# THORNTON WATER TREATMENT PLANT

## Project CIP -15-486

## 920 Thornton Parway

## Thornton, CO 80229



PROJECT VICINITY MAP
NTS




MARTIN KIMMES - WATER TREATMENT & QUALITY MA... DATE

EDUARDO MORENO - PROJECT ... DATE

RALPH MI... ...NAGER DATE

JASON PIERCE, ... ...INEER DATE

Signatures on Issue for Construction drawings

## CONFORMING TO CONSTRUCTION RECORDS

**APRIL, 2021**

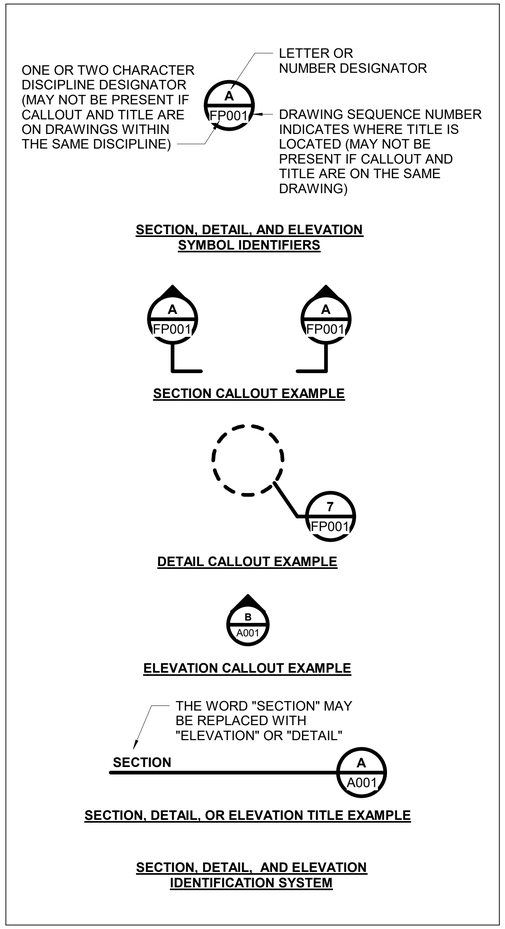
**Garney Construction Project No. 6277**
**Burns & McDonnell Project No. 98101**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

# Contract Drawings




| SHEET NAME | SHEET DESCRIPTION |
|---|---|
| **GENERAL** | |
| G000 | COVER SHEET |
| G001 | INDEX OF DRAWINGS I |
| G002 | INDEX OF DRAWINGS II |
| G003 | INDEX OF DRAWINGS III |
| **CIVIL** | |
| C001 | CIVIL NOTES, ABBREVIATIONS, & LEGEND |
| C002 | CIVIL DETAILS I |
| C003 | CIVIL DETAILS II |
| C004 | CIVIL DETAILS III |
| C005 | CIVIL DETAILS IV |
| C006 | CIVIL DETAILS V |
| C007 | CIVIL DETAILS VI |
| C008 | CIVIL DETAILS VII |
| C009 | CIVIL DETAILS VIII |
| C010 | CIVIL DETAILS IX |
| C011 | CIVIL DETAILS X |
| C012 | CIVIL DETAILS XI |
| C013 | CIVIL DETAILS XII |
| C014 | CIVIL DETAILS XIII |
| C015 | CIVIL DETAILS XIV |
| C016 | CIVIL DETAILS XV |
| C017 | CIVIL DETAILS XVI |
| C018 | CIVIL DETAILS XVII |
| C019 | CIVIL DETAILS XVIII |
| C020 | CIVIL DETAILS XIX |
| C100 | SURVEY CONTROL PLAN |
| C101 | OVERALL SITE PLAN |
| C102 | SITE PLAN I |
| C103 | SITE PLAN II |
| C104 | SITE PLAN III |
| C105 | CONTROL POINT PLAN I |
| C106 | CONTROL POINT PLAN II |
| C107 | CONTROL POINT PLAN III |
| C108 | CONTROL POINT TABLE I |
| C109 | CONTROL POINT TABLE II |
| C110 | JOINTING PLAN |
| C111 | STRIPING AND SIGNING PLAN |
| C112 | STORMWATER PLAN I |
| C113 | STORMWATER PLAN II |
| C114 | FOUNDATION PIPING & ROOF DRAIN PLAN |
| C115 | FOUNDATION PIPING & ROOF DRAIN CONTROL POINT TABLE |
| C116 | OVERALL GRADING PLAN |
| C117 | GRADING PLAN I |
| C118 | GRADING PLAN II |
| C119 | GRADING PLAN III |
| C120 | INITIAL SEDIMENT & EROSION CONTROL PLAN |
| C121 | INTERIM SEDIMENT, EROSION CONTROL PLAN |
| C122 | FINAL SEDIMENT, EROSION CONTROL PLAN |
| C123 | LANDSCAPING PLAN |
| C124 | SOUTH RETAINING WALL PLAN & PROFILE |
| C125 | NORTH RETAINING WALL PLAN & PROFILE |
| C126 | RETAINING WALL DETAILS |
| C127 | IRRIGATION PLAN I |
| C128 | IRRIGATION PLAN II |
| C129 | IRRIGATION PLAN III |
| C130 | IRRIGATION PLAN IV |
| **STRUCTURAL** | |
| S001 | ABBREVIATIONS, LEGEND & GENERAL NOTES |
| S002 | GENERAL NOTES |
| S003 | STATEMENT OF SPECIAL INSPECTIONS |
| S004 | STANDARD CONCRETE DETAILS I |
| S005 | STANDARD CONCRETE DETAILS II |
| S006 | STANDARD CONCRETE DETAILS III |
| S007 | STANDARD MASONRY DETAILS I |
| S008 | STANDARD STRUCTURAL DETAILS I |
| S009 | STANDARD STRUCTURAL DETAILS II |
| S010 | STANDARD STAIR DETAILS I |
| S011 | STANDARD STAIR DETAILS II |
| S012 | STANDARD PRECAST DETAILS |
| S013 | PIPE SUPPORTS I |
| S014 | PIPE SUPPORTS II |
| S200 | OVERALL DRILLED SHAFT PLAN |
| S201 | OVERALL LOWER LEVEL FOUNDATION PLAN |
| S202 | OVERALL TOP SLAB PLAN |
| S203 | LOWER LEVEL FOUNDATION PLAN AREA A |
| S204 | LOWER LEVEL FOUNDATION PLAN AREA B |
| S205 | LOWER LEVEL FOUNDATION PLAN AREA C |
| S206 | UPPER LEVEL TOP SLAB PLAN AREA A |
| S207 | UPPER LEVEL TOP SLAB PLAN AREA B |
| S208 | UPPER LEVEL TOP SLAB PLAN AREA C |
| S209 | UPPER LEVEL TOP SLAB PLAN AREA D |
| S210 | UPPER LEVEL TOP SLAB PLAN AREA E |
| S211 | OVERALL ROOF PLAN |
| S212 | OVERALL CLEARWELL PLAN |
| S213 | LOWER LEVEL FOUNDATION PLAN CLEARWELL WEST |
| S214 | LOWER LEVEL FOUNDATION PLAN CLEARWELL EAST |
| S215 | UPPER LEVEL PLAN CLEARWELL WEST |
| S216 | UPPER LEVEL PLAN CLEARWELL EAST |
| S217 | FILTER GALLERY STEEL FRAMING PLAN |
| S218 | BACKWASH PUMP STATION STEEL FRAMING PLAN |
| S219 | UPPER LEVEL ENLARGED PLANS |
| S220 | ROOF ENLARGED PLAN I |
| S221 | ROOF ENLARGED PLAN II |
| S222 | ROOF ENLARGED PLAN III |
| S223 | ROOF ENLARGED PLAN IV |
| S230 | SECTIONS I |
| S231 | SECTIONS II |
| S232 | SECTIONS III |
| S233 | SECTIONS IV |
| S234 | SECTIONS V |
| S235 | SECTIONS VI |
| S236 | SECTIONS VII |
| S237 | SECTIONS VIII |
| S238 | TYPICAL WALL TYPES |
| S239 | CLEARWELL SECTIONS I |
| S240 | CLEARWELL SECTIONS II |
| S241 | CLEARWELL SECTIONS III |
| S242 | CLEARWELL SECTIONS IV |
| S243 | CLEARWELL SECTIONS V |
| S244 | MASONRY ELEVATIONS I |
| S245 | MASONRY ELEVATIONS II |
| S246 | MASONRY ELEVATIONS III |
| S247 | MASONRY ELEVATIONS IV |
| S248 | MASONRY ELEVATIONS V |
| S249 | MASONRY ELEVATIONS VI |
| S250 | MASONRY ELEVATIONS VII |
| S251 | MASONRY ELEVATIONS VIII - BWPS ELECTRICAL BUILDING |
| S252 | MASONRY ELEVATIONS IX - OZONE DESTRUCT BUILDING |
| S300 | STAIRS I |
| S301 | STAIRS II |
| S302 | STAIRS III |
| S303 | STAIRS IV |
| S304 | CLEARWELL STAIRS |
| S305 | BOX GIRDER DETAILS |
| S306 | BEAM DETAILS |
| S307 | PRECAST DETAILS I |
| S308 | PRECAST DETAILS II |
| S309 | BRIDGE CRANE DETAILS I |
| S310 | BRIDGE CRANE DETAILS II |
| S311 | SCREEN WALL AND CANOPY PLANS I |
| S312 | SCREEN WALL AND CANOPY PLANS II |
| S313 | SCREEN WALL AND CANOPY SECTIONS |
| S314 | LOX TANK & GENERATOR ENCLOSURE FOUNDATION |
| S400 | 48" FINISHED WATERLINE BFV VAULT |
| **ARCHITECTURAL** | |
| A001 | GENERAL NOTES, ABBREVIATIONS AND LEGEND |
| A002 | BUILDING CODE INFORMATION AND AREA PLAN |
| A003 | DOOR SCHEDULE AND DETAILS |
| A004 | DOOR DETAILS |
| A005 | FINISH SCHEDULE AND WINDOW DETAILS |
| A006 | STORE FRONT WINDOW ELEVATIONS |
| A007 | ARCHITECTURAL DETAILS |
| A008 | FIRE-RESISTIVE JOINTS |
| A201 | OVERALL LOWER LEVEL PLAN |
| A202 | OVERALL TOP SLAB PLAN |
| A203 | LOWER LEVEL PLAN AREA A |
| A204 | LOWER LEVEL PLAN AREA B |
| A205 | LOWER LEVEL PLAN AREA C |
| A206 | UPPER LEVEL PLAN AREA A |
| A207 | UPPER LEVEL PLAN AREA B |
| A208 | UPPER LEVEL PLAN AREA C |
| A209 | UPPER LEVEL PLAN AREA D |
| A210 | UPPER LEVEL PLAN AREA E |
| A211 | OVERALL ROOF PLAN |
| A212 | OVERALL CLEARWELL PLAN |
| A213 | ARCHITECTURAL ELEVATIONS I |
| A214 | ARCHITECTURAL ELEVATIONS II |
| A215 | ARCHITECTURAL ELEVATIONS III |
| A216 | ARCHITECTURAL ELEVATIONS IV |
| A217 | ARCHITECTURAL ELEVATIONS V |
| A218 | BUILDING SECTIONS I |
| A219 | BUILDING SECTIONS II |
| A220 | ENLARGED PLANS I |
| A221 | ENLARGED PLANS II |
| A222 | ENLARGED PLANS III |
| A223 | ENLARGED PLANS IV |
| A224 | ENLARGED PLANS V |
| A225 | RESTROOM DETAILS |
| A226 | CABINET DETAILS |
| A227 | REFLECTED CEILING PLAN |
| A228 | REFLECTED CEILING PLAN II |
| A300 | WALL DETAILS I |
| A301 | WALL DETAILS II |
| A302 | WALL DETAILS III |
| A303 | WALL DETAILS IV |
| A304 | WALL DETAILS V |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

THORNTON WATER TREATMENT PLANT

98101

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

City of Thornton

# Contract Drawings

| SHEET NAME | SHEET DESCRIPTION |
|---|---|
| **FIRE PROTECTION** | |
| FA001 | FIRE ALARM NOTES, LEGEND AND ABBREVIATIONS |
| FA201 | OVERALL LOWER LEVEL FIRE ALARM PLAN |
| FA202 | OVERALL UPPER LEVEL FIRE ALARM PLAN |
| FA601 | FIRE ALARM RISER DIAGRAM AND MATRIX |
| FX001 | FIRE SUPPRESSION NOTES, LEGEND AND ABBREVIATIONS |
| FX201 | OVERALL LOWER LEVEL FIRE SUPPRESSION PLAN |
| FX202 | OVERALL UPPER LEVEL FIRE SUPPRESSION PLAN |
| FX601 | FIRE SUPPRESSION ONE LINE DIAGRAM |
| **PLUMBING** | |
| P001 | PLUMBING GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS |
| P002 | PLUMBING DETAILS I |
| P003 | PLUMBING DETAILS II |
| P004 | PLUMBING DETAILS III |
| P005 | PLUMBING DETAILS IV |
| P006 | PLUMBING SCHEDULES I |
| P007 | PLUMBING SCHEDULES II |
| P201 | OVERALL LOWER LEVEL PLAN |
| P202 | LOWER LEVEL PLAN AREA A |
| P203 | LOWER LEVEL PLAN AREA B |
| P204 | LOWER LEVEL PLAN AREA C |
| P205 | UPPER LEVEL PLAN AREA A |
| P207 | UPPER LEVEL PLAN AREA B |
| P208 | UPPER LEVEL PLAN AREA C |
| P209 | UPPER LEVEL PLAN AREA D |
| P211 | UPPER LEVEL PLAN AREA E |
| P213 | LOWER LEVEL PLAN CLEARWELL WEST |
| P214 | OVERALL PLUMBING ROOF PLAN |
| P301 | ENLARGED PLANS |
| P302 | ENLARGED PLANS |
| P303 | WASTE/VENT RISER DIAGRAMS |
| P304 | COLD & HOT WATER RISER DIAGRAM |
| P305 | COLD & HOT WATER RISER DIAGRAM CONT. |
| P306 | WASTE & VENT RISER DIAGRAM |
| P307 | WASTE & VENT RISER DIAGRAM CONT. |
| **PROCESS** | |
| D001 | PROCESS LEGEND, SYMBOLS, AND ABBREVIATIONS |
| D002 | DESIGN CRITERIA I |
| D003 | DESIGN CRITERIA II |
| D004 | PROCESS FLOW DIAGRAM |
| D004A | ANALYZER LOCATION DIAGRAM |
| D005 | HYDRAULIC PROFILE |
| D006 | WASTE HYDRAULIC PROFILE |
| D007 | PROCESS DETAILS I |
| D008 | PROCESS DETAILS II |
| D009 | PROCESS DETAILS III |
| D010 | YARD PIPING DETAILS I |
| D011 | YARD PIPING DETAILS II |
| D012 | YARD PIPING DETAILS III |
| D013 | YARD PIPING DETAILS IV |
| D014 | YARD PIPING DETAILS V |
| D015 | YARD PIPING DETAILS VI |
| D016 | CORROSION PROTECTION I |
| D017 | CORROSION PROTECTION II |
| D018 | CORROSION PROTECTION III |
| D019 | CORROSION PROTECTION IV |
| D020 | CORROSION PROTECTION V |
| D021 | EQUIPMENT SCHEDULE I |
| D022 | EQUIPMENT SCHEDULE II |
| D023 | VALVE SCHEDULE I |
| D024 | VALVE SCHEDULE II |
| D025 | VALVE SCHEDULE III |
| D026 | PIPE PENETRATION SCHEDULE |
| D100 | DEMOLITION PLAN |
| D101 | OVERALL YARD PIPING PLAN |
| D102 | YARD PIPING PLAN I |
| D103 | YARD PIPING CONTROL POINT TABLE |
| D104 | STANDLEY LAKE 30" RAW WATERLINE |
| D105 | EGL4 24" RAW WATERLINE |
| D106 | FUTURE NORTHERN SUPPLY 30" WATERLINE |
| D107 | 6" RAW WATER CHEMICAL CONDUITS |
| D108 | 12" FIRE & DOMESTIC LOOP LINE A I |
| D109 | 12" FIRE & DOMESTIC LOOP LINE A II |
| D110 | 12" FIRE & DOMESTIC LOOP LINE B |
| D111 | 36" OVERFLOW PLAN & PROFILE |
| D112 | 30" BACKWASH WASTE PLAN & PROFILE |
| D113 | 10" PRESSURE SOLIDS LINE PLAN & PROFILE |
| D114 | 48" FINISHED WATERLINE PLAN & PROFILE |
| D115 | 6" SANITARY PLAN & PROFILE SS LINES A & B |
| D116 | 4" PRESSURE SANITARY PLAN & PROFILE SS LINE C |
| D201 | LOWER LEVEL OVERALL PLAN |
| D202 | UPPER LEVEL OVERALL PLAN |
| D203 | LOWER LEVEL PLAN AREA A |
| D203A | LOWER LEVEL AREA A PIPE SUPPORTS, SAMPLE TAPS, AND CHEMICAL INJECTION |
| D204 | LOWER LEVEL PLAN AREA B |
| D204A | LOWER LEVEL AREA B PIPE SUPPORTS |
| D205 | LOWER LEVEL PLAN AREA C |
| D206 | UPPER LEVEL PLAN AREA B |
| D207 | UPPER LEVEL PLAN AREA C |
| D208 | UPPER LEVEL PLAN AREA D |
| D209 | UPPER LEVEL PLAN AREA E |
| D210 | CLEARWELL OVERALL PLAN |
| D211 | CLEARWELL ROOF PLAN |
| D212 | LOWER LEVEL PLAN CLEARWELL WEST |
| D213 | LOWER LEVEL PLAN CLEARWELL EAST |
| D214 | ENLARGED PLANS I |
| D215 | ENLARGED PLANS II |
| D216 | ENLARGED PLANS III |
| D217 | ENLARGED PLANS IV |
| D217A | ENLARGED PLANS V |
| D218 | ENLARGED PLANS VI |
| D219 | ENLARGED PLANS VII |
| D220 | ENLARGED PLANS VIII |
| D221 | ENLARGED PLANS IX |
| D222 | SECTIONS I |
| D223 | SECTIONS II |
| D224 | SECTIONS III |
| D225 | SECTIONS IV |
| D226 | SECTIONS V |
| D227 | SECTIONS VI |
| D228 | SECTIONS VII |
| D229 | SECTIONS VIII |
| D230 | SECTIONS IX |
| D231 | SECTIONS X |
| D232 | SECTIONS XI |
| D233 | PROCESS ISOMETRIC VIEWS I |
| D234 | PROCESS ISOMETRIC VIEWS II |
| D235 | PROCESS ISOMETRIC VIEWS III |
| **PIPELINE** | |
| PP001 | 30" WATERLINE A |
| PP002 | 24" WATERLINE B |
| PP003 | 16" WATERLINE C |
| PP004 | 16" WATERLINE C AND 24" WATERLINE D |
| PP005 | CONNECTION DETAILS |
| PP006 | STANDARD DETAILS I |
| **MECHANICAL** | |
| M001 | MECHANICAL GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS |
| M002 | MECHANICAL DETAILS I |
| M003 | MECHANICAL DETAILS II |
| M004 | MECHANICAL DETAILS III |
| M005 | MECHANICAL SCHEDULES I |
| M006 | MECHANICAL SCHEDULES II |
| M007 | MECHANICAL SCHEDULES III |
| M201 | LOWER LEVEL PLAN AREA A |
| M202 | LOWER LEVEL PLAN AREA B |
| M203 | LOWER LEVEL PLAN AREA C |
| M204 | UPPER LEVEL PLAN AREA A |
| M205 | UPPER LEVEL PLAN AREA B |
| M206 | UPPER LEVEL PLAN AREA C |
| M207 | UPPER LEVEL PLAN AREA D |
| M208 | UPPER LEVEL PLAN AREA E |
| M209 | OVERALL ROOF PLAN |
| M210 | OVERALL CLEARWELL PLAN |
| M301 | MECHANICAL CONTROLS I |
| M302 | MECHANICAL CONTROLS II |
| M303 | MECHANICAL CONTROLS III |
| M304 | MECHANICAL CONTROLS IV |
| M305 | MECHANICAL CONTROLS V |
| M306 | MECHANICAL CONTROLS VI |
| M307 | MECHANICAL CONTROLS VII |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

THORNTON WATER TREATMENT PLANT

98101

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

# Contract Drawings

| SHEET NAME | SHEET DESCRIPTION |
|---|---|
| **ELECTRICAL** | |
| E001 | ELECTRICAL LEGEND |
| E002 | LUMINAIRE INSTALLATION DETAILS |
| E003 | ENTRANCE GATE DETAILS |
| E004 | DUCT BANK DETAILS |
| E005 | HAND HOLE DETAILS |
| E006 | ELECTRICAL INSTRUMENT DETAILS |
| E100 | ELECTRICAL SITE PLAN |
| E101 | ENLARGED ELECTRICAL SITE PLANS I |
| E102 | ELECTRICAL SITE LIGHTING PLAN |
| E103 | SECURITY SITE PLAN |
| E104 | DUCT BANK SECTIONS I |
| E105 | DUCT BANK SECTIONS II |
| E201 | OVERALL LOWER LEVEL |
| E202 | OVERALL UPPER LEVEL |
| E203 | LOWER LEVEL PLAN AREA A - POWER AND GROUNDING |
| E204 | LOWER LEVEL PLAN AREA B - POWER AND GROUNDING |
| E205 | LOWER LEVEL PLAN AREA C - POWER AND GROUNDING |
| E206 | UPPER LEVEL PLAN AREA A - POWER AND GROUNDING |
| E207 | UPPER LEVEL PLAN AREA B - POWER AND GROUNDING |
| E208 | UPPER LEVEL PLAN AREA C - POWER AND GROUNDING |
| E209 | UPPER LEVEL PLAN AREA D - POWER AND GROUNDING |
| E210 | UPPER LEVEL PLAN AREA E - POWER AND GROUNDING |
| E211 | OVERALL ROOF - POWER AND GROUNDING |
| E212 | OVERALL CLEARWELL - POWER AND GROUNDING |
| E213 | LOWER LEVEL PLAN CLEARWELL WEST - POWER AND GROUNDING |
| E215 | UPPER LEVEL PLAN CLEARWELL WEST - POWER AND GROUNDING |
| E217 | LOWER LEVEL PLAN AREA A - LIGHTING AND RECEPTACLES |
| E218 | LOWER LEVEL PLAN AREA B - LIGHTING AND RECEPTACLES |
| E219 | LOWER LEVEL PLAN AREA C - LIGHTING AND RECEPTACLES |
| E220 | UPPER LEVEL PLAN AREA A - LIGHTING AND RECEPTACLES |
| E221 | UPPER LEVEL PLAN AREA B - LIGHTING AND RECEPTACLES |
| E222 | UPPER LEVEL PLAN AREA C - LIGHTING AND RECEPTACLES |
| E223 | UPPER LEVEL PLAN AREA D - LIGHTING AND RECEPTACLES |
| E224 | UPPER LEVEL PLAN AREA E - LIGHTING AND RECEPTACLES |
| E225 | OVERALL ROOF - LIGHTING AND RECEPTACLES |
| E226 | LOWER LEVEL PLAN CLEARWELL WEST - LIGHTING AND RECEPTACLES |
| E228 | UPPER LEVEL PLAN CLEARWELL WEST - LIGHTING AND RECEPTACLES |
| E229 | LOWER LEVEL PLAN AREA A - INSTRUMENTATION & CONTROL |
| E230 | LOWER LEVEL PLAN AREA B - INSTRUMENTATION & CONTROL |
| E231 | LOWER LEVEL PLAN AREA C - INSTRUMENTATION & CONTROL |
| E233 | UPPER LEVEL PLAN AREA B - INSTRUMENTATION & CONTROL |
| E234 | UPPER LEVEL PLAN AREA C - INSTRUMENTATION & CONTROL |
| E235 | UPPER LEVEL PLAN AREA D - INSTRUMENTATION & CONTROL |
| E236 | UPPER LEVEL PLAN AREA E - INSTRUMENTATION & CONTROL |
| E238 | LOWER LEVEL PLAN CLEARWELL WEST - INSTRUMENTATION & CONTROL |
| E240 | UPPER LEVEL PLAN CLEARWELL WEST - INSTRUMENTATION & CONTROL |
| E241 | UPPER LEVEL PLAN CLEARWELL EAST - INSTRUMENTATION & CONTROL |
| E243 | LOWER LEVEL PLAN AREA B - COMMUNICATION |
| E245 | UPPER LEVEL PLAN AREA A - COMMUNICATION |
| E246 | UPPER LEVEL PLAN AREA B - COMMUNICATION |
| E248 | UPPER LEVEL PLAN AREA D - COMMUNICATION |
| E249 | UPPER LEVEL PLAN AREA E - COMMUNICATION |
| E253 | UPPER LEVEL PLAN CLEARWELL WEST - COMMUNICATION |
| E255 | LOWER LEVEL PLAN AREA A - SECURITY |
| E256 | LOWER LEVEL PLAN AREA B - SECURITY |
| E257 | LOWER LEVEL PLAN AREA C - SECURITY |
| E258 | UPPER LEVEL PLAN AREA A - SECURITY |
| E259 | UPPER LEVEL PLAN AREA B - SECURITY |
| E260 | UPPER LEVEL PLAN AREA C - SECURITY |
| E261 | UPPER LEVEL PLAN AREA D - SECURITY |
| E262 | UPPER LEVEL PLAN AREA E - SECURITY |
| E263 | OVERALL ROOF - SECURITY |
| E264 | LOWER LEVEL PLAN CLEARWELL WEST - SECURITY |
| E266 | UPPER LEVEL PLAN CLEARWELL WEST - SECURITY |
| E267 | UPPER LEVEL PLAN CLEARWELL EAST - SECURITY |
| E268 | LIGHTNING PROTECTION ROOF PLANS |
| E300 | ONE-LINE DIAGRAM I |
| E301 | ONE-LINE DIAGRAM II |
| E302 | LOAD SUMMARIES I |
| E303 | PANELBOARD SCHEDULES I |
| E304 | PANELBOARD SCHEDULES II |
| E305 | PANELBOARD SUMMARIES III |
| E306 | PANELBOARD SCHEDULES IV |
| E307 | PANELBOARD SCHEDULES V |
| E308 | LUMINAIRE SCHEDULE |
| E309 | LUMINAIRE SCHEDULE - CONTINUED |
| E310 | GENERATOR AND UTILITY EQUIPMENT PAD ENLARGED PLAN |
| E317A | LOWER LEVEL PLAN AREA A - CONDUIT PLAN |
| E317B | CONDUIT PLANS |
| E317C | LOWER LEVEL AREA C - IN-SLAB CONDUIT |
| E318 | ELECTRICAL ROOM DETAIL - POWER AND GROUNDING |
| E320 | LIGHTING DETAILS I |
| E321 | LIGHTING DETAILS II |
| E324 | LIGHTING CONTROL SCHEMATICS |
| E325 | ELECTRICAL CONTROL SCHEMATICS I |
| E326 | ELECTRICAL CONTROL SCHEMATICS II |
| E327 | ELECTRICAL CONTROL SCHEMATICS III |
| E328 | ELECTRICAL CONTROL SCHEMATICS IV |
| E329 | ELECTRICAL CONTROL SCHEMATICS V |
| E330 | TYPICAL REMOTE FILL PANEL SCHEMATIC |
| E331 | NETWORK ARCHITECTURE |
| E335 | SECURITY DETAILS I |
| E336 | SECURITY DETAILS II |
| E337 | COMMUNICATION DETAILS |
| E338 | RACK ELEVATIONS |
| E339 | SECURITY CAMERA RISER DIAGRAMS I |
| E340 | SECURITY CAMERA RISER DIAGRAMS II |
| E341 | SECURITY CAMERA RISER DIAGRAMS III |
| E342 | COMMUNICATION RISER DIAGRAM |
| E343 | SCP-1 SECURITY RISER DIAGRAM |
| E344 | SCP-2 AND SCP-3 SECURITY RISER DIAGRAMS |
| E345 | INTERCOM RISER DIAGRAM |
| E346 | POWER CABLE SCHEDULE I |
| E347 | POWER CABLE SCHEDULE II |
| E348 | POWER CABLE SCHEDULE III |
| E349 | POWER CABLE SCHEDULE IV |
| E350 | POWER CABLE SCHEDULE V |
| E351 | POWER CABLE SCHEDULE VI |
| E352 | POWER CABLE SCHEDULE VII |
| E353 | POWER CABLE SCHEDULE VIII |
| E354 | POWER CABLE SCHEDULE IX |
| E355 | POWER CABLE SCHEDULE X |
| E356 | POWER CABLE SCHEDULE XI |
| E357 | POWER CABLE SCHEDULE XII |
| E358 | POWER CABLE SCHEDULE XIII |
| E359 | POWER CABLE SCHEDULE XIV |
| E360 | POWER CABLE SCHEDULE XV |
| E361 | POWER CABLE SCHEDULE XVI |
| E362 | CONTROL CABLE SCHEDULE I |
| E363 | CONTROL CABLE SCHEDULE II |
| E364 | CONTROL CABLE SCHEDULE III |
| E365 | CONTROL CABLE SCHEDULE IV |
| E366 | CONTROL CABLE SCHEDULE V |
| E367 | CONTROL CABLE SCHEDULE VI |
| E368 | CONTROL CABLE SCHEDULE VII |
| E369 | CONTROL CABLE SCHEDULE VIII |
| E370 | CONTROL CABLE SCHEDULE IX |
| E371 | DATA CABLE SCHEDULE I |
| E372 | DATA CABLE SCHEDULE II |
| E373 | ANALOG CABLE SCHEDULE I |
| E374 | ANALOG CABLE SCHEDULE II |
| E375 | ANALOG CABLE SCHEDULE III |
| E376 | ANALOG CABLE SCHEDULE IV |
| E377 | ANALOG CABLE SCHEDULE V |
| E378 | ANALOG CABLE SCHEDULE VI |
| E379 | ANALOG CABLE SCHEDULE VII |
| E380 | ANALOG CABLE SCHEDULE VIII |
| E381 | ANALOG CABLE SCHEDULE IX |
| EG001 | OVERALL LOWER LEVEL - FLOOR SLAB |
| EG002 | OVERALL UPPER LEVEL - FLOOR SLAB |
| EG003 | OVERALL CLEARWELL - FLOOR SLAB |
| **P&ID** | |
| I001 | PROCESS AND INSTRUMENTATION LEGEND I |
| I002 | PROCESS AND INSTRUMENTATION LEGEND II |
| I003 | RAW WATER CONTROL P&ID SHEET I |
| I004 | RAW WATER CONTROL P&ID SHEET II |
| I005 | RAW WATER CONTROL P&ID SHEET III |
| I006 | FLASH MIX P&ID |
| I007 | FLOCCULATION AND SEDIMENTATION BASINS NO. 1 P&ID |
| I008 | FLOCCULATION AND SEDIMENTATION BASINS NO. 2 P&ID |
| I009 | OZONE FLASH REACTOR P&ID |
| I010 | OZONE INJECTION P&ID |
| I011 | OZONE CONTACTOR P&ID |
| I012 | PRE-FILTER FLASH MIX |
| I013 | FILTER P&ID |
| I014 | FILTER NO. 1 P&ID |
| I015 | FILTER NO. 2 P&ID |
| I016 | FILTER NO. 3 P&ID |
| I017 | FILTER NO. 4 P&ID |
| I018 | FILTER NO. 5 P&ID |
| I019 | FILTER NO. 6 P&ID |
| I020 | FILTER EFFLUENT HEADER AND DISINFECTION BASIN P&ID |
| I021 | FILTER BACKWASH SUPPLY P&ID |
| I022 | AIR SCOUR BLOWERS P&ID |
| I023 | BACKWASH WASTE BASINS AND PUMPING P&ID |
| I024 | DETENTION BASIN P&ID |
| I025 | DETENTION BASIN P&ID II |
| I026 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID I |
| I027 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID II |
| I028 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID III |
| I029 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID IV |
| I030 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID V |
| I031 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID VI |
| I032 | CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID VII |
| I033 | AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID I |
| I034 | AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID II |
| I035 | AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID III |
| I036 | AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID IV |
| I037 | AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID V |
| I038 | HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID I |
| I039 | HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID II |
| I040 | HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID III |
| I041 | HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID IV |
| I042 | HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID V |
| I043 | FERRIC SULFATE CHEMICAL FEED SYSTEM P&ID I |
| I044 | FERRIC SULFATE CHEMICAL FEED SYSTEM P&ID II |
| I045 | FERRIC SULFATE CHEMICAL FEED SYSTEM P&ID III |
| I046 | FERRIC SULFATE CHEMICAL FEED SYSTEM P&ID IV |
| I047 | FERRIC SULFATE CHEMICAL FEED SYSTEM P&ID V |
| I048 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID I |
| I049 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID II |
| I050 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID III |
| I051 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID IV |
| I052 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID V |
| I053 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID VI |
| I054 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID VII |
| I055 | SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM VIII |
| I056 | SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID I |
| I057 | SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID II |
| I058 | SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID III |
| I059 | SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID IV |
| I060 | SODIUM PERMANGANATE CHEMICAL FEED SYSTEM P&ID I |
| I061 | SODIUM PERMANGANATE CHEMICAL FEED SYSTEM P&ID II |
| I062 | SODIUM PERMANGANATE CHEMICAL FEED SYSTEM P&ID III |
| I063 | SODIUM PERMANGANATE CHEMICAL FEED SYSTEM P&ID IV |
| I064 | SODIUM PERMANGANATE CHEMICAL FEED SYSTEM P&ID V |
| I065 | PHOSPHORIC ACID CHEMICAL FEED SYSTEM P&ID |
| I066 | COAGULANT AID POLYMER CHEMICAL FEED SYSTEM P&ID I |
| I067 | COAGULANT AID POLYMER CHEMICAL FEED SYSTEM P&ID II |
| I068 | COAGULANT AID POLYMER CHEMICAL FEED SYSTEM P&ID III |
| I069 | COAGULANT AID POLYMER CHEMICAL FEED SYSTEM P&ID IV |
| I070 | COAGULANT AID POLYMER CHEMICAL FEED SYSTEM P&ID V |
| I071 | FLOC-AID POLYMER CHEM FEED SYSTEM P&ID SHEET I |
| I072 | FLOC-AID POLYMER CHEM FEED SYSTEM P&ID SHEET II |
| I073 | FLOC-AID POLYMER CHEM FEED SYSTEM P&ID SHEET III |
| I074 | FLOC-AID POLYMER CHEM FEED SYSTEM P&ID SHEET IV |
| I075 | FLOC-AID POLYMER CHEM FEED SYSTEM P&ID SHEET V |
| I076 | LOX SUPPLY P&ID |
| I077 | NITROGEN BOOST |
| I078 | GOX CONDITIONING |
| I079 | OZONE GENERATOR NO. 1 |
| I080 | OZONE GENERATOR NO. 2 |
| I081 | OZONE DESTRUCTOR NO. 1 |
| I082 | OZONE DESTRUCTOR NO. 2 |
| I083 | PLANT SERVICE WATER |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

