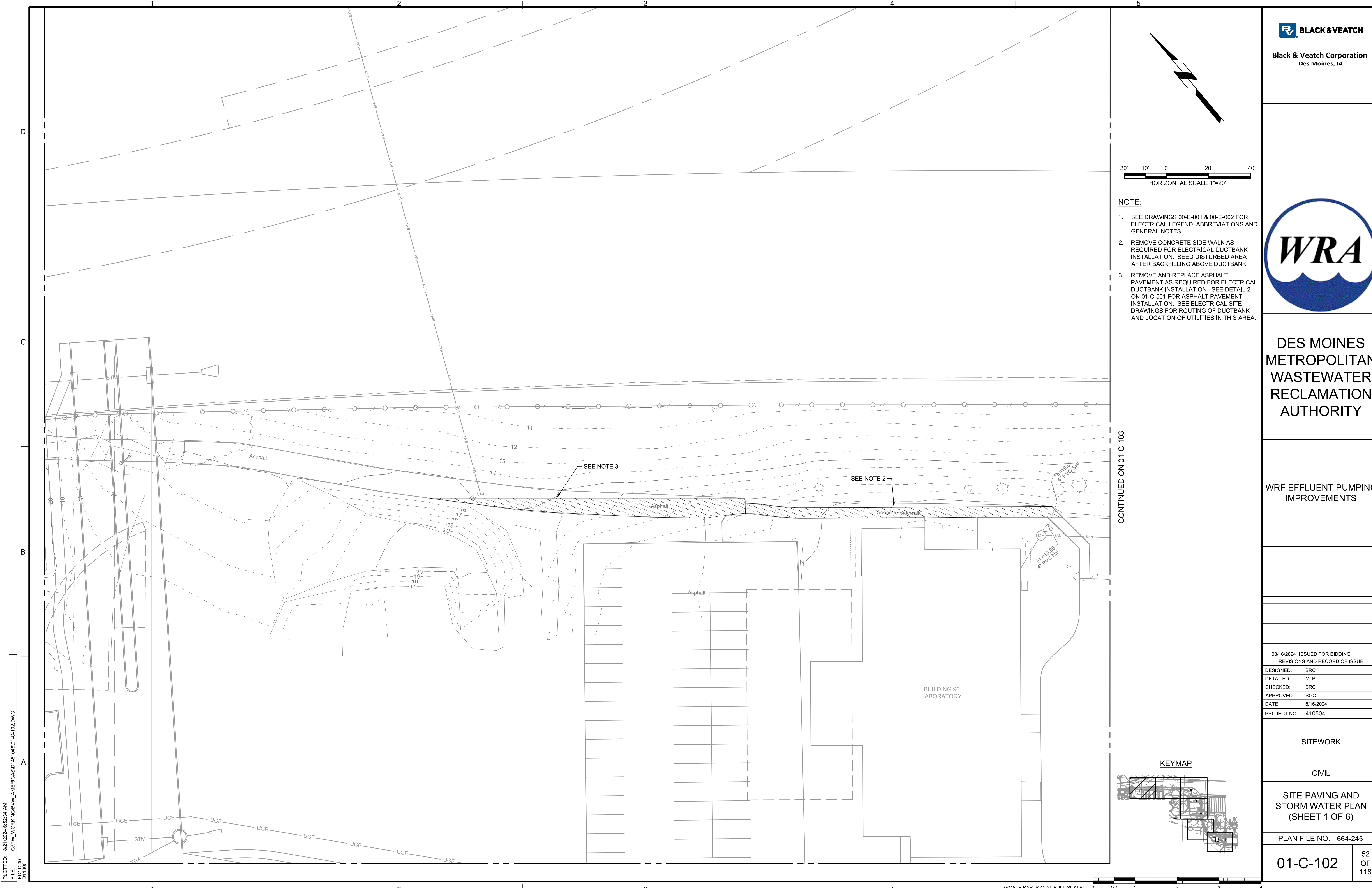
OVERALL SITE PLAN

PLAN FILE NO. 664-244

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SITWORK

CIVIL

SITE PAVING AND  
STORM WATER PLAN  
(SHEET 1 OF 6)

PLAN FILE NO. 664-245

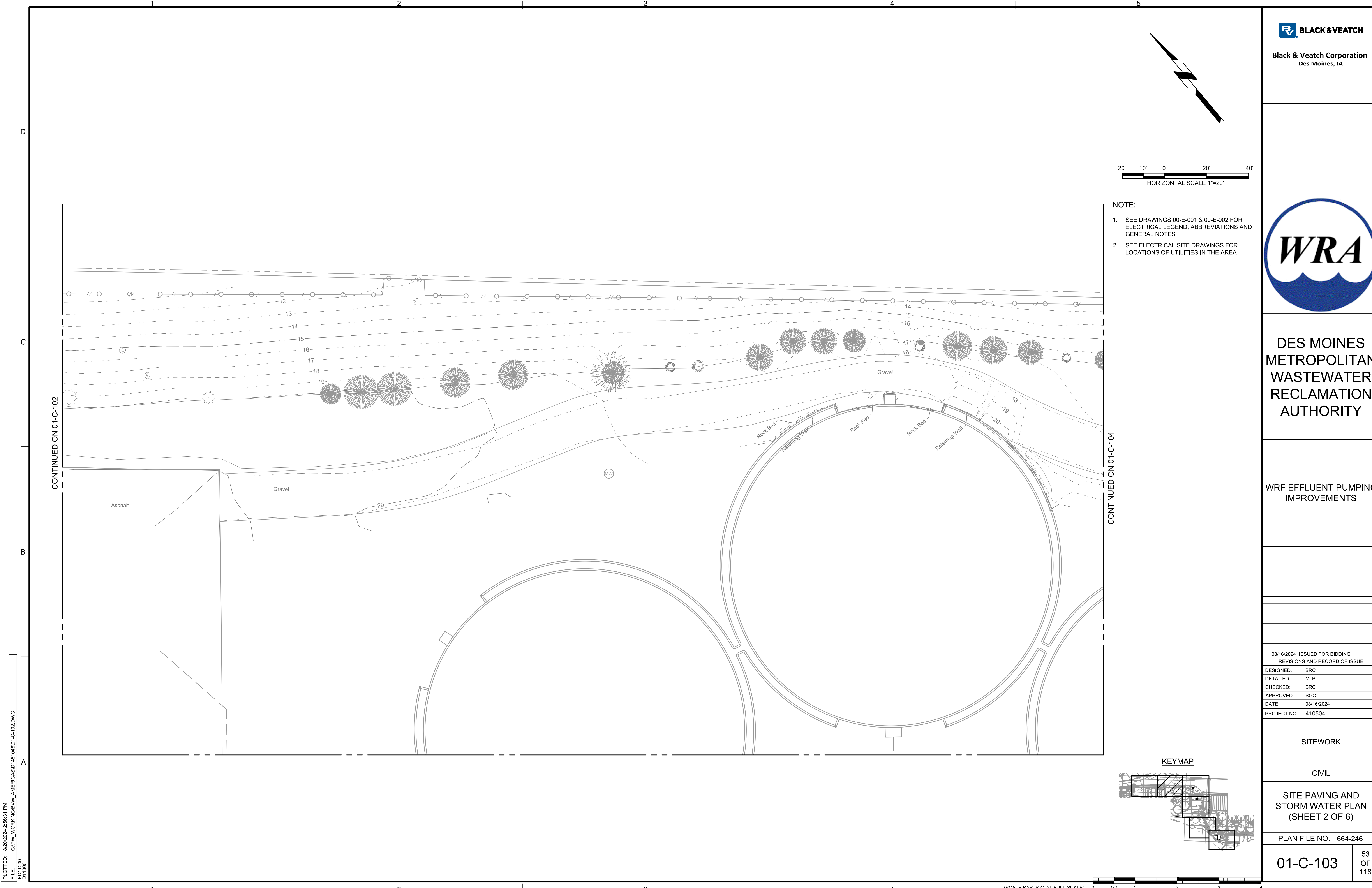
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SITWORK

CIVIL

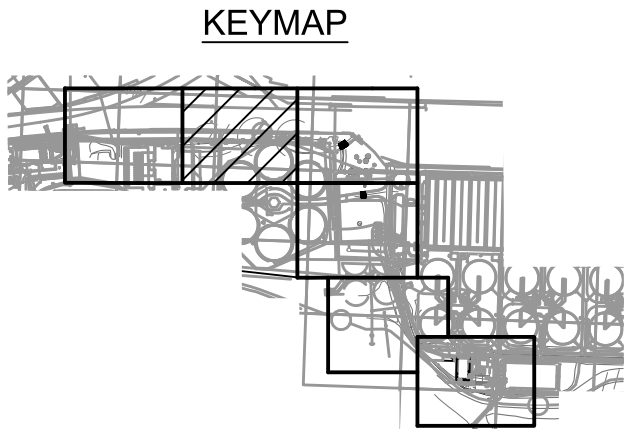
SITE PAVING AND  
STORM WATER PLAN  
(SHEET 2 OF 6)

PLAN FILE NO. 664-246

01-C-103

53  
OF  
118

PLOTTED: 8/20/2024 2:56:31 PM  
FILE: C:\PW\WORKING\BW\AMERICAS\0145\048\01-C-102.DWG  
FD1000  
D11000



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

## SITework

CIVIL

SITE PAVING AND  
STORM WATER PLAN  
(SHEET 3 OF 6)

|                       |
|-----------------------|
| PLAN FILE NO. 664-247 |
|-----------------------|

01-C-104

54  
OF  
118



NOTES:

1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. REMOVE AND REPLACE EXISTING GRAVEL ROAD AS REQUIRED FOR INSTALLATION OF NEW ELECTRICAL DUCTBANK. SEE DETAIL 6 ON 01-C-501 FOR GRAVEL ROAD DETAILS. SEE ELECTRICAL SITE DRAWINGS FOR ROUTING OF DUCTBANK AND LOCATION OF UTILITIES IN THIS AREA.

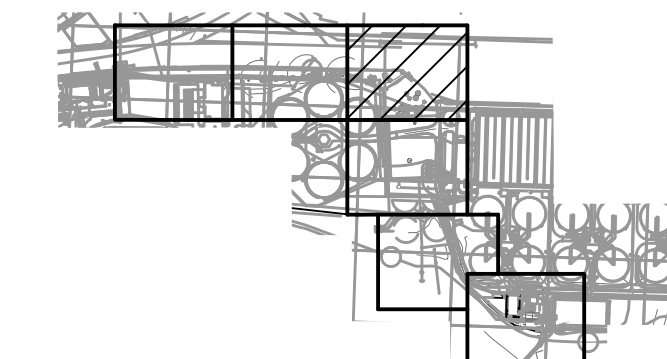
SEE NOTE 2

REPLACE EXISTING  
CATCH BASIN  
TOP GRATE = 17.62 12'  
STM (NW) = 12.62 —

REPLACE EXISTING  
CATCH BASIN  
TOP GRATE = 17.62 12  
STM (NW) = 12.62

CONTINUED ON 01-C-104

## KEYMAP

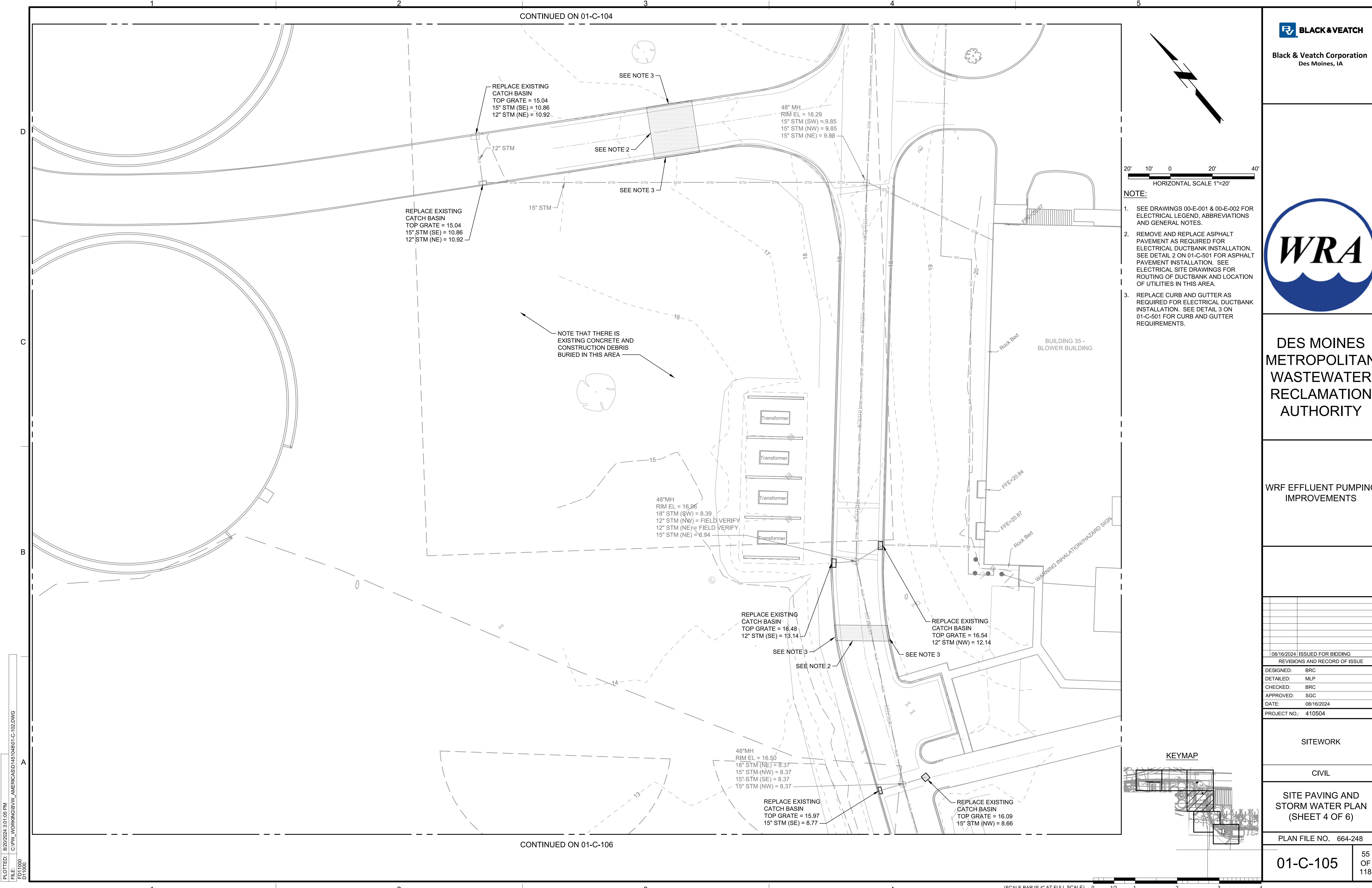


(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4

CONTINUED ON 01-C-103

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CONTINUED ON 01-C-104

CONTINUED ON 01-C-106



Black & Veatch Corporation  
Des Moines, IA



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMPING  
IMPROVEMENTS

|                               |            |
|-------------------------------|------------|
| 08/16/2024 ISSUED FOR BIDDING |            |
| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | BRC        |
| DETAILED:                     | MLP        |
| CHECKED:                      | BRC        |
| APPROVED:                     | SGC        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

SITWORK

CIVIL

SITE PAVING AND  
STORM WATER PLAN  
(SHEET 4 OF 6)

PLAN FILE NO. 664-248

01-C-105

55  
OF  
118

PLOTTED: 8/20/2024 3:01:05 PM  
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FD1000  
D11000

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

## SITework

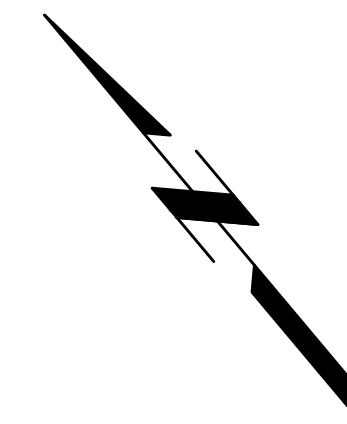
CIVIL

SITE PAVING AND  
STORM WATER PLAN  
(SHEET 5 OF 6)

|                       |
|-----------------------|
| PLAN FILE NO. 664-249 |
|-----------------------|

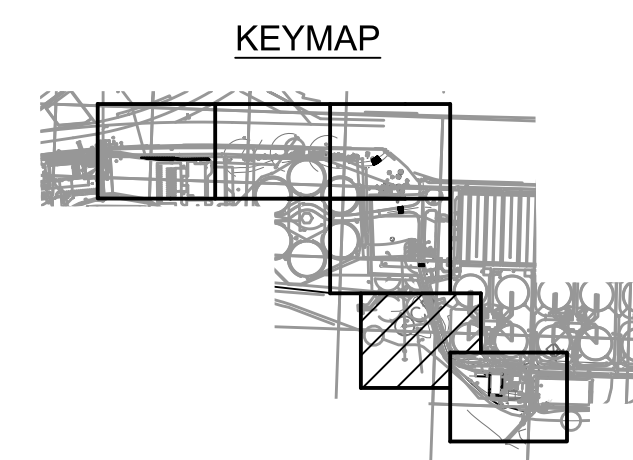
01-C-106

56  
OF  
118



NOTES:

1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. REMOVE AND REPLACE ASPHALT PAVEMENT AS REQUIRED FOR ELECTRICAL DUCTBANK INSTALLATION. SEE DETAIL 2 ON 01-C-501 FOR ASPHALT PAVEMENT INSTALLATION. SEE ELECTRICAL SITE DRAWINGS FOR ROUTING OF DUCTBANK AND LOCATION OF UTILITIES IN THIS AREA.
3. REPLACE CURB AND GUTTER AS REQUIRED FOR ELECTRICAL DUCTBANK INSTALLATION. SEE DETAIL 3 ON 01-C-501 FOR CURB AND GUTTER REQUIREMENTS.



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3

CONTINUED ON 01-C-105

SEE NOTE 2

SEE NOTE 3

SEE NOTE 3

SEE NOTE 2

REPLACE EXISTING  
CATCH BASIN  
TOP GRATE = 15.36  
15" STM (W) = 9.81  
18" STM (NE) = 9.81  
18" STM (SE) = 9.81

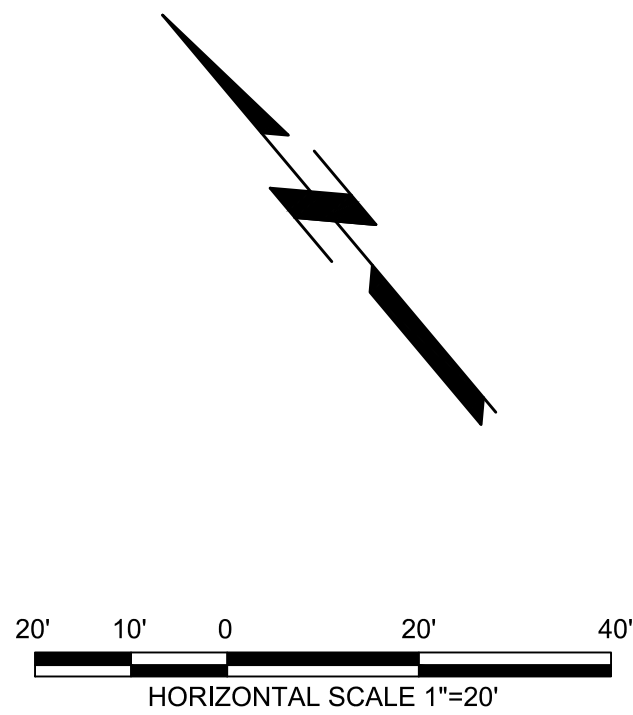
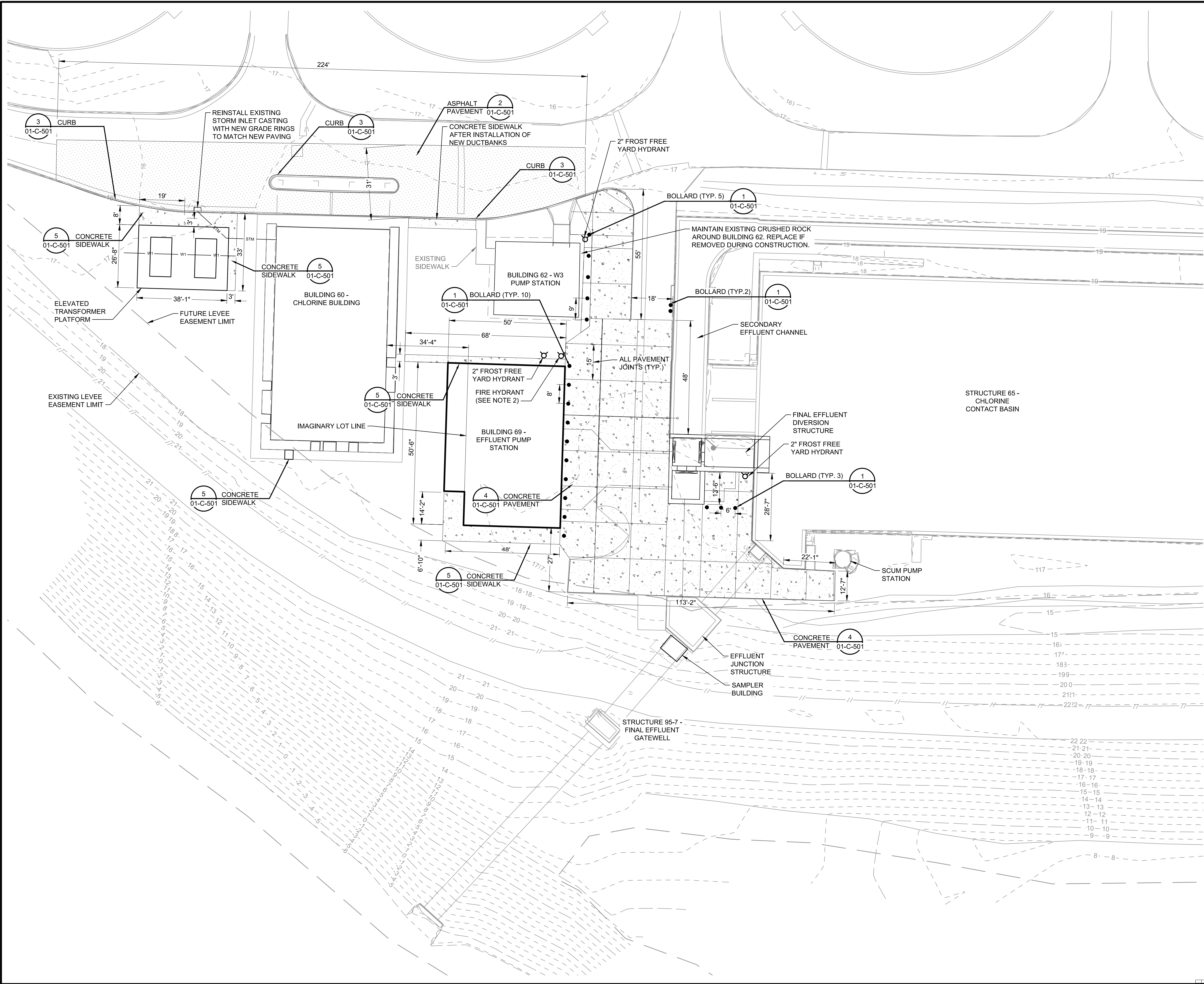
REPLACE EXISTING  
CATCH BASIN  
TOP GRATE = 15.38  
15" STM (E) = 10.53

SEE NOTE 3

|          |                                                   |
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PLOTTED: 8/21/2024 7:12:08 AM  
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FDI1000  
D11000



GENERAL NOTES:

1. CONTRACTOR SHALL MAINTAIN ACCESS TO BUILDING 60 FOR CHLORINE DELIVERIES WHILE DISINFECTION FACILITY IS IN OPERATION (MARCH 15 THROUGH NOVEMBER 15)
2. FIRE HYDRANT SHALL HAVE 5-FT CLEARANCE FOR ACCESS.



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMPING  
IMPROVEMENTS

|                               |            |
|-------------------------------|------------|
| 08/16/2024 ISSUED FOR BIDDING |            |
| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | JHW        |
| DETAILED:                     | GLC        |
| CHECKED:                      | JCK        |
| APPROVED:                     | SGC        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

SITWORK

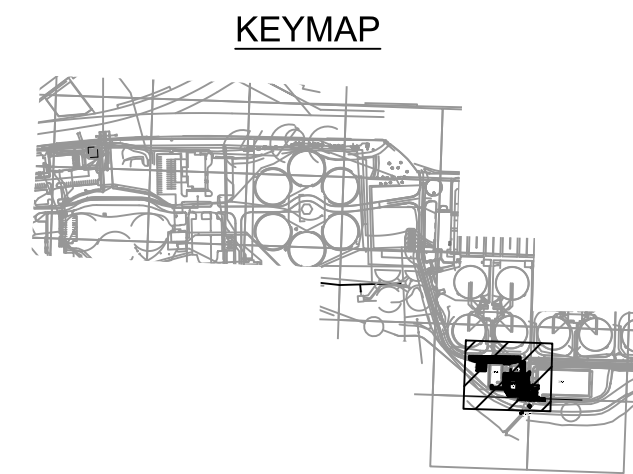
CIVIL

SITE PAVING AND  
STORM WATER PLAN  
(SHEET 6 OF 6)

PLAN FILE NO. 664-250

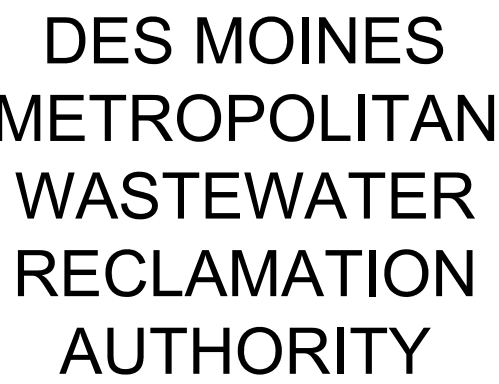
01-C-107

57  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
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|                               |                    |
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|                               |                    |
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JHW                |
| DETAILED:                     | GLC                |
| CHECKED:                      | JCK                |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

## SITework

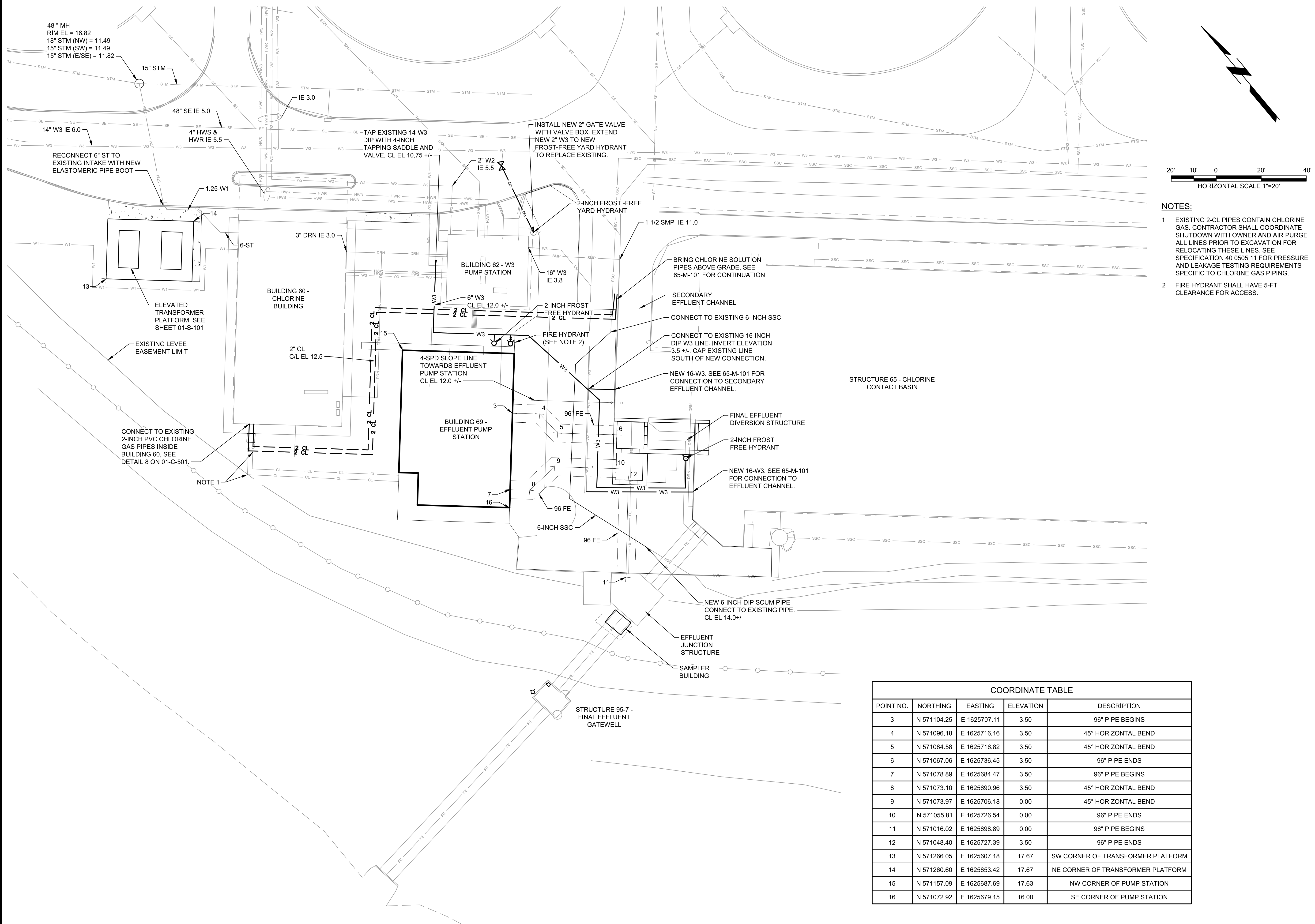
CIVIL

## YARD PIPING PLAN

PLAN FILE NO. 664-251

01-C-108

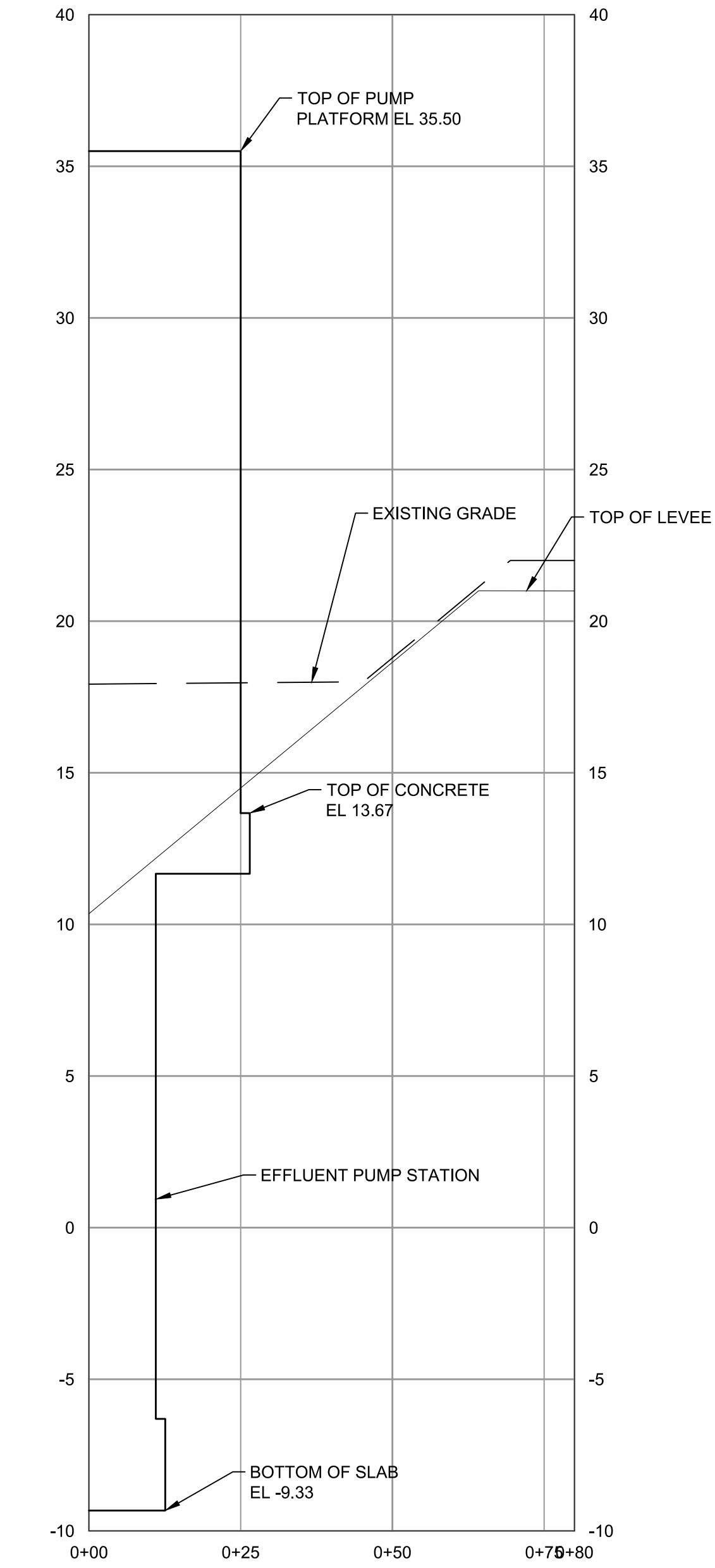
58  
OF  
18



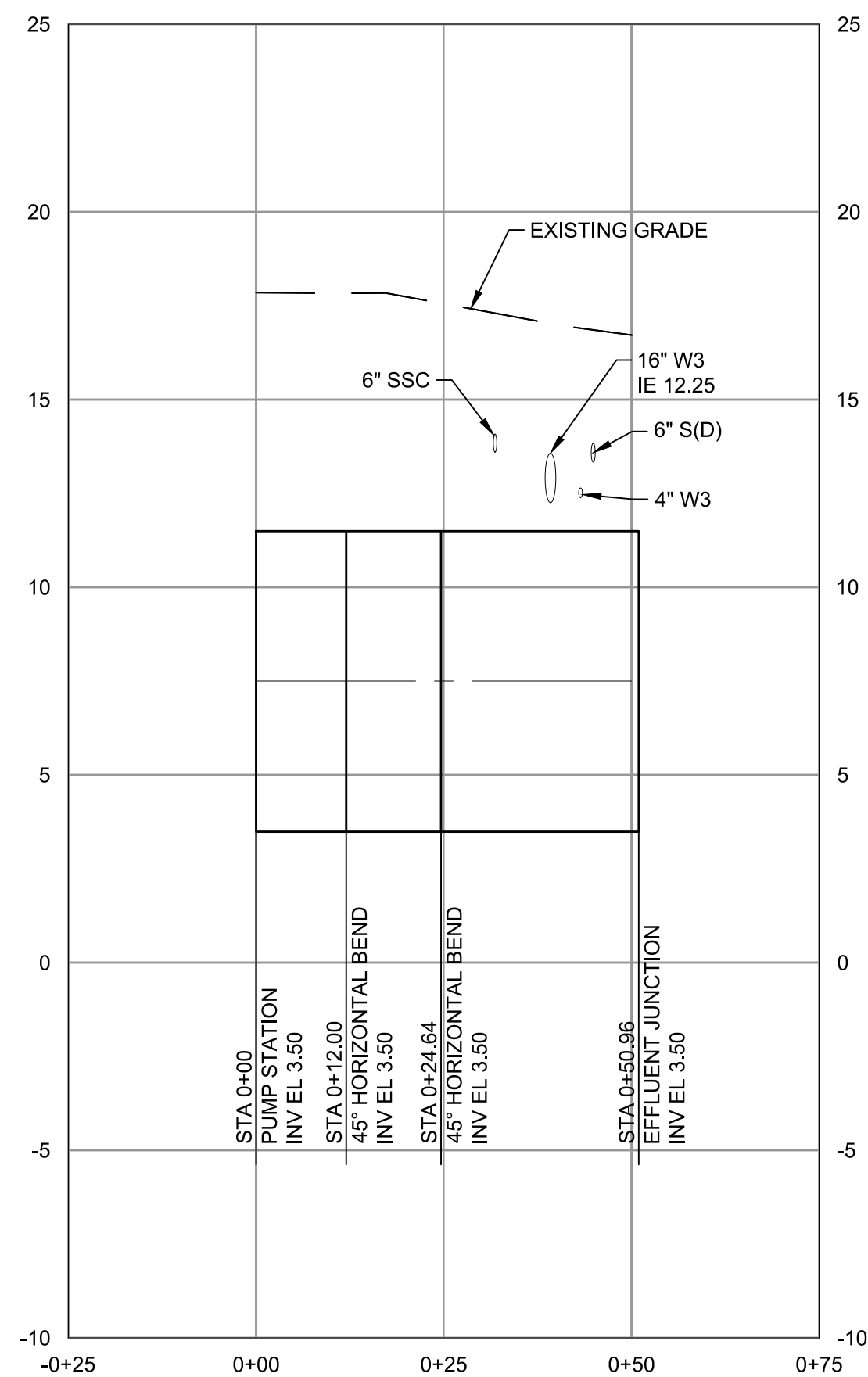
| COORDINATE TABLE |             |              |           |                                   |
|------------------|-------------|--------------|-----------|-----------------------------------|
| POINT NO.        | NORTHING    | EASTING      | ELEVATION | DESCRIPTION                       |
| 3                | N 571104.25 | E 1625707.11 | 3.50      | 96" PIPE BEGINS                   |
| 4                | N 571096.18 | E 1625716.16 | 3.50      | 45° HORIZONTAL BEND               |
| 5                | N 571084.58 | E 1625716.82 | 3.50      | 45° HORIZONTAL BEND               |
| 6                | N 571067.06 | E 1625736.45 | 3.50      | 96" PIPE ENDS                     |
| 7                | N 571078.89 | E 1625684.47 | 3.50      | 96" PIPE BEGINS                   |
| 8                | N 571073.10 | E 1625690.96 | 3.50      | 45° HORIZONTAL BEND               |
| 9                | N 571073.97 | E 1625706.18 | 0.00      | 45° HORIZONTAL BEND               |
| 10               | N 571055.81 | E 1625726.54 | 0.00      | 96" PIPE ENDS                     |
| 11               | N 571016.02 | E 1625698.89 | 0.00      | 96" PIPE BEGINS                   |
| 12               | N 571048.40 | E 1625727.39 | 3.50      | 96" PIPE ENDS                     |
| 13               | N 571266.05 | E 1625607.18 | 17.67     | SW CORNER OF TRANSFORMER PLATFORM |
| 14               | N 571260.60 | E 1625653.42 | 17.67     | NE CORNER OF TRANSFORMER PLATFORM |
| 15               | N 571157.09 | E 1625687.69 | 17.63     | NW CORNER OF PUMP STATION         |
| 16               | N 571072.92 | E 1625679.15 | 16.00     | SE CORNER OF PUMP STATION         |



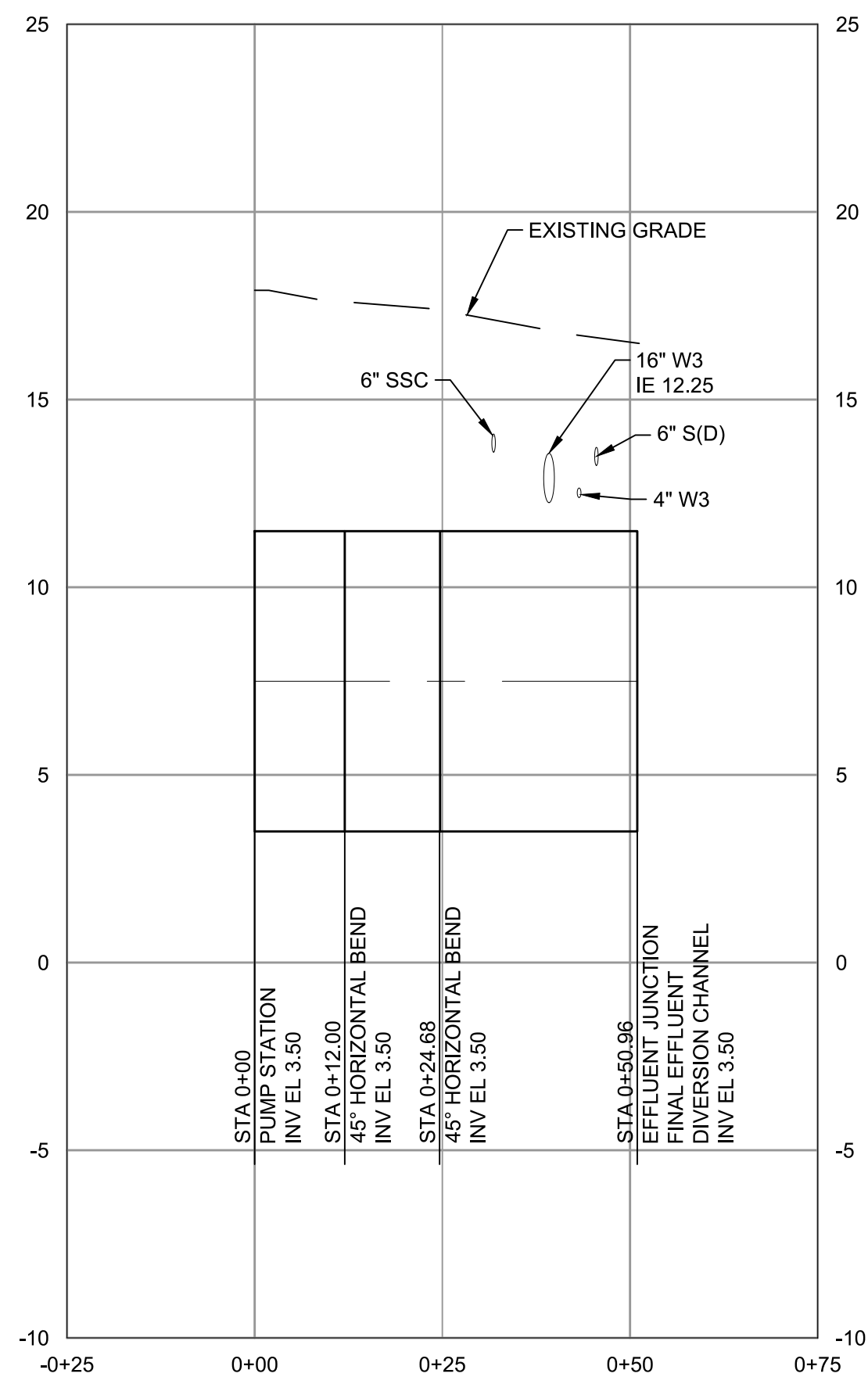
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 D11000



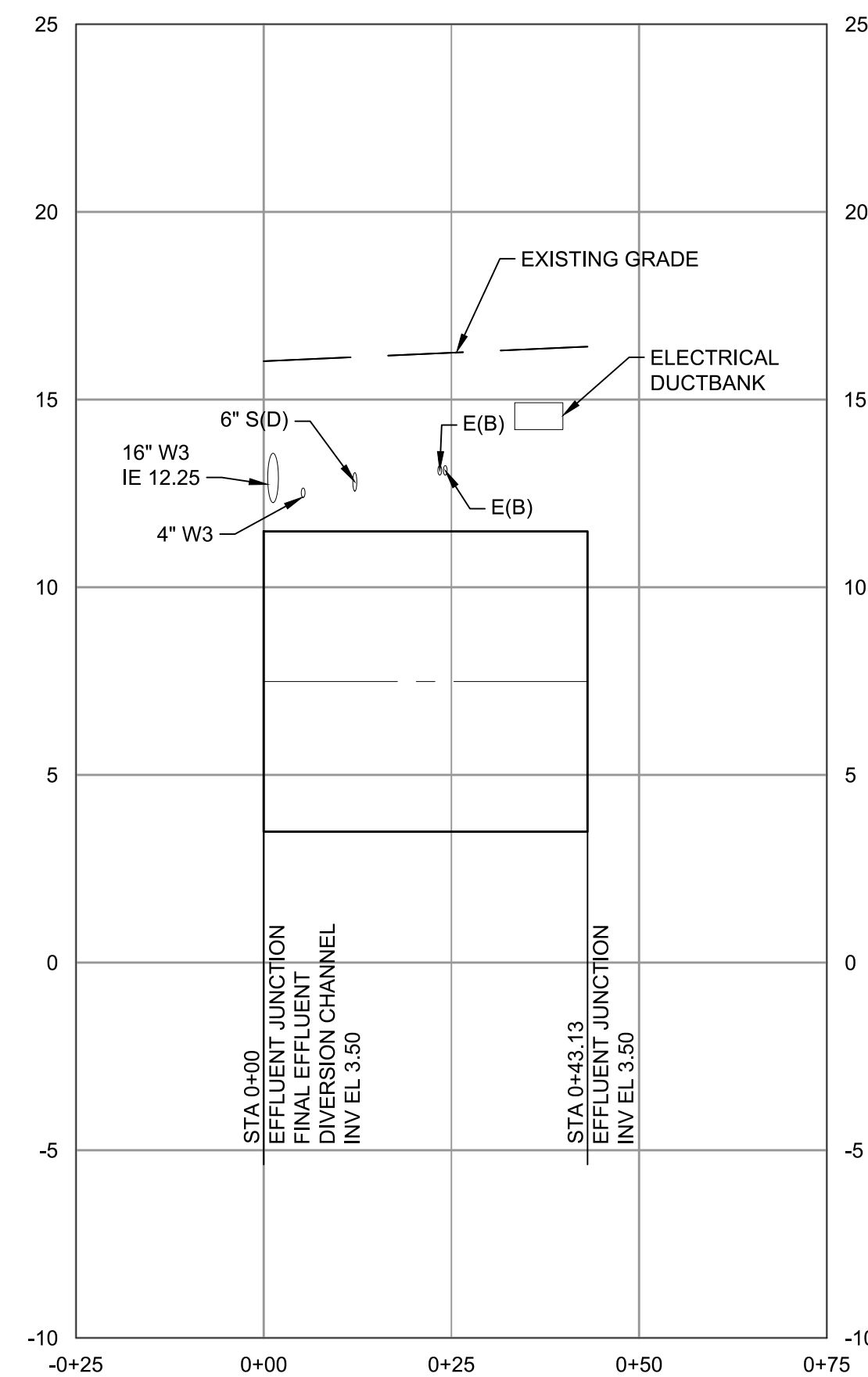
S1 PUMP STATION AND LEVEE SECTION VIEW



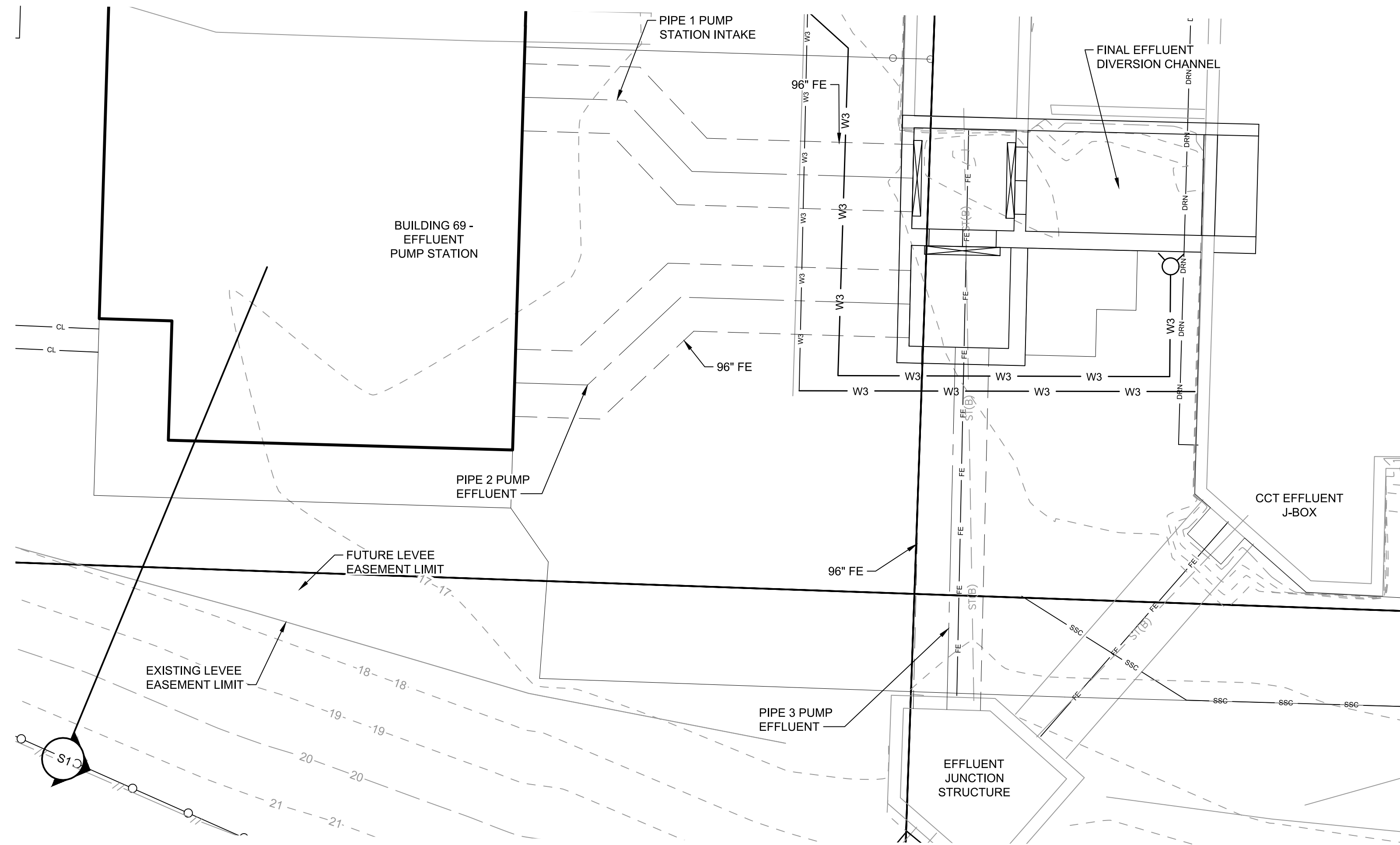
PIPE 1 PUMP STATION INTAKE PROFILE



PIPE 2 PUMP EFFLUENT



PIPE 3 PUMP EFFLUENT



EFFLUENT PUMP STATION  
 PIPING PLAN VIEW

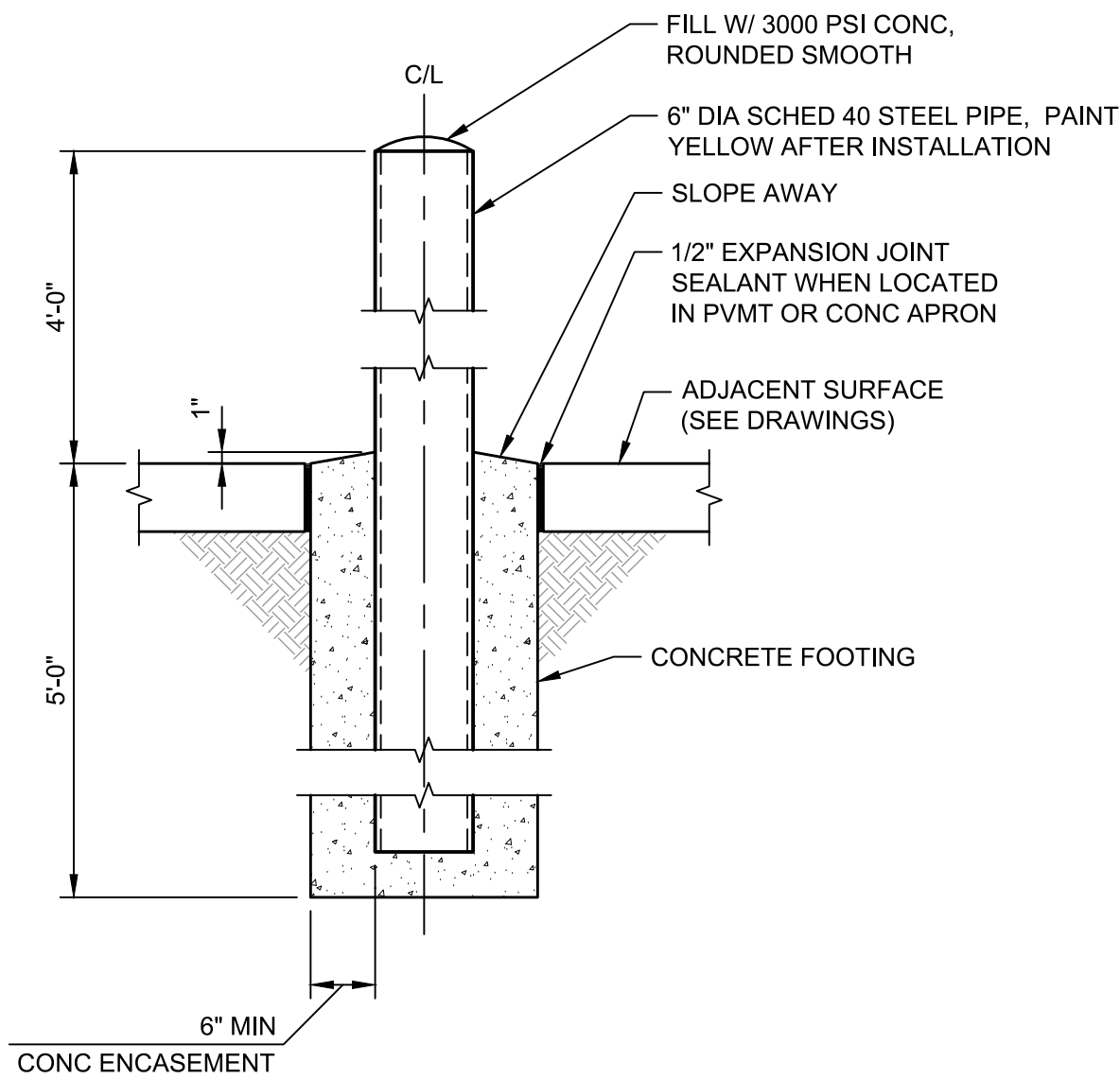


NOTES:  
 1. CONTRACTOR SHALL FIELD VERIFY ALL ELEVATIONS OF ALL UNDERGROUND UTILITIES

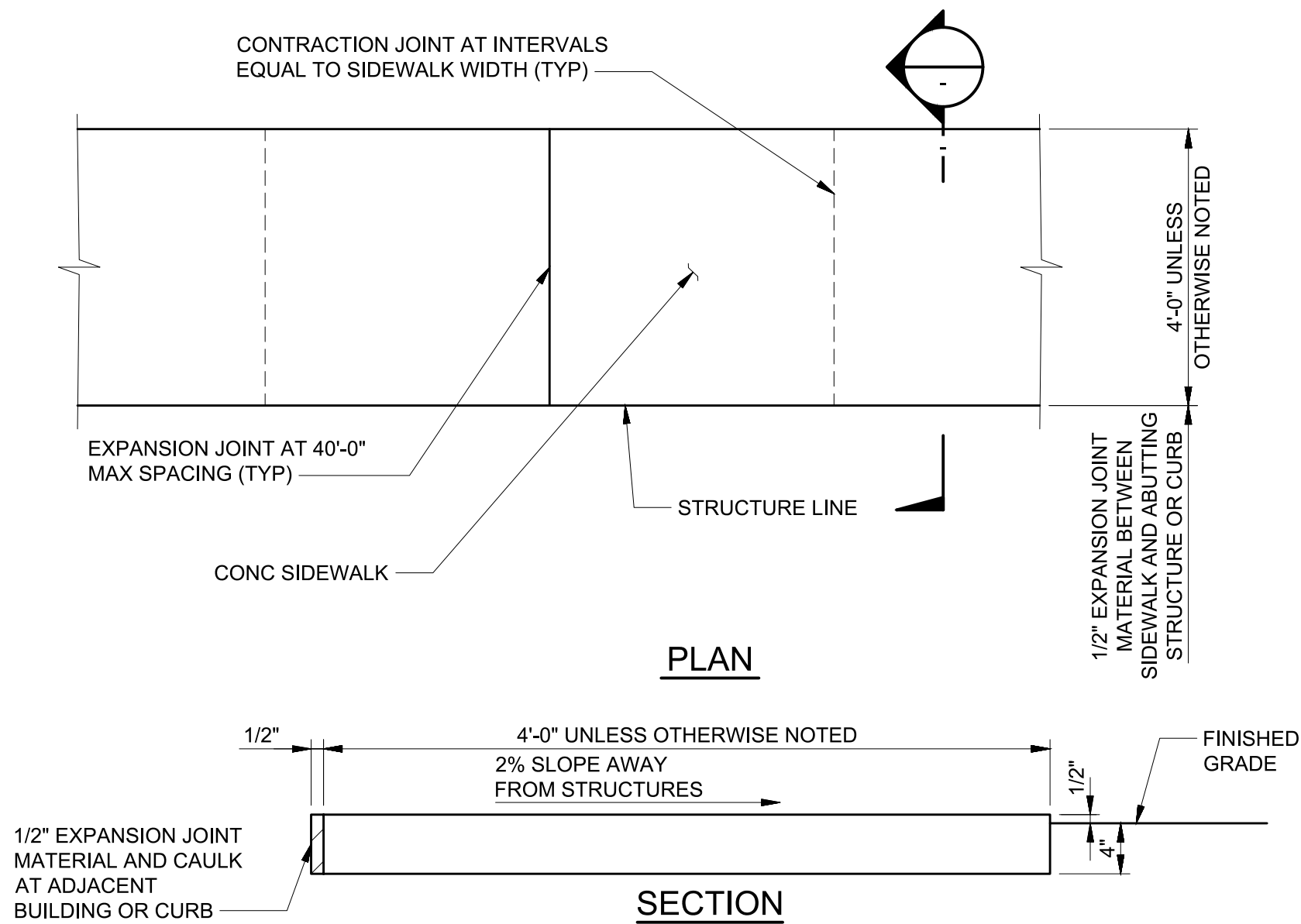


| REVISIONS AND RECORD OF ISSUE |                    |
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| 08/16/2024                    | ISSUED FOR BIDDING |
| DESIGNED:                     | JHW                |
| DETAILED:                     | GLC                |
| CHECKED:                      | JCK                |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

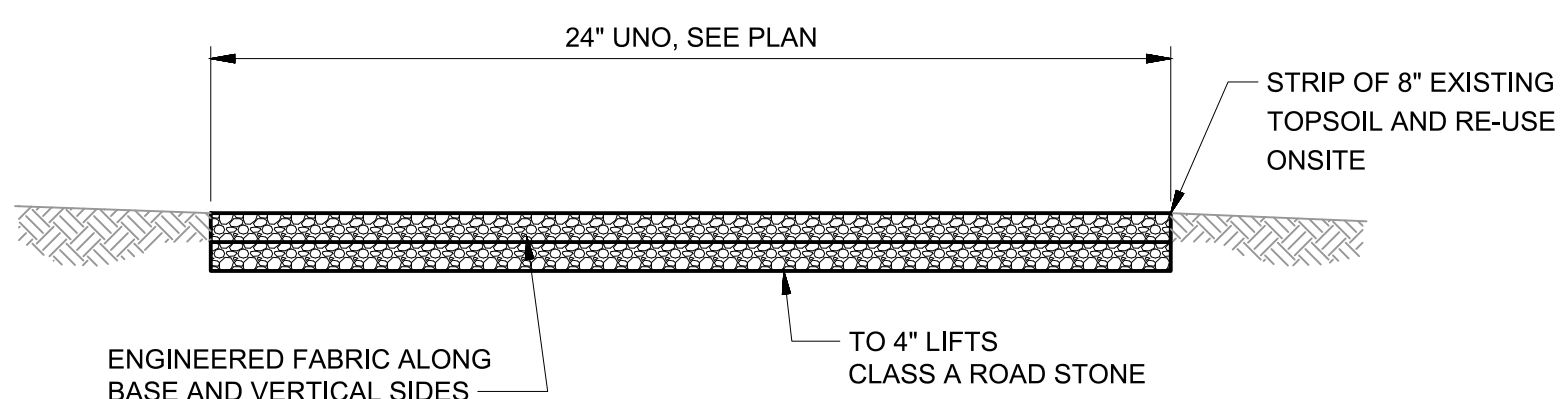




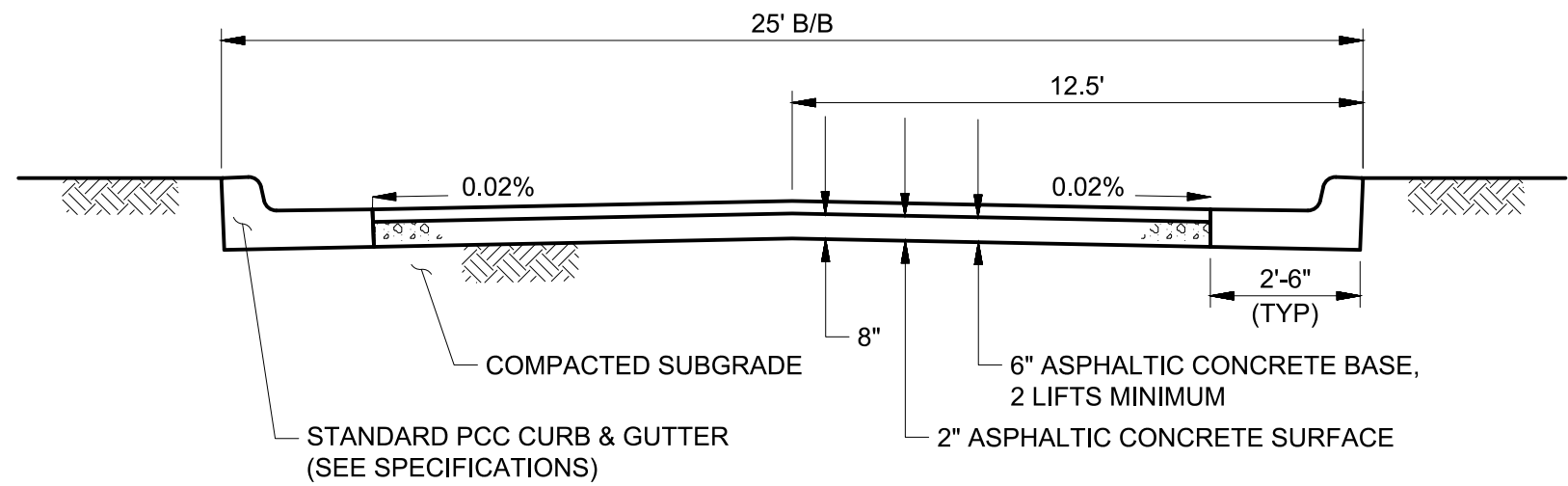
1 EXTERIOR BOLLARD  
01-C-501 NTS



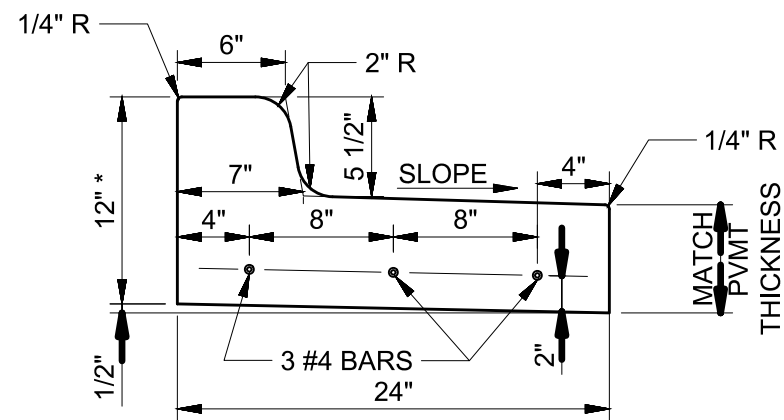
5 CONCRETE SIDEWALK  
01-C-501 NTS



6 GRAVEL ACCESS ROAD DETAIL  
01-C-501 NTS



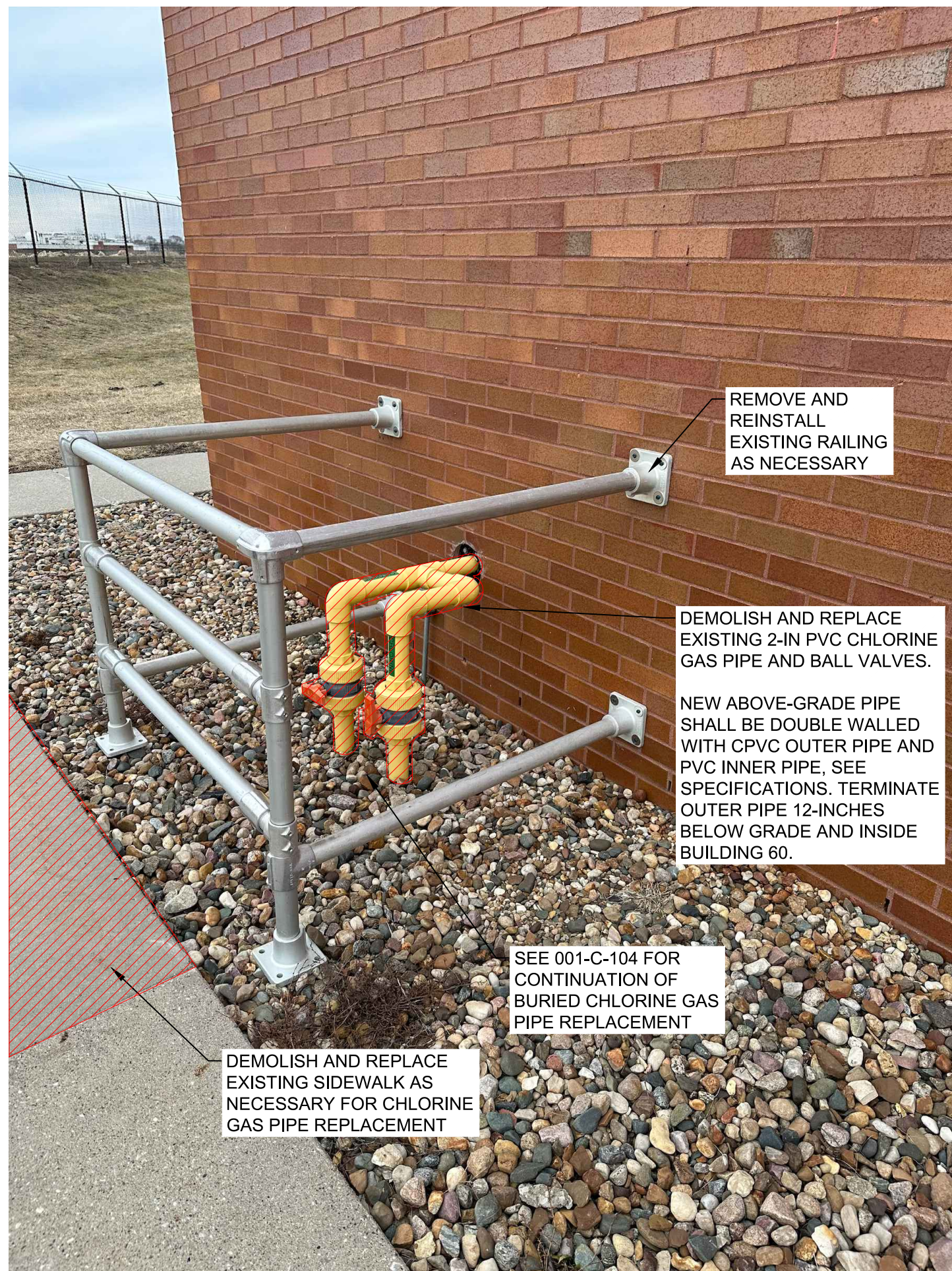
2 ASPHALTIC CONCRETE PAVEMENT WITH CURB & GU  
01-C-501 NTS



3 COMBIND CURB AND GUTTER (FOWARD SLOPED  
01-C-501 NTS

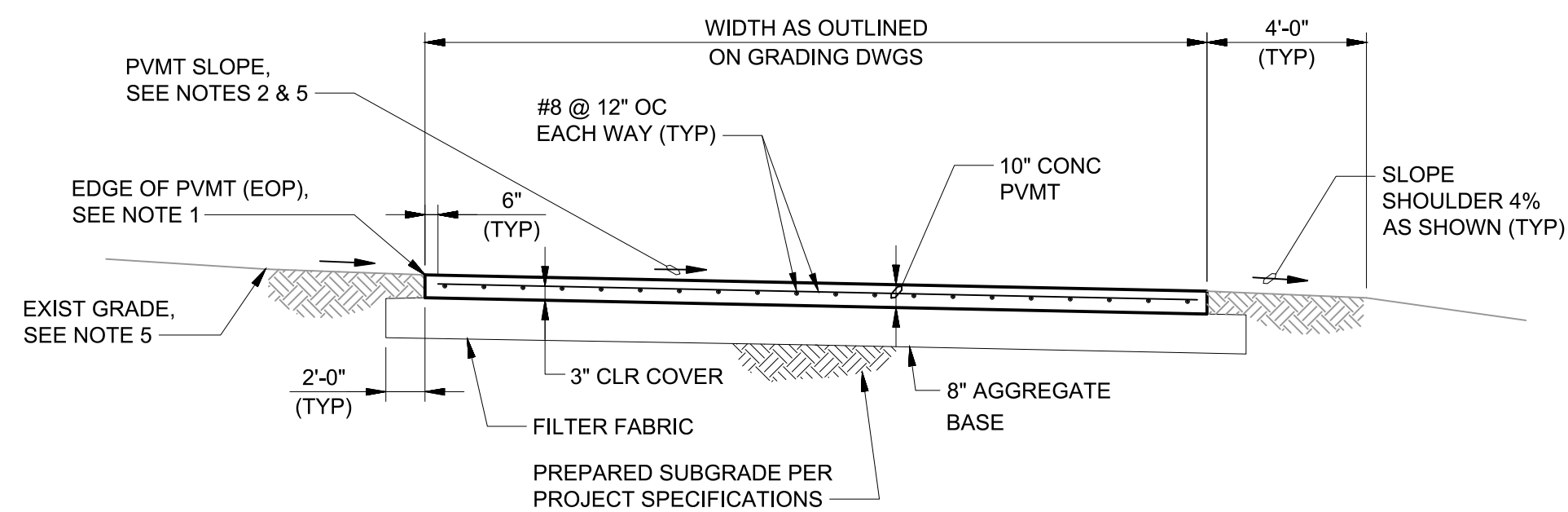
NOTES:

- PAVEMENT IS TO BE SLOPED TO DRAIN AT A MINIMUM OF 2% UNLESS OTHERWISE NOTED ON THE GRADING DRAWINGS.
- JOINTS IN CURB SHALL MATCH IN MEASUREMENT TO THAT OF THE SIDEWALK OR PAVEMENT TO WHICH IT ABUTS.
- ALL NEW CURB SHALL BE TIED INTO EXISTING CURB OR GRADE SUCH THAT NO WATER WILL BE TRAPPED TO CAUSE PONDING AND TO PROVIDE POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES TO STORM SEWER INLETS OR AN ACCEPTABLE DRAINAGE COURSE.



EXTERIOR CHLORINE PIPING AT  
CHLORINE BUILDING (BUILDING 60)

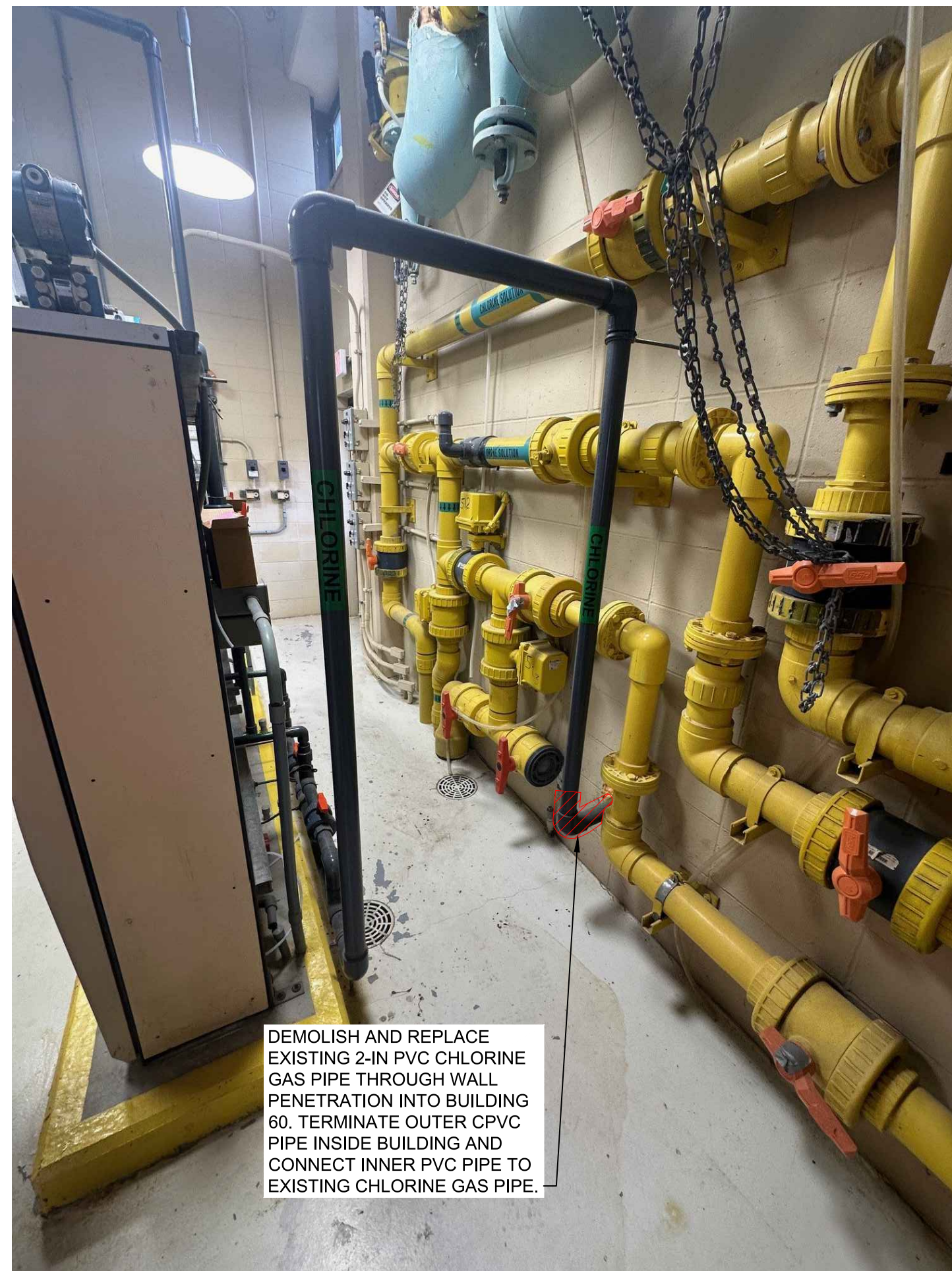
7  
01-C-501



4 CONCRETE PAVEMENT (REINFORCED)  
01-C-501 NTS

NOTES:

- USE 3/4-INCH EXPANSION JOINT MATERIAL BETWEEN CONCRETE PAVEMENT AND ABUTTING STRUCTURES.
- CONCRETE PAVEMENT SHALL BE SLOPED TO DRAIN AT A MINIMUM OF 2% UNLESS OTHERWISE NOTED ON THE GRADING DRAWINGS.
- CONSTRUCTION OR CONTRACTION JOINTS SHALL BE SPACED AT A MINIMUM OF 15 FEET IN BOTH DIRECTIONS.
- CONTRACTION JOINTS SHALL BE PLACED BETWEEN ADJACENT POURS.
- ALL NEW PAVEMENT SHALL BE TIED INTO EXISTING PAVEMENT OR GRADE SUCH THAT NO WATER WILL BE TRAPPED TO CREATE PONDING BUT WILL PROVIDE POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES AND AWAY FROM ROADWAYS TOWARD STORM SEWER INLETS OR OTHER ACCEPTABLE DRAINAGE COURSE.



INTERIOR CHLORINE PIPING AT  
CHLORINE BUILDING (BUILDING 60)

8  
01-C-501

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



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WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMPING  
IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JHW                |
| DETAILED:                     | BCS                |
| CHECKED:                      | JCK                |
| APPROVED:                     | SGC                |
| DATE:                         | 09/16/24           |
| PROJECT NO.:                  | 410504             |

SITework

CIVIL

DETAILS

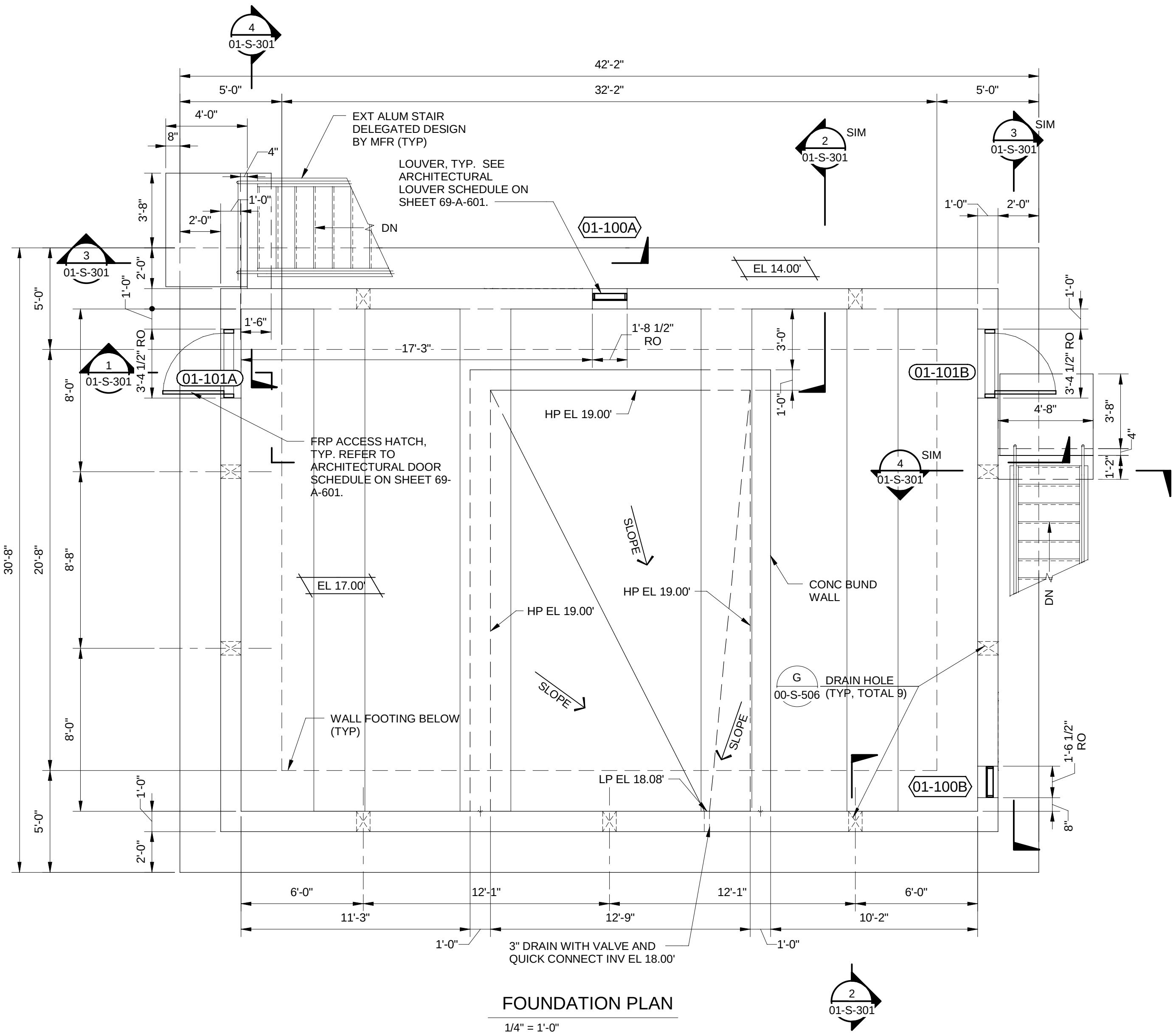
PLAN FILE NO. 664-253

01-C-501

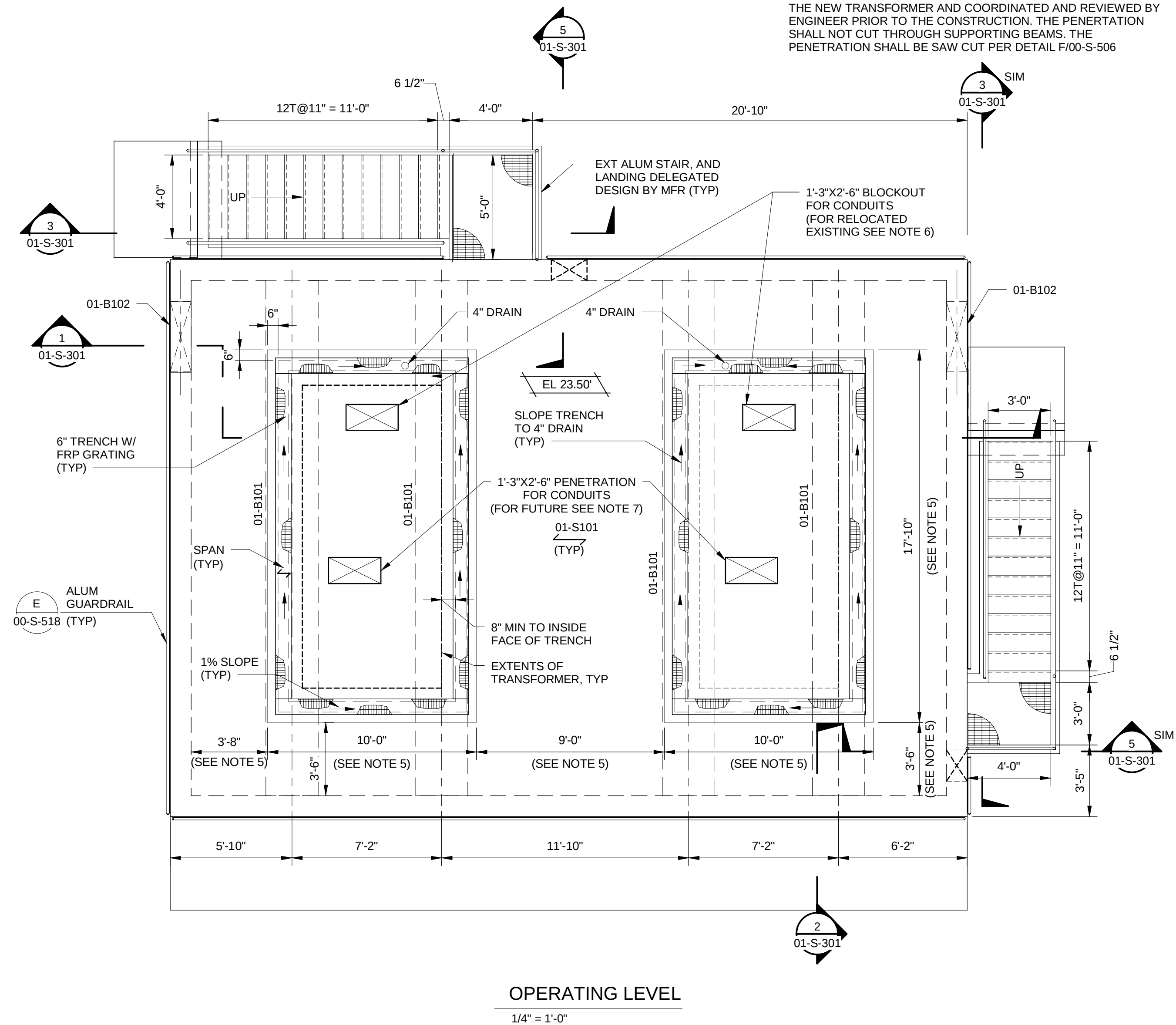
60  
OF  
118



PLOTTED: 8/20/2024 9:32:05 AM  
FILE: BIM 360/410504 - WRF Effluent Pump Station/410504-WRF ELEVATED TRANSFORMER PLATFORM.rvt  
D11000



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



OPERATING LEVEL  
1/4" = 1'-0"

NOTES:

1. SEE CIVIL SITE PLAN FOR PLATFORM COORDINATES.
2. FOR STRUCTURAL NOTES AND LOADING CRITERIA, SEE SHEET 00-S-001 AND 00-S-003.
3. FOR STANDARD CONCRETE DETAILS, SEE SHEET 00-S-501 AND 00-S-502.
4. SEE SHEET 00-S-004 FOR CONCRETE BEAM AND SLAB SCHEDULE AND DETAILS.
5. DIMENSIONS ARE PRELIMINARY AND SHALL BE COORDINATED WITH THE FURNISHED EQUIPMENT.
6. THE BLOCKOUT FOR CONDUITS SHALL BE COORDINATED WITH THE EXISTING TRANSFORMER THAT IS RELOCATED. THE BLOCKOUT SHALL NOT CUT THROUGH SUPPORTING BEAMS. THE BLOCKOUT SHALL BE INFILLED WITH CONCRETE USING DETAIL H/00-S-506
7. THE PENETRATION FOR CONDUITS SHALL BE COORDINATED WITH THE NEW TRANSFORMER AND COORDINATED AND REVIEWED BY ENGINEER PRIOR TO THE CONSTRUCTION. THE PENETRATION SHALL NOT CUT THROUGH SUPPORTING BEAMS. THE PENETRATION SHALL BE SAW CUT PER DETAIL F/00-S-506



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IMPROVEMENTS

|                               |                    |
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| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | AVS                |
| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

SITWORK

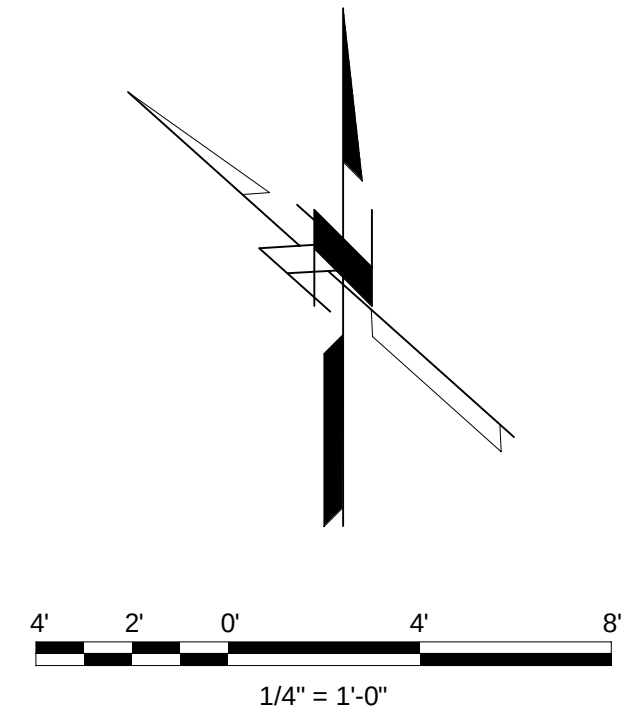
STRUCTURAL

ELEVATED  
TRANSFORMER  
PLATFORM - PLANS

PLAN FILE NO. 664-254

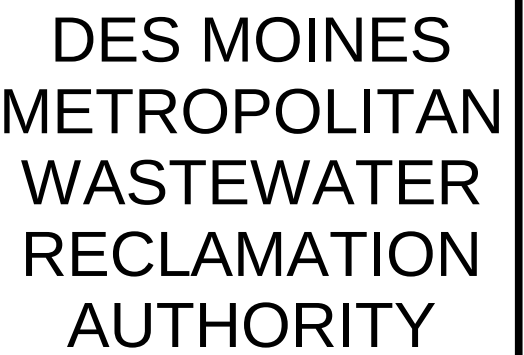
01-S-101

61  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

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| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
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| DETAILED:                     | VVS                |
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| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

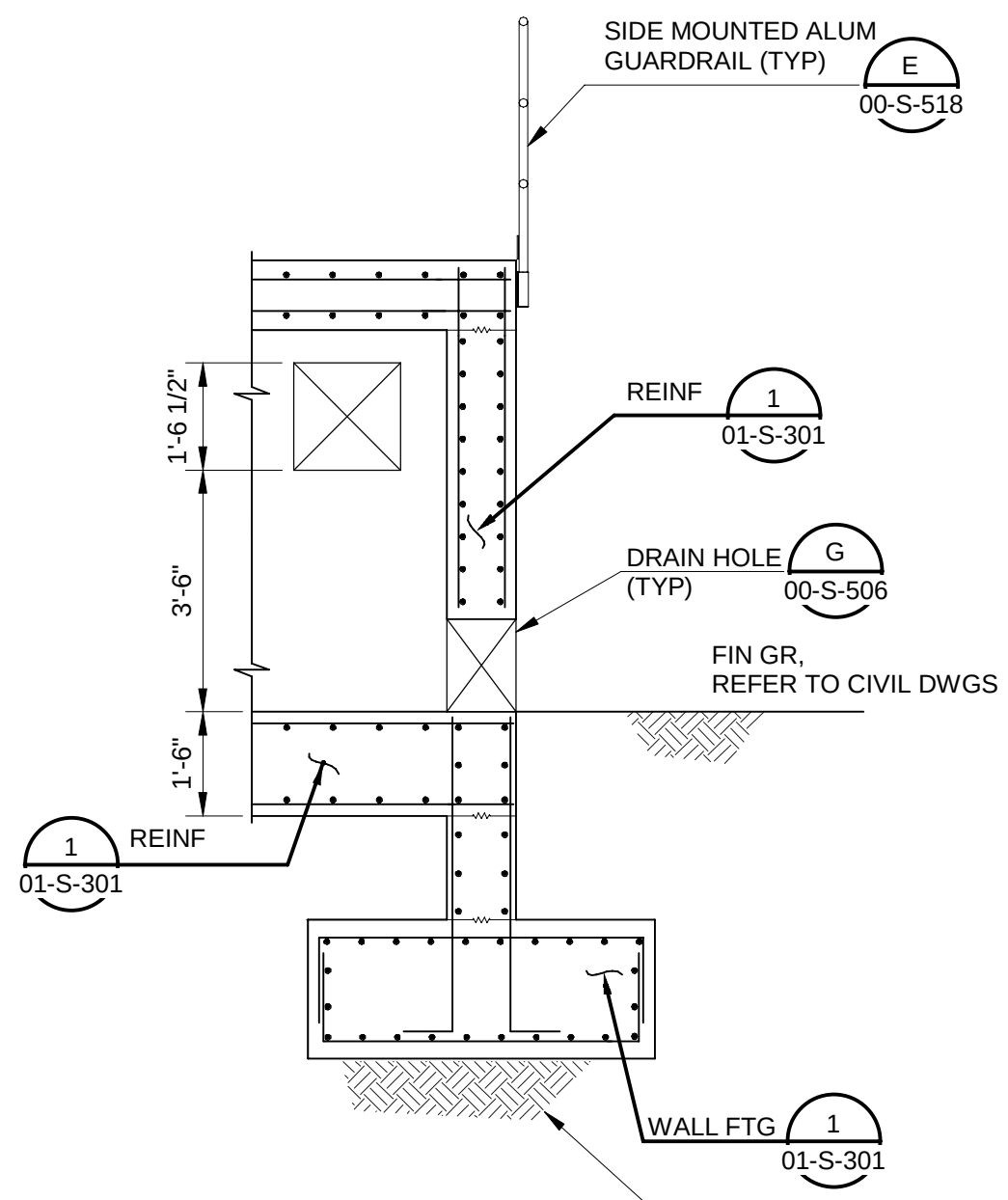
## SITework

STRUCTURAL

ELEVATED  
TRANSFORMER  
PLATFORM - SECTIONS

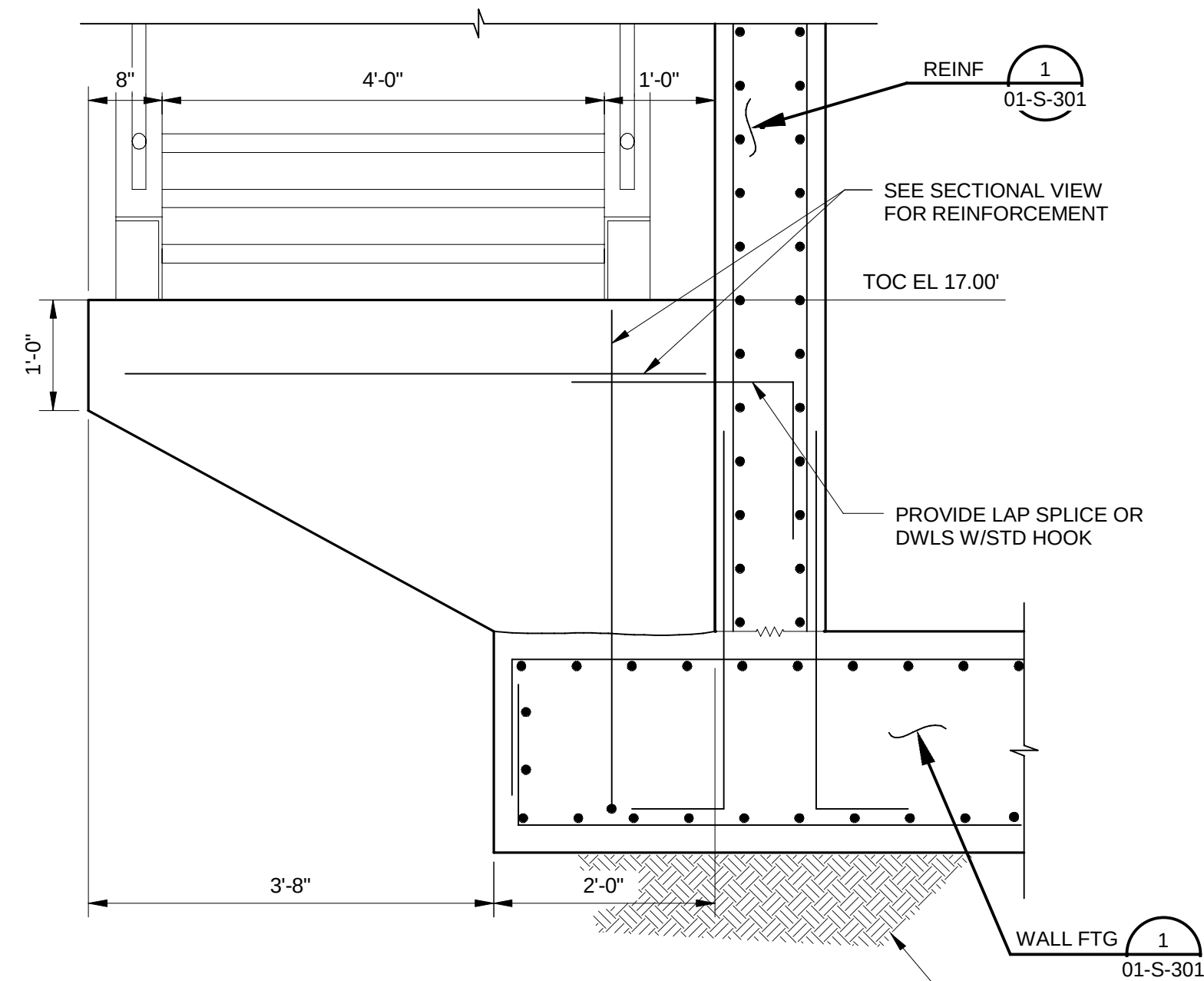
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01-S-301

62  
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18

SECTION

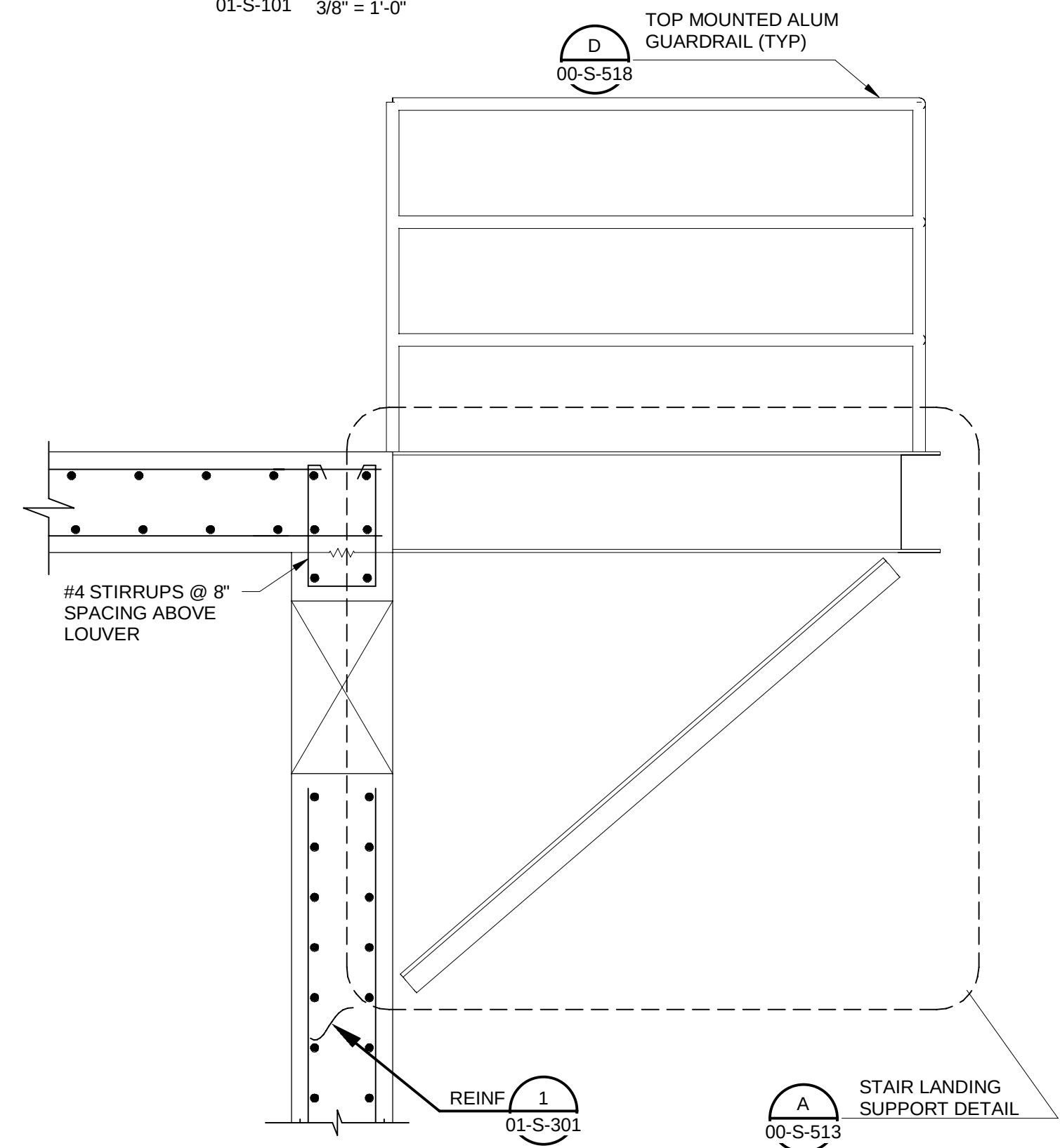
01-S-101 3/8" = 1'-0"



SECTION

4

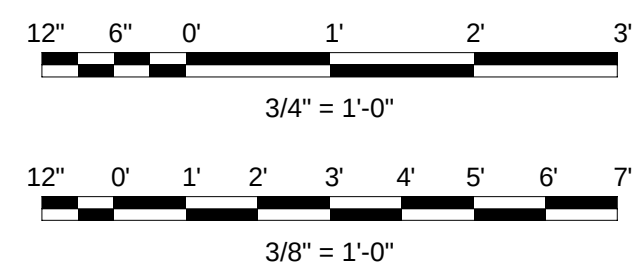
01-S-101  $3/4" = 1'-0"$



SECTION

5

01-S-101 3/4" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



## GENERAL SHEET NOTES

1. SEE DRAWING 00-H-001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.

**BLACK & VEATCH**

Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

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| 08/15/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | VSS                |
| DETAILED:                     | AJP                |
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| PROJECT NO.:                  | 410504             |

## SITework

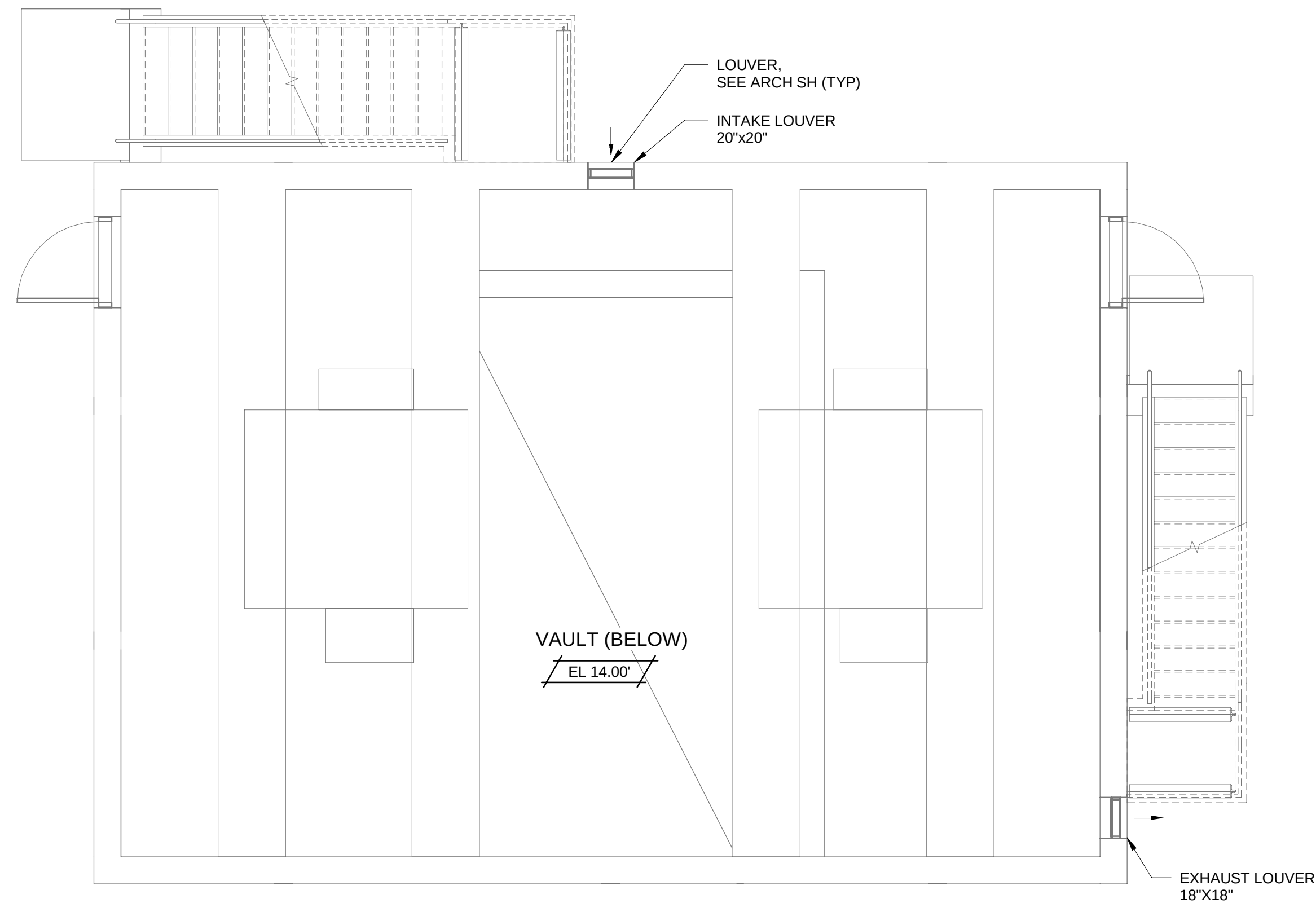
IVAC

## ELEVATED TRANSFORMER PLATFORM

PLAN FILE NO. 664-256

01-H-101

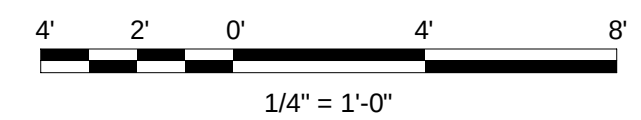
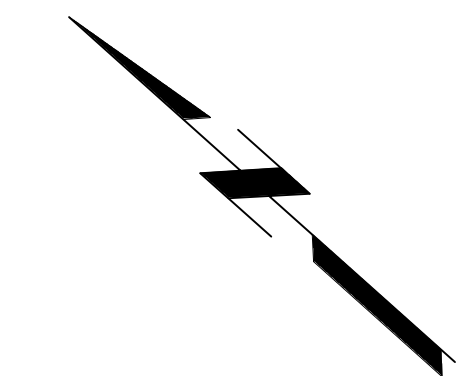
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DF  
18



### LOWER LEVEL - PLAN

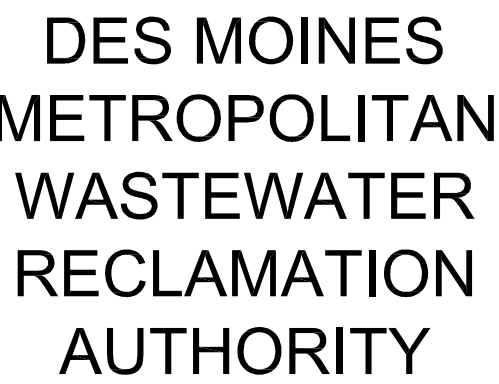
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1/4" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JCK                |
| DETAILED:                     | GLC                |
| CHECKED:                      | SJB                |
| APPROVED:                     | TDH                |
| DATE:                         | 02/05/2024         |
| PROJECT NO.:                  | 410504             |

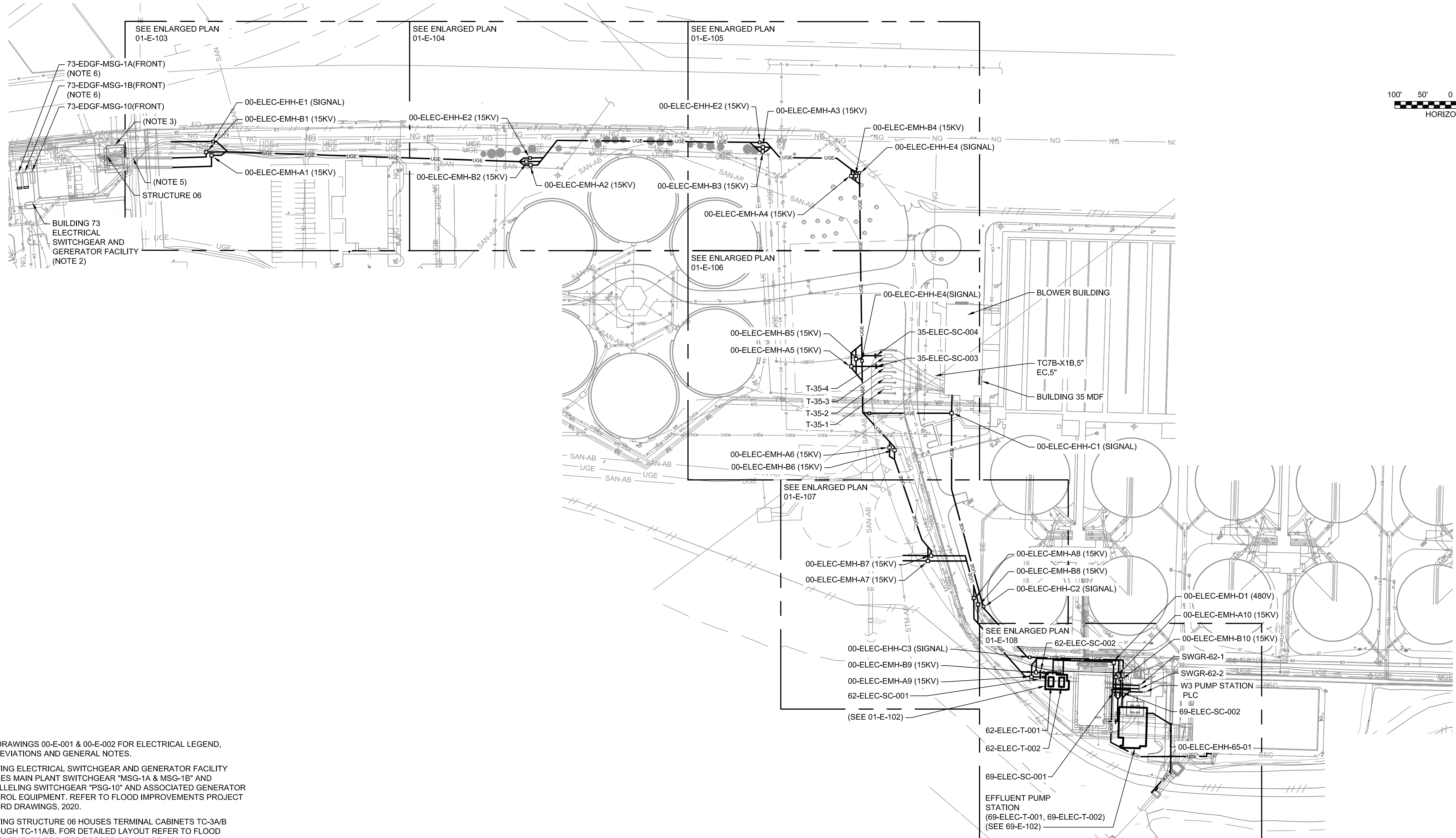
## SITework

ELECTRICAL

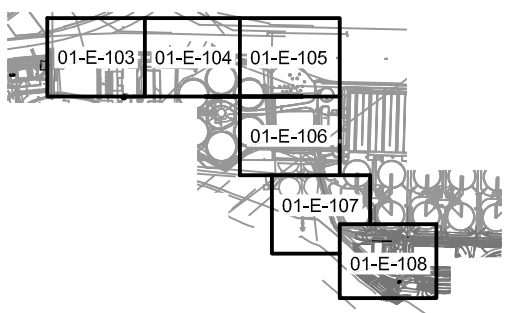
## ITE PLAN

PLAN FILE NO.

01-E-101

64  
DF  
18

## KEYMAP



NOTES:

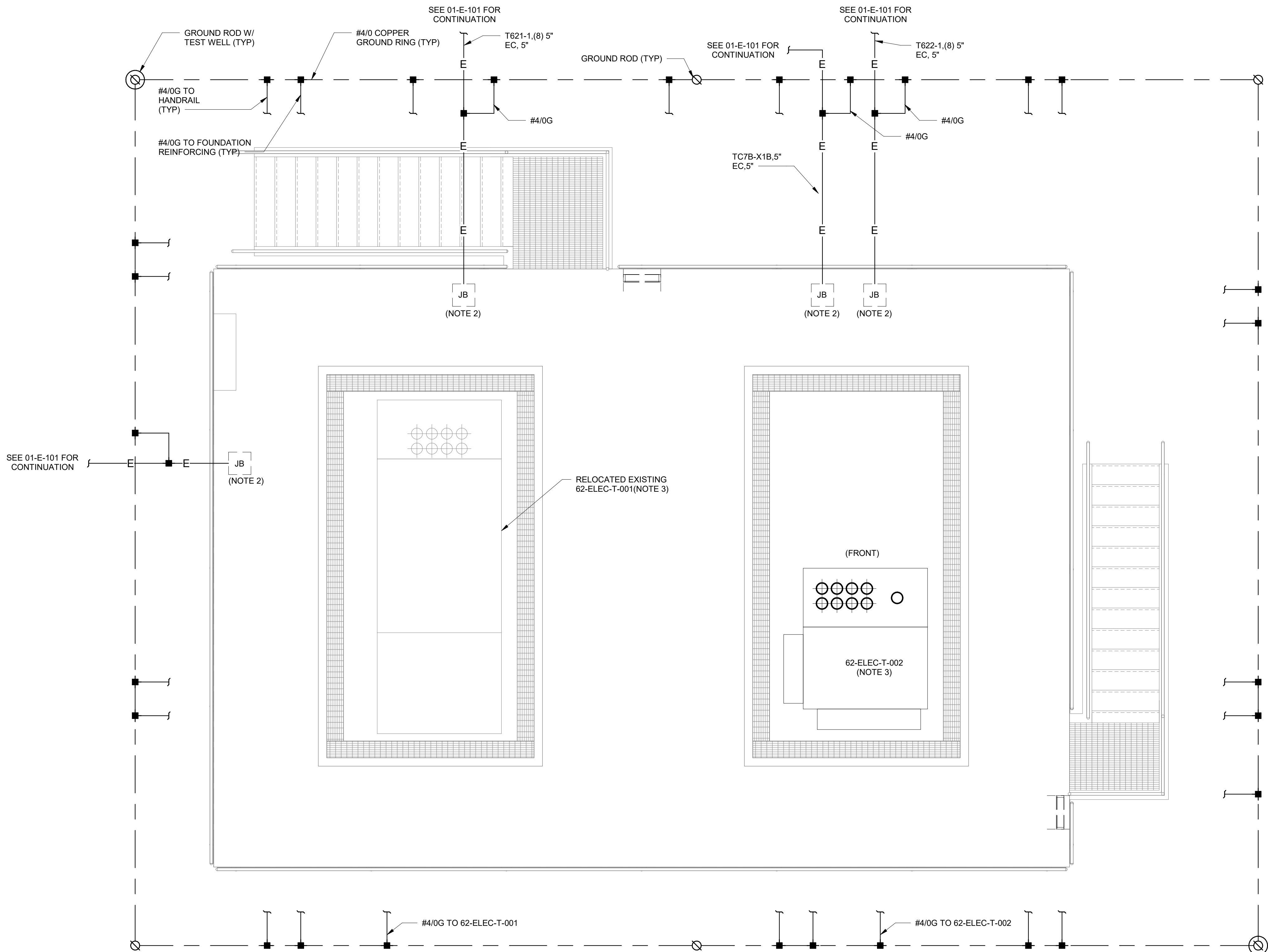
1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. EXISTING ELECTRICAL SWITCHGEAR AND GENERATOR FACILITY HOUSES MAIN PLANT SWITCHGEAR "MSG-1A & MSG-1B" AND PARALLELING SWITCHGEAR "PSG-10" AND ASSOCIATED GENERATOR CONTROL EQUIPMENT. REFER TO FLOOD IMPROVEMENTS PROJECT RECORD DRAWINGS, 2020.
3. EXISTING STRUCTURE 06 HOUSES TERMINAL CABINETS TC-3A/B THROUGH TC-11A/B. FOR DETAILED LAYOUT REFER TO FLOOD IMPROVEMENTS PROJECT RECORD DRAWINGS, 2020.
4. CONTRACTOR SHALL DEMOLISH EXISTING CABLE TO PRIMARY OF T-35-1 AND T-35-2 AS IDENTIFIED ON THE ONE-LINES. CONTRACTOR SHALL DEMOLISH EXISTING CONDUIT AS REQUIRED TO FACILITATE INSTALLATION OF NEW CONDUCTORS. REMAINING EXISTING CONDUIT SHALL BE GROUTED AND ABANDONED IN PLACE.
5. LOCATION OF STUB & CAPPED EXISTING DUCTBANKS IS APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY PRECISE LOCATIONS, INTERCEPT & CONTINUE DUCTBANKS UNDER EXISTING ROADWAY TO NEW 00-ELEC-EMH-A0 AND 00-ELEC-EMH-B0.
6. CONTRACTOR SHALL COORDINATE WITH ZIEGLER POWER SYSTEMS AS A PRESELECTED EQUIPMENT SUPPLIER TO FURNISH, INSTALL, AND COMMISSION FEEDER BREAKERS 11A AND 11B AND OTHER GENERATOR AND SWITCHGEAR CONTROL SYSTEM MODIFICATIONS. REFER TO SECTION 010310 FOR DETAILS.

|          |                                                  |
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| FILE:    | C:\PW_WORKING\BVW_AMERICAS\ID145106001-E-101.DWG |
| FD11000  |                                                  |
| D11000   |                                                  |
| PLOTTED: | 8/20/2024 8:09:40 AM                             |

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



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FILE: BIN\_360/410504 - WRF Effluent Pump Station/410504-WRF ELEVATED TRANSFORMER PLATFORM.rvt  
D11000



ELEVATED TRANSFORMER PLATFORM POWER & GROUNDING PLAN

3/8" = 1'-0"

GENERAL SHEET NOTES

- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
- CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 SS JUNCTION BOXES AT GRADE, SIZED AS REQUIRED, TO FACILITATE TRANSITION FROM DUCTBANK TO EXPOSED CONDUIT. JUNCTION BOXES SHALL ALSO SERVE AS TERMINATION POINT FOR DUCTBANK SPARES WHERE PRESENT.
- ELEVATED TRANSFORMER PAD IS DESIGNED FOR USE OF BOTH EXISTING AND NEW TRANSFORMERS: 62-ELECT-T-001 AND -002. TO REDUCE CONSTRUCTION SEQUENCE TIME, CONTRACTOR SHALL RELOCATE EXISTING TRANSFORMERS AS SHOWN TYPICAL ON LEFT. PRIOR TO CONSTRUCTION OF ELEVATED PAD AND PRIOR TO RELOCATION OF EXISTING TRANSFORMERS, CONTRACTOR SHALL FIELD CONFIRM EXISTING TRANSFORMER DIMENSIONS AND COORDINATED WITH STRUCTURAL ENGINEER IF DIFFERENT FROM INDICATED IN THE DRAWINGS. CONTRACTOR SHALL LOOP PRIMARY AND SECONDARY CABLES AND CONTROL WIRING AS REQUIRED TO ENSURE THERE IS SUFFICIENT LENGTH OF CABLE FOR USE ON THE NEW TRANSFORMERS. INSTALL NEW TRANSFORMERS AS SHOWN TYPICAL ON THE RIGHT. FINAL CONDUIT PENETRATIONS SHALL BE DETERMINED BASED UPON FINAL EQUIPMENT FURNISHED.



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WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |                    |
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| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JCK                |
| DETAILED:                     | AJP                |
| CHECKED:                      | SJB                |
| APPROVED:                     | TDH                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

SITWORK

ELECTRICAL

ELEVATED  
TRANSFORMER  
PLATFORM POWER &  
GROUNDING PLAN

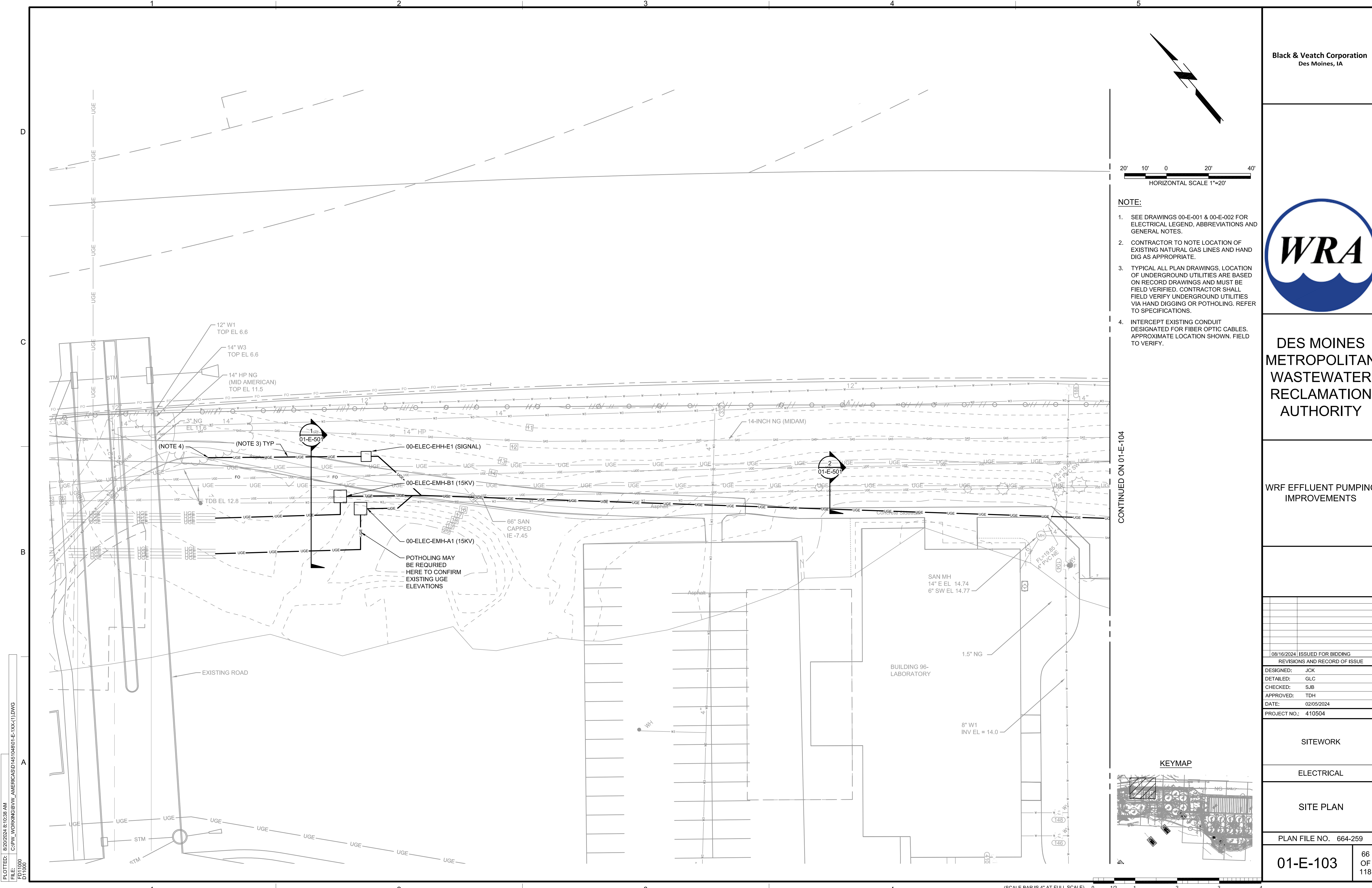
PLAN FILE NO. 664-258

01-E-102

65  
OF  
118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





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FDI000  
D11000

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|                               |            |
|-------------------------------|------------|
| 08/16/2024 ISSUED FOR BIDDING |            |
| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | JCK        |
| DETAILED:                     | GLC        |
| CHECKED:                      | SJB        |
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| DATE:                         | 02/05/2024 |
| PROJECT NO.:                  | 410504     |

SITEWORK

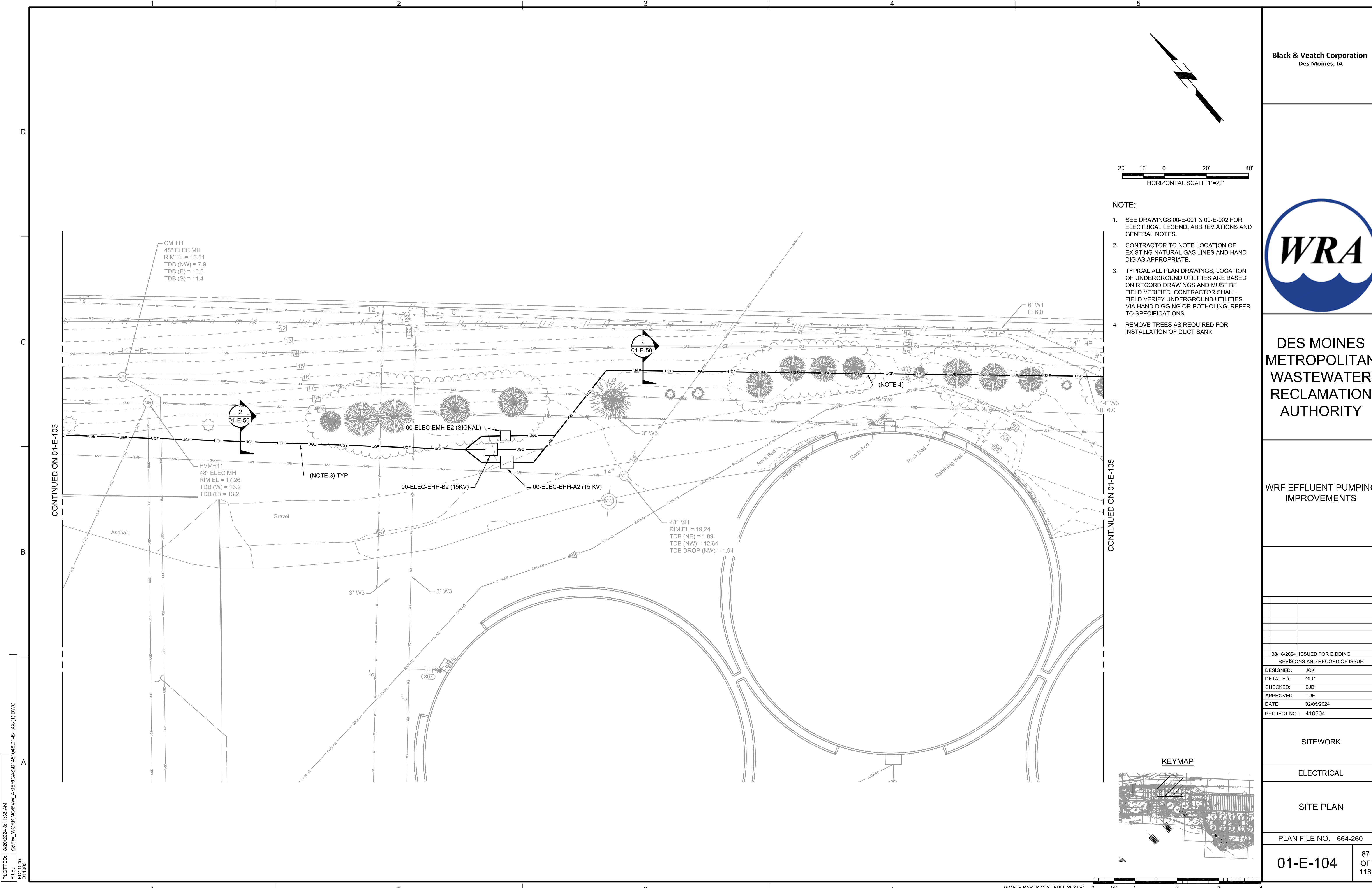
ELECTRICAL

SITE PLAN

PLAN FILE NO. 664-259

01-E-103 66 OF 118





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|                               |            |
|-------------------------------|------------|
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| DESIGNED:                     | JCK        |
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| CHECKED:                      | SJB        |
| APPROVED:                     | TDH        |
| DATE:                         | 02/05/2024 |
| PROJECT NO.:                  | 410504     |

SITEWORK

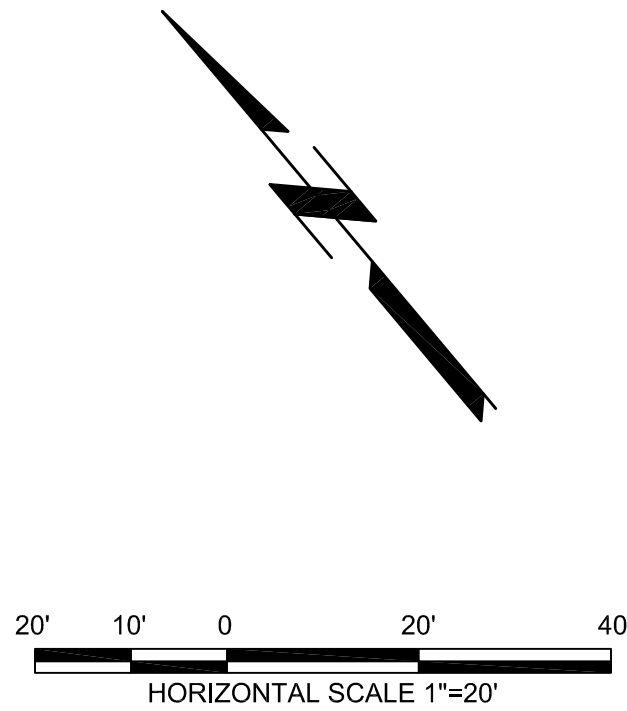
ELECTRICAL

SITE PLAN

PLAN FILE NO. 664-260

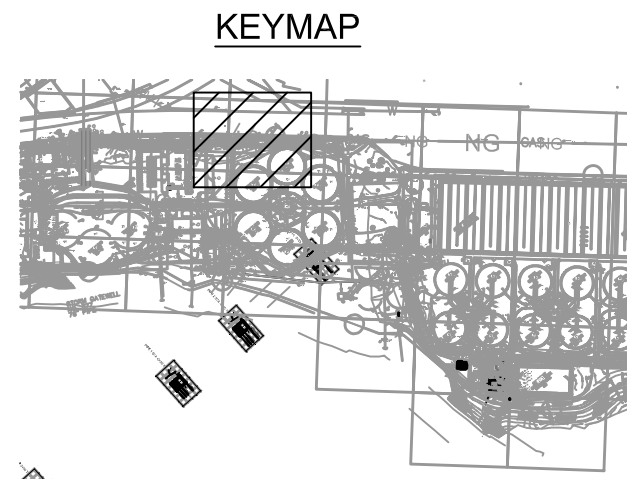
01-E-104

67  
OF  
118



NOTE:

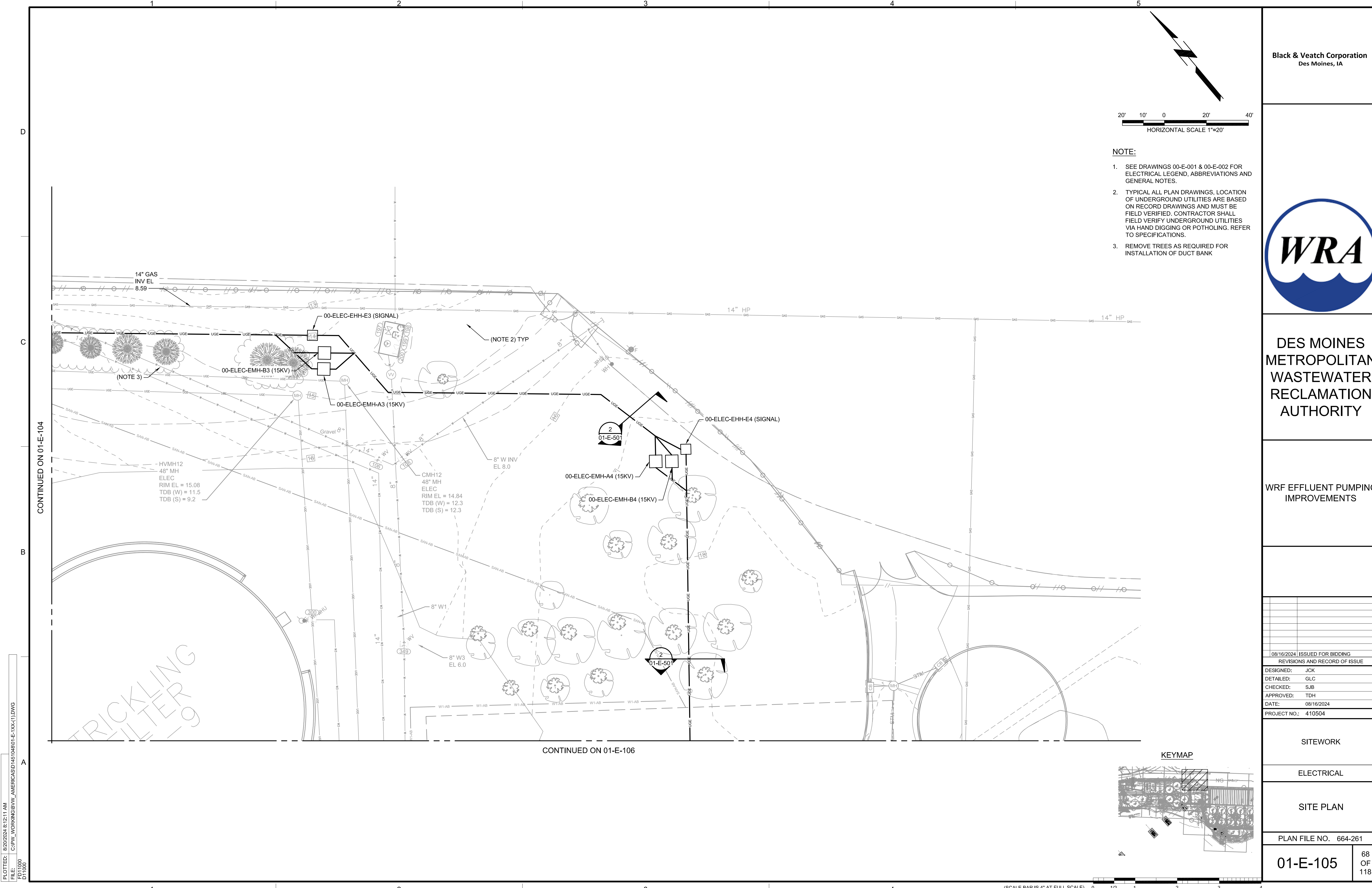
- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
- CONTRACTOR TO NOTE LOCATION OF EXISTING NATURAL GAS LINES AND HAND DIG AS APPROPRIATE.
- TYPICAL ALL PLAN DRAWINGS, LOCATION OF UNDERGROUND UTILITIES ARE BASED ON RECORD DRAWINGS AND MUST BE FIELD VERIFIED. CONTRACTOR SHALL FIELD VERIFY UNDERGROUND UTILITIES VIA HAND DIGGING OR POTHOLING. REFER TO SPECIFICATIONS.
- REMOVE TREES AS REQUIRED FOR INSTALLATION OF DUCT BANK



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FDI1000  
D11000

(SCALE BAR IS 4" AT FULL SCALE)





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IMPROVEMENTS

|                               |            |
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| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | JCK        |
| DETAILED:                     | GLC        |
| CHECKED:                      | SJB        |
| APPROVED:                     | TDH        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

SITWORK

ELECTRICAL

SITE PLAN

PLAN FILE NO. 664-261

01-E-105 68 OF 118

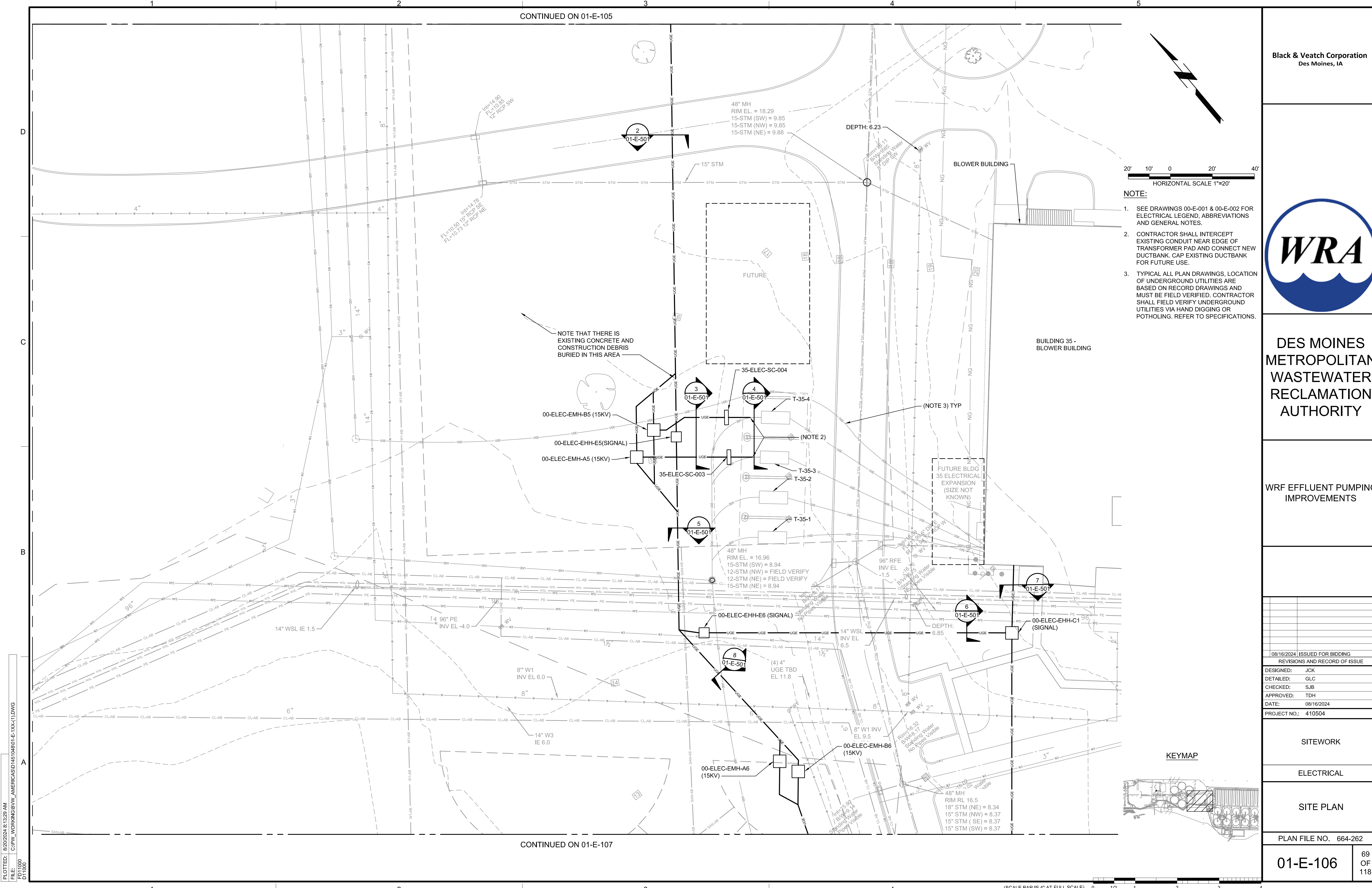
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CONTINUED ON 01-E-104

CONTINUED ON 01-E-106

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





CONTINUED ON 01-E-105

CONTINUED ON 01-E-107

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IMPROVEMENTS

| REVISIONS AND RECORD OF ISSUE |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
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| APPROVED:                     | TDH                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

SITWORK

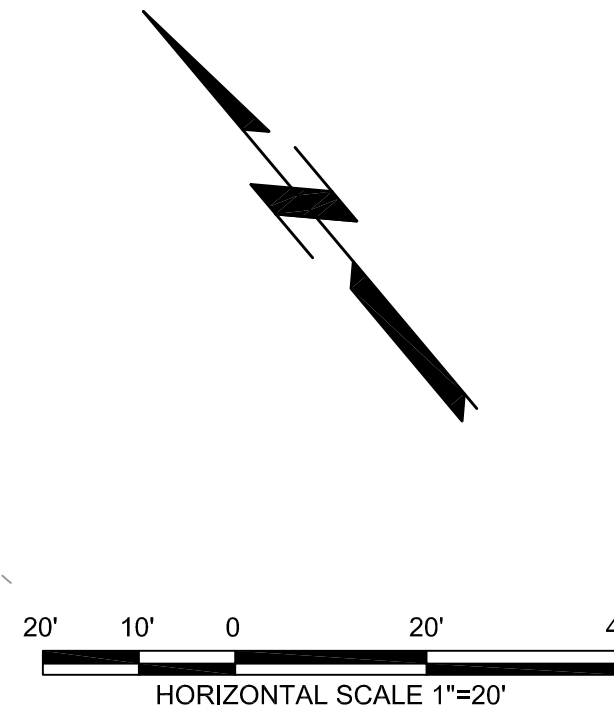
ELECTRICAL

SITE PLAN

PLAN FILE NO. 664-262

01-E-106

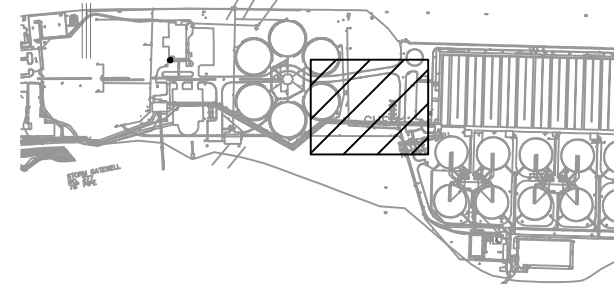
69  
OF  
118



NOTE:

- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
- CONTRACTOR SHALL INTERCEPT EXISTING CONDUIT NEAR EDGE OF TRANSFORMER PAD AND CONNECT NEW DUCTBANK. CAP EXISTING DUCTBANK FOR FUTURE USE.
- TYPICAL ALL PLAN DRAWINGS, LOCATION OF UNDERGROUND UTILITIES ARE BASED ON RECORD DRAWINGS AND MUST BE FIELD VERIFIED. CONTRACTOR SHALL FIELD VERIFY UNDERGROUND UTILITIES VIA HAND DIGGING OR POTHOLES. REFER TO SPECIFICATIONS.