THORNTON WATER TREATMENT PLANT

98101

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT LEAST THREE BUSINESS DAYS PRIOR TO CONSTRUCTION, NOT INCLUDING DAY OF NOTIFICATION. CALL 811 OR 1-(800) 922-1987.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK ON THE PROJECT, OR AS APPROVED BY THE OWNER. CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS WITH THE APPROPRIATE ADMINISTRATIVE AUTHORITY. ALL COSTS ASSOCIATED WITH OBTAINING PERMITS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL CONFINE ALL GRADING AND CONSTRUCTION ACTIVITIES TO WITHIN THE OWNER'S PROPERTY AND ANY PERMANENT AND/OR TEMPORARY EASEMENTS.
4. CONTRACTOR SHALL PROVIDE ADEQUATE ACCESS TO EXISTING SITE FACILITIES ON THE PROJECT SITE DURING CONSTRUCTION AT ALL TIMES. ACCESS AND PARKING FACILITIES SHALL BE SUBJECT TO THE OWNER'S APPROVAL.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER-OF-RECORD OF ANY PROBLEM IN CONFORMING TO THE APPROVED LINE AND GRADE FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO ITS CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE ALL TRAFFIC CONTROL NECESSARY TO COMPLETE THE WORK, INCLUDING ANY MOBILIZATION OF EQUIPMENT ON PUBLIC ROADWAYS. ALL TRAFFIC CONTROL DEVICES AND METHODS OF CONTROLLING TRAFFIC THROUGH CONSTRUCTION ZONES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (M.U.T.C.D.), FEDERAL HIGHWAY ADMINISTRATION, AND ALL REVISIONS THERETO (INCLUDING STATE SUPPLEMENTS), AS WELL AS PER CITY OF THORNTON APPROVED PERMIT. WORK REQUIRING TRAFFIC CONTROL SHALL BE DONE IN A TIMELY MANNER, SO AS TO MINIMIZE TRAFFIC FLOW DISRUPTION.
7. UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS; AND, THEREFORE, THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH ARE PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID DAMAGE THERETO. CONTRACTOR SHALL PROVIDE THE COST OF ANY POTHOLING OR UNDERGROUND INVESTIGATIONS DEEMED NECESSARY TO IDENTIFY AND LOCATE EXISTING FACILITIES AND/OR UTILITIES.
8. UNLESS NOTED OTHERWISE, ALL EXISTING FACILITIES ARE TO REMAIN UNDISTURBED AND USED IN PLACE. THE CONTRACTOR SHALL PROVIDE PROTECTIONS NECESSARY TO PREVENT DAMAGE AND SHALL REPAIR AND/OR REPLACE ALL EXISTING FACILITIES DAMAGED DURING CONSTRUCTION ACTIVITIES. EXISTING FACILITIES NOTED FOR REMOVAL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.
9. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL NECESSARY UTILITY RELOCATIONS WITH THE APPROPRIATE UTILITY COMPANY, AND THE CITY OF THORNTON.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE ON LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY ADJOINING IMPROVEMENTS, SIDEWALK, ALLEY OR UTILITY WITHOUT SUPPORTING AND PROTECTING SUCH PROPERTY FROM SETTLING, OR OTHER DAMAGE THAT MIGHT RESULT FROM THE WORK.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PRESERVING PROPERTY MONUMENTATION, AND WILL BE REQUIRED TO RE-ESTABLISH ANY MONUMENTATION WHICH IS DAMAGED OR DESTROYED DURING CONSTRUCTION OPERATIONS. SUCH MONUMENTATION SHALL BE RE-ESTABLISHED BY A LICENSED LAND SURVEYOR IN ACCORDANCE WITH STATE LAWS.
12. CONTRACTOR SHALL PROVIDE TEMPORARY THRUST RESTRAINTS AND PIPE SUPPORTS FOR ANY EXISTING FACILITIES AND UTILITIES AS REQUIRED PERFORMING THE WORK. ANY EXISTING RESTRAINT OR SUPPORT SYSTEMS SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE IF DAMAGED.
13. CONTRACTOR IS RESPONSIBLE FOR THE SAFE AND SECURE STORAGE OF GOODS, MATERIALS, AND EQUIPMENT ONSITE. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF STORAGE AND STAGING AREAS WITH THE OWNER PRIOR TO CONSTRUCTION.
14. TREES AND SHRUBS WITHIN THE CONSTRUCTION LIMITS, WHICH ARE IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION, SHALL BE TRIMMED AND/OR REMOVED AND DISPOSED OF BY THE CONTRACTOR WITH OWNER APPROVAL. REMOVED TREES SHALL BE REPLACED WITH TREE OF EQUAL INCH DIAMETER, AS DIRECTED BY OWNER. TREES AND SHRUBS WHICH ARE NOT IN DIRECT CONFLICT SHALL BE SAVED AND PROTECTED FROM DAMAGE.
15. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY POWER, PROCESS, AND UTILITY SERVICE BYPASSES AND CONNECTIONS REQUIRED BY THE WORK.
16. THE CONTRACTOR SHALL COORDINATE THE ALLOTTED DAILY HOURS OF CONSTRUCTION OPERATION WITH THE CITY. AT ALL OTHERS TIMES, NO CONSTRUCTION ACTIVITY SHALL OCCUR.
17. DETAILS FOUND ON CIVIL SITE DRAWINGS CALLOUT THE APPLICABLE DETAIL PAGE, HOWEVER, CIVIL DETAIL PAGES DO NOT CALLOUT THE CORRESPONDING SITE DRAWINGS.
18. SEE CONTRACT AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

## CIVIL LEGEND AND SYMBOLOGY

SCREENED OR GRAYSCALE ITEMS REPRESENT EXISTING FEATURES

### LINE SYMBOLOGY

| | | | |
|---|---|---|---|
| R/W | RIGHT-OF-WAY LINE | ST | STORM SEWER (EXIST) |
| PL | PROPERTY LINE | ST | STORM SEWER (PROP) |
| P/E | PERMANENT EASEMENT | 5600 | EXISTING CONTOUR |
| T/E | TEMPORARY EASEMENT | 5600 | PROPOSED CONTOUR |
| U/E | UTILITY EASEMENT | | RAILROAD TRACKS |
| E | ELECTRIC LINE (OVERHEAD) | X | CHAINLINK FENCE |
| E | ELECTRIC LINE (BURIED) | XX | BARBED WIRE FENCE |
| CATV | CABLE TV | | SILT FENCE |
| FO | FIBER OPTIC (OVERHEAD) | | GUARDRAIL |
| FO | FIBER OPTIC | | EDGE OF WATER |
| G | GAS LINE | | FLOWLINE (WITH DIRECTION) |
| T | TELEPHONE LINE (OVERHEAD) | IRR | IRRIGATION LINE |
| T | TELEPHONE LINE (BURIED) | | GRADING LIMITS |
| SS | SANITARY SEWER | | TOP OF SLOPE |
| | SAN SEWER PROCESS PIPE | | TOE OF SLOPE |
| W | WATERLINE | FP | FLOODPLAIN LIMITS |
| | EDGE OF PAVEMENT | FDN | FOUNDATION DRAIN |

### SYMBOLS (UTILITIES)

| | | | | | |
|---|---|---|---|---|---|
| S | SANITARY SEWER MH | E | ELECTRIC MANHOLE | FO | FIBER OPTIC BOX |
| ST | STORM MANHOLE | EB | ELECTRIC BOX/HANDHOLE | | LIGHT POLE |
| T | TELEPHONE MH | EP | ELECTRIC PEDESTAL | | LIGHT POLE W/ ARM |
| TP | TELEPHONE PEDESTAL | ET | ELECTRIC TRANSFORMER | | POWER POLE |
| GV | GAS VALVE | W | WATER MANHOLE | | GUY |
| GM | GAS METER | WM | WATER METER | TR | TRAFFIC BOX |
| MW | MONITORING WELL | WV | WATER VALVE | | TRAFFIC SIGN |
| TV | CABLE TV PEDESTAL | | FIRE HYDRANT | W | WELL |
| CO | CLEANOUT | | | | CURB FLOW DIRECTION |

### SYMBOLS (MISC)

- PROJECT CONTROL POINT
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE
- TREE LINE
- BOLLARD
- MB — MAIL BOX
- IRRIGATION CONTROL VALVE

### PATTERNS

| | | | |
|---|---|---|---|
| | UNDISTURBED EARTH | | SWAMP |
| | COMPACTED FILL | | WATER |
| | ROCK | | RIPRAP |
| | AGGREGATE SURFACING | | CONCRETE SURFACING |
| | ASPHALT SURFACING | | FLEX-A-MAT (2) |

* EXISTING ITEMS WILL BE GREYED OR NOTED

## ABBREVIATIONS:

| | | | |
|---|---|---|---|
| @ | AT | ICV | IRRIGATION CONTROL VALVE |
| Ø | DIAMETER | | |
| ' | FOOT OR FEET | INV | INVERT |
| " | INCH OR INCHES | LF | LINEAR FEET |
| # | NUMBER | LP | LIGHT POLE |
| % | PERCENT | MAX | MAXIMUM |
| APPROX | APPROXIMATE | MH | MANHOLE |
| ASPH | ASPHALT | MIN | MINIMUM |
| ASTM | AMERICAN SOCIETY FOR TESTING & MATERIALS | N | NORTH OR NORTHING |
| | | N/A | NOT APPLICABLE |
| ATG | ADJUST TO GRADE | OC | ON CENTER |
| BC | BACK OF CURB | PC | POINT OF CURVATURE |
| BLDG | BUILDING | PI | POINT OF INTERSECTION |
| BO | BY OTHERS | PCC | PORTLAND CEMENT CONCRETE |
| BOP | BOTTOM OF PIPE | | |
| BSC | BOLTED SLEEVE COUPLING | PP | POWER POLE |
| C&G | CURB AND GUTTER | PRC | POINT OF REVERSE CURVATURE |
| CATV | CABLE TELEVISION | | |
| CDOT | COLORADO DEPARTMENT OF TRANSPORTATION | PROP | PROPOSED |
| | | PT | POINT OF TANGENCY |
| CL | CENTERLINE | PVMT | PAVEMENT |
| CIS | CENTER IN SLAB | R | RADIUS |
| CIW | CENTERED IN WALL | R&R | REMOVE AND REPLACE |
| CMP | CORRUGATED METAL PIPE | R/W OR ROW | RIGHT-OF-WAY |
| CNTR | CENTER | RCP | REINFORCED CONCRETE PIPE |
| CO | CLEAN-OUT | | |
| CONC | CONCRETE | S | SOUTH |
| CONSTR | CONSTRUCTION | SAN | SANITARY |
| CP | CONTROL POINT | SCH | SCHEDULE |
| DESC | DESCRIPTION | SDWK | SIDEWALK |
| DIA | DIAMETER | SL | SLUDGE |
| DIP | DUCTILE IRON PIPE | SPEC | SPECIFICATION |
| DND | DO NOT DISTURB | SST | STAINLESS STEEL |
| DWG | DRAWING | STA | STATION |
| E | EAST OR EASTING | STD | STANDARD |
| EBOX | ELECTRIC BOX | STRUC | STRUCTURAL |
| EFF | EFFLUENT | TBA | TO BE ABANDONED |
| ELEC | ELECTRIC | TBD | TO BE DETERMINED |
| EL OR ELEV | ELEVATION | TBR | TO BE REMOVED |
| EOA | EDGE OF ASPHALT | TBR&R | TO BE REMOVED AND REPLACED |
| ESMT | EASEMENT | | |
| ETC | ETCETERA | TBRBO | TO BE REMOVED BY OTHERS |
| EURV | EXCESS URBAN RUNOFF VOLUME | TBR&RBO | TO BE REMOVED AND REPLACED BY OTHERS |
| EXIST | EXISTING | TC | TOP OF CURB |
| EXP | EXPANSION | TE | THREADED END |
| FC | FACE OF CURB | TH | THICKNESS |
| FF | FINISHED FLOOR | TOW | TOP OF WALL |
| FG | FINISHED GRADE | TP | TOP OF PAVEMENT |
| FH | FIRE HYDRANT | TPED | TELEPHONE PEDESTAL |
| FL | FLOWLINE | TRANSF | TRANSFORMER |
| FT | FOOT OR FEET | TYP | TYPICAL |
| GAL | GALLON | UIP | USE IN PLACE |
| GM | GAS METER | W | WEST |
| GS | GALVANIZED STEEL | W/ | WITH |
| HDPE | HIGH DENSITY POLYETHYLENE | WM | WATER METER |
| | | WMH | WATER MANHOLE |
| HMA | HOT MIX ASPHALT | WTR | WATER |
| HP | HIGHPOINT | WV | WATER VALVE |
| | | WWF | WELDED WIRE FABRIC |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | EV | NT | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 3/8/2021 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

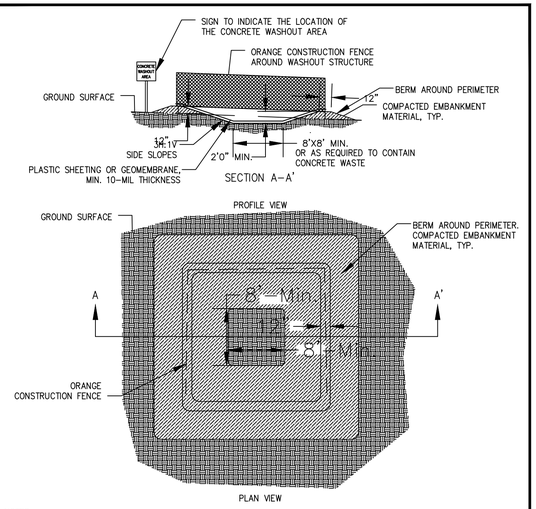
| | |
|---|---|
| date MARCH 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL NOTES, ABBREVIATIONS, & LEGEND

| | |
|---|---|
| project 98101 | contract |
| drawing C001 – | rev. 1 |
| sheet 5 of 542 sheets | |
| file 98101 C_001.DWG | |

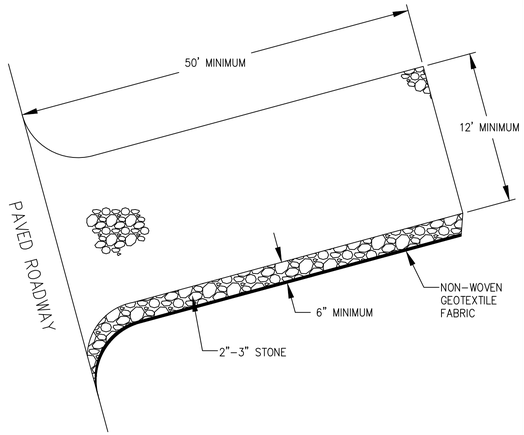
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:
1. CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE; PLACED A MINIMUM 50' FROM STATE WATERS.
2. VEHICLE TRACKING CONTROL IS REQUIRED AT CONCRETE WASHOUT ENTRANCE IF ACCESS TO CONCRETE WASHOUT AREA IS OFF PAVEMENT.
3. A PLASTIC SHEETING OR GEOMEMBRANE LINER SHALL BE PLACED. MINIMUM 10-MIL THICKNESS..
4. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND/OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR WASTE CONCRETE.
5. WASTE MATERIAL FROM CONCRETE WASHOUT OPERATIONS MUST BE REMOVED AND LEGALLY DISPOSED OF WHEN IT HAS ACCUMULATED TWO-THIRDS OF THE WET STORAGE CAPACITY OF THE STRUCTURE AND AT THE END OF CONSTRUCTION.
6. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER ACCEPTED BY THE CITY.
7. NO STORMWATER RUN-OFF SHALL DRAIN INTO CONCRETE WASHOUT AREA.

N.T.S.

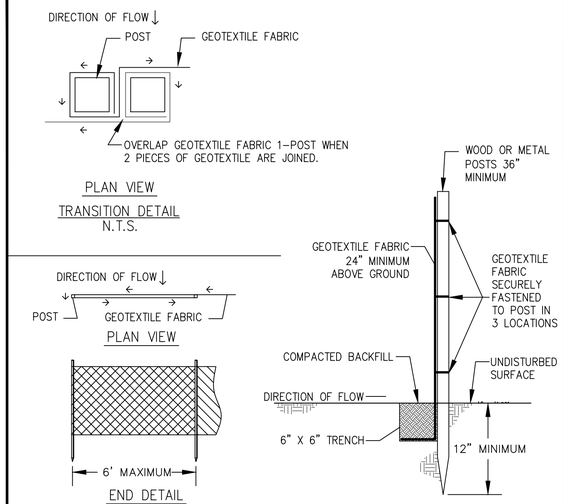
| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: MARCH 2005 REVISED: NOV 08 |
|---|---|---|
| | CONCRETE WASHOUT AREA DETAIL | DRAWING NO. 400-6 |




NOTES:
1. PAVED ROADWAY TO BE KEPT CLEAN OF MUD, DIRT, ROCKS, AND DEBRIS AT ALL TIMES.
2. GEOTEXTILE FABRIC SHALL COMPLY WITH CDOT 712.08b.
3. 2"-3" STONE SHALL CONTAIN LESS THAN 10% FINES.
4. CONSTRUCTION EXIT SHALL BE MAINTAINED AT ALL TIMES. STONE SHOULD BE BLADED AND/OR ADDITIONAL 2"-3" STONE SHOULD BE PLACED IF VOIDS BEGIN FILLING WITH DEBRIS.
5. IF A DRAINAGE DITCH EXISTS NEXT TO ROADWAY, INSTALL TEMPORARY CULVERT UNDERNEATH STONE CONSTRUCTION EXIT TO CONVEY FLOW.
6. PROVIDE INLET PROTECTION FOR ANY INLETS LOCATED IMMEDIATELY ADJACENT TO THE CONSTRUCTION EXIT.
7. IF TRACKOUT DOES OCCUR, ROADWAY SHOULD BE SWEPT IMMEDIATELY.
8. RECYCLED CONCRETE OR RECYCLED ASPHALT SHALL NOT BE USED.

N.T.S.

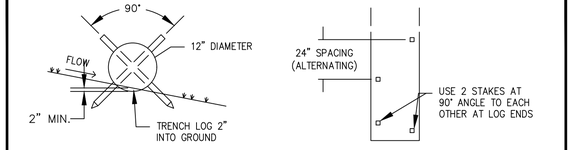
| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: NOV 08 REVISED: |
|---|---|---|
| | VEHICLE TRACKING PAD | DRAWING NO. 400-7 |

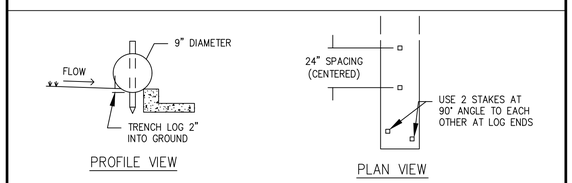


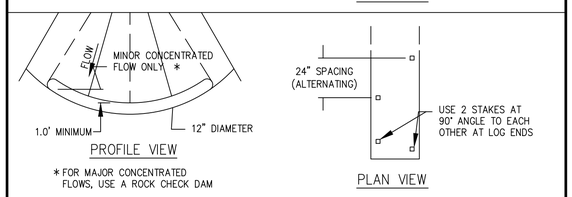

NOTES:
1. WOOD POSTS SHALL HAVE A MINIMUM DIAMETER OR CROSS-SECTION OF 2 INCHES. METAL POSTS SHALL BE STUDDED "T" OR "U" TYPE.
2. GEOTEXTILE FABRIC SHALL COMPLY WITH CDOT 712.08b.
3. GEOTEXTILE FABRIC SHALL EXTEND A MINIMUM OF 6" BELOW GRADE AND ANOTHER 6" HORIZONTALLY IN A "L" SHAPE BEFORE BACKFILLING AND COMPACTING THE TRENCH. (SLICING METHOD IS ALSO ACCEPTED)
4. SILT FENCE SHALL NOT BE USED IN CONCENTRATED FLOWS.
5. SILT FENCE SHALL ONLY BE PLACED PARALLEL TO SURFACE CONTOURS.
6. CLEAN AND REMOVE SILT WHEN THE SILT REACHES ½ THE HEIGHT OF THE GEOTEXTILE FABRIC.
7. UPON PERMANENT STABILIZATION OF AREAS UPSLOPE OF THE SILT FENCE, THE SILT FENCE SHALL BE REMOVED AND DISTURBED AREAS PERMANENTLY STABILIZED.

N.T.S.

| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: NOV 08 REVISED: |
|---|---|---|
| | SILT FENCE | DRAWING NO. 400-08 |



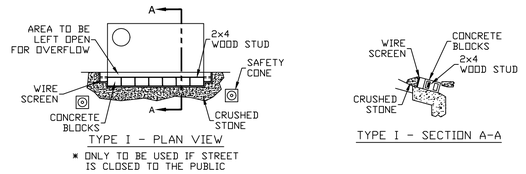



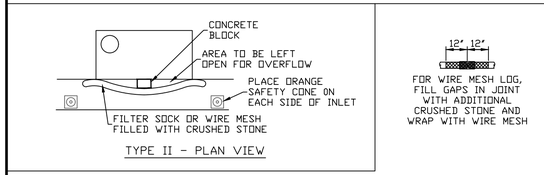



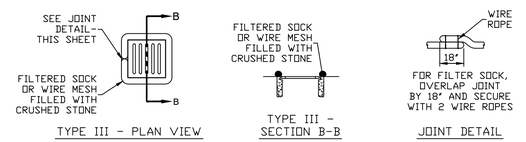

NOTES:
1. STAKES SHALL BE 1-1/2" x 1-1/2" x 24" MINIMUM AND EMBEDDED INTO GROUND A MINIMUM OF 12".
2. SEDIMENT CONTROL LOG SHALL BE TRENCHED 2" INTO GROUND.
3. FOR CONTINUOUS CONTROL, ADJACENT SEDIMENT CONTROL LOGS SHALL BE PLACED FIRMLY TOGETHER WITH NO GAPS.
4. SEDIMENT SHALL BE CLEANED/ REMOVED WHEN SEDIMENT DEPTH IS 1/2 THE HEIGHT OF THE SEDIMENT CONTROL LOG.

N.T.S.

| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: NOV 08 REVISED: |
|---|---|---|
| | SEDIMENT CONTROL LOG | DRAWING NO. 400-9 |



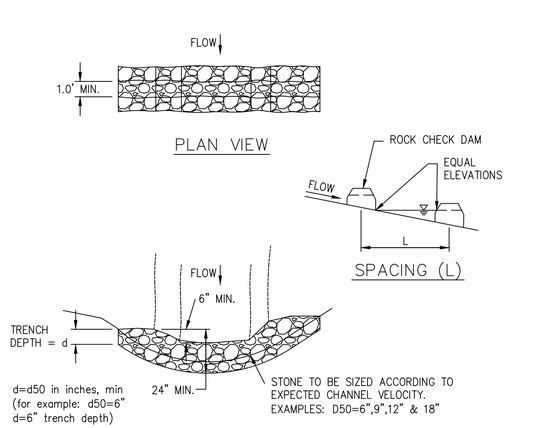




NOTES:
1. CRUSHED STONE SHALL BE NO. 4 STONE WITH 0% PASSING THE 3/4" SIEVE.
2. SEDIMENT SHALL BE REMOVED WHEN SEDIMENT ACCUMULATION REACHES 1/2 THE INLET PROTECTION HEIGHT.
3. INLET PROTECTION SHALL BE PLACED IN A MANNER NOT TO CAUSE SIGNIFICANT FLOODING IN PUBLIC STREETS OR AREAS.
4. INSET FILTER BAGS WITH OVERFLOW PORTS MAY BE USED IN HIGH TRAFFIC AREAS AS A SUBSTITUTE.
5. IF LARGE DEPOSITS OF SEDIMENT ENTERS THE STORM SEWER, THE CONTRACTOR SHALL CLEAN THE STORM SEWER TO THE SATISFACTION OF THE CITY.

N.T.S.

| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: NOV 08 REVISED: |
|---|---|---|
| | INLET PROTECTION | DRAWING NO. 400-10 |




NOTES:
1. CHECK DAMS SHALL BE INSTALLED PRIOR TO UPSTREAM EARTH DISTURBING ACTIVITIES.
2. STONE SHALL HAVE < 10% FINES.
3. EACH END OF CHECK DAM SHALL BE 6" MINIMUM HIGHER THAN CENTER.
4. SEDIMENT SHALL BE REMOVED FROM THE CHECK DAM WHEN THE SEDIMENT DEPTH REACHES 1/2. THE HEIGHT OF THE CENTER.
5. CHECK DAM SHALL BE REMOVED ONCE ALL UPSTREAM DISTURBED AREAS HAVE BEEN STABILIZED.
6. UPON REMOVAL OF CHECK DAM, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED FILL, SEEDED AND COVERED WITH AN EROSION CONTROL BLANKET ADEQUATE FOR EXPECTED CHANNEL VELOCITY.

N.T.S.

| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS | ISSUED: NOV 08 REVISED: |
|---|---|---|
| | CHECK DAM | DRAWING NO. 400-11 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

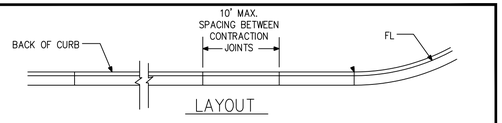
| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS I

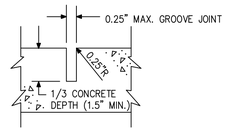
| | |
|---|---|
| project 98101 | contract |
| drawing **C002** | rev. **0** |
| sheet 6 of 542 sheets | |
| file 98101 C_002.DWG | |

Millimeters
Inches
Scale For Microfilming
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

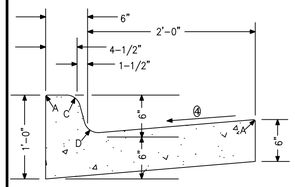



LAYOUT

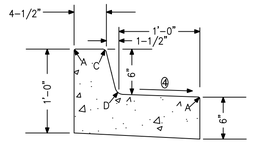
| LEGEND FOR RADII |
|---|
| A = 1/8" TO 1/4" |
| B = 1" |
| C = 1-1/2" |
| D = 1-1/2" TO 2" |




CONTRACTION JOINT




TYPE 2 CURB & GUTTER
SECTION IIB

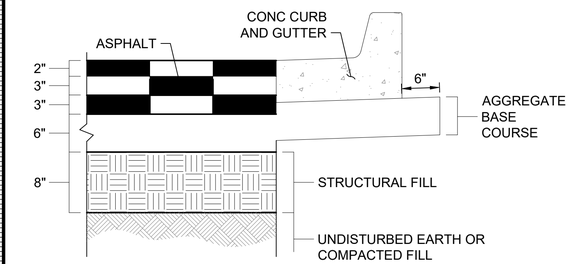



TYPE 2 CURB & GUTTER
SECTION I B

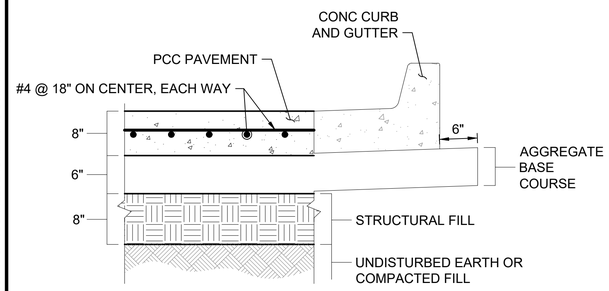
NOTES:
1. TYPE 2 CURB & GUTTER IS FOR USE IN COMMERCIAL, ARTERIALS AND COLLECTOR STREETS.
2. ANY OVER-EXCAVATION SHALL BE REPLACED WITH GRANULAR BACKFILL COMPACTED TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698.
3. TYPE 2 SPILL CURB MAY BE REQUIRED FOR SPECIAL CONDITIONS.
4. GUTTER CROSS SLOPE SHALL BE 1/2" /FT. WHEN DRAINING AWAY FROM CURB AND 1" /FT. WHEN DRAINING TOWARD CURB.
5. CONCRETE SHALL CONFORM TO CITY OF THORNTON SECTION 600-CONCRETE. 4500PSI CDOT CLASS D CONCRETE WITH FIBER MESH REINFORCEMENT

N.T.S.

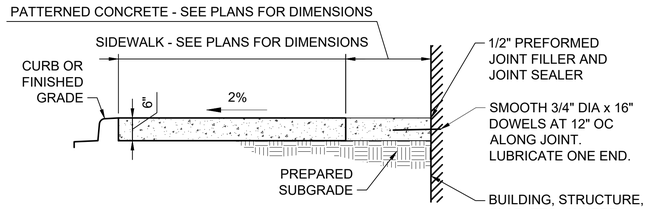
| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>CURB AND GUTTER<br>TYPE 2 (SECTION IB)<br>TYPE 2 (SECTION IIB) | ISSUED: DECEMBER 1998<br>REVISED: APRIL 2010<br>DRAWING NO. 500-8A |



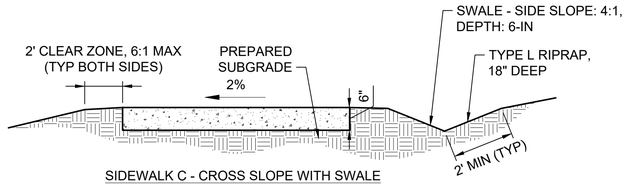

**ASPHALT ACCESS DRIVE A** 3A (2)
**NOT TO SCALE**



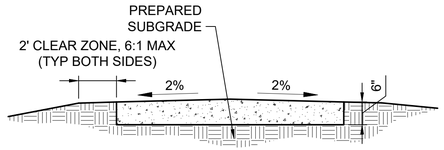

**CONCRETE ACCESS DRIVE A (PORTLAND CEMENT CONCRETE - PCC)** 4A (2)
**NOT TO SCALE**



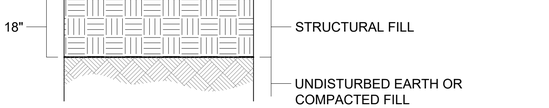

SIDEWALK A - ABUTTING BUILDING



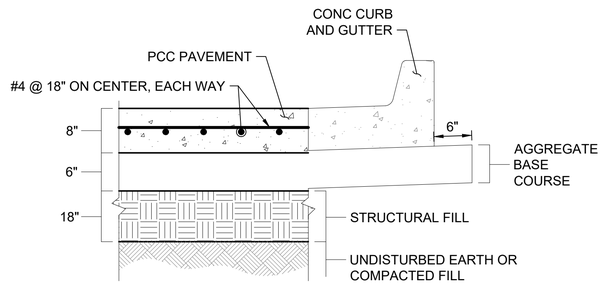

SIDEWALK C - CROSS SLOPE WITH SWALE




SIDEWALK B - CROWNED



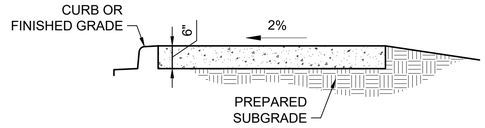

**ASPHALT ACCESS DRIVE B** 3B (2)
**NOT TO SCALE**



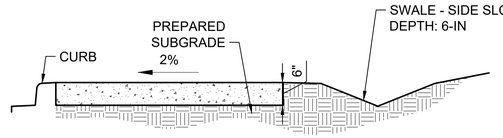

**CONCRETE ACCESS DRIVE B (PORTLAND CEMENT CONCRETE - PCC)** 4B (2)
**NOT TO SCALE**

NOTES

1. HOT MIX ASPHALT DETAIL APPLIES TO ASPHALT ACCESS ROAD AND ASPHALT PARKING LOT.
2. WHEN ASPHALT OR CONCRETE ACCESS DRIVE ABUTS CURB AND GUTTER, AGGREGATE BASE COURSE SHALL CONTINUE UNDERNEATH CURB AND GUTTER AND EXTEND 6" BEYOND THE BACKSIDE OF CURB.
3. STRUCTURAL FILL TO BE IMPORTED NON-EXPANSIVE SOIL TO 95% STANDARD PROCTOR.