KEYMAP



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(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4













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IMPROVEMENTS

PERMIT REVIEW  
- NOT FOR  
CONSTRUCTION

08/16/2024 ISSUED FOR BIDDING  
REVISIONS AND RECORD OF ISSUE

DESIGNED: JCK  
DETAILED: JCK  
CHECKED: SJB  
APPROVED: TDH  
DATE: 02/05/2024

PROJECT NO.: 410504

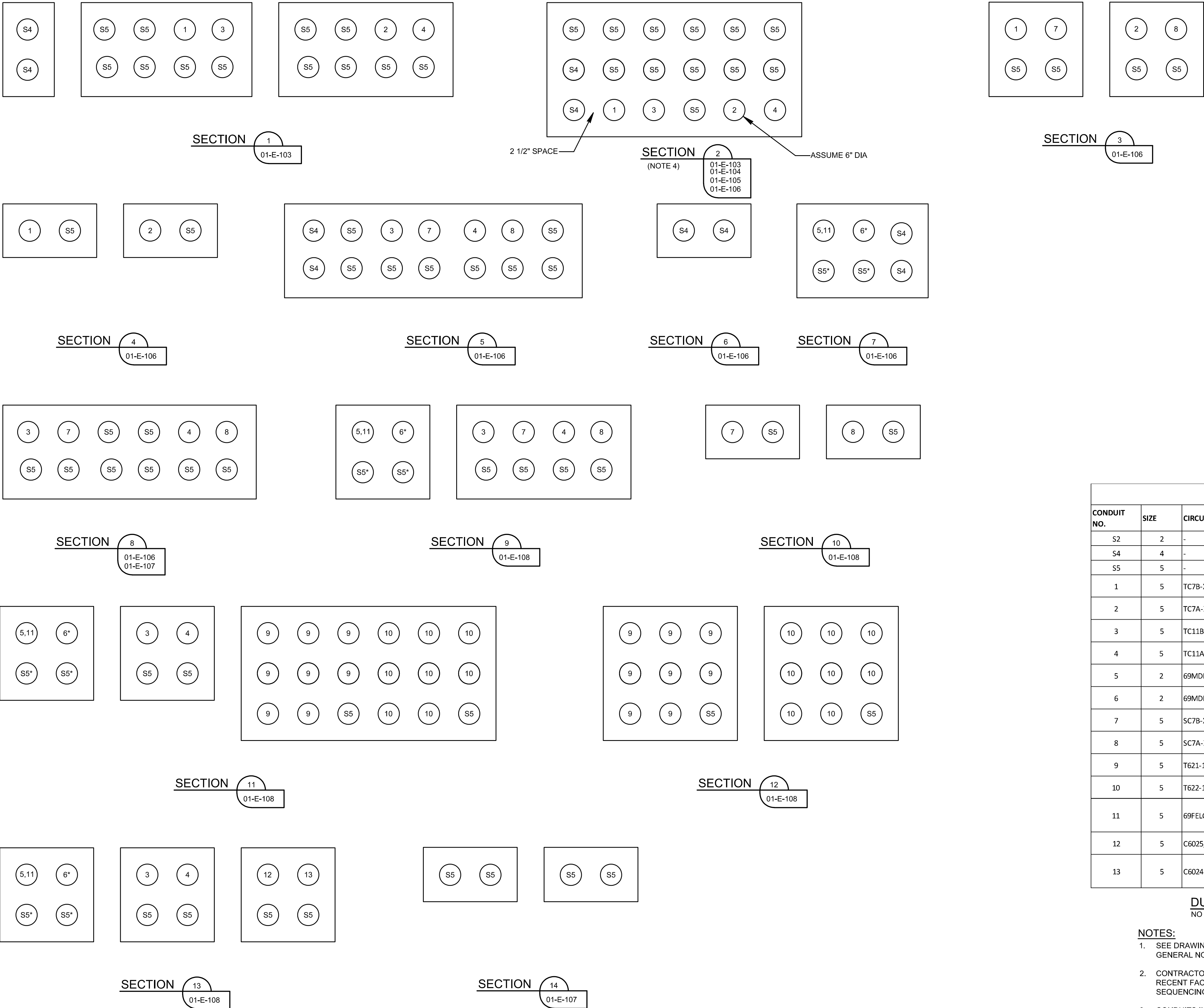
ELECTRICAL

DUCTBANK SECTIONS  
AND SCHEDULES

PLAN FILE NO. 664-264

01-E-501

72  
OF  
118

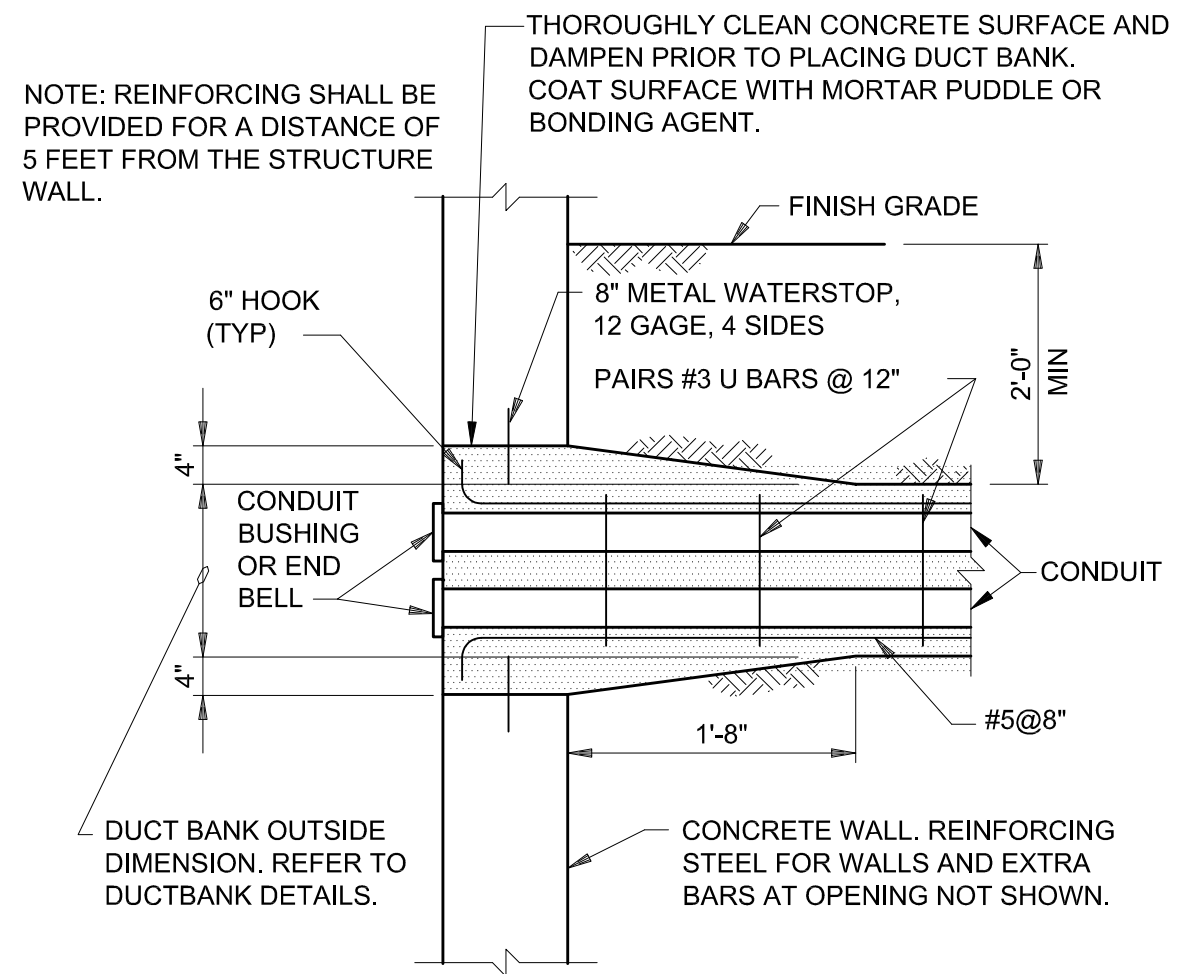


| DUCTBANK SCHEDULE |      |                               |                                                                  |
|-------------------|------|-------------------------------|------------------------------------------------------------------|
| CONDUIT NO.       | SIZE | CIRCUIT                       | NOTES                                                            |
| S2                | 2    | -                             | SPARE 2" CONDUITS                                                |
| S4                | 4    | -                             | SPARE 4" CONDUITS                                                |
| S5                | 5    | -                             | SPARE 5" CONDUITS                                                |
| 1                 | 5    | TC7B-X1                       | 13.2kV POWER FROM MAIN SWGR. TO T-35-4.                          |
| 2                 | 5    | TC7A-X1                       | 13.2kV POWER FROM MAIN SWGR. TO T-35-3.                          |
| 3                 | 5    | TC11B-X1, SC69-2-1X, T69-2-1  | 13.2kV POWER FROM MAIN SWGR. TO T-69-2.                          |
| 4                 | 5    | TC11A-X1, SC69-1-1X, T69-1-1  | 13.2kV POWER FROM MAIN SWGR. TO T-69-1.                          |
| 5                 | 2    | 69MDF01-1                     | FIBER OPTIC FROM BUILDING 35 MDF TO PUMP STATION MDF.            |
| 6                 | 2    | 69MDF01-2                     | FIBER OPTIC FROM BUILDING 35 MDF TO PUMP STATION MDF.            |
| 7                 | 5    | SC7B-X1B, SC-62-2-1X, T62-2-1 | 13.2kV POWER FROM 35-ELEC-SC-004 TO T-62-2.                      |
| 8                 | 5    | SC7A-X1B, SC-62-1-1X, T62-1-1 | 13.2kV POWER FROM 35-ELEC-SC-003 TO T-62-1.                      |
| 9                 | 5    | T621-1                        | 480V POWER FROM T-62-1 TO SWGR-62-1.                             |
| 10                | 5    | T622-1                        | 480V POWER FROM T-62-2 TO SWGR-62-2.                             |
| 11                | 5    | 69FELCP01-4                   | FIBER OPTIC FROM PUMP STATION MDF TO BUILDING 35 MDF FOR BACNET. |
| 12                | 5    | C6025, C6027                  | DIGITAL CONTROL FROM W3 PUMP STATION TO DISINFECTION BLDG.       |
| 13                | 5    | C6024                         | ANALOG CONTROL FROM W3 PUMP STATION TO DISINFECTION BLDG.        |

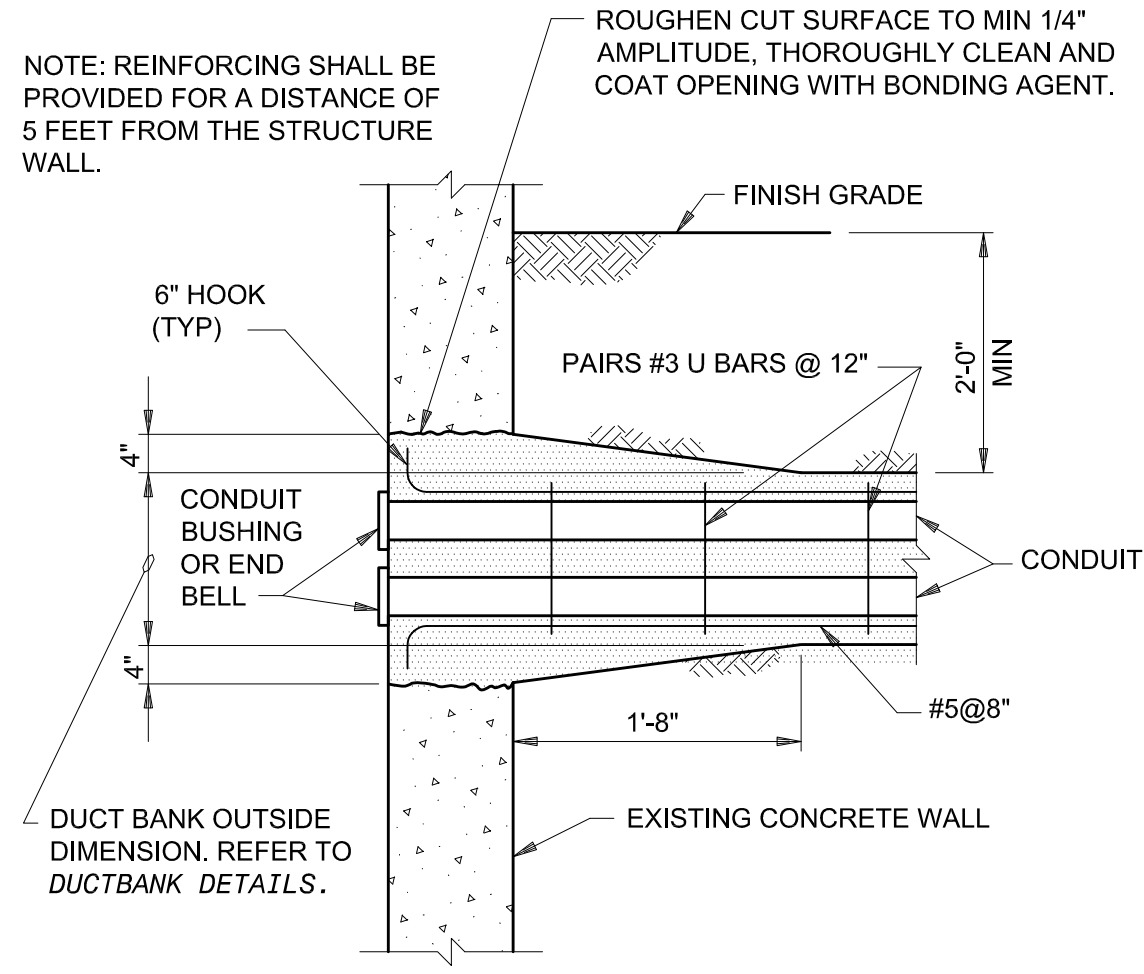
DUCTBANK SCHEDULE  
NO SCALE

- NOTES:
- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
  - CONTRACTOR SHALL COORDINATE WITH OWNER REGARDING CONCURRENT AND RECENT FACILITY IMPROVEMENTS PROJECTS TO AVOID CONFLICT OF CONSTRUCTION SEQUENCING AND ENSURE COORDINATION OF DUCTBANK HAND-OFF POINTS.
  - CONDUITS INDICATED WITH "" SHALL BE FURNISHED WITH INNERDUCT AS SPECIFIED UNDER SECTION 26 05 11.
  - CIRCUITS FED FROM MSG-1A SHALL BE ROUTED TOGETHER AND THROUGH 'A' MANHOLES. CIRCUITS FED FROM MSG-1B SHALL BE ROUTED TOGETHER AND THROUGH 'B' MANHOLES. TYP ALL.

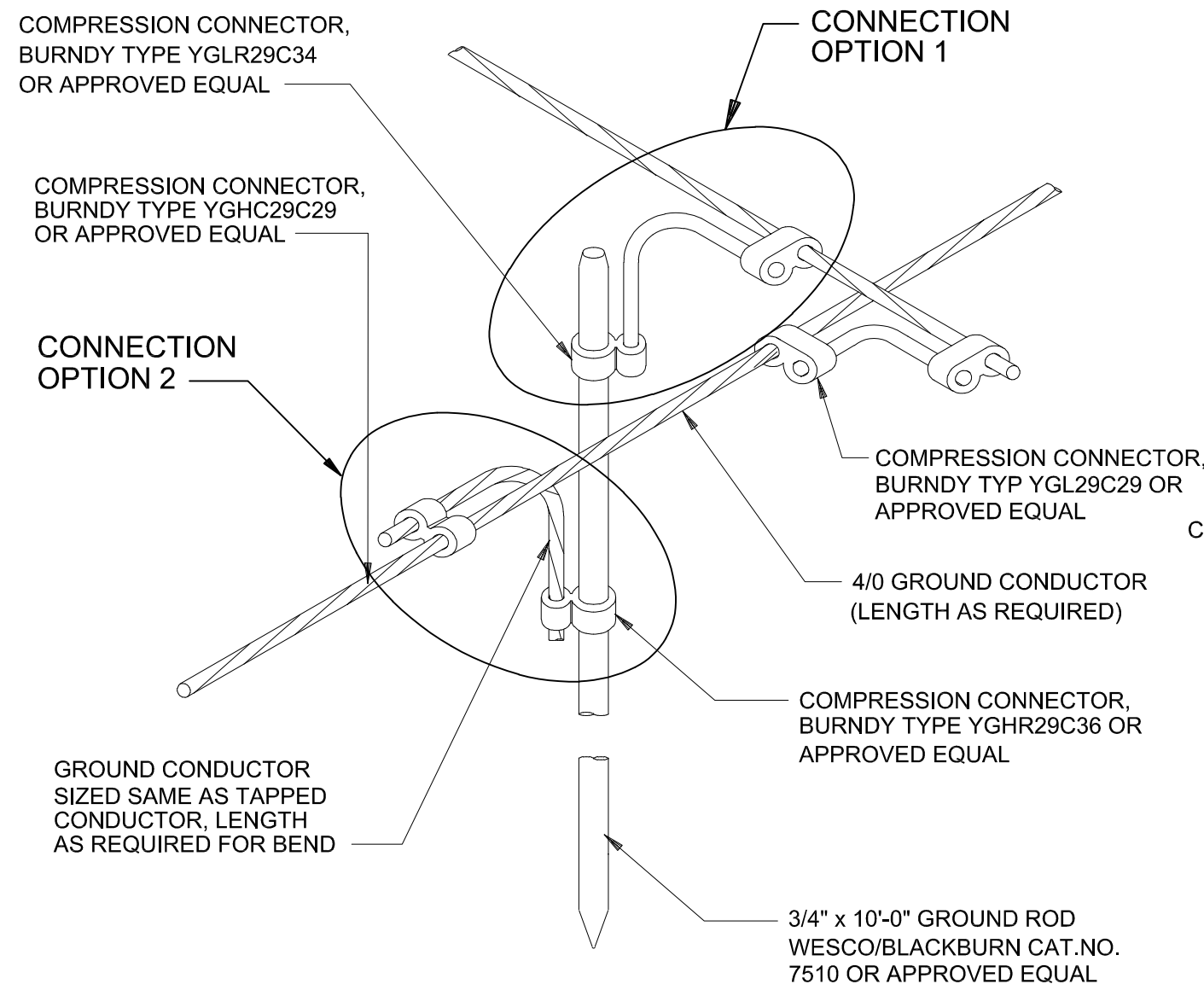




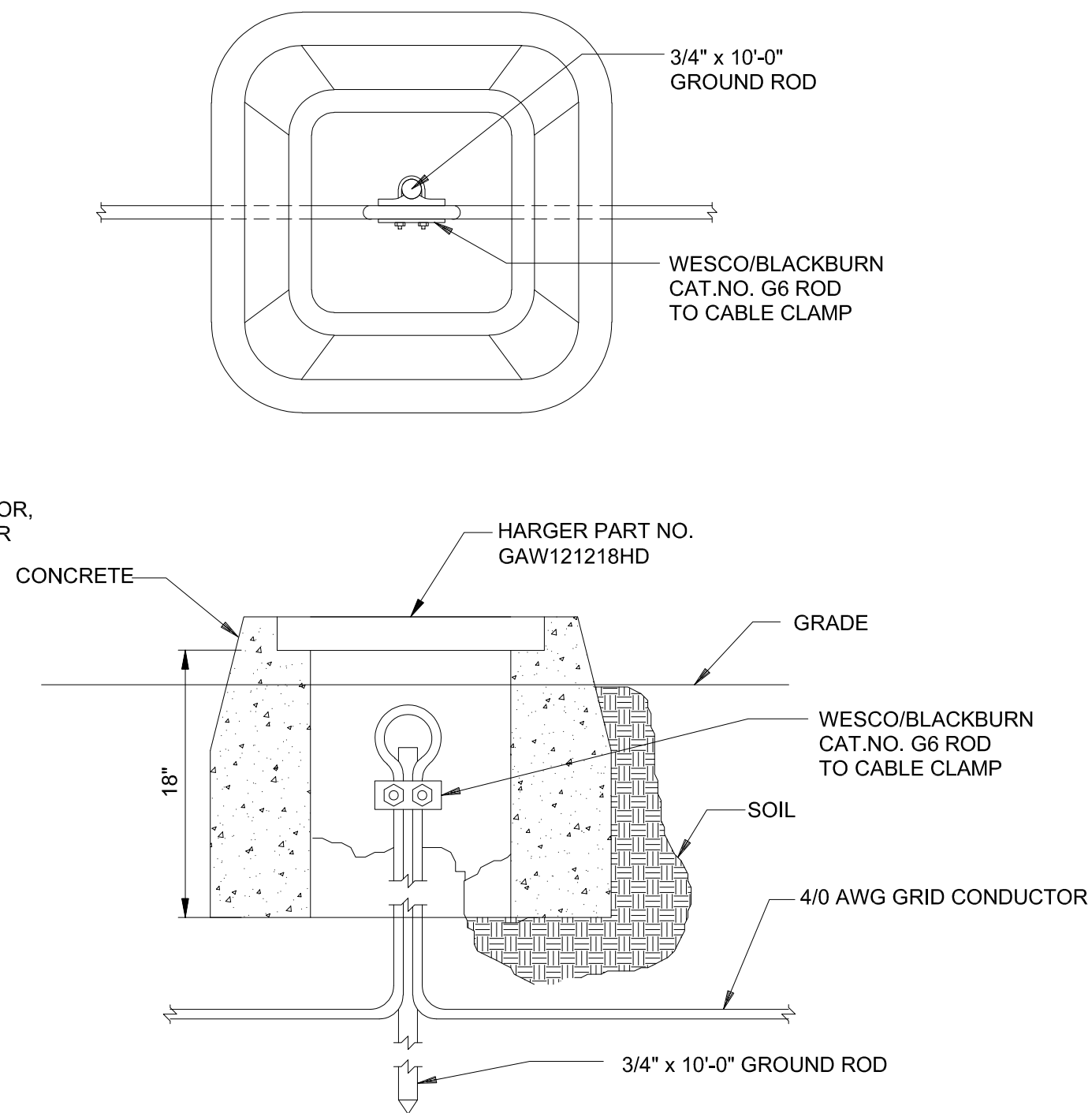
**TYPICAL UNDERGROUND  
DUCT BANK ENTRANCE DETAIL**  
NO SCALE



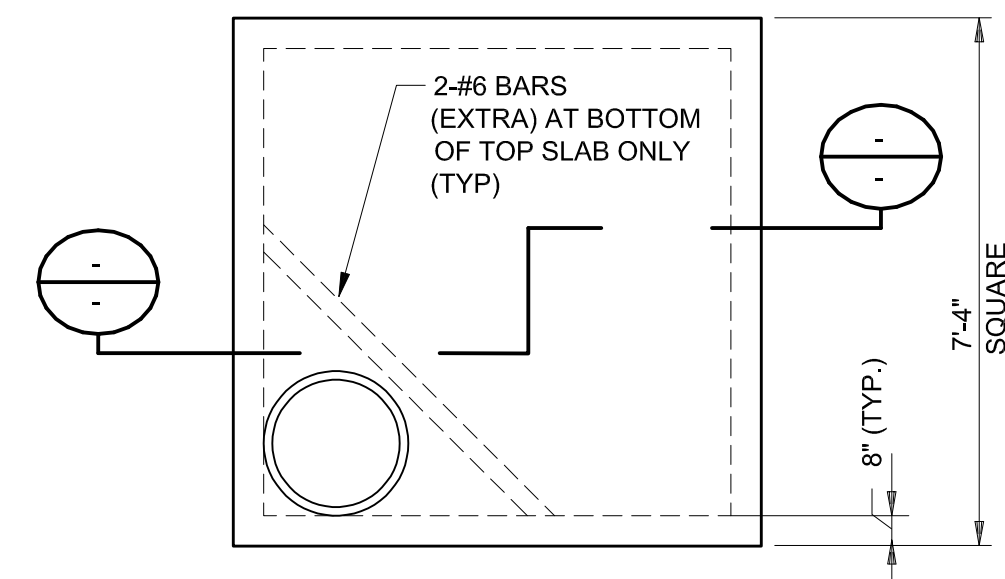
**TYPICAL UNDERGROUND  
DUCT BANK ENTRANCE DETAIL**  
NO SCALE  
NOTE: FOR EXISTING WALL



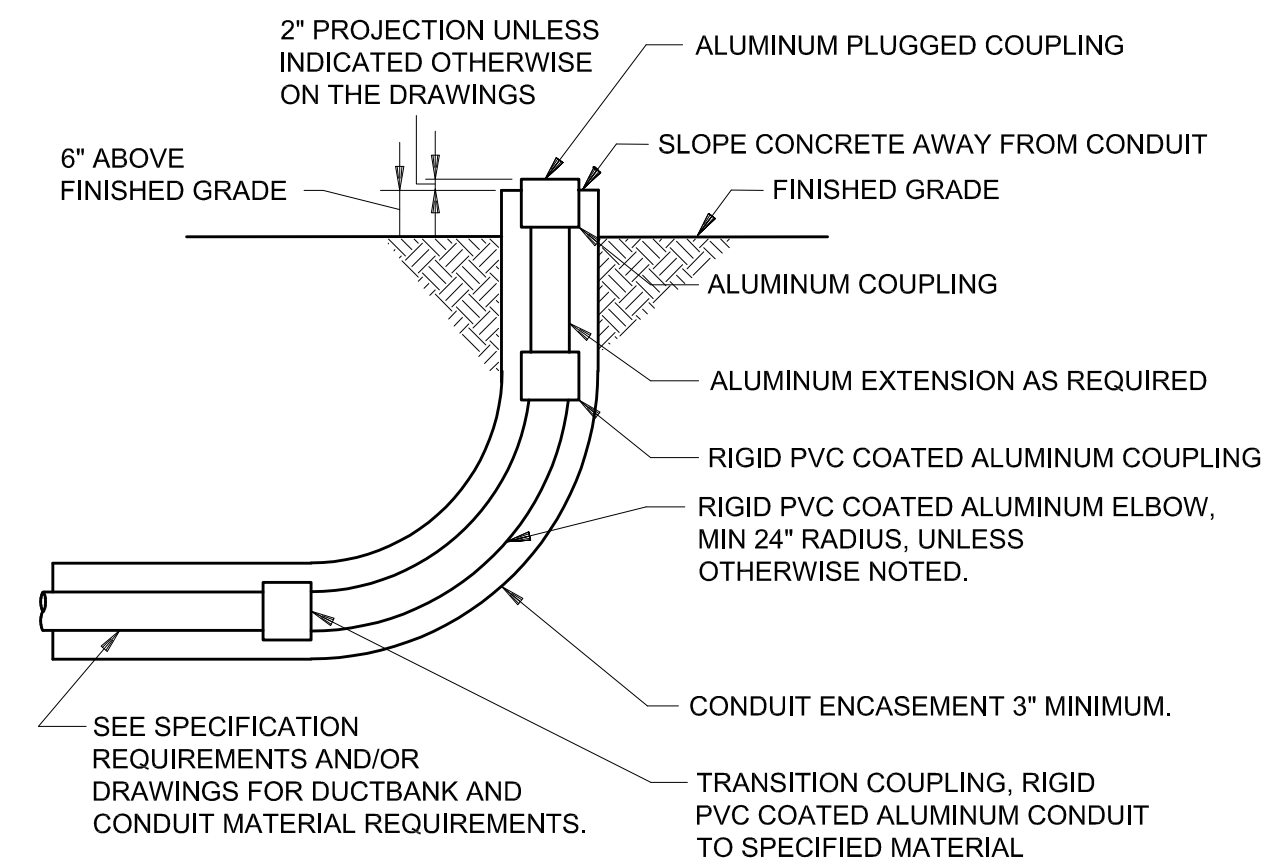
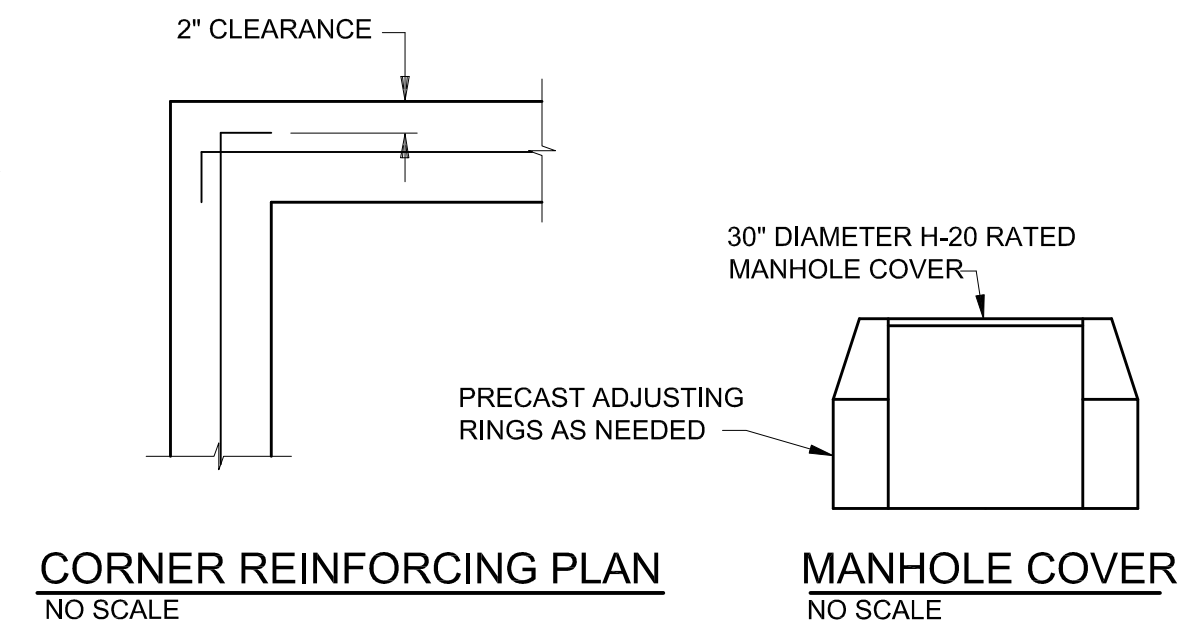
**TYPICAL COMPRESSION FITTING  
GROUND ROD TO CONNECTION AT CROSS OR TEE**  
(TWO CONNECTION OPTIONS SHOWN)



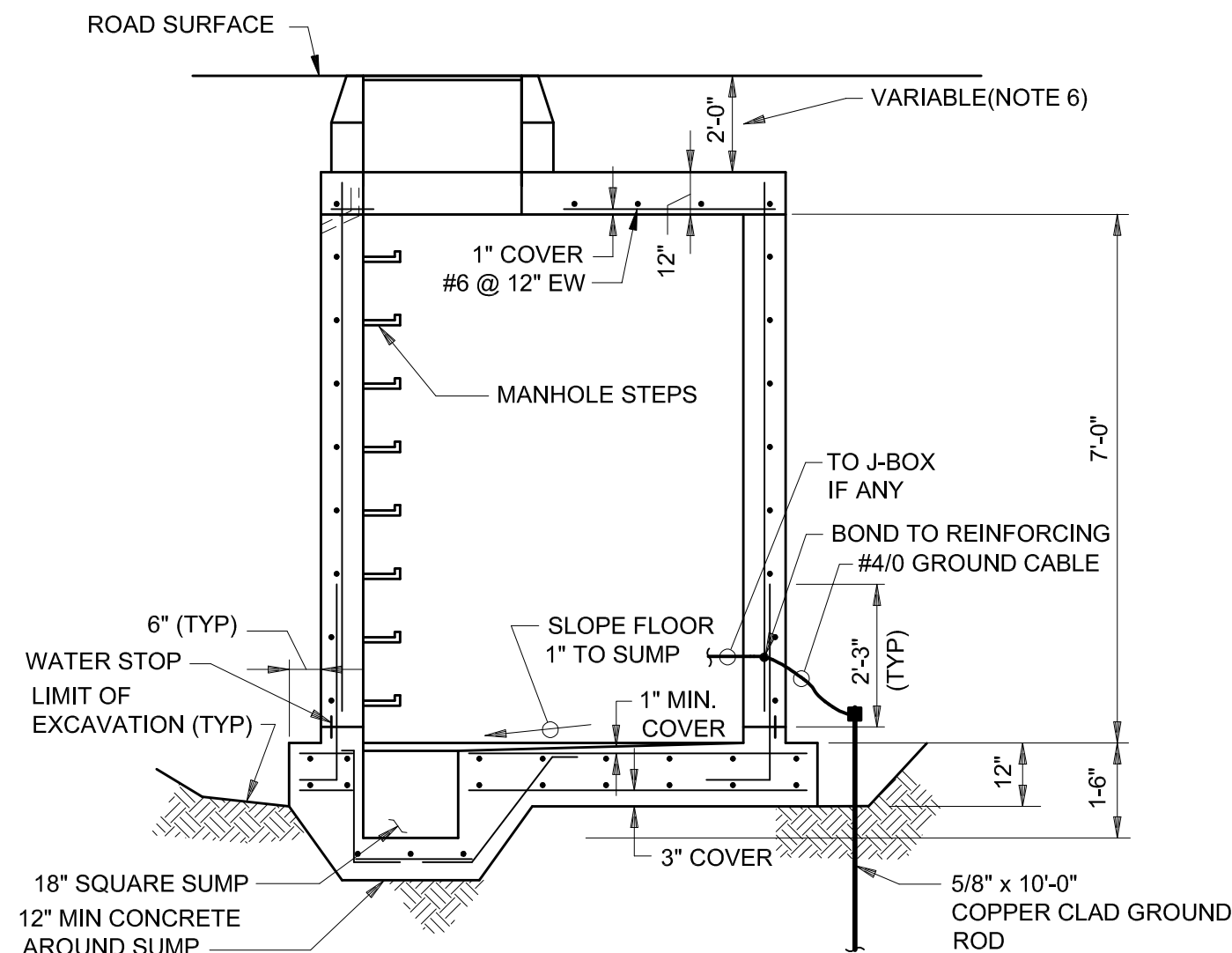
**ELEVATION  
TYPICAL GROUND TEST STATION**



**TYPICAL TRAFFIC RATED ELECTRICAL MANHOLE**  
NO SCALE SUITABLE FOR ROADWAY LOCATIONS



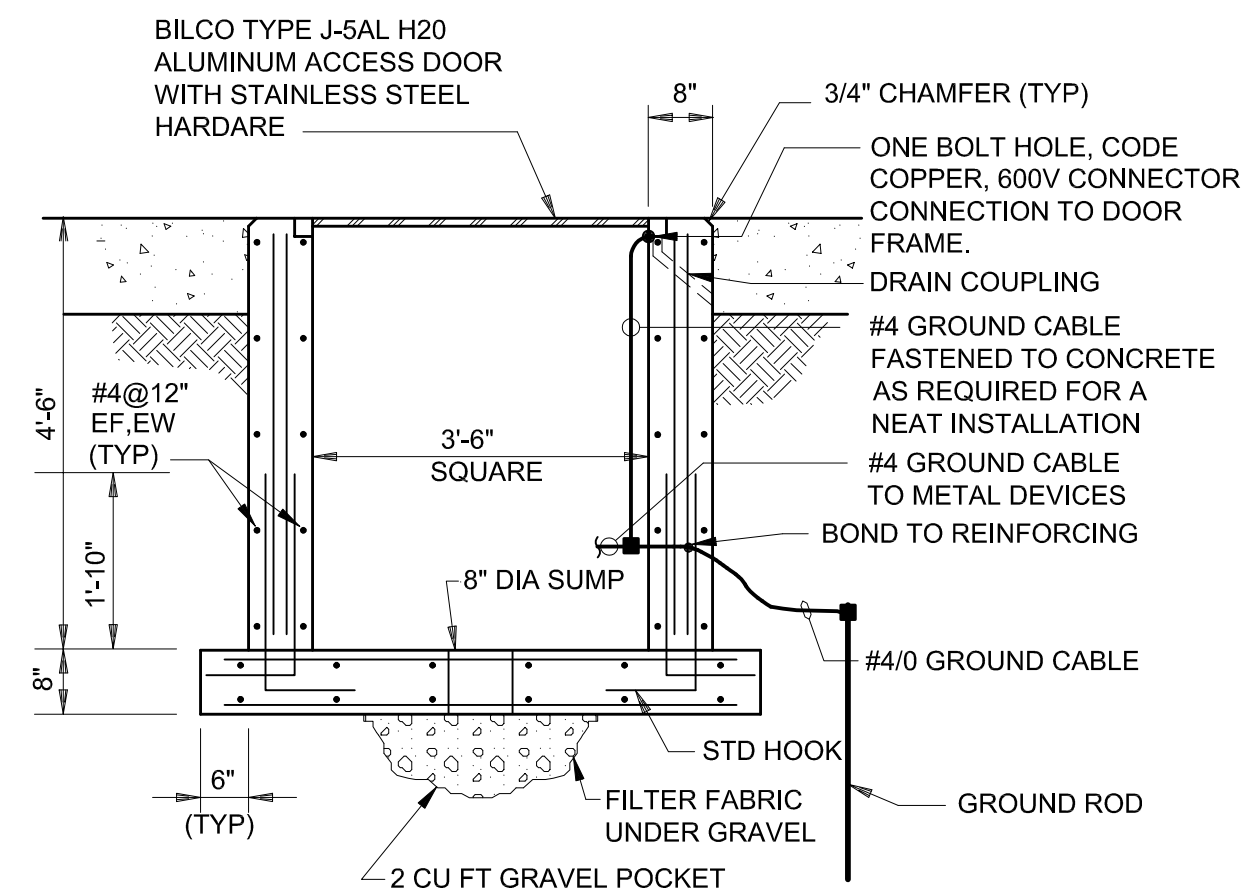
**TYPICAL CONDUIT RISER  
TERMINATING IN SOIL**  
NO SCALE



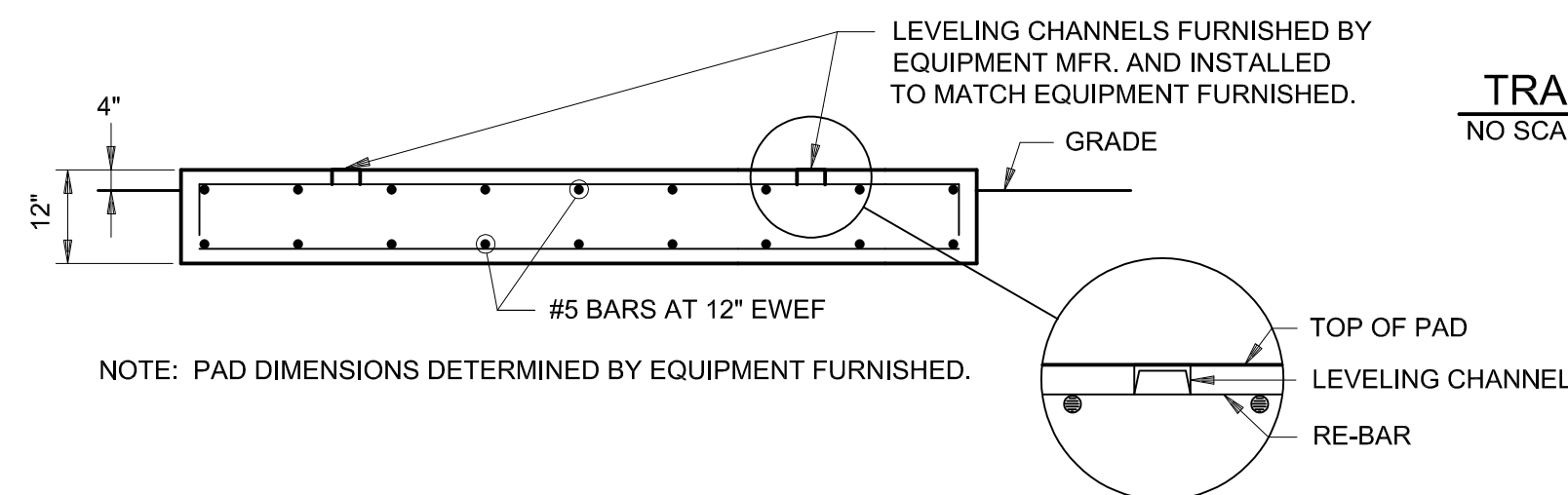
**ELECTRICAL MANHOLE NOTES:**

1. CABLE AND CONDUIT SUPPORTS SHALL BE SPACED AT 2'-0" HORIZONTAL CENTERS IN WALLS AND SHALL BEGIN 2'-0" FROM FLOOR.
2. SUPPORTS IN CEILINGS SHALL RUN FROM WALL TO WALL.
3. OPENING SHALL BE PROVIDED IN MANHOLE WALLS FOR CONDUIT BANK ENTRANCE AS REQUIRED.
4. ALL REINFORCING ON THIS DETAIL SHALL BE #6@12" UNLESS NOTED OTHERWISE. CENTER VERTICAL REINFORCING IN THE WALLS.
5. CONCRETE TO BE ROUGH AND CLEAN AT CONSTRUCTION JOINT FACES.
6. MANHOLE RINGS SHALL COME WITH INTEGRAL MANHOLE STEPS TO ALIGN WITH MANHOLE STEPS.

**TRAFFIC RATED ELECTRICAL MANHOLE SECTION**  
NO SCALE SUITABLE FOR ROADWAY LOCATIONS

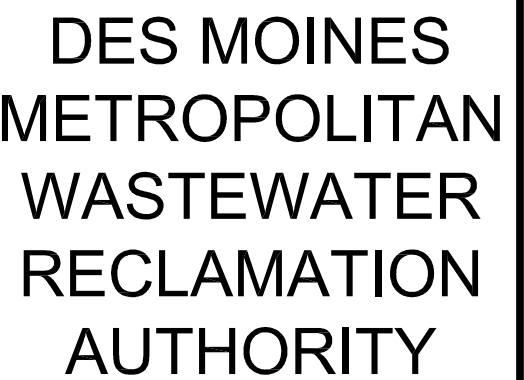


**TYPICAL TRAFFIC RATED  
ELECTRICAL HANDHOLE DETAIL**  
NO SCALE SUITABLE FOR ROADWAY LOCATIONS



**TYPICAL EQUIPMENT PAD DETAIL**  
NO SCALE





## WRF EFFLUENT PUMPING IMPROVEMENTS

PERMIT REVIEW  
- NOT FOR  
CONSTRUCTION

|              |                                                     |
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| 08/16/2024   | ISSUED FOR BIDDING<br>REVISIONS AND RECORD OF ISSUE |
| DESIGNED:    | JCK                                                 |
| Detailed:    | JCK                                                 |
| CHECKED:     | SJB                                                 |
| APPROVED:    | TDH                                                 |
| DATE:        | 02/05/2024                                          |
| PROJECT NO.: | 410504                                              |

ELECTRICAL

## DETAILS

PLAN FILE NO. 664-264

01-E-503

74  
DF  
18

NOTE: USE STAINLESS STEEL BOLTS, NUTS, WASHERS, AND ANCHOR BOLTS.



NO SCALE



| A     | B     | C     | POLE LENGTH |
|-------|-------|-------|-------------|
| 1'-0" | 2"    | 3'-0" | 10' TO 12'  |
| 1'-6" | 2"    | 4'-0" | 12' TO 20'  |
| 2'-0" | 2"    | 5'-0" | 20' TO 40'  |
| 2'-0" | 2"-6" | 5'-0" | 20' TO 40'  |



NO SCALE

NOTE:  
CONTRACTOR SHALL INSTALL REINFORCING ON ALL DUCTBANK  
FOR THIS PROJECT DUE TO FUTURE ROADWAY PLANS.



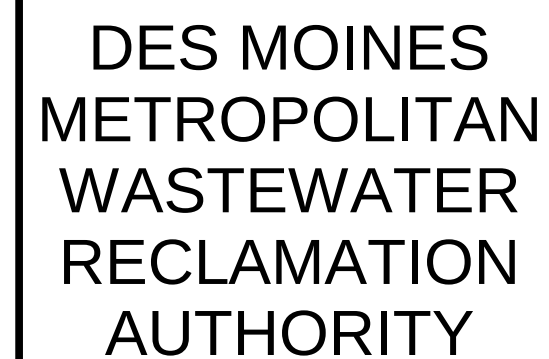
NO SCALE



NO SCALE

NOTE:  
DIMENSIONAL SIZE OF STAINLESS STEEL GHFL100 TRANSITS AND QUANTITY OF EPDM MODULES IS AS REQUIRED FOR TRANSITION THROUGH EXTERIOR WALL. CONTRACTOR SHALL COORDINATE TRANSIT SIZE WITH STRUCTURAL TO ENSURE FRAME SIZE IS COORDINATED WITH BLOCK COURSING. PROVIDE SPARE SPACE CAPACITY AS REQUIRED. REFER TO MANUFACTURES INSTRUCTIONS FOR INSTALLATION REQUIREMENTS.





## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

CHLORINE CONTACT BASIN

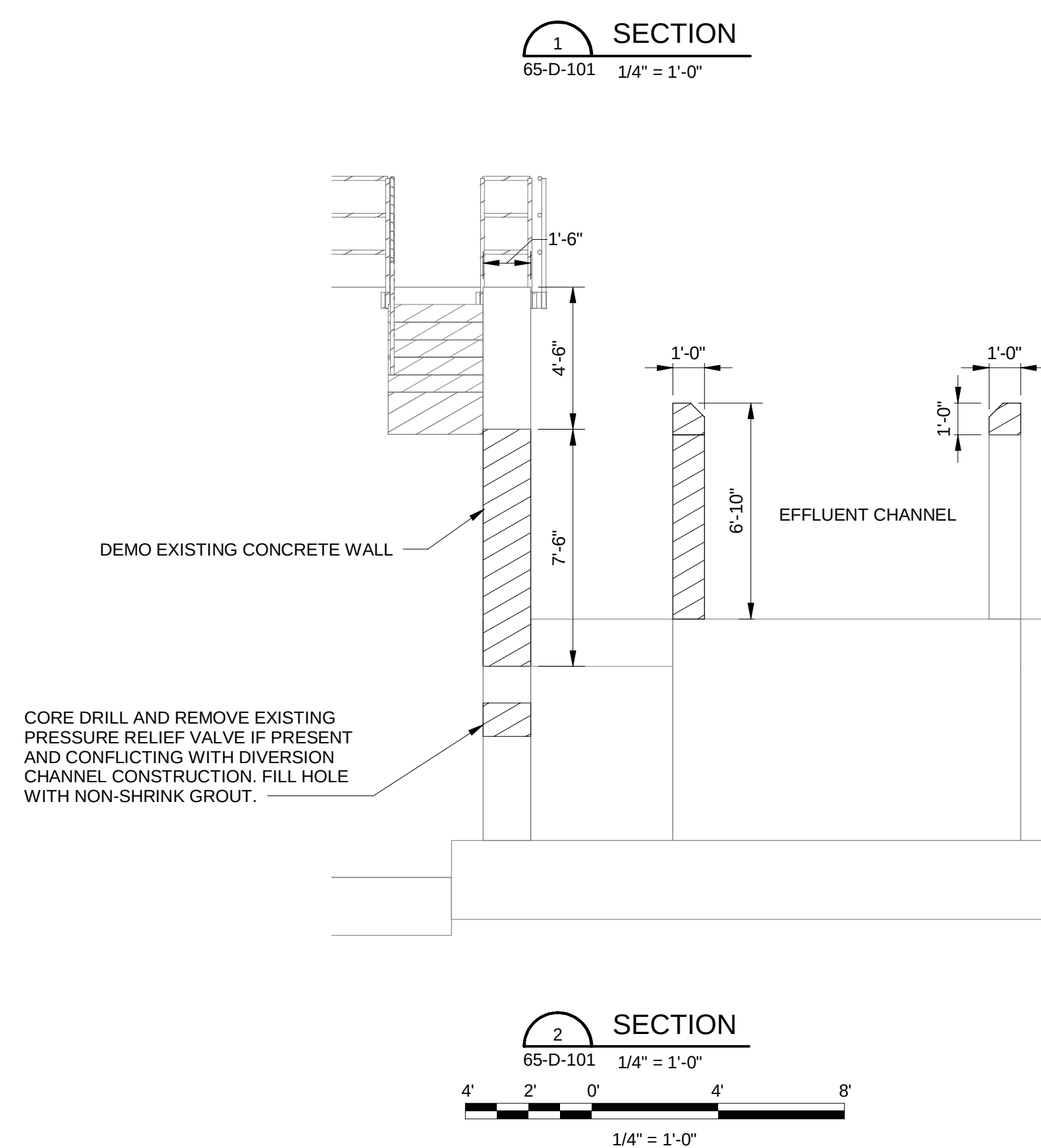
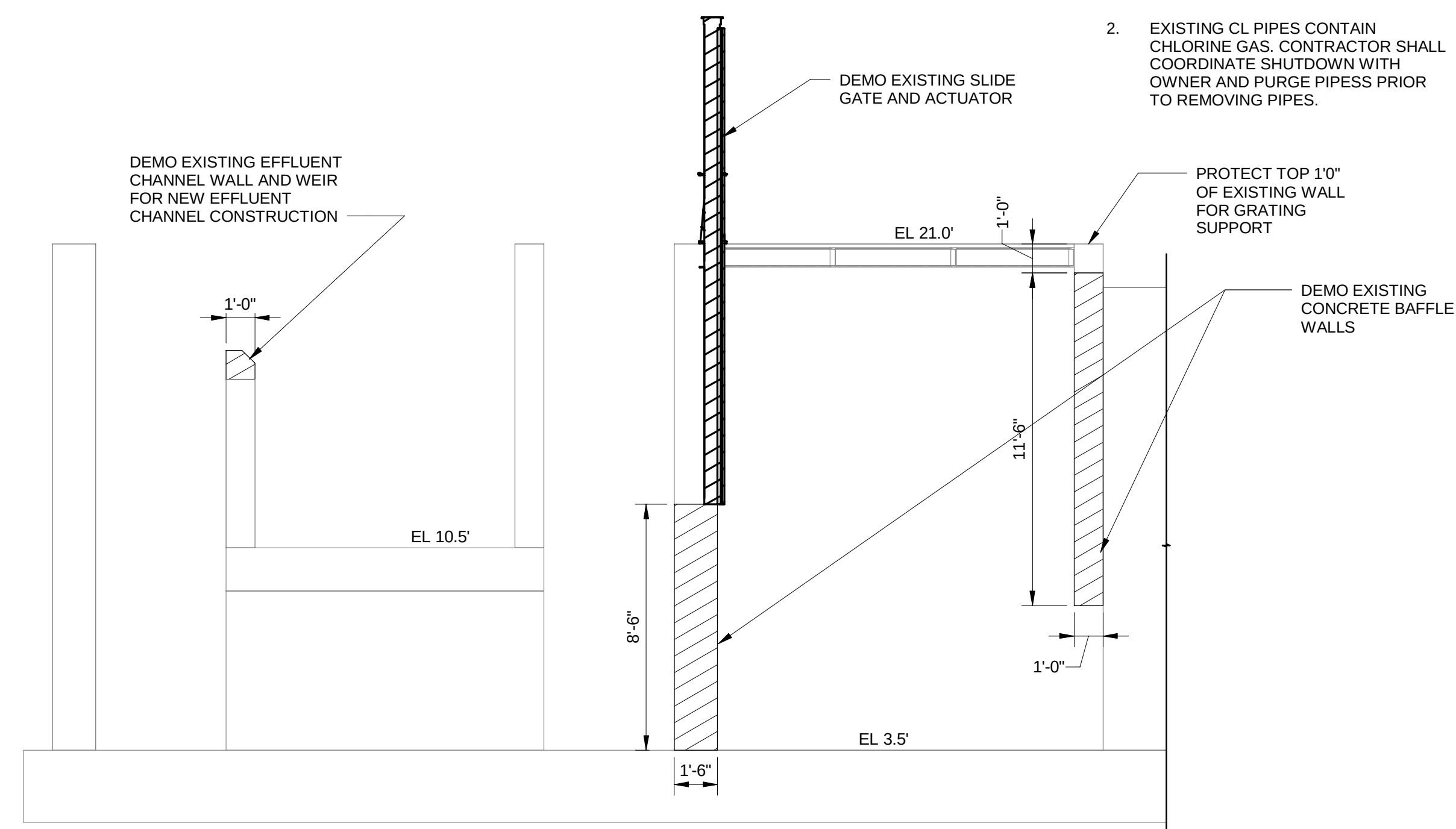
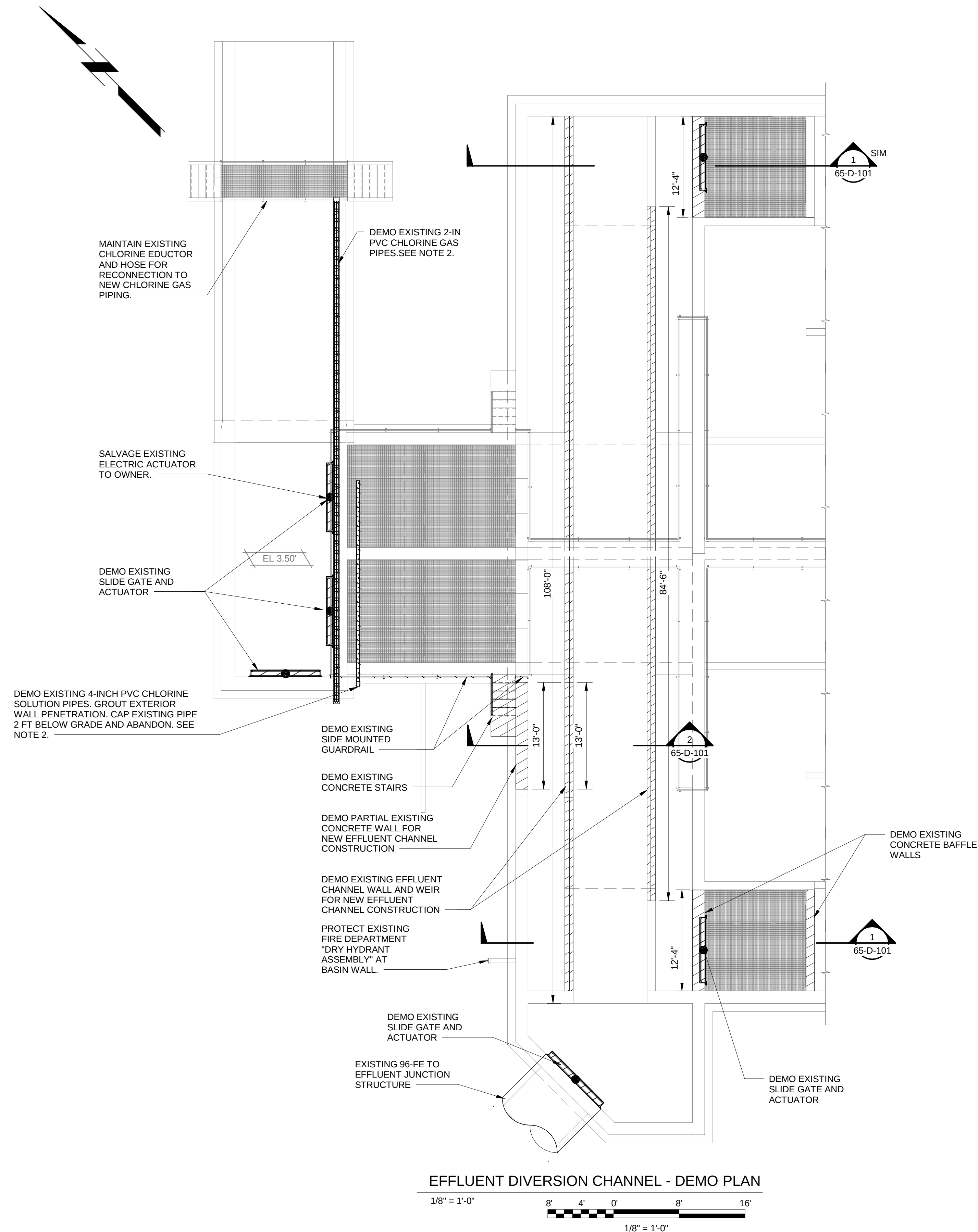
## DEMOLITION

## PLAN AND SECTIONS

PLAN FILE NO. 664-268

65-D-101

75  
OF  
118



GENERAL NOTES:

1. SEE SPECIFICATION SECTION 01015  
PROJECT REQUIREMENTS FOR  
CONSTRUCTION SEQUENCING AND  
COORDINATION WITH WRA.  
CHLORINE CONTACT BASIN  
CONSTRUCTION SHALL BE LIMITED  
TO NON-DISINFECTION SEASON.
2. EXISTING CL PIPES CONTAIN  
CHLORINE GAS. CONTRACTOR SHALL  
COORDINATE SHUTDOWN WITH  
OWNER AND PURGE PIPES PRIOR  
TO REMOVING PIPES.

— PROTECT TOP 1'0"  
OF EXISTING WALL  
FOR GRATING  
SUPPORT

— DEMO EXISTING  
CONCRETE BAFFLE  
WALLS

SECTION

1

65-D-101 1/4" = 1'-0"

SECTION

65-D-101 1/4" = 1'-0"

## EFFLUENT DIVERSION CHANNEL - DEMO PLAN

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1/8" = 1'-0"

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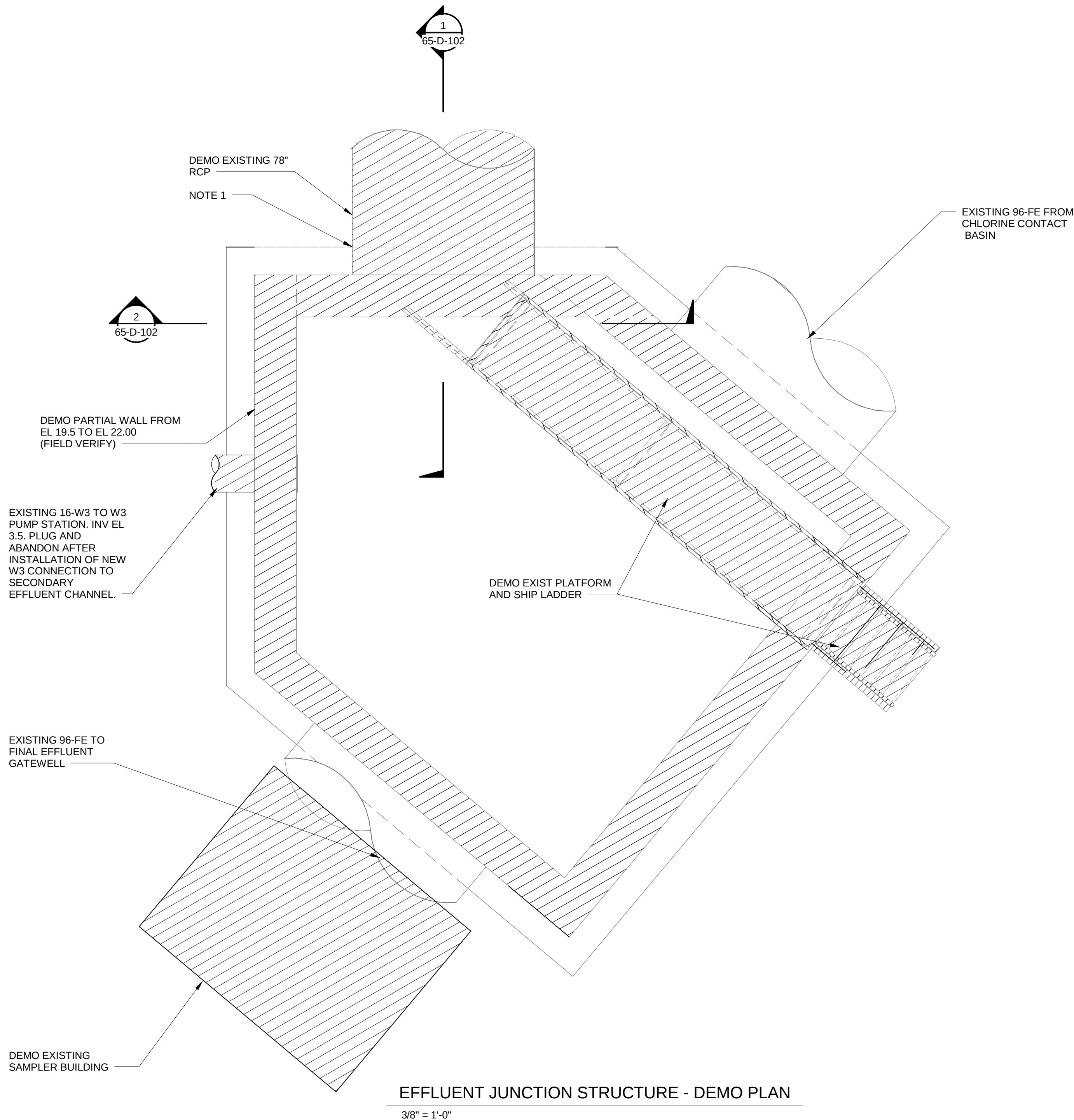
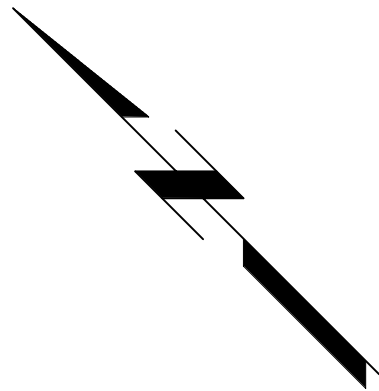
1/8" = 1'-0"

$$1/4'' = 1'-0$$

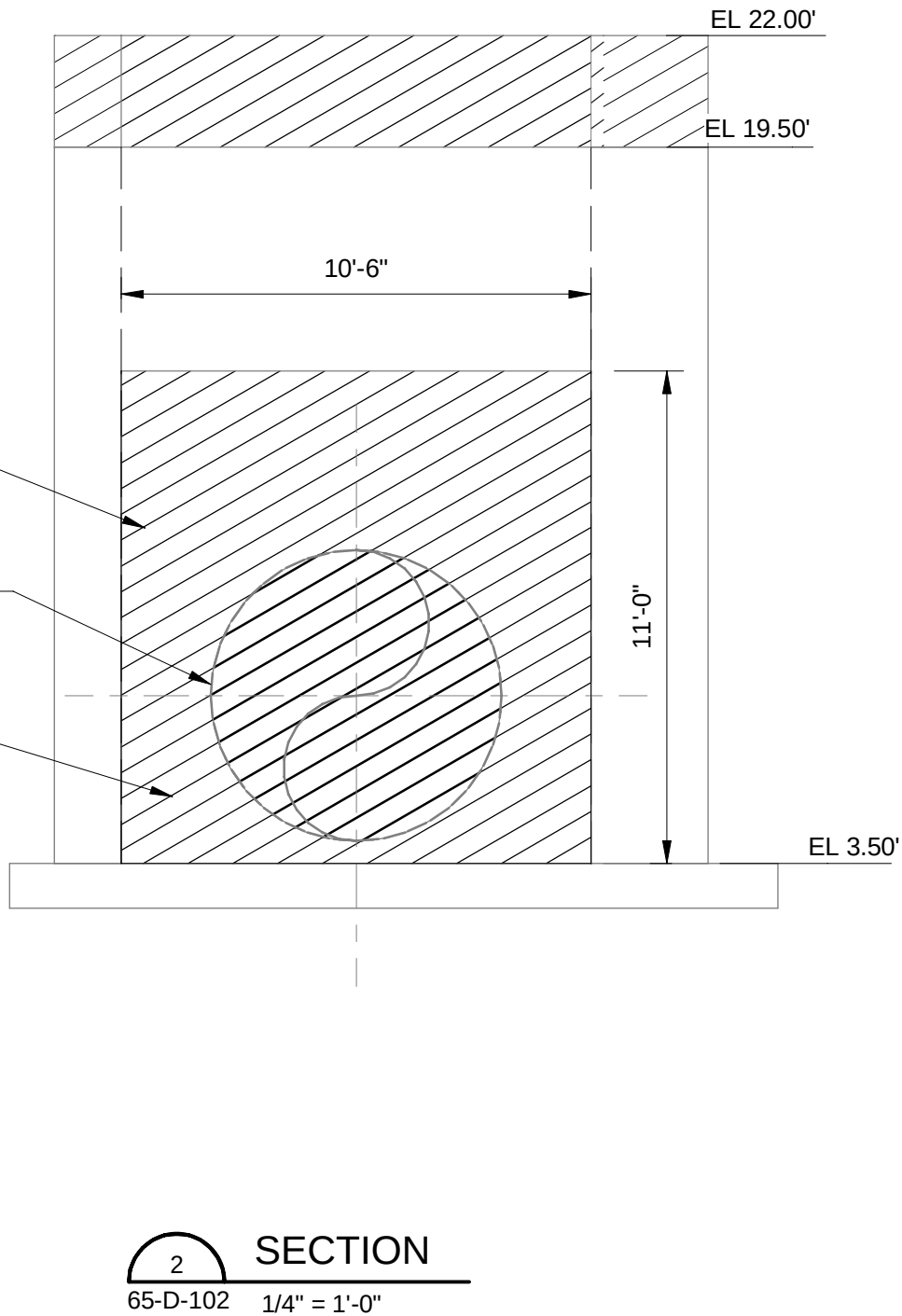
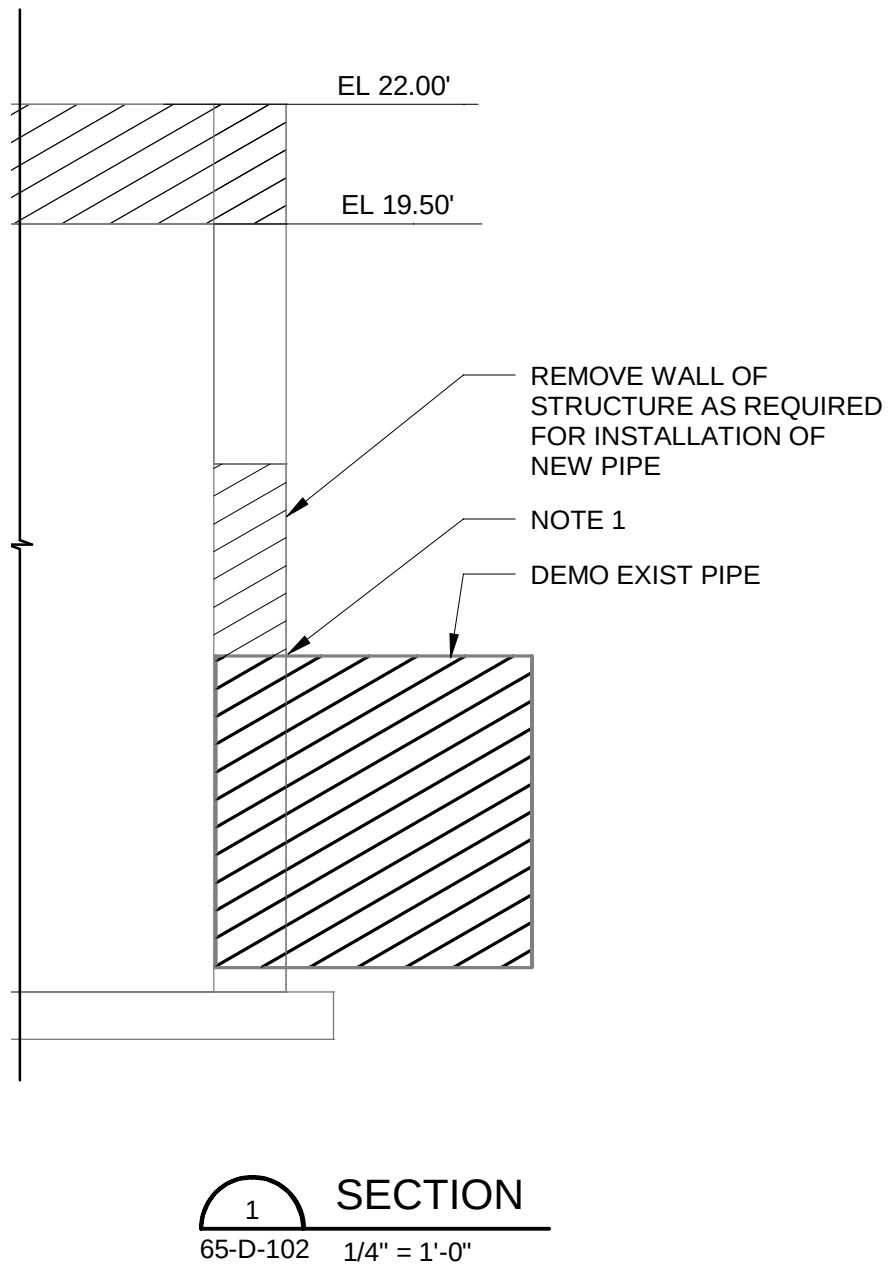
(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3

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FILE: BIM 360://410504 - WRF Effluent Pump Station/410504-Chlorine Contract Basin.rvt  
D11000





EFFLUENT JUNCTION STRUCTURE - DEMO PLAN  
3/8" = 1'-0"

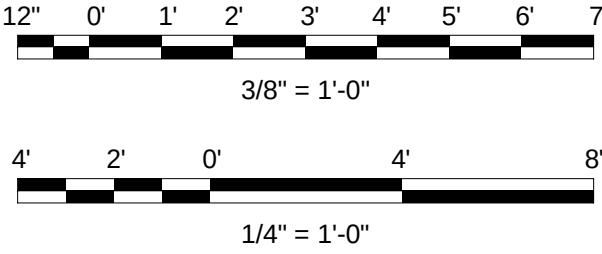


GENERAL NOTES:

- SEE SPECIFICATION SECTION 01015 PROJECT REQUIREMENTS FOR CONSTRUCTION SEQUENCING AND COORDINATION WITH WRA.

NOTES:

- PROVIDE TEMPORARY BULKHEAD FOLLOWING DEMOLITION OF EXISTING PIPE AND PRIOR TO INSTALLATION OF NEW PIPE



(SCALE BAR IS 4" AT FULL SCALE)



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMP  
IMPROVEMENTS

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| REVISIONS AND RECORD OF ISSUE |            |
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| DESIGNED:                     | DT         |
| DETAILED:                     | VVS        |
| CHECKED:                      | MZL        |
| APPROVED:                     | JAB        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

EFFLUENT JUNCTION  
STRUCTURE & SAMPLER  
BUILDING

DEMOLITION

PLAN AND SECTIONS

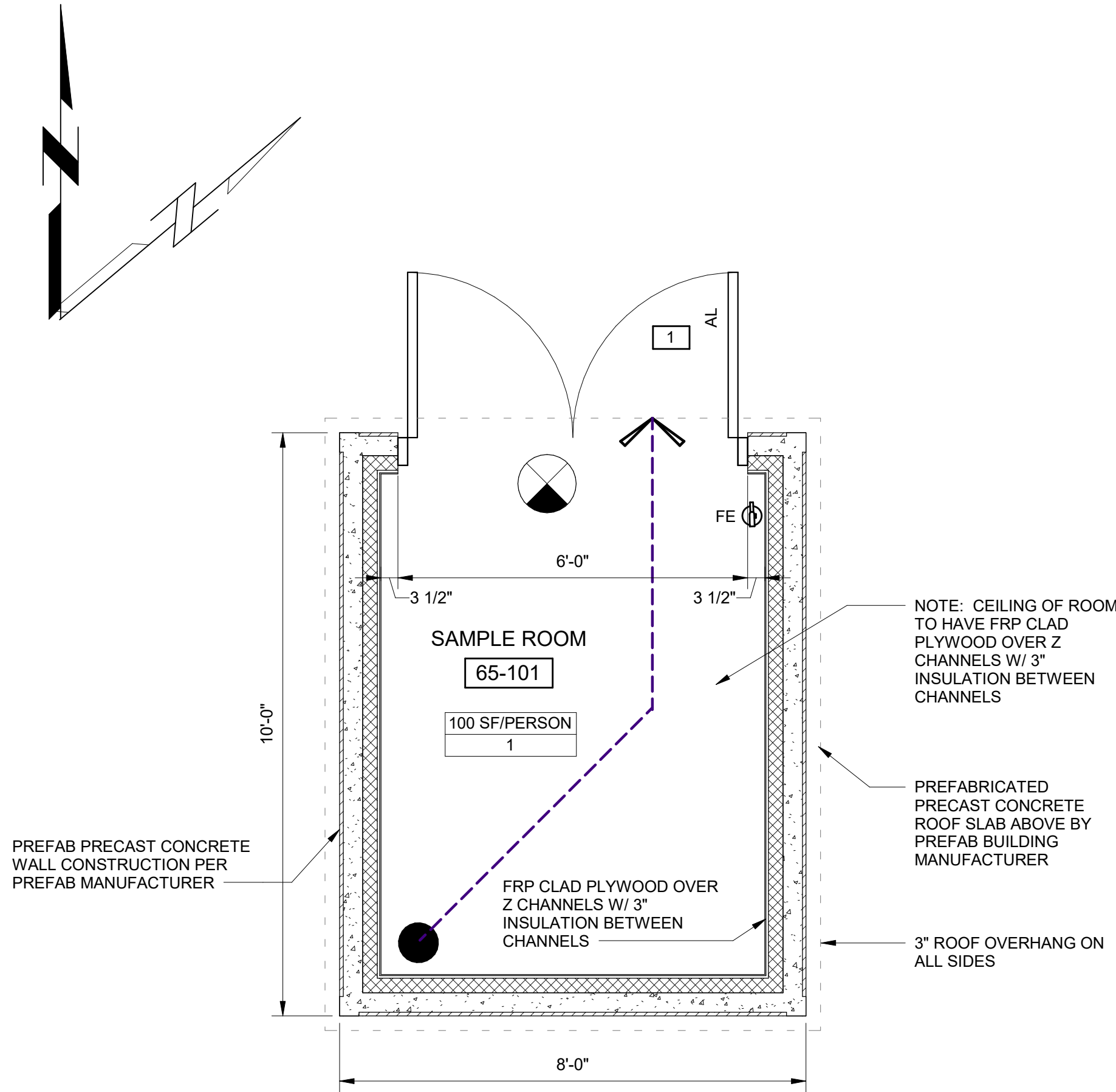
PLAN FILE NO. 664-269

65-D-102

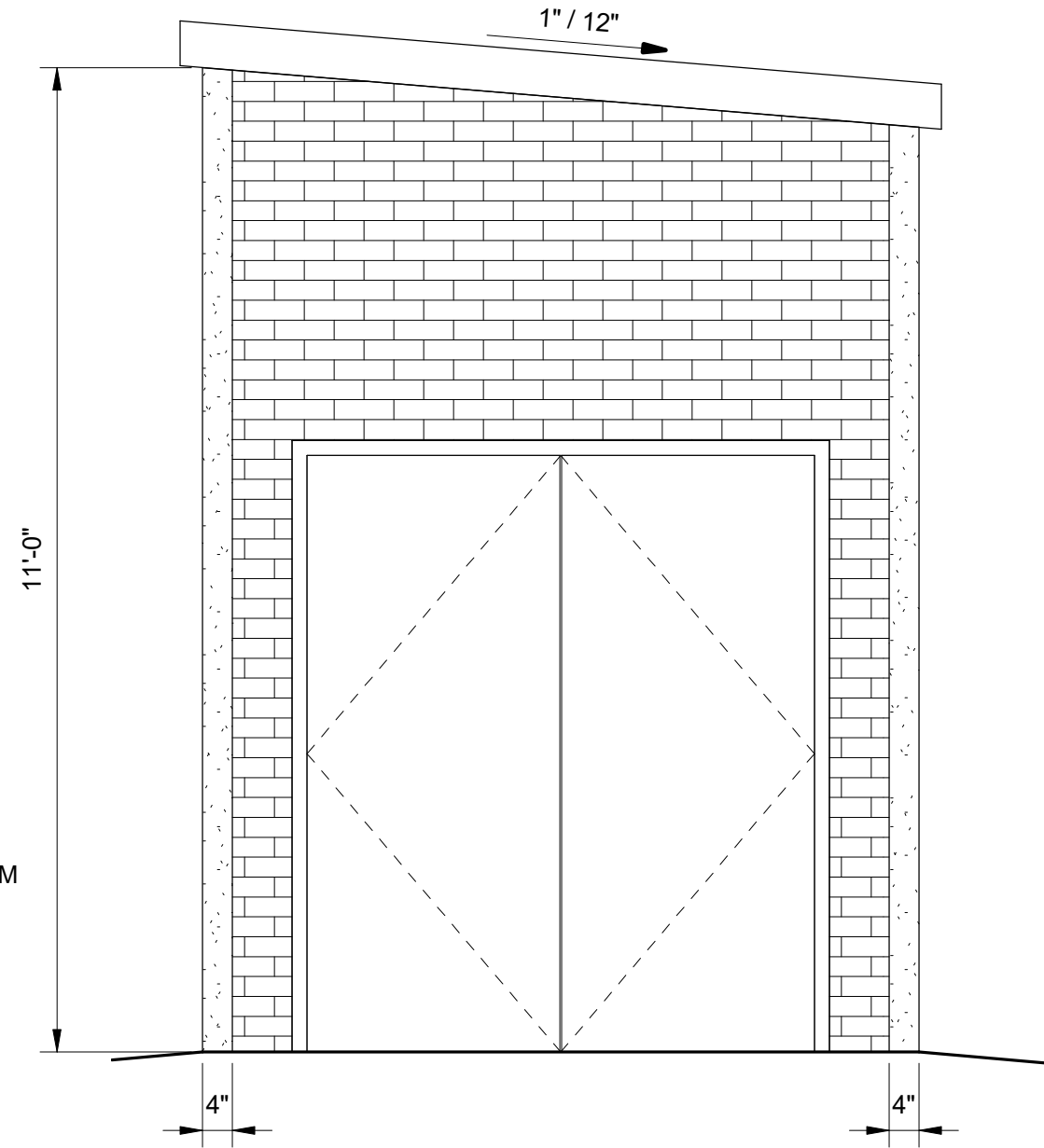
76  
OF  
118



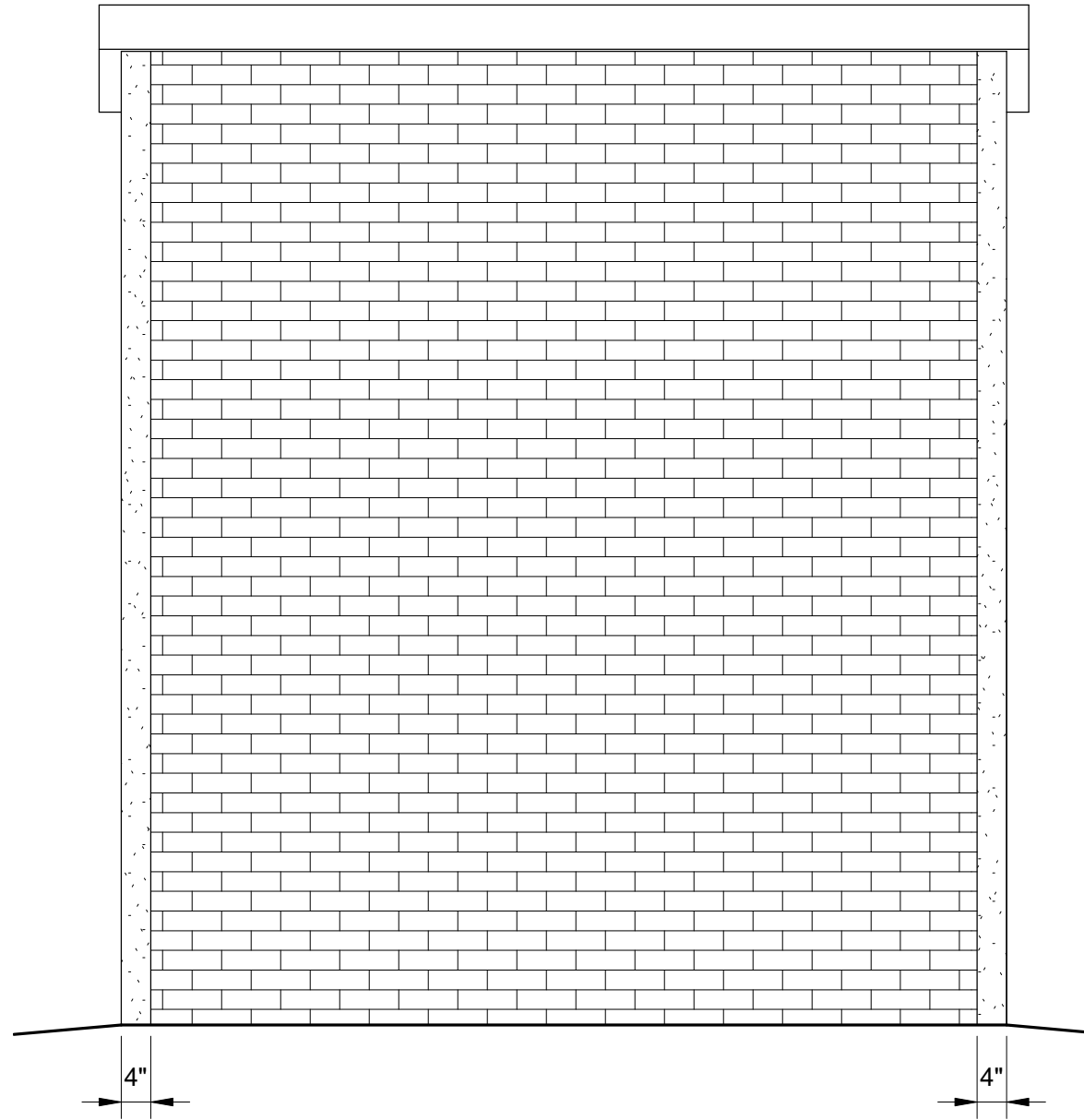
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 D11000



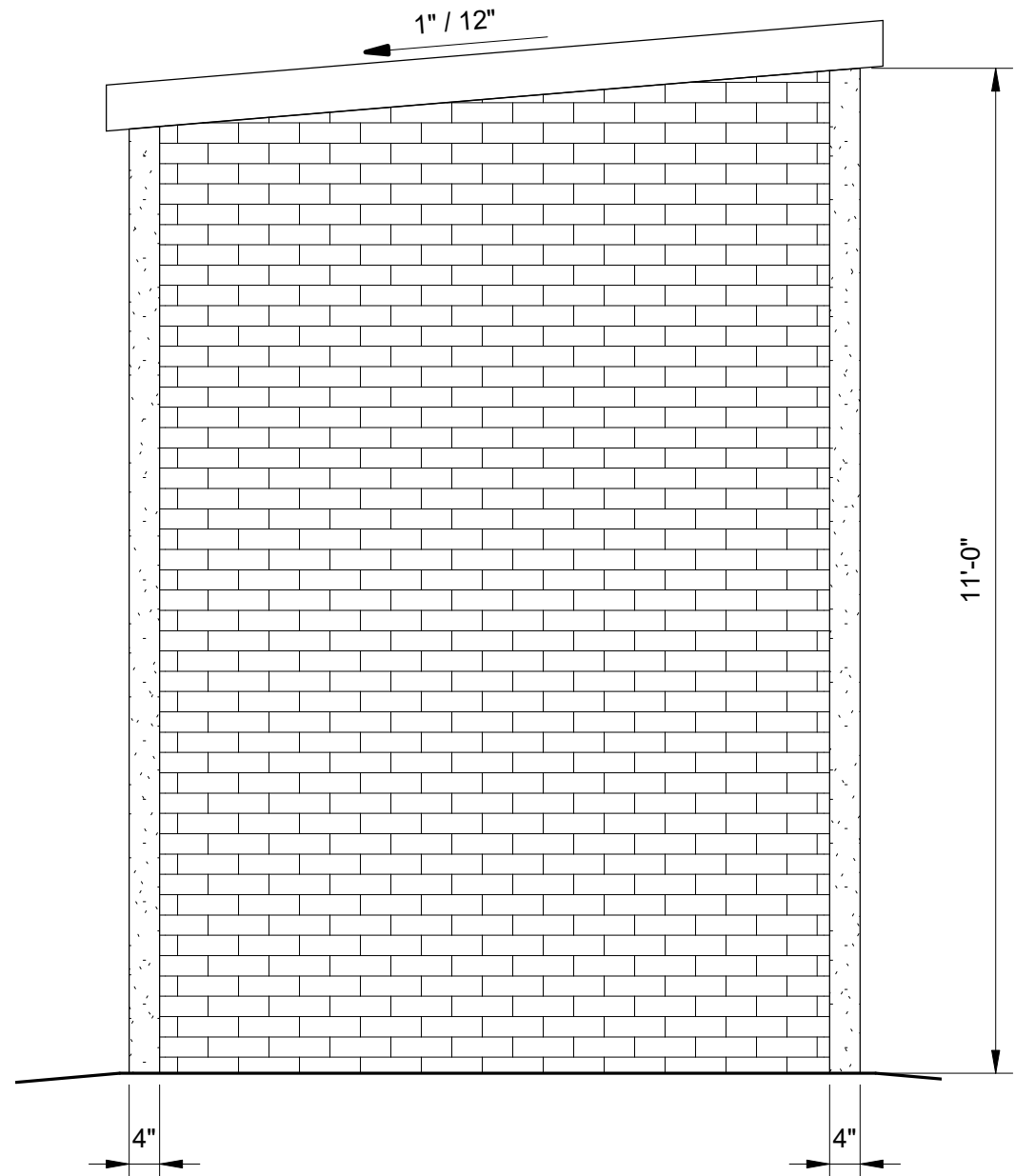
OPERATING LEVEL - LIFE SAFETY PLAN  
 1/2" = 1'-0"



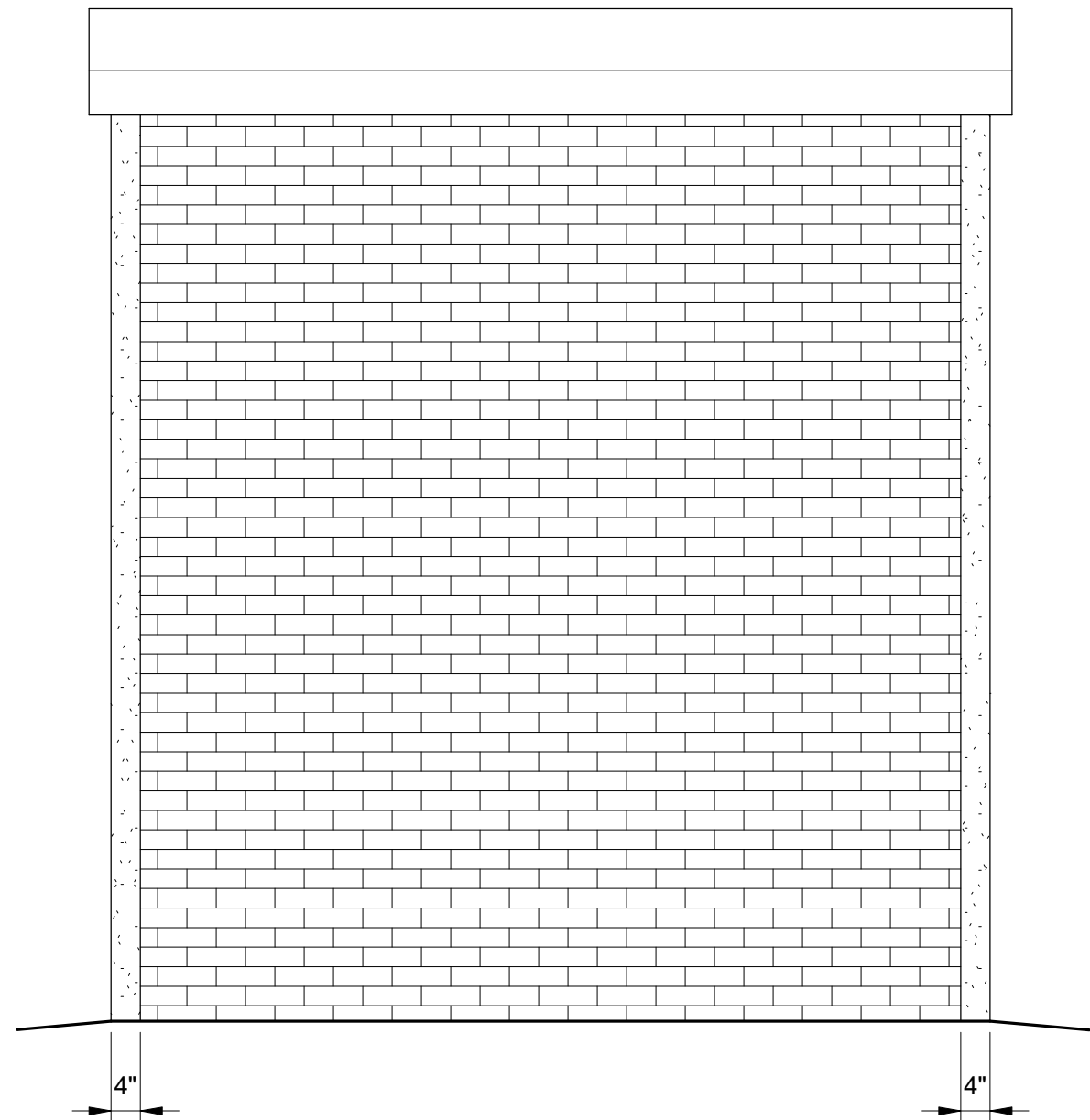
PLAN NORTH ELEVATION  
 1/2" = 1'-0"



PLAN EAST ELEVATION  
 1/2" = 1'-0"



PLAN SOUTH ELEVATION  
 1/2" = 1'-0"



PLAN WEST ELEVATION  
 1/2" = 1'-0"

LIFE SAFETY LEGEND

- FIRE EXTINGUISHER (FE)
- EXIT ACCESS TRAVEL PATH
- OCCUPANTS PER SF OCCUPANT LOAD
- CUMULATIVE OCCUPANT LOAD
- EXIT
- 1 HOUR FIRE BARRIER

BUILDING CODE ANALYSIS

|                                  |                      |
|----------------------------------|----------------------|
| APPLICABLE BUILDING CODES:       |                      |
| 2018 INTERNATIONAL BUILDING CODE |                      |
| BUILDING NAME                    | SAMPLER BUILDING     |
| OCCUPANCY                        | F-1, MODERATE HAZARD |
| ACTUAL FLOOR AREA                | 80 SF TOTAL          |
| ACTUAL HEIGHT                    | 11 FT                |
| TYPE OF CONSTRUCTION             | TYPE II-B            |
| ALLOWABLE AREA                   | 15,500 SF            |
| ALLOWABLE HEIGHT                 | 55 FT                |
| DESIGN OCCUPANT LOAD             | 1 PERSON             |
| ADA ACCESSIBILITY                | NO                   |
| OCCUPANCY SEPARATION             | NO                   |
| NUMBER OF STORIES                | 1 STORY              |
| ALLOWABLE NUMBER OF STORIES      | 2 STORIES            |
| MINIMUM EXITS REQUIRED           | 1 EXIT               |
| NUMBER OF EXITS                  | 1 EXIT               |
| FIRE SPRINKLERS                  | NO                   |
| MAX EXIT TRAVEL DISTANCE         | 75 FT                |
| ENERGY CODE COMPLIANCE           | YES                  |



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 Des Moines, Iowa



DES MOINES  
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 AUTHORITY

WRF EFFLUENT PUMP  
 IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | RNP                |
| DETAILED:                     | SJU                |
| CHECKED:                      |                    |
| APPROVED:                     |                    |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT JUNCTION  
 STRUCTURE & SAMPLER  
 BUILDING

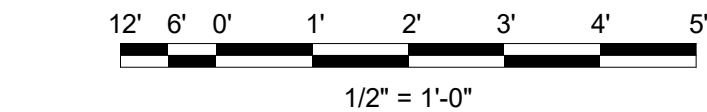
ARCHITECTURAL

PLAN

PLAN FILE NO. 664-270

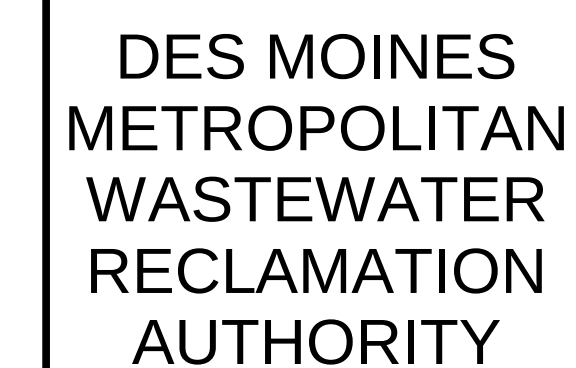
65-A-101

77  
 OF  
 118



(SCALE BAR IS 4" AT FULL SCALE)





## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

CHLORINE CONTACT BASIN

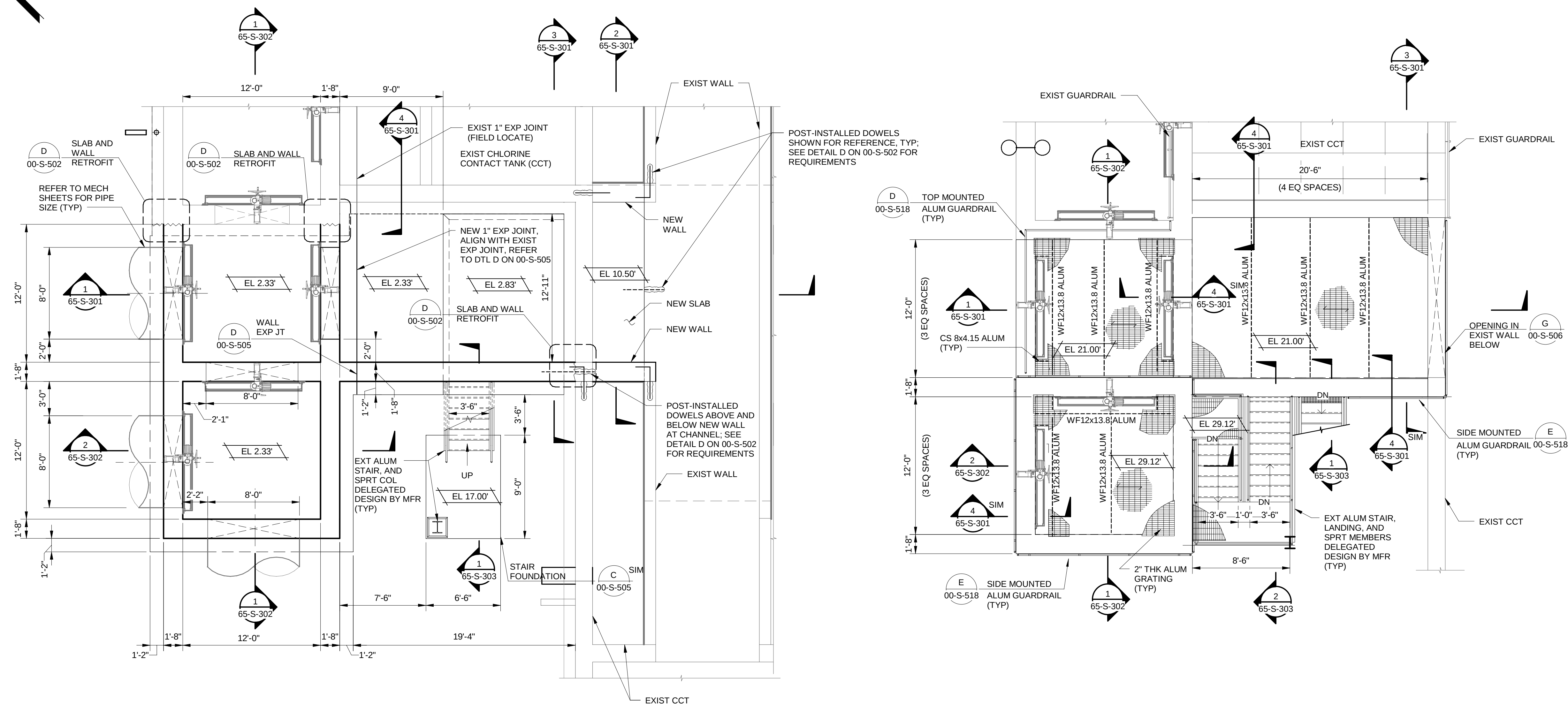
STRUCTURAL

## PLANS

PLAN FILE NO. 664-271

65-S-101

78  
OF  
118



BASE SLAB - ENLARGED PLAN

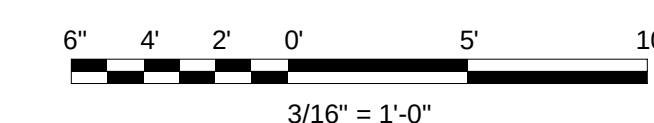
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3/16" = 1'-0"

UPPER LEVEL - ENLARGED PLAN

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3/16" = 1'-0'



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3





## WRF EFFLUENT PUMP IMPROVEMENTS

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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT JUNCTION  
STRUCTURE & SAMPLER  
BUILDING

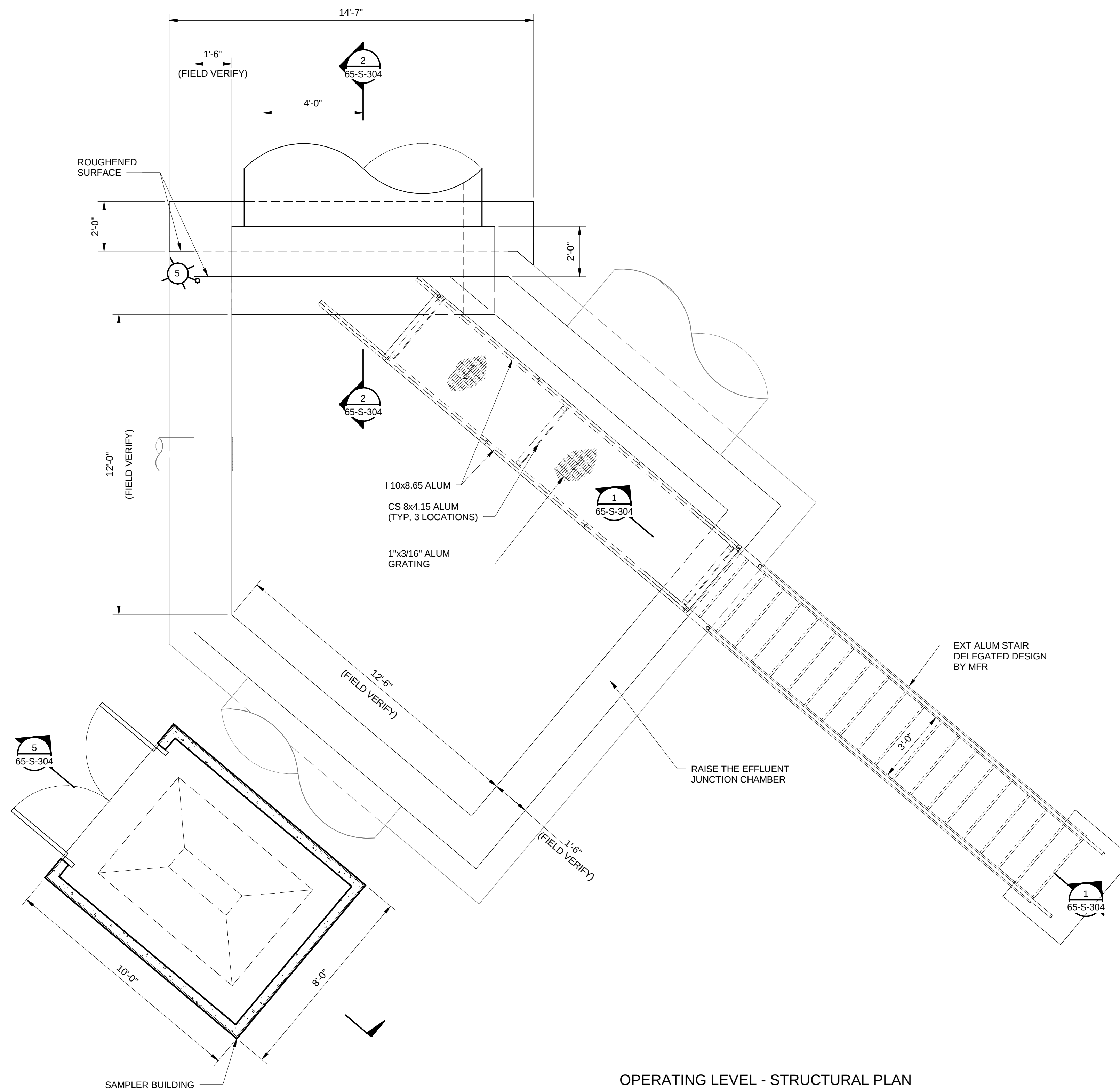
STRUCTURAL

## PLAN

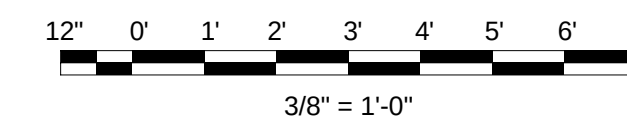
PLAN FILE NO. 664-272

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OF  
118



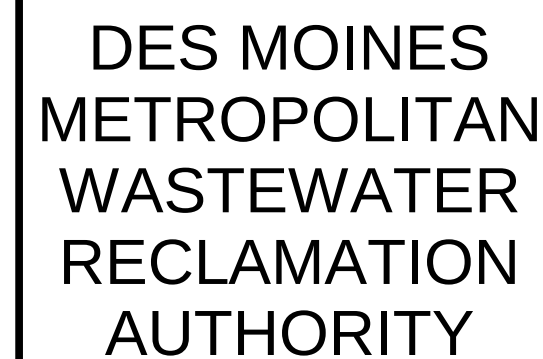
OPERATING LEVEL - STRUCTURAL PLAN



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4

PLOTTED: 8/20/2024 9:31:53 AM  
 FILE: BIM 360://410504 - WRF Effluent Pump Station/410504- Chlorine Contact Basin Junction Chamber.rvt  
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## WRF EFFLUENT PUMPING IMPROVEMENTS

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CHLORINE CONTACT BASIN

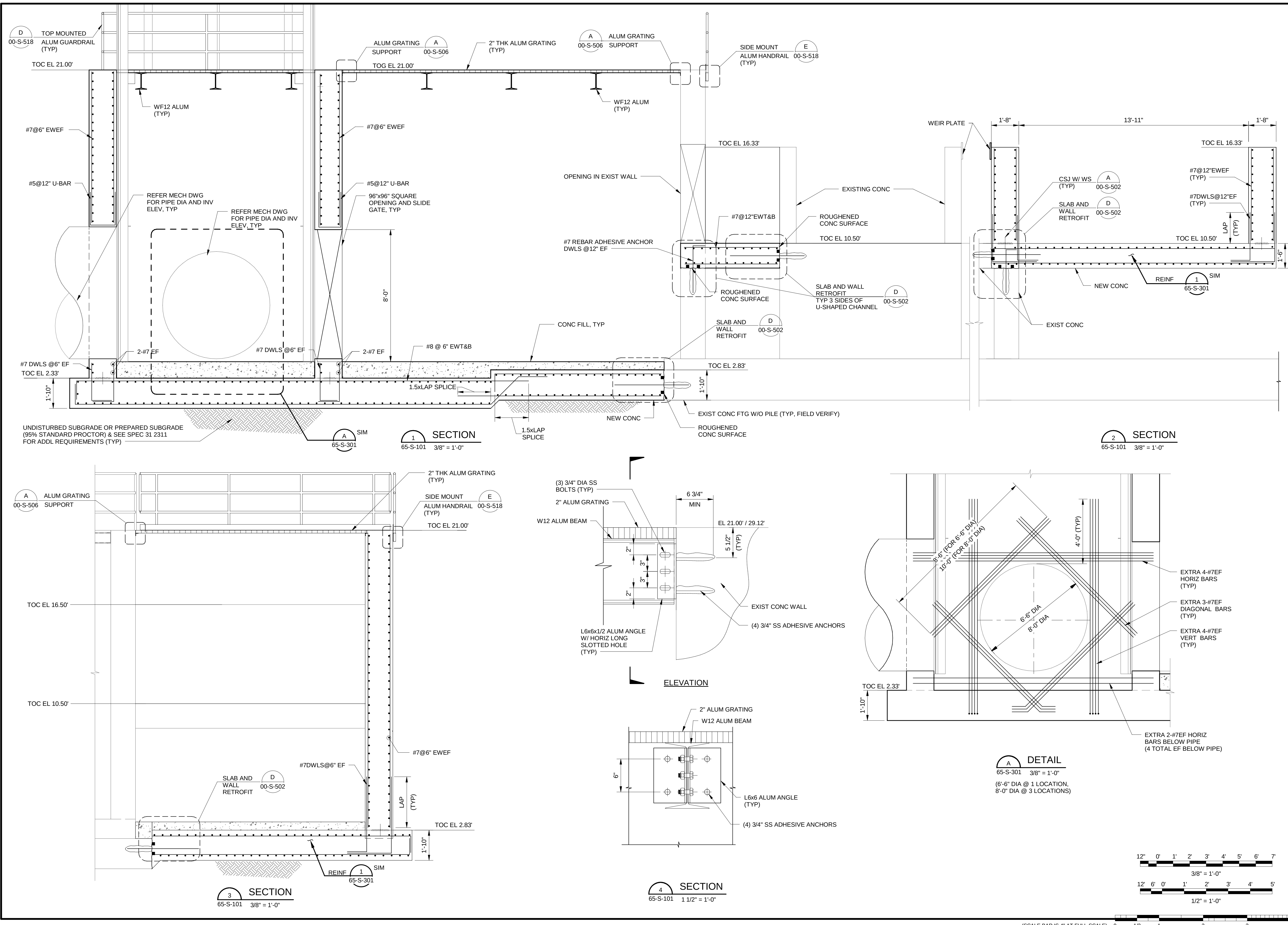
STRUCTURAL

## SECTIONS & DETAILS

PLAN FILE NO. 664-273

65-S-301

80  
OF  
118







## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

CHLORINE CONTACT BASIN

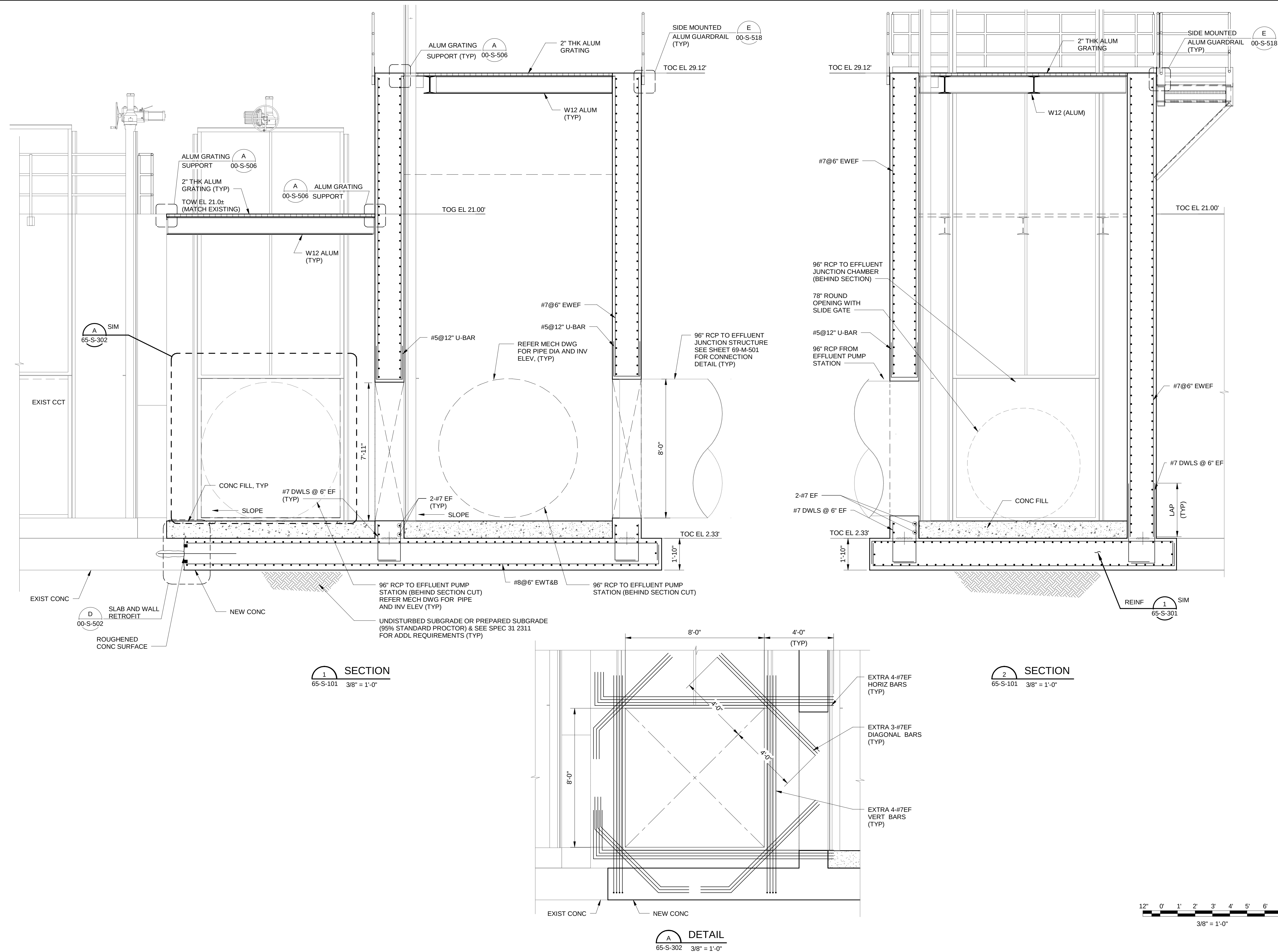
STRUCTURAL

## SECTIONS & DETAILS

PLAN FILE NO. 664-274

65-S-302

81  
OF  
118







DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

CHLORINE CONTACT BASIN

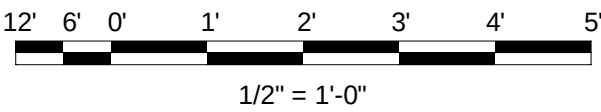
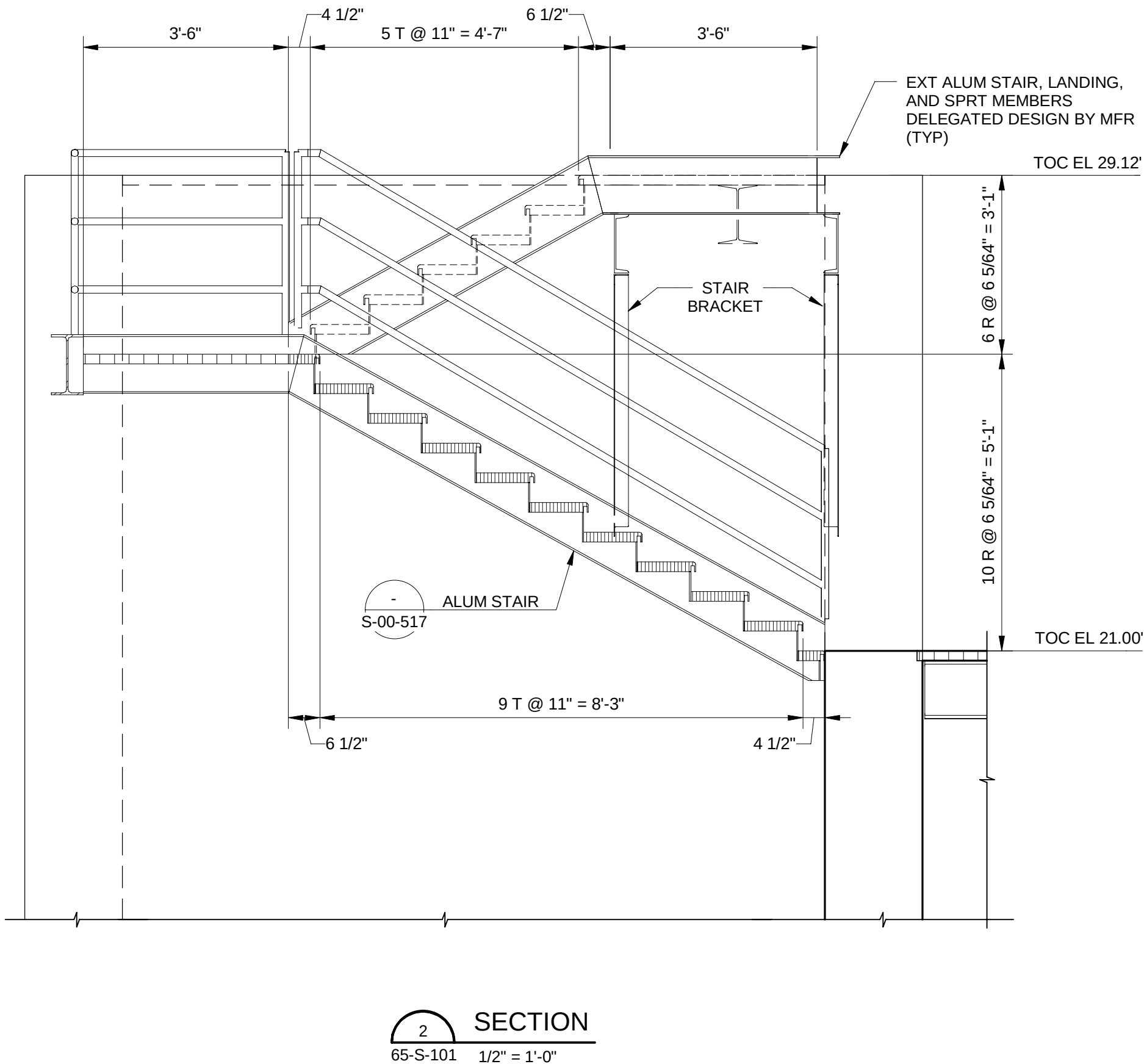
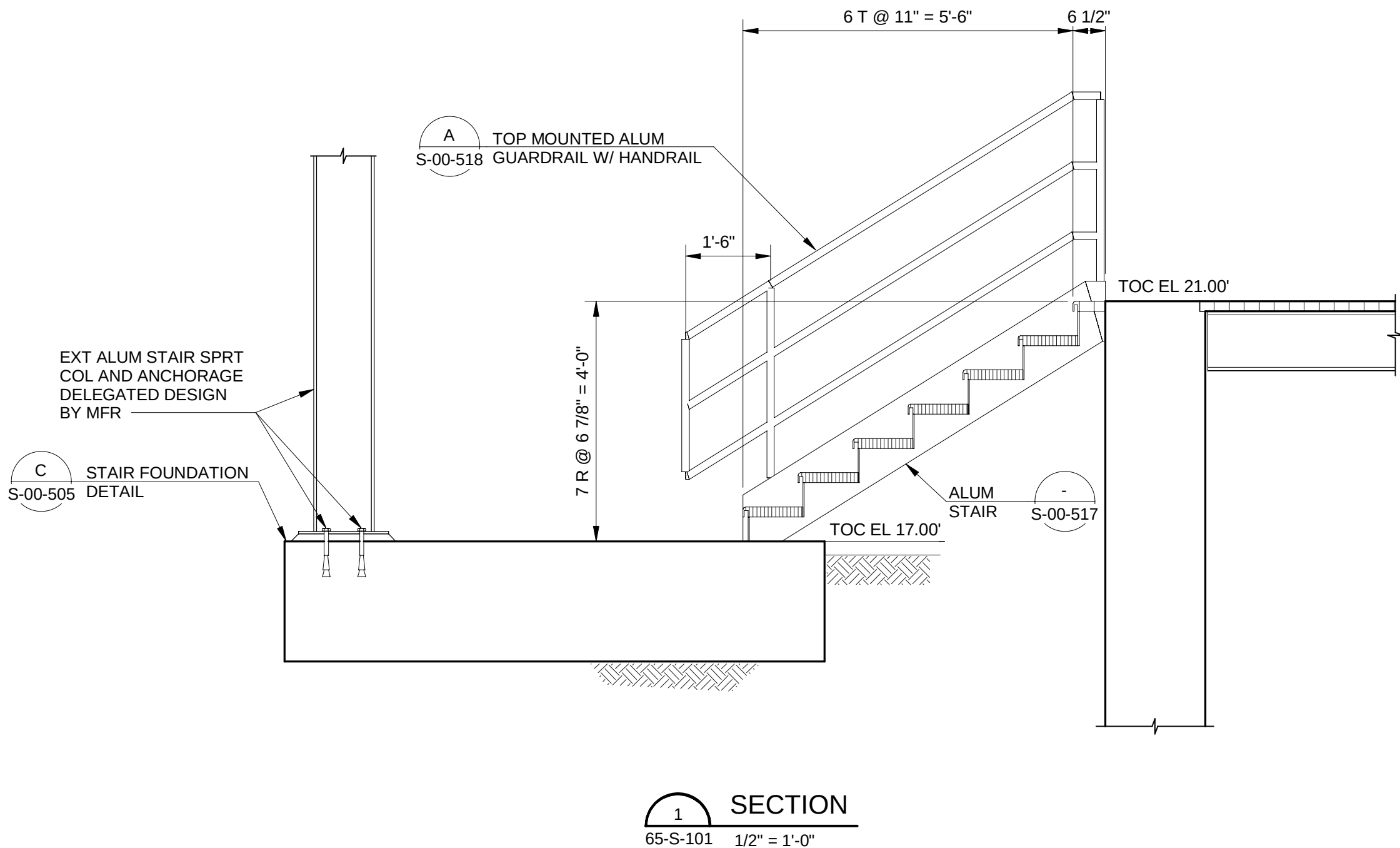
STRUCTURAL