SIDEWALK D - ABUTTING STREET

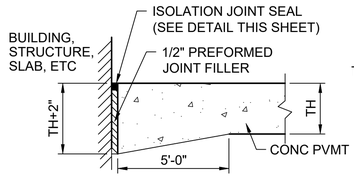



SIDEWALK E - CROSS SLOPE WITH SWALE

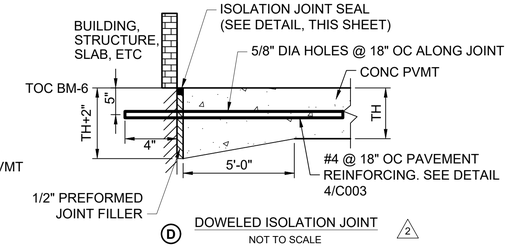
NOTES:

1. REINFORCE PER STRUCTURAL SPECIFICATIONS.
2. SEE DWG C020 FOR ADDITIONAL RAMP SLOPE DETAILS, AND SECTION VIEW.
3. ALL EXTERIOR CONCRETE SHALL BE 4500 PSI CONCRETE AND FIBERMESH REINFORCEMENT PER COT STANDARDS.
4. PROVIDE CONSTRUCTION JOINTS SPACED AT A DISTANCE EQUAL TO PATH WIDTH. (1)

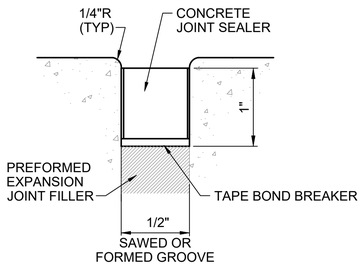
**CONCRETE SIDEWALK/PATH DETAILS** 2
**NOT TO SCALE**



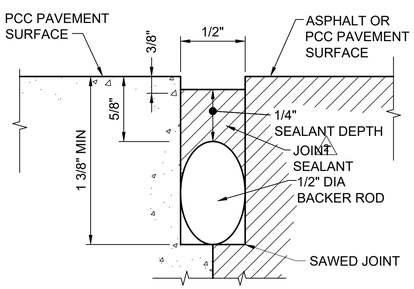

(I) ISOLATION JOINT
NOT TO SCALE




(D) DOWELED ISOLATION JOINT (2)
NOT TO SCALE



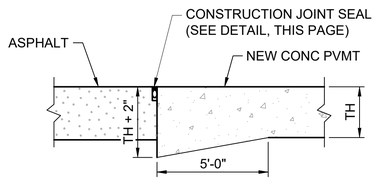

ISOLATION JOINT SEAL
NOT TO SCALE



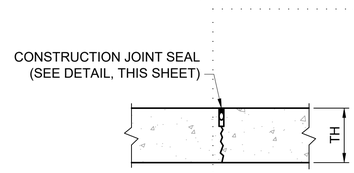

**NOTES:**

1. JOINT SEALANT SHALL BE DOW 890-SL OR APPROVED EQUAL

**CONSTRUCTION JOINT SEAL**
NOT TO SCALE




(T) CONCRETE-ASPHALT JOINT
NOT TO SCALE




(C) CONSTRUCTION JOINT
NOT TO SCALE

**JOINTING DETAILS** 1
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

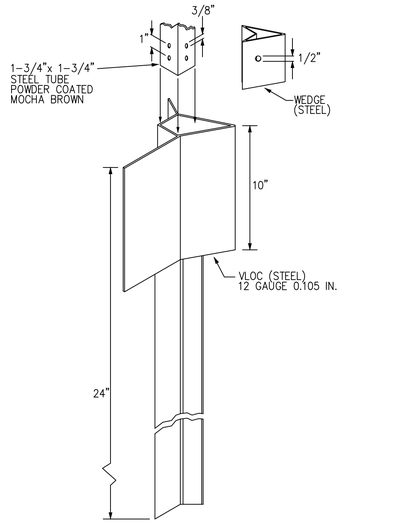
CITY OF THORNTON
TTP - PACKAGE 3
CIVIL DETAILS II

| | |
|---|---|
| project 98101 | contract |
| drawing C003 | rev. 2 |
| sheet 7 of 542 sheets | |
| file 98101 C_003.DWG | |

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

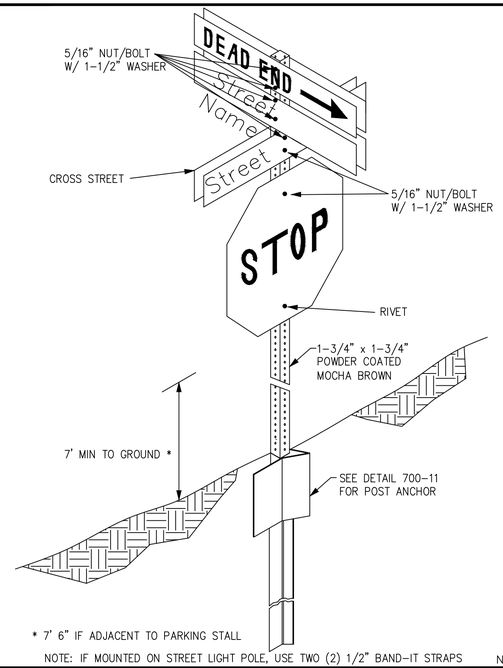
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_003.DWG 10/21/2020 9:05 PM MDSTROBEL




NOTE: ALL TUBINGS ARE #12 U.S. STD. GAUGE WALL THICKNESS. SIGN POST INSTALLATION SHALL FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND THESE SPECIFICATIONS:
1. THE SIGN POST ANCHOR SHALL BE DRIVEN INTO THE GROUND TO 1" ABOVE THE GROUND. SIDEWALK SHALL BE POURED AROUND SIGN POST ANCHOR OR EXISTING SIDEWALK SHALL BE CORE DRILLED AND SEALED AROUND THE POST ANCHOR.
2. INSERT SIGN POST INTO ANCHOR ASSEMBLY 6 INCHES AND INSTALL WEDGE.
3. INSTALLED SIGN AND POST SHALL BE PLUMB AND FREE OF VERTICAL AND LATERAL MOVEMENT.

N.T.S.

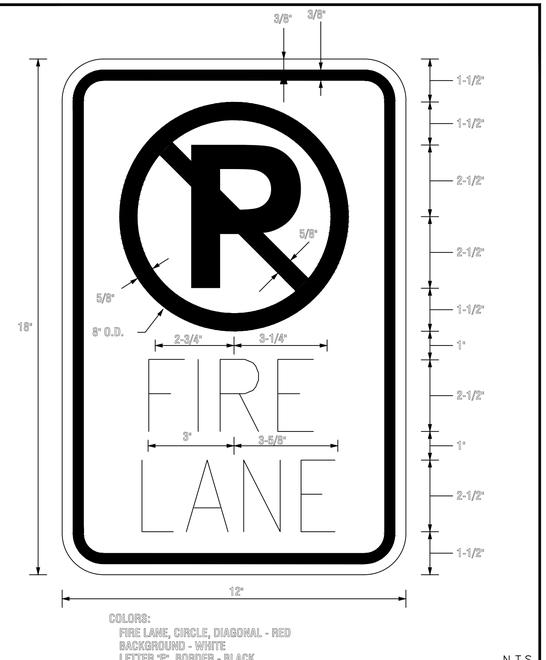
| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>SIGN POST ANCHOR DETAIL | ISSUED: FEBRUARY 2003<br>REVISED: APRIL 2010<br>DRAWING NO. 700–11 |




NOTE: IF MOUNTED ON STREET LIGHT POLE, USE TWO (2) 1/2" BAND-IT STRAPS

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>SIGN ASSEMBLY DETAIL | ISSUED: FEBRUARY 2003<br>REVISED: AUG 2012<br>DRAWING NO. 700–12 |



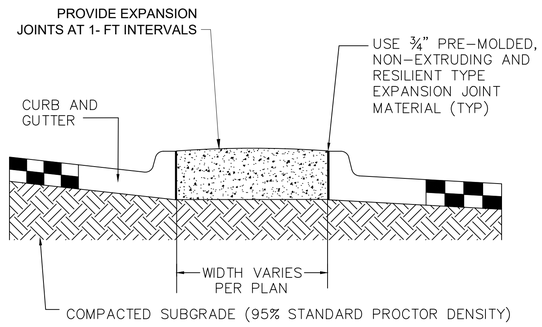

COLORS:
FIRE LANE, CIRCLE, DIAGONAL - RED
BACKGROUND - WHITE
LETTER "F", BORDER - BLACK

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>FIRE LANE – NO PARKING<br>REGULATORY SIGN | ISSUED: FEBRUARY 2005<br>REVISED: APRIL 2010<br>DRAWING NO. 700–13 |

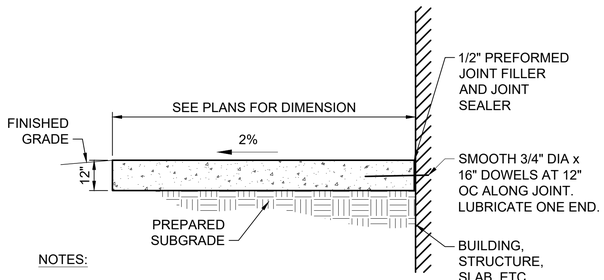
NOTES:
1. WASH AS NECESSARY TO REMOVE RELEASE AGENT AND SEAL WITH CLEAR ACRYLIC SEALER: ROCASEAL BY US SPEC, CEMENTONE BY LM SCOFIELD, OR APPROVED EQUAL.

6" DEPTH COLORED PATTERNED CONCRETE PATTERN IS "RUNNING BOND" PLACED HORIZONTALLY COLOR IS DAVIS "FLAGSTONE BROWN" OR APPROVED EQUAL FIBER MESH REINFORCEMENT IS REQUIRED 4500 PSI CONCRETE AT 28 DAYS



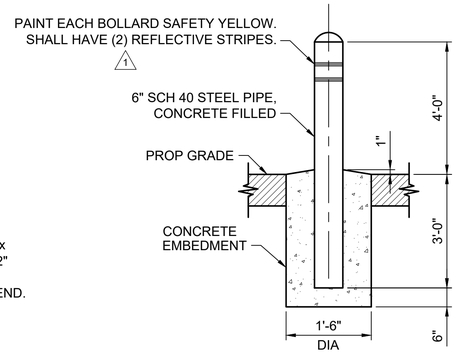

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>PAVED MEDIAN | ISSUED: JUNE 2003<br>REVISED: JAN 2012<br>DRAWING NO. 800–4 |




NOTES:
1. REINFORCE PER STRUCTURAL SPECIFICATIONS.
2. WHEN APRON IS BEING INSTALLED ADJACENT TO CONCRETE OR ASPHALT PAVING, THE AGGREGATE BASE COURSE OF SAID PAVING SHALL BE PLACED UNDER APRON AS WELL.

**CONCRETE APRON** — **1**
**NOT TO SCALE**




**BOLLARD** — **2**
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date: APRIL 2021 | detailed: E. VIK |
| designed: E. VIK | checked: N. TESSITORE |

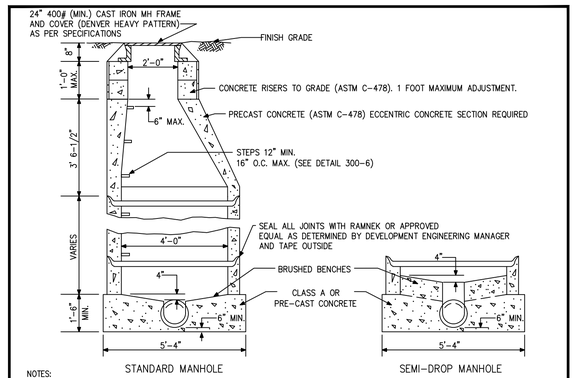
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS III

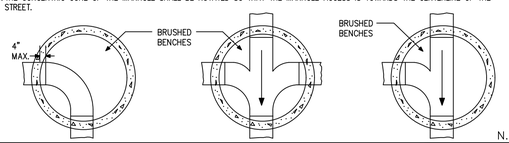
| | |
|---|---|
| project: 98101 | contract: |
| drawing: **C004** – | rev.: **1** |
| sheet 8 of 542 sheets | |
| file 98101 C_004.DWG | |

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




NOTES:
1. TOP ELEVATION OF THE MANHOLE SHALL BE ADJUSTED TO EXACTLY MATCH FINAL STREET GRADE PRIOR TO THE INITIATION OF THE ONE (1) YEAR WARRANTY PERIOD.
2. IF MANHOLES ARE LOCATED IN OPEN FIELDS, THEY SHALL BE LEFT SIX (6) INCHES TO EIGHT (8) INCHES ABOVE GRADE WHERE PRACTICAL.
3. FLAT TOP SECTIONS MAY BE USED ON SHALLOW LINES WHERE CONE SECTIONS ARE IMPRACTICAL TO USE AS SPECIFIED BY THE DEVELOPMENT ENGINEERING MANAGER.
4. SEMI-DROP MANHOLES SHALL BE USED FOR DROPS OF 2'-0" OR LESS.
5. MANHOLE RINGS SHALL BE 30 INCH DIAMETER, WITH 24 INCH INSERT AND COVER, FOR 60 INCH AND 72 INCH DIAMETER MANHOLE BARRELS.
6. MANHOLE INVERTS SHALL BE FORMED AS INDICATED BELOW TO ENSURE SMOOTH FLOW THROUGH MANHOLE.
7. WHERE MORE THAN ONE SEWER ENTERS A MANHOLE, THE SMALLER OF THE LINES SHALL INSTALLED AT THE CROWN ELEVATION OF THE LARGER SEWER.
8. WATERPROOFING IS REQUIRED WHERE GROUNDWATER IS PRESENT AS REQUIRED BY THE DEVELOPMENT ENGINEERING MANAGER.
9. A LOCKING RING AND COVER SHALL BE INSTALLED ON MANHOLES LOCATED OUTSIDE OF ROADWAYS. THE LOCKING LIDS SHALL HAVE MCGARD INTIMIDATOR MANLOCKS MODEL NUMBER 117011 (2 PER MANHOLE).
10. THE CONCENTRIC CONE OF THE MANHOLE SHALL BE ROTATED SO THAT THE MANHOLE ACCESS IS TOWARDS THE CENTERLINE OF THE STREET.

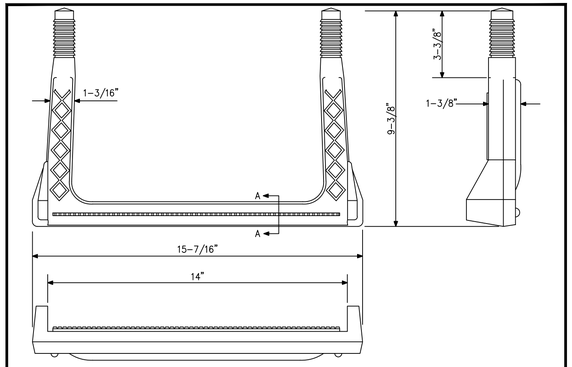



N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STANDARD AND SEMI-DROP MANHOLE DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 300-3



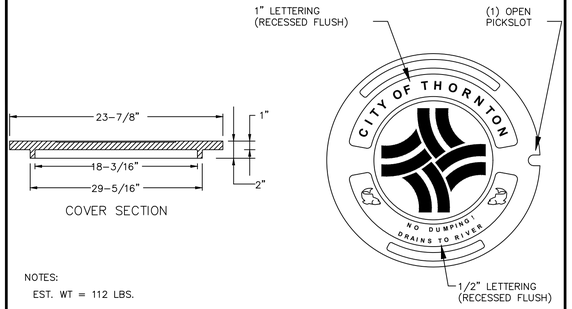

NOTE:
STEPS SHALL BE PLASTIC COATED STEEL STEPS MANUFACTURED BY M.A. INDUSTRIES INC., #PS2-PF, OR APPROVED EQUIVALENT, AS DETERMINED BY THE DEVELOPMENT ENGINEERING MANAGER, SPACED 12 TO 16 INCHES ON CENTER, ALIGNED AWAY FROM THE INVERT OVER LARGEST BENCH.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

PLASTIC MANHOLE STEP DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 300-6



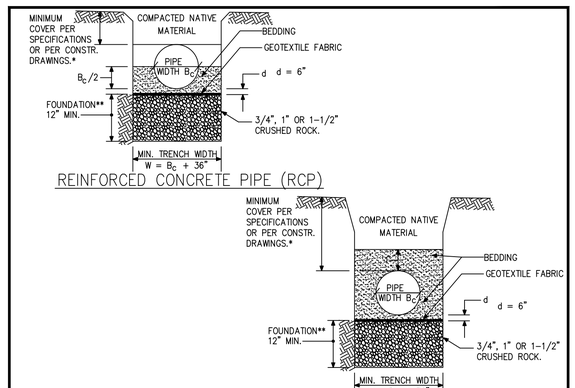

NOTES:
EST. WT = 112 LBS.
COVER – GRAY IRON ASTM A48 CL35B
HEAVY DUTY LOAD RATING.
MANHOLE TO BE EAST JORDAN IRON WORKS, INC.
CATALOG NO. 2408A OR APPROVED EQUAL.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STORM MANHOLE COVER

ISSUED: NOVEMBER 2005
REVISED: APRIL 2010
DRAWING NO. 400-3




| NATIVE SOIL: | BEDDING: |
|---|---|
| COARSE GRAINED SAND AND GRAVEL (50% OR MORE BY WEIGHT RETAINED ON # 40 SIEVE) | CDOT CLASS A FILTER MATERIAL (SECTION 703.0q) |
| FINE GRAINED SOIL (LESS THAN 50% RETAINED ON # 40 SIEVE) | UDFCD TYPE 1 FILTER MATERIAL, CDOT FINE AGGREGATE FOR CONCRETE AASHTO M6 (SECTION 703.01) |

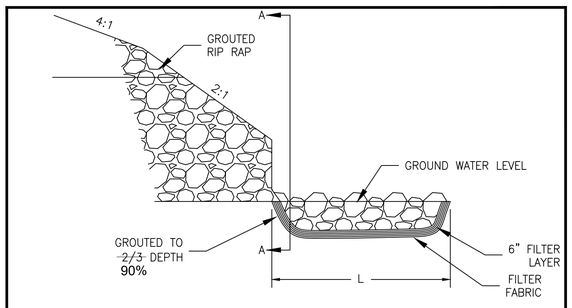
* MINIMUM COVER SHALL NOT INCLUDE PAVEMENT.
** MAY BE REQUIRED IN AREAS WITH HIGH GROUNDWATER TABLE OR UNSUITABLE SUB-GRADE.

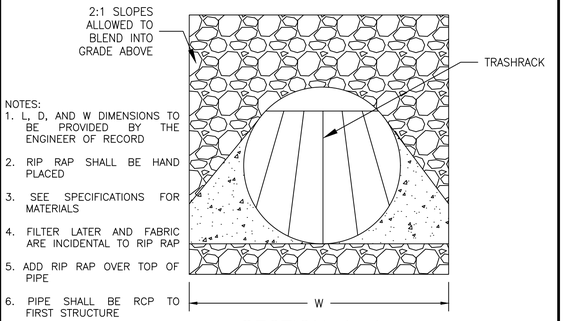
N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STORM DRAINAGE PIPE BEDDING DETAILS

ISSUED: DECEMBER 2002
REVISED: APRIL 2010
DRAWING NO. 400-2




NOTES:
1. L, D, AND W DIMENSIONS TO BE PROVIDED BY THE ENGINEER OF RECORD
2. RIP RAP SHALL BE HAND PLACED
3. SEE SPECIFICATIONS FOR MATERIALS
4. FILTER LATER AND FABRIC ARE INCIDENTAL TO RIP RAP
5. ADD RIP RAP OVER TOP OF PIPE
6. PIPE SHALL BE RCP TO FIRST STRUCTURE

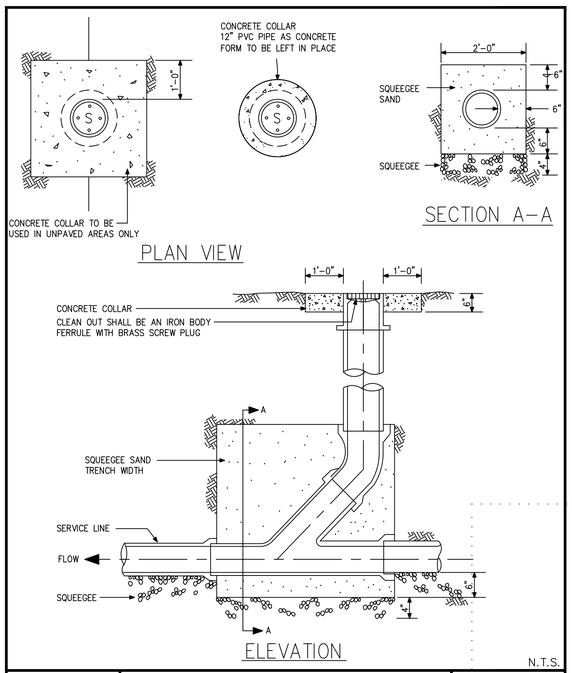
SECTION A–A

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

RIP RAP AT CULVERT OUTLET DETAIL

ISSUED: APRIL 1995
REVISED: APRIL 2010
DRAWING NO. 400-4




N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

STANDARD CLEAN-OUT DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 300-7

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS IV

| project | contract |
|---|---|
| 98101 | |

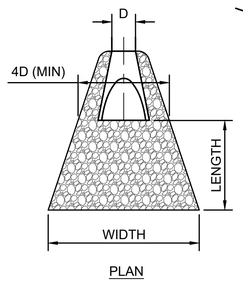
drawing **C005** – rev. **0**

sheet 9 of 542 sheets

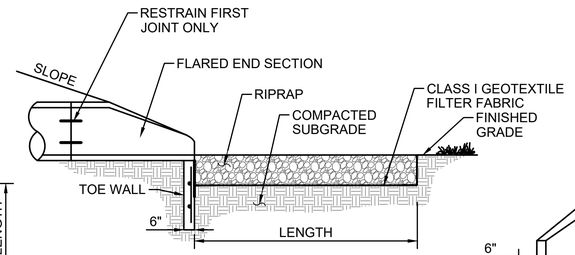
file 98101 C_005.DWG

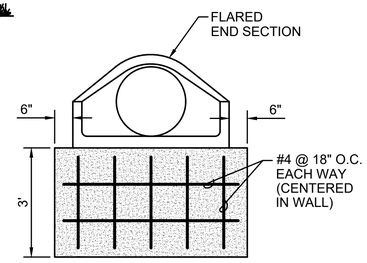
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_005.DWG 10/20/2020 8:48 PM MDSTROBEL




PLAN

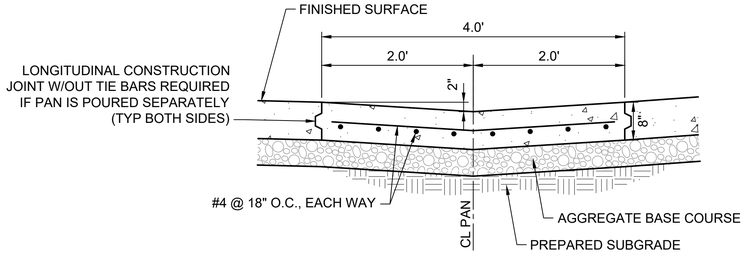


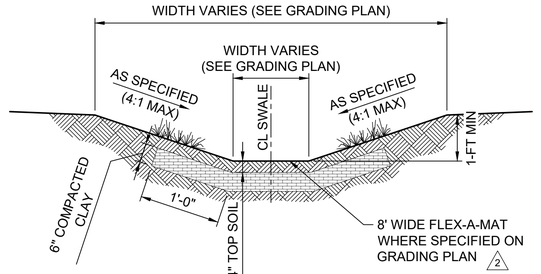

NOTE:

1. SEE PLANS FOR OUTLET PROTECTION DIMENSIONS
2. RIPRAP SHALL MEET THE REQUIREMENTS OF THE CITY OF THORNTON.
3. AS PER CITY OF THORNTON DETAIL 400-4, RIPRAP AT FLARED END OUTLETS SHALL BE GROUTED.

**FLARED END OUTLET DETAIL** — 1
**NOT TO SCALE**

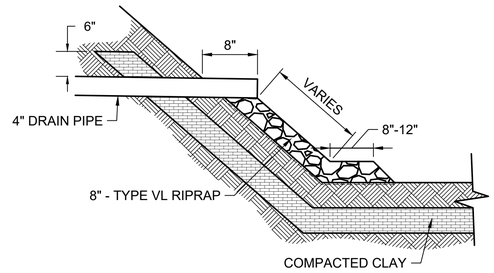



**CONCRETE PAN** — 2
**NOT TO SCALE**

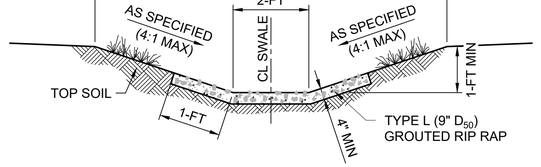



**EARTHEN BOTTOM SWALE** — 3
**NOT TO SCALE**

1




**ROOF DRAIN SWALE PENETRATION DETAIL** — 8
**NOT TO SCALE**

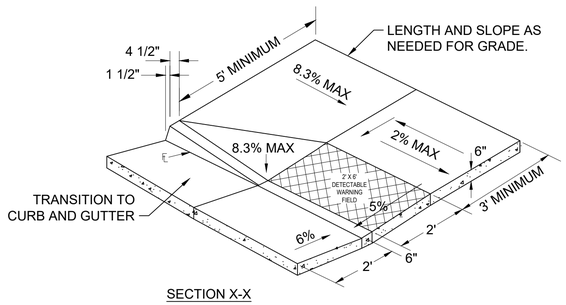



**GROUTED RIPRAP BOTTOM SWALE** — 4
**NOT TO SCALE**



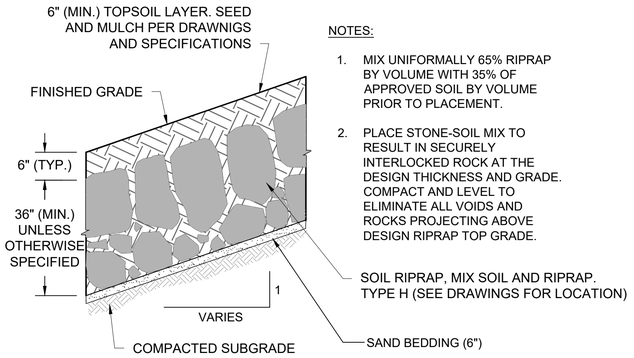

NOTES

1. DETECTABLE WARNING FIELD SHALL BE CAST-IN-PLACE RED EAST JORDAN IRON WORKS OR APPROVED EQUAL.
2. CONCRETE SHALL CONFORM TO THE THORNTON STANDARDS AND SPECIFICATIONS SECTION 600-CONCRETE WORK. 4500PSI CDOT CLASS D CONCRETE WITH FIBER MESH REINFORCEMENT.
3. CHANGES IN GRADE SHALL NOT EXCEED 11%.




SECTION X-X

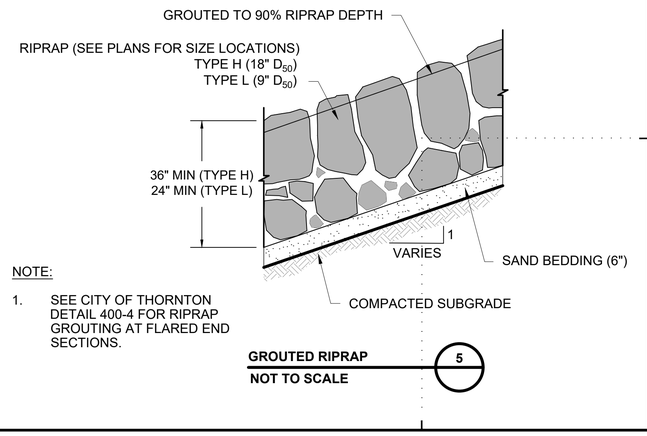
**CONCRETE FOOTPATH RAMP** — 6
**NOT TO SCALE**




NOTES:

1. MIX UNIFORMALLY 65% RIPRAP BY VOLUME WITH 35% OF APPROVED SOIL BY VOLUME PRIOR TO PLACEMENT.
2. PLACE STONE-SOIL MIX TO RESULT IN SECURELY INTERLOCKED ROCK AT THE DESIGN THICKNESS AND GRADE. COMPACT AND LEVEL TO ELIMINATE ALL VOIDS AND ROCKS PROJECTING ABOVE DESIGN RIPRAP TOP GRADE.

**SOIL RIPRAP** — 7
**NOT TO SCALE**




NOTE:

1. SEE CITY OF THORNTON DETAIL 400-4 FOR RIPRAP GROUTING AT FLARED END SECTIONS.

**GROUTED RIPRAP** — 5
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

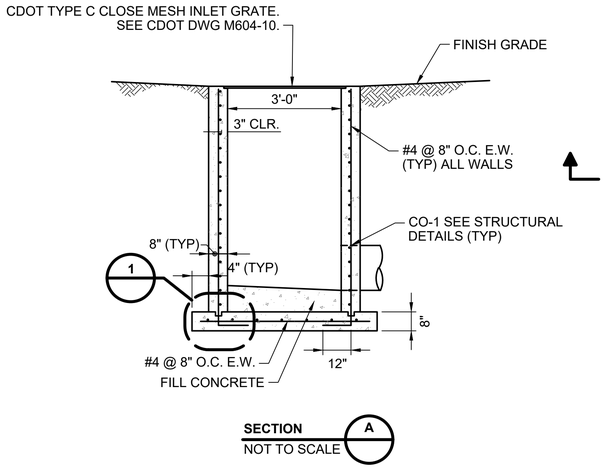
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS V

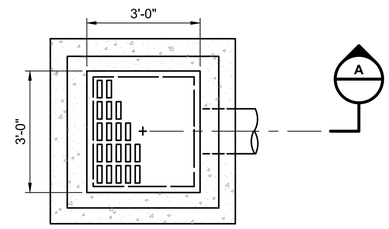
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** C006 | **rev.** 2 |
| **sheet** 10 **of** 542 sheets | |
| **file** 98101 C_006.DWG | |

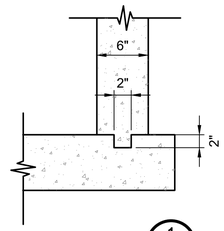
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_006.DWG 10/20/2020 8:51 PM MDSTROBEL




**SECTION A**
NOT TO SCALE




**1**
NOT TO SCALE

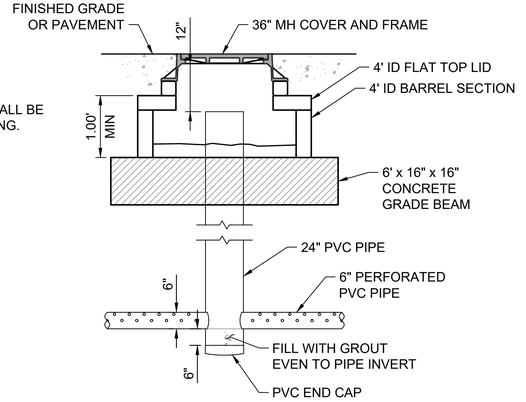
NOTES:

1. ALL JOINTS TO BE SET IN FLEXIBLE BUTYL RESIN SEALING COMPOUND AND PLASTERED WITH MORTAR 5/8" THICK AND EXTENDING 4" EACH SIDE OF JOINT INSIDE AND OUTSIDE.
2. SEE STORMWATER DWGS FOR INLET AND OUTLET PIPE LOCATIONS AND ELEVATIONS.
3. CONTRACTOR SHALL ADD CONCRETE TO MATCH PIPE INVERT FLOWLINES.

**AREA DRAIN**
**NOT TO SCALE** 1

NOTES:

1. MANHOLE BARREL, LID, COVER, AND FRAME SHALL BE RATED FOR H-20 LOADING.




**VERTICAL INSPECTION PIPE** 3
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS VI

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **C007** – **rev.** **1**

**sheet** 11 **of** 542 sheets

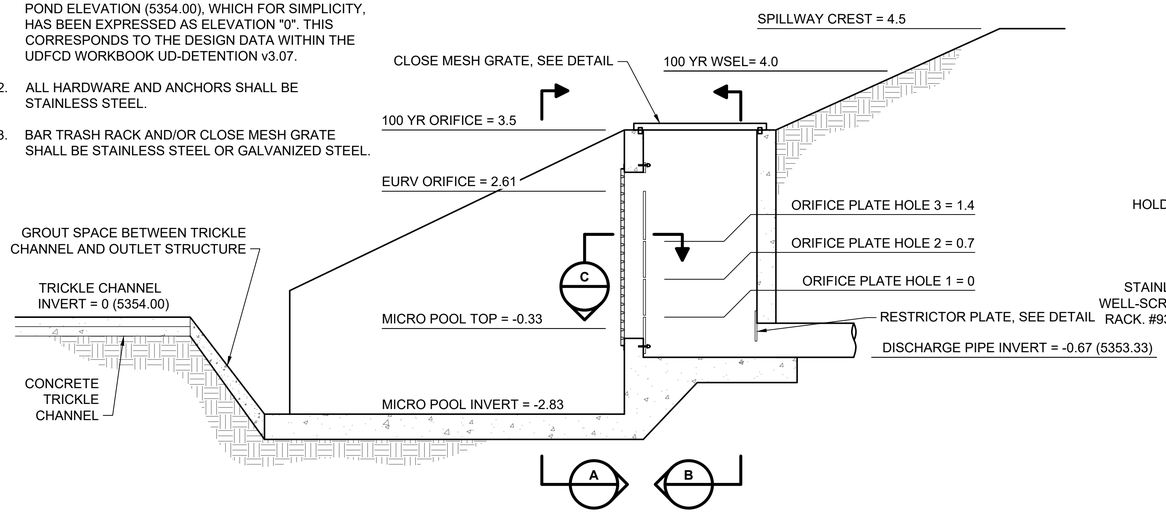
**file** 98101 C_007.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

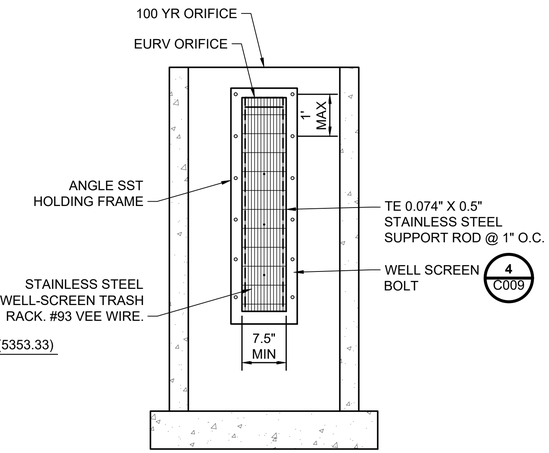
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_007.DWG 10/22/2020 12:31 PM MDSTROBEL

NOTES:

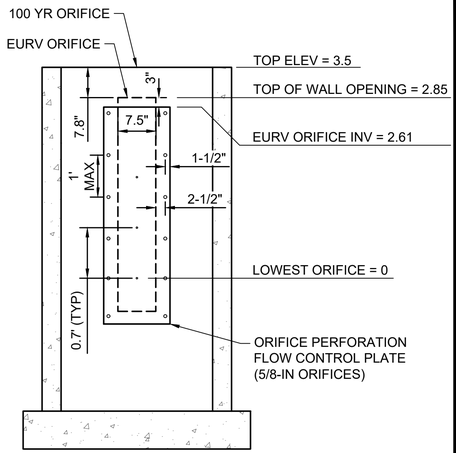
1. ELEVATIONS ARE RELATIVE TO THE BOTTOM OF POND ELEVATION (5354.00), WHICH FOR SIMPLICITY, HAS BEEN EXPRESSED AS ELEVATION "0". THIS CORRESPONDS TO THE DESIGN DATA WITHIN THE UDFCD WORKBOOK UD-DETENTION v3.07.
2. ALL HARDWARE AND ANCHORS SHALL BE STAINLESS STEEL.
3. BAR TRASH RACK AND/OR CLOSE MESH GRATE SHALL BE STAINLESS STEEL OR GALVANIZED STEEL.