SECTIONS

PLAN FILE NO. 664-275

65-S-303

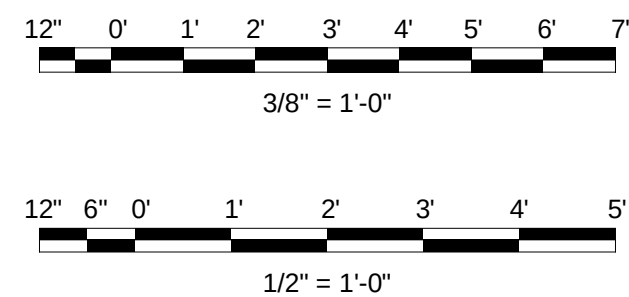
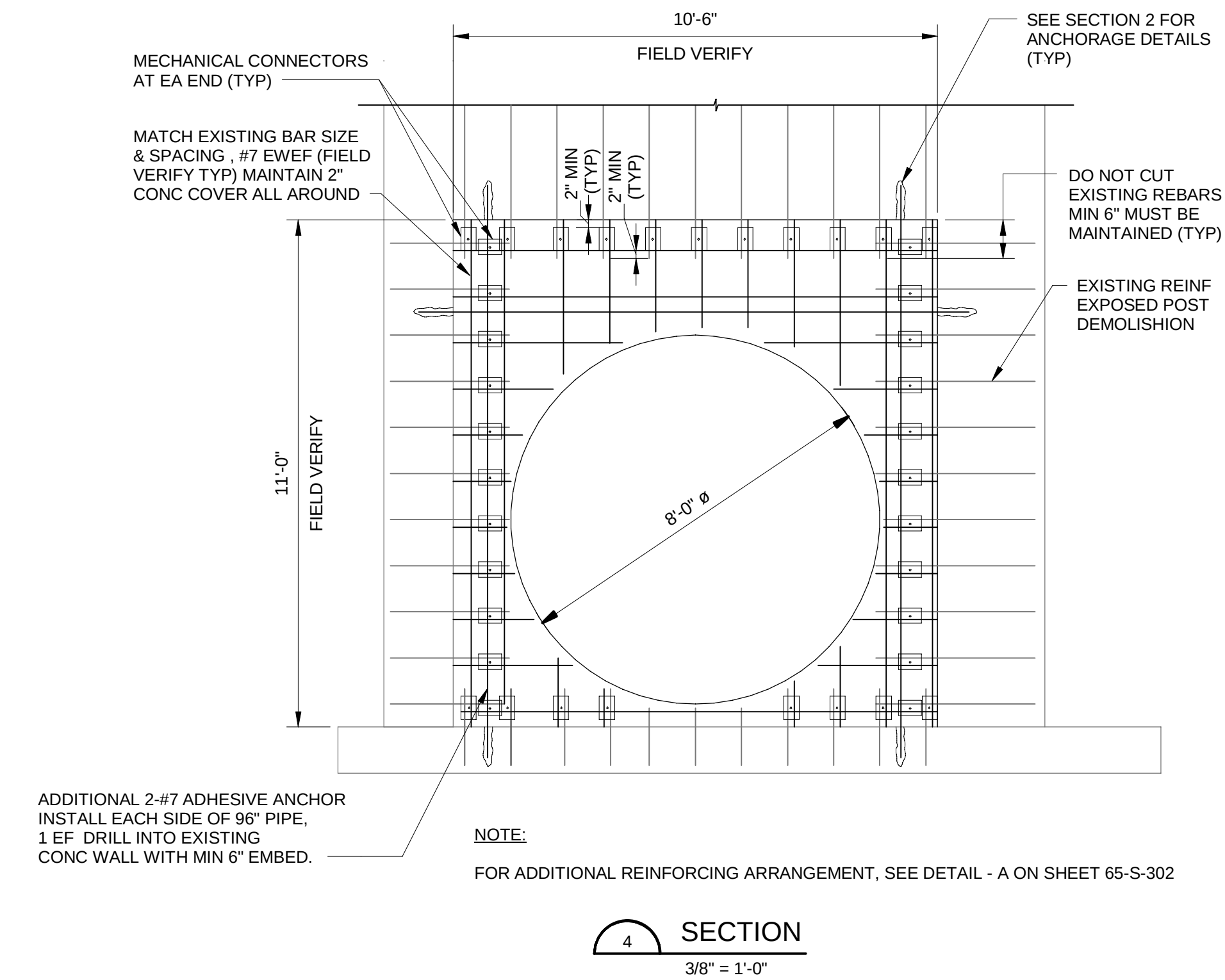
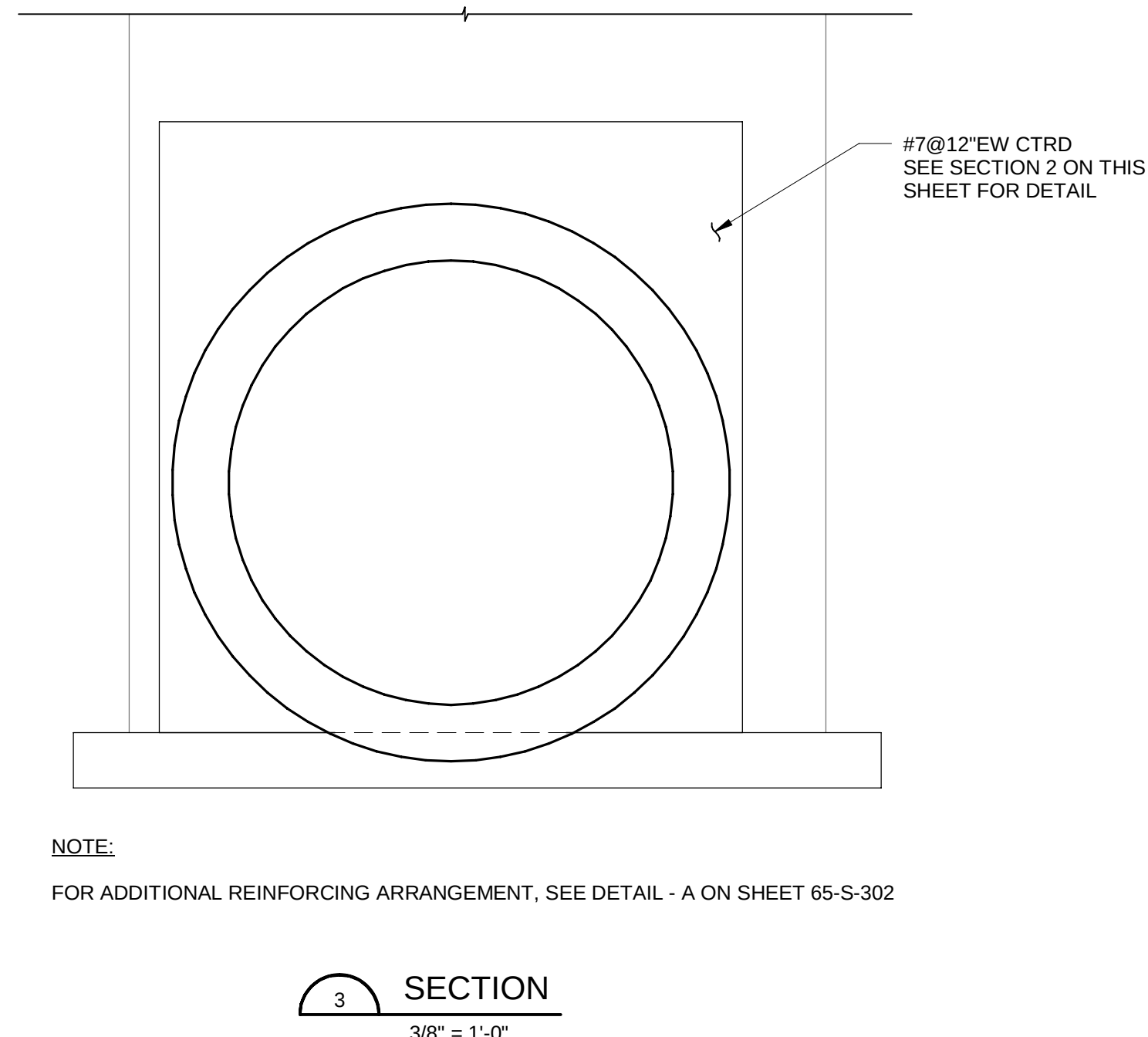
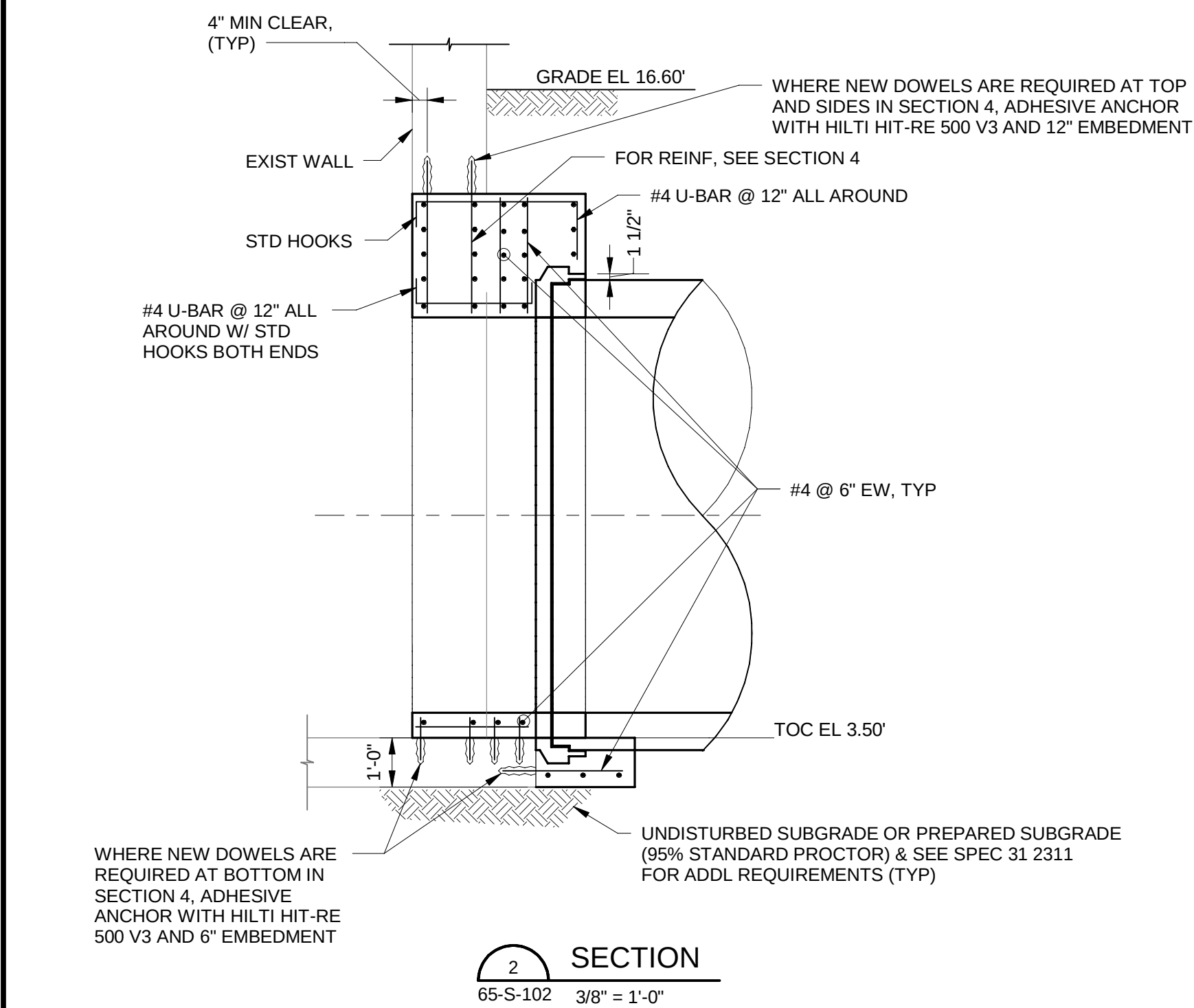
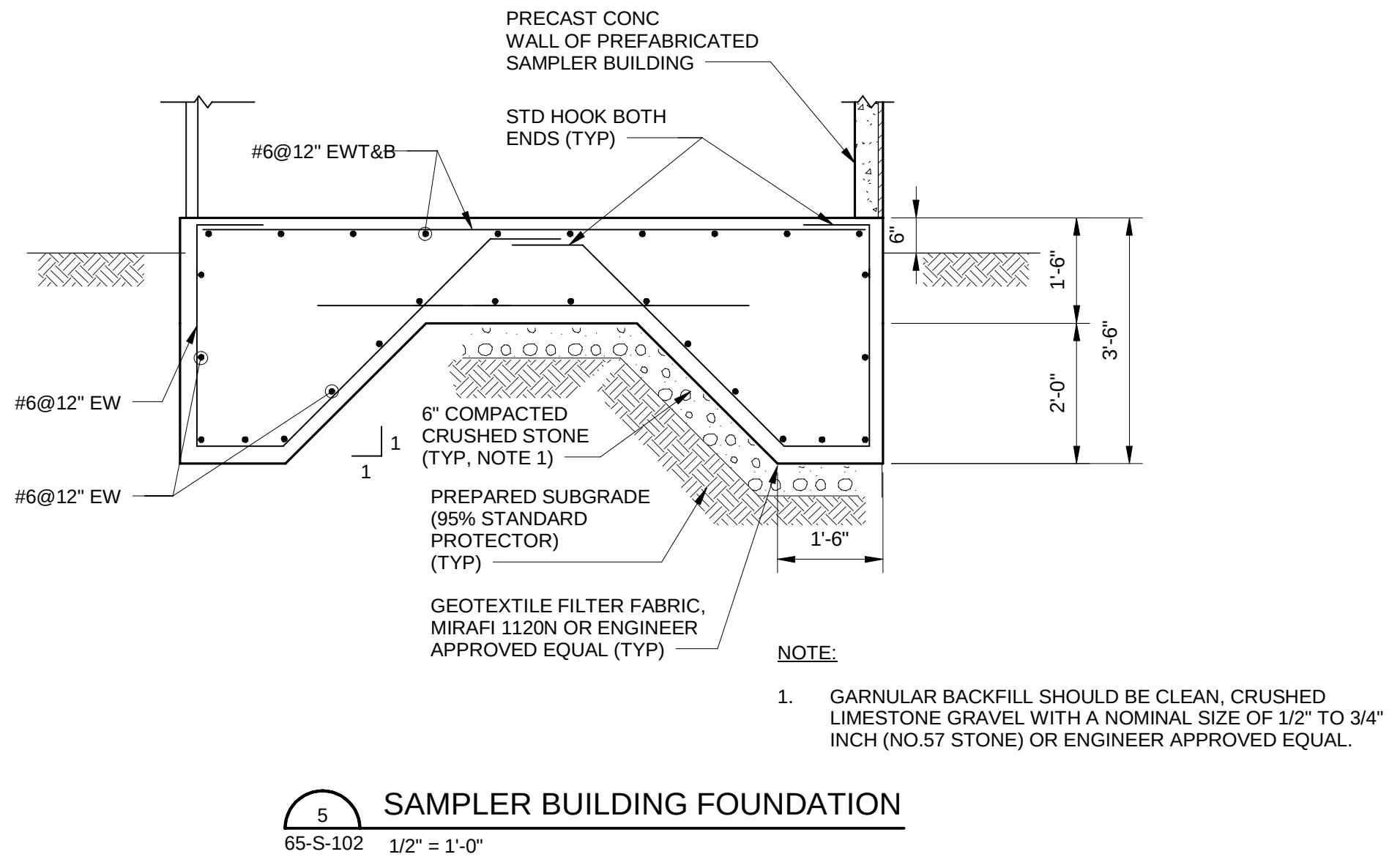
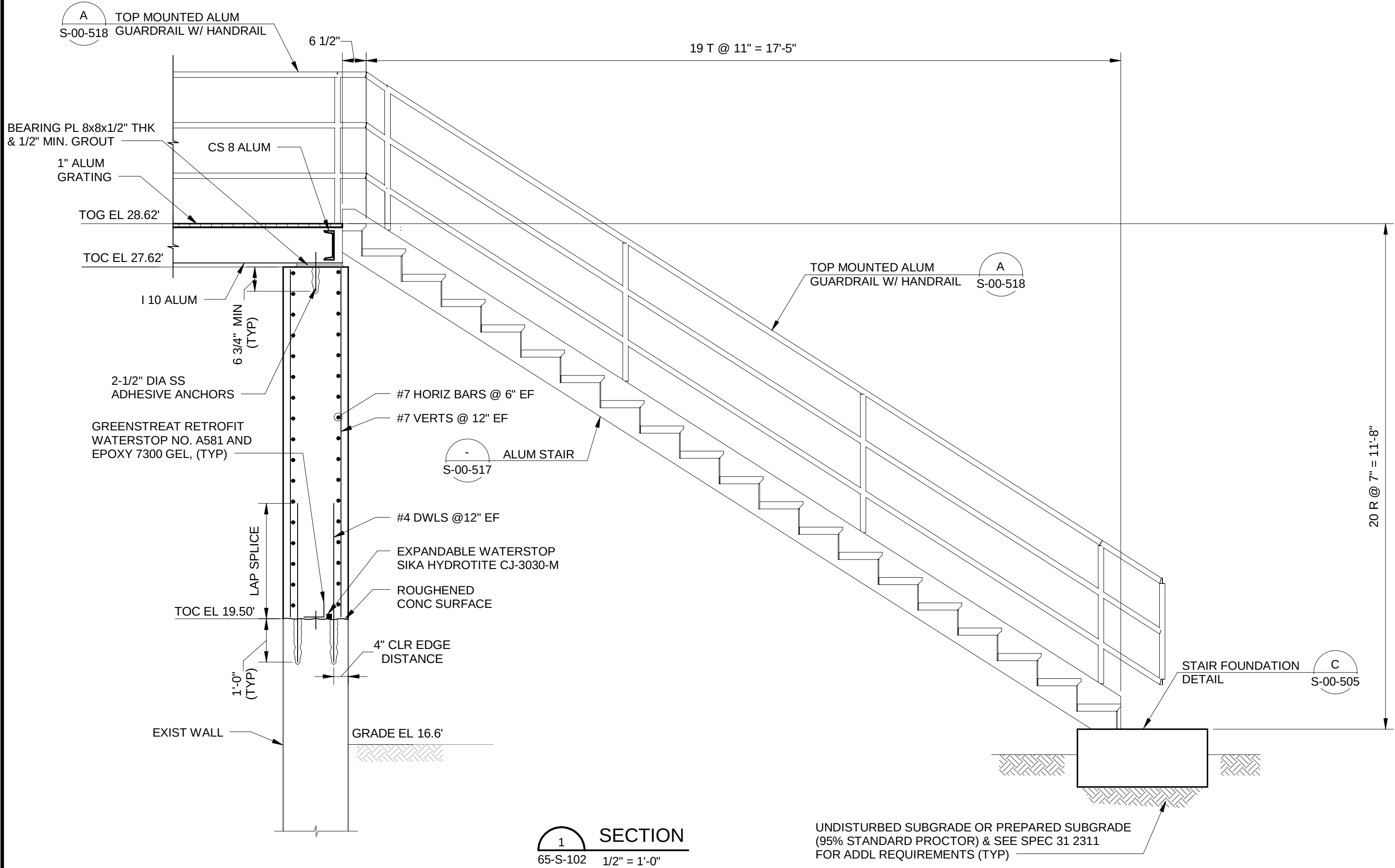
82  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



PLOTTED: 8/20/2024 9:31:56 AM  
FILE: BIM 360/M10504 - WRF Effluent Pump Station/M10504 - Chlorine Contact Basin Junction Chamber.rvt  
D11000





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Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMP  
IMPROVEMENTS

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| REVISIONS AND RECORD OF ISSUE |                    |
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| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT JUNCTION  
STRUCTURE & SAMPLER  
BUILDING

STRUCTURAL

SECTIONS

PLAN FILE NO. 664-276

65-S-304

83  
OF  
118





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JCK                |
| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
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| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

CHLORINE CONTACT BASIN

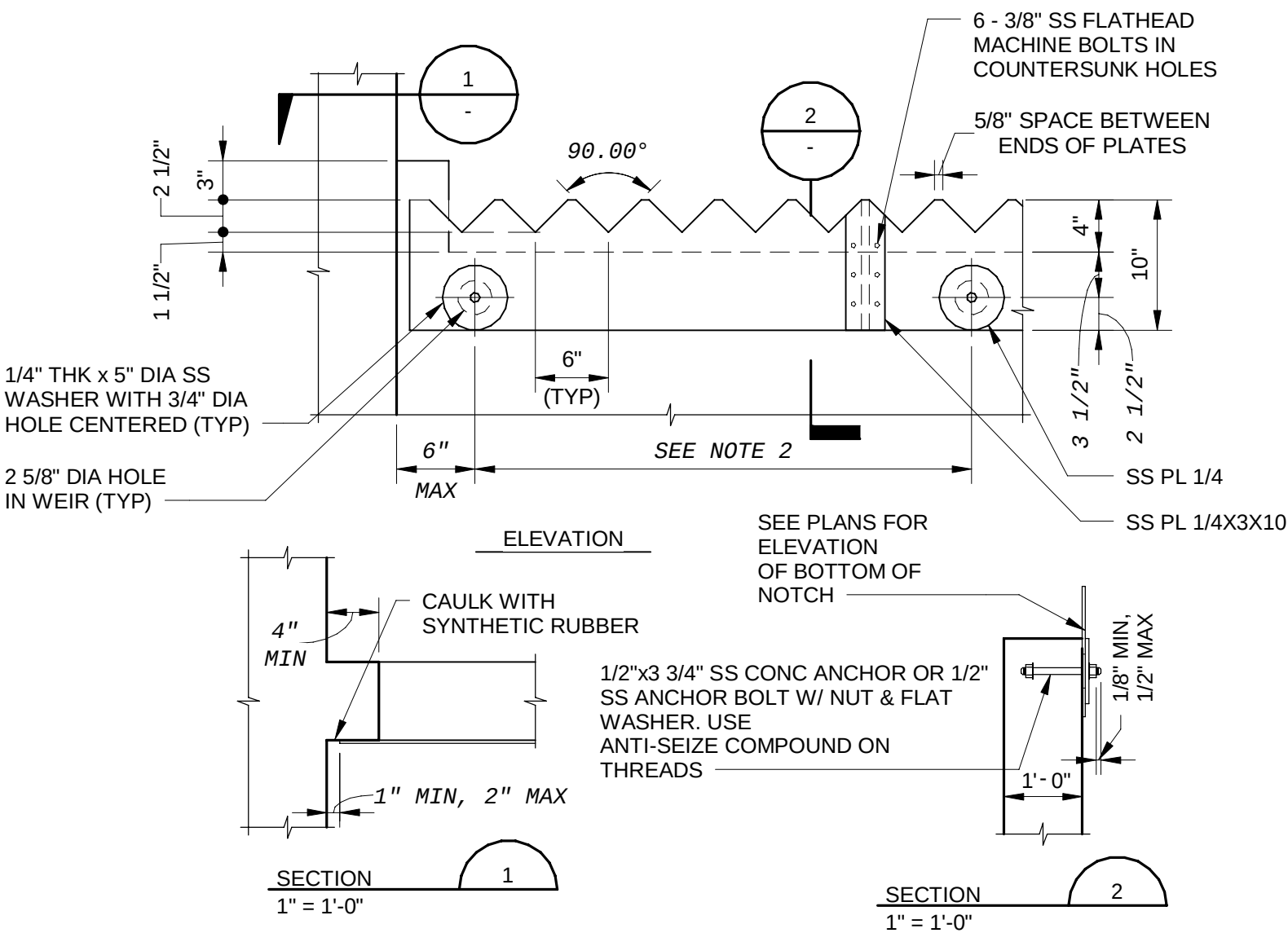
PROCESS MECHANICAL

PLAN

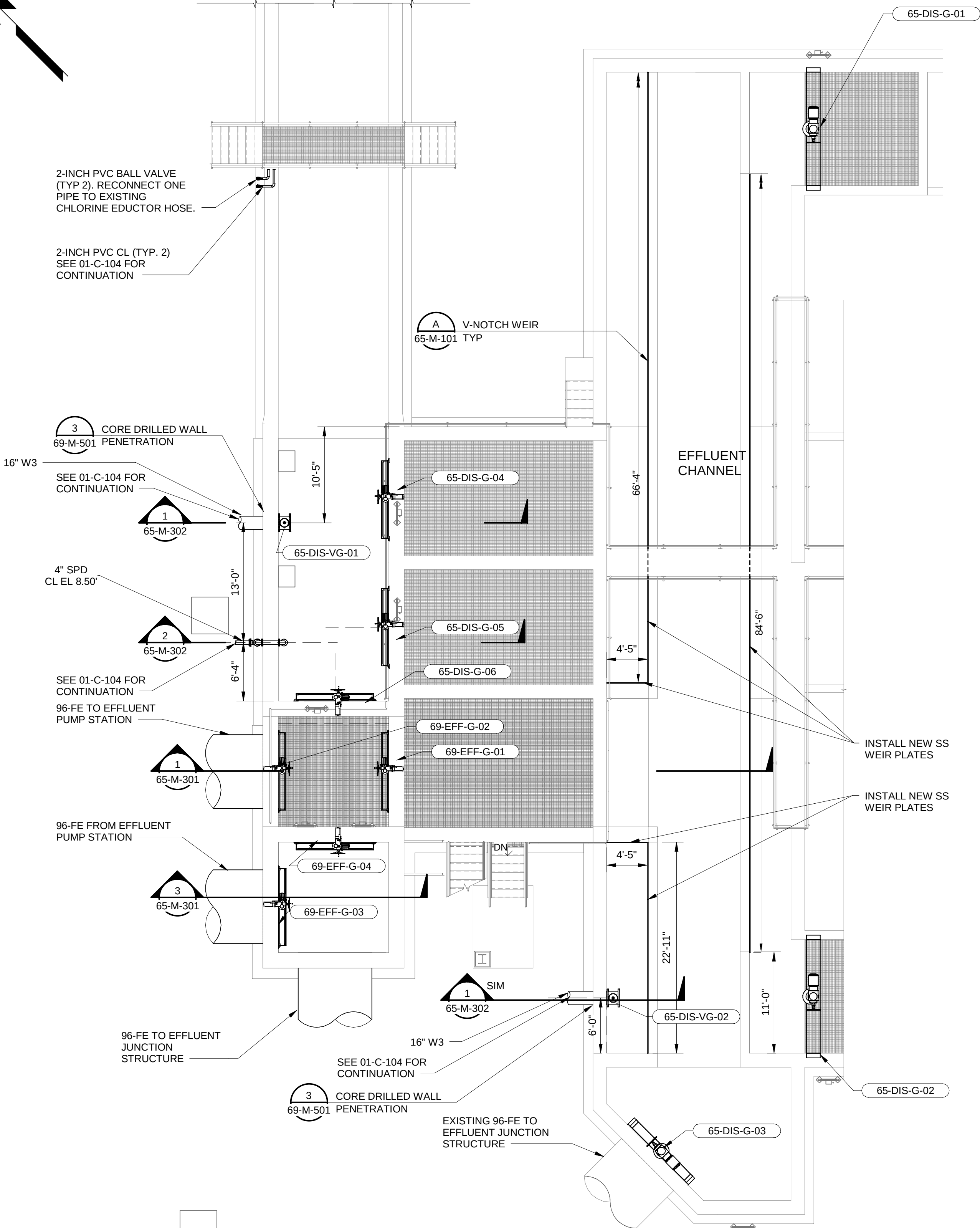
PLAN FILE NO. 664-277

65-M-101

84  
OF  
118

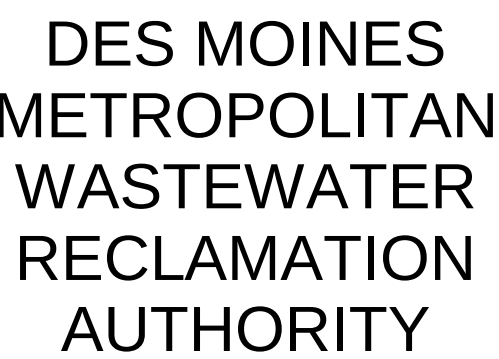


V-NOTCH WEIR  
NO SCALE



OPERATING LEVEL - ENLARGED PLAN  
1/8" = 1'-0"





## WRF EFFLUENT PUMPING IMPROVEMENTS

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| 08/16/2024                    | ISSUED FOR BIDDING |
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| DESIGNED:                     | JCK                |
| DETAILS:                      | VVS                |
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| PROJECT NO.:                  | 410504             |

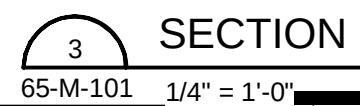
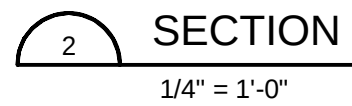
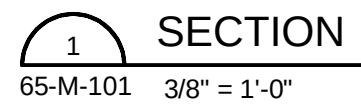
CHLORINE CONTACT BASIN

## PROCESS MECHANICAL

## SECTIONS

PLAN FILE NO. 664-278

65-M-301

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18

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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## REVISIONS AND RECORD OF ISSUE

DESIGNED: Design

|           |        |
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| DETAILED: | Author |
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| CHECKED: | Checke |
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APPROVED: \_\_\_\_\_ Approve

DATE: 08/16/2

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| PROJECT NO.: | 41050 |
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CHLORINE CONTACT BASIN

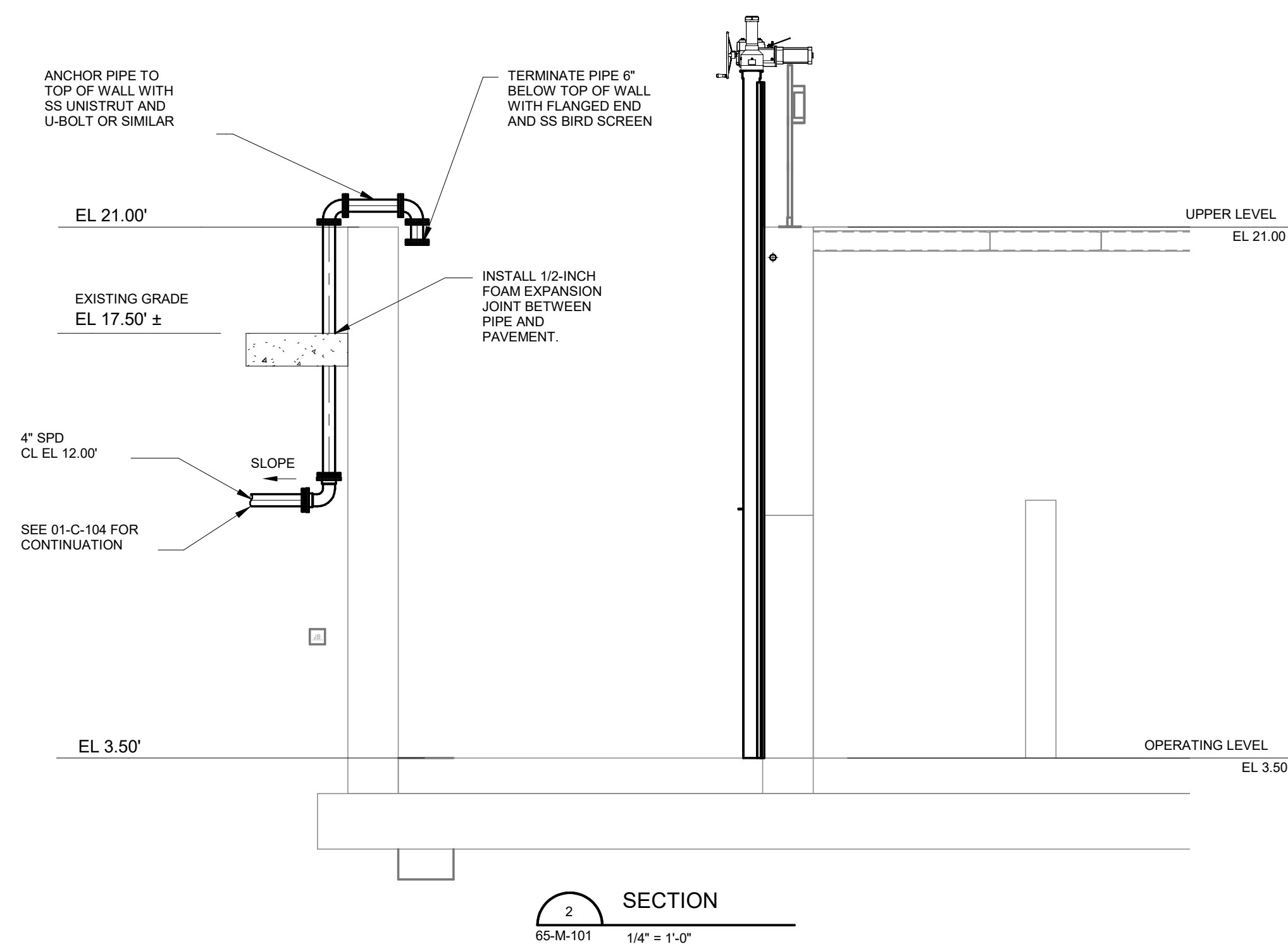
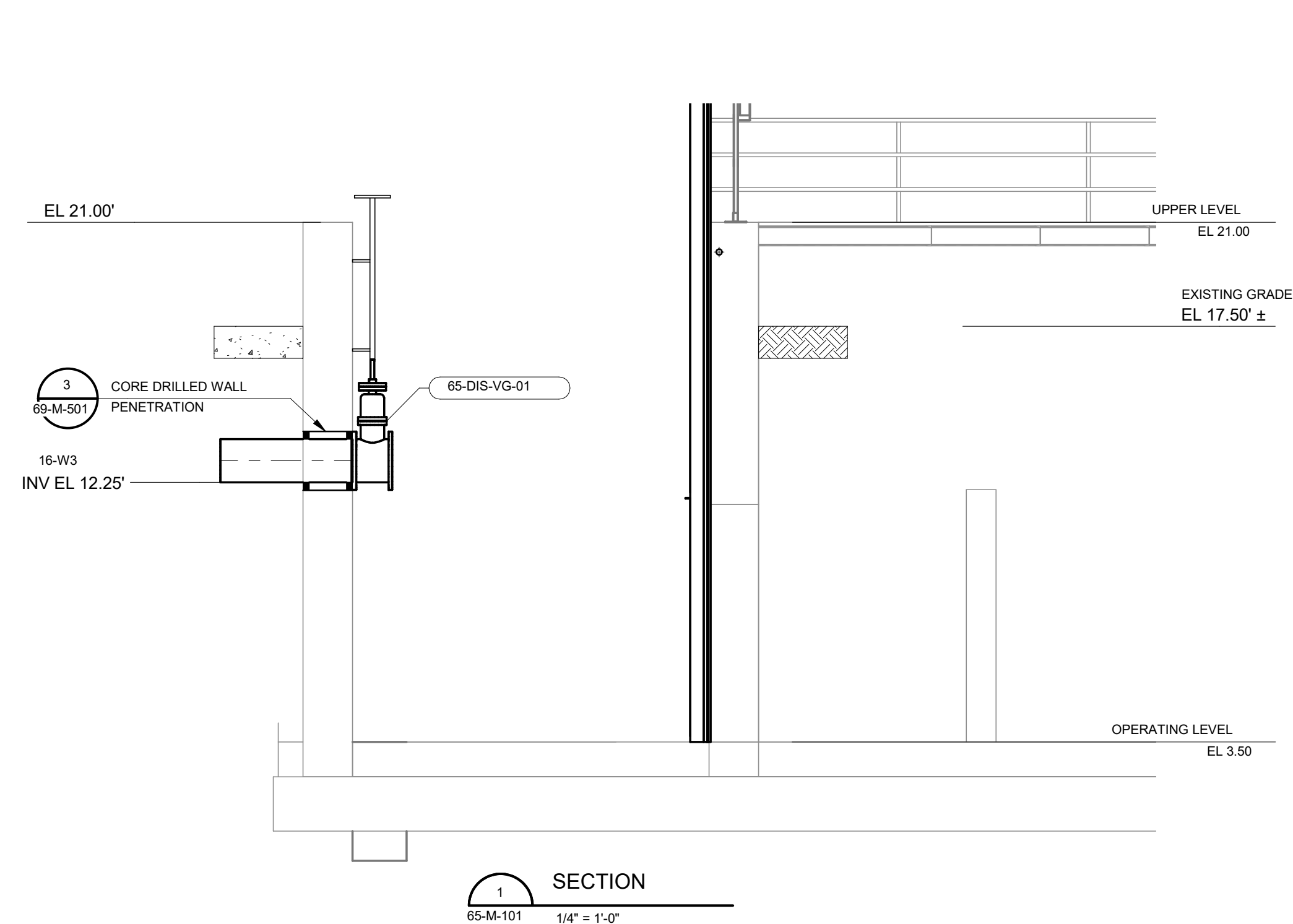
PROCESS MECHANICAL

## SECTIONS

PLAN FILE NO. 664-279

65-M-302

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OF  
118







DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JGP                |
| DETAILED:                     | CRG                |
| CHECKED:                      | SJB                |
| APPROVED:                     | TDH                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

CHLORINE CONTACT BASIN

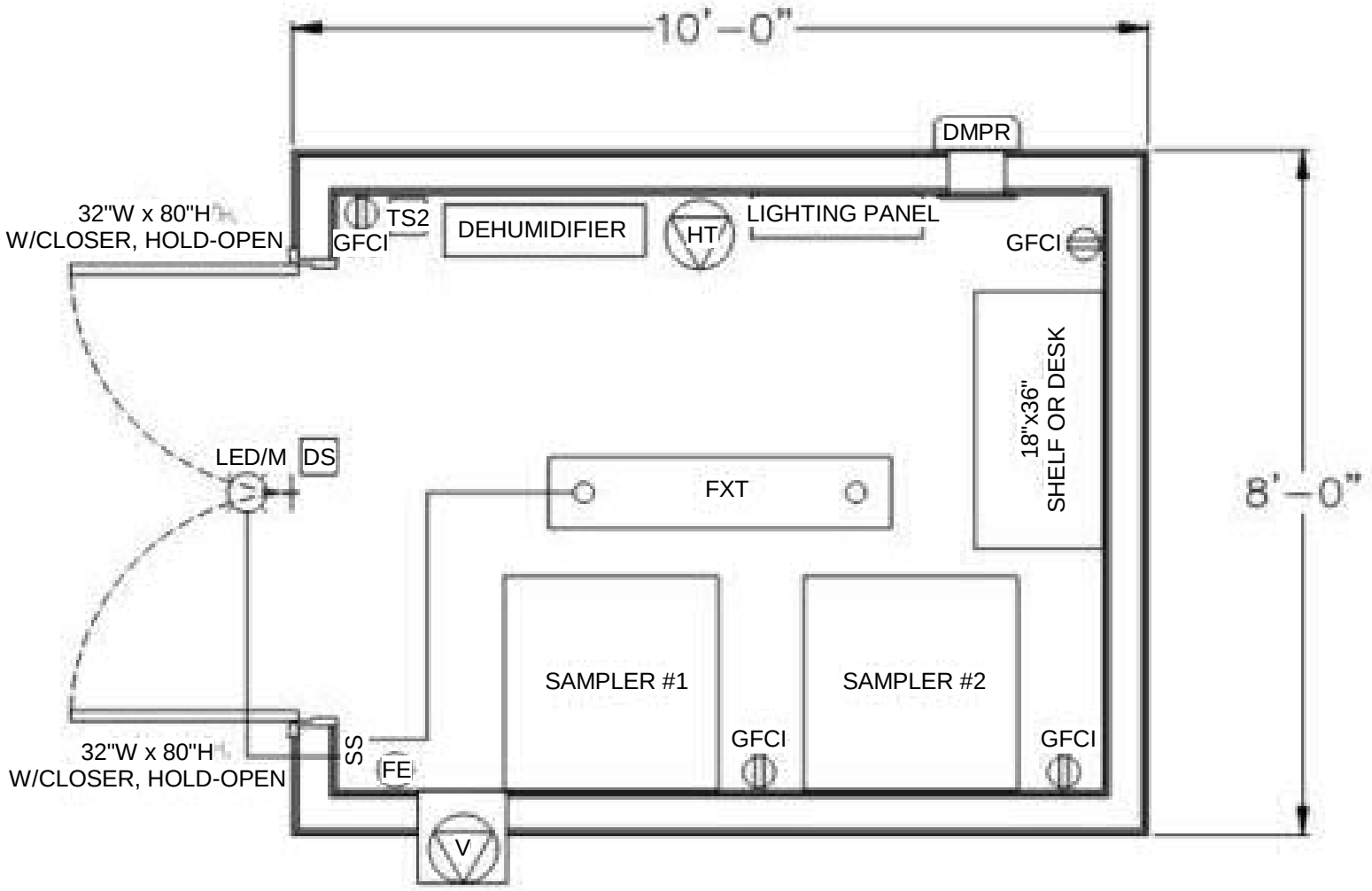
ELECTRICAL

POWER & GROUNDING  
PLAN

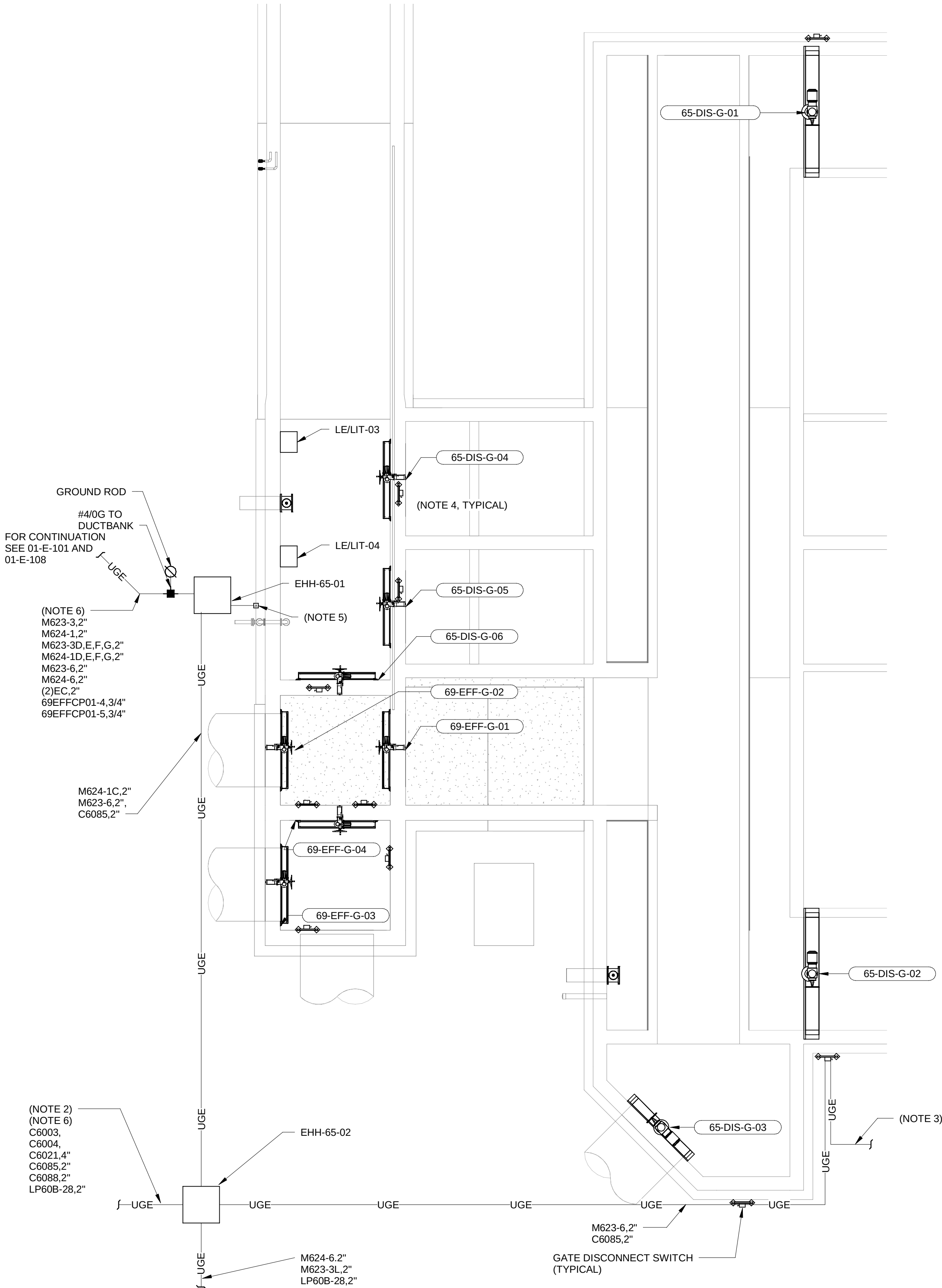
PLAN FILE NO. 664-280

65-E-101

87  
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118



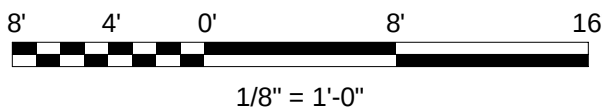
(NOTE 7)  
**SAMPLER BUILDING FLOOR PLAN**  
SCALE: 1/2" = 1'-0"



**OPERATING LEVEL - POWER, CONTROL & GROUNDING**  
1/8" = 1'-0"

NOTES:

- SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
- CONTRACTOR SHALL ROUTE CIRCUITS C6003 AND C6004 EXPOSED TO RECONNECT EXISTING LOADS. REFER TO SEGMENT 5 INTERMEDIATE TREATMENT & ANAEROBIC DIGESTION FACILITIES RECORD DRAWINGS SET, 1988.
- CONTRACTOR SHALL FURNISH AND INSTALL CIRCUITS C6021 AND C6085 TO EXISTING SCUM PUMP STATION AND TERMINATE AT EXISTING EQUIPMENT AS REQUIRED. SEE DRAWING 01-E-108 FOR LOCATION.
- TYPICAL ALL CONTRACTORS SHALL COORDINATE WITH OWNER FOR PREFERRED LOCATION OF DISCONNECT SWITCHES.
- CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 STAINLESS STEEL JUNCTION BOXES AS REQUIRED TO FACILITATE TRANSITION FROM BELOW GRADE TO EXPOSED CONDUIT.
- SEE DRAWING 00-E-604 AND 00-E-605 FOR CONDUIT DETAILS.
- SAMPLER BUILDING IS A PRE-FABRICATED BUILDING. REFER TO SECTION 13 34 00 FOR DETAILS ON PRE WIRED ELECTRICAL EQUIPMENT. THE LAYOUT SHOWN IS FOR REFERENCE ONLY WILL BE FINALIZED VIA APPROVED SUBMITTAL DRAWINGS OF CONTRACTOR SELECTED BUILDING SUPPLIER.



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | DT                 |
| DETAILED:                     | DMF                |
| CHECKED:                      | EMB                |
| APPROVED:                     | TDH                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

CHLORINE CONTACT BASIN

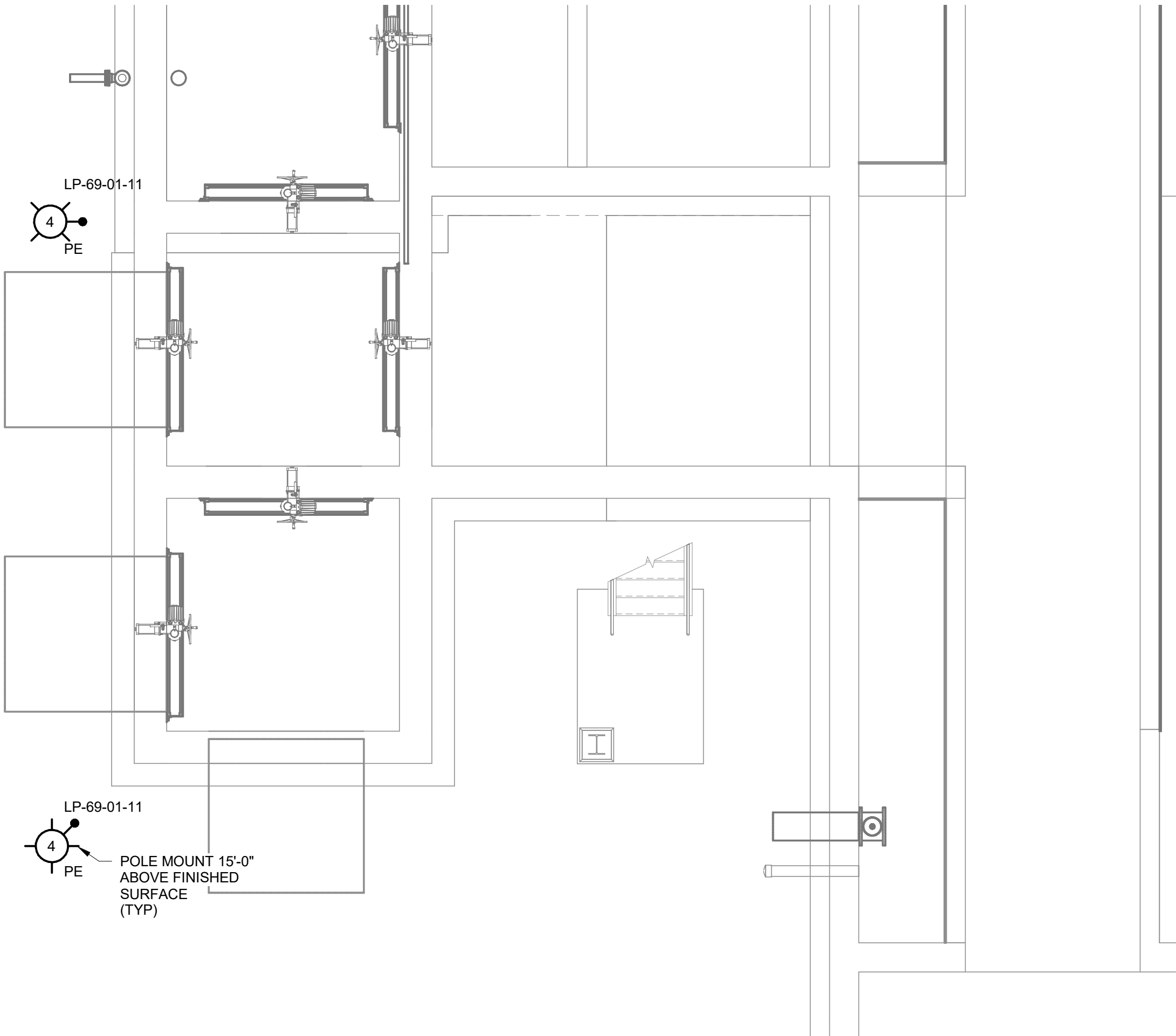
ELECTRICAL

LIGHTING PLAN

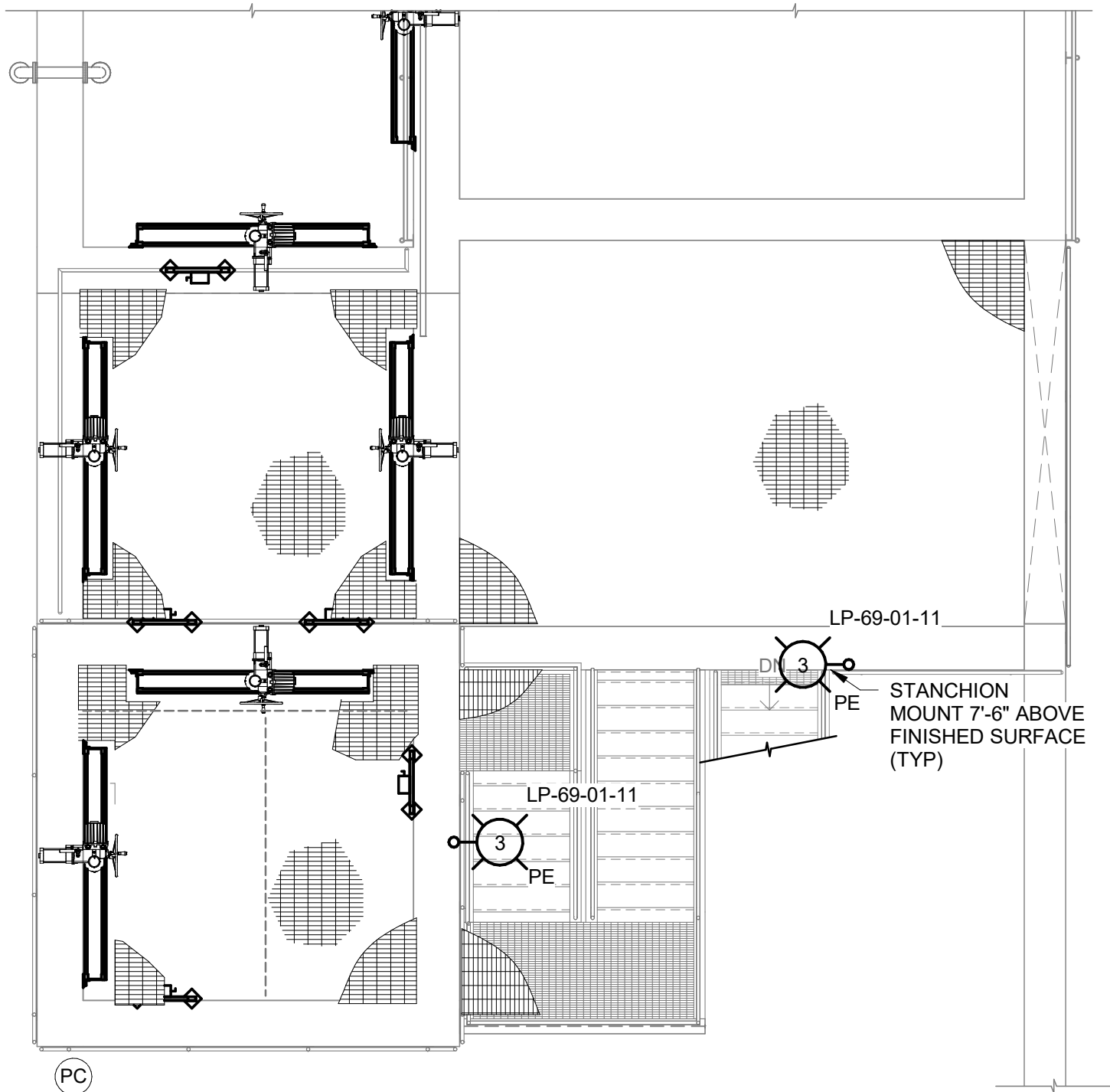
PLAN FILE NO. 664-281

65-E-102

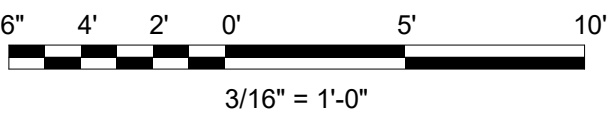
88  
OF  
118



BASE SLAB - ENLARGED PLAN.  
3/16" = 1'-0"

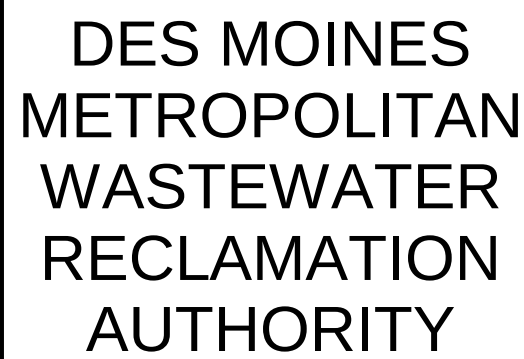
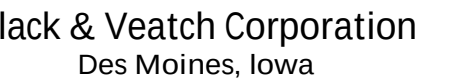


UPPER LEVEL - ENLARGED PLAN  
3/16" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE)



WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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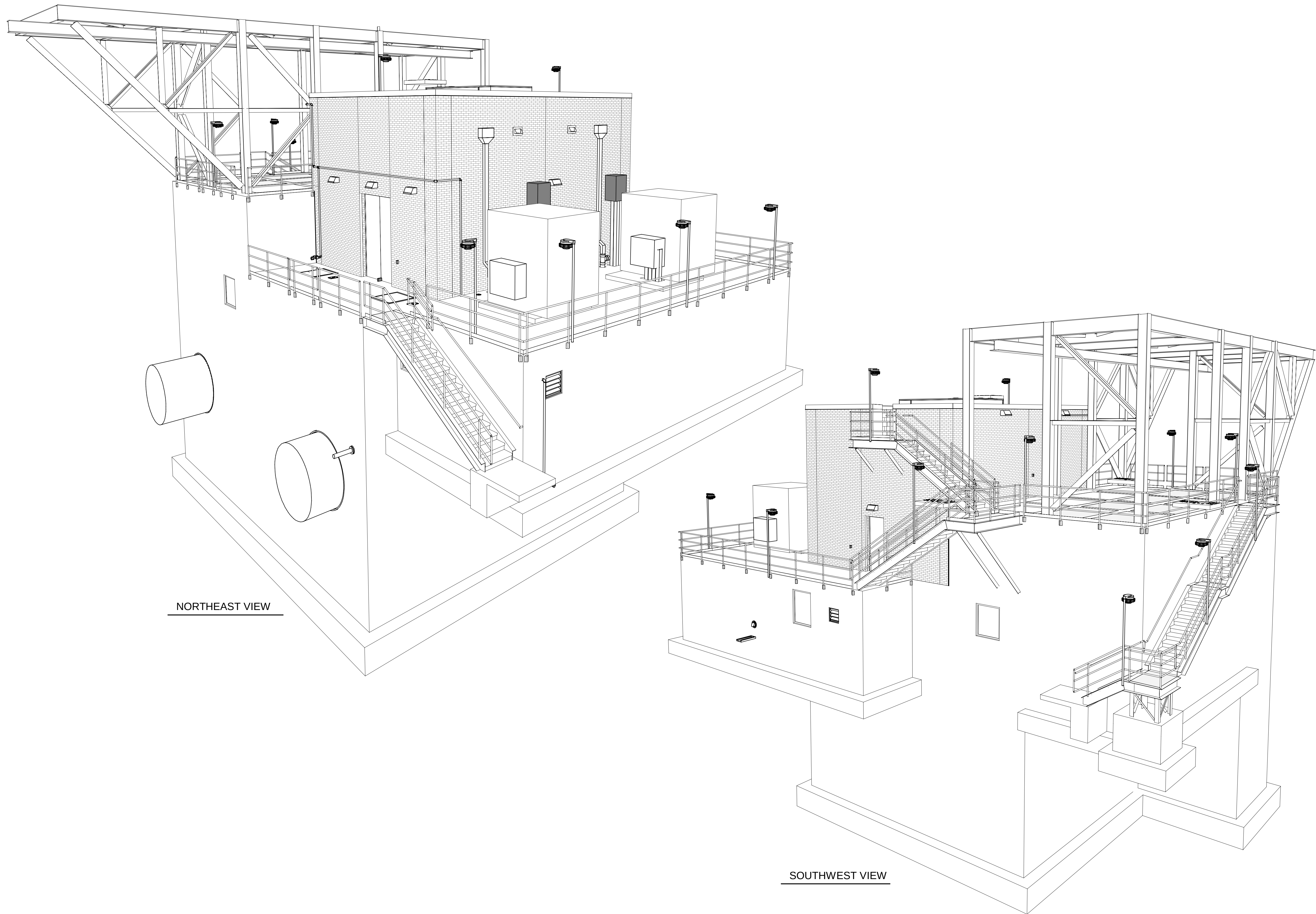
EFFLUENT PUMP STATION

ARCHITECTURAL

## PERSPECTIVES

PLAN FILE NO. 664-282

69-A-001



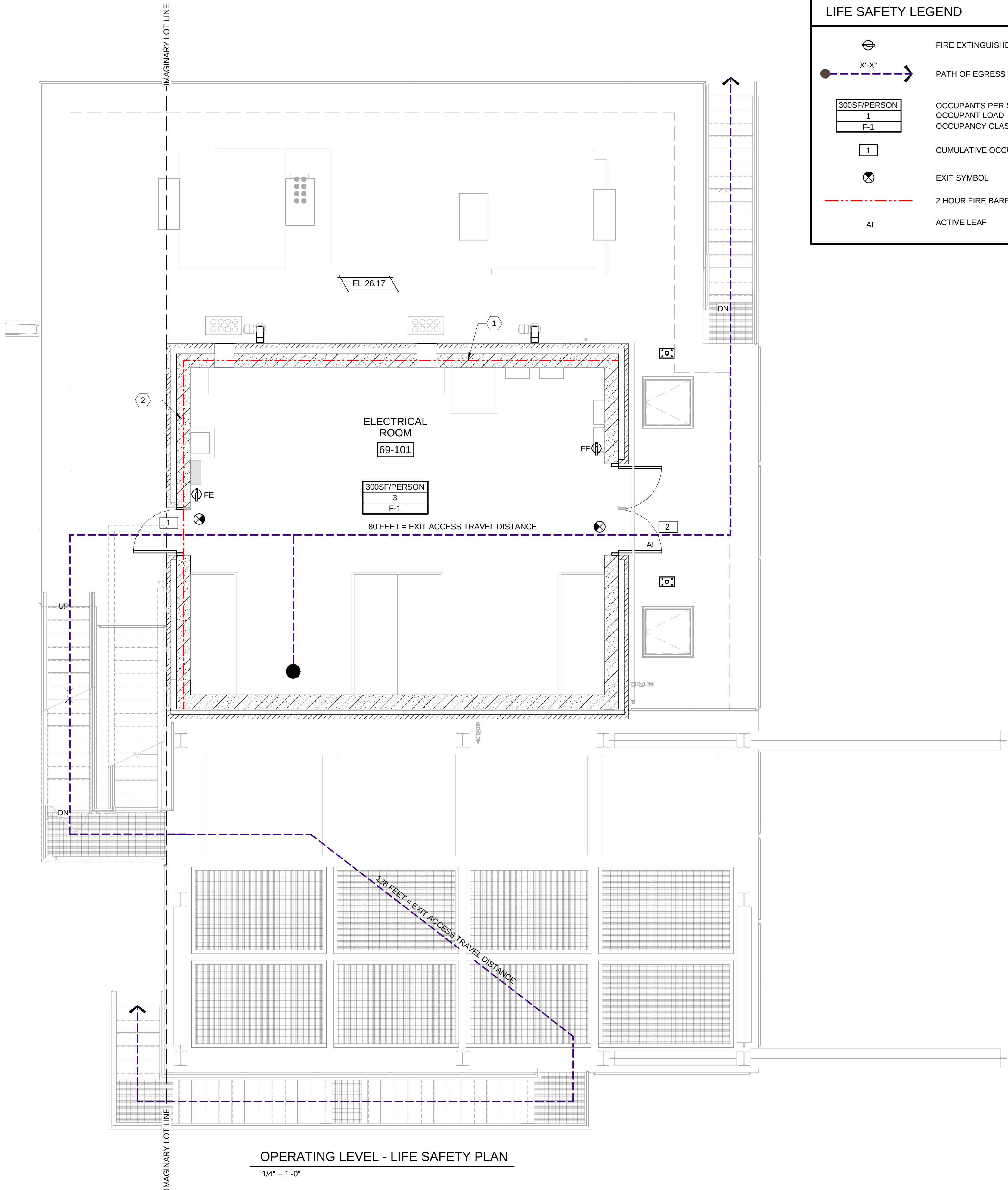
NORTHEAST VIEW

SOUTHWEST VIEW

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



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LIFE SAFETY LEGEND

- FIRE EXTINGUISHER (FE)
- PATH OF EGRESS TRAVEL
- OCCUPANTS PER SF  
OCCUPANT LOAD  
OCCUPANCY CLASSIFICATION
- CUMULATIVE OCCUPANT LOAD AT EXIT
- EXIT SYMBOL
- 2 HOUR FIRE BARRIER
- ACTIVE LEAF

GENERAL SHEET NOTES

- FOR ARCHITECTURAL SYMBOL LEGEND - SEE SHEET 69-A-101.

SHEET KEYNOTES

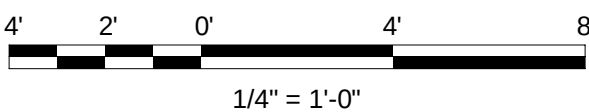
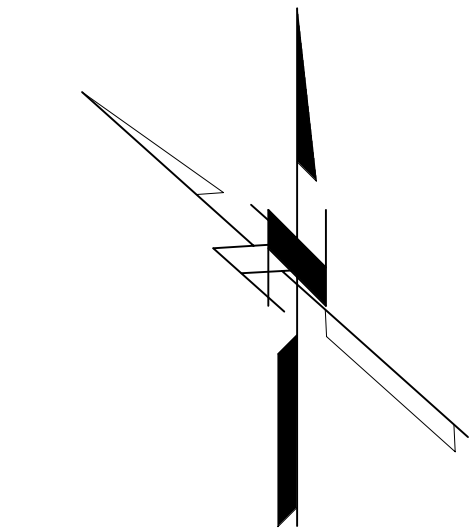
- 2 HOUR RATED FIRE BARRIER REQUIRED FOR TRANSFORMER SEPARATION.
- 1 HOUR RATED FIRE BARRIER REQUIRED PER IBC TABLE 602

BUILDING CODE ANALYSIS

APPLICABLE BUILDING CODES:  
2018 INTERNATIONAL BUILDING CODE  
2015 INTERNATIONAL ENERGY CONSERVATION CODE  
NFPA 70, NEC 2020  
FM GLOBAL PROPERTY LOSS PREVENTION DATA SHEETS - TRANSFORMERS.

|                             |                                                                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BUILDING NAME               | EFFLUENT PUMP STATION                                                                                                                                                                                              |
| OCCUPANCY                   | F-1 (SECTION 306.2)                                                                                                                                                                                                |
| ACTUAL FLOOR AREA           | 3,161 GROSS SF (SEE NOTE 1)<br>832 GROSS SF (ELECTRICAL ROOM, SEE NOTE 2)                                                                                                                                          |
| ACTUAL HEIGHT               | 30.50 FT                                                                                                                                                                                                           |
| TYPE OF CONSTRUCTION        | II-B-(NON-COMBUSTIBLE) (TABLE 601)                                                                                                                                                                                 |
| ALLOWABLE AREA              | 15,500 SF (TABLE 506.2)                                                                                                                                                                                            |
| ALLOWABLE HEIGHT            | 55 FT (TABLE 504.3)                                                                                                                                                                                                |
| DESIGN OCCUPANT LOAD        | 3 PERSONS                                                                                                                                                                                                          |
| ADA ACCESSIBILITY           | NOT REQUIRED (1103.2.9)                                                                                                                                                                                            |
| OCCUPANCY SEPARATION        | 2 HOUR SEPARATION BETWEEN ELECTRICAL ROOM AND TRANSFORMER PAD PER DESIRE OF OWNER & DESIGNER<br>1 HOUR SEPARATION ON WEST WALL OF ELECTRICAL ROOM REQUIRED TO MEET FIRE SPARATION DISTANCE REQUIREMENT (TABLE 602) |
| NUMBER OF STORIES           | 1 STORY                                                                                                                                                                                                            |
| ALLOWABLE NUMBER OF STORIES | 2 STORIES (TABLE 504.4)                                                                                                                                                                                            |
| MINIMUM EXITS REQUIRED      | 2 EXITS (NFPA 70 110.26)                                                                                                                                                                                           |
| NUMBER OF EXITS             | 2 EXITS                                                                                                                                                                                                            |
| FIRE SPRINKLERS             | NO                                                                                                                                                                                                                 |
| MAX EXIT TRAVEL DISTANCE    | W/O SPRINKLER SYSTEM - 200 FT (TABLE 1016.2)                                                                                                                                                                       |
| ENERGY CODE COMPLIANCE      | YES                                                                                                                                                                                                                |

- NOTES:
- ELEVATED STRUCTURE AND PLATFORMS ARE INCLUDED IN TOTAL SQ FT.
  - OCCUPANCY LOAD IS BASED ON SQUARE FOOT OF ELECTRICAL ROOM ONLY.