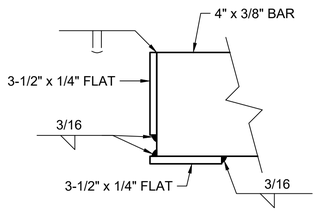

**OUTLET STRUCTURE DETAIL I** (1) △2
**NOT TO SCALE**



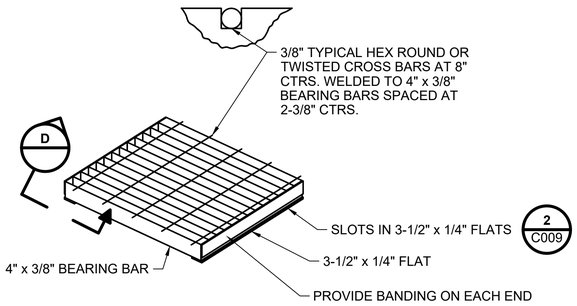

**SECTION A**
**NOT TO SCALE**



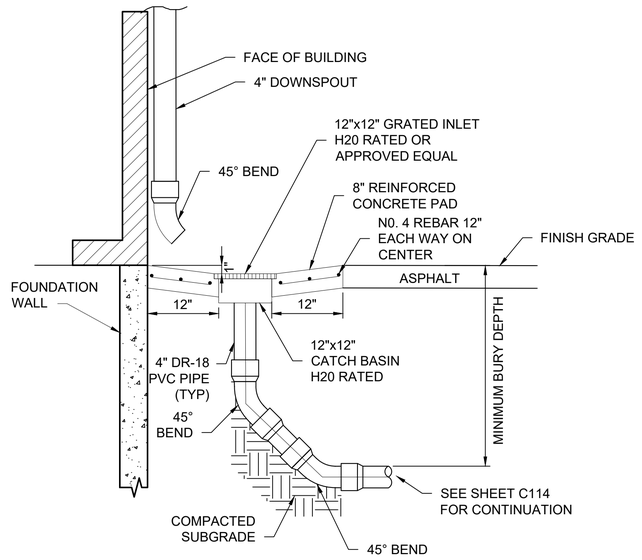

**SECTION B**
**NOT TO SCALE**



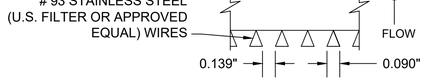

**SECTION D**
**NOT TO SCALE**



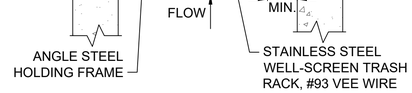

**CLOSE MESH GRATE DETAIL** 2 △2
**NOT TO SCALE**



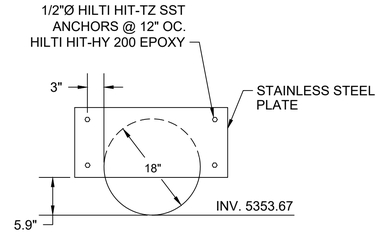

**DOWNSPOUT** 5
**NOT TO SCALE**




**WELL SCREEN DETAIL** 4
**NOT TO SCALE**




**SECTION C**
**NOT TO SCALE**




**RESTRICTOR PLATE DETAIL** 3
**NOT TO SCALE**

△1

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 02/07/20 | AG | NT | REVISED PER RFI #168 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | A. GEORGE |
| **designed** | **checked** |
| A. GEORGE | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS VII

| project | contract |
|---|---|
| 98101 | |

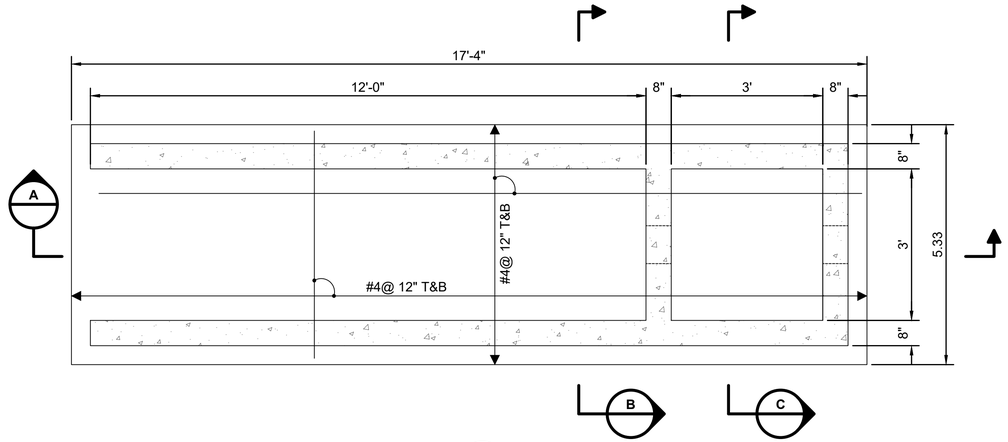
**drawing** C008 — **rev.** 2

**sheet** 12 **of** 542 sheets

**file** 98101 C_008.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

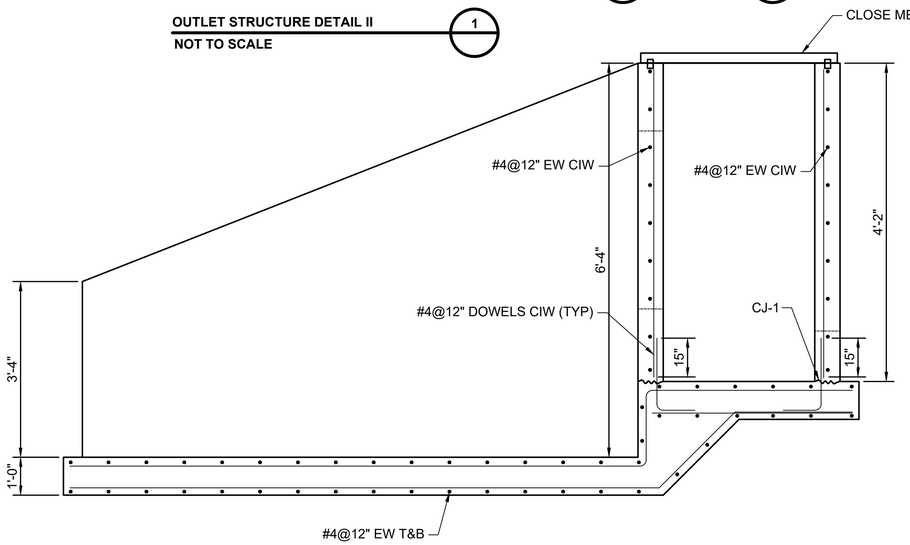
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_008.DWG 10/22/2020 5:18 PM MDSTROBEL



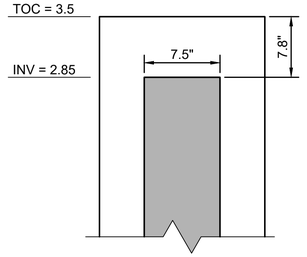

GENERAL CAST-IN-PLACE CONCRETE NOTES

1. ALL CONCRETE SHALL BE DESIGNED AND PLACED IN ACCORDANCE WITH THE CITY OF THORNTON STANDARD SPECIFICATIONS AND ACI 318-14.
2. BEFORE CONCRETE WORK BEGINS, THE PROPOSED CONCRETE MIX DESIGN, ALONG WITH ASSOCIATED DATA SHOWING COMPLIANCE WITH THESE REQUIREMENTS, SHALL BE SUBMITTED FOR APPROVAL.
3. ALL REINFORCING STEEL, BOLSTERS, CHAIRS, AND ACCESSORIES SHALL MEET THE CITY OF THORNTON STANDARD SPECIFICATIONS, ACI-SP-66, AND THE CRSI MANUAL OF STANDARD PRACTICE.
4. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
5. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT UNLESS OTHERWISE NOTED:
   - 5.1. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"
   - 5.2. CONCRETE EXPOSED TO EARTH, LIQUID, WEATHER = 2"
6. SEE STRUCTURAL DRAWINGS FOR TYPICAL CORNER BAR DETAILS, LAP SLICE TABLE, AND JOINT DETAILS. ALL CONSTRUCTION JOINTS BETWEEN WALLS AND SLABS SHALL BE TYPE CJ-2.
7. CONCRETE OUTLET STRUCTURE MAY BE DESIGNED BY A LICENSED CONCRETE PRECASTER, AT THE CHOICE OF THE DESIGN-BUILDER. STRUCTURES DESIGNED BY A PRECASTER MUST BE STAMPED BY A LICENSED COLORADO PE. PRECASTER'S DRAWINGS AND CALCULATIONS SHOULD BE PROVIDED TO ENGINEER FOR APPROVAL.

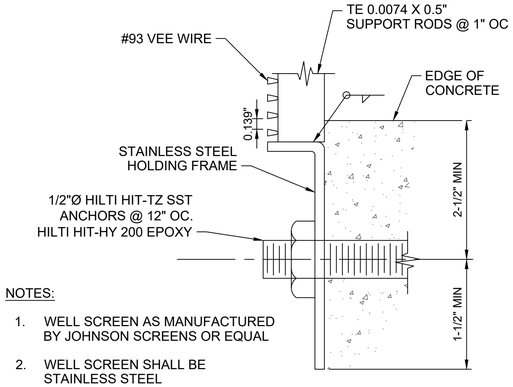
**OUTLET STRUCTURE DETAIL II** — 1
**NOT TO SCALE**




**SECTION A** — NOTES 1
**NOT TO SCALE**



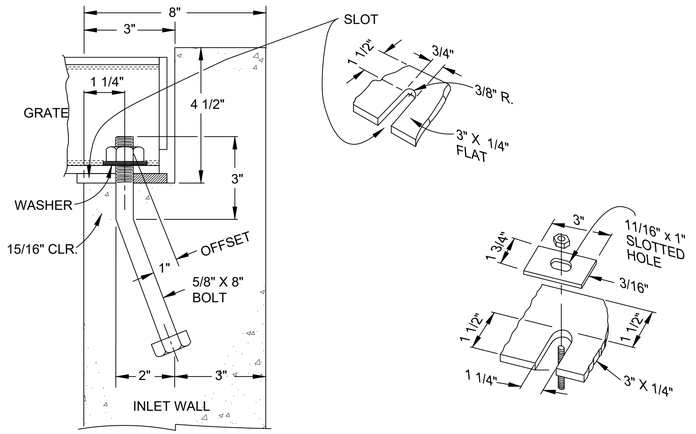

**WALL OPENING DETAIL** — 3
**NOT TO SCALE**



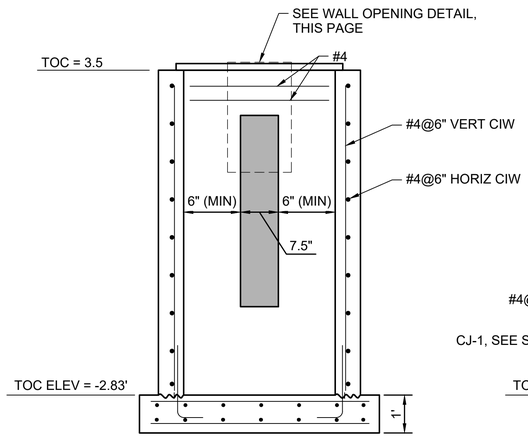

NOTES:

1. WELL SCREEN AS MANUFACTURED BY JOHNSON SCREENS OR EQUAL
2. WELL SCREEN SHALL BE STAINLESS STEEL

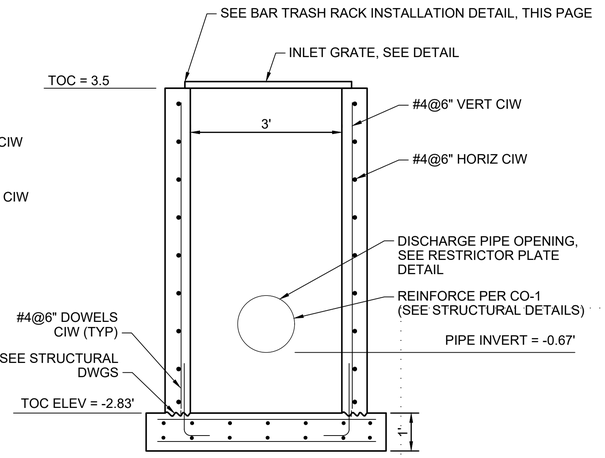
**WELL SCREEN BOLT DETAIL** — 4
**NOT TO SCALE**




**BAR TRASH RACK INSTALLATION DETAIL** — 2
**NOT TO SCALE**




**SECTION B**
**NOT TO SCALE**




**SECTION C**
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

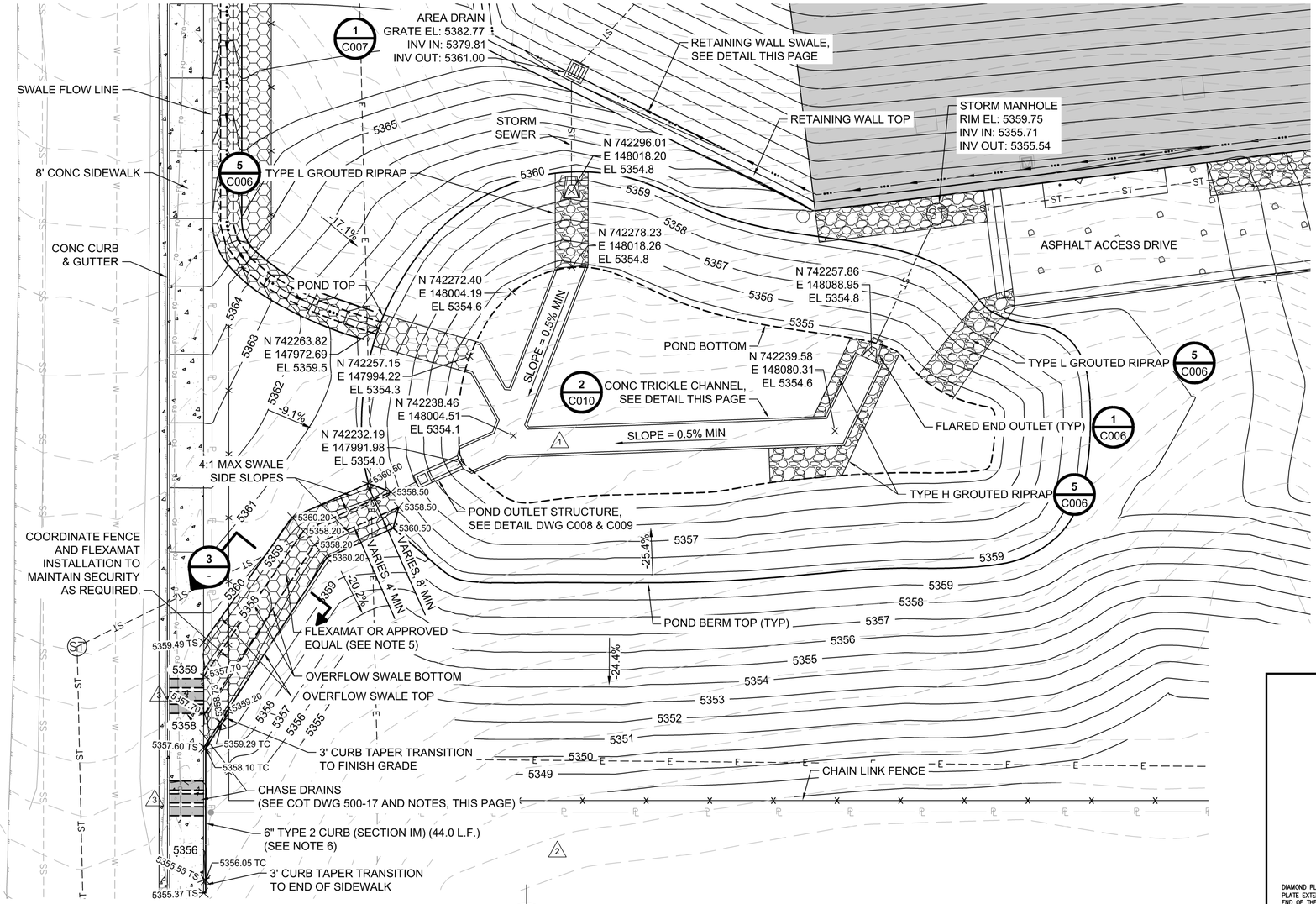
**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS VIII

| | |
|---|---|
| project 98101 | contract |
| drawing **C009** | rev. **1** |
| sheet 13 of 542 sheets | |
| file 98101 C_009.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_009.DWG 10/22/2020 5:42 PM MDSTROBEL

Scale For Microfilming: Millimeters / Inches




**ABBREVIATIONS**
TC = TOP OF CURB
TS = TOP OF SIDEWALK

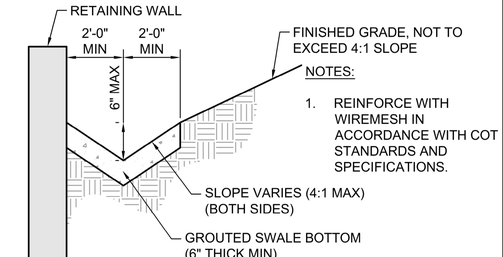
NORTH

**STORMWATER DETENTION POND DETAIL** 3

0 15' 30'
SCALE IN FEET

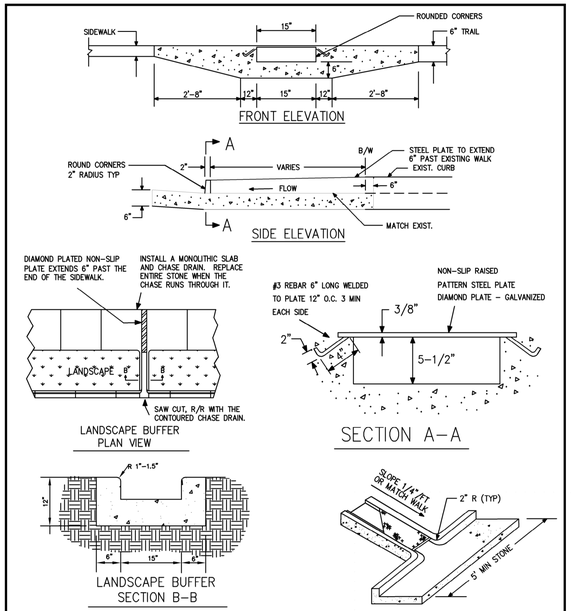
NOTES:

1. DETENTION POND SPILLWAY SHALL DRAIN TOWARDS SIDEWALK, AND BE DIRECTED UNDER SIDEWALK WITH THREE ADJACENT CHASE DRAINS, MATCHING THE CITY OF THORNTON DETAIL PROVIDED ON THIS PAGE.
2. CHASE DRAINS SHALL BE SPACED FROM EDGE TO EDGE AT 6".
3. CHASE DRAINS SHALL DISCHARGE TO THE FLOW LINE OF THE PROPOSED CURB AND GUTTER.
4. GROUTED RIPRAP BOTTOM SWALE SHALL CONTINUE INTO POND TOWARDS POND BOTTOM.
5. CHANNEL OVERFLOW SWALE SHOULD BE OVEREXCAVATED 2.5-INCHES TO ACCOMMODATE FLEXAMAT. INSTALL MIRAFI 600 (OR APPROVED EQUAL) UNDER FLEXAMAT. FLEXAMAT SHALL BE ANCHORED A MINIMUM OF 2 BLOCKS INTO TOP OF SWALE OR TOP OF SLOPE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6. CONCRETE CURB SHALL BE PER CITY OF THORNTON DRAWING 500-8 TYPE 2 (SECTION IM) DETAIL. GUTTER IS NOT REQUIRED. CURB SHALL BE INSTALLED ABUTTED TO SIDEWALK AND SEPARATED WITH A NON-EXTRUDABLE ISOLATION MATERIAL AT THE JOINT BETWEEN THE CURB AND SIDEWALK.



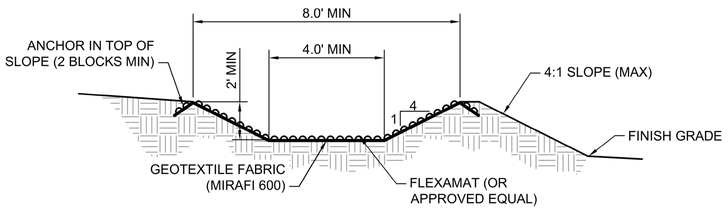

NOTES:
1. REINFORCE WITH WIREMESH IN ACCORDANCE WITH COT STANDARDS AND SPECIFICATIONS.

**RETAINING WALL SWALE DETAIL** 1
**NOT TO SCALE**

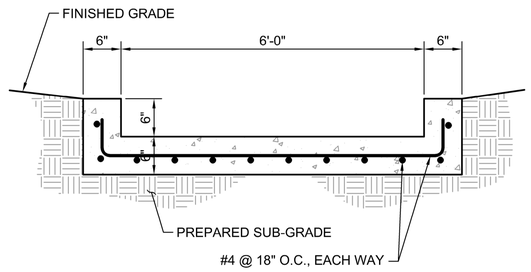



NOTE:
CONCRETE SHALL CONFORM TO CITY OF THORNTON SECTION 600-CONCRETE.
4500PSI CDOT CLASS D CONCRETE WITH FIBER MESH REINFORCEMENT

N.T.S.




**OVERFLOW SWALE SECTION** 3
**NOT TO SCALE**




**TRICKLE CHANNEL DETAIL** 2
**NOT TO SCALE**

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS
CONCRETE SIDEWALK CHASE DRAIN (FOR COMMERCIAL, COMMON AREAS, AND DETACHED)

ISSUED: APRIL 1992
REVISED: MAY 2010
DRAWING NO. 500-17

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 08/13/20 | NT | NT | ISSUED FOR REVISION |
| 3 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| MARCH 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

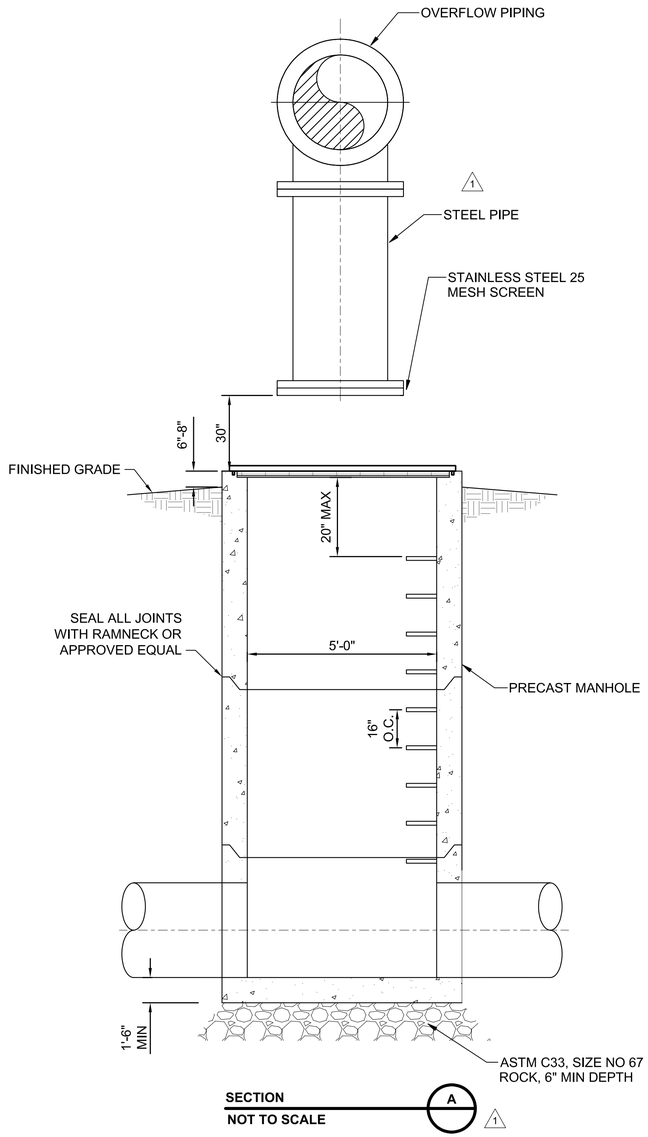
**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS IX

| project | contract |
|---|---|
| 98101 | |

drawing **C010** – rev. **3**

sheet 14 of 542 sheets
file 98101 C_010.DWG

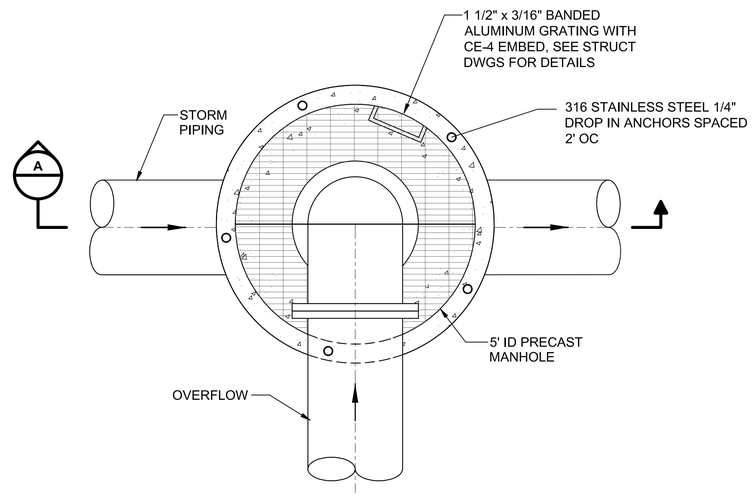
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



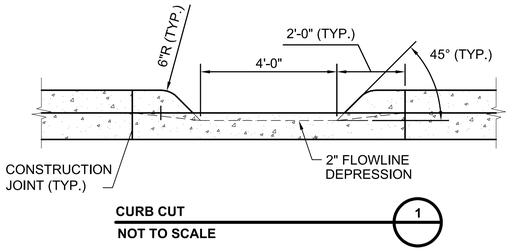

**SECTION A**
**NOT TO SCALE**
1

NOTES:

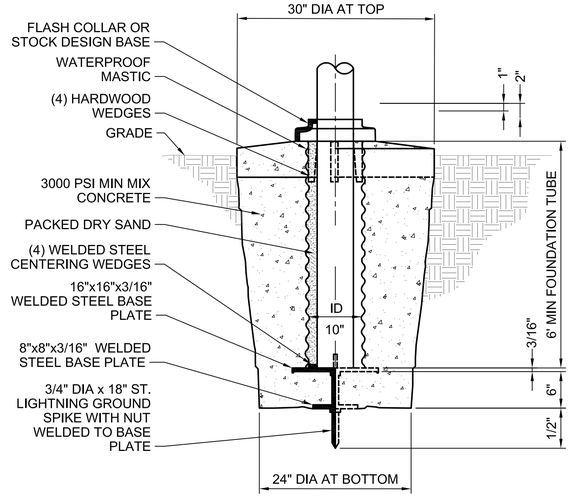
1. STRUCTURE SHALL BE RATED FOR H20 LOADING. PRECAST VAULT STRUCTURE CALCULATIONS TO BE PROVIDED BY SUPPLIER AND DESIGNED AND STAMPED BY A COLORADO PE.
2. MANHOLE BENCH HEIGHT SHALL EQUAL 1/2 PIPE DIAMETER, MINIMUM.
3. MANHOLE BENCHES SHALL BE BRUSHED AND INVERTS SHALL BE SMOOTH.
4. SEE PROCESS DWG D102 FOR OVERFLOW PIPE ELEVATIONS AND LOCATIONS.




**OVERFLOW MANHOLE DETAIL 2**
**NOT TO SCALE**
1




**CURB CUT 1**
**NOT TO SCALE**




**FLAG POLE FOUNDATION DETAIL 3**
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | EG | NT | CONFORMING TO CONSTRUICTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| MARCH 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS X

| project | contract |
|---|---|
| 98101 | |

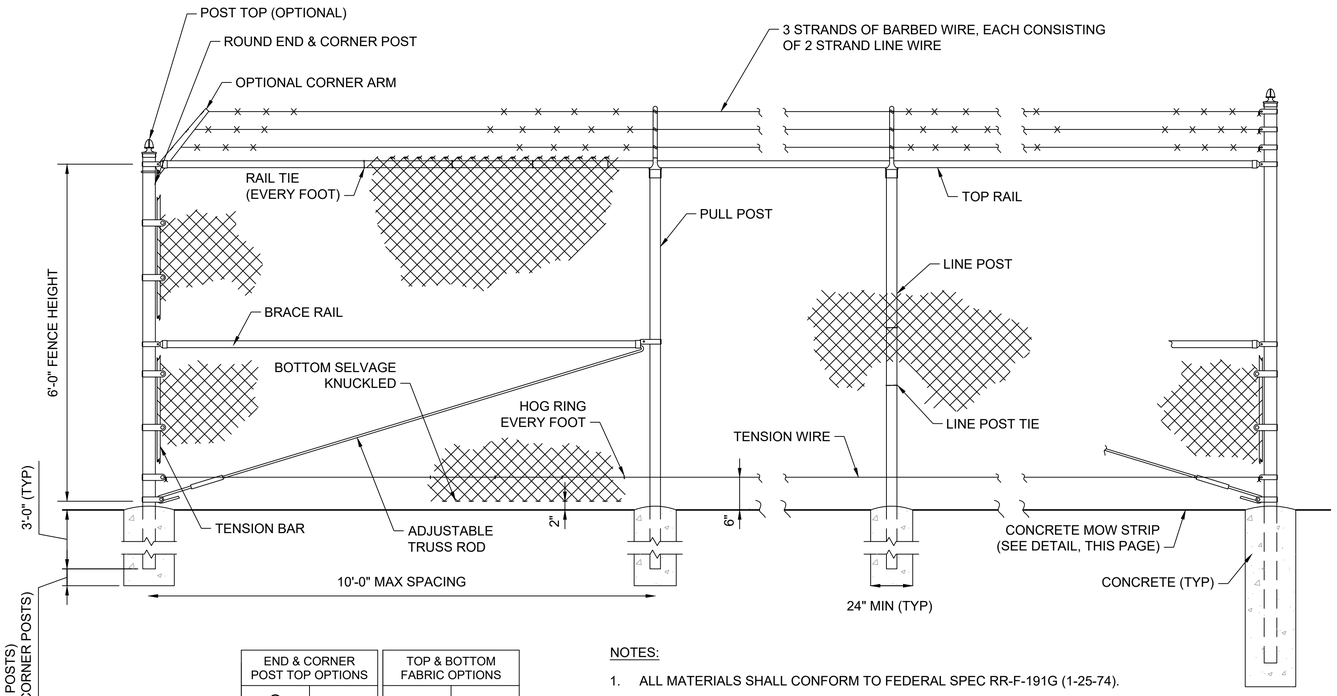
**drawing** C011 – **rev.** 1

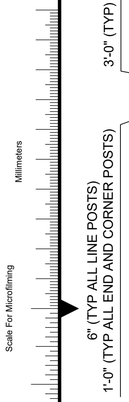
**sheet** 15 **of** 542 sheets

**file** 98101 C_011.DWG

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



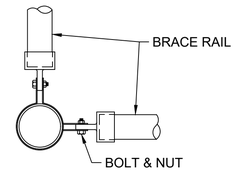



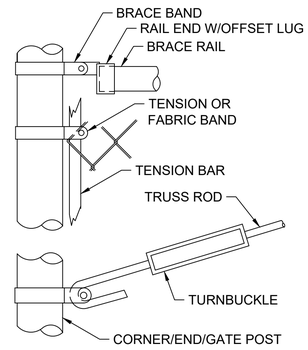

| END & CORNER POST TOP OPTIONS | | TOP & BOTTOM FABRIC OPTIONS | |
|---|---|---|---|
| STANDARD | DOME | TWIST | KNUCKLE |
|  |  |  |  |

NOTES:

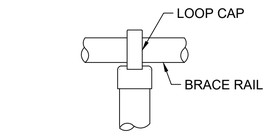
1. ALL MATERIALS SHALL CONFORM TO FEDERAL SPEC RR-F-191G (1-25-74).
2. ALL GALVANIZED FITTINGS TO CONFORM TO ASTM-A153.
3. SHALL UTILIZE 9 GAUGE WIRE OR HEAVIER.
4. CHAIN LINK FENCING SHALL BE PVC COATED, BLACK IN COLOR. FABRIC SHALL BE COATED TO A MINIMUM THICKNESS OF 0.2 MM OVER TOP OF SPECIFIED GALVANIZED WIRE. ALL POSTS, RAILS, AND FRAMEWORK SHALL BE COATED TO A MINIMUM THICKNESS OF 0.25 MM OVER TOP OF GALVANIZING.

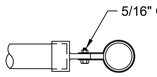
**CHAIN LINK FENCE** — 1
**NOT TO SCALE**

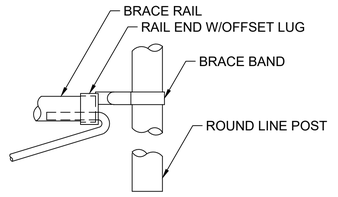


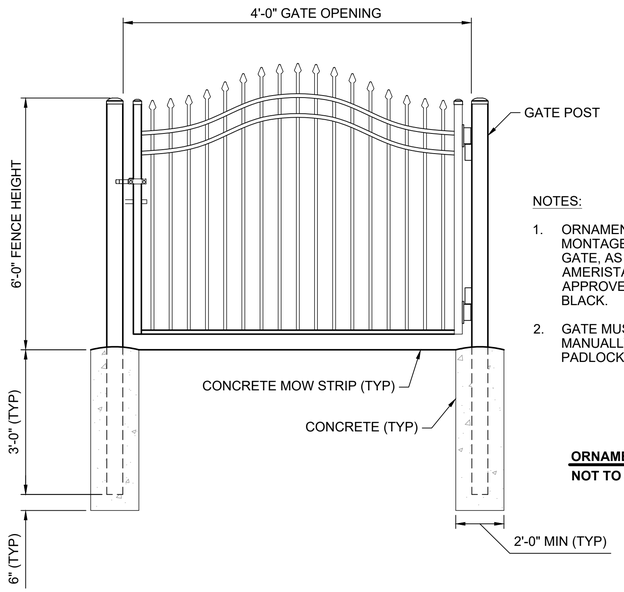

**END, CORNER, OR GATE POST**



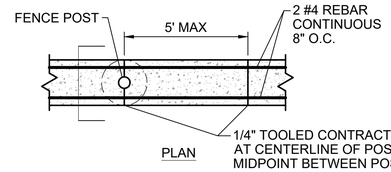

**LINE POST**



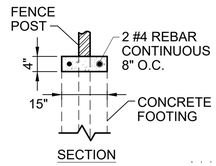

NOTES:

1. ORNAMENTAL MAN GATE SHALL BE MONTAGE II CLASSIC SINGLE SWING MAN GATE, AS MANUFACTURED BY AMERISTAR FENCE PRODUCTS, INC. (OR APPROVED EQUAL). COLOR SHALL BE BLACK.
2. GATE MUST BE LOCKABLE WITH MANUALLY OPERATED LEVER AND PADLOCK.

**ORNAMENTAL MAN GATE** — 2
**NOT TO SCALE**




PLAN




SECTION

**CONCRETE MOW STRIP** — 3
**NOT TO SCALE**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XI

| project | contract |
|---|---|
| 98101 | |

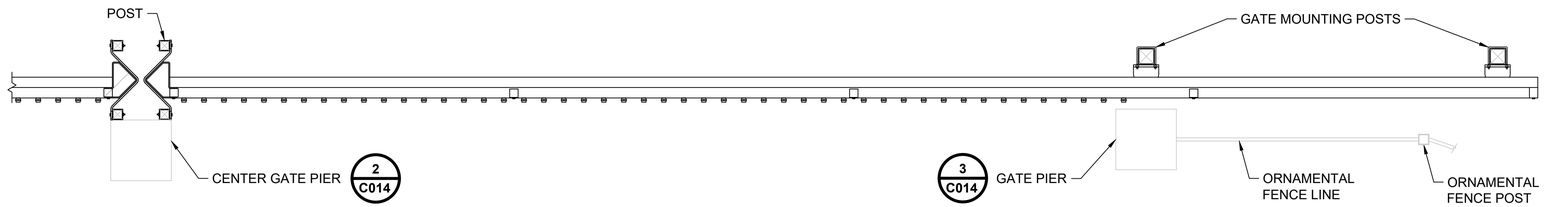
drawing **C012 – 0** (rev.)

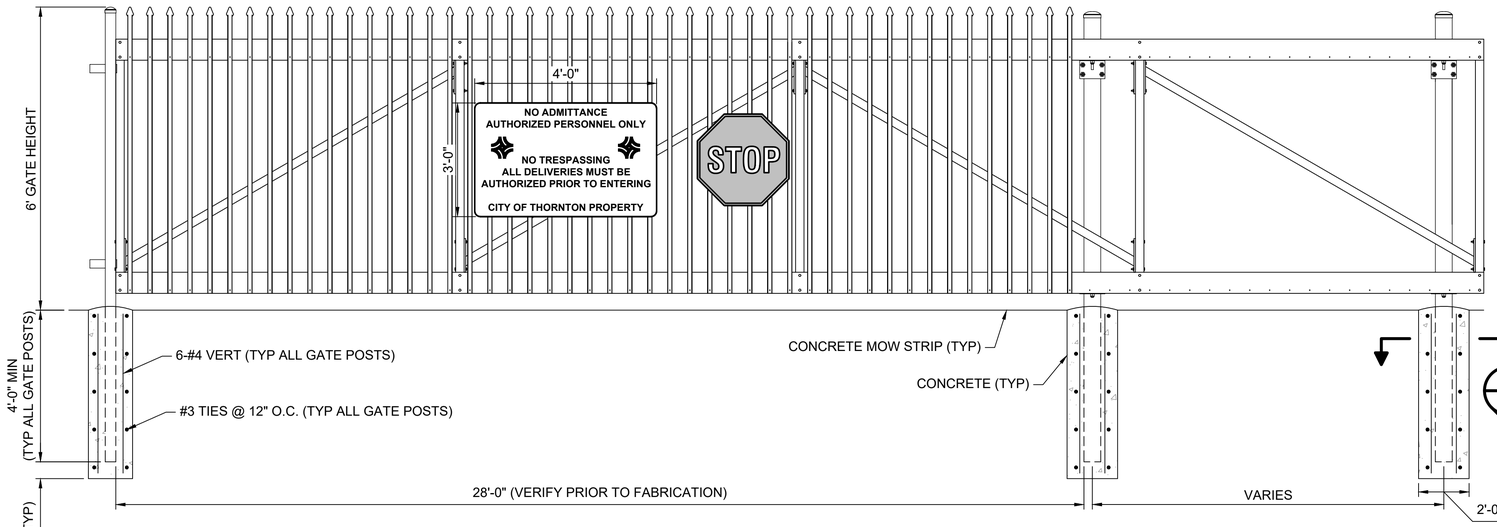
sheet 16 of 542 sheets

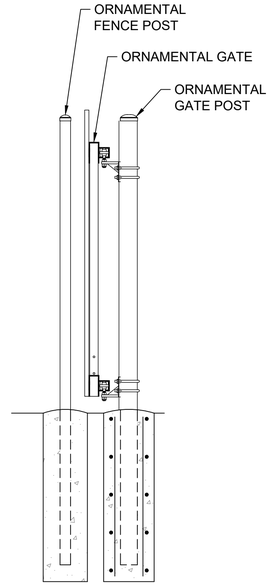
file 98101 C_012.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_012.DWG 10/20/2020 9:53 PM MDSTROBEL




NOTES:

1. ORNAMENTAL CANTILEVERED GATE SHALL BE TRANSPORT II CLASSIC, AS MANUFACTURED BY AMERISTAR FENCE PRODUCTS, INC. (OR APPROVED EQUAL). COLOR SHALL BE BLACK. GATE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR SHALL PROVIDE FINAL DRAWINGS AND DETAILS SHOWING CONFIGURATION OF GATE AND FENCE PILLARS.
2. GATE SHALL BE MOTOR OPERATED. SEE ELECTRICAL DWGS AND SPECIFICATIONS FOR MOTOR AND OPERATION REQUIREMENTS.
3. CONTRACTOR SHALL ENSURE THAT SITE GRADING WILL ALLOW THE GATE TO OPEN. SEE GRADING PLAN FOR ELEVATIONS.
4. INSTALL STOP AND AUTHORIZED PERSONNEL ONLY SIGNS ON BOTH GATES, FACING OUTSIDE OF PLANT.
5. STOP SIGN SHALL COMPLY WITH MUTCD SPECIFICATIONS.
6. SIGNS SHALL BE REFLECTIVE.

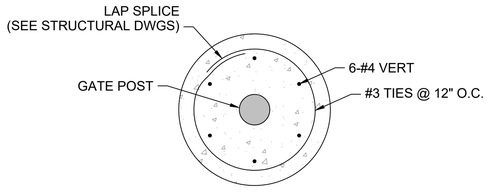
**ORNAMENTAL CANTILEVERED SLIDE GATE** 1
**NOT TO SCALE**



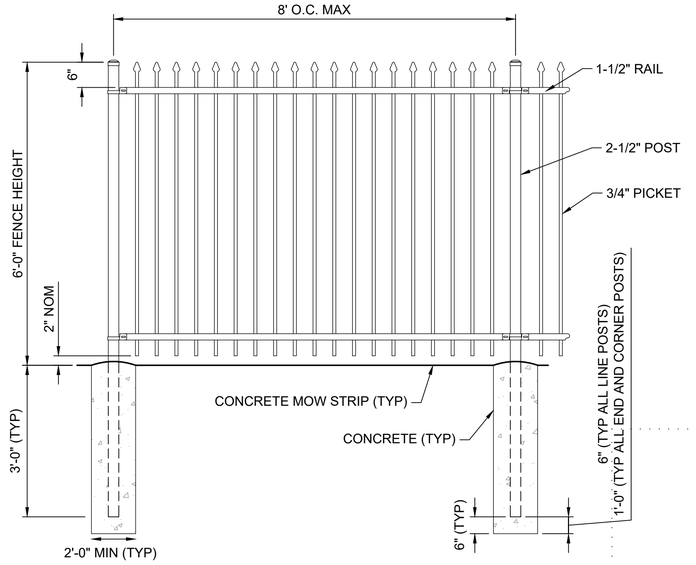

NOTES:

1. SIGN SHALL BE .080" ALUMINUM, WITH FADE RESISTANT BLACK LETTERING ON WHITE BACKGROUND.
2. SIGNS SHALL BE POSTED ON FENCE, NEAR CORNER POSTS. (2) SIGNS SHALL BE POSTED AT EACH POST, (1) FACING EACH DIRECTION.

**NO TRESPASSING SIGN DETAIL** 3
**NOT TO SCALE**




**GATE POST FOUNDATION SECTION** A
**NOT TO SCALE**




**ORNAMENTAL FENCE** 2
**NOT TO SCALE**

NOTES:

1. ORNAMENTAL FENCE SHALL BE MONTAGE II CLASSIC 2-RAIL AS MANUFACTURED BY AMERISTAR FENCE PRODUCTS, INC. (OR APPROVED EQUAL). COLOR SHALL BE BLACK.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XII

| project | contract |
|---|---|
| 98101 | |

drawing **C013 – 0** (rev.)

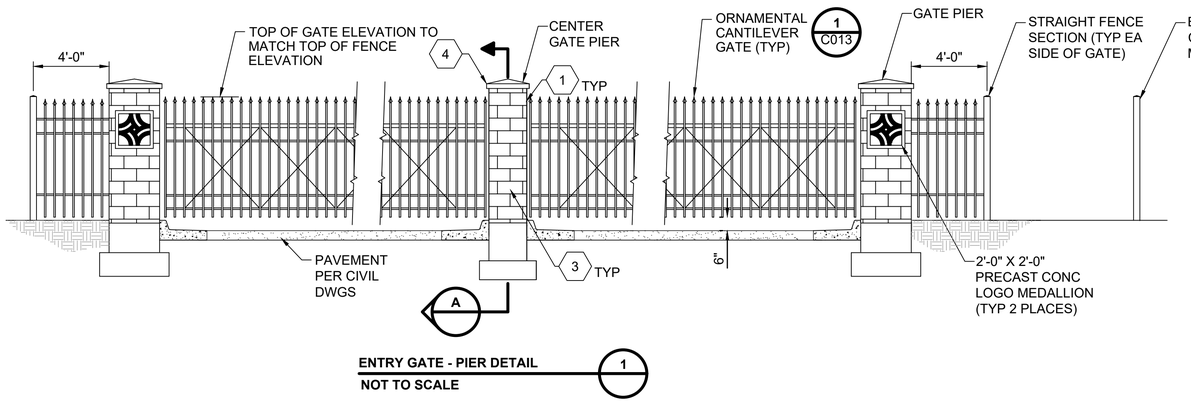
sheet 17 of 542 sheets

file 98101 C_013.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

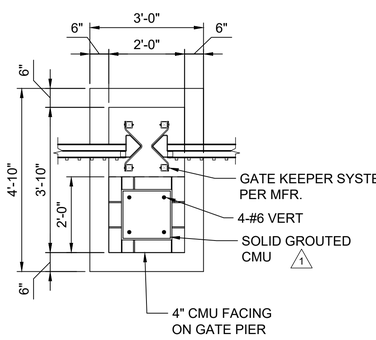
Scale For Microfilming: Millimeters / Inches

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_013.DWG 10/20/2020 9:57 PM MDSTROBEL

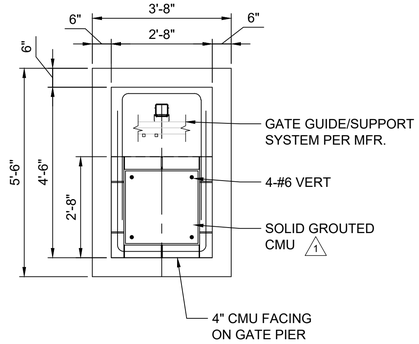



**ENTRY GATE - PIER DETAIL** 1
**NOT TO SCALE**

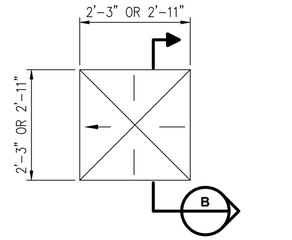
NOTE: SEE ELEVATION KEYNOTES BELOW.



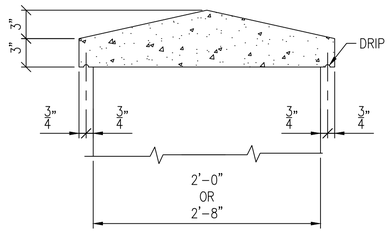

**CENTER GATE PIER DETAIL** 2
**NOT TO SCALE**



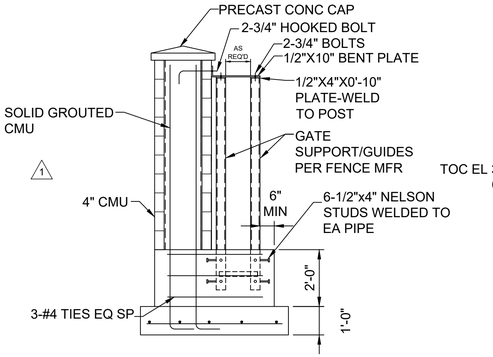

**GATE PIER DETAIL** 3
**NOT TO SCALE**



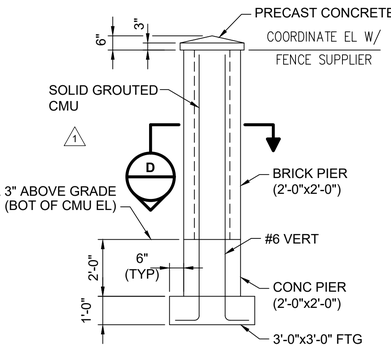

**PRECAST CONCRETE CAP DETAIL** 4
**NOT TO SCALE**



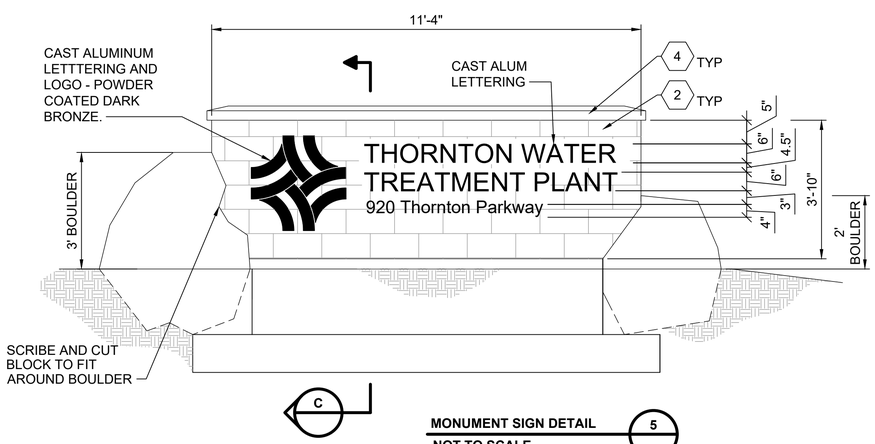

**SECTION** B
**NOT TO SCALE**



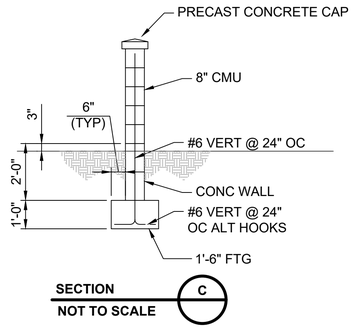

**CENTER GATE PIER SECTION** A
**NOT TO SCALE**



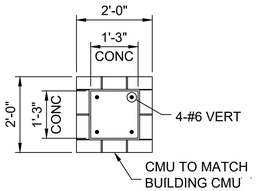

**TYPICAL FENCE PIER DETAIL** 6
**NOT TO SCALE**




**MONUMENT SIGN DETAIL** 5
**NOT TO SCALE**




**SECTION** C
**NOT TO SCALE**




**SECTION** D
**NOT TO SCALE**

**ELEVATION KEYNOTES:**

1. SCORED SMOOTH FACE CMU BASALITE 668R WITH 245 PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2. SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
3. SPLITFACE CMU, BASALITE 924R WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4. PRECAST CONCRETE CAP, TO MATCH METAL PANELS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XIII

| project | contract |
|---|---|
| 98101 | |

drawing **C014** – rev. **1**

sheet 18 of 542 sheets

file 98101 C_014.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_014.DWG 10/28/2020 4:42 PM MDSTROBEL




**GATE LOOP DETAIL (MAIN ENTRANCE GATE)** 1

NOTES:

1. LOCATION OF GATE OPERATORS AND DETECTION LOOPS TO BE COORDINATED WITH GATE MANUFACTURER/SUPPLIER.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XIV

| project | contract |
|---|---|
| 98101 | |

**drawing** C015 – **rev.** 2

**sheet** 19 **of** 542 sheets

**file** 98101 C_015.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

STAKING: INSTALL 6' METAL T-POST STAKES OUTSIDE PLANTING PIT IN UNDISTURBED MULCHED SOIL. USE #12 GAUGE GALVANIZED WIRE.

ALLOW FOR SOME TRUNK MOVEMENT

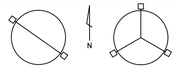
ATTACH TO 2" NYLON STRAPS THROUGH METAL GROMMETS, WITH 1/2" x 15" WHITE PVC SLEEVE ON EACH WIRE.

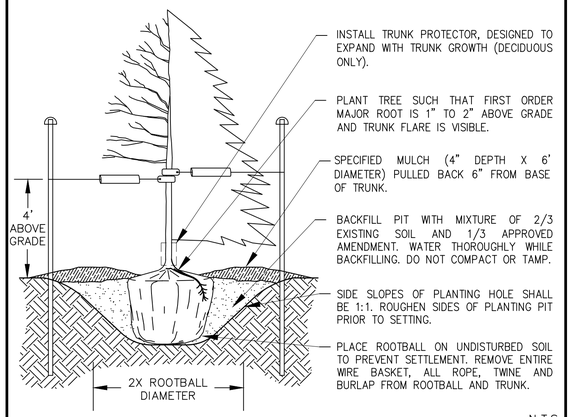
NYLON STRAPS SHALL BE LONG ENOUGH TO ACCOMMODATE 1-1/2" OF TRUNK GROWTH.

ADD PROTECTOR CAP TO TOP OF POST.

WRAP TREES TO FIRST BRANCH IF PLANTED IN THE FALL. DO NOT WRAP IF PLANTED IN SPRING.

TREE STAKING PLAN VIEW




N.T.S.

| | | |
|---|---|---|
| CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>DECIDUOUS AND EVERGREEN TREE PLANTING DETAIL | ISSUED: MARCH 1996<br>REVISED: APRIL 2010 | DRAWING NO. 800-1A |

ARRODRIGAR: INSTALAR ESTACAS METÁLICAS EN FORMA DE T DE 6' FUERA DEL HOYO DE PLANTACIÓN EN TIERRA SIN DISTURBAR CUBIERTA DE MANTILLO. USE ALAMBRE GALVANIZADO DE ANCHO #12.

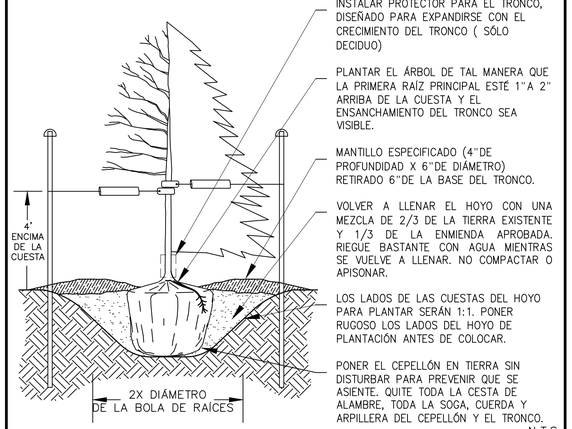
DEJE ESPACIO PARA QUE EL TRONCO SE PUEDA MOVER

PONER CORREAS DE NYLON DE 2"A TRAVÉS DE OJALES METÁLICOS, CON UNA MANGA DE PVC BLANCA DE ½"X 15"EN CADA ALAMBRE.

LAS CORREAS DE NYLON SERÁN LO SUFICIENTEMENTE LARGAS PARA PERMITIR QUE EL TRONCO CREZCA 1 –½"

AGREGAR TAPA PROTECTORA A LA PARTE DE ARRIBA DE LA ESTACA.

ENVOLVER LOS ÁRBOLES HASTA LA PRIMERA RAMA SI SE PLANTA EN EL OTOÑO. NO ENVOLVER SI SE PLANTA EN LA PRIMAVERA.




N.T.S.

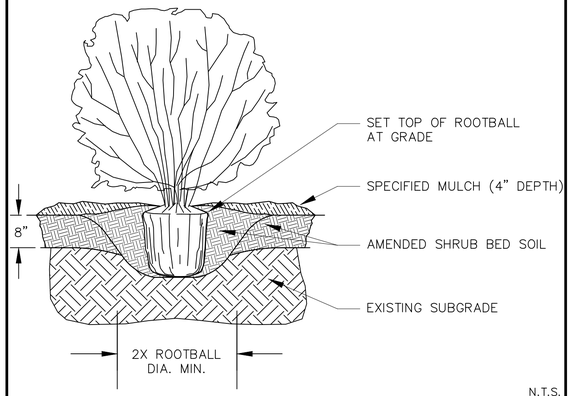
| | | |
|---|---|---|
| CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>DECIDUOUS AND EVERGREEN TREE PLANTING DETAIL | ISSUED: MARCH 1996<br>REVISED: APRIL 2010 | DRAWING NO. 800-1B |

PLANT SHRUBS 1/2 MATURE WIDTH OR 4' FROM EDGE OF WALK, CURB OR EDGING.

ENTIRE SHRUB BED AREA SHALL BE AMENDED WITH 4 CUBIC YARDS (6 CUBIC YARDS FOR CITY MAINTAINED PROJECTS) OF CLASS I OR CLASS II COMPOST PER 1000 S.F. TILLED TO DEPTH OF 8".

IF PLANT IS ROOT BOUND AND HAS CIRCLING ROOTS, SHEAR 1/2" OF THE ROOTMASS OFF OF ALL SIDES AND BOTTOM.

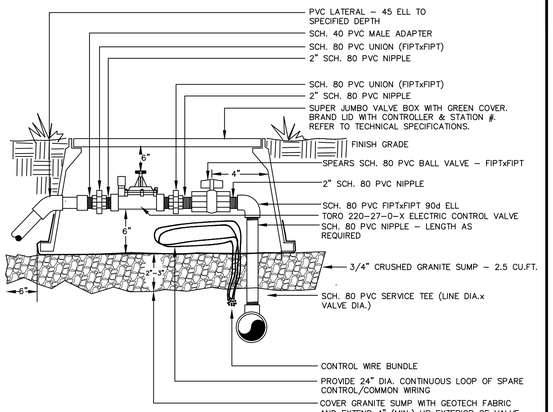
DO NOT PLANT SHRUBS HIGHER THAN SURROUNDING GRADE. BACKFILL SOIL SHOULD BE PULLED OVER TOP OF ROOTBALL (NO MORE THAN 1") TO PREVENT MOISTURE WICKING AND TO ALLOW ROOTS TO GROW INTO SURROUNDING SOIL.




N.T.S.

| | | |
|---|---|---|
| CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>SHRUB PLANTING DETAIL | ISSUED: MARCH 1996<br>REVISED: APRIL 2010 | DRAWING NO. 800-2 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/10/19 | EV | NT | REVISED PER COR-XX |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |



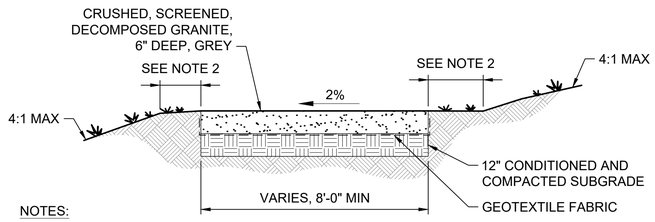

NOTES:
1. DIAMETERS OF BALL VALVES, PVC FITTINGS, AND NIPPLES SHALL EQUAL ELECTRIC CONTROL VALVE DIAMETER
2. VALVE BOXES SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO ADJACENT SIDEWALKS AND HARD SURFACES WHERE APPLICABLE
3. USE BRAND NAMES SPECIFIED OR APPROVED EQUAL
4. BALL VALVE IN SEPARATE BOX FOR VALVES THAT ARE 3" OR GREATER

N.T.S.

| | | |
|---|---|---|
| CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>AUTOMATIC CONTROL VALVE | ISSUED: APRIL 2010<br>REVISED: | DRAWING NO. 800-8 |

NOTES:

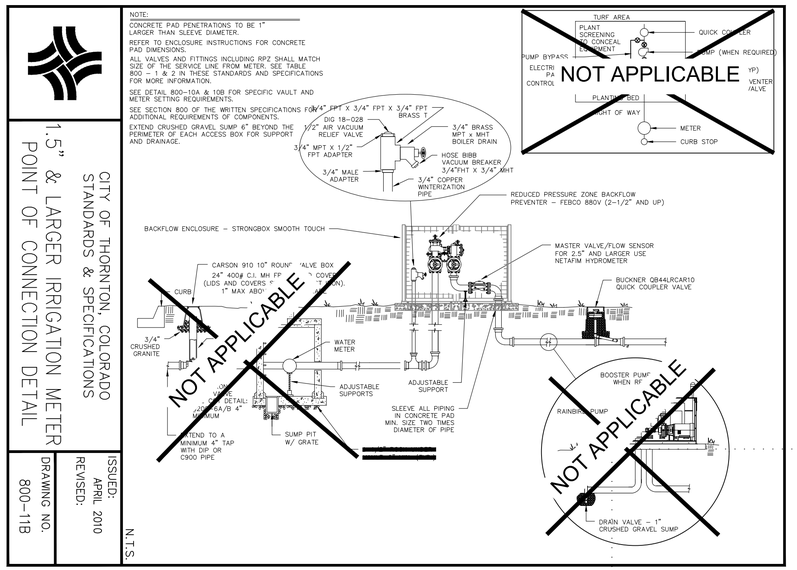
1. CONTRACTOR SHALL DESIGN AND SUBMIT, FOR ENGINEER AND OWNER'S APPROVAL, DRIP IRRIGATION SYSTEM FOR ALL TREES, SHRUBS, AND ORNAMENTAL GRASSED AREAS ON SITE. SPRAY IRRIGATION FOR DRY LAND SEEDING SHALL NOT BE DONE. DESIGN, LAYOUT, AND CALCULATIONS SHALL BE SUBMITTED TO ENGINEER AND OWNER.
2. IRRIGATED AREA SHALL BE DIVIDED INTO INDIVIDUAL ZONES, AS NECESSARY, TO SUPPLY SUFFICIENT WATER PRESSURE AND FLOW RATE FOR THE RESPECTIVE WATER DEMAND. EACH ZONE SHALL CONTAIN A RAIN BIRD QUICK COUPLER VALVE CONNECTION, IN VAULT, AND NECESSARY AUTOMATIC CONTROL VALVES.
3. SEE LANDSCAPING PLAN FOR APPROXIMATE VAULT LOCATIONS. CONTRACTOR TO SUBMIT FOR ENGINEER AND OWNER'S APPROVAL, ON PROPOSED VAULT LOCATIONS.
4. WATER DEPARTMENT IRRIGATION METER, BACKFLOW PREVENTER, AND MASTER VALVE/FLOW SENSOR, SHALL BE LOCATED INSIDE MECHANICAL ROOM FOR WATER TREATMENT PLANT SITE.
5. PARKS DEPARTMENT IRRIGATION METER SHALL BE LOCATED INSIDE WATER TREATMENT MECHANICAL ROOM. BACKFLOW PREVENTER AND MASTER VALVE/FLOW SENSOR, SHALL BE LOCATED NEXT TO WATER DEPARTMENT VAULT. A MANUAL ISOLATION VALVE AND CONTROL VALVES SHALL BE LOCATED OUTSIDE WATER DEPARTMENT FENCE SHOWN ON LANDSCAPING PLAN.




NOTES:

1. SEE SPECIFICATION SECTION 32 FOR GRASS SPECIES COT STANDARDS AND SPECS
2. 2' CLEAR ZONE - MAXIMUM SLOPE: 6:1

**CRUSHER FINES TRAIL/BENCH NODE** (1)
**NOT TO SCALE**




| | | |
|---|---|---|
| CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>1.5" & LARGER IRRIGATION METER POINT OF CONNECTION DETAIL | ISSUED: APRIL 2010<br>REVISED: | DRAWING NO. 800-11B |

N.T.S.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

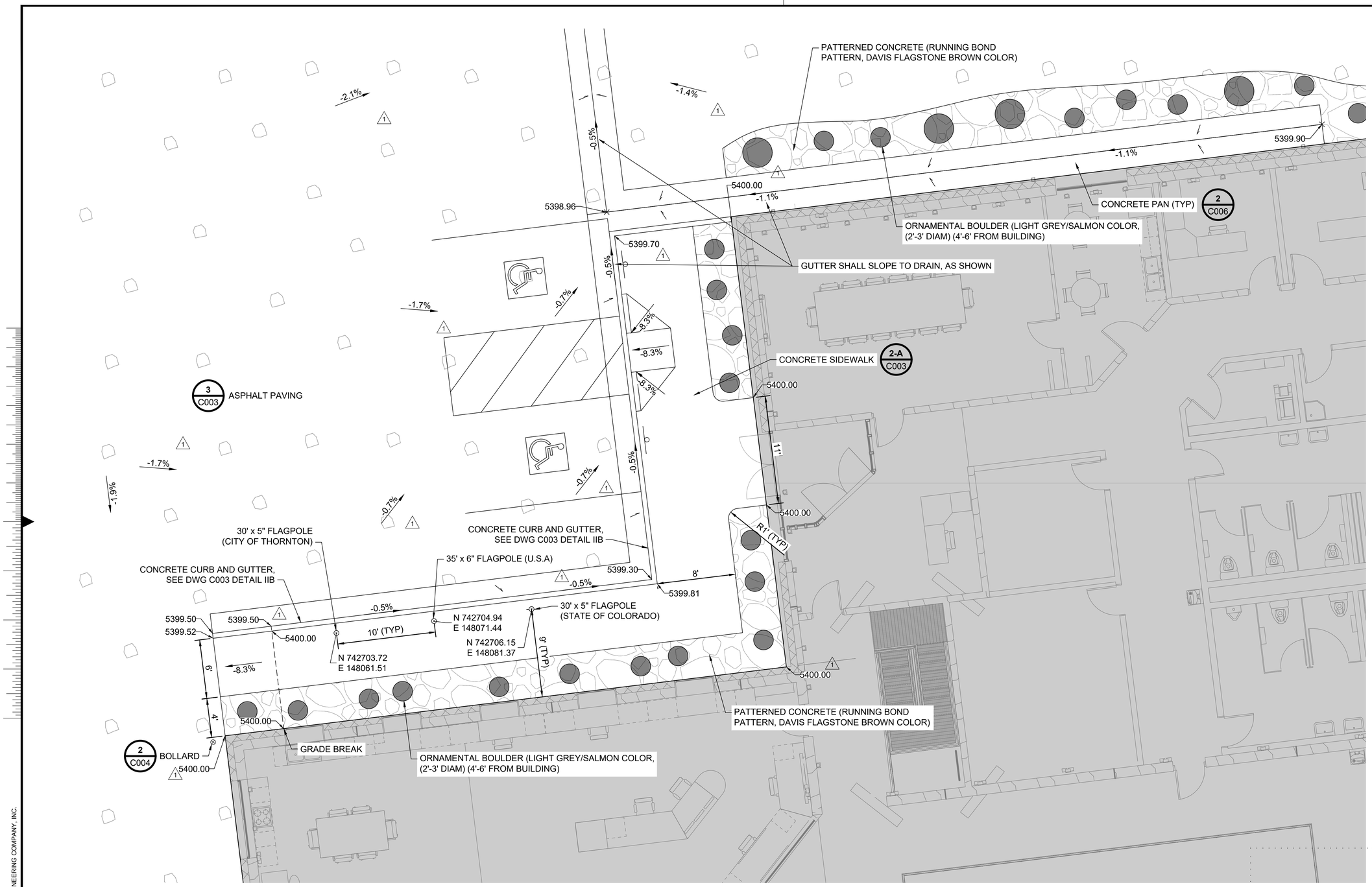
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XV

| | |
|---|---|
| project 98101 | contract |
| drawing C016 – | rev. 2 |
| sheet 20 of 542 sheets | |
| file 98101 C_016.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_016.DWG 10/21/2020 11:28 AM MDSTROBEL




NOTES:

1. SEE DWG C011 FOR FLAG POLE FOUNDATION DETAILS.
2. SITUATE ORNAMENTAL BOULDERS WITHIN PATTERNED CONCRETE IN AN ARCHITECTURAL LAYOUT, SIMILAR TO THAT WHICH IS SHOWN. BOULDERS SHOULD PROVIDE PROTECTION TO ADJACENT BUILDING FROM VEHICLES. EMBED BOULDERS TO A DEPTH OF 6-IN TO 9-IN.