(SCALE BAR IS 4" AT FULL SCALE)



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EFFLUENT PUMP STATION

ARCHITECTURAL

OPERATING LEVEL LIFE  
SAFETY PLAN & CODE  
ANALYSIS

PLAN FILE NO. 664-283

69-A-002

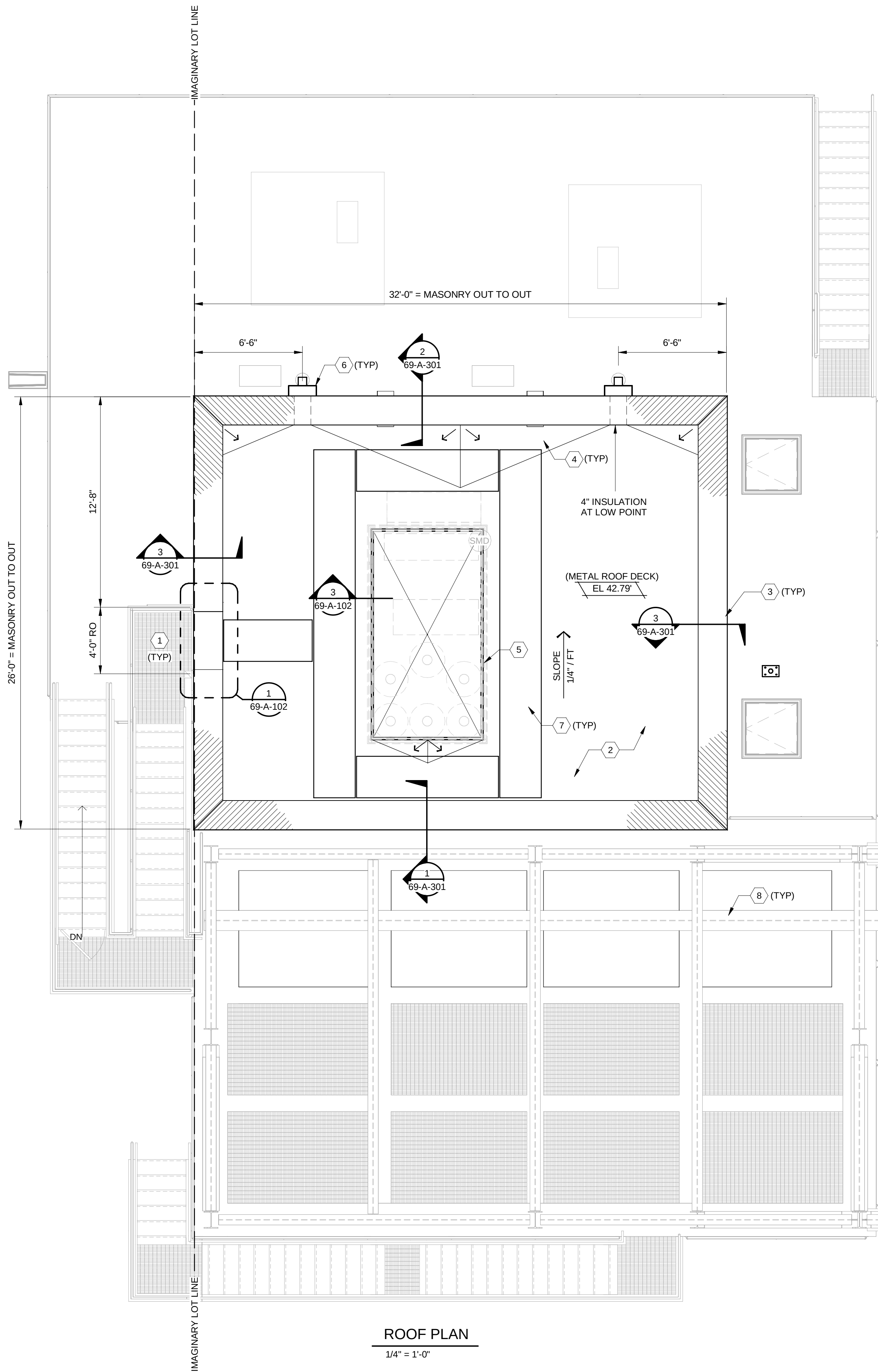
90  
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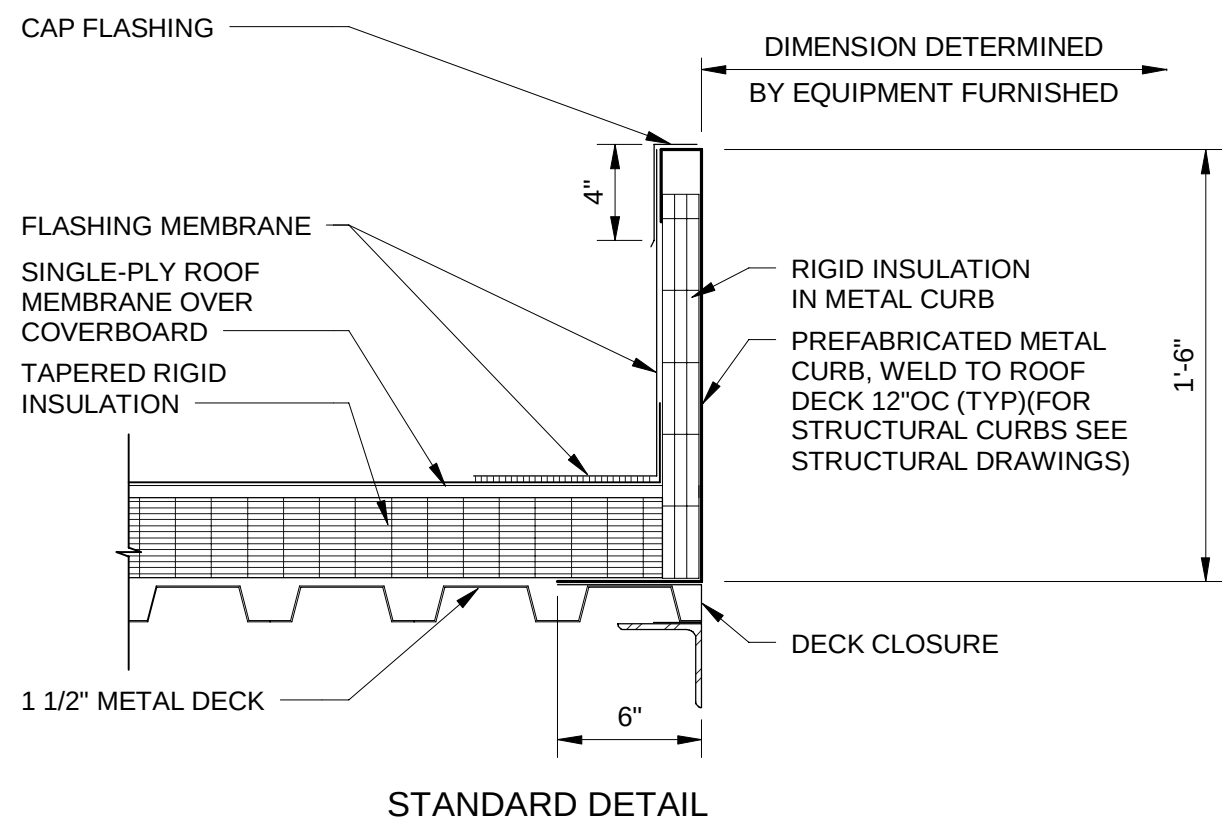
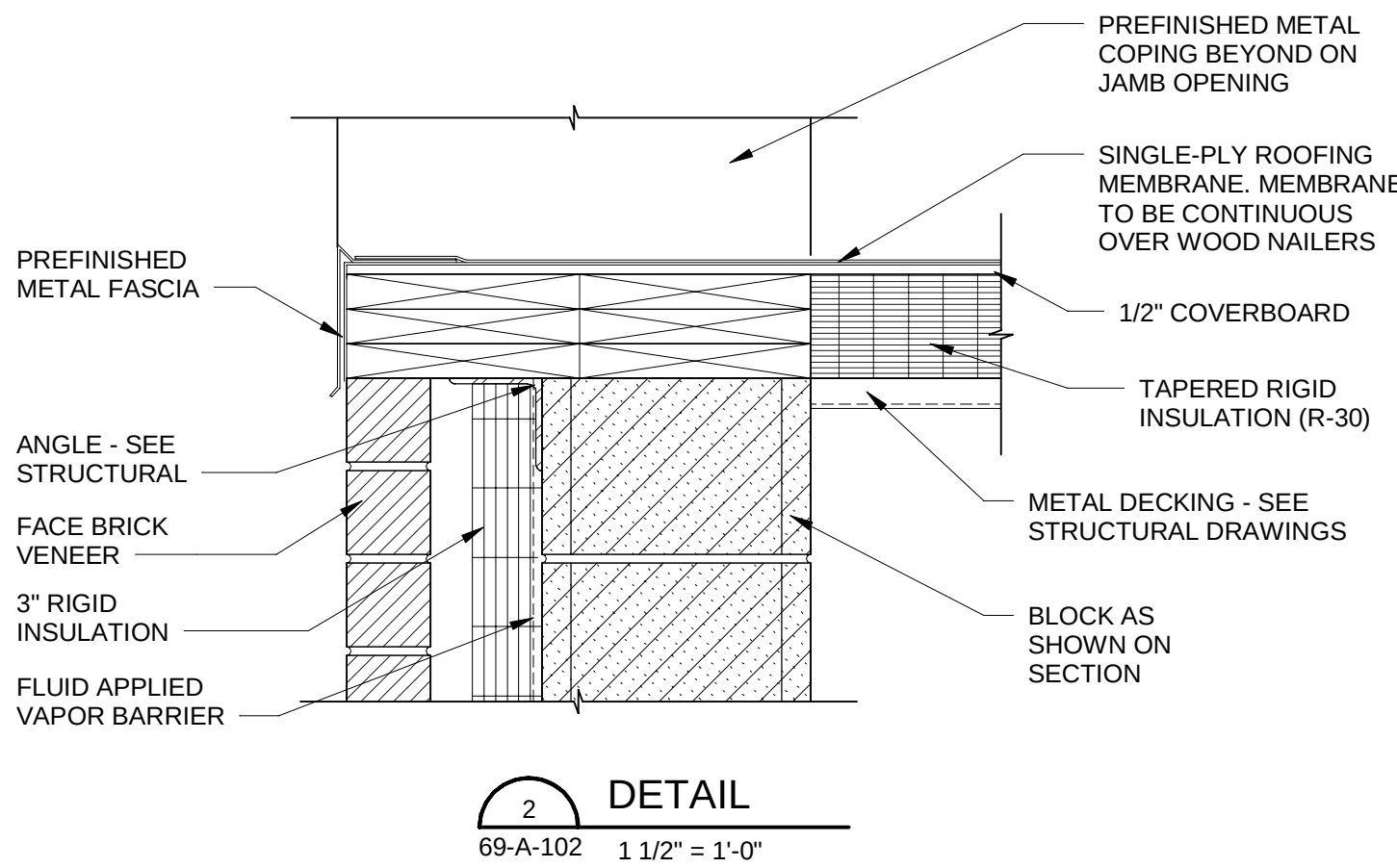
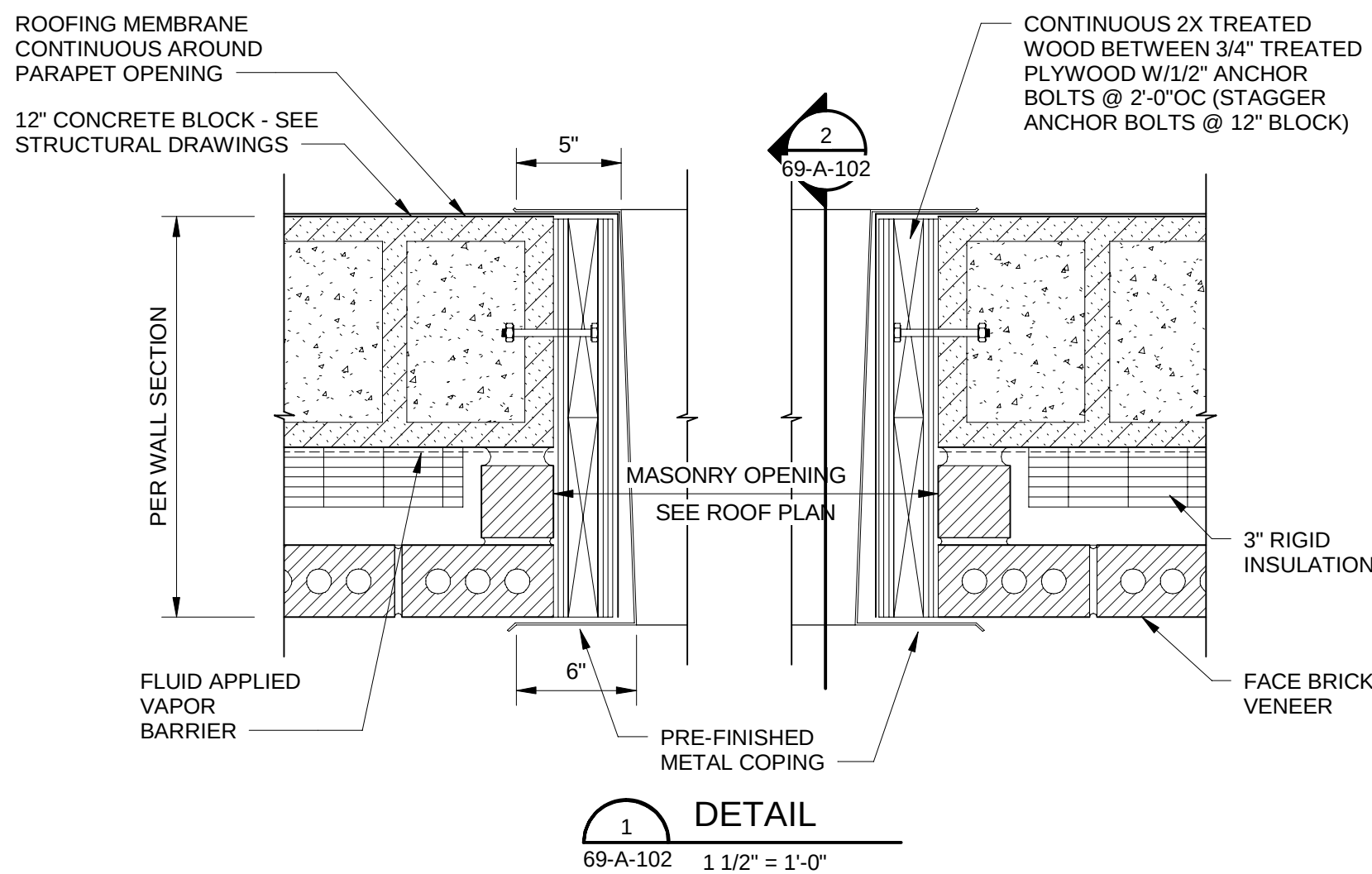




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ROOF PLAN  
 1/4" = 1'-0"



3  
 69-A-102 1 1/2" = 1'-0"

GENERAL NOTES

1. FOR ARCHITECTURAL SYMBOL LEGEND - SEE SHEET 69-A-101

SHEET KEYNOTES

1. STAIR - SEE STRUCTURAL DRAWINGS  
2. SINGLE-PLY ROOFING MEMBRANE OVER COVERBOARD AND TAPERED RIGID INSULATION (R-30 MIN)  
3. PREFINISHED METAL COPING (TYP)  
4. CRICKET DRAINAGE SYSTEM (TYP)  
5. 1 1/2" INSULATED PREFINISHED METAL CURB FOR MECHANICAL EQUIPMENT - SEE HVAC DRAWINGS FOR EQUIPMENT  
6. PREFINISHED METAL CONDUCTOR HEAD WITH DOWNSPOUT (DS)(TYP)  
7. WALKING PADS  
8. MONORAIL FRAME - SEE STRUCTURAL DRAWINGS



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EFFLUENT PUMP STATION

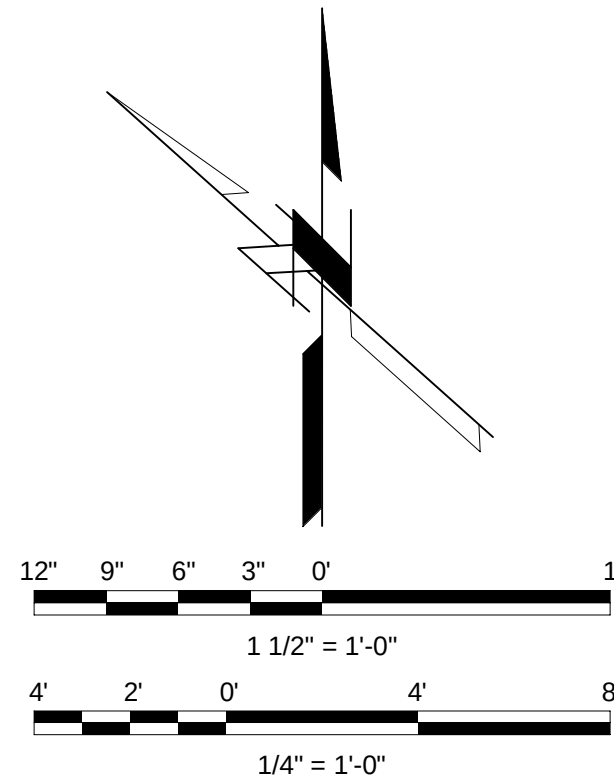
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ROOF PLAN

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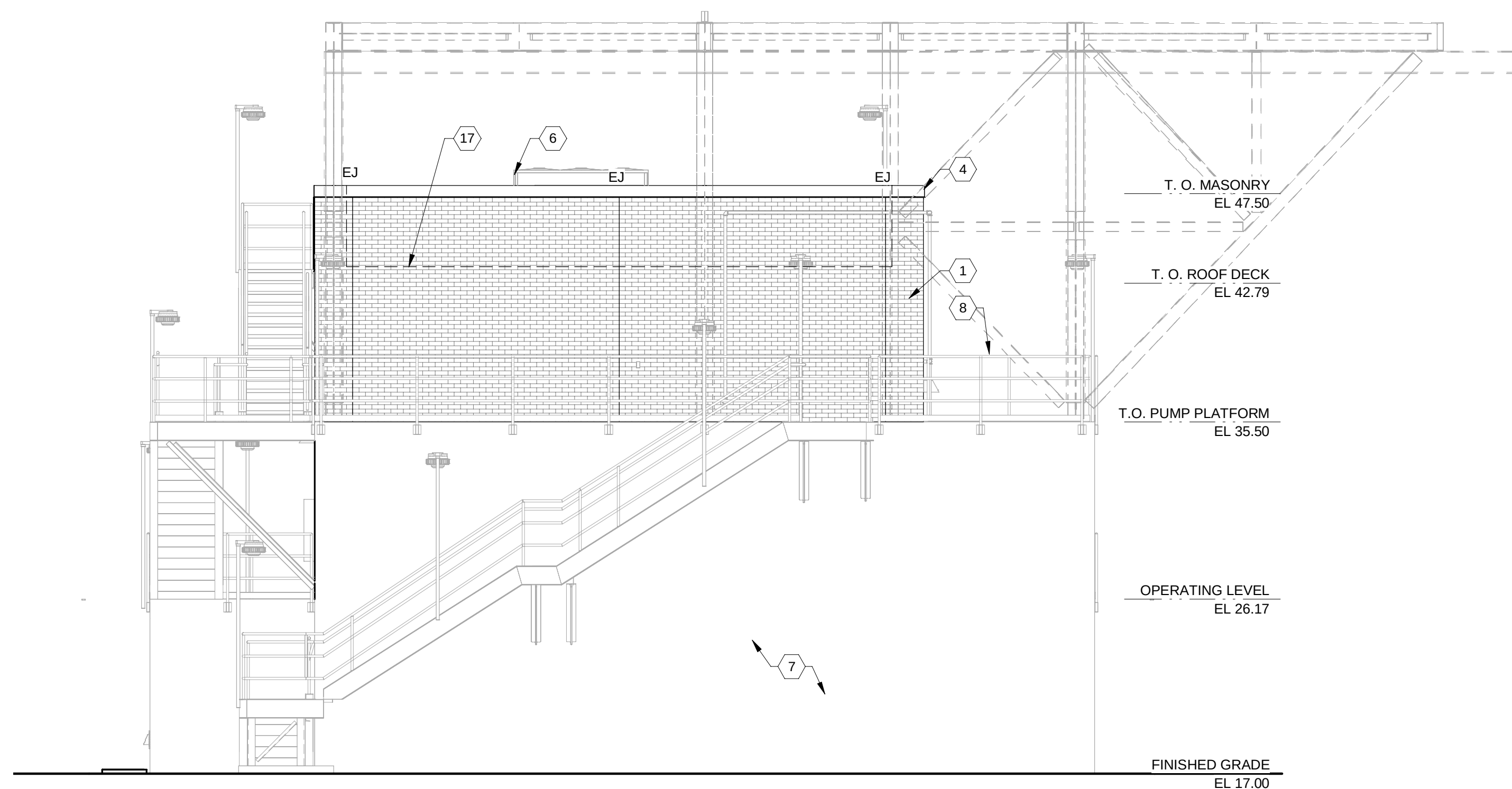


(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4

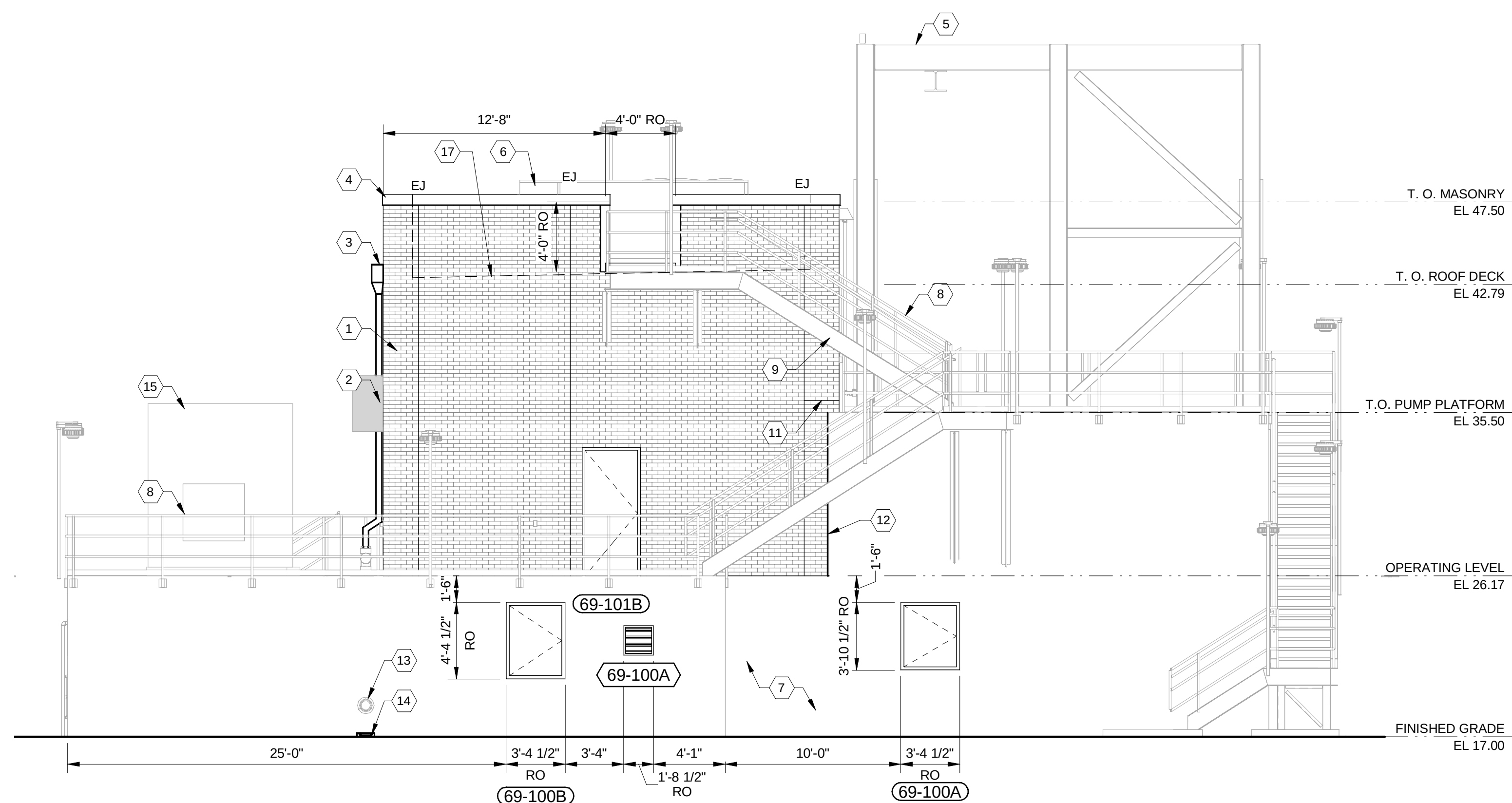








SOUTH ELEVATION



WEST ELEVATION

## GENERAL SHEET NOTES

1. FOR ARCHITECTURAL SYMBOL LEGEND - SEE SHEET 69-A-101
2. GRADE LINES SHOWN ON BUILDING ELEVATIONS ARE APPROXIMATE - SEE CIVIL SITE PLAN
3. VENEER BRICK EXPANSION JOINT (EJ) - SEE STRUCTURAL DRAWINGS FOR BACKUP CONCRETE MASONRY UNITS (CMU) WALL CONTROL JOINT LOCATIONS

 SHEET KEYNOTES

1. BRICK VENEER TO MATCH EXISTING ADJACENT STRUCTURES
2. PREFINISHED METAL DOWNSPOUT (DS)
3. PREFINISHED METAL CONDUCTOR HEAD AND SCUPPER - SEE DETAIL 1/69-A-201 FOR MORE INFORMATION
4. PREFINISHED METAL COPING
5. STEEL FRAME - SEE STRUCTURAL DRAWINGS
6. MECHANICAL EQUIPMENT - SEE HVAC DRAWINGS
7. ELEVATED CONCRETE FOUNDATION - SEE STRUCTURAL DRAWINGS
8. GUARDRAIL (TYP) - SEE STRUCTURAL DRAWINGS
9. ASSEMBLED METAL STAIR, TYPICAL - SEE STRUCTURAL DRAWINGS
10. REMOVABLE GUARDRAIL - SEE STRUCTURAL DRAWINGS
11. EXPANSION JOINT @ CHANGE IN BACK-UP WALL
12. BACKER ROD AND SEALANT @ BRICK AND CONCRETE WALL JOINT
13. ROOF DRAIN DOWNSPOUT - SEE PLUMBING DRAWINGS
14. PRECAST CONCRETE SPLASH BLOCK
15. ELECTRICAL EQUIPMENT - SEE ELECTRICAL DRAWINGS
16. NOT USED
17. ROOF OUTLINE BEYOND



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## WRF EFFLUENT PUMPING IMPROVEMENTS

|                                      |                    |  |  |
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EFFLUENT PUMP STATION

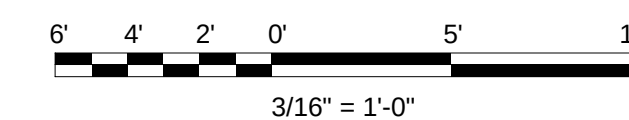
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BUILDING ELEVATIONS

PLAN FILE NO. 664-287

69-A-202

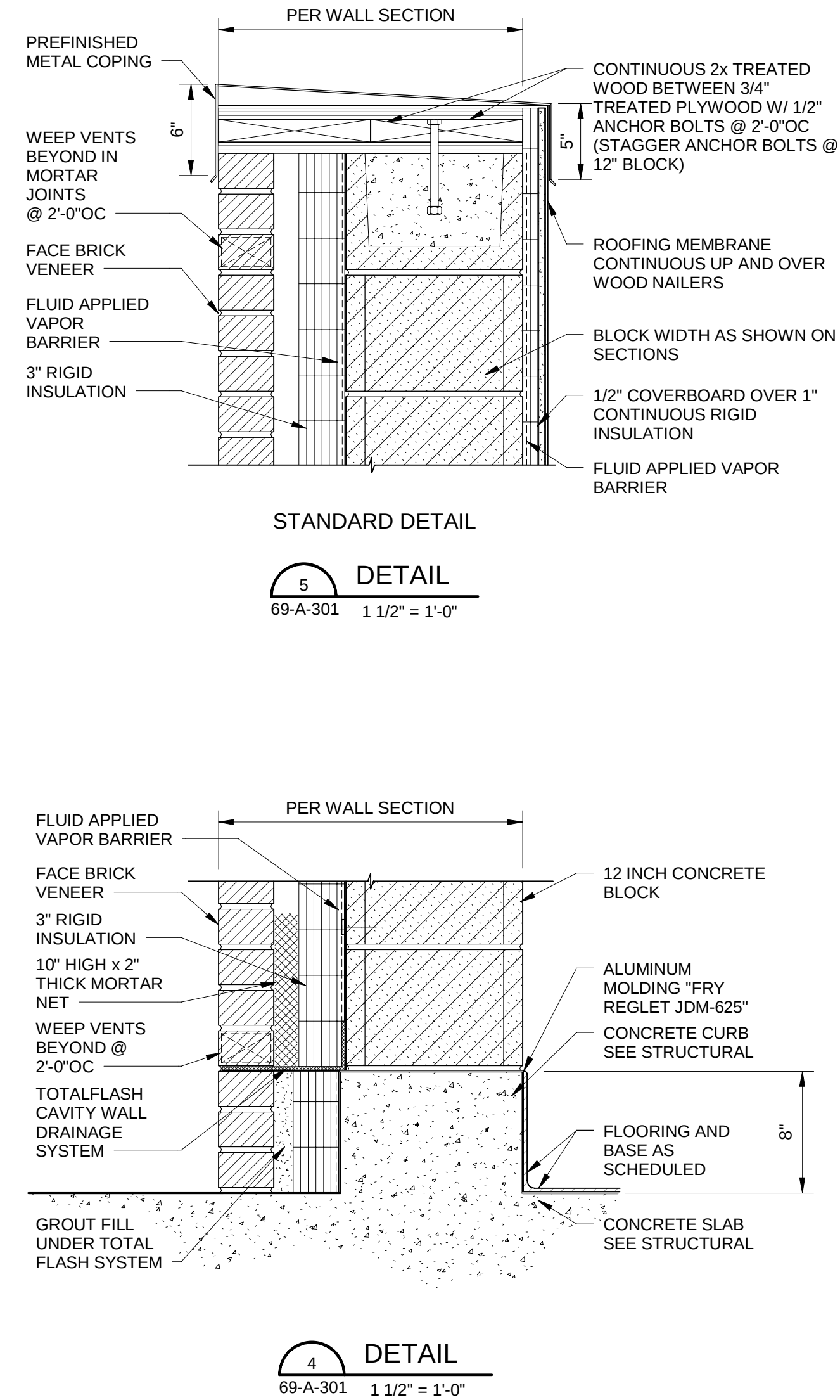
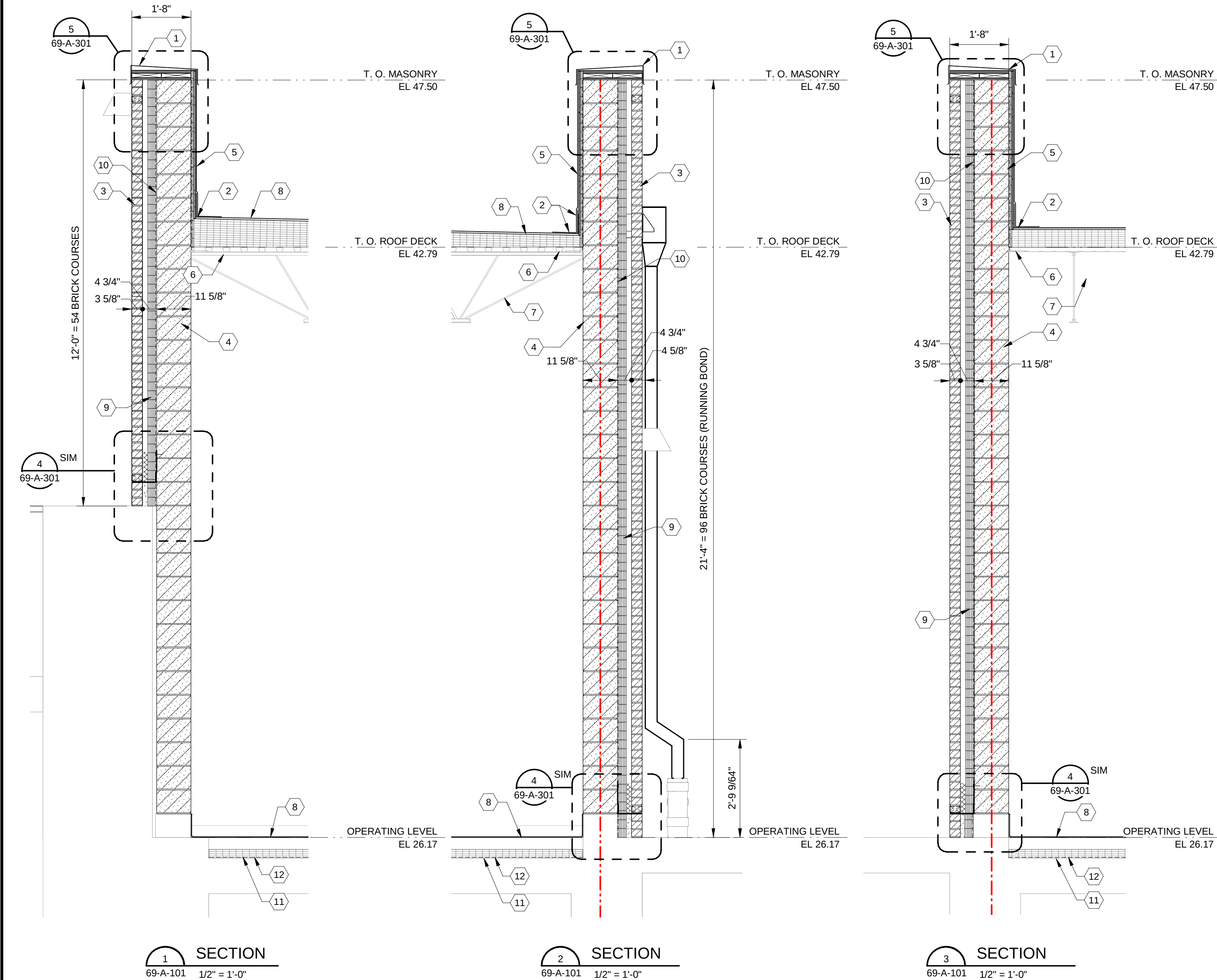
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(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3



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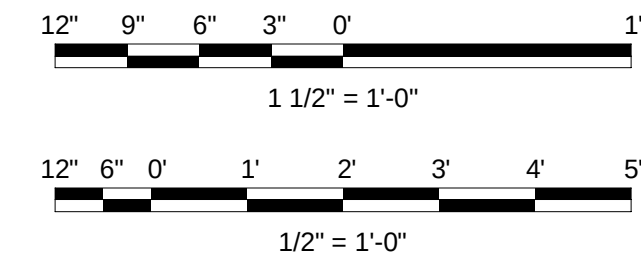


#### GENERAL NOTES

- FOR ARCHITECTURAL SYMBOL LEGEND - SEE SHEET 69-A-101
- FOR VERTICAL REINFORCING AND BOND BEAMS IN MASONRY DESIGN - SEE STRUCTURAL DRAWINGS
- FOR HORIZONTAL JOINT REINFORCING - SEE SPECIFICATION SECTION 04200
- ALL TREATED WOOD PRODUCTS ARE TO BE FIRE RETARDANT.

#### SHEET KEYNOTES

- PREFINISHED METAL COPING OVER CONTINUOUS FIRE RETARDANT 2x WOOD NAILERS BETWEEN 3/4" FIRE RETARDANT TREATED PLYWOOD WITH 1/2" ANCHOR BOLTS @ 2'-0"OC
- SINGLE-PLY ROOFING SYSTEM OVER 1/2" COVERBOARD AND TAPERED RIGID INSULATION
- FACE BRICK VENEER (RUNNING BOND)
- 12" CONCRETE BLOCK (TYP)
- EXTEND ROOFING MEMBRANE UP WALL UNDER COPING AND OVER TOP OF NAILERS
- 1 1/2" METAL ROOF DECK - SEE STRUCTURAL DRAWINGS
- ROOF FRAMING - SEE STRUCTURAL DRAWINGS
- CONCRETE FLOOR SLAB - SEE STRUCTURAL DRAWINGS
- 3" RIGID INSULATION (R-15 MIN)
- FLUID-APPLIED VAPOR BARRIER
- 3" RIGID INSULATION (R-15 MIN) UNDER CONCRETE TOPPING SLAB - SEE STRUCTURAL DRAWINGS FOR TOPPING SLAB THICKNESS
- VAPOR RETARDER



(SCALE BAR IS 4" AT FULL SCALE)



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EFFLUENT PUMP STATION

ARCHITECTURAL

WALL SECTIONS

PLAN FILE NO. 664-288

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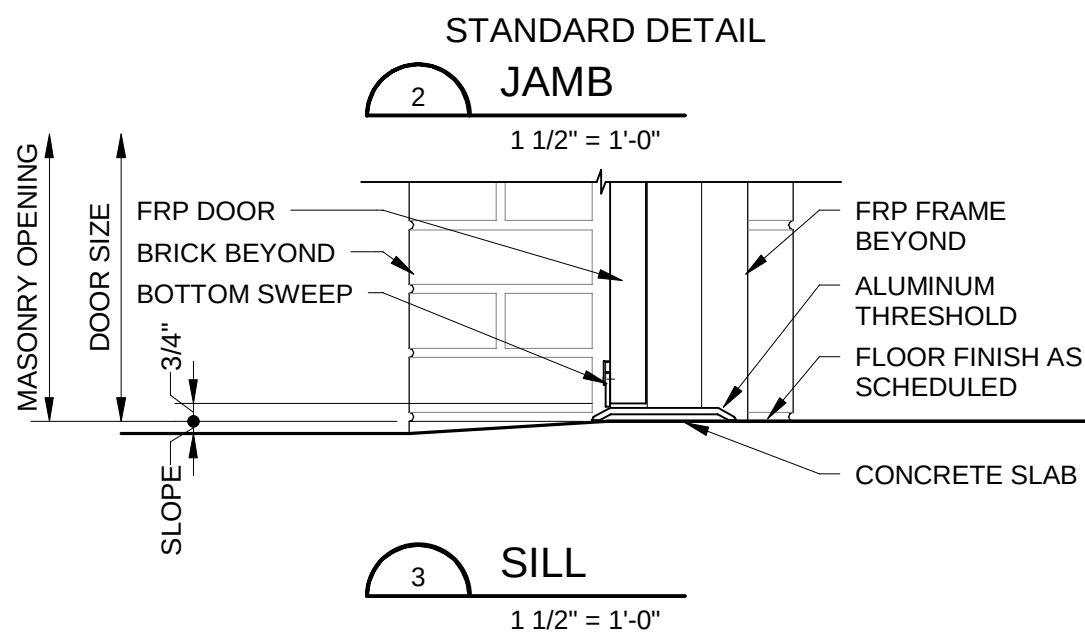
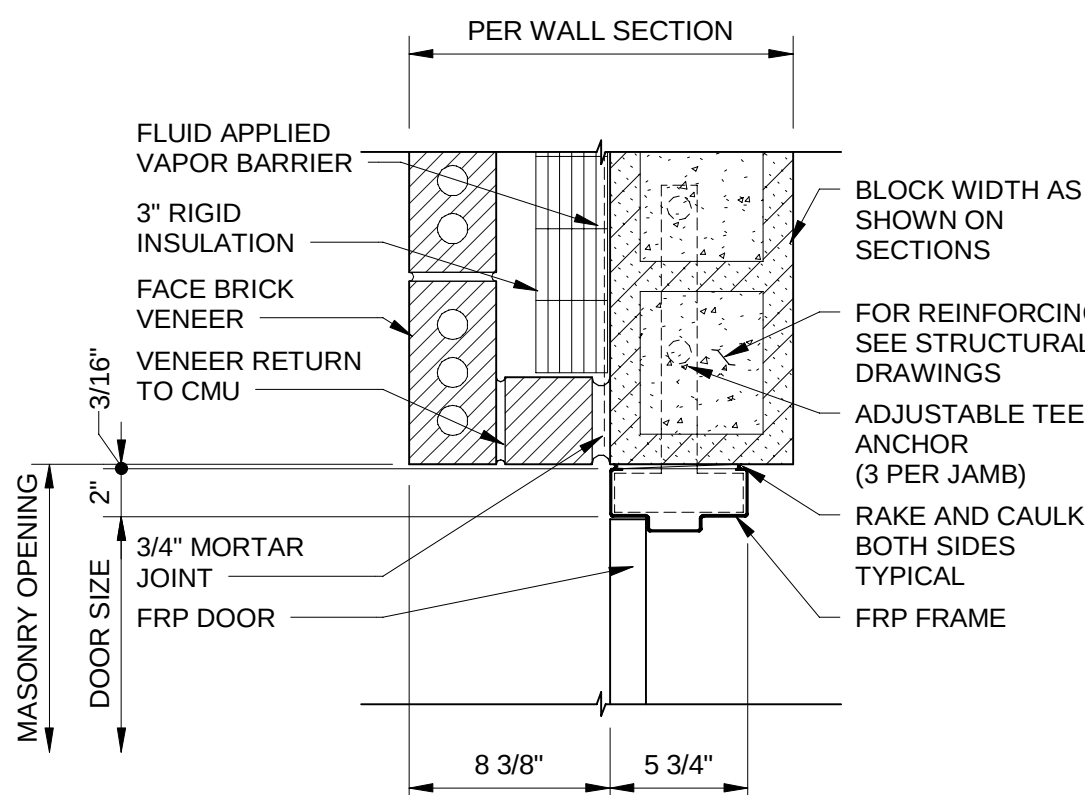
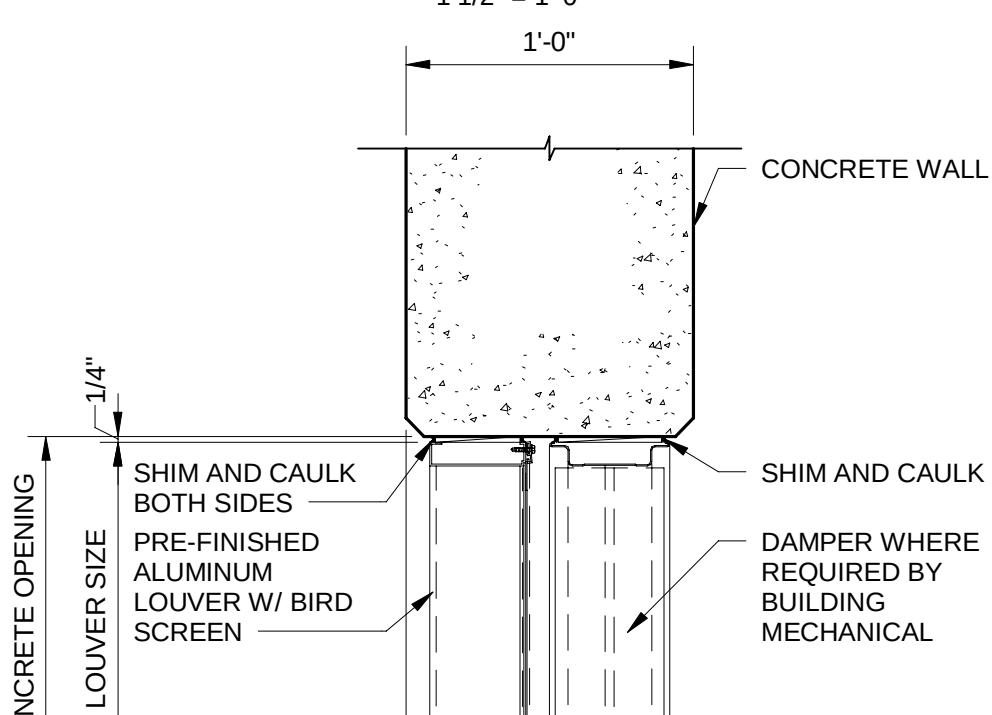
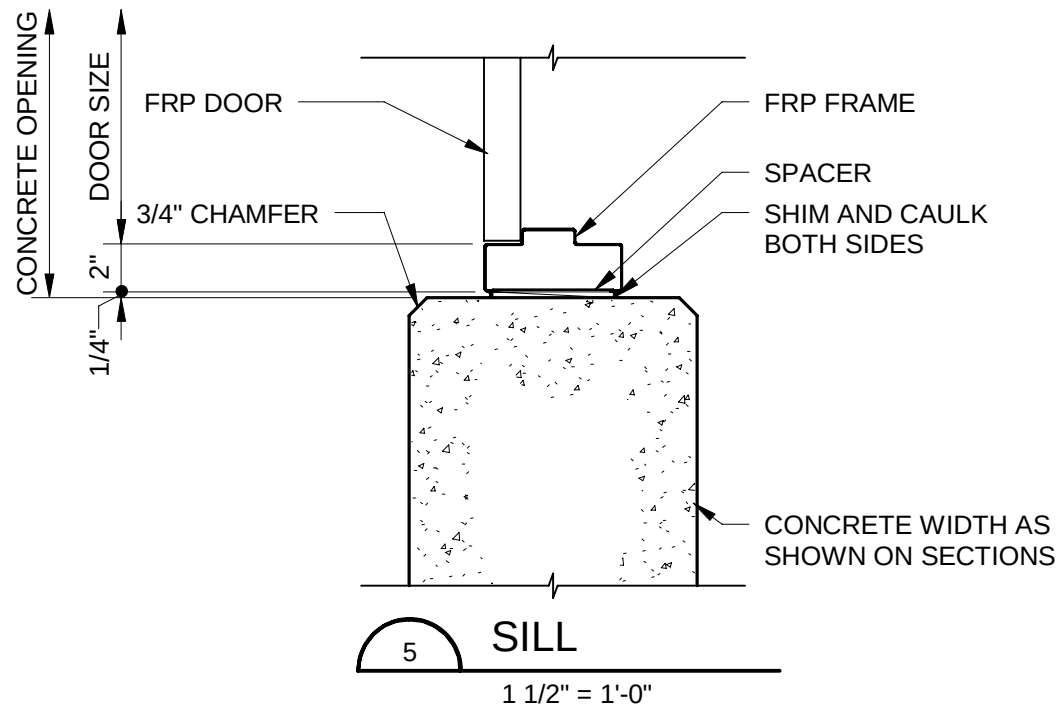
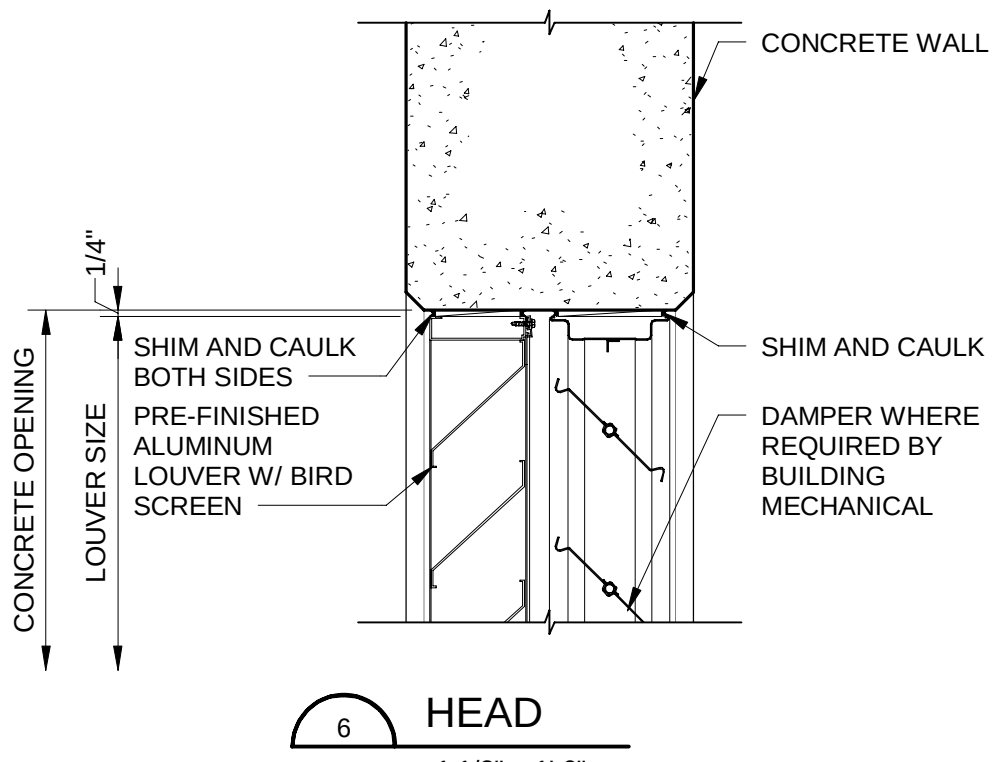
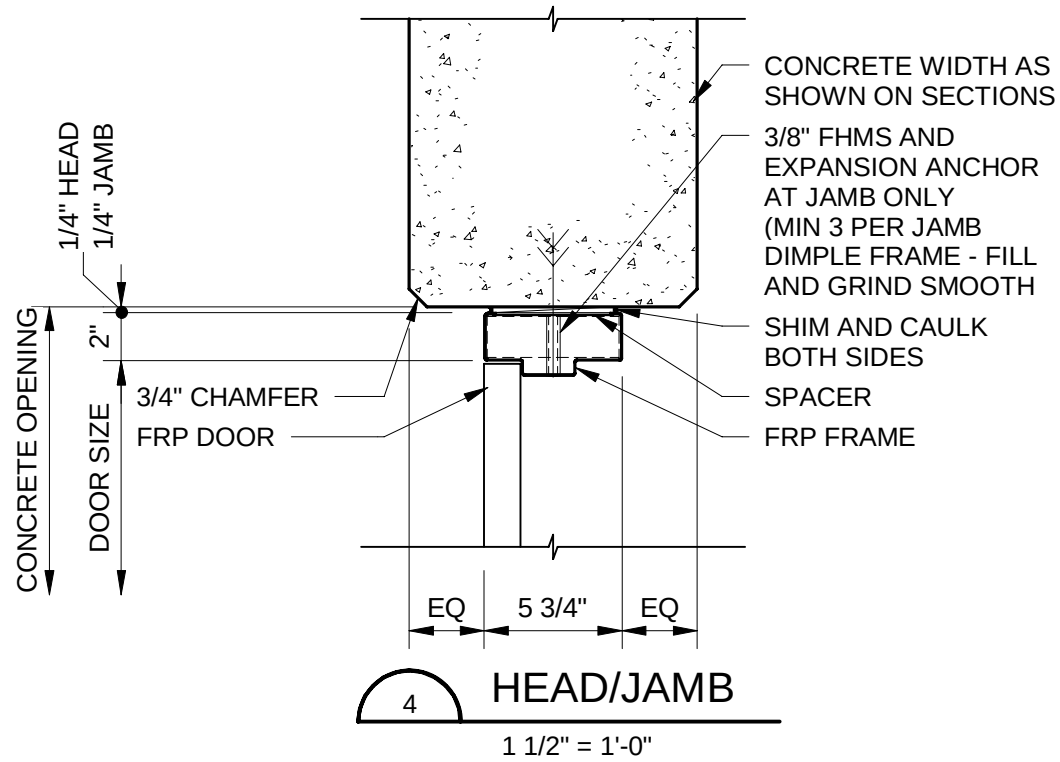
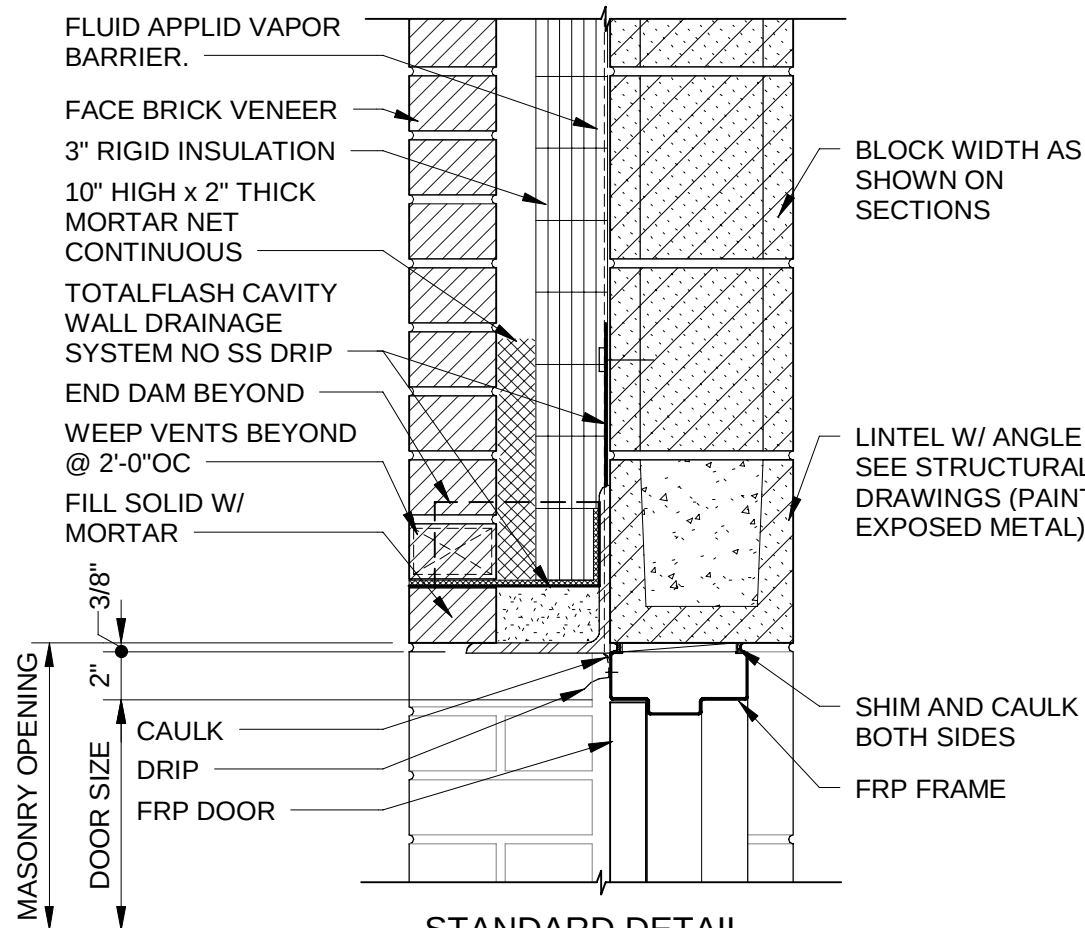


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| ROOM FINISH SCHEDULE  |          |                 |          |        |          |        |      |          |        |      |          |        |      |          |        |      |          |        |        |                   |
|-----------------------|----------|-----------------|----------|--------|----------|--------|------|----------|--------|------|----------|--------|------|----------|--------|------|----------|--------|--------|-------------------|
| BLDG                  | ROOM No. | ROOM NAME       | FLOOR    |        | WALLS    |        |      |          |        |      |          |        |      |          |        |      | CEILING  |        |        | REMARKS           |
|                       |          |                 | MATERIAL | FINISH | NORTH    |        |      | EAST     |        |      | SOUTH    |        |      | WEST     |        |      | MATERIAL | FINISH | HEIGHT |                   |
|                       |          |                 |          |        | MATERIAL | FINISH | BASE | MATERIAL | FINISH | BASE | MATERIAL | FINISH | BASE | MATERIAL | FINISH | BASE |          |        |        |                   |
| EFFLUENT PUMP STATION |          |                 |          |        |          |        |      |          |        |      |          |        |      |          |        |      |          |        |        |                   |
| 69                    | 69-101   | ELECTRICAL ROOM | CO       | EPF    | CB       | PT     | IEB  | CB       | PT     | IEB  | CB       | PT     | IEB  | CB       | PT     | IEB  | EXP      | PT     | 16'-6" | SEE NOTES 1 AND 2 |

| DOOR SCHEDULE (D)             |                 |              |           |       |        |          |          |         |      |      |                  |      |        |          |          |            |       |        |            |
|-------------------------------|-----------------|--------------|-----------|-------|--------|----------|----------|---------|------|------|------------------|------|--------|----------|----------|------------|-------|--------|------------|
| DOOR ID                       |                 |              | DOOR SIZE |       |        | DOOR     |          |         |      |      |                  |      |        | FRAME    |          |            |       |        | REMARKS    |
| BLDG                          | LEVEL           | DOOR No. (D) |           | WIDTH | HEIGHT | TYPE (D) | MATERIAL | DETAILS |      |      | GLAZING TYPE (G) | HDWR | RATING | TYPE (F) | MATERIAL | DIMENSIONS |       |        |            |
|                               |                 |              |           |       |        |          |          | HEAD    | JAMB | SILL |                  |      |        |          |          | HEAD       | WIDTH | DEPTH  |            |
|                               |                 |              |           |       |        |          |          |         |      |      |                  |      |        |          |          |            |       |        |            |
| EFFLUENT PUMP STATION         |                 |              |           |       |        |          |          |         |      |      |                  |      |        |          |          |            |       |        |            |
| 69                            | FINISHED GRADE  | 69-100A      |           | 3'-0" | 3'-6"  | D2       | FRP      | 4       | 4    | 5    | -                | 03   | -      |          | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 4 |
| 69                            | FINISHED GRADE  | 69-100B      |           | 3'-0" | 4'-0"  | D1       | FRP      | 4       | 4    | 5    | -                | 03   | -      | F2       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 4 |
| 69                            | FINISHED GRADE  | 69-100C      |           | 3'-0" | 4'-0"  | D1       | FRP      | 4       | 4    | 5    | -                | 03   | -      | F2       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 3 |
| 69                            | FINISHED GRADE  | 69-100D      |           | 3'-0" | 3'-6"  | D2       | FRP      | 4       | 4    | 5    | -                | 03   | -      |          | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 3 |
| 69                            | OPERATING LEVEL | 69-101A      | PR        | 3'-0" | 9'-10" | D1/D1    | FRP      | 1       | 2    | 3    | -                | 02   | -      | F1       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 6 |
| 69                            | OPERATING LEVEL | 69-101B      |           | 3'-0" | 7'-2"  | D1       | FRP      | 1       | 2    | 3    | -                | 01   | 60 MIN | F1       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 6 |
| ELEVATED TRANSFORMER PLATFORM |                 |              |           |       |        |          |          |         |      |      |                  |      |        |          |          |            |       |        |            |
| 01                            | FINISH GRADE    | 01-101A      |           | 3'-0" | 4'-0"  | D1       | FRP      | 4       | 4    | 5    | -                | 03   | -      | F2       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 5 |
| 01                            | FINISH GRADE    | 01-101B      |           | 3'-0" | 4'-0"  | D1       | FRP      | 4       | 4    | 5    | -                | 03   | -      | F2       | FRP      | 2"         | 2"    | 5 3/4" | SEE NOTE 5 |

| LOUVER SCHEDULE (L)           |                |                |         |        |        |      |      |      |         |              |
|-------------------------------|----------------|----------------|---------|--------|--------|------|------|------|---------|--------------|
| BLDG                          | LEVEL          | LOUVER No. (L) | OPENING |        | LOUVER |      |      |      | REMARKS |              |
|                               |                |                | WIDTH   | HEIGHT | TYPE   | HEAD | JAMB | SILL |         | TOP ELEV AFF |
| EFFLUENT PUMP STATION         |                |                |         |        |        |      |      |      |         |              |
| 69                            | FINISHED GRADE | 69-100A        | 1'-8"   | 1'-8"  | ALUM   | 6    | 7    | 8    | 6'-4"   | SEE NOTE 8   |
| 69                            | FINISHED GRADE | 69-100B        | 2'-0"   | 2'-0"  | ALUM   | 6    | 7    | 8    | 6'-8"   | SEE NOTE 9   |
| ELEVATED TRANSFORMER PLATFORM |                |                |         |        |        |      |      |      |         |              |
| 01                            | FINISH GRADE   | 01-100A        | 1'-8"   | 1'-8"  | ALUM   | 6    | 7    | 8    | 5'-0"   | SEE NOTE 7   |
| 01                            | FINISH GRADE   | 01-100B        | 1'-6"   | 1'-6"  | ALUM   | 6    | 7    | 8    | 5'-0"   | SEE NOTE 7   |



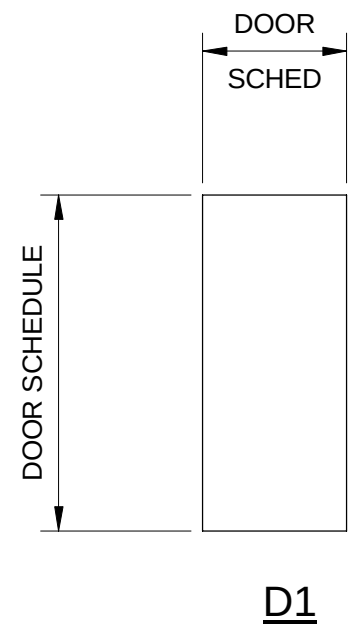
## GENERAL SHEET NOTES

- CEILING HEIGHT IN ELECTRICAL ROOM IS TO MEASURED TO THE UNDERSIDE OF METAL DECK
- INTEGRAL EPOXY BASE IN ELECTRICAL ROOM IS TO BE 8 INCHES HIGH - SEE DETAIL 4/69-A-301
- FOR ACCESS DOOR PLACEMENT - SEE SHEET 69-A-201
- FOR ACCESS DOOR PLACEMENT - SEE SHEET 69-A-202
- FOR ACCESS DOOR PLACEMENT - SEE SHEET 01-S-101
- EXTERIOR DOOR TO BE FITTED FOR CARD READER ACCESS
- FOR LOUVER PLACEMENT - SEE SHEET 01-S-101
- FOR LOUVER PLACEMENT - SEE SHEET 69-A-202
- FOR LOUVER PLACEMENT - SEE SHEET 69-A-201

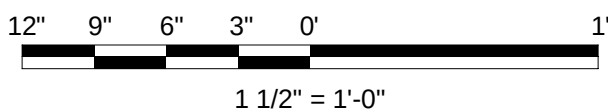
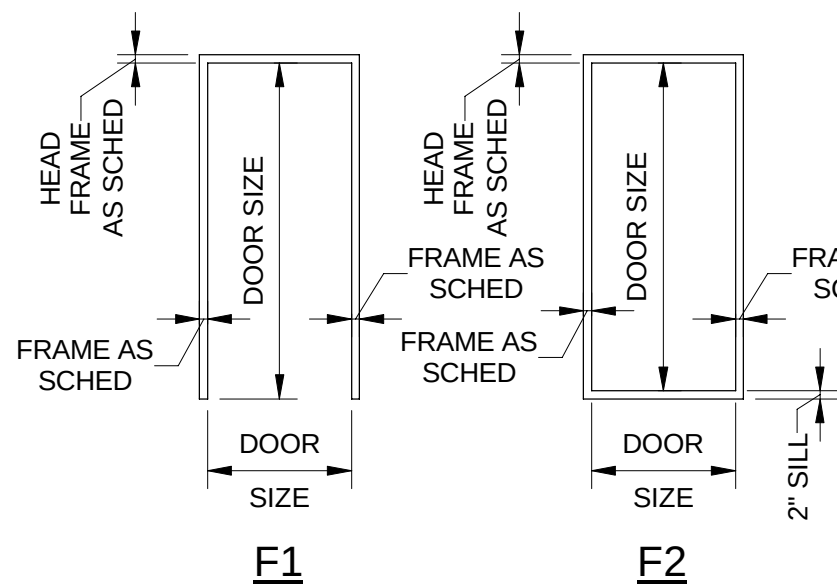
## ARCHITECTURAL ABBREVIATIONS

|     |                                 |
|-----|---------------------------------|
| CB  | - CONCRETE BLOCK                |
| CO  | - CONCRETE                      |
| EPF | - EPOXY FLOOR                   |
| EXP | - EXPOSED CONSTRUCTION          |
| FRP | - FIBERGLASS REINFORCED PLASTIC |
| FS  | - FLOOR SEALER                  |
| IEB | - INTEGRAL EPOXY BASE           |
| MD  | - METAL DECK                    |
| NO  | - NONE                          |
| PT  | - PAINT                         |

## DOOR TYPES



## FRAME TYPES



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |            |
|-------------------------------|------------|
| 08/16/2024 ISSUED FOR BIDDING |            |
| REVISIONS AND RECORD OF ISSUE |            |
| DESIGNED:                     | RNP        |
| DETAILED:                     | KMF, ANH   |
| CHECKED:                      | DRH        |
| APPROVED:                     | DRH        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

EFFLUENT PUMP STATION

ARCHITECTURAL

SCHEDULES & DETAILS

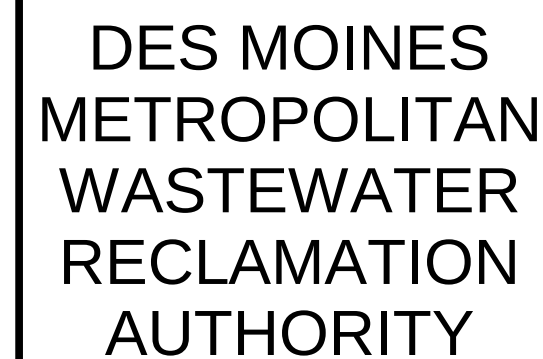
PLAN FILE NO. 664-289

69-A-601

96  
OF  
118

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

EFFLUENT PUMP STATION

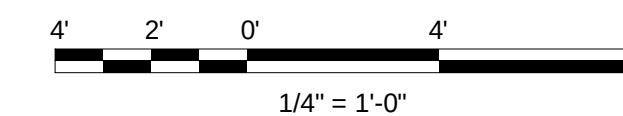
STRUCTURAL

## LOWER LEVEL PLAN

PLAN FILE NO. 664-290

69-S-101

97  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3





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WASTEWATER  
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AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

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EFFLUENT PUMP STATION

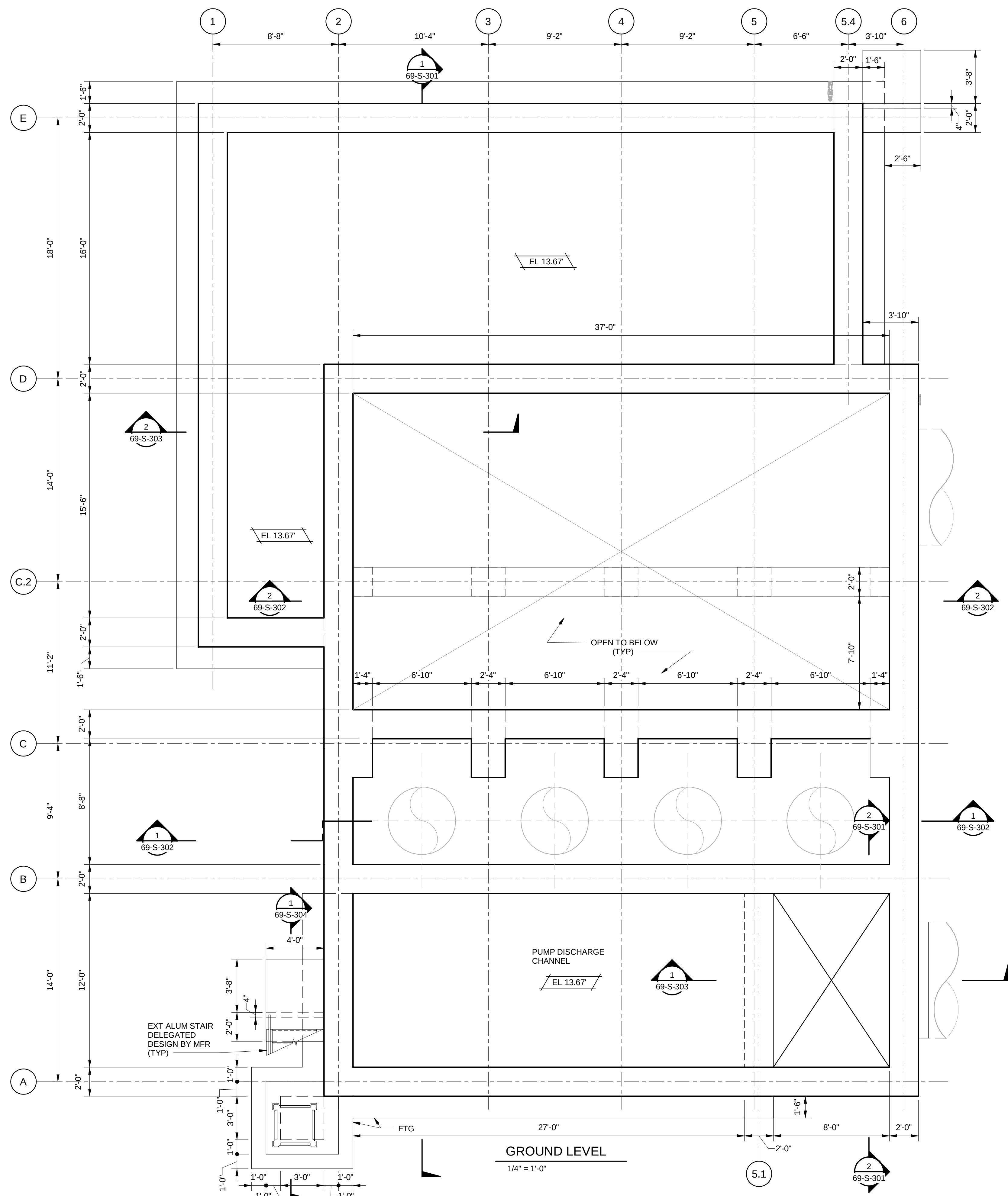
STRUCTURAL

## GROUND LEVEL PLAN

PLAN FILE NO. 664-291

69-S-102

98  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

EFFLUENT PUMP STATION

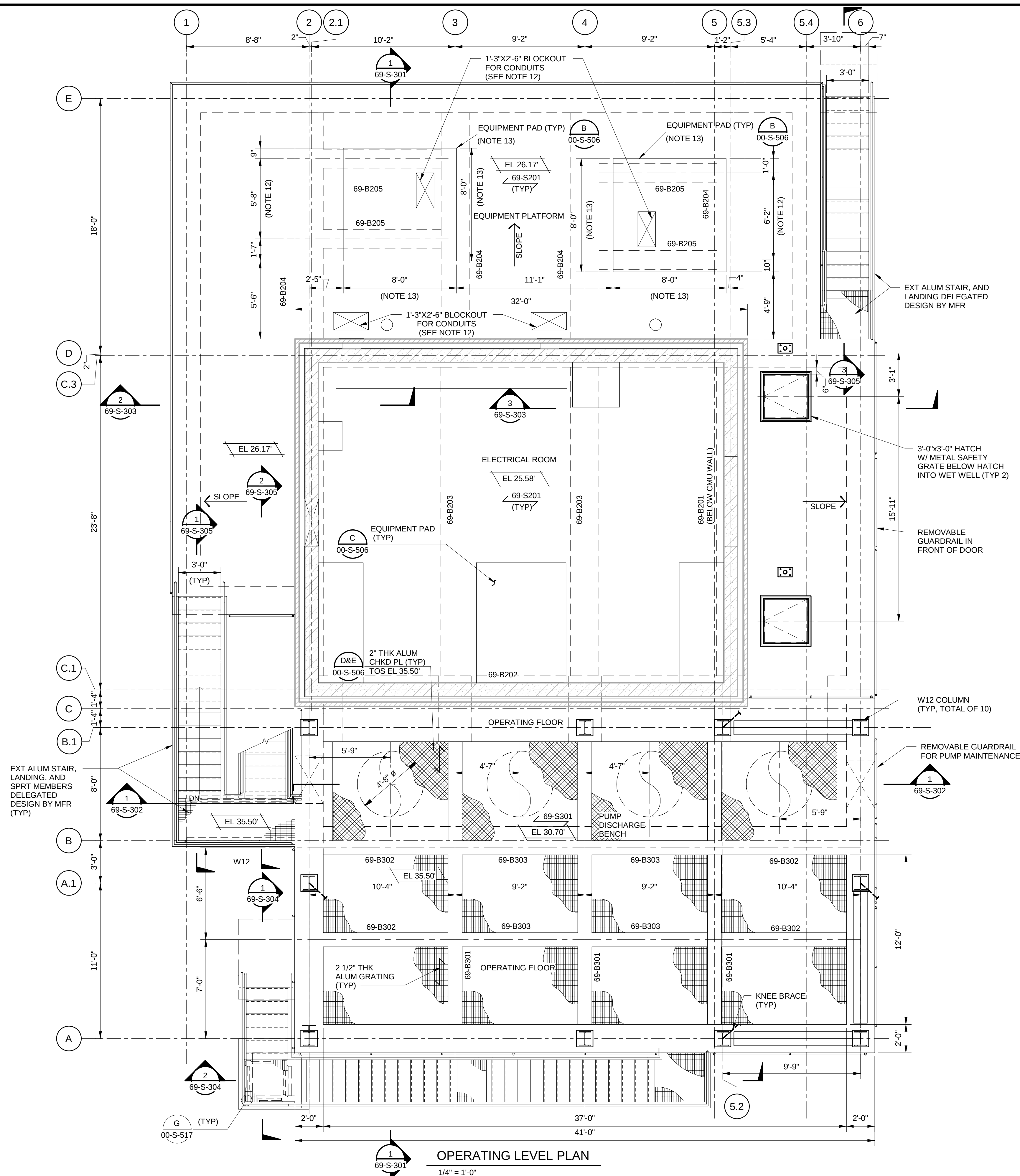
STRUCTURAL

## OPERATING LEVEL PLAN

PLAN FILE NO. 664-292

69-S-103

99  
OF  
118



NOTES:

1. SEE SHEET 00-S-001 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET 00-S-002 FOR STRUCTURAL ABBREVIATIONS AND LEGEND.
3. SEE SHEET 00-S-003 FOR STRUCTURAL LOADING CRITERIA.
4. SEE SHEET 00-S-501 FOR STANDARD CONCRETE REINFORCEMENT DETAILS.
5. SEE SHEET 00-S-502 FOR STANDARD CONCRETE JOINT DETAILS.
6. SEE SHEET 00-S-503 FOR STANDARD CONCRETE COLUMN AND PILASTER SCHEDULE DETAILS.
7. SEE SHEET 00-S-504 FOR STANDARD CONCRETE BEAM AND SLAB SCHEDULE AND DETAILS.
8. SEE SHEET 00-S-505 FOR STAIR FOOTING DETAILS.
9. SEE SHEET 00-S-006 FOR GRATING/CHECKERED PLATE SUPPORT DETAILS AND EQUIPMENT BASE DETAILS.
10. SEE SHEET 00-S-008 AND 00-S-009 FOR CONCRETE MASONRY DETAILS.
11. SEE SHEET 00-S-010 FOR STEEL COLUMN BASEPLATE DETAILS.
12. FINAL LOCATION OF CONCRETE BEAMS SHALL BE COORDINATED WITH EQUIPMENT FURNISHED AND LOCATION OF CONDUITS PENETRATION. THE LAYOUT SHALL BE SUBMITTED FOR ENGINEER'S REVIEW PRIOR TO CONSTRUCTION.
13. FINAL EQUIPMENT PAD LAYOUT AND SIZE TO BE COORDINATED WITH THE EQUIPMENT FURNISHED. THE LAYOUT SHALL BE SUBMITTED FOR ENGINEER'S REVIEW PRIOR TO CONSTRUCTION.