NORTH

**BUILDING ENTRANCE DETAIL** 1

0 5' 10'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 1/15/20 | NT | NT | GRADING REVISION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XVI

| project | contract |
|---|---|
| 98101 | |

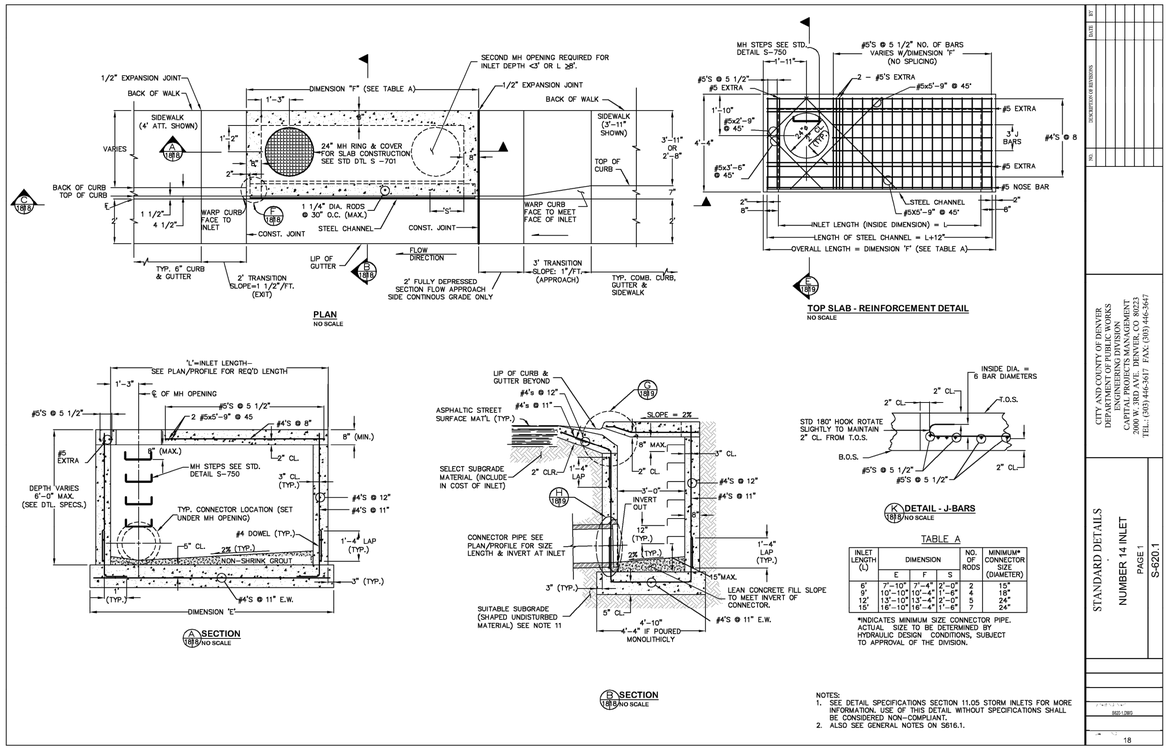
drawing **C017** – rev. **1**

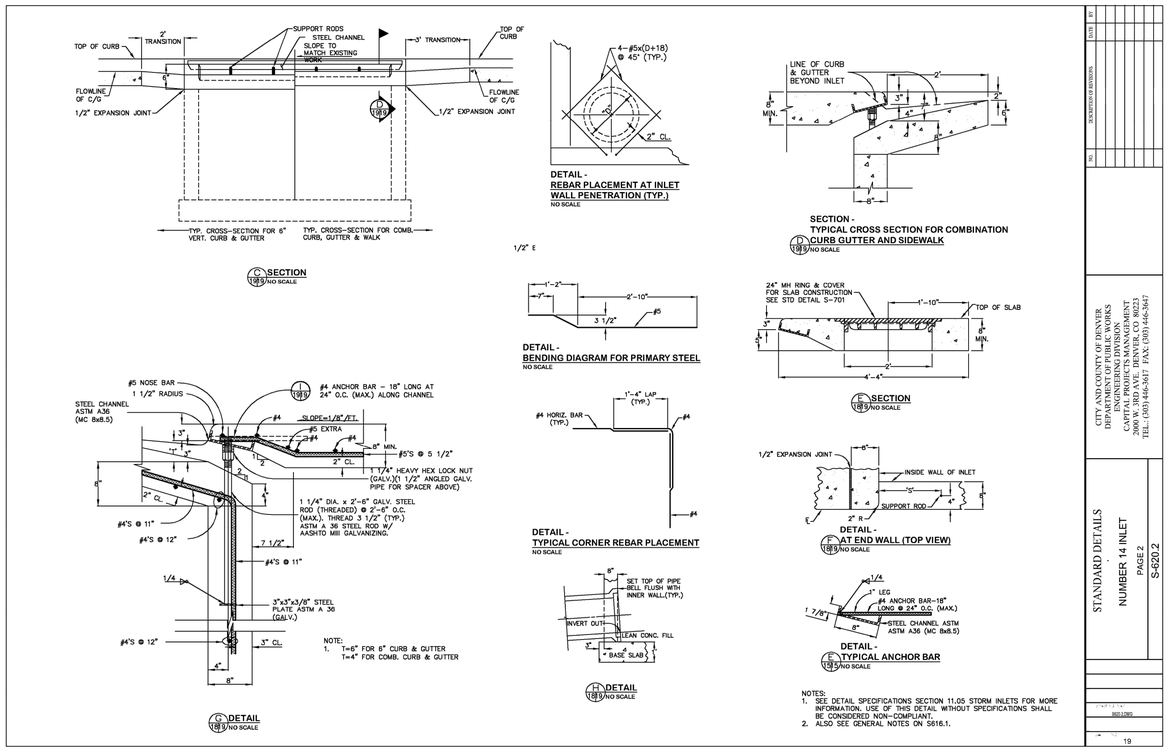
sheet 21 of 542 sheets

file 98101 C_017.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:

1. MANHOLE LIDS SHALL CONFORM TO CITY OF THORNTON DETAIL 400-3.
2. SEE CIVIL SITE PLAN FOR DROP INLET SIZING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

CITY AND COUNTY OF DENVER
DEPARTMENT OF PUBLIC WORKS
DENVER WATER BUILDING
CAPITAL PROJECTS MANAGEMENT
2000 W. 3RD AVE. DENVER, CO 80223
TEL: (303) 446-3437 FAX: (303) 446-3447

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XVII

| project | contract |
|---|---|
| 98101 | |

drawing **C018** – rev. **0**

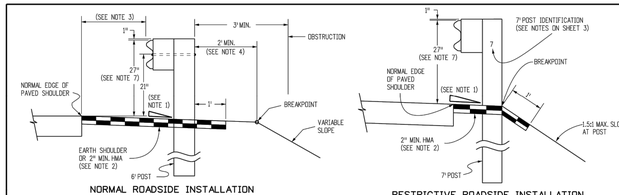
sheet 22 of 542 sheets

file 98101 C_018.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_018.DWG 10/21/2020 2:53 PM MDSTROBEL

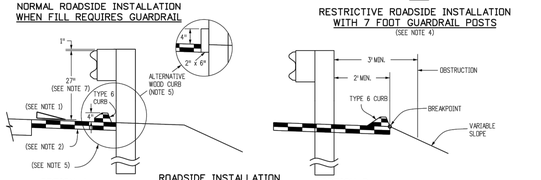
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSED FOR COR 034 |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |




NORMAL ROADSIDE INSTALLATION
WHEN FILL REQUIRES GUARDRAIL

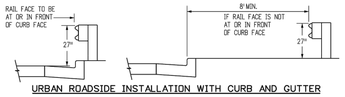



RESTRICTIVE ROADSIDE INSTALLATION
WITH 7 FOOT GUARDRAIL POSTS
(SEE NOTE 4)

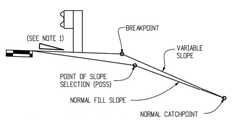



OPTION A — OPTION B

ROADSIDE INSTALLATION
WITH EROSION CONTROL CURB




URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER




EMBANKMENT WITH GUARDRAIL

(NOTE: THE CATCHPOINT REMAINS THE SAME AS THAT FOR "NORMAL" FILL SLOPE. FOR THE WIDER "2" DISTANCES, THE VARIABLE SLOPE MAY "CATCH" AT THE POSS.)

| LOCATION | SPACING |
|---|---|
| ALL LOCATIONS EXCEPT BRIDGE RAIL LOCATIONS | 6'-3" |
| BRIDGE OR STRUCTURE APPROACH | SEE SHEETS 11 & 18 |

NORMAL CENTER-TO-CENTER POST SPACING

## GENERAL NOTES

1. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
   A. FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
   B. FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.
2. WHEN SPECIFIED ON THE PLANS, EXTEND A 2 IN. MINIMUM THICKNESS PAVED SURFACE TO 1 FT. BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. ASPHALT CUTTING & PATCHING OR OTHER APPROVED METHOD SHALL BE USED TO MINIMIZE DAMAGE TO ALL PAVED SURFACES UNDER GUARDRAIL INSTALLATIONS. ALL REPAIRS TO THE PAVED AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 3 IN. THICK FIBER REINFORCED CONCRETE PAVEMENT MAY ALSO BE USED FOR PAVING BENEATH THE GUARDRAIL. INSTALL THE POST IN A ½ IN. OVERSIZED FORMED HOLE FOR GUARDRAIL RUNS AND TERMINALS AS DIRECTED. PAYMENT FOR THIS PAVED SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.
3. THE MINIMUM GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
   0 FT. FOR SHOULDERS 8 FT. OR WIDER
   2 FT. FOR SHOULDERS 6 FT. OR LESS
   THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE;
   0 FT. MINIMUM FOR SHOULDERS 6 FT. OR WIDER
   2 FT. DESIRABLE FOR 4 FT. SHOULDERS
   THE ABOVE 2 FT. GUARDRAIL TO SHOULDER OFFSET IS DESIRABLE BUT NOT REQUIRED FOR:
   A. FOR AN EXISTING HIGHWAY WITH A DESIGN SPEED LESS THAN 50 MPH, THE MINIMUM OFFSET OF RAIL IS 0 FT. FROM ANY WIDTH PAVED SHOULDER, OR 4 FT. MINIMUM FROM THE TRAVELED WAY.
   B. FOR A ONE-WAY ONE-LANE RAMP, AND WHERE ONE OR MORE OF THE FOLLOWING ARE TRUE:
      (1) THE NON-OFFSET GUARDRAIL BEGINS AT LEAST 100 FT. BEYOND RAMP NOSE.
      (2) THE NON-OFFSET GUARDRAIL IS NOT LOCATED ON THE RAMP EXIT OR ENTRANCE CURVE CONNECTION TO THE MAJOR HIGHWAY.
      (3) THE RAMP SHOULDERS ARE 4 FT. OR WIDER.
   USE OF GREATER THAN MINIMUM OFFSET DIMENSIONS IS ENCOURAGED TO MEET THE DESIRABLE GOAL OF PLACING THE GUARDRAIL AS FAR AS POSSIBLE FROM THE TRAVEL WAY, EVEN FOR SHORT DISTANCES, WHILE PROVIDING A SMOOTH CHANGE IN GUARDRAIL ALIGNMENT.
4. IF 2 FT. CANNOT BE PROVIDED BETWEEN THE BACK OF THE GUARDRAIL POST AND THE BREAKPOINT, USE 7 FT. GUARDRAIL POSTS. REFER TO THE "RESTRICTIVE ROADSIDE INSTALLATION" DETAIL.
5. WHEN SPECIFIED ON THE PLANS, INSTALL A 4 IN. HIGH TYPE 6 CURB WITH ITS FACE AT OR BEHIND THE RAIL FACE. AS AN ALTERNATIVE WHEN SPECIFIED ON THE PLANS, INSTALL A 2 IN. x 6 IN. TREATED (AASHTO M 133) WOOD CURB. FASTEN WITH A 4 IN. LAG BOLT AND WASHER AT EACH WOOD POST, OR WITH A ½ IN. DIA. BOLT WITH WASHER AND NUT AT EACH STEEL POST. IF THE 2 IN. x 6 IN. WOOD CURB IS SPECIFIED, IT WILL BE INCLUDED IN THE COST OF THE GUARDRAIL. IF APPROVED BY THE ENGINEER, A 2 IN. x 4 IN. TREATED WOOD CURB MAY BE SUBSTITUTED FOR THE 2 IN. x 6 IN. CURB AND SET ON TOP OF PAVEMENT SURFACE AND ATTACHED AS DESCRIBED ABOVE. NO SPLICING SHALL BE ALLOWED IN WOOD CURBS. ADJACENT BOARDS SHALL BE BUTTED TOGETHER AND BOLTED AT A POST LOCATION. JOINTS SHALL BE LOCATED AT THE POSTS.
6. SEE SHEET 6 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.
7. RESET GUARDRAIL IF THIS DIMENSION WILL BE LESS THAN 24 IN.
8. ALL W-BEAM SPLICES, AND SPLICES OF TERMINAL CONNECTORS TO W-BEAM SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED.
9. MATERIAL TYPE AND SHAPE OF POSTS AND BLOCKS SHALL BE THE SAME THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIC POSTS AND BLOCKS ARE SPECIFIED, i.e. AT END ANCHORAGES AND BOX CULVERTS.
10. CONCRETE MAY BE READY-MIXED OR FIELD-MIXED AND SHALL CONSIST OF A MINIMUM OF 1 PART CEMENT TO 6 PARTS AGGREGATE BY VOLUME.

THE GENERAL NOTES ARE CONTINUED ON SHEET 2.

| Computer File Information | | Sheet Revisions | |
|---|---|---|---|
| Creation Date: 07/04/06 | Initials: DD | Date: | Comments |
| Last Modification Date: 05/05/11 | Initials: LTA | | Revised Sheet 14 and 18. |
| Full Path: www.dot.state.co.us/DesignSupport/ | | 8/11/10 | Added Sheet 15. |
| Drawing File Names: 6010101018.dgn | | | Added the 'a' dimension to Option A detail |
| CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English | | 5/05/11 | Revised Sheet Numbers 11-18. |

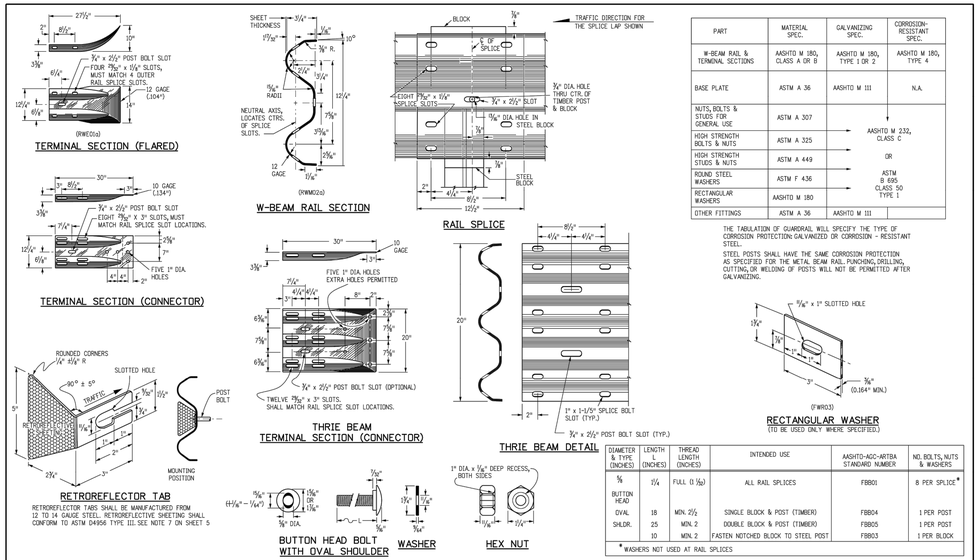
Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch DD/LTA

GUARDRAIL TYPE 3
W-BEAM

STANDARD PLAN NO.
M-606-1

Issued By: Project Development Branch July 04, 2006

Sheet No. 1 of 18




| PART | MATERIAL SPEC. | GALVANIZING SPEC. | CORROSION-RESISTANT SPEC. |
|---|---|---|---|
| W-BEAM RAIL & TERMINAL SECTIONS | AASHTO M 180, CLASS A OR B | AASHTO M 180, TYPE I OR 2 | AASHTO M 180, TYPE 4 |
| BASE PLATE | ASTM A 36 | AASHTO M 111 | N.A. |
| NUTS, BOLTS & STUDS FOR GENERAL USE | ASTM A 307 | AASHTO M 232, CLASS C | |
| HIGH STRENGTH BOLTS & NUTS | ASTM A 325 | OR | |
| HIGH STRENGTH STUDS & NUTS | ASTM A 449 | ASTM B 695 CLASS 50 TYPE 1 | |
| ROUND STEEL WASHERS | ASTM F 436 | | |
| RECTANGULAR WASHERS | AASHTO M 180 | | |
| OTHER FITTINGS | ASTM A 36 | AASHTO M 111 | |

THE TABULATION OF GUARDRAIL WILL SPECIFY THE TYPE OF CORROSION PROTECTION: GALVANIZED OR CORROSION - RESISTANT STEEL.

STEEL POSTS SHALL HAVE THE SAME CORROSION PROTECTION AS SPECIFIED FOR THE METAL BEAM RAIL. PUNCHING, DRILLING, CUTTING, OR WELDING OF POSTS WILL NOT BE PERMITTED AFTER GALVANIZING.

| DIAMETER & TYPE (INCHES) | LENGTH L (INCHES) | THREAD LENGTH (INCHES) | INTENDED USE | AASHTO-AGC-ARTBA STANDARD NUMBER | NO. BOLTS, NUTS & WASHERS |
|---|---|---|---|---|---|
| ⅝ BUTTON HEAD | 1¼ | FULL (1 ⅛) | ALL RAIL SPLICES | FBB01 | 8 PER SPLICE* |
| OVAL | 1B | MIN. 2½ | SINGLE BLOCK & POST (TIMBER) | FBB04 | 1 PER POST |
| SHLDR. | 2S | MIN. 2 | DOUBLE BLOCK & POST (TIMBER) | FBB05 | 1 PER POST |
| | 10 | MIN. 2 | FASTEN NOTCHED BLOCK TO STEEL POST | FBB03 | 1 PER BLOCK |

* WASHERS NOT USED AT RAIL SPLICES

| Computer File Information | | Sheet Revisions | |
|---|---|---|---|
| Creation Date: 07/04/06 | Initials: DD | Date: | Comments |
| Last Modification Date: 05/05/11 | Initials: LTA | | |
| Full Path: www.dot.state.co.us/DesignSupport/ | | | |
| Drawing File Names: 6060103018.dgn | | | |
| CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English | | | |

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch DD/LTA

GUARDRAIL TYPE 3
W-BEAM

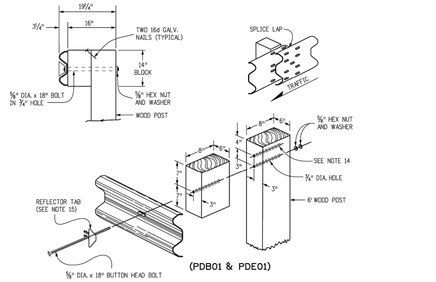
STANDARD PLAN NO.
M-606-1

Issued By: Project Development Branch July 04, 2006

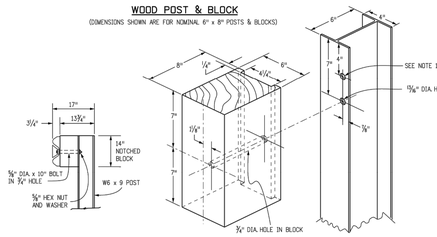
Sheet No. 3 of 18

## GENERAL NOTES (CONTINUED FROM SHEET 1)

11. WHEN SPECIFIED IN THE CONTRACT, 7 FT. POSTS SHALL BE INSTALLED INSTEAD OF THE STANDARD 6 FT. POSTS. THE 7 FT. POSTS SHALL BE MARKED WITH THE NUMBER 7 TO ENSURE PERMANENT IDENTIFICATION. STEEL POSTS SHALL BE STAMPED PRIOR TO GALVANIZING. THE NUMBER 7 SHALL BE A MINIMUM 2 IN. TALL AND LOCATED AS SHOWN ON THE ELEVATION VIEW ON SHEET 1.
12. THE STANDARD 3 IN. X 1⅞ IN. X ⅜ IN. RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE PAST MAY REMAIN IN EXISTING INSTALLATIONS BUT SHALL NOT BE USED IN NEW CONSTRUCTION, REPAIRS, OR RESETTING OF RAIL, EXCEPT WHEN SPECIFICALLY IDENTIFIED ON THE STANDARD PLAN.
13. STANDARD GALVANIZED ROUND STEEL WASHERS SHALL BE USED UNDER ALL NUTS IN CONTACT WITH WOOD POSTS.
14. AN ADDITIONAL HOLE SHALL BE PROVIDED IN THE POSTS TO FACILITATE FUTURE RAISING OF THE RAIL ELEMENTS AND BLOCKS FOR OVERLAYS.
15. RETROREFLECTOR TABS SHALL BE INSTALLED AT 25 FT. INTERVALS (SEE SHEETS 5 AND 7 FOR EXCEPTIONS). RETROREFLECTOR TABS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK. THE TABS SHALL BE MOUNTED SO THE BOLT SLOT FACES AWAY FROM TRAFFIC, AND THE RETROREFLECTOR SURFACE FACES THE APPROACHING TRAFFIC FOR ONE-WAY ROADS. FOR TWO-WAY ROADS, BOTH SIDES OF THE TABS SHALL BE RETROREFLECTIVE, SO THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. THE RETROREFLECTIVE SHEETING COLOR SHALL MATCH THE COLOR OF THE ADJACENT TRAVEL WAY EDGE LINE. SEE THE RETROREFLECTOR TAB DETAIL ON SHEET 3.
16. AT THE TIME OF INSTALLATION, WOOD POSTS OR BLOCKS WITH SEASONING CHECKS GREATER THAN ¼ IN. SHALL NOT BE USED WHEN THE CHECK EXTENDS THE FULL LENGTH OF THE PIECE.
17. WOOD BLOCKS SHALL BE CUT FROM THE SAME CROSS-SECTION, SPECIES, AND GRADE, AND SHALL RECEIVE THE SAME PRESERVATIVE TREATMENT AS THE POSTS WHEN WOOD POSTS ARE USED.
18. REFERENCES SUCH AS 6@PDB01', 6@PDE01', AND 6@PWE01' IN THIS STANDARD PLAN SPECIFY HARDWARE DETAILS FROM 6@A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE' PREPARED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.
19. NOTCHED RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD NOTCHED BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.
20. WOOD POSTS SHALL BE MADE OF TIMBER WITH AN EXTREME FIBER STRESS IN BENDING OF 1200 PSI STRESS GRADING AND POST DIMENSIONS SHALL CONFORM WITH THE RULES OF THE WEST COAST INSPECTION BUREAU, OR THE SOUTHERN PINE BUREAU, OR THE WESTERN WOOD PRODUCTS ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. ONLY ONE TYPE OF SURFACE FINISH SHALL BE USED FOR POSTS AND BLOCKS IN ANY ONE CONTINUOUS LENGTH OF GUARDRAIL.
21. GUILAM POSTS AND BLOCKS WILL BE ACCEPTED AS ALTERNATIVES PROVIDED THAT THE SUPPLIED MATERIALS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.
22. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO AASHTO M 133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET THE REQUIREMENTS OF THE CONTRACT.
23. W-BEAM AND THRIE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING AASHTO M 270 (ASTM A 709) GRADE 36 STEEL UNLESS CORROSION RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM AASHTO M 270 (ASTM A 709) GRADE 50W STEEL. THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9 SECTION AS DEFINED IN AASHTO M 160 (ASTM A 6) W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
24. AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED OR PUNCHED THE COMPONENT SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) UNLESS CORROSION-RESISTANT STEEL IS USED. WHEN CORROSION-RESISTANT STEEL IS USED THE PORTION OF THE POST TO BE EMBEDDED IN SOIL SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) AND THE PORTION ABOVE THE SOIL SHALL NOT BE ZINC-COATED, PAINTED OR OTHERWISE TREATED.
25. FIELD MODIFICATION TO RAIL ELEMENTS ONLY IS ALLOWED BY SAWING AND DRILLING OF HOLES. FLAME CUTTING IS NOT PERMITTED. POSTS SHALL NOT BE MODIFIED. COMPONENTS ON WHICH THE SPELTER COATING HAS BEEN DAMAGED SHALL BE EITHER REGALVANIZED OR RECOATED IN CONFORMANCE WITH AASHTO M 36, OR PAINTED WITH ONE FULL BRUSH COAT OF ZINC RICH PAINT CONFORMING TO MILITARY SPECIFICATION DOD-P-21035A.

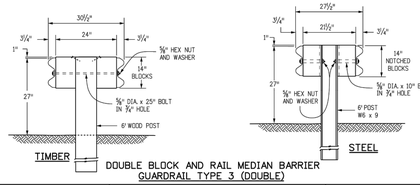



WOOD POST & BLOCK
(DIMENSIONS SHOWN ARE FOR NOMINAL 6" x 8" POSTS & BLOCKS)




STEEL POST & NOTCHED BLOCK
(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

(PWE01)




DOUBLE BLOCK AND RAIL MEDIAN BARRIER
GUARDRAIL TYPE 3 (DOUBLE)

| Computer File Information | | Sheet Revisions | |
|---|---|---|---|
| Creation Date: 07/04/06 | Initials: DD | Date: | Comments |
| Last Modification Date: 05/05/11 | Initials: LTA | | |
| Full Path: www.dot.state.co.us/DesignSupport/ | | | |
| Drawing File Name: 6060102018.dgn | | | |
| CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English | | | |

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch DD/LTA

GUARDRAIL TYPE 3
W-BEAM

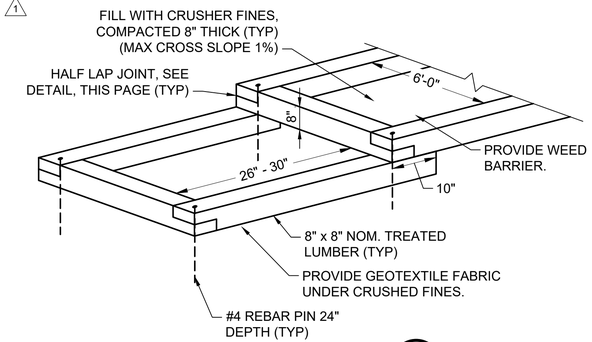
STANDARD PLAN NO.
M-606-1

Issued By: Project Development Branch July 04, 2006

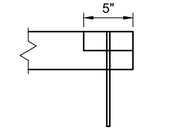
Sheet No. 2 of 18

NOTES:

1. GUARDRAIL SHALL CONFORM TO CDOT TYPE 3 - W BEAM GUARDRAIL (REFER TO CDOT SHEET M-606-1) FOR ADDITIONAL DETAILS.
2. STEEL POSTS SHALL BE USED.




WOODEN TRAIL STAIRS — 1
NOT TO SCALE




HALF LAP JOINT — 2
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
CIVIL DETAILS XVIII

| project | contract |
|---|---|
| 98101 | |

drawing C019 — rev. 1

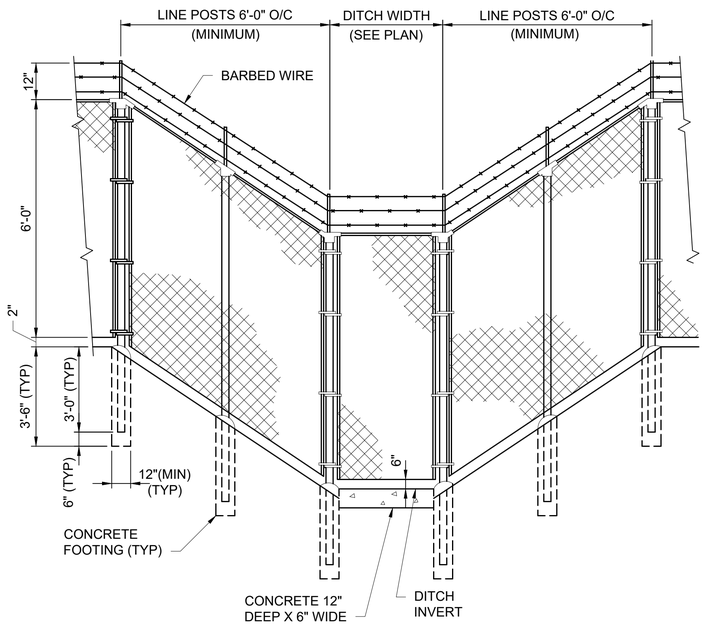
sheet 23 of 542 sheets

file 98101 C_019.DWG

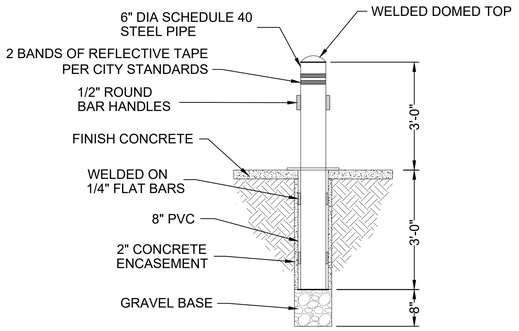
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_019.DWG 10/21/2020 3:01 PM MDSTROBEL

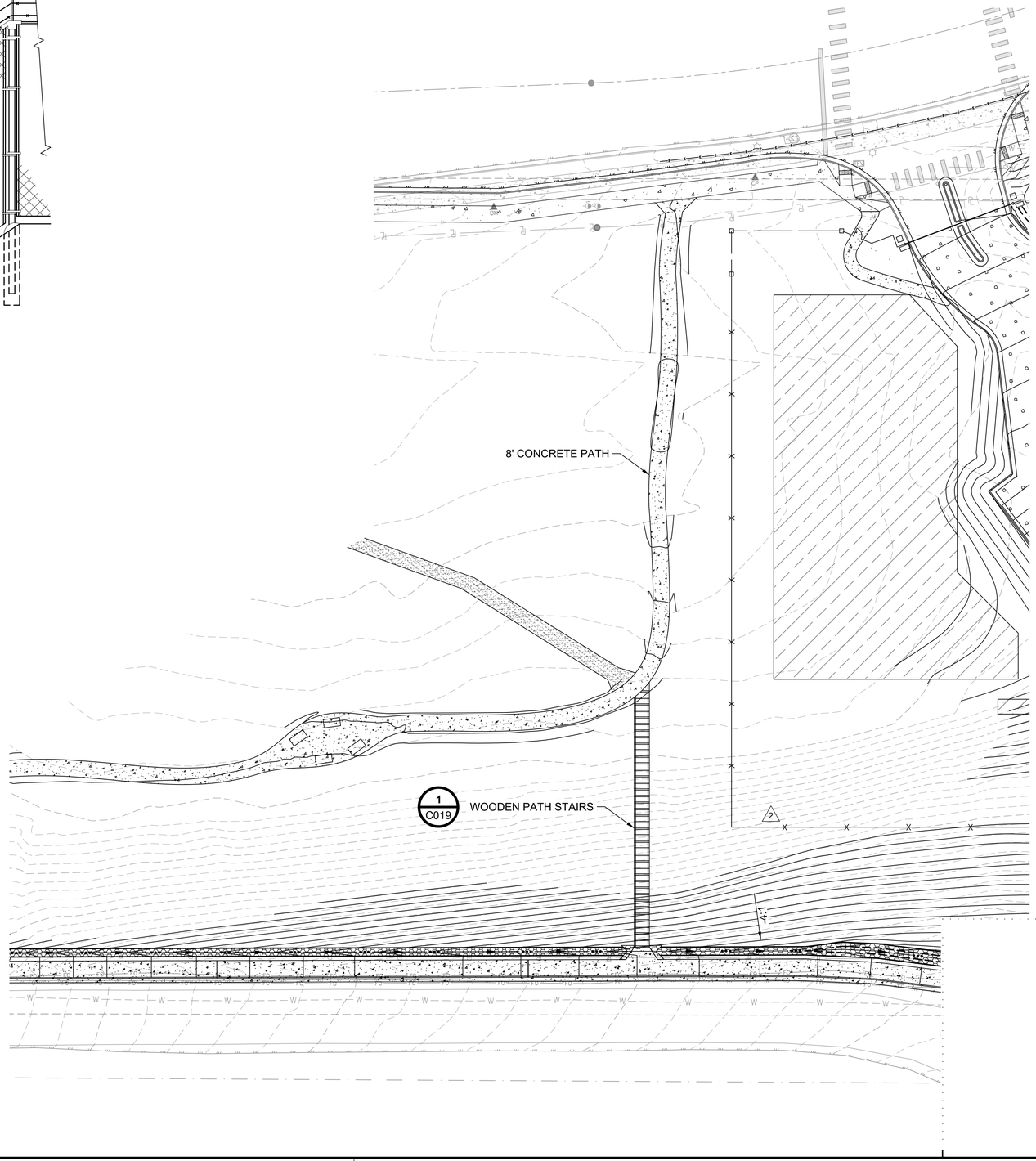
Scale For Microfilming: Millimeters / Inches




**FENCE CROSSING SWALE** — 1
**NOT TO SCALE**




**REMOVABLE GUARD POST** — 2
**NOT TO SCALE**




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CIVIL DETAILS XIX

| project | contract |
|---|---|
| 98101 | |

**drawing** C020 – **rev.** 2

**sheet** 24 **of** 542 sheets

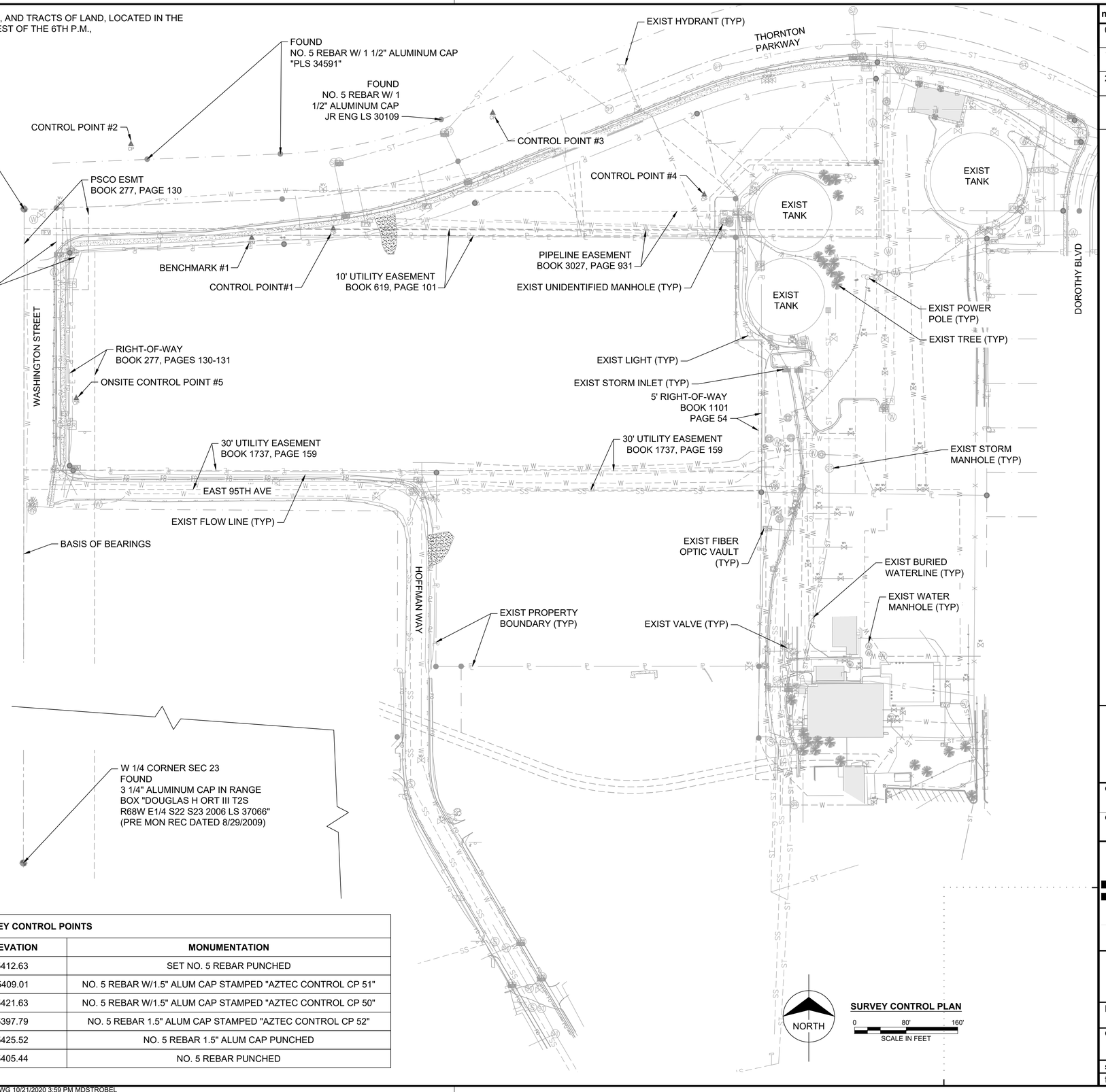
**file** 98101 C_020.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_020.DWG 10/22/2020 10:07 AM MDSTROBEL

TRACTS OF LAND, LOCATED IN THE SOUTHWEST QUARTER OF SECTION 14, AND TRACTS OF LAND, LOCATED IN THE NORTHWEST QUARTER OF SECTION 23, TOWNSHIP 2 SOUTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF THORNTON, COUNTY OF ADAMS, STATE OF COLORADO




NOTES:

1. BASIS OF BEARINGS: GPS DERIVED BEARINGS BASED ON A BEARING OF N00°04'01"E ALONG THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 23, BETWEEN A FOUND 3-1/4" ALUMINUM CAP IN RANGE BOX "DOUGLAS H ORT III T2S R68W E1/4 S22 S23 2006 LS 37066" AT THE WEST QUARTER CORNER OF SAID SECTION AND A FOUND 2-1/2" ALUMINUM CAP IN RANGE BOX "GLORSO MURRAY SURVEYING T2S R68W SEC COR 15 14 22 23 LS 16109" AT THE NORTHWEST CORNER OF SAID SECTION AS SHOWN HEREON. COLORADO STATE PLANE COORDINATE SYSTEM, COLORADO CENTRAL ZONE, NORTH AMERICAN DATUM 1983 (NAD83(2011)). ALL BEARINGS SHOWN HEREON ARE RELATIVE THERETO.
2. BENCHMARK INFORMATION: A GPS DERIVED ELEVATION WAS ESTABLISHED AT AN ONSITE BENCHMARK AT THE NORTHWEST PORTION OF THE SITE, BEING A NO. 5 REBAR W/PUNCH WITH AN ELEVATION OF 5412.63 FEET. A CHECK SHOT, 0.1+/-, WAS TAKEN ON NGS POINT K 411, BEING A METAL ROD LOCATED 1.2 MILES FROM THE SITE, WITH A PUBLISHED ELEVATION OF 5286.40 FEET (NAVD88). NO DIFFERENTIAL LEVELING WAS PERFORMED TO ESTABLISH THIS ELEVATION. A COMBINED SCALE FACTOR OF 1.0002249735 WAS USED TO MODIFY SITE COORDINATES. PROJECT COORDINATES WERE DERIVED FROM STATE PLANE COORDINATES USING THE FOLLOWING FORMULAS:

   PROJECT NORTHING = (STATE PLANE NORTHING X 1.0002249735) - 1,000,000
   PROJECT EASTING = (STATE PLAN EASTING X 1.0002249735 - 3,000,000

**SURVEY CONTROL POINTS**

| POINT # | NORTHING | EASTING | ELEVATION | MONUMENTATION |
|---|---|---|---|---|
| BM 1 | 742815.57 | 147647.42 | 5412.63 | SET NO. 5 REBAR PUNCHED |
| CP 1 | 742829.96 | 147773.98 | 5409.01 | NO. 5 REBAR W/1.5" ALUM CAP STAMPED "AZTEC CONTROL CP 51" |
| CP 2 | 742960.98 | 147459.95 | 5421.63 | NO. 5 REBAR W/1.5" ALUM CAP STAMPED "AZTEC CONTROL CP 50" |
| CP 3 | 743009.59 | 148021.57 | 5397.79 | NO. 5 REBAR 1.5" ALUM CAP STAMPED "AZTEC CONTROL CP 52" |
| CP 4 | 742882.50 | 148350.09 | 5425.52 | NO. 5 REBAR 1.5" ALUM CAP PUNCHED |
| CP 5 | 742566.31 | 147375.04 | 5405.44 | NO. 5 REBAR PUNCHED |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | EV | NT | WP1 - ISSUED FOR CONSTRUCTION |
| 1 | 3/9/18 | EV | NT | WP2 - ISSUED FOR CONSTRUCTION |
| 2 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SURVEY CONTROL PLAN

| project | contract |
|---|---|
| 98101 | |

drawing C100 – rev. 2

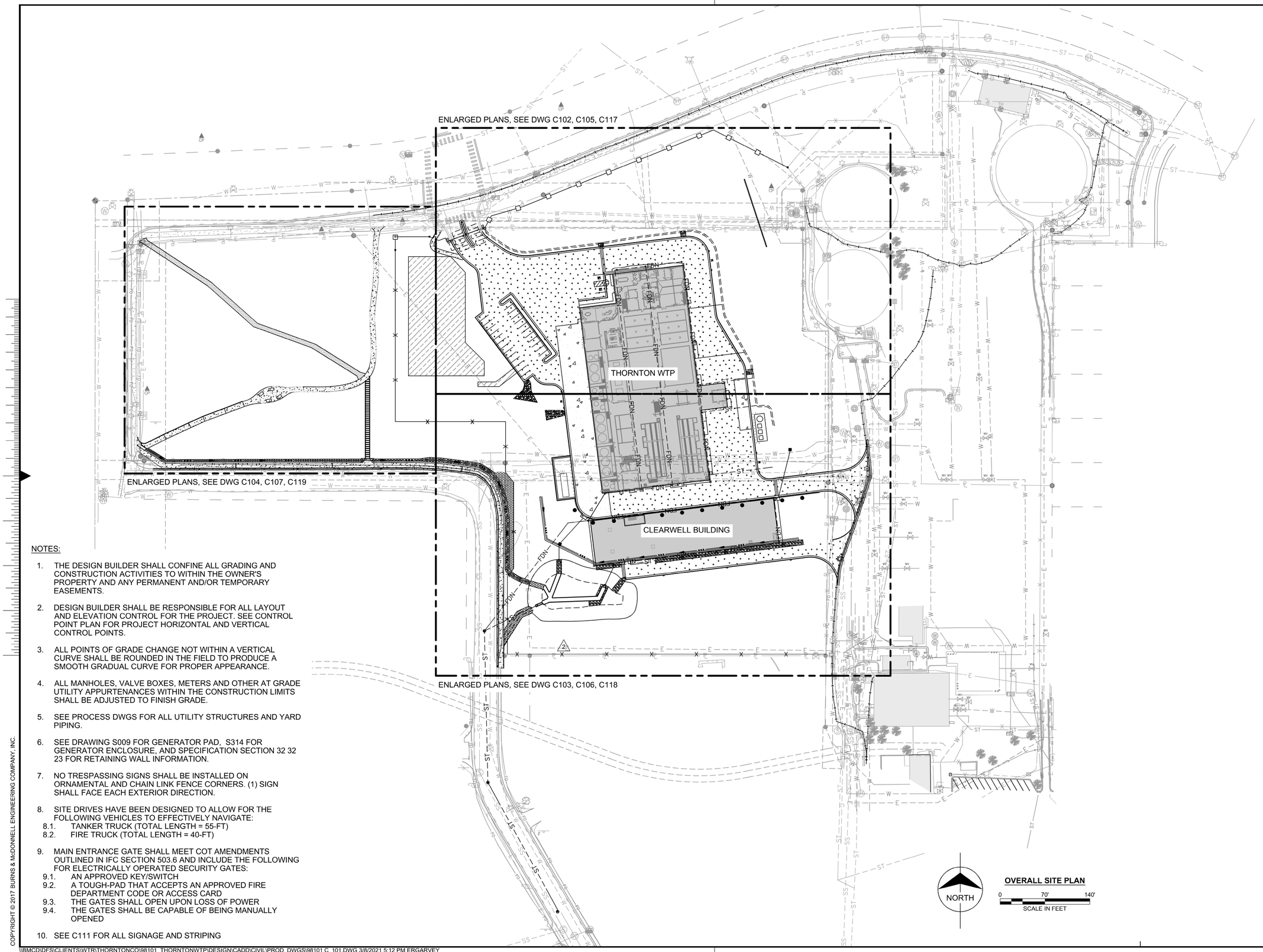
sheet 25 of 542 sheets

file 98101 C_100.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_100.DWG 10/21/2020 3:59 PM MDSTROBEL

Scale For Microfilming: Millimeters / Inches




NOTES:

1. THE DESIGN BUILDER SHALL CONFINE ALL GRADING AND CONSTRUCTION ACTIVITIES TO WITHIN THE OWNER'S PROPERTY AND ANY PERMANENT AND/OR TEMPORARY EASEMENTS.
2. DESIGN BUILDER SHALL BE RESPONSIBLE FOR ALL LAYOUT AND ELEVATION CONTROL FOR THE PROJECT. SEE CONTROL POINT PLAN FOR PROJECT HORIZONTAL AND VERTICAL CONTROL POINTS.
3. ALL POINTS OF GRADE CHANGE NOT WITHIN A VERTICAL CURVE SHALL BE ROUNDED IN THE FIELD TO PRODUCE A SMOOTH GRADUAL CURVE FOR PROPER APPEARANCE.
4. ALL MANHOLES, VALVE BOXES, METERS AND OTHER AT GRADE UTILITY APPURTENANCES WITHIN THE CONSTRUCTION LIMITS SHALL BE ADJUSTED TO FINISH GRADE.
5. SEE PROCESS DWGS FOR ALL UTILITY STRUCTURES AND YARD PIPING.
6. SEE DRAWING S009 FOR GENERATOR PAD, S314 FOR GENERATOR ENCLOSURE, AND SPECIFICATION SECTION 32 32 23 FOR RETAINING WALL INFORMATION.
7. NO TRESPASSING SIGNS SHALL BE INSTALLED ON ORNAMENTAL AND CHAIN LINK FENCE CORNERS. (1) SIGN SHALL FACE EACH EXTERIOR DIRECTION.
8. SITE DRIVES HAVE BEEN DESIGNED TO ALLOW FOR THE FOLLOWING VEHICLES TO EFFECTIVELY NAVIGATE:
   - 8.1. TANKER TRUCK (TOTAL LENGTH = 55-FT)
   - 8.2. FIRE TRUCK (TOTAL LENGTH = 40-FT)
9. MAIN ENTRANCE GATE SHALL MEET COT AMENDMENTS OUTLINED IN IFC SECTION 503.6 AND INCLUDE THE FOLLOWING FOR ELECTRICALLY OPERATED SECURITY GATES:
   - 9.1. AN APPROVED KEY/SWITCH
   - 9.2. A TOUGH-PAD THAT ACCEPTS AN APPROVED FIRE DEPARTMENT CODE OR ACCESS CARD
   - 9.3. THE GATES SHALL OPEN UPON LOSS OF POWER
   - 9.4. THE GATES SHALL BE CAPABLE OF BEING MANUALLY OPENED
10. SEE C111 FOR ALL SIGNAGE AND STRIPING

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | EV | NT | WP1 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | EV | NT | WP3- ISSUED FOR CONSTRUCTION |
| 2 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| | 3/31/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** MARCH 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

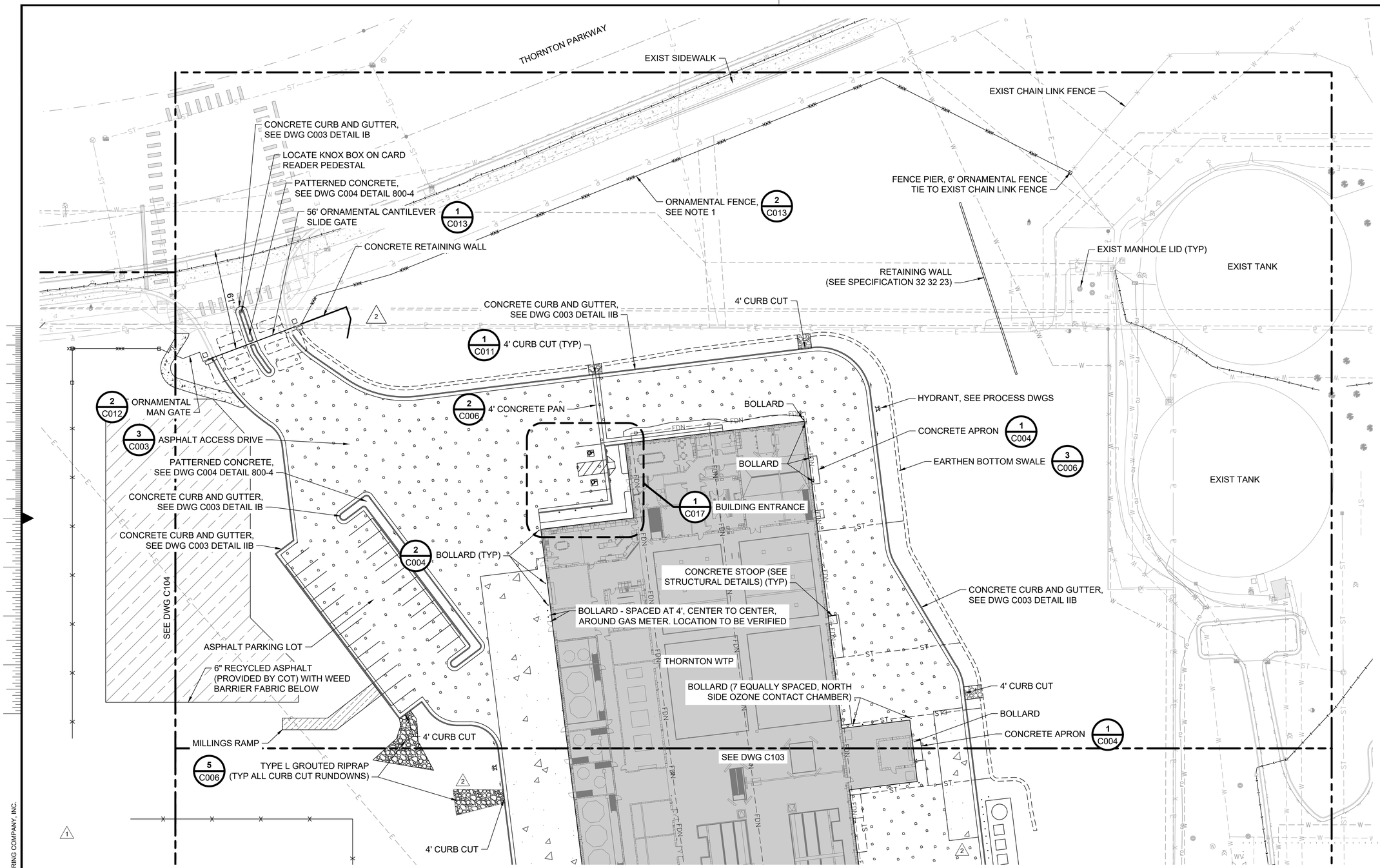
**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL SITE PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** C101 | **rev.** – 2 |
| **sheet** 26 **of** 542 sheets | |
| **file** 98101 C_101.DWG | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_101.DWG 3/8/2021 5:12 PM ERGARVEY




NOTES:

1. FOUR FENCE PIERS SHALL BE INSTALLED ALONG ORNAMENTAL FENCE. LOCATIONS SHALL BE APPROXIMATELY AS SHOWN HERE.
2. KNOX BOXES SHALL BE LOCATED ON MAIN ENTRANCE GATE ACCESS PEDESTAL, NEAR TREATMENT PLANT FRONT DOOR, AND NEAR CLEARWELL MAIN DOOR. SEE ARCHITECTURAL DRAWINGS FOR KNOX BOX LOCATIONS AT FACILITY DOORS.
3. MAIN ENTRANCE GATE SHALL BE SETBACK FROM ROADWAY BY A MINIMUM DISTANCE OF 50-FT.
4. SEE C111 FOR ALL SIGNAGE AND STRIPING.

NORTH

**SITE PLAN I**

0 30' 60'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

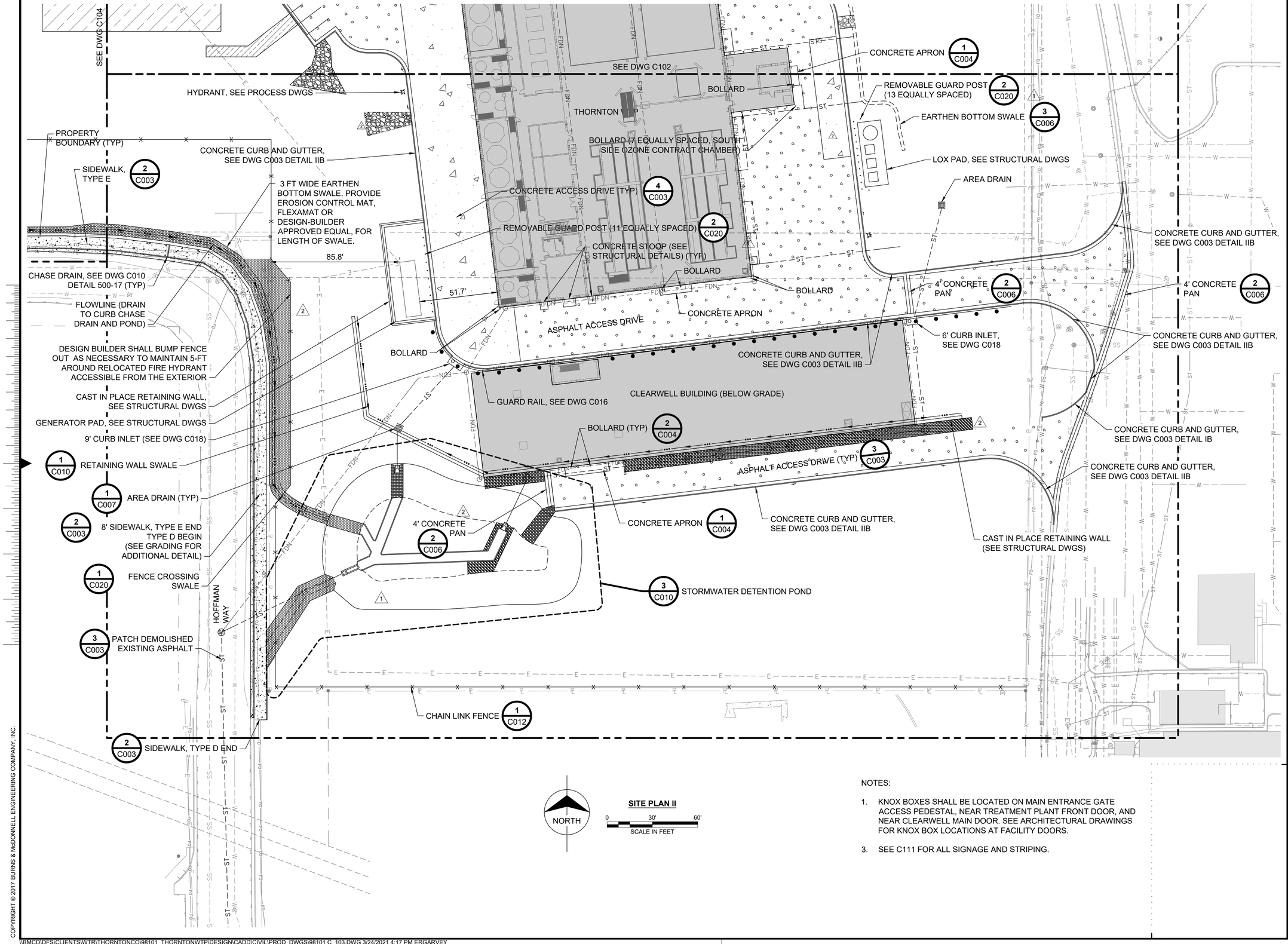
| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
SITE PLAN I

| | |
|---|---|
| project 98101 | contract |
| drawing C102 – | rev. 2 |
| sheet 27 of 542 sheets | |
| file 98101 C_102.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:

1. KNOX BOXES SHALL BE LOCATED ON MAIN ENTRANCE GATE ACCESS PEDESTAL, NEAR TREATMENT PLANT FRONT DOOR, AND NEAR CLEARWELL MAIN DOOR. SEE ARCHITECTURAL DRAWINGS FOR KNOX BOX LOCATIONS AT FACILITY DOORS.

3. SEE C111 FOR ALL SIGNAGE AND STRIPING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SITE PLAN II

| project | contract |
|---|---|
| 98101 | |

drawing **C103** – rev. **2**

sheet 28 of 542 sheets

file 98101 C_103.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_103.DWG 3/24/2021 4:17 PM ERGARVEY

THORNTON PARKWAY

EXIST LIGHT POLE (TYP)

EXIST SIDEWALK

6 / C014 FENCE PIER

ORNAMENTAL FENCE

2 / C013

TRANSITION FROM ORNAMENTAL TO CHAIN LINK FENCE

6" RECYCLED ASPHALT (PROVIDED BY COT) WITH WEED BARRIER FABRIC BELOW

8' CRUSHER FINES TRAIL. PROVIDE GEOTEXTILE FABRIC.

SEE DWG C102

2 / C003 8' CONCRETE SIDEWALK TYPE B

WASHINGTON STREET

ROCK BENCH (TYP OF 4). FINAL LOCATION TO BE DETERMINED BY COT.

8' CONCRETE SIDEWALK, TYPE C BEGIN 2 / C003

1 / C019 WOODEN TRAIL STAIRS

CHAIN LINK FENCE 1 / C012

8' CONCRETE SIDEWALK, TYPE C END TYPE E BEGIN 2 / C003

FLOWLINE (DRAIN TO CURB CHASE DRAINS)

CHASE DRAIN, SEE DWG C010

CONCRETE CURB AND GUTTER, SEE DWG C003 DETAIL IIB

CHASE DRAIN, SEE DWG C010

CHASE DRAIN, SEE DWG C010

EAST 95TH AVENUE

EXIST WATER MANHOLE (TYP)

PROVIDE EROSION CONTROL MAT, FLEXAMAT OR DESIGN-BUILDER APPROVED EQUAL, AROUND CULVERT INLET/OUTLET

SEE DWG C103

NOTES:

1. KNOX BOXES SHALL BE LOCATED ON MAIN ENTRANCE GATE ACCESS PEDESTAL, NEAR TREATMENT PLANT FRONT DOOR, AND NEAR CLEARWELL MAIN DOOR. SEE ARCHITECTURAL DRAWINGS FOR KNOX BOX LOCATIONS AT FACILITY DOORS.

3. SEE C111 FOR ALL SIGNAGE AND STRIPING.

NORTH

**SITE PLAN III**

0 30' 60'

SCALE IN FEET

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_104.DWG 3/16/2021 11:24 AM ERGARVEY

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 3/31/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

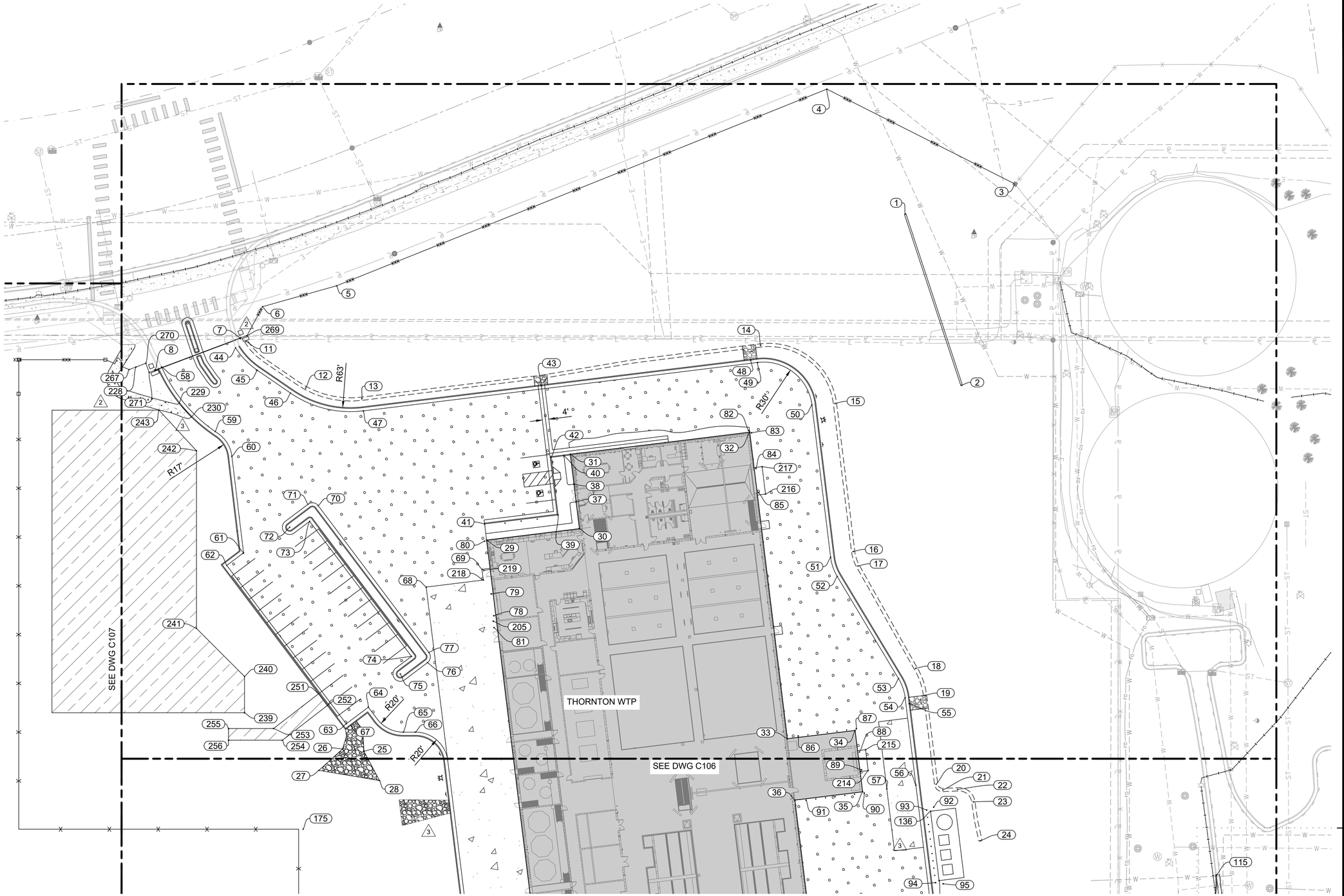
| | |
|---|---|
| date MARCH 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SITE PLAN III

| | |
|---|---|
| project 98101 | contract |
| drawing C104 | rev. 2 |
| sheet 29 of 542 sheets | |
| file 98101 C_104.DWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 1/15/20 | EV | NT | FENCE REVISION |
| 3 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |




Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL POINT PLAN I

| project | contract |
|---|---|
| 98101 | |

drawing **C105** – rev. **3**

sheet 30 of 542 sheets

file 98101 C_105.DWG

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_105.DWG 10/21/2020 5:50 PM MDSTROBEL

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 1/15/20 | EV | NT | FENCE REVISION |
| 3 | 3/31/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

THORNTON WTP

SEE DWG C105

SEE DWG C107

1.5'

3.5'

R30'

R20'

R45'

R44'

NORTH

**CONTROL POINT PLAN II**

0 30' 60'

SCALE IN FEET

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_105.DWG 10/30/2020 5:24 PM ERGARVEY

BURNS McDONNELL

| date | detailed |
|---|---|
| MARCH 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL POINT PLAN II

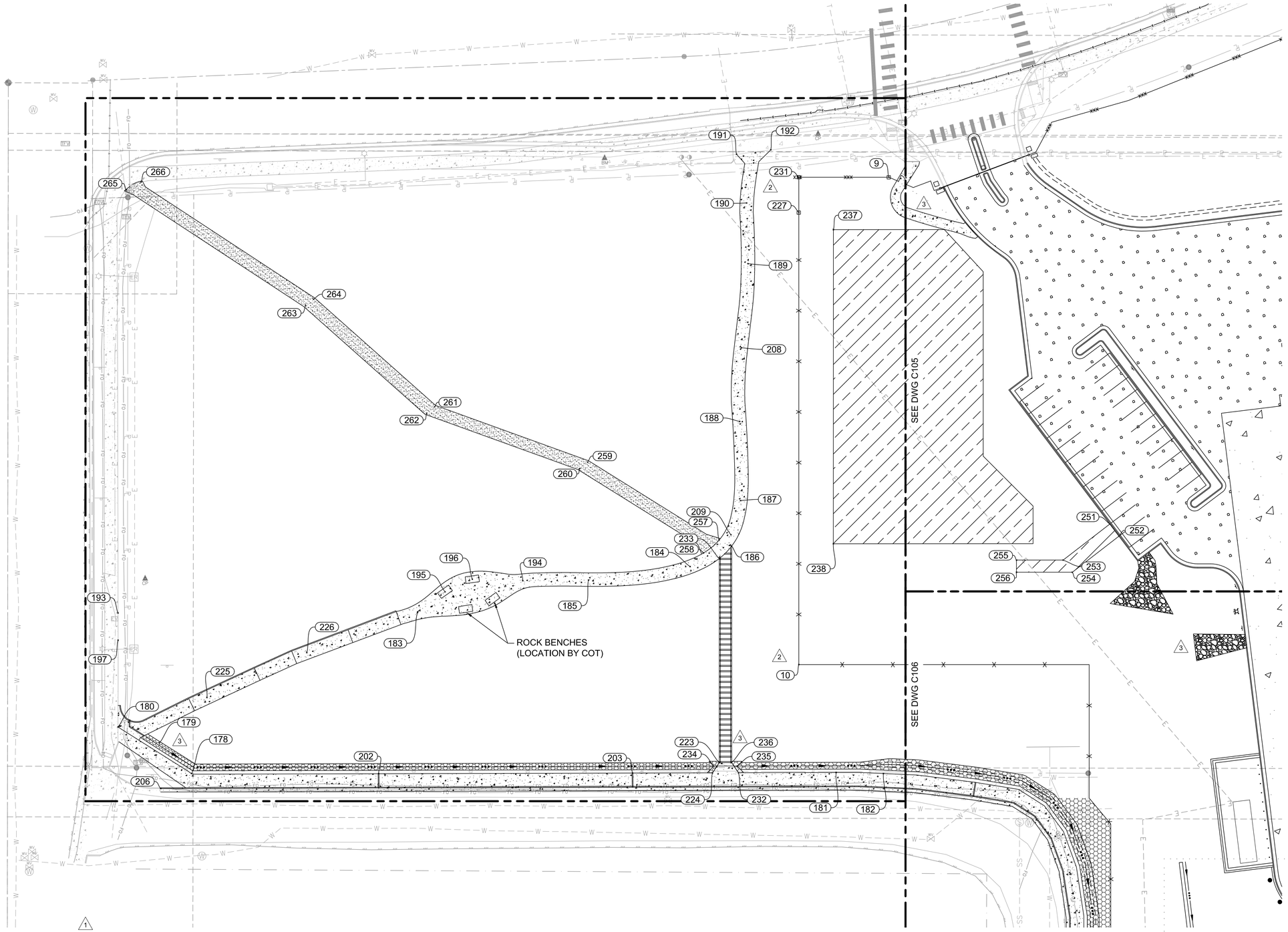
| project | contract |
|---|---|
| 98101 | |

**drawing** C106 – **rev.** 3

**sheet** 31 **of** 542 sheets

**file** 98101 C_105.DWG

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 1/15/20 | EV | NT | FENCE REVISION |
| 3 | 3/31/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |




Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_105.DWG 10/30/2020 5:24 PM ERGARVEY

BURNS McDONNELL

| | |
|---|---|
| date MARCH 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL POINT PLAN III