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

EFFLUENT PUMP STATION

STRUCTURAL

ROOF PLAN

PLAN FILE NO. 664-293

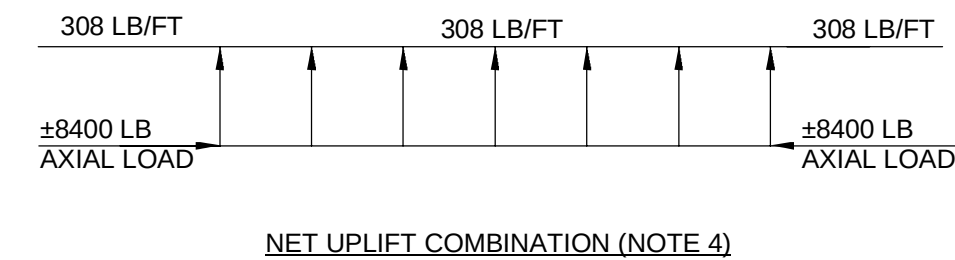
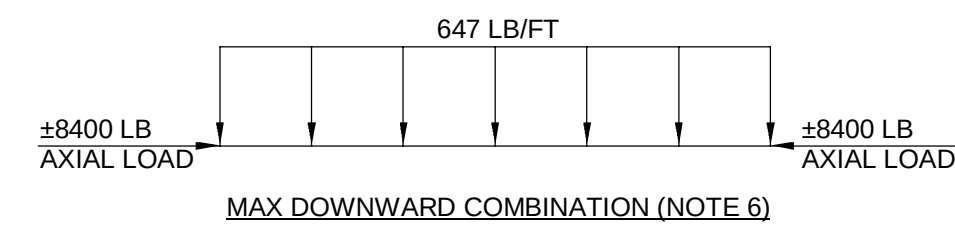
69-S-104

100  
OF  
118

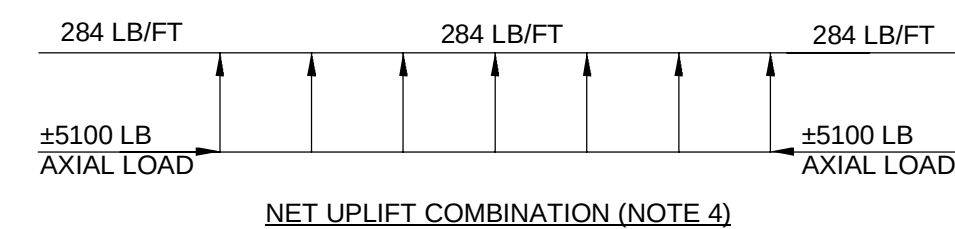
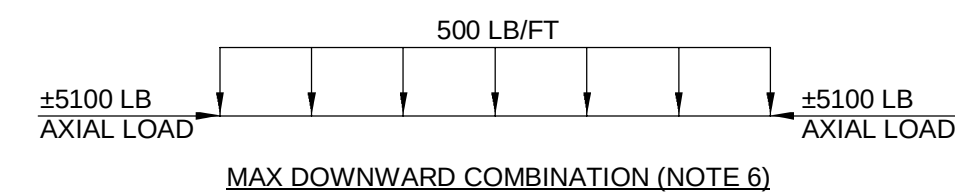
GENERAL NOTES:

1. SEE SHEET 00-S-001 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET 00-S-002 FOR STRUCTURAL ABBREVIATIONS AND LEGEND.
3. SEE SHEET 00-S-003 FOR STRUCTURAL LOADING CRITERIA.
4. SEE SHEET 00-S-511, 00-S-512 AND 00-S-513 FOR STEEL CONNECTION DETAILS.
5. SEE SHEET 00-S-514, 00-S-515 AND 00-S-516 FOR STEEL ROOF DETAILS.

GOVERNING STRENGTH LEVEL LOAD  
COMBINATIONS FOR INTERIOR JOIST



GOVERNING STRENGTH LEVEL LOAD  
COMBINATIONS FOR END JOIST



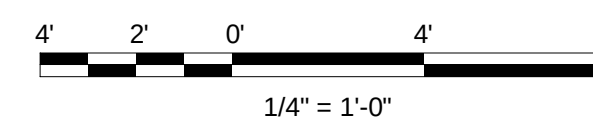
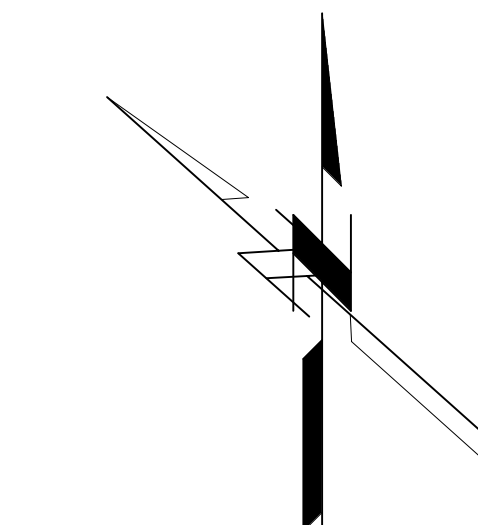
NOTES:

1. JOIST MANUFACTURER TO DESIGN JOISTS TO SUPPORT GOVERNING STRENGTH LEVEL LOAD COMBINATIONS SHOWN.
2. ALL LOADS ARE LISTED AT STRENGTH LEVEL AND DESIGN SHALL BE BASED UPON LOAD RESISTANCE FACTOR DESIGN (LRFD) PARAMETERS.
3. JOIST DESIGNATION SHOWN ON PLANS INDICATE MAXIMUM DEPTH AND MINIMUM WEIGHT. SP INDICATES SPECIAL JOIST. JOISTS TO BE DESIGNED FOR FACTORED LOAD COMBINATIONS SHOWN AND OTHER LOADS INDICATED. CONCENTRATED LOADS INDICATED ON ROOF PLAN ARE UNFACTORED DEAD LOADS.
4. JOIST BRIDGING REQUIRED FOR ERECTION AND WIND UPLIFT LOADING SHALL BE DESIGNED AND FURNISHED BY JOIST SUPPLIER. LOCATIONS, QUANTITIES AND DETAILS TO BE SHOWN ON JOIST SUPPLIER'S PLACEMENT DRAWINGS.
5. IN ADDITION TO OTHER LOADS INDICATED, JOIST MFR TO DESIGN JOIST SEATS AND TOP CHORD FOR FACTORED AXIAL LOAD (TENSION AND COMPRESSION) INDICATED IN LOAD COMBINATIONS SHOWN. JOIST SEAT'S SHALL ALSO BE DESIGNED FOR THE ECCENTRIC LOAD MEASURED FROM THE TOP OF THE JOIST BEARING PLATE TO CENTROID OF TOP CHORD MEMBER.
6. IN ADDITION TO THE LOADS SHOWN, INCLUDE A VERTICAL CONCENTRATED LOAD OF 300 LBS (UNFACTORED DEAD LOAD) AT ANY LOCATION ALONG THE BOTTOM CHORD FOR DOWNWARD LOAD COMBINATIONS ONLY.
7. REFERENCE MECHANICAL AND ARCHITECTURAL DRAWINGS FOR LOCATIONS OF ROOF TOP UNITS.

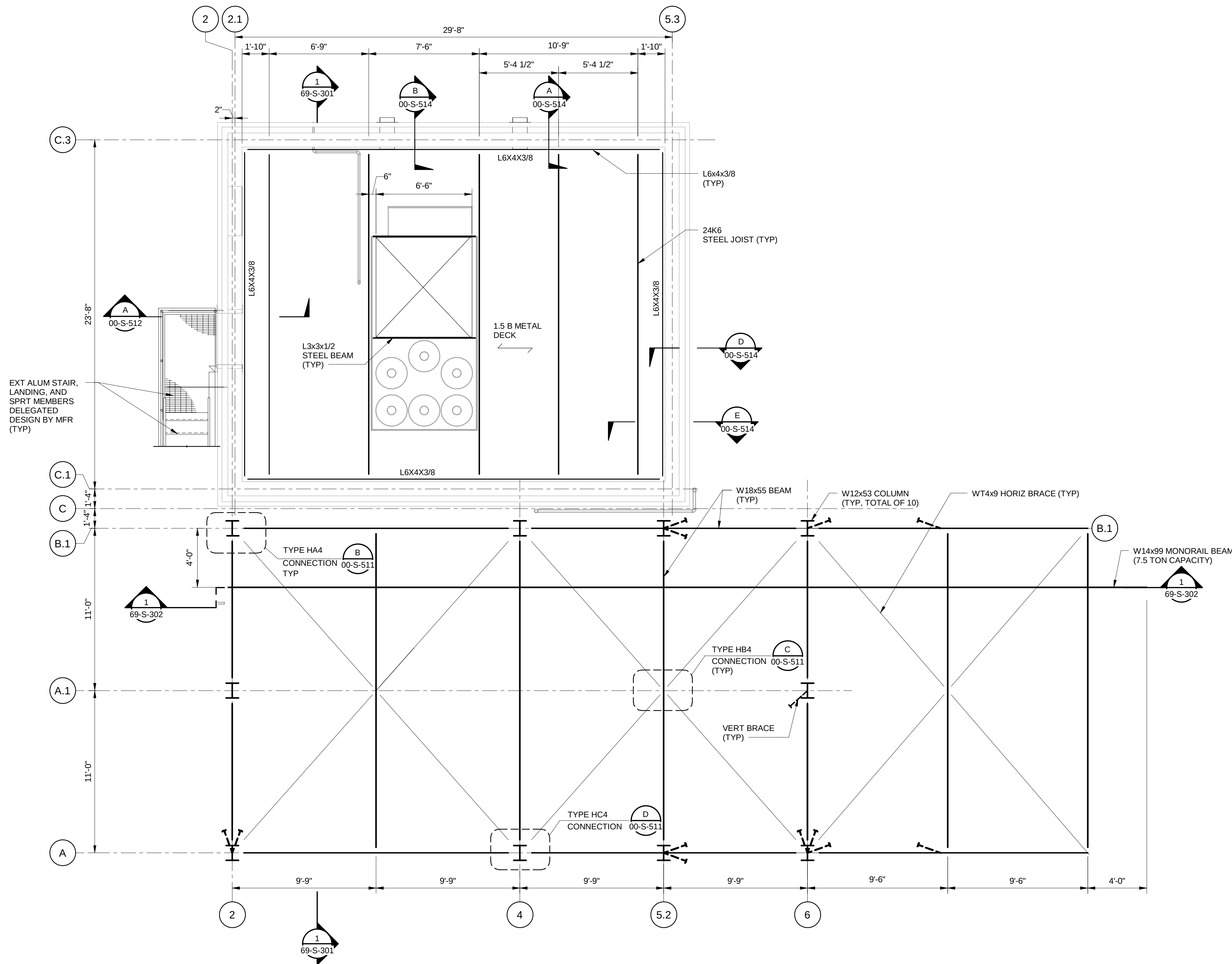
## STEEL JOIST LOADING DIAGRAMS AND NOTES

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12" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3

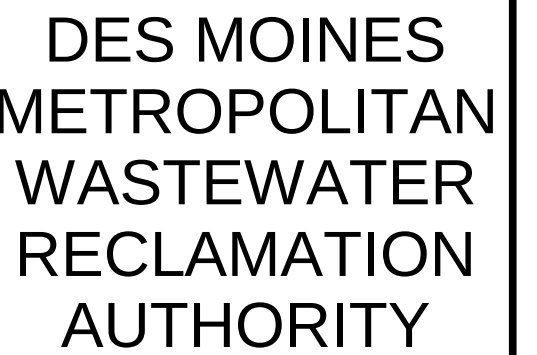


ROOF PLAN

---

1/4" = 1'-0"





## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
|                               |                    |
|                               |                    |
|                               |                    |
|                               |                    |
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | KB                 |
| DETAILED:                     | VVS                |
| CHECKED:                      | MZL                |
| APPROVED:                     | JAB                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

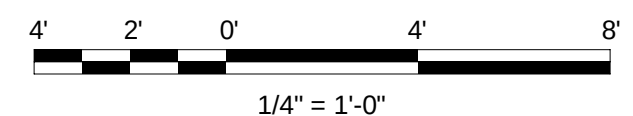
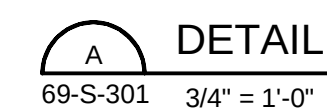
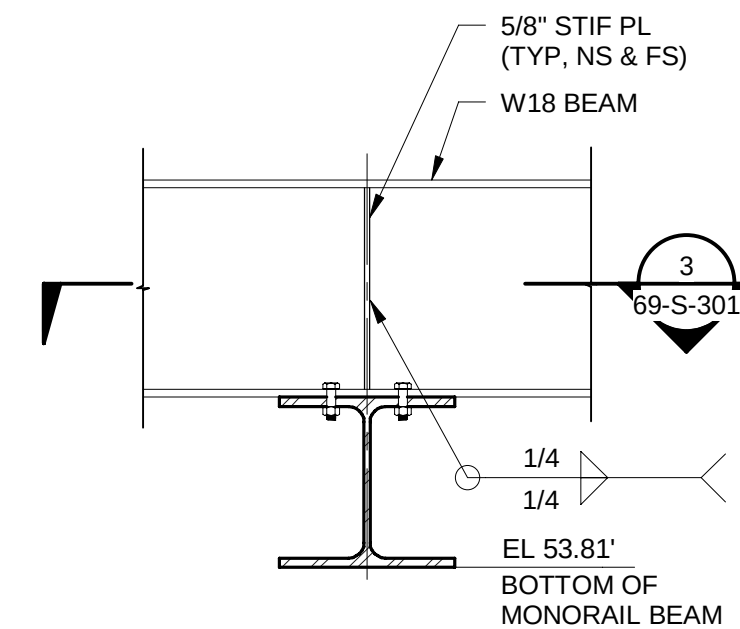
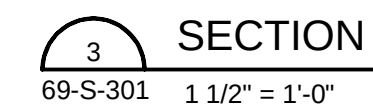
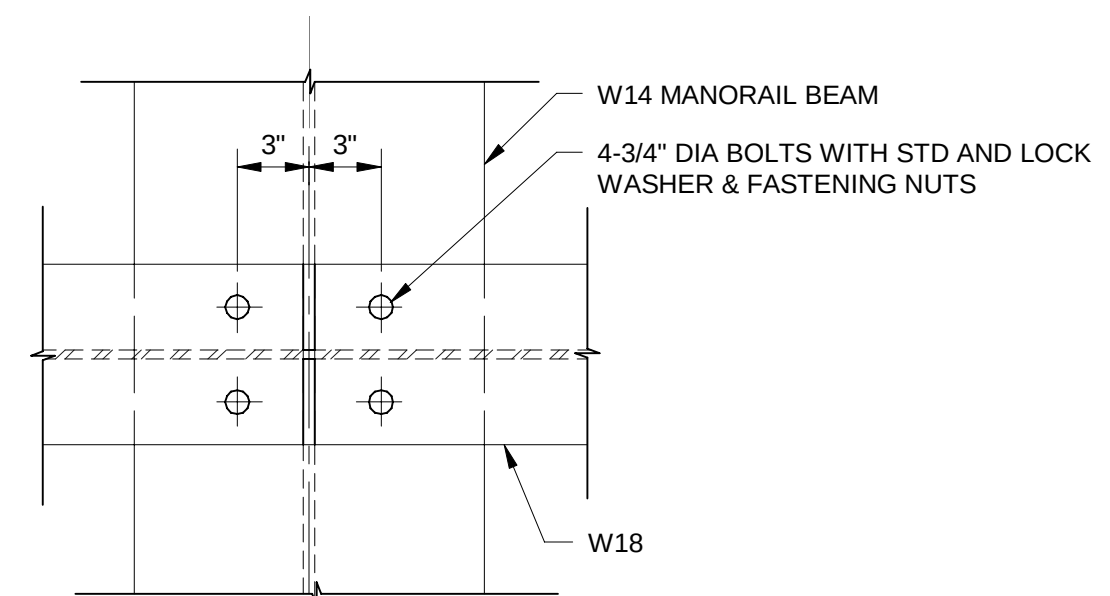
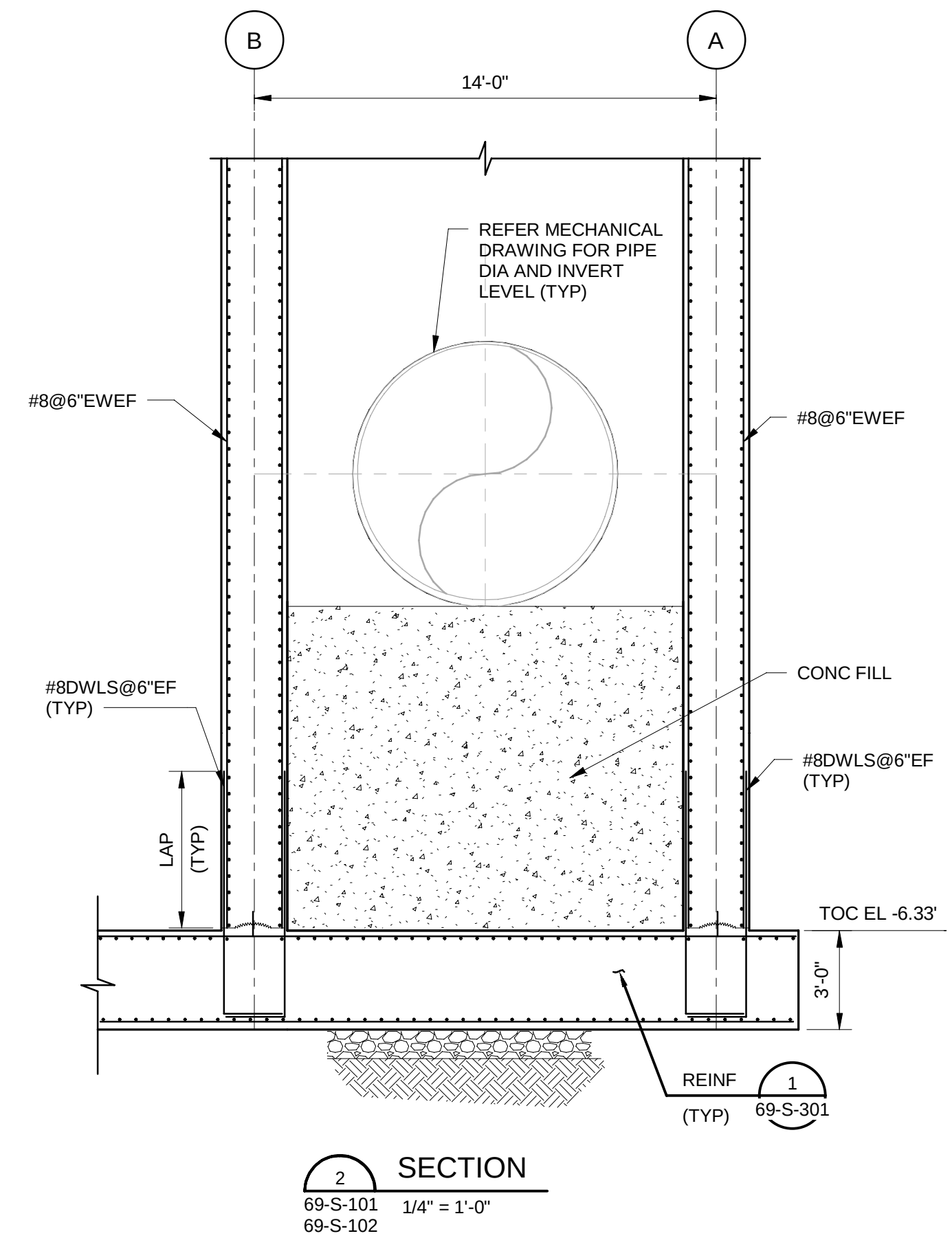
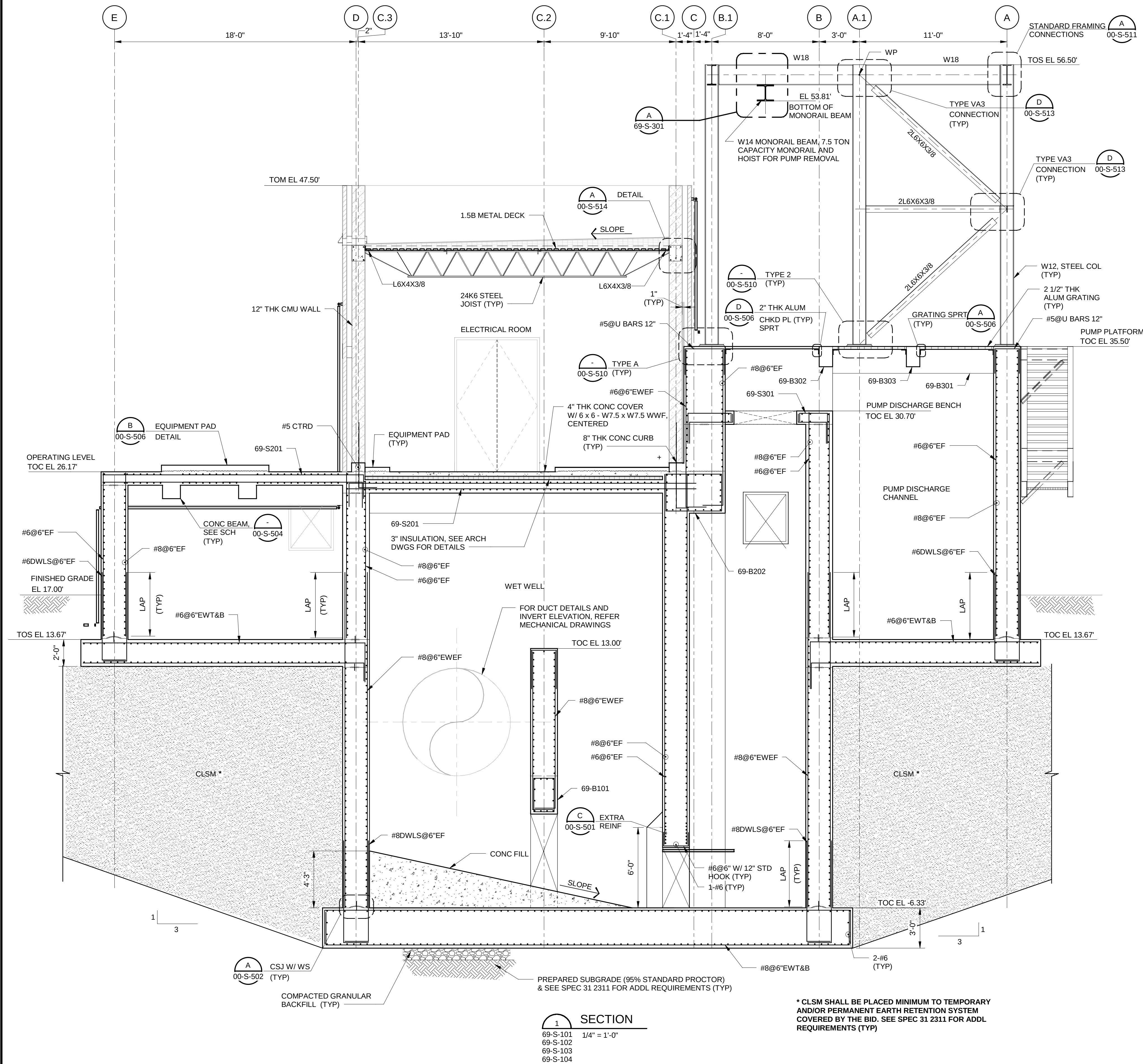
EFFLUENT PUMP STATION

STRUCTURAL

## SECTIONS

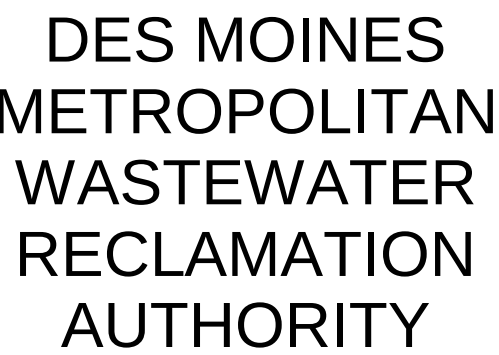
PLAN FILE NO. 664-294

69-S-301

01  
DF  
18

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





## WRF EFFLUENT PUMPING IMPROVEMENTS

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|--------------------------------------|--------------------|
|                                      |                    |
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|                                      |                    |
| 08/06/2024                           | ISSUED FOR BIDDING |
| <b>REVISIONS AND RECORD OF ISSUE</b> |                    |
| DESIGNED:                            | KB                 |
| DETAILED:                            | VVS                |
| CHECKED:                             | MZL                |
| APPROVED:                            | JAB                |
| DATE:                                | 08/16/2024         |
| PROJECT NO.:                         | 410504             |

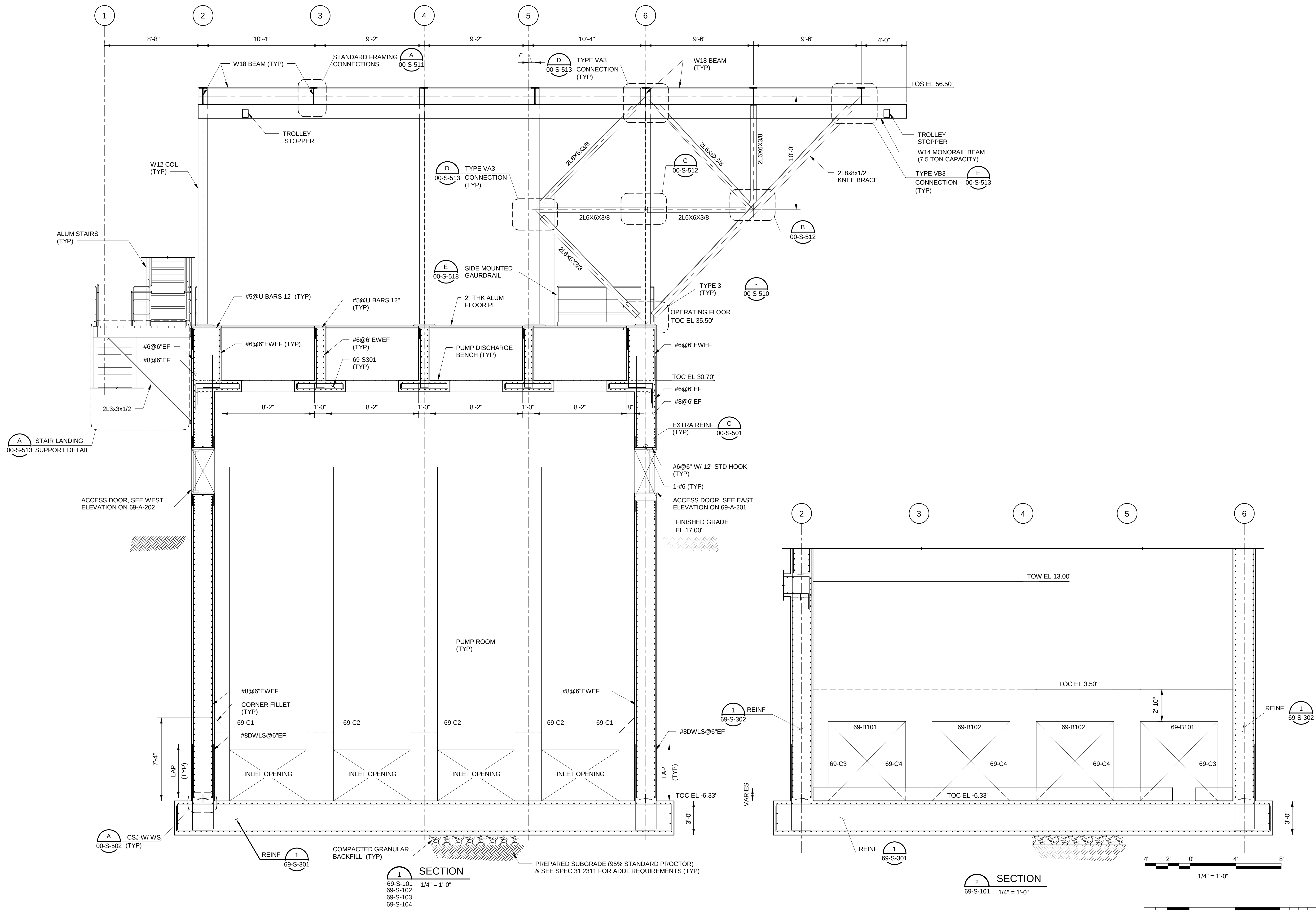
EFFLUENT PUMP STATION

STRUCTURAL

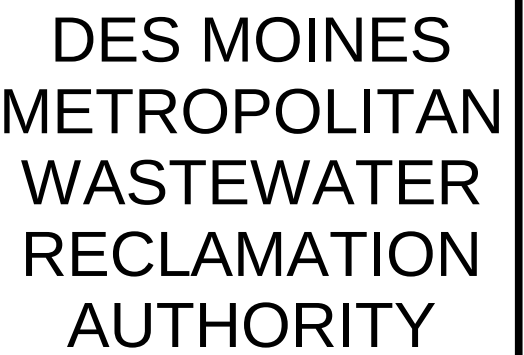
## SECTIONS

PLAN FILE NO. 664-295

69-S-302

02  
DF  
18





## WRF EFFLUENT PUMPING IMPROVEMENTS

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| 08/15/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
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| DETAILED:                     | VVS                |
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| PROJECT NO.:                  | 410504             |

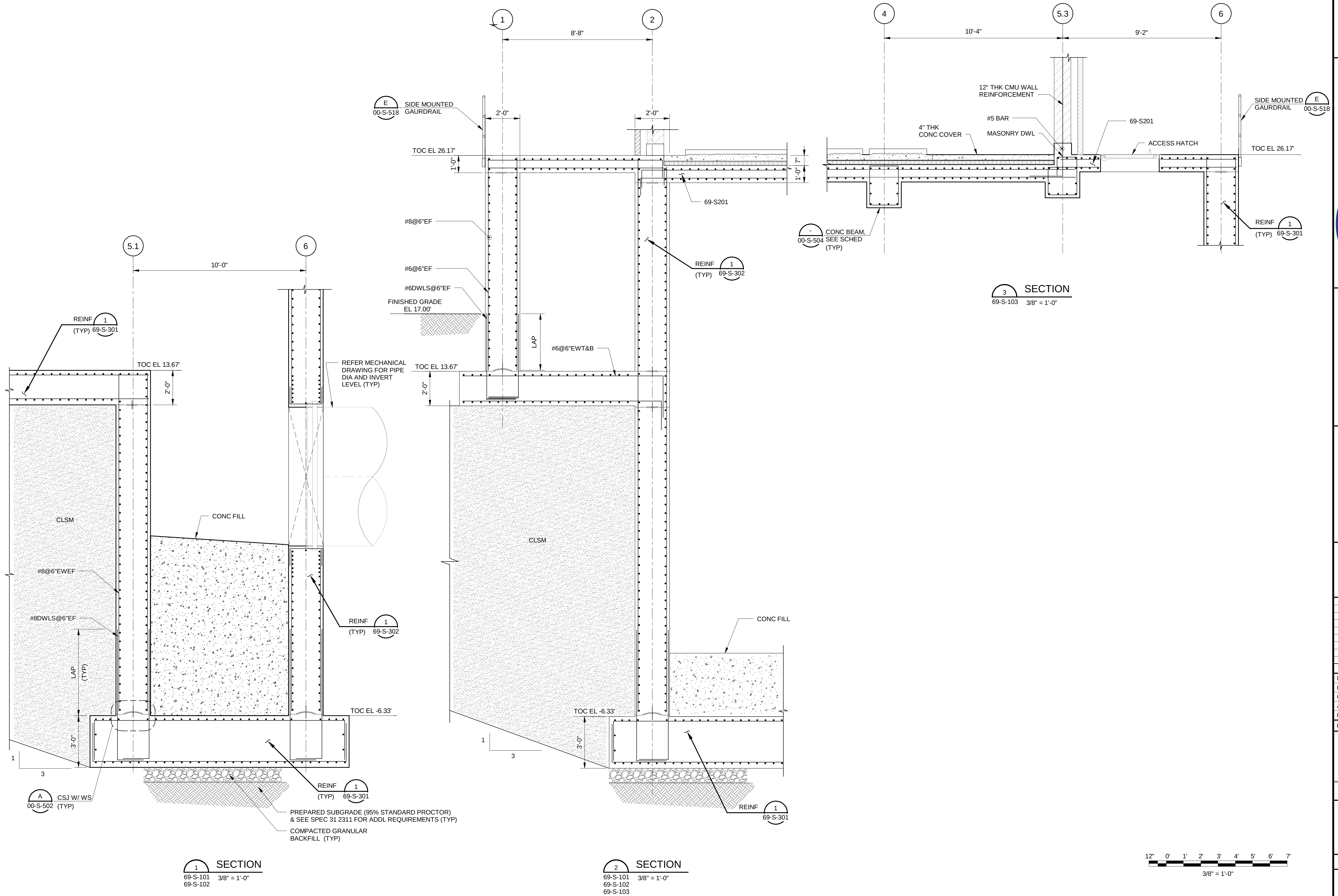
EFFLUENT PUMP STATION

STRUCTURAL

## SECTIONS

PLAN FILE NO. 664-296

69-S-303

03  
DF  
18





## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

EFFLUENT PUMP STATION

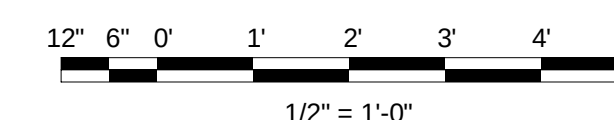
STRUCTURAL

## SECTIONS

PLAN FILE NO. 664-297

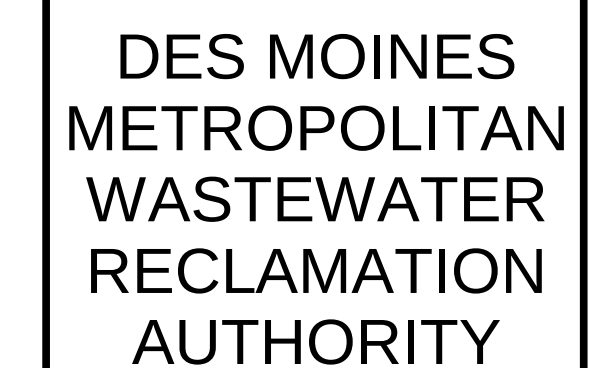
69-S-304

104  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3





## WRF EFFLUENT PUMPING IMPROVEMENTS

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|------------------------------|--------------------|
|                              |                    |
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| 08/16/2024                   | ISSUED FOR BIDDING |
| REVISONS AND RECORD OF ISSUE |                    |
| DESIGNED:                    | KB                 |
| DETAILED:                    | VVS                |
| CHECKED:                     | MZL                |
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| DATE:                        | 08/16/2024         |
| PROJECT NO.:                 | 410504             |

EFFLUENT PUMP STATION

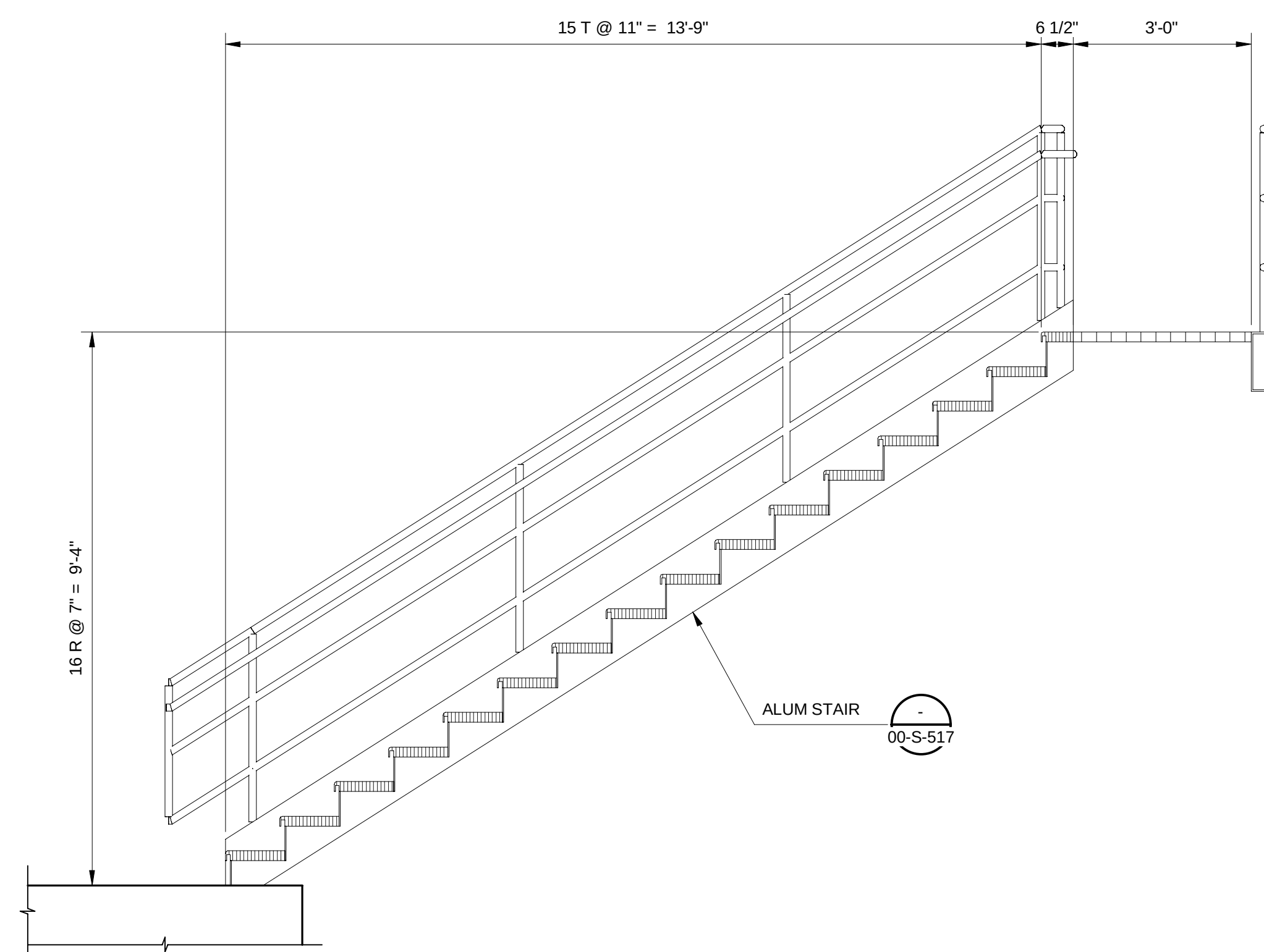
STRUCTURAL

## SECTIONS

PLAN FILE NO. 664-298

69-S-305

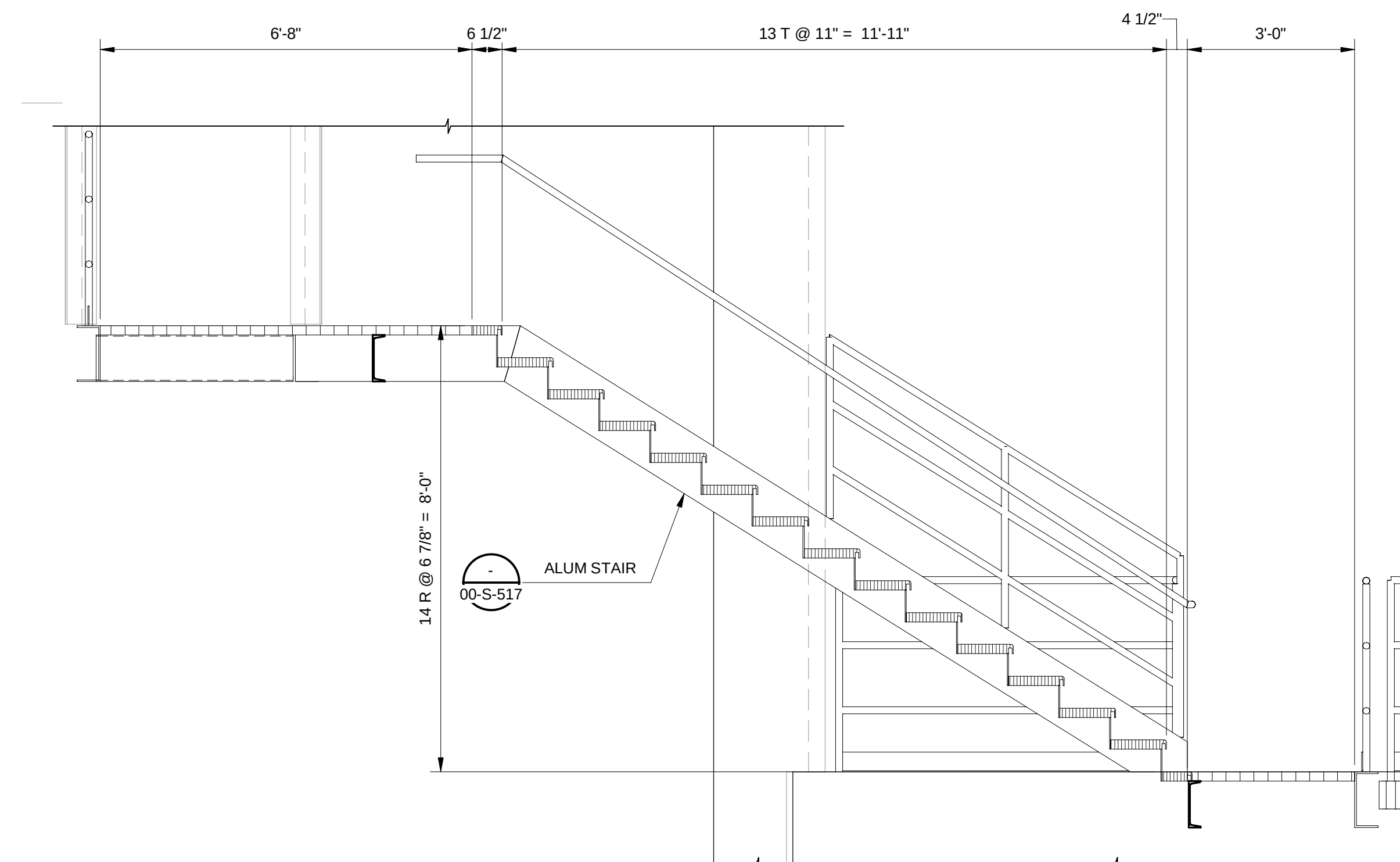
105  
OF  
118



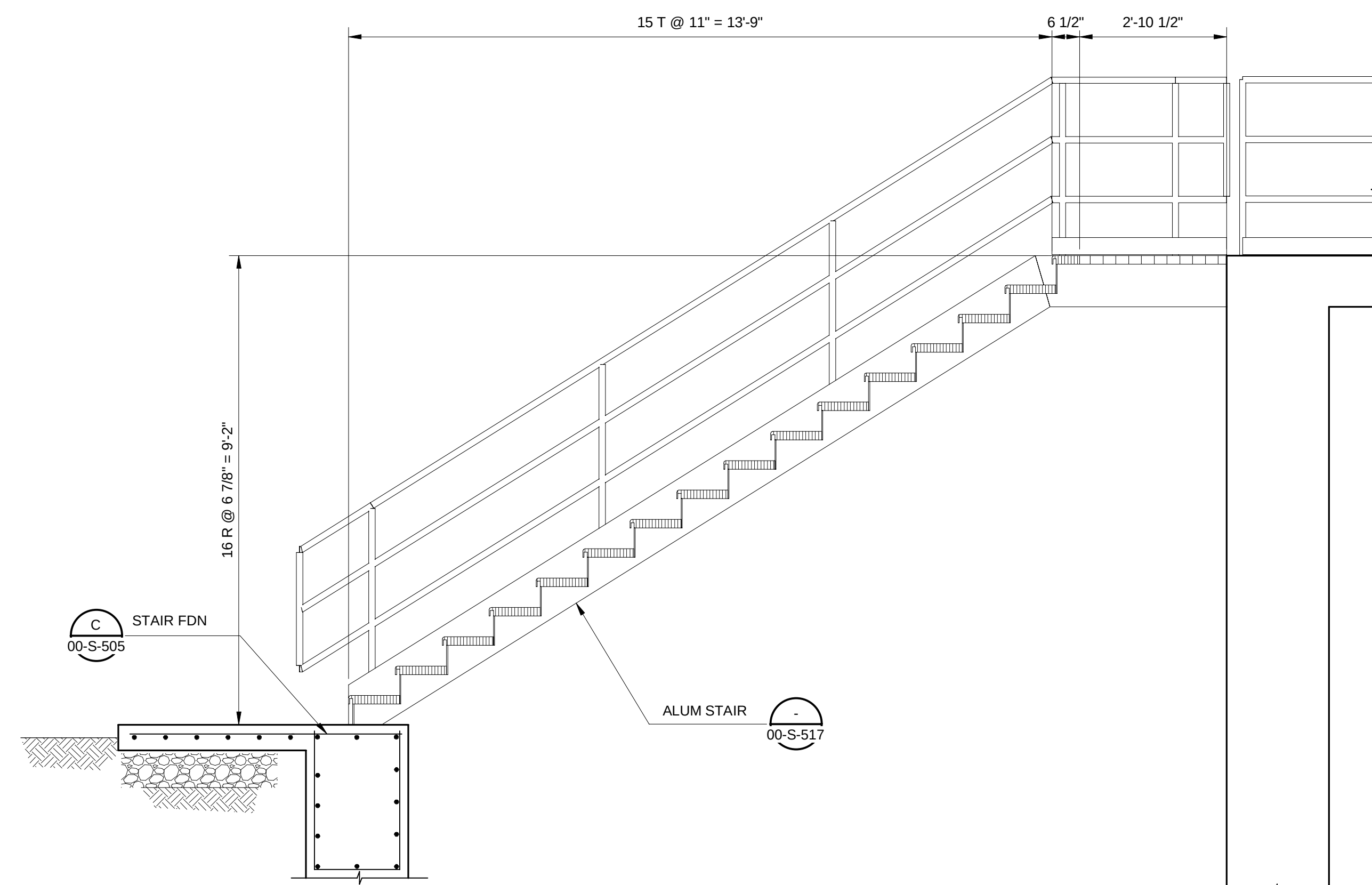
SECTION

1

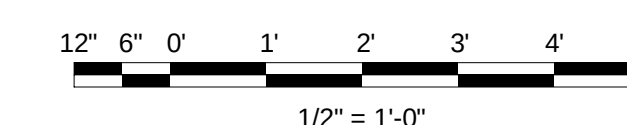
69-S-103 1/2" = 1'-0"



SECTION



SECTION



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
|                               |                    |
|                               |                    |
|                               |                    |
|                               |                    |
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| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JCK                |
| DETAILED:                     | JKS                |
| CHECKED:                      | TA                 |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

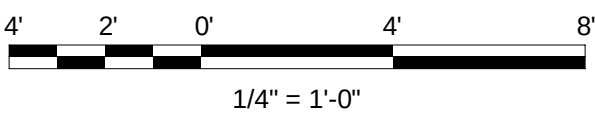
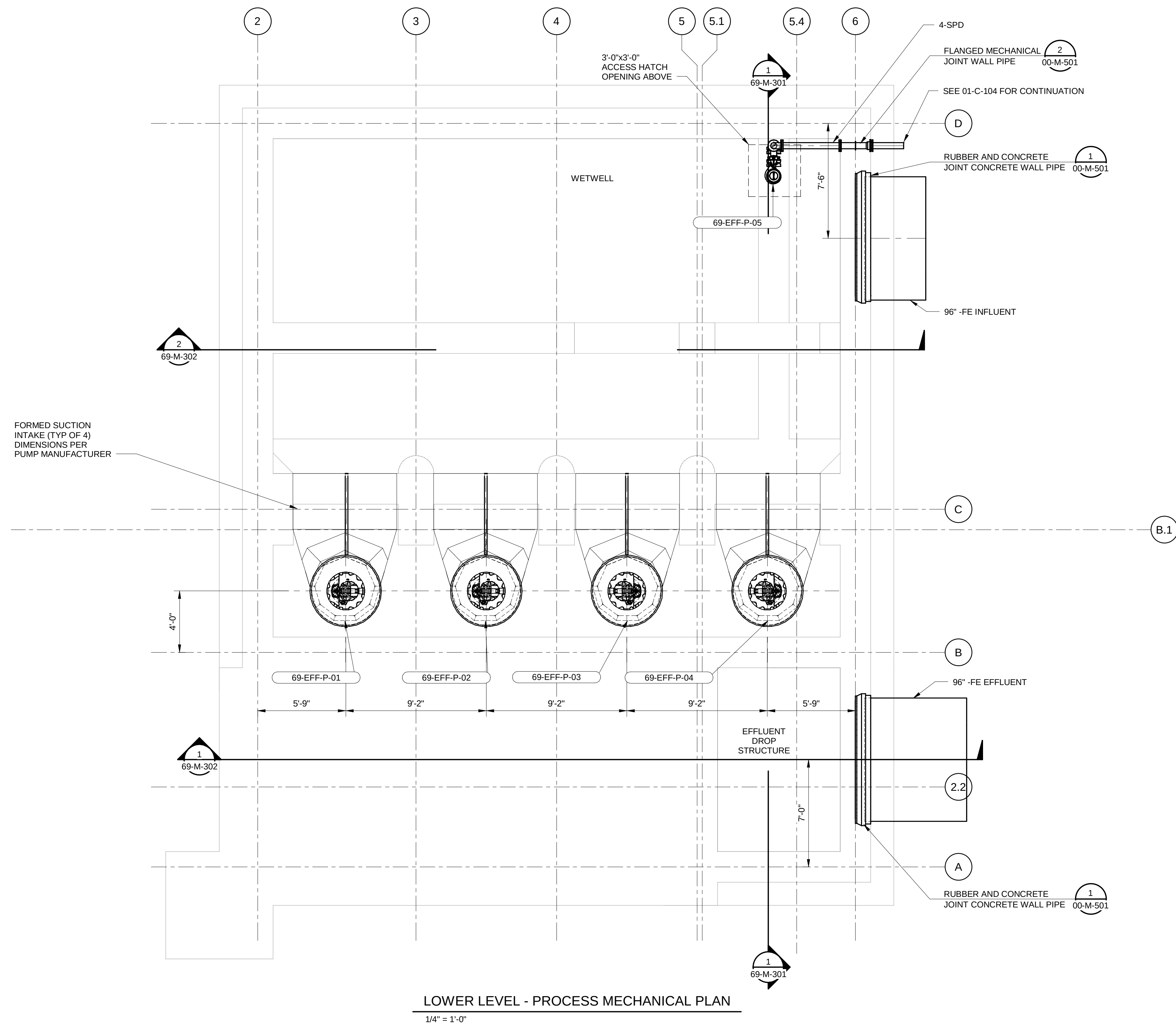
## PROCESS MECHANICAL

## LOWER LEVEL PLAN

PLAN FILE NO. 664-299

69-M-101

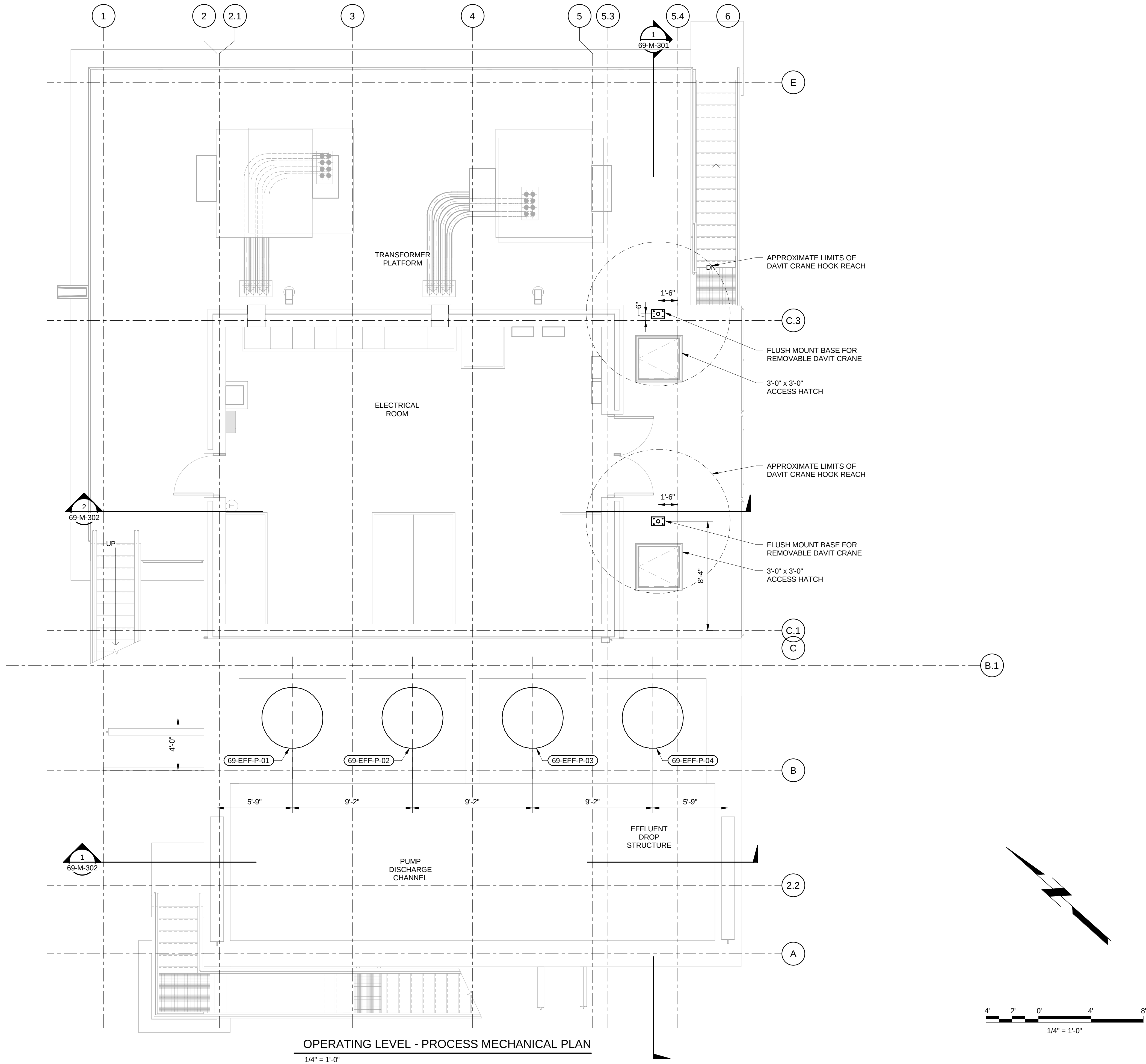
106  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



PLOTTED: 8/20/2024 9:33:42 AM  
 FILE: BIM 360/410504 - WRF Effluent Pump Station/410504 - WRF Effluent Pump Station.rvt  
 D11000



Black & Veatch Corporation  
Des Moines, Iowa

DES MOINES METROPOLITAN WASTEWATER RECLAMATION AUTHORITY

WRF EFFLUENT PUMPING IMPROVEMENTS

| REVISIONS AND RECORD OF ISSUE |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| DESIGNED:                     | JCK                |
| DETAILED:                     | JKS                |
| CHECKED:                      | TA                 |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

PROCESS MECHANICAL

EFFLUENT PUMPING STATION OPERATING LEVEL PLAN

PLAN FILE NO. 664-300

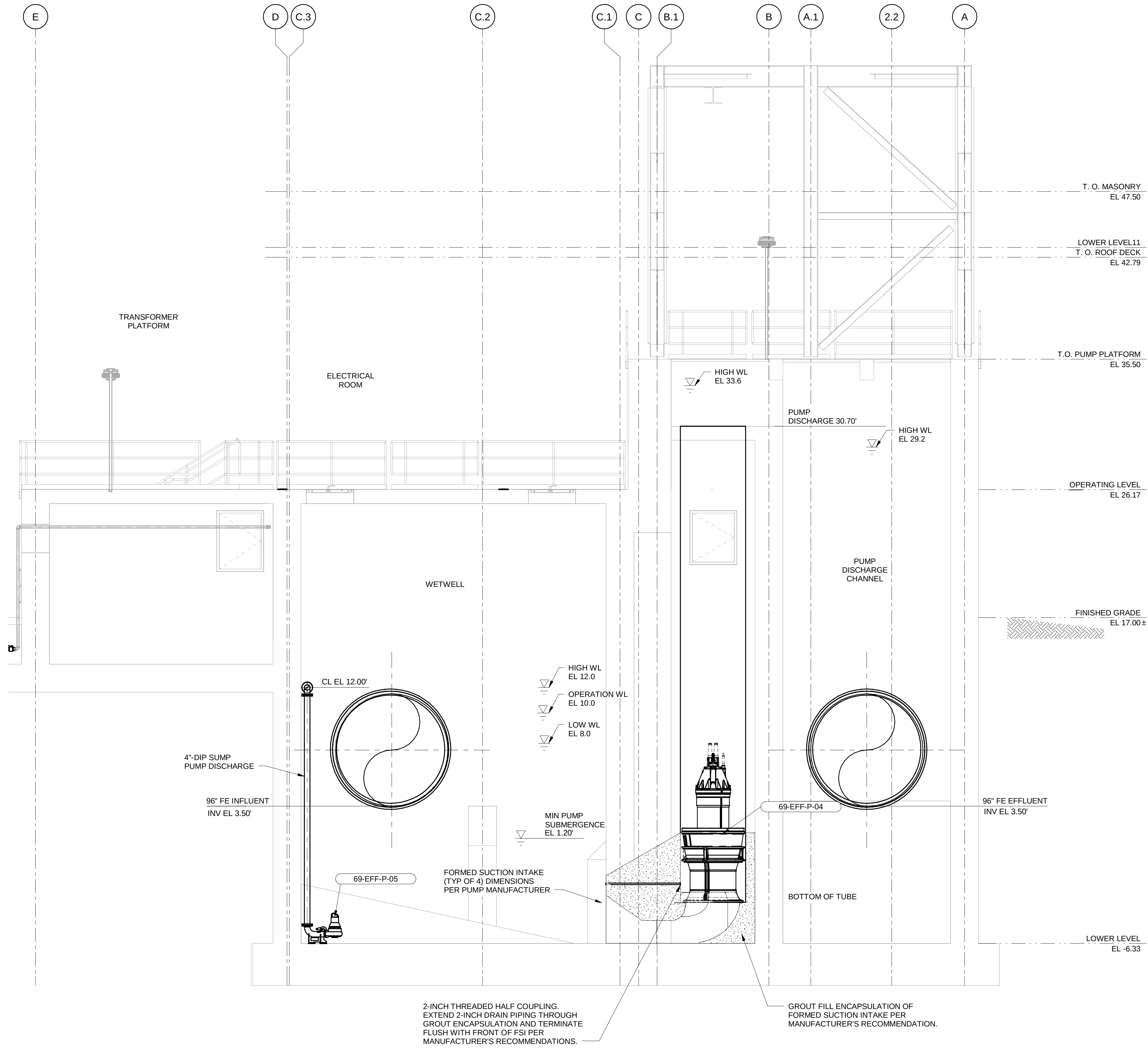
69-M-102

107 OF 118

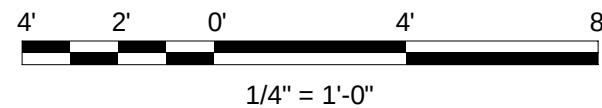
(SCALE BAR IS 4" AT FULL SCALE)
 0
 1/2
 1
 2
 3
 4



PLOTTED: 8/20/2024 9:32:59 AM  
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 D11000



SECTION  
 69-M-101 1/4" = 1'-0"



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



Black & Veatch Corporation  
 Des Moines, Iowa



DES MOINES  
 METROPOLITAN  
 WASTEWATER  
 RECLAMATION  
 AUTHORITY

WRF EFFLUENT  
 PUMPING  
 IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | JCK                |
| DETAILED:                     | JKS                |
| CHECKED:                      | TA                 |
| APPROVED:                     | SGC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

PROCESS MECHANICAL

SECTIONS

PLAN FILE NO. 664-301

69-M-301

108  
 OF  
 118





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

## WRF EFFLUENT PUMPING IMPROVEMENTS

[illegible]

EFFLUENT PUMP STATION

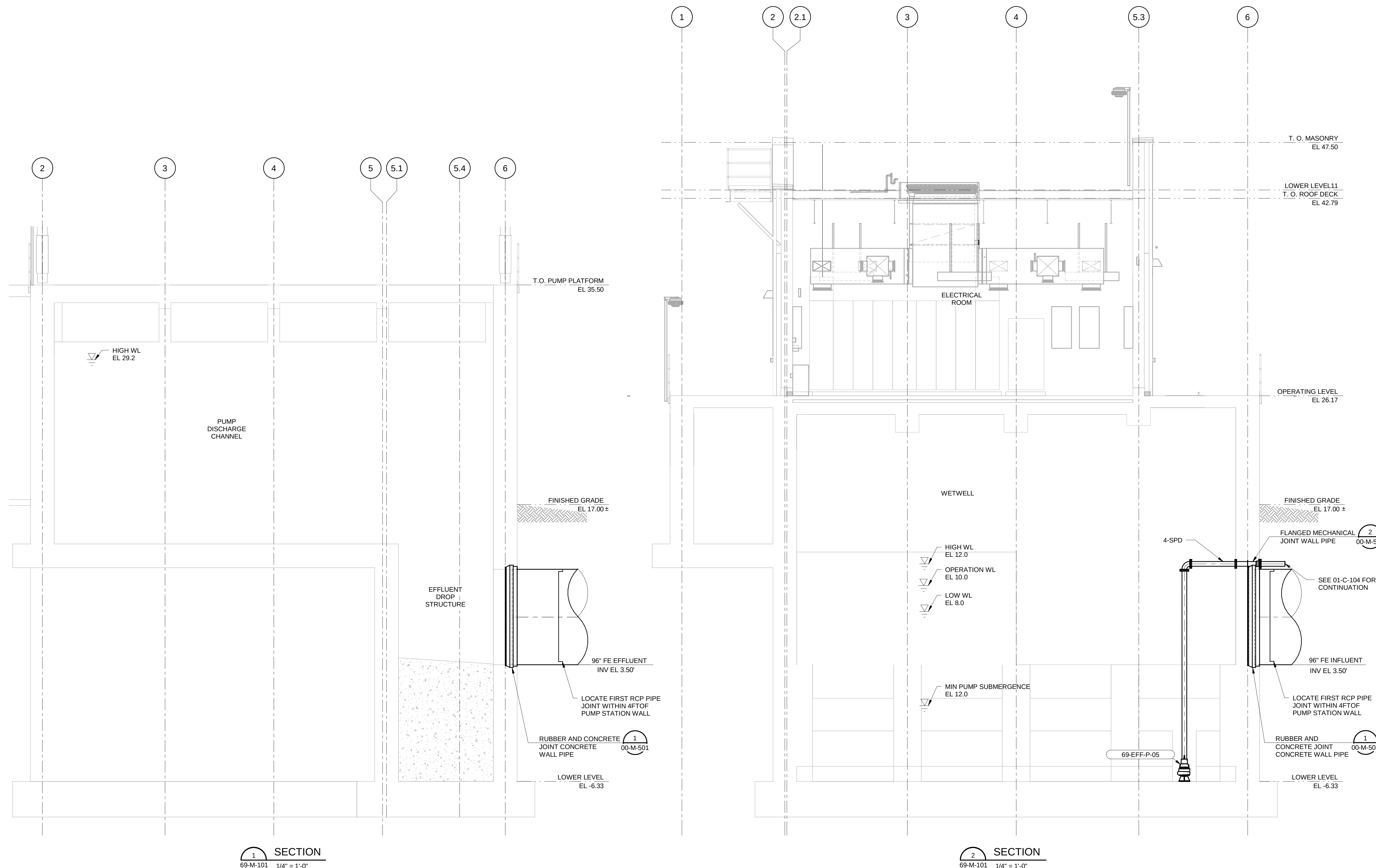
## PROCESS MECHANICAL

## SECTIONS

PLAN FILE NO. 664-302

69-M-302

109  
OF  
118



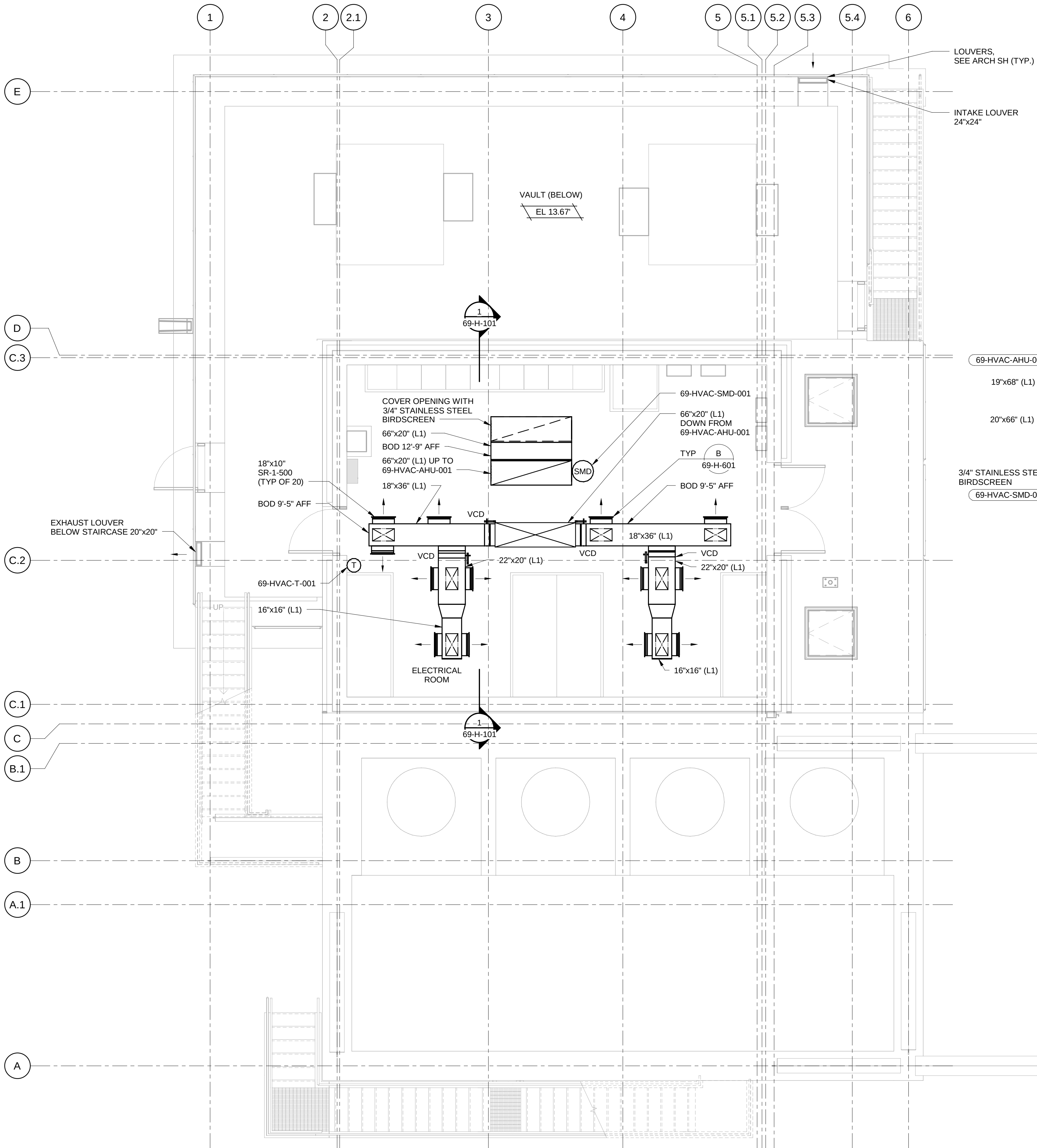
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D11000

011000

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3



PLOTTED: 8/20/2024 9:32:48 AM  
 FILE: BIM 360/410504 - WRF Effluent Pump Station/410504 - WRF Effluent Pump Station.rvt  
 D11000



OPERATING LEVEL - PLAN  
 1/4" = 1'-0"

GENERAL SHEET NOTES

1. SEE DRAWING 00-H-001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

|                               |                    |
|-------------------------------|--------------------|
| 08/16/2024                    | ISSUED FOR BIDDING |
| REVISIONS AND RECORD OF ISSUE |                    |
| DESIGNED:                     | VSS                |
| DETAILED:                     | AJP                |
| CHECKED:                      | DV                 |
| APPROVED:                     | RWC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

HVAC

OPERATING LEVEL PLAN

PLAN FILE NO. 664-303

69-H-101

110  
OF  
118

LOUVERS,  
SEE ARCH SH (TYP.)

INTAKE LOUVER  
24"x24"

VAULT (BELOW)  
EL 13.67'

1  
69-H-101

COVER OPENING WITH  
3/4" STAINLESS STEEL  
BIRDSCREEN

66"x20" (L1)  
BOD 12'-9" AFF

66"x20" (L1) UP TO  
69-HVAC-AHU-001

18"x36" (L1)

18"x10"  
SR-1-500  
(TYP OF 20)

BOD 9'-5" AFF

69-HVAC-SMD-001

66"x20" (L1)  
DOWN FROM  
69-HVAC-AHU-001

TYP B  
69-H-601

BOD 9'-5" AFF

EXHAUST LOUVER  
BELOW STAIRCASE 20"x20"

69-HVAC-T-001

16"x16" (L1)

ELECTRICAL ROOM

22"x20" (L1)

18"x36" (L1)

22"x20" (L1)

16"x16" (L1)

69-HVAC-AHU-001

19"x68" (L1)

20"x66" (L1)

3/4" STAINLESS STEEL  
BIRDSCREEN

69-HVAC-SMD-001

BOD 12'-9"

BOD 9'-5"

TYP B  
69-H-601

18"x10"  
SR-1-500 (TYP)

ELECTRICAL ROOM

ROOF LEVEL  
EL 48.17

T. O. MASONRY  
EL 47.50

EQUIPMENT CURB  
BY MANUFACTURER

LOWER LEVEL.11  
T. O. ROOF DECK  
EL 42.79

UPPER LEVEL  
EL 41.17

62"x26" (L1)

FLEX  
CONN (TYP)

20"x66" (L1)

18"x36" (L1)

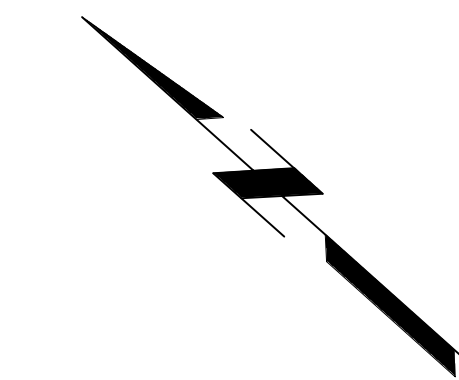
20"x22" (L1)

16"x16" (L1)

T.O. PUMP PLATFORM  
EL 35.50

OPERATING LEVEL  
EL 26.17

1 SECTION  
1/4" = 1'-0"

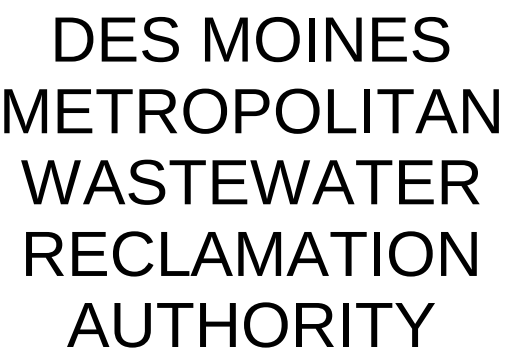
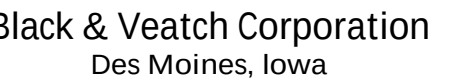


4' 2' 0' 4' 8'  
1/4" = 1'-0"

(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



1. SEE DRAWING 00-H-001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.



## WRF EFFLUENT PUMPING IMPROVEMENTS

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| APPROVED:                     | RWC                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

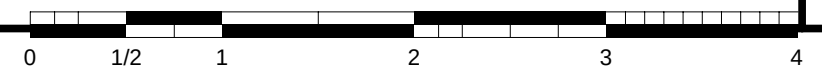
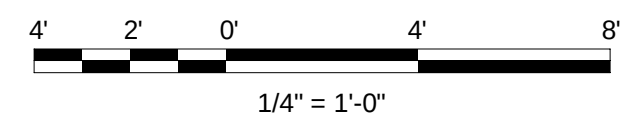
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## ROOF PLAN

PLAN FILE NO. 664-304

69-H-102

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| 11 | DF | 18 |
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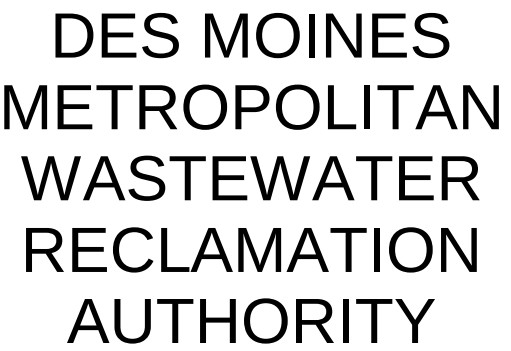
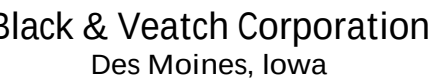




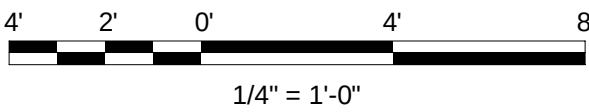
112  
OF  
118



1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. UNLESS OTHERWISE NOTED, ALL INSTRUMENT TAGS ON THIS PAGE ARE PRECEDED BY "69-EFF-".

[illegible]69-E-101

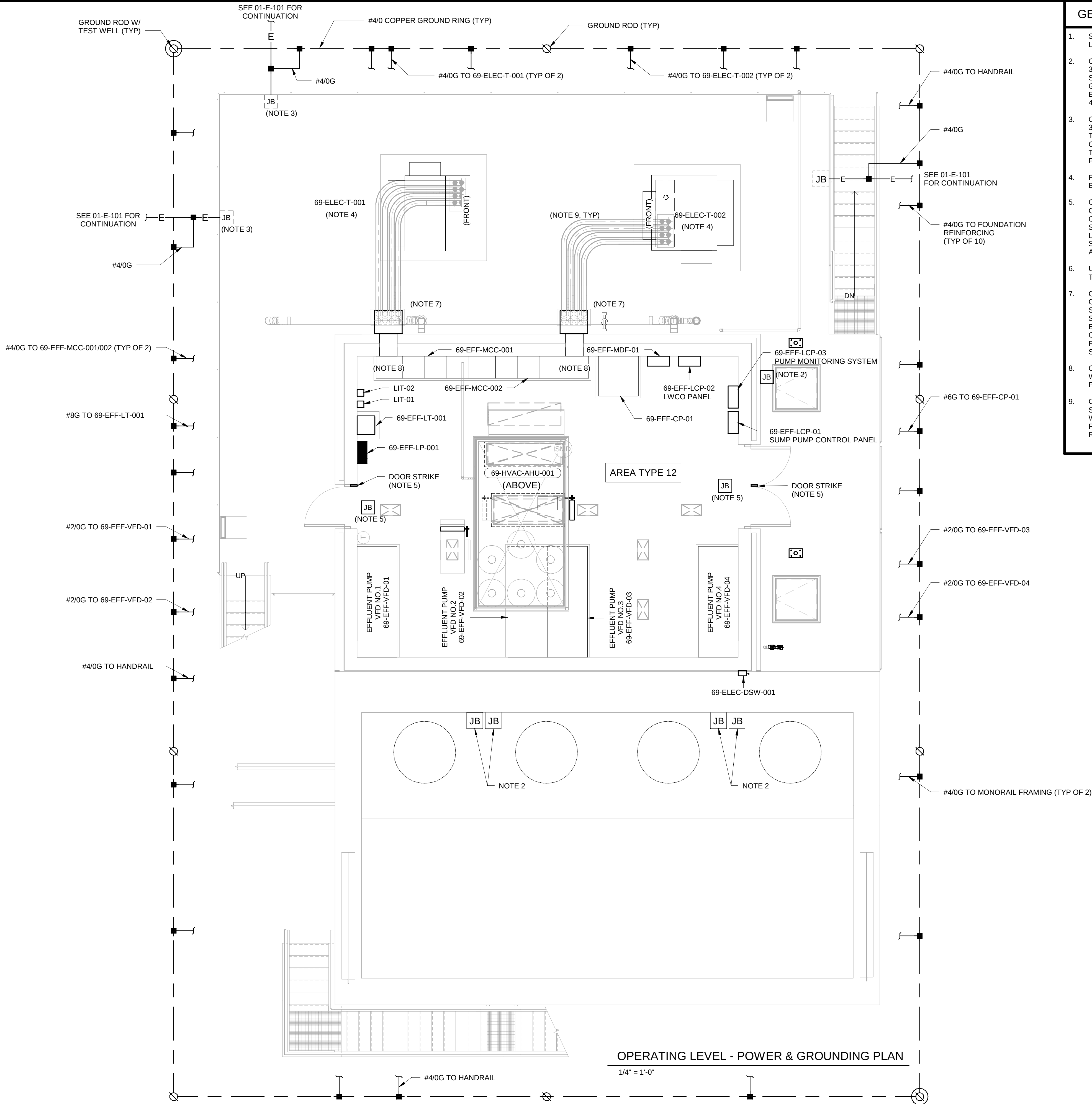
113  
OF  
118



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4



PLOTTED: 8/20/2024 9:33:08 AM  
 FILE: BIM 360/410504 - WRF Effluent Pump Station/410504 - WRF Effluent Pump Station.rvt  
 D11000



GENERAL SHEET NOTES

- SEE DRAWINGS 00-E-001 AND 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
- CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 SS JUNCTION BOXES TO FACILITATE TRANSITION TO SUBMERSIBLE CABLE FOR EACH PUMPING UNIT. KELLEMS GRIPS OR APPROVED EQUAL SHALL BE PROVIDED WITHIN EACH BOX IN ACCORDANCE WITH SECTIONS 260511 AND 432413.
- CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 SS JUNCTION BOXES AT GRADE, SIZED AS REQUIRED, TO FACILITATE TRANSITION FROM DUCTBANK TO EXPOSED CONDUIT. JUNCTION BOXES SHALL ALSO SERVE AS TERMINATION POINT FOR DUCTBANK SPARES WHERE PRESENT.
- FINAL CONDUIT PENETRATIONS SHALL BE DETERMINED BASED UPON FINAL EQUIPMENT FURNISHED.
- CONTRACTOR SHALL FURNISH AND INSTALL CABLE AND CONDUIT TO INDICATED DEVICES AS INDICATED ON THE ONE-LINES, AND SHALL COORDINATE WITH THE SECURITY SYSTEM SUPPLIER TO CONFIRM FINAL MOUNTING LOCATIONS FOR ITEMS, AND SHALL PROVIDE SUPPLEMENTAL PROVISIONS AS NECESSARY TO FACILITATE A FULLY FUNCTIONAL SYSTEM.
- UNLESS OTHERWISE NOTED, ALL INSTRUMENT TAGS ON THIS PAGE ARE PROCEEDED BY "69-EFF-".
- CONTRACTOR SHALL FURNISH AND INSTALL ROXTEC GHFL100 TRANSIT. REFER TO STANDARD DETAILS AND SPECIFICATIONS FOR ADDITIONAL DETAIL. CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 SS PULL BOX TO FACILITATE TRANSITION TO WALL PENETRATION. COORDINATE SIZE OF PULLBOX WITH TRANSIT AND AS REQUIRED BY NEC. COORDINATE PULL BOX SUPPORT WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH AND INSTALL CABLE WIREWAY TO FACILITATE TRANSITION FROM WALL PENETRATION TO MCC CABLE ENTRY.
- CONTRACTOR SHALL FURNISH AND INSTALL RIGID CONDUIT SUPPORT SYSTEMS. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL AND ARCHITECTURAL ENGINEERS AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND DETAILS.



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| DETAILED:                     | AJR                |
| CHECKED:                      | SJB                |
| APPROVED:                     | TDH                |
| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

ELECTRICAL

OPERATING LEVEL  
POWER & GROUNDING  
PLAN

PLAN FILE NO. 664-307

69-E-102

OF  
118



GENERAL SHEET NOTES

1. SEE DRAWINGS 00-E-001 & 00-E-002 FOR ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.



Black & Veatch Corporation  
Des Moines, Iowa



DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT  
PUMPING  
IMPROVEMENTS

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| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

EFFLUENT PUMP STATION

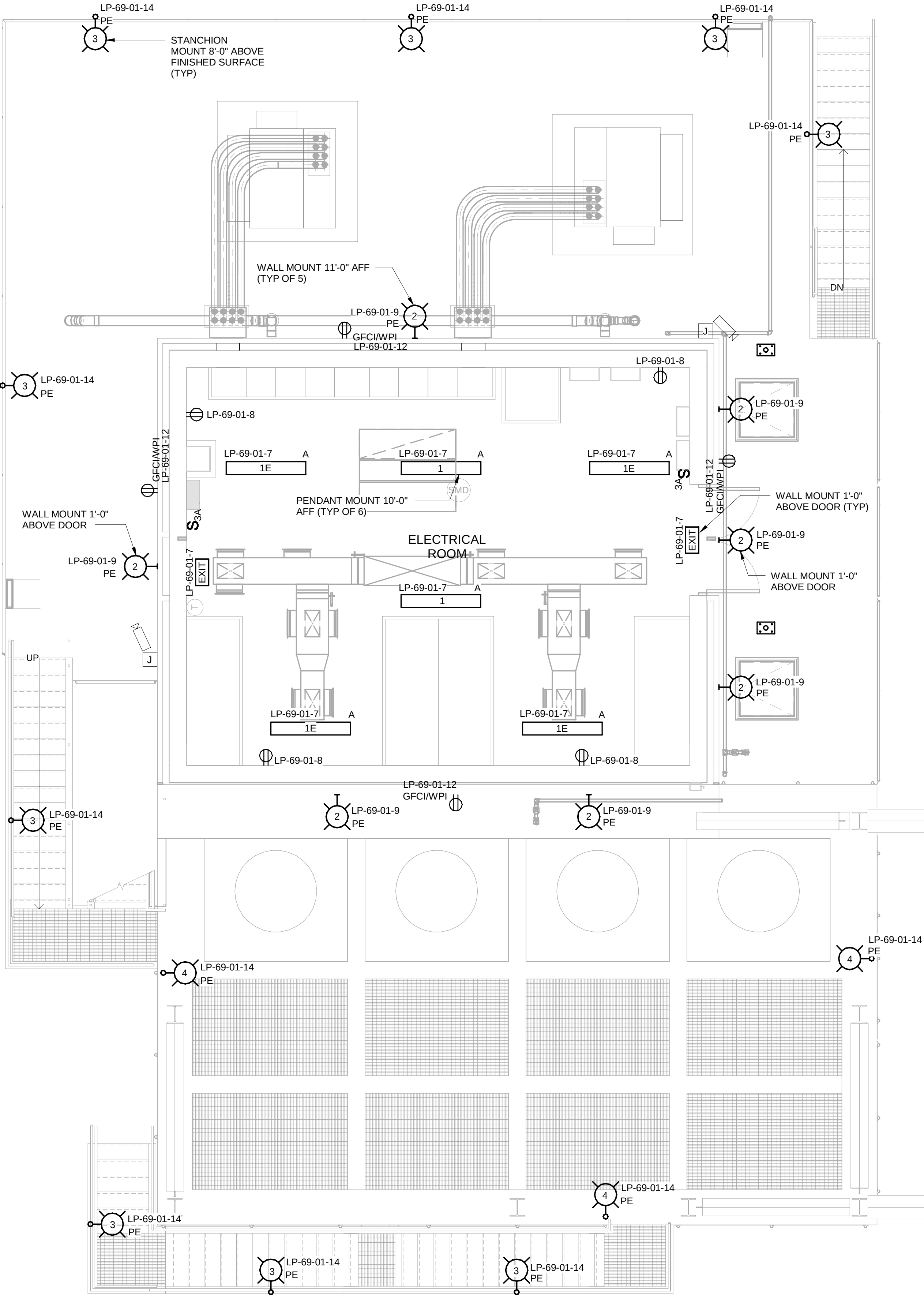
ELECTRICAL

OPERATING LEVEL  
LIGHTING &  
RECEPTACLE PLAN

PLAN FILE NO. 664-308

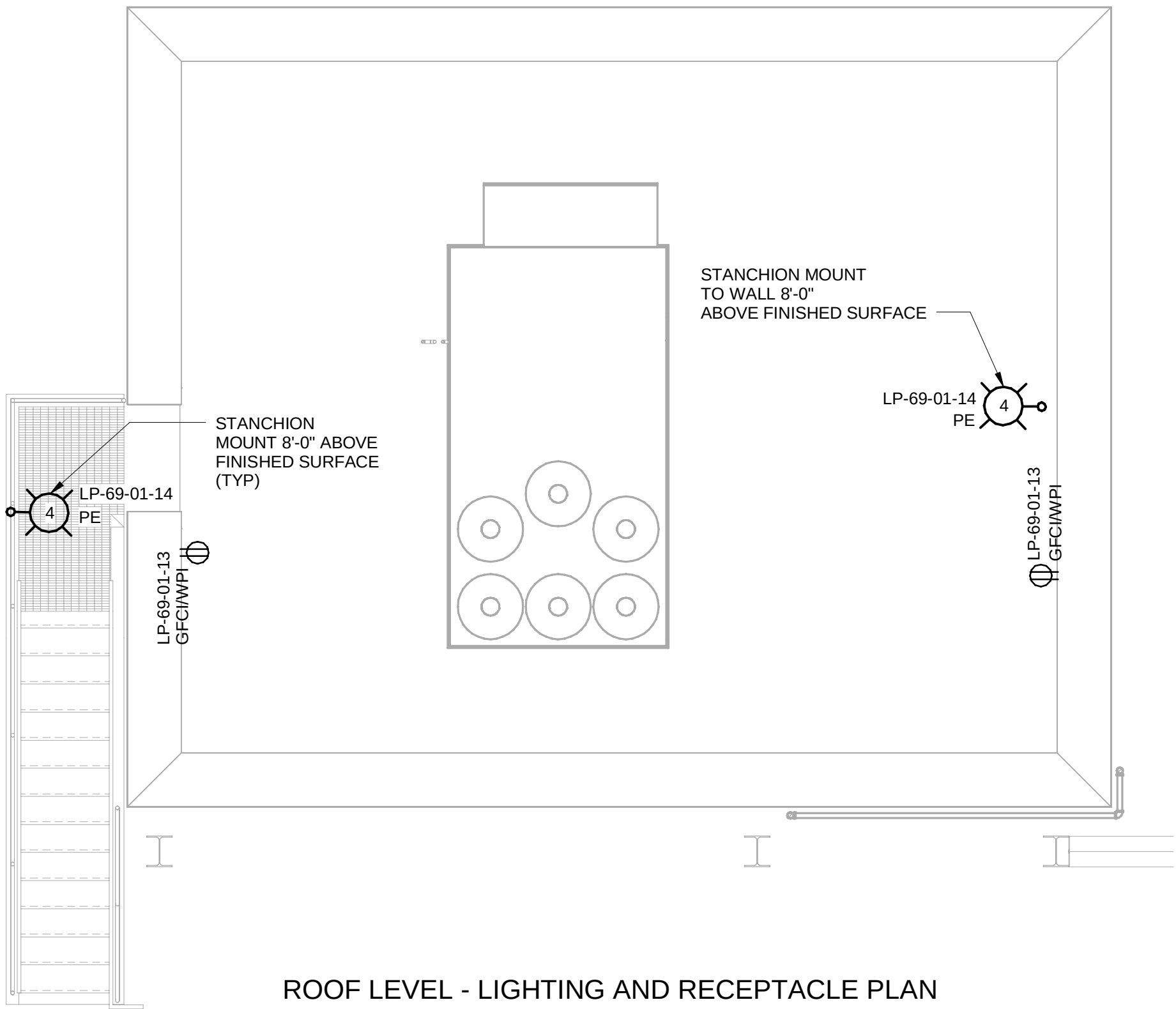
69-E-103

115  
OF  
118



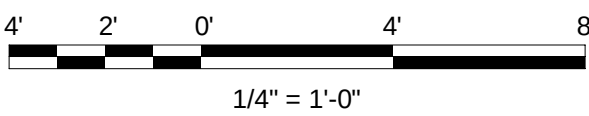
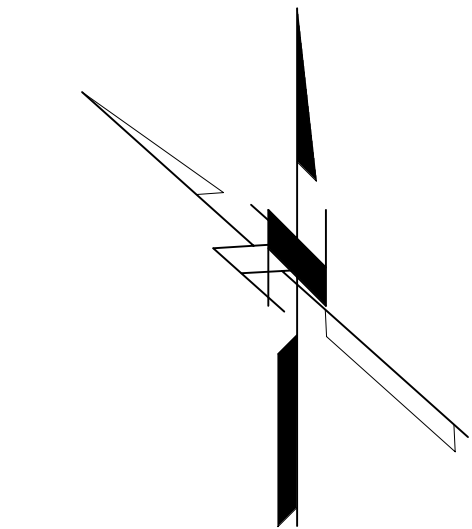
OPERATING LEVEL - LIGHTING & RECEPTACLE PLAN

1/4" = 1'-0"



ROOF LEVEL - LIGHTING AND RECEPTACLE PLAN

1/4" = 1'-0"



1/4" = 1'-0"

(SCALE BAR IS 4" AT FULL SCALE)





DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMP  
IMPROVEMENTS

|                               |            |
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| CHECKED:                      | MZL        |
| APPROVED:                     | JAB        |
| DATE:                         | 08/16/2024 |
| PROJECT NO.:                  | 410504     |

FINAL EFFLUENT GATEWELL

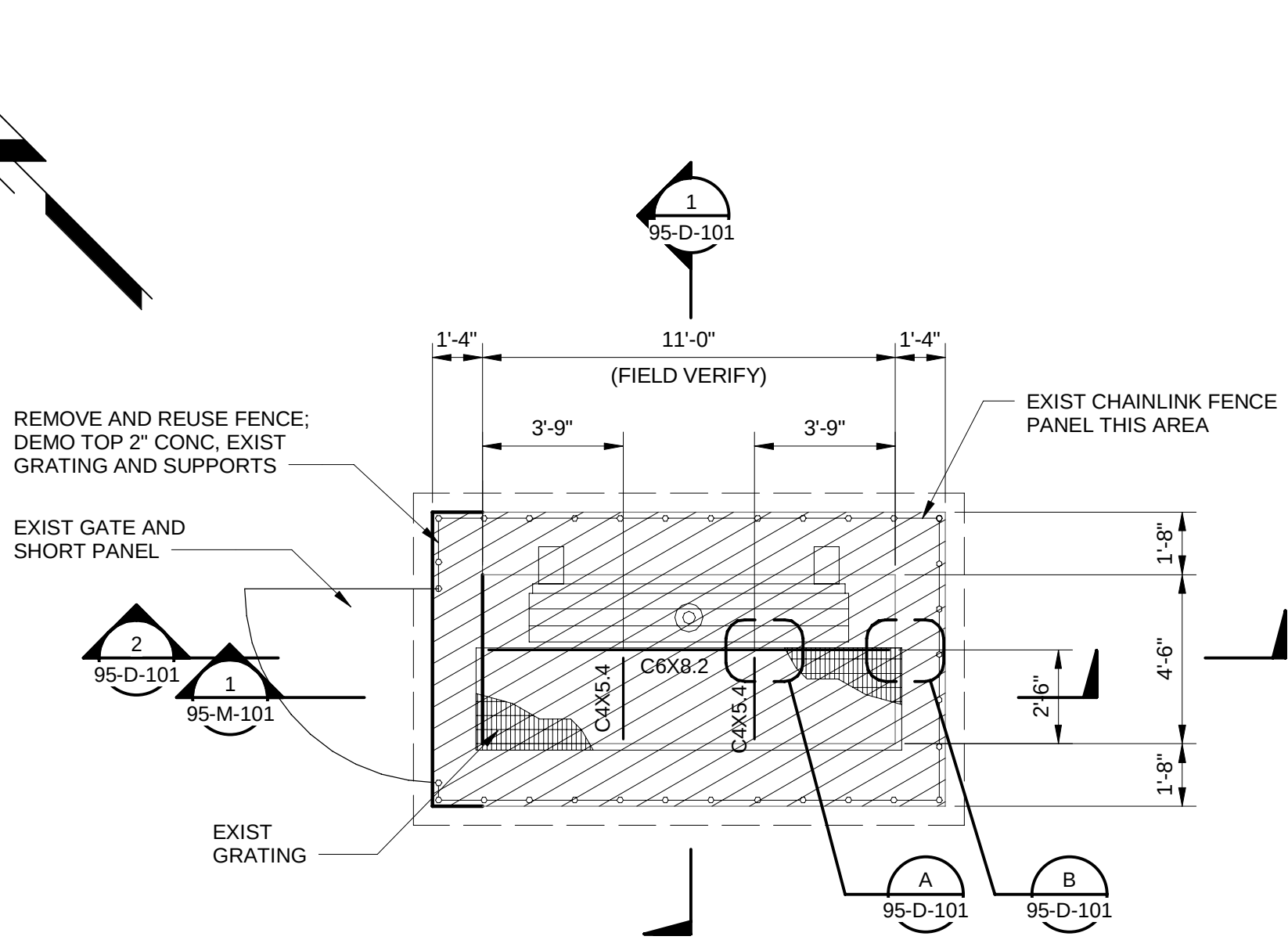
DEMOLITION

PLAN, SECTIONS AND  
DETAILS

PLAN FILE NO. 664-309

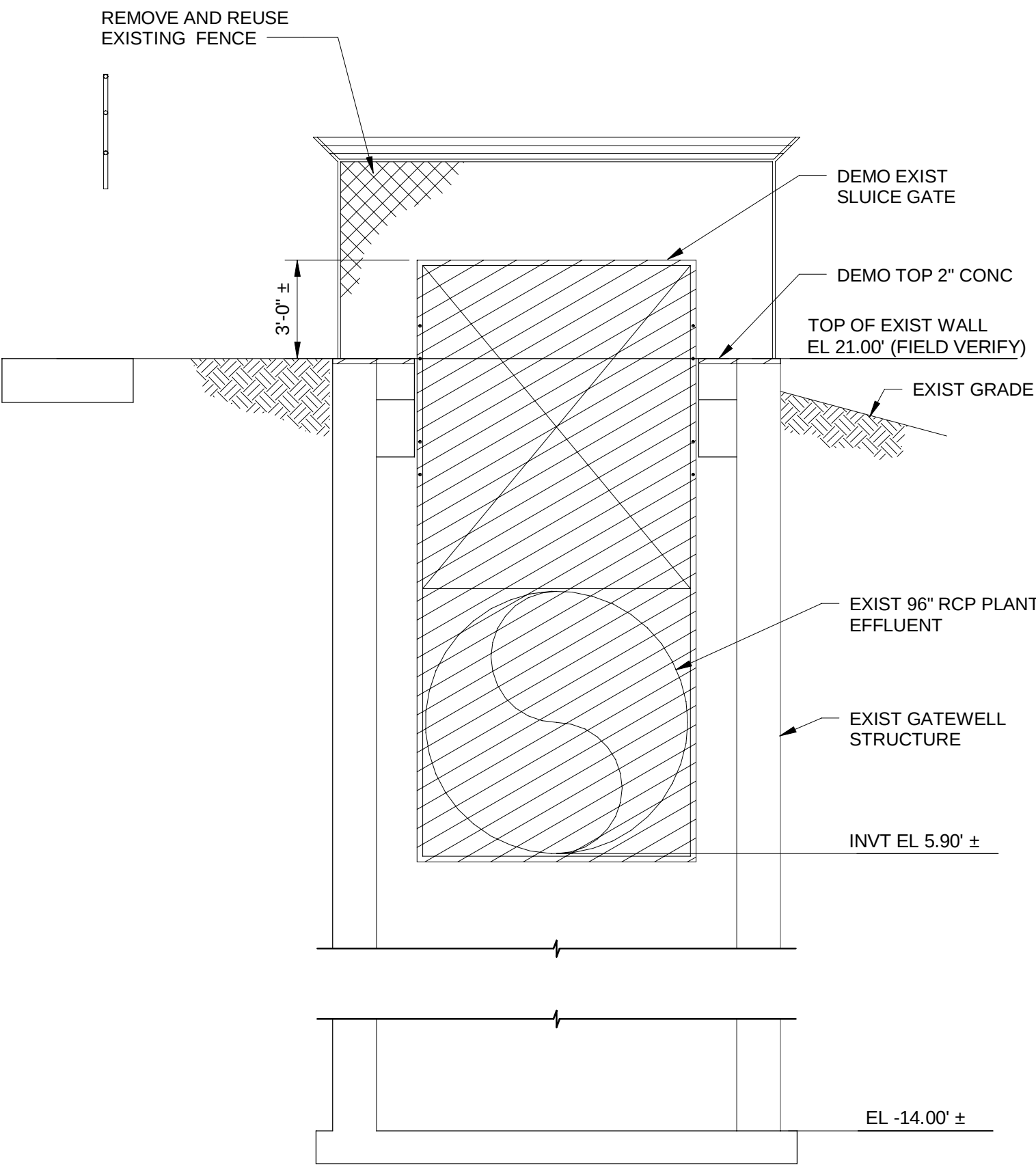
95-D-101

116  
OF  
118



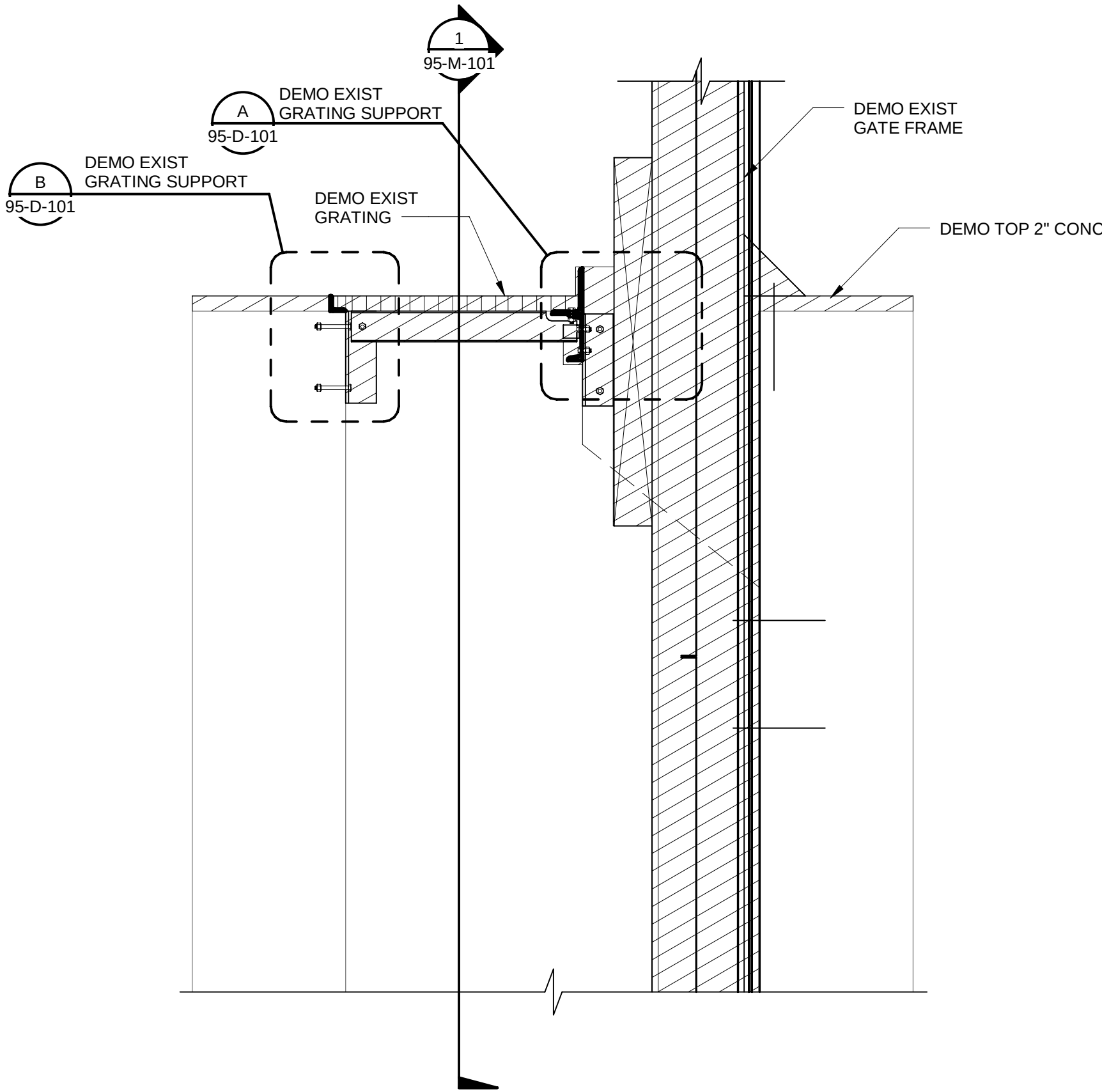
GATEWELL PLAN

1/4" = 1'-0"



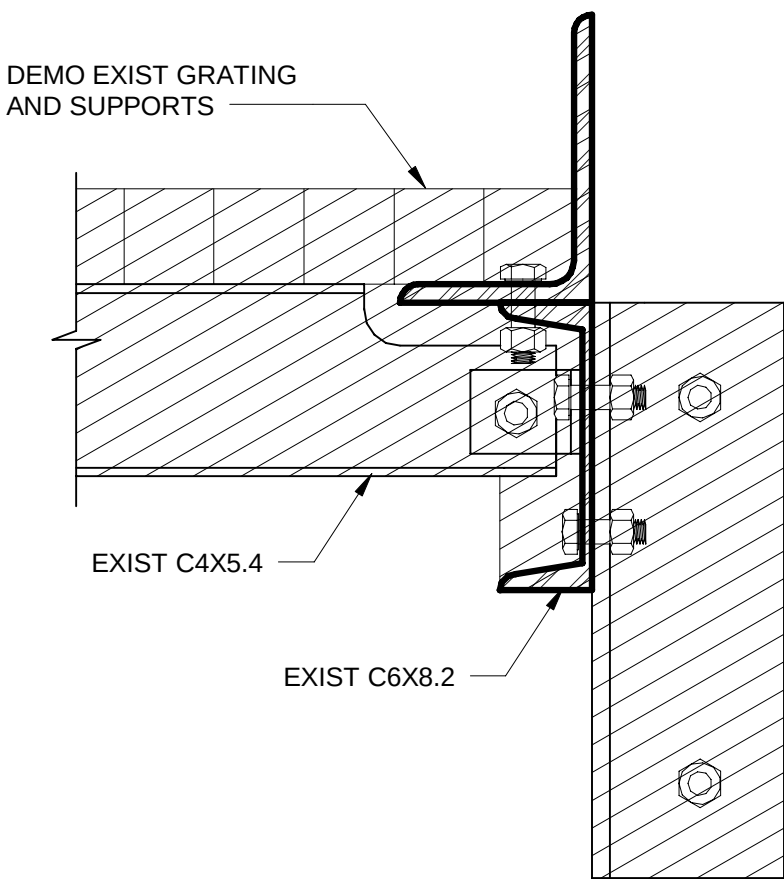
SECTION 2

95-D-101 1/4" = 1'-0"



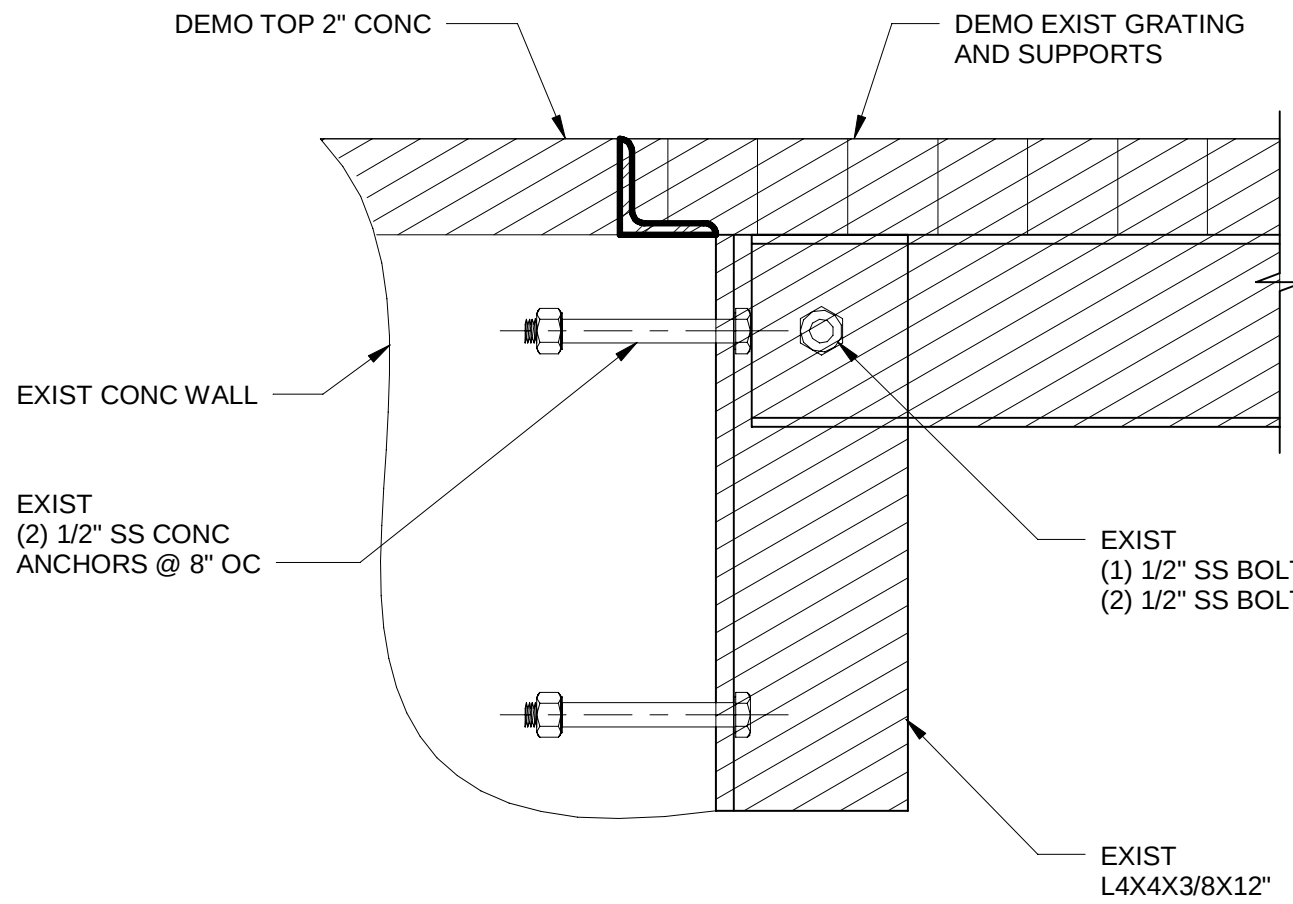
SECTION 1

95-D-101 3/4" = 1'-0"



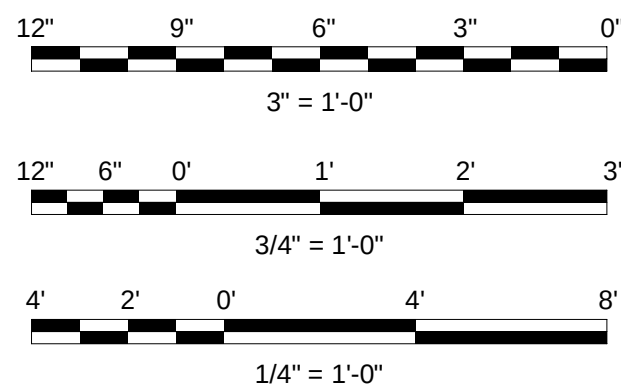
DETAIL A

95-D-101 3" = 1'-0"



DETAIL B

95-D-101 3" = 1'-0"







DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMP  
IMPROVEMENTS

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| APPROVED:                     | JAB                |
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| PROJECT NO.:                  | 410504             |

FINAL EFFLUENT GATEWELL

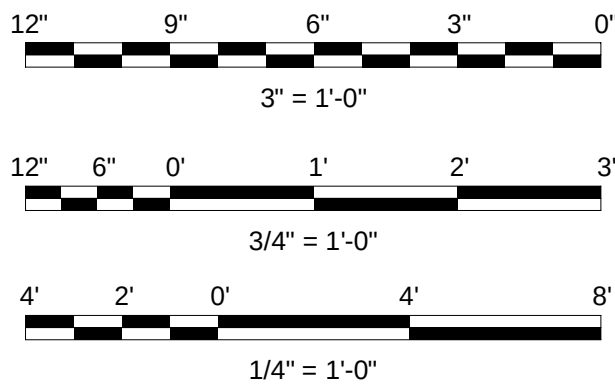
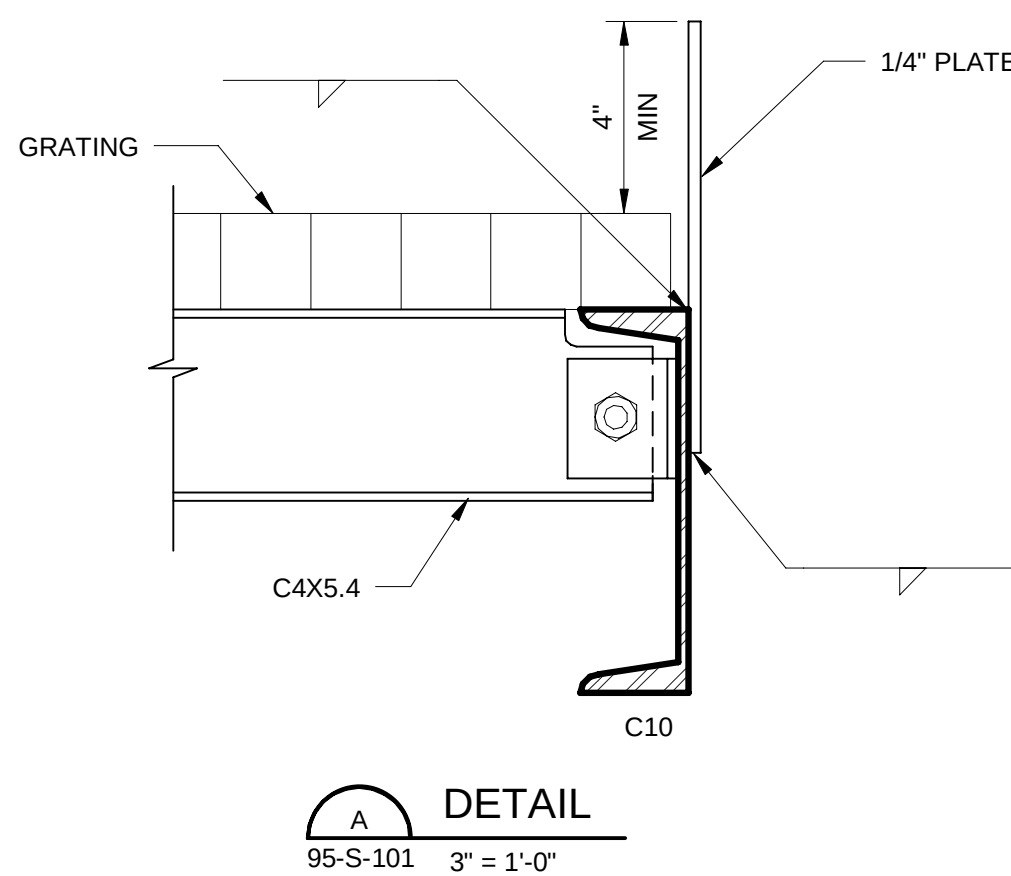
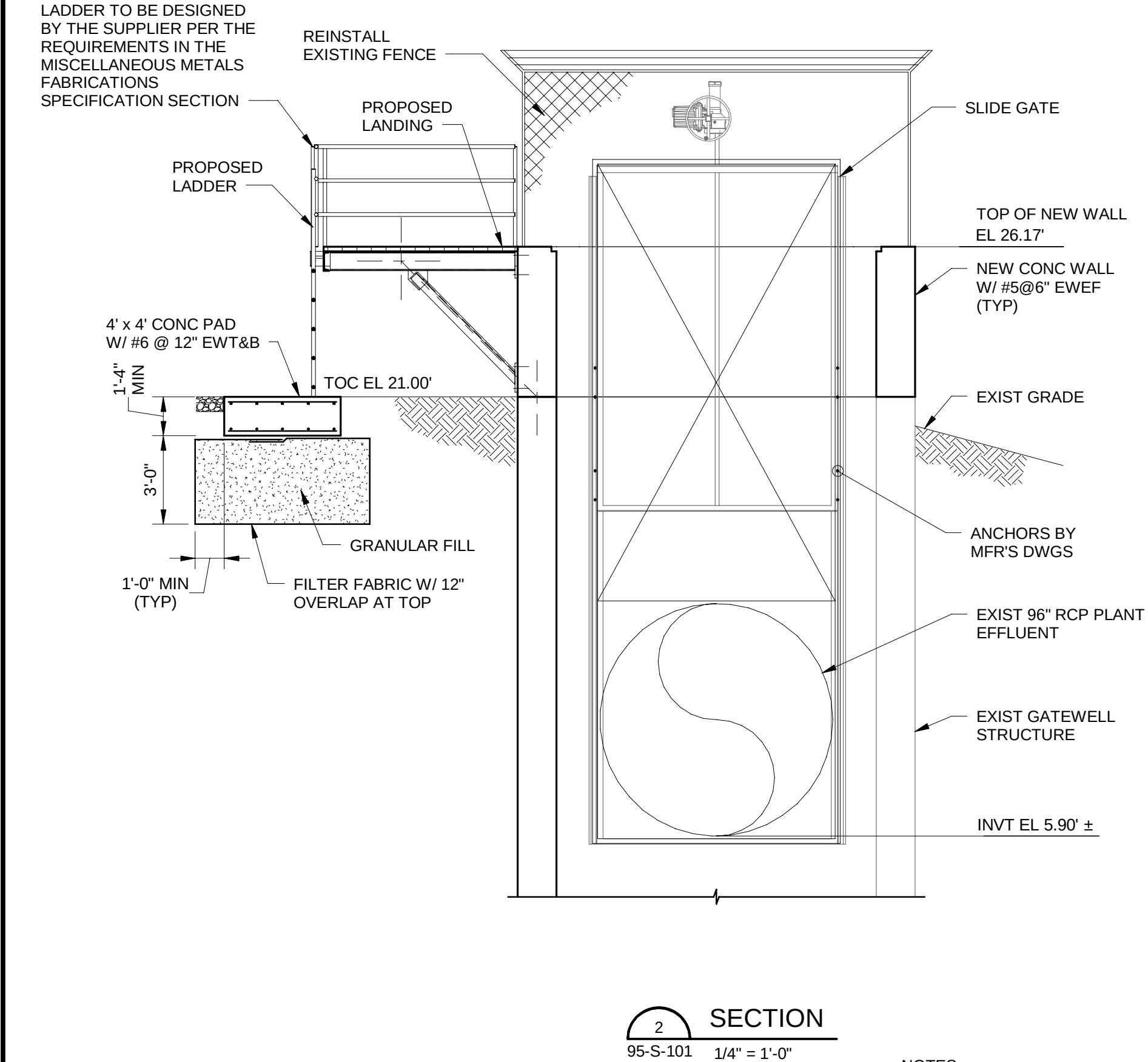
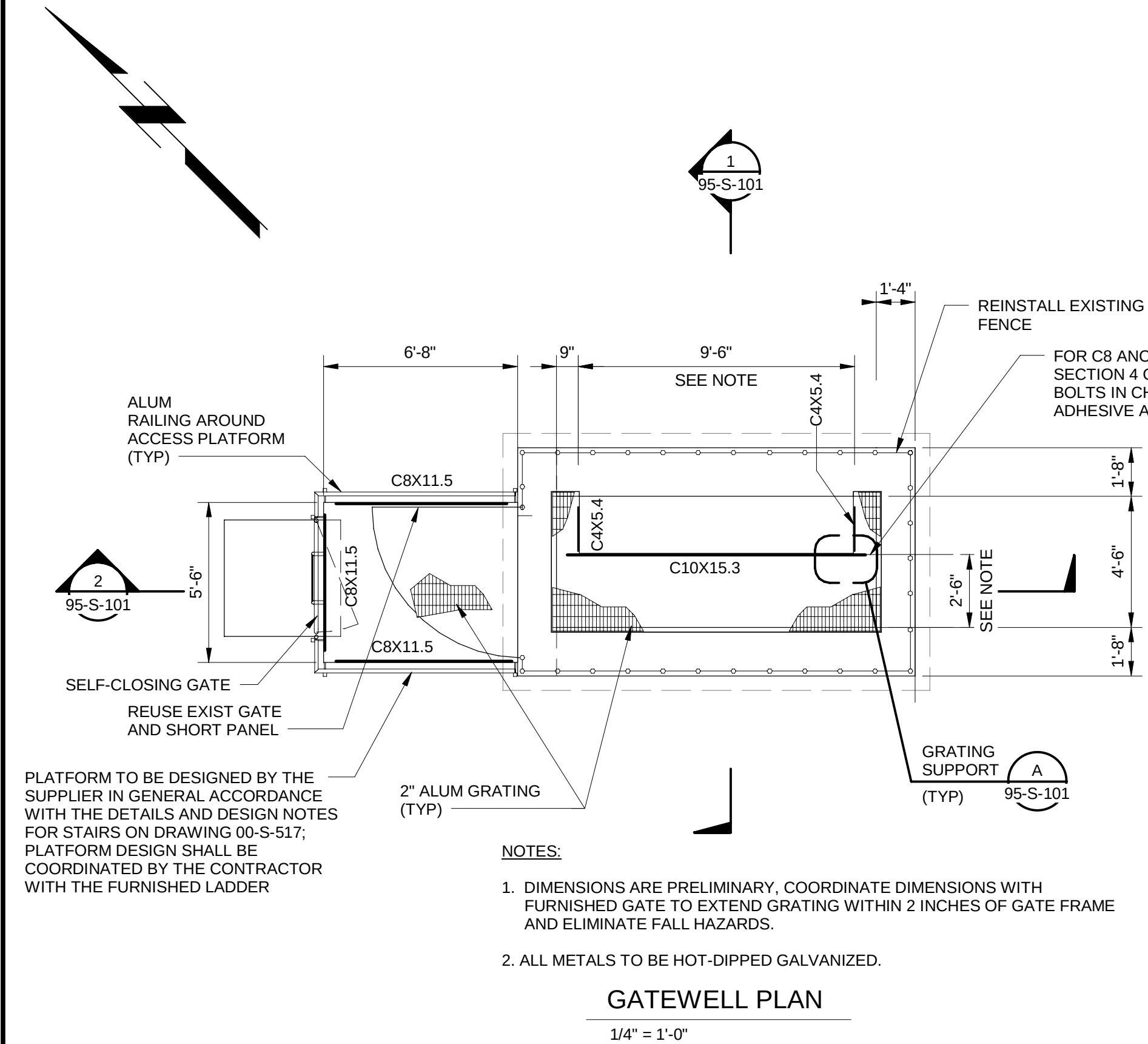
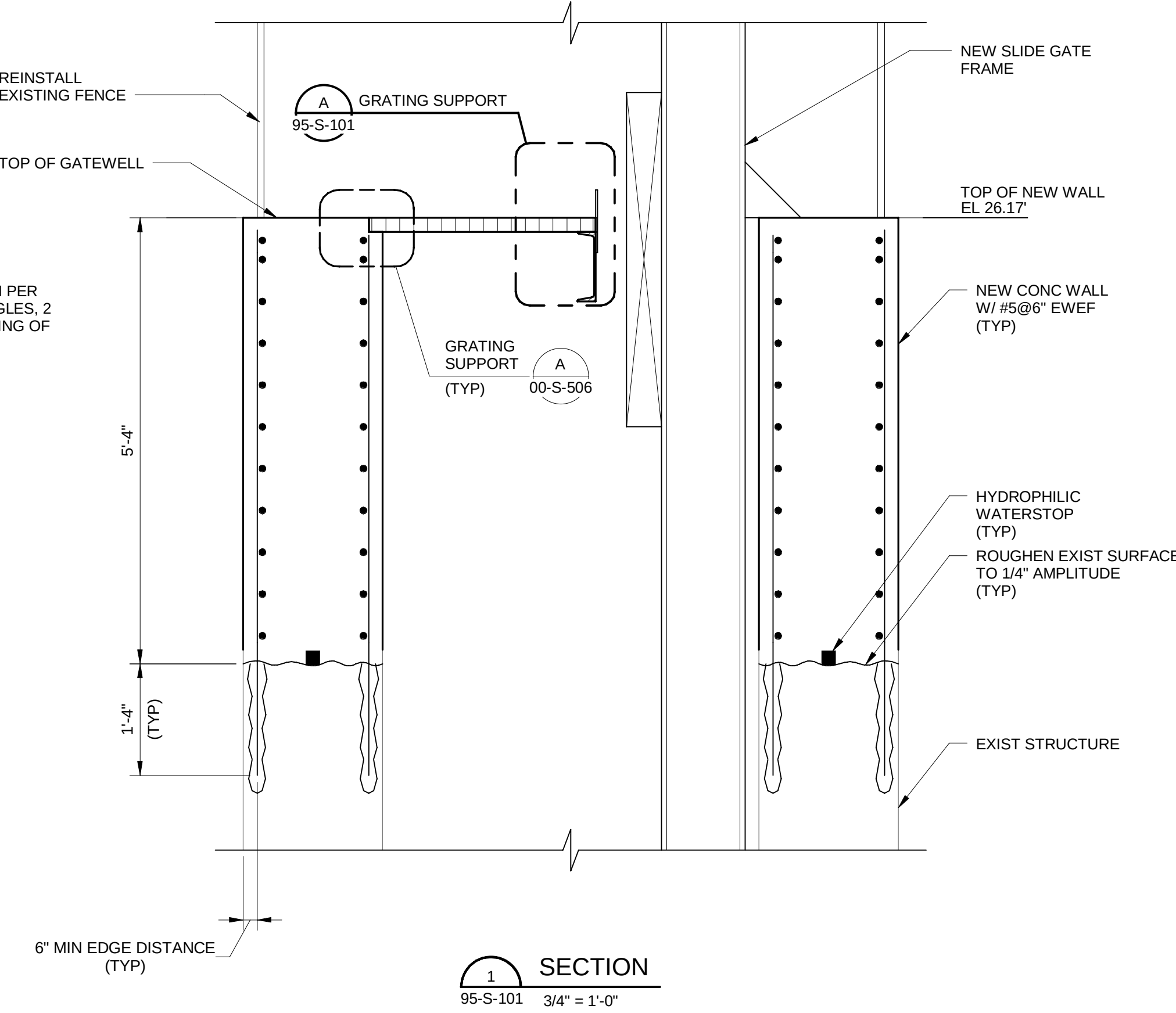
STRUCTURAL

PLAN, SECTIONS AND  
DETAILS

PLAN FILE NO. 664-310

95-S-101

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OF  
118







DES MOINES  
METROPOLITAN  
WASTEWATER  
RECLAMATION  
AUTHORITY

WRF EFFLUENT PUMP  
IMPROVEMENTS

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| DATE:                         | 08/16/2024         |
| PROJECT NO.:                  | 410504             |

FINAL EFFLUENT GATEWELL

PROCESS MECHANICAL

PLAN AND SECTION

PLAN FILE NO. 664-311

95-M-101

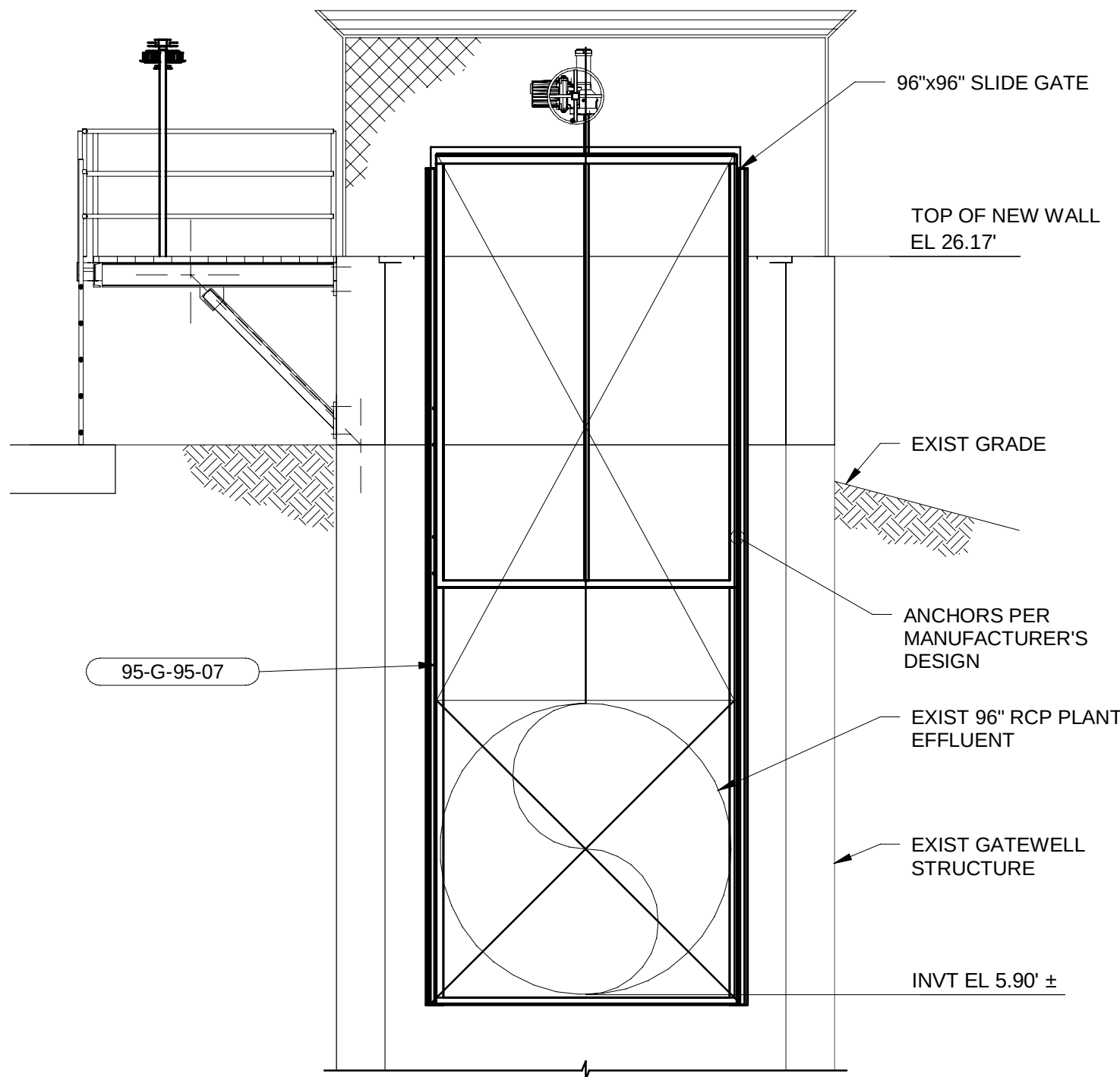
118  
OF  
118

STANCHION  
MOUNTED SITE  
LIGHT - SEE  
ELECTRICAL SITE  
PLANS FOR  
ADDITIONAL  
INFORMATION

1  
95-M-101

GATEWELL PLAN

1/4" = 1'-0"

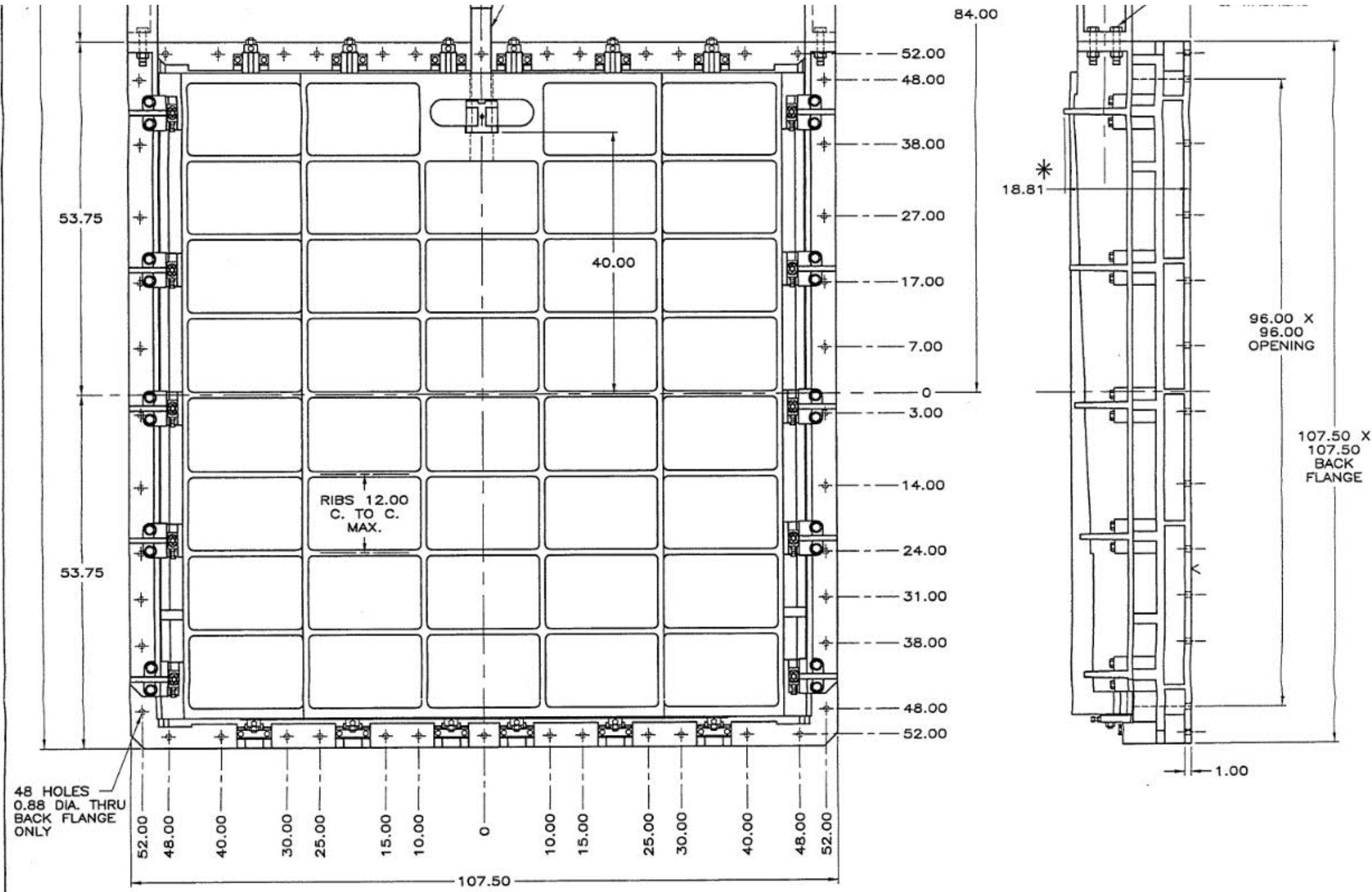


SECTION

1/4" = 1'-0"

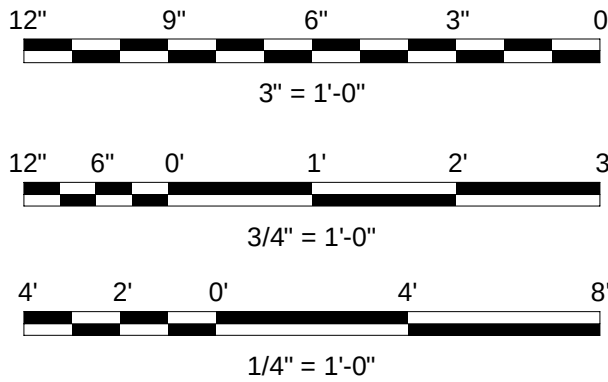
NOTES:

1. NEW SLIDE GATE SHALL MOUNT OVER EXISTING WALL THIMBLE. CONTRACTOR SHALL REMOVE EXISTING BOLTS AND DRILL AND TAP LARGER BOLT HOLES AS NECESSARY FOR NEW GATE MANUFACTURER'S DESIGN.
2. CONTRACTOR SHALL APPLY A COAT OF COAL TAR EPOXY OVER EXISTING WALL THIMBLE PRIOR TO INSTALLATION OF THE NEW SLIDE GATE TO PREVENT GALVANIC CORROSION.
3. COORDINATE WITH OWNER FOR TEMPORARY SHUTDOWNS AS NECESSARY FOR GATE REMOVAL AND INSTALLATION WORK. SE SPECIFICATION SECTION 01 113



EXISTING GATE THIMBLE BOLT PATTERN

NO SCALE



(SCALE BAR IS 4" AT FULL SCALE) 0 1/2 1 2 3 4