| | |
|---|---|
| project 98101 | contract |
| drawing **C107** – | rev. **3** |
| sheet 32 of 542 sheets | |
| file 98101 C_105.DWG | |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 1 | 742893.81 | 148307.63 | 5423.00 | RETAINING WALL END |
| 2 | 742788.47 | 148342.32 | 5417.00 | RETAINING WALL END |
| 3 | 742912.26 | 148375.26 | 5418.24 | FENCE PIER, ORNAMENTAL FENCE TIE TO EXIST CHAIN LINK |
| 4 | 742970.69 | 148259.46 | 5395.62 | ORNAMENTAL FENCE CORNER |
| 5 | 742849.71 | 147957.97 | 5412.90 | ORNAMENTAL FENCE CORNER |
| 6 | 742836.83 | 147912.35 | 5407.76 | ORNAMENTAL FENCE CORNER |
| 7 | 742817.50 | 147898.79 | 5404.68 | ORNAMENTAL GATE ENDPOST |
| 8 | 742797.77 | 147846.37 | 5406.47 | ORNAMENTAL GATE ENDPOST |
| 9 | 742804.22 | 147815.88 | 5406.62 | ORNAMENTAL FENCE CORNER, FENCE PIER |
| 10 | 742515.39 | 147762.47 | 5395.36 | CHAINLINK FENCE CORNER |
| 11 | 742815.53 | 147902.27 | 5404.52 | EARTH SWALE BOTTOM |
| 12 | 742786.77 | 147938.93 | 5402.29 | EARTH SWALE BOTTOM |
| 13 | 742780.20 | 147973.48 | 5400.52 | EARTH SWALE BOTTOM |
| 14 | 742813.01 | 148218.74 | 5397.72 | EARTH SWALE BOTTOM |
| 15 | 742777.30 | 148264.44 | 5397.41 | EARTH SWALE BOTTOM |
| 16 | 742686.19 | 148275.62 | 5396.97 | EARTH SWALE BOTTOM |
| 17 | 742677.32 | 148278.54 | 5396.92 | EARTH SWALE BOTTOM |
| 18 | 742614.34 | 148314.07 | 5396.58 | EARTH SWALE BOTTOM |
| 19 | 742597.75 | 148319.78 | 5396.50 | EARTH SWALE BOTTOM |
| 20 | 742543.04 | 148326.65 | 5396.21 | EARTH SWALE BOTTOM |
| 21 | 742539.53 | 148330.78 | 5396.17 | EARTH SWALE BOTTOM |
| 22 | 742539.90 | 148339.83 | 5396.12 | EARTH SWALE BOTTOM |
| 23 | 742532.22 | 148349.53 | 5396.06 | EARTH SWALE BOTTOM |
| 24 | 742508.27 | 148353.89 | 5395.93 | EARTH SWALE BOTTOM |
| 25 | 742563.34 | 147974.77 | 5396.43 | EDGE OF GROUTED RIPRAP |
| 26 | 742564.68 | 147961.53 | 5396.22 | EDGE OF GROUTED RIPRAP |
| 27 | 742551.61 | 147947.07 | 5394.99 | EDGE OF GROUTED RIPRAP |
| 28 | 742545.30 | 147984.38 | 5395.00 | EDGE OF GROUTED RIPRAP |
| 29 | 742693.26 | 148050.19 | 5400.02 | BUILDING CORNER |
| 30 | 742700.28 | 148107.29 | 5400.50 | BUILDING CORNER |
| 31 | 742746.10 | 148101.67 | 5400.00 | BUILDING CORNER |
| 32 | 742759.65 | 148212.01 | 5400.00 | BUILDING CORNER |
| 33 | 742571.02 | 148235.17 | 5400.00 | BUILDING CORNER |
| 34 | 742576.13 | 148276.80 | 5400.00 | BUILDING CORNER |
| 35 | 742538.41 | 148281.44 | 5400.00 | BUILDING CORNER |
| 36 | 742533.30 | 148239.80 | 5400.00 | BUILDING CORNER |
| 37 | 742716.76 | 148105.27 | 5400.00 | SIDEWALK END |
| 38 | 742727.68 | 148103.93 | 5400.00 | SIDEWALK END |
| 39 | 742708.73 | 148094.16 | 5400.02 | SIDEWALK CORNER/END |
| 40 | 742745.11 | 148097.76 | 5399.92 | SIDEWALK CORNER/END |
| 41 | 742703.18 | 148048.97 | 5400.00 | SIDEWALK CORNER/END |
| 42 | 742744.14 | 148089.82 | 5399.76 | SIDEWALK CORNER/END |
| 43 | 742788.17 | 148083.91 | 5398.75 (2) | CONC FLOW PAN FLOWLINE |
| 44 | 742811.46 | 147895.85 | 5404.99 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 45 | 742797.74 | 147909.19 | 5404.12 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 46 | 742783.70 | 147929.61 | 5403.00 | EDGE OF ASPHALT/EDGE OF GUTTER |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 47 | 742772.75 | 147974.36 | 5401.00 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 48 | 742804.02 | 148212.60 | 5399.40 | CURB CUT |
| 49 | 742802.52 | 148216.82 | 5398.96 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 50 | 742776.39 | 148250.26 | 5399.20 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 51 | 742682.66 | 148261.77 | 5398.93 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 52 | 742670.88 | 148265.83 | 5398.84 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 53 | 742608.04 | 148303.54 | 5398.33 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 54 | 742596.25 | 148307.59 | 5398.24 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 55 | 742592.67 | 148310.04 | 5398.67 | CURB CUT |
| 56 | 742542.43 | 148314.20 | 5398.63 | EDGE OF ASPHALT/EDGE OF CONC |
| 57 | 742540.24 | 148296.33 | 5399.38 | EDGE OF ASPHALT/EDGE OF CONC |
| 58 | 742799.80 | 147850.34 | 5406.84 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 59 | 742760.05 | 147883.28 | 5402.89 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 60 | 742744.77 | 147893.56 | 5401.93 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 61 | 742685.43 | 147900.74 | 5399.58 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 62 | 742677.67 | 147890.44 | 5399.49 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 63 | 742580.21 | 147963.88 | 5398.63 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 64 | 742590.44 | 147977.46 | 5398.71 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 65 | 742575.11 | 147998.99 | 5398.80 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 66 | 742575.11 | 148006.46 | 5398.85 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 67 | 742579.34 | 147966.88 | 5399.11 | CURB CUT |
| 68 | 742664.35 | 148013.03 | 5399.62 | EDGE OF ASPHALT/EDGE OF CONC |
| 69 | 742675.27 | 148047.36 | 5399.88 | EDGE OF ASPHALT/EDGE OF CONC |
| 70 | 742714.40 | 147946.67 | 5400.07 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 71 | 742715.29 | 147940.37 | 5400.08 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 72 | 742701.16 | 147929.10 | 5399.85 | PATTERNED CONC ISLAND CENTER |
| 73 | 742704.79 | 147941.39 | 5399.91 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 74 | 742621.71 | 148003.99 | 5399.13 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 75 | 742610.89 | 147997.12 | 5399.00 | PATTERNED CONC ISLAND CENTER |
| 76 | 742617.83 | 148013.80 | 5399.19 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 77 | 742624.14 | 148014.69 | 5399.24 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 78 | 742646.71 | 148054.61 | 5399.97 | BOLLARD |
| 79 | 742660.13 | 148053.02 | 5399.98 | BOLLARD |
| 80 | 742692.61 | 148048.97 | 5400.00 | BOLLARD |
| 81 | 742639.40 | 148054.79 | 5399.96 | BOLLARD AROUND GAS METER (LOCATION TO BE VERIFIED) |
| 82 | 742760.58 | 148211.39 | 5399.98 | BOLLARD |
| 83 | 742759.27 | 148213.06 | 5399.98 | BOLLARD |
| 84 | 742737.27 | 148215.77 | 5399.97 | BOLLARD |
| 85 | 742722.37 | 148217.59 | 5399.97 | BOLLARD |
| 86 | 742572.73 | 148241.83 | 5400.00 | BOLLARD |
| 87 | 742577.12 | 148277.57 | 5399.95 | BOLLARD |
| 88 | 742562.85 | 148279.44 | 5399.96 | BOLLARD |
| 89 | 742551.93 | 148280.78 | 5399.96 | BOLLARD |
| 90 | 742537.64 | 148282.42 | 5399.97 | BOLLARD |
| 91 | 742533.25 | 148246.68 | 5400.00 | BOLLARD |
| 92 | 742528.97 | 148325.17 | 5398.37 | BOLLARD |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 93 | 742527.18 | 148320.86 | 5398.53 | BOLLARD |
| 94 | 742482.50 | 148326.34 | 5398.76 | BOLLARD |
| 95 | 742481.81 | 148330.96 | 5398.62 | BOLLARD |
| 96 | 742425.21 | 148254.08 | 5399.98 | BOLLARD |
| 97 | 742423.53 | 148252.78 | 5399.98 | BOLLARD |
| 98 | 742403.10 | 148086.32 | 5399.97 | BOLLARD |
| 99 | 742404.40 | 148084.65 | 5399.98 | BOLLARD |
| 100 | 742455.80 | 148034.77 | 5399.65 | BOLLARD |
| 101 | 742401.20 | 148041.48 | 5398.76 | BOLLARD |
| 102 | 742417.81 | 148206.14 | 5399.90 | BOLLARD |
| 103 | 742416.22 | 148193.23 | 5399.90 | BOLLARD |
| 104 | 742299.14 | 148146.25 | 5359.98 | BOLLARD |
| 105 | 742297.56 | 148133.34 | 5359.98 | BOLLARD |
| 106 | 742424.59 | 148253.15 | 5400.00 | BUILDING CORNER |
| 107 | 742404.03 | 148085.70 | 5400.00 | BUILDING CORNER |
| 108 | 742460.81 | 148306.08 | 5399.12 | EDGE OF ASPHALT/EDGE OF CONC |
| 109 | 742463.01 | 148323.95 | 5398.82 | EDGE OF ASPHALT/EDGE OF CONC |
| 110 | 742405.05 | 148095.42 | 5400.00 | EDGE OF ASPHALT/EDGE OF CONC |
| 111 | 742368.32 | 148099.93 | 5398.81 | EDGE OF ASPHALT/EDGE OF CONC |
| 112 | 742441.50 | 148326.59 | 5398.79 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 113 | 742424.08 | 148348.88 | 5398.70 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 114 | 742437.92 | 148461.70 | 5399.94 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 115 | 742487.26 | 148498.97 | 5404.93 | CONCRETE CURB TIE TO EXIST CURB |
| 116 | 742409.09 | 148432.00 | 5398.78 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 117 | 742354.71 | 148479.58 | 5392.95 | CONCRETE FLOW PAN FLOWLINE |
| 118 | 742259.93 | 148453.54 | 5384.16 | CONCRETE CURB TIE TO EXIST CURB |
| 119 | 742305.78 | 148404.58 | 5383.35 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 120 | 742329.03 | 148446.17 | 5388.25 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 121 | 742294.99 | 148168.93 | 5359.84 | EDGE OF ASPHALT |
| 122 | 742271.14 | 148122.48 | 5359.63 | EDGE OF ASPHALT/EDGE OF GUTTER |
| 123 | 742302.81 | 148167.97 | 5379.68 | EDGE OF ASPHALT |
| 124 | 742296.84 | 148119.32 | 5379.68 | EDGE OF ASPHALT |
| 125 | 742298.06 | 148129.25 | 5379.68 | EDGE OF ASPHALT/EDGE OF CONC |
| 126 | 742301.60 | 148158.04 | 5379.68 | EDGE OF ASPHALT/EDGE OF CONC |
| 127 | 742292.11 | 148129.98 | 5359.91 | EDGE OF ASPHALT/EDGE OF CONC |
| 128 | 742295.64 | 148158.77 | 5359.88 | EDGE OF ASPHALT/EDGE OF CONC |
| 129 | 742471.78 | 148379.06 | 5390.90 | AREA DRAIN |
| 130 | 742323.40 | 148018.94 | 5382.75 | AREA DRAIN |
| 131 | 742368.84 | 148058.41 | 5399.00 | 9' CURB INLET |
| 132 | 742397.61 | 148359.02 | 5398.50 | 6' CURB INLET |
| 133 | 742392.01 | 148046.64 | 5398.76 | EDGE OF CONC/EDGE OF GUTTER |
| 134 | 742365.88 | 148080.08 | 5398.69 | EDGE OF CONC/EDGE OF GUTTER |
| 135 | 742483.77 | 148328.45 | 5398.72 | EDGE OF LOX TANK AREA |
| 136 | 742526.46 | 148323.21 | 5398.50 | EDGE OF LOX TANK AREA |
| 137 | 742459.31 | 148006.63 | 5399.73 | RETAINING WALL TOP/OUTSIDE EDGE |
| 138 | 742391.89 | 148014.91 | 5399.73 | RETAINING WALL TOP/OUTSIDE EDGE |

(1)

NOTES:

1. UNLESS OTHERWISE NOTED, ELEVATIONS REFER TO FINISHED GRADE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 1/15/20 | EV | NT | GRADING REVISION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL POINT TABLE I

| project | contract |
|---|---|
| 98101 | |

drawing **C108** rev. **2**

sheet 33 of 542 sheets

file 98101 C_105.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_105.DWG 3/16/2021 4:56 PM ERGARVEY

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 139 | 742398.14 | 147988.95 | 5386.00 | RETAINING WALL TOP |
| 140 | 742331.18 | 147997.17 | 5386.00 | RETAINING WALL TOP |
| 141 | 742292.47 | 148075.52 | 5386.00 | RETAINING WALL TOP |
| 142 | 742331.40 | 148392.52 | 5386.00 | RETAINING WALL TOP |
| 143 | 742230.90 | 148116.53 | 5354.58 | DETENTION POND BOTTOM |
| 144 | 742244.61 | 148117.53 | 5354.60 | DETENTION POND BOTTOM |
| 145 | 742258.72 | 148094.17 | 5354.57 | DETENTION POND BOTTOM |
| 146 | 742271.66 | 148039.63 | 5354.72 | DETENTION POND BOTTOM |
| 147 | 742264.59 | 147997.92 | 5354.50 | DETENTION POND BOTTOM |
| 148 | 742232.38 | 147991.89 | 5354.20 | DETENTION POND BOTTOM |
| 149 | 742225.15 | 148050.78 | 5354.25 | DETENTION POND BOTTOM |
| 150 | 742228.26 | 147983.14 | | DETENTION POND OUTLET STRUCTURE |
| 151 | 742223.51 | 147976.44 | 5358.50 | POND SPILLWAY BOTTOM |
| 152 | 742214.39 | 147956.40 | 5358.50 | POND SPILLWAY BOTTOM |
| 153 | 742180.73 | 147932.35 | 5358.10 | POND SPILLWAY BOTTOM |
| 154 | 742227.21 | 147970.34 | 5359.50 | DETENTION POND TOP |
| 155 | 742216.66 | 147976.16 | 5359.50 | DETENTION POND TOP |
| 156 | 742204.13 | 147993.96 | 5359.50 | DETENTION POND TOP |
| 157 | 742204.16 | 148052.30 | 5359.50 | DETENTION POND TOP |
| 158 | 742207.59 | 148114.28 | 5359.50 | DETENTION POND TOP |
| 159 | 742223.52 | 148138.16 | 5359.50 | DETENTION POND TOP |
| 160 | 742248.56 | 148140.35 | 5359.50 | DETENTION POND TOP |
| 161 | 742264.49 | 148128.59 | 5359.51 | DETENTION POND TOP |
| 162 | 742278.99 | 148103.94 | 5359.50 | DETENTION POND TOP |
| 163 | 742293.02 | 148047.03 | 5359.50 | DETENTION POND TOP |
| 164 | 742294.89 | 147997.62 | 5359.50 | DETENTION POND TOP |
| 165 | 742130.77 | 147931.45 | 5355.37 | EDGE OF SIDEWALK |
| 166 | 742366.27 | 147931.45 | 5370.14 | EDGE OF SIDEWALK |
| 167 | 742431.69 | 147908.06 | 5373.40 | EDGE OF SIDEWALK |
| 168 | 742449.93 | 147832.57 | 5375.91 | EDGE OF SIDEWALK |
| 169 | 742323.11 | 148368.17 | 5380.40 | STORM MANHOLE |
| 170 | 742310.32 | 148263.95 | 5369.78 | STORM MANHOLE |
| 171 | 742306.34 | 148231.53 | 5366.48 | STORM MANHOLE |
| 172 | 742303.81 | 148210.94 | 5364.37 | STORM MANHOLE |
| 173 | 742290.74 | 148104.45 | 5359.79 | STORM MANHOLE |
| 174 | 742420.87 | 147947.42 | 5377.66 | CHAIN LINK FENCE CORNER |
| 175 | 742515.40 | 147937.39 | 5377.53 | CHAIN LINK FENCE CORNER |
| 176 | 742152.51 | 147937.41 | 5356.15 | CHAIN LINK FENCE CORNER |
| 177 | 742152.51 | 148435.54 | 5373.29 | CHAIN LINK FENCE TIE TO EXIST FENCE △1 |
| 178 | 742450.82 | 147402.47 | 5393.70 | EDGE OF SIDEWALK |
| 179 | 742469.00 | 147383.48 | 5396.71 | EDGE OF SIDEWALK |
| 180 | 742478.41 | 147358.84 | 5398.35 | EDGE OF SIDEWALK |
| 181 | 742451.45 | 147784.61 | 5377.71 | EDGE OF SIDEWALK |
| 182 | 742450.83 | 147812.63 | 5376.68 | EDGE OF SIDEWALK |
| 183 | 742546.24 | 147536.43 | 5405.96 | CONCRETE FOOTPATH CENTER |
| 184 | 742573.46 | 147698.04 | 5407.08 | CONCRETE FOOTPATH CENTER |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 185 | 742565.50 | 147637.83 | 5407.08 | CONCRETE FOOTPATH CENTER |
| 186 | 742585.65 | 147722.66 | 5407.51 | TOP OF WOODEN STAIRS |
| 187 | 742612.58 | 147727.90 | 5408.54 | CONCRETE FOOTPATH CENTER |
| 188 | 742659.44 | 147727.46 | 5410.32 | CONCRETE FOOTPATH CENTER |
| 189 | 742752.99 | 147732.37 | 5410.79 | CONCRETE FOOTPATH CENTER |
| 190 | 742788.98 | 147731.57 | 5410.25 | CONCRETE FOOTPATH CENTER |
| 191 | 742817.83 | 147725.58 | 5410.24 | EDGE OF FOOTPATH |
| 192 | 742820.44 | 147745.82 | 5409.66 | EDGE OF FOOTPATH |
| 193 | 742545.96 | 147358.89 | 5402.52 | EDGE OF FOOTPATH |
| 194 | 742565.07 | 147598.85 | 5407.02 | CONCRETE FOOTPATH CENTER |
| 195 | 742558.53 | 147552.76 | 5406.61 | ROCK BENCH |
| 196 | 742565.99 | 147568.93 | 5406.97 | ROCK BENCH |
| 197 | 742529.86 | 147358.93 | 5401.59 | EDGE OF FOOTPATH |
| 198 | 742395.30 | 148042.71 | 5398.65 | GUARDRAIL ENDPOINT |
| 199 | 742367.18 | 148119.42 | 5399.12 | GUARDRAIL ENDPOINT |
| 200 | 742371.04 | 148150.86 | 5399.29 | GUARDRAIL ENDPOINT |
| 201 | 742404.72 | 148425.13 | 5398.90 | GUARDRAIL ENDPOINT |
| 202 | 742450.72 | 147513.39 | 5387.61 | CHASE DRAIN |
| 203 | 742451.12 | 147663.91 | 5381.88 | CHASE DRAIN |
| 204 | 742445.56 | 147867.25 | 5374.48 | CHASE DRAIN |
| 205 | 742643.37 | 148054.30 | 5399.96 | BOLLARD AROUND GAS METER (LOCATION TO BE VERIFIED) |
| 206 | 742441.88 | 147384.12 | 5394.46 | CONCRETE CURB AND GUTTER, TIE TO EXISTING |
| 207 | 742131.85 | 147922.95 | 5354.94 | CONCRETE CURB AND GUTTER, TIE TO EXISTING |
| 208 | 742703.18 | 147728.33 | 5411.00 | CONCRETE FOOTPATH CENTER |
| 209 | 742592.35 | 147722.24 | 5407.77 | CONCRETE FOOTPATH CENTER |
| 210 | 742275.54 | 147978.32 | 5359.50 | DETENTION POND TOP |
| 211 | 742312.15 | 148278.84 | 5371.30 | STORM MANHOLE |
| 212 | 742412.13 | 148192.70 | 5399.91 | EDGE OF ASPHALT/EDGE OF CONC |
| 213 | 742414.69 | 148213.55 | 5399.91 | EDGE OF ASPHALT/EDGE OF CONC |
| 214 | 742551.43 | 148284.88 | 5399.79 | EDGE OF ASPHALT/EDGE OF CONC |
| 215 | 742564.33 | 148283.29 | 5399.79 | EDGE OF ASPHALT/EDGE OF CONC |
| 216 | 742721.54 | 148221.73 | 5399.86 | EDGE OF ASPHALT/EDGE OF CONC |
| 217 | 742738.42 | 148219.66 | 5399.86 | EDGE OF ASPHALT/EDGE OF CONC |
| 218 | 742668.66 | 148048.17 | 5399.88 | EDGE OF ASPHALT/EDGE OF CONC |
| 219 | 742674.57 | 148048.45 | 5399.91 | BOLLARD |
| 220 | 742347.76 | 148474.99 | 5392.19 | CONCRETE CURB CORNER |
| 221 | 742363.20 | 148480.48 | 5394.40 | CONCRETE CURB CORNER |
| 222 | 742430.45 | 148504.20 | 5401.30 | CONCRETE FLOW PAN FLOWLINE |
| 223 | 742457.26 | 147715.32 | 5380.07 | EDGE OF SIDEWALK/RIPRAP |
| 224 | 742451.25 | 147711.32 | 5380.19 | EDGE OF SIDEWALK/RIPRAP |
| 225 | 742495.85 | 147411.58 | 0.00 | CONCRETE FOOTPATH CENTER |
| 226 | 742522.48 | 147470.77 | 0.00 | CONCRETE FOOTPATH CENTER |
| 227 | 742783.34 | 147762.47 | 5408.58 | FENCE PIER, TRANSITION TO CHAIN LINK |
| 228 | 742799.73 | 147834.54 | 5406.38 | ORNAMENTAL MAN GATE |
| 229 | 742777.38 | 147861.04 | 5404.77 | SIDEWALK TIE TO CURB |
| 230 | 742768.99 | 147868.58 | 5404.40 | SIDEWALK TIE TO CURB |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| △2 231 | 742804.22 | 147762.51 | 5408.25 | ORNAMENTAL FENCE CORNER, FENCE PIER |
| 232 | 742451.29 | 147726.66 | 5379.67 | EDGE OF SIDEWALK/RIPRAP |
| 233 | 742578.26 | 147715.32 | 5407.26 | TOP OF WOODEN STAIRS |
| 234 | 742455.25 | 147711.99 | 5379.68 | END OF CULVERT |
| 235 | 742455.29 | 147726.01 | 5379.20 | END OF CULVERT |
| 236 | 742457.28 | 147722.66 | 5379.82 | EDGE OF SIDEWALK/RIPRAP |
| 237 | 742773.19 | 147782.96 | 5408.40 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 238 | 742587.00 | 147782.96 | 5406.85 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 239 | 742587.03 | 147901.34 | 5404.03 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 240 | 742609.36 | 147901.34 | 5404.47 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 241 | 742638.93 | 147871.77 | 5406.22 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 242 | 742748.22 | 147871.77 | 5405.82 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 243 | 742773.21 | 147848.72 | 5406.57 | RECYCLED ASPHALT SOLAR PANEL AREA |
| 244 | 742455.48 | 147798.33 | 5376.73 | EARTHEN BOTTOM SWALE FLOWLINE |
| 245 | 742456.17 | 147816.37 | 5376.05 | EARTHEN BOTTOM SWALE FLOWLINE |
| 246 | 742446.46 | 147894.79 | 5373.34 | EARTHEN BOTTOM SWALE FLOWLINE |
| 247 | 742419.07 | 147924.18 | 5372.02 | EARTHEN BOTTOM SWALE FLOWLINE |
| 248 | 742366.41 | 147936.95 | 5369.64 | EARTHEN BOTTOM SWALE FLOWLINE |
| 249 | 742288.22 | 147936.95 | 5365.05 | EARTHEN BOTTOM SWALE FLOWLINE |
| 250 | 742271.92 | 147951.76 | 5362.00 | EARTHEN BOTTOM SWALE FLOWLINE |
| 251 | 742598.68 | 147946.83 | 5398.63 | MILLINGS RAMP |
| 252 | 742591.48 | 147952.26 | 5398.63 | MILLINGS RAMP |
| 253 | 742577.34 | 147919.21 | 5403.50 | MILLINGS RAMP |
| 254 | 742570.14 | 147924.63 | 5402.00 | MILLINGS RAMP |
| 255 | 742577.34 | 147891.51 | 5403.50 | MILLINGS RAMP |
| 256 | 742570.14 | 147891.51 | 5402.00 | MILLINGS RAMP |
| 257 | 742589.14 | 147715.19 | 5407.00 | CRUSHER FINES PATH |
| 258 | 742581.57 | 147706.01 | 5407.00 | CRUSHER FINES PATH |
| 259 | 742635.36 | 147637.24 | 5409.50 | CRUSHER FINES PATH |
| 260 | 742631.59 | 147632.57 | 5409.50 | CRUSHER FINES PATH |
| 261 | 742668.15 | 147546.53 | 5412.00 | CRUSHER FINES PATH |
| 262 | 742664.38 | 147541.86 | 5412.00 | CRUSHER FINES PATH |
| 263 | 742728.17 | 147470.09 | 5414.00 | CRUSHER FINES PATH |
| 264 | 742731.94 | 147474.76 | 5414.00 | CRUSHER FINES PATH |
| 265 | 742796.76 | 147363.67 | 5417.00 | CRUSHER FINES PATH |
| 266 | 742801.34 | 147372.53 | 5417.00 | CRUSHER FINES PATH |
| 267 | 742798.15 | 147830.34 | 5406.40 | ORNAMENTAL FENCE CORNER |
| 268 | 742432.88 | 147937.41 | 5376.35 | CHAIN LINK FENCE CORNER |
| 269 | 742819.04 | 147902.88 | 5404.83 | ORNAMENTAL FENCE CORNER |
| 270 | 742802.03 | 147840.65 | 5406.72 | ORNAMENTAL FENCE CORNER |
| 271 | 742796.39 | 147842.70 | 5406.43 | ORNAMENTAL FENCE CORNER |
| 272 | 742286.14 | 147947.42 | 5364.63 | CHAIN LINK FENCE CORNER |
| 273 | 742274.14 | 147937.41 | 5364.54 | CHAIN LINK FENCE CORNER |

NOTES:

1. UNLESS OTHERWISE NOTED, ELEVATIONS REFER TO FINISHED GRADE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/10/19 | EV | NT | REVISED PER COR-34 |
| 2 | 1/15/20 | EV | NT | FENCE REVISION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

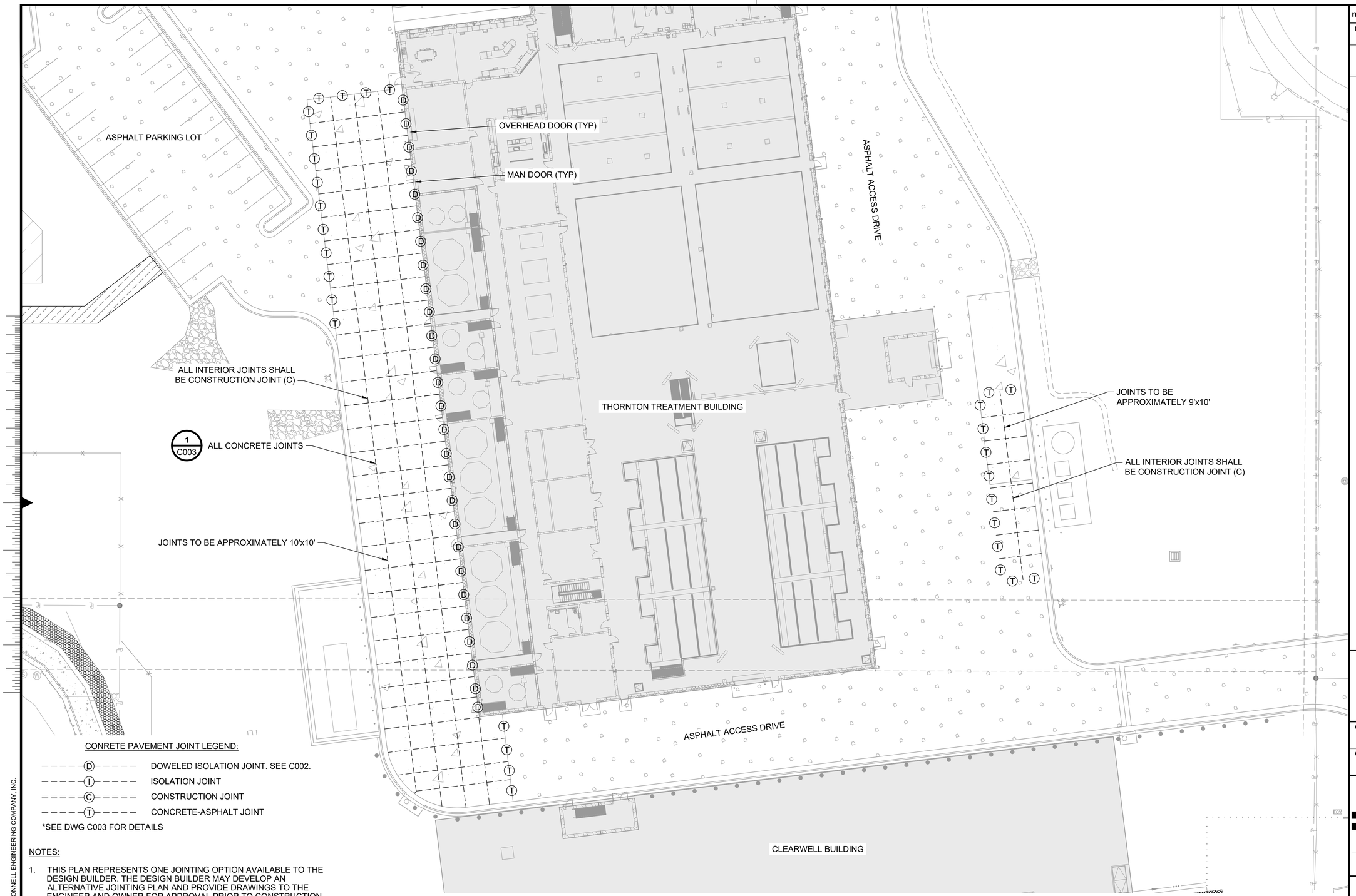
**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL POINT TABLE II

| | |
|---|---|
| project 98101 | contract |
| drawing C109 | rev. 2 |
| sheet 34 of 542 sheets | |
| file 98101 C_105.DWG | |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_105.DWG 3/16/2021 4:56 PM ERGARVEY




**JOINTING PLAN**

CONRETE PAVEMENT JOINT LEGEND:

- D — DOWELED ISOLATION JOINT. SEE C002.
- I — ISOLATION JOINT
- C — CONSTRUCTION JOINT
- T — CONCRETE-ASPHALT JOINT

*SEE DWG C003 FOR DETAILS

NOTES:

1. THIS PLAN REPRESENTS ONE JOINTING OPTION AVAILABLE TO THE DESIGN BUILDER. THE DESIGN BUILDER MAY DEVELOP AN ALTERNATIVE JOINTING PLAN AND PROVIDE DRAWINGS TO THE ENGINEER AND OWNER FOR APPROVAL PRIOR TO CONSTRUCTION.
2. DESIGN BUILDER SHALL ANGLE JOINTS PERPENDICULAR TO THE EDGE OF CONCRETE WHEN WITHIN TWO FEET OF THE EDGE OF CONCRETE.
3. INSTALL DOWELS IN ALL SLABS ABUTTING DOORS PER CIVIL DETAILS.
4. INSTALL JOINTS IN CONCRETE SIDEWALKS PER SIDEWALK DETAIL.
5. INSTALL JOINTS IN CONCRETE CURBS, GUTTERS, PANS AND SIDEWALKS PER SPECIFICATIONS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| **designed** | **checked** |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
JOINTING PLAN

| project | contract |
|---|---|
| 98101 | |

**drawing** C110 — **rev.** 0

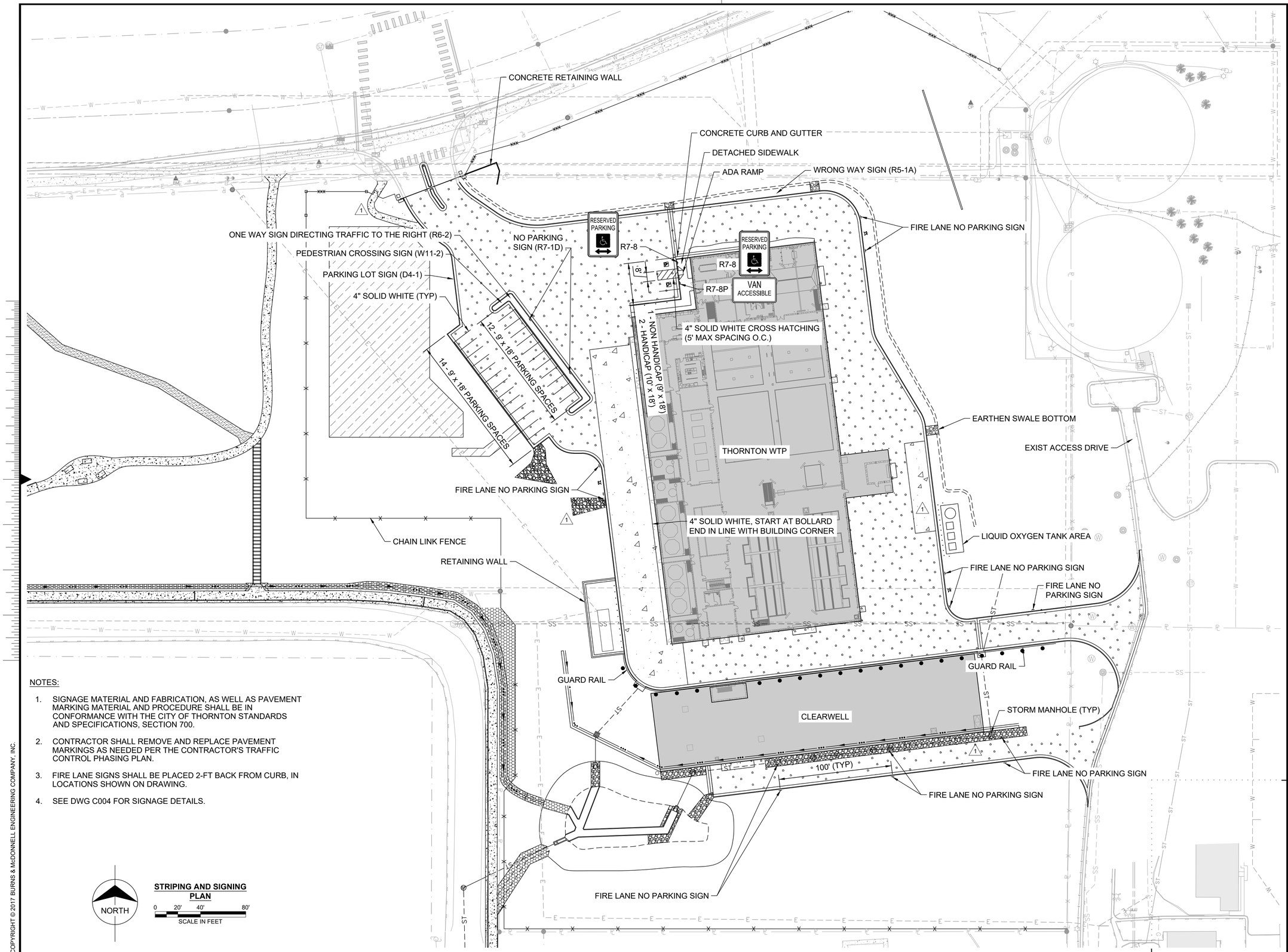
**sheet** 35 **of** 542 sheets

**file** 98101 C_110.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTON\WTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_110.DWG 10/21/2020 5:56 PM MDSTROBEL




NOTES:

1. SIGNAGE MATERIAL AND FABRICATION, AS WELL AS PAVEMENT MARKING MATERIAL AND PROCEDURE SHALL BE IN CONFORMANCE WITH THE CITY OF THORNTON STANDARDS AND SPECIFICATIONS, SECTION 700.
2. CONTRACTOR SHALL REMOVE AND REPLACE PAVEMENT MARKINGS AS NEEDED PER THE CONTRACTOR'S TRAFFIC CONTROL PHASING PLAN.
3. FIRE LANE SIGNS SHALL BE PLACED 2-FT BACK FROM CURB, IN LOCATIONS SHOWN ON DRAWING.
4. SEE DWG C004 FOR SIGNAGE DETAILS.

NORTH

**STRIPING AND SIGNING PLAN**

0 20' 40' 80'

SCALE IN FEET

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_111.DWG 3/24/2021 11:30 PM MDSTROBEL

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

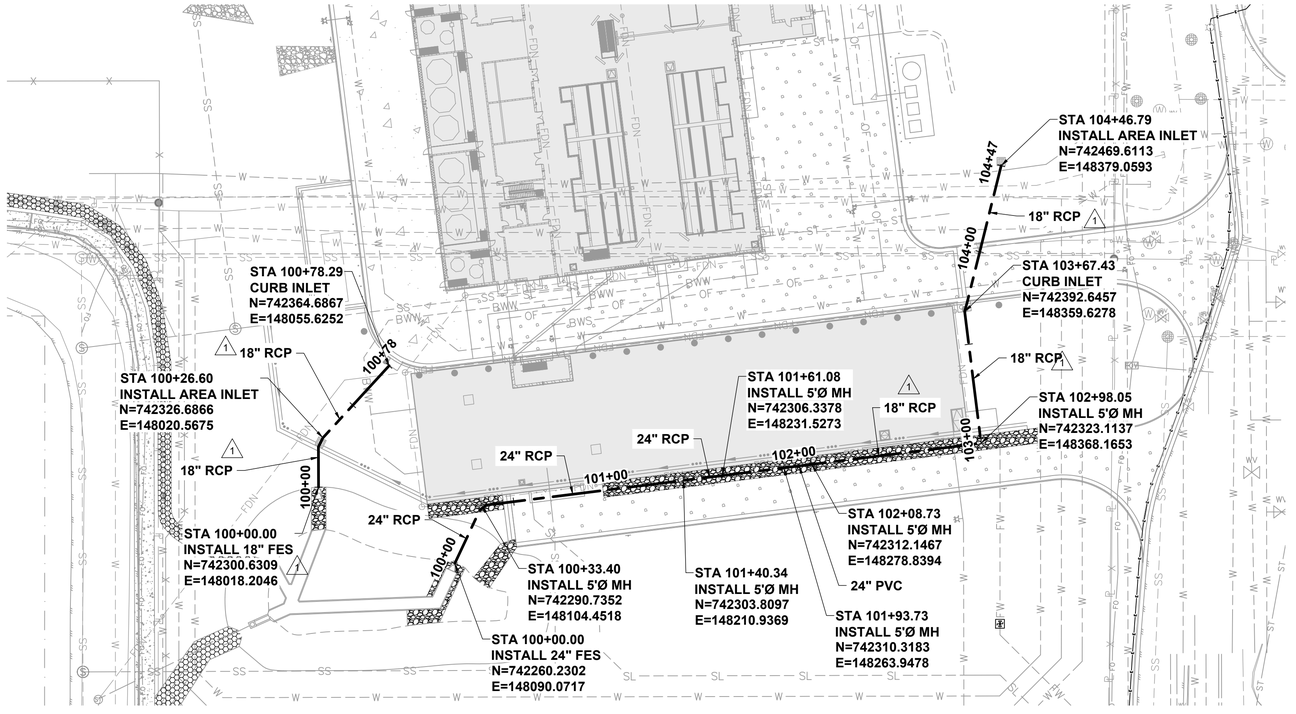
BURNS McDONNELL

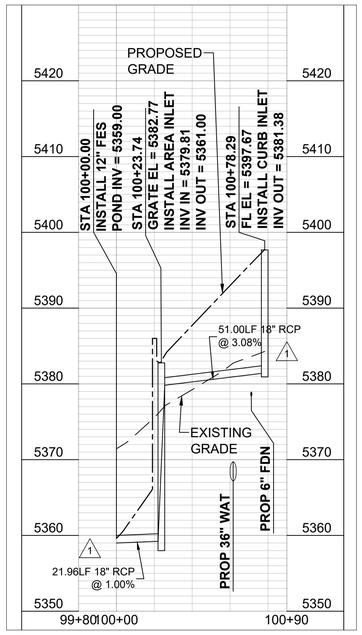
| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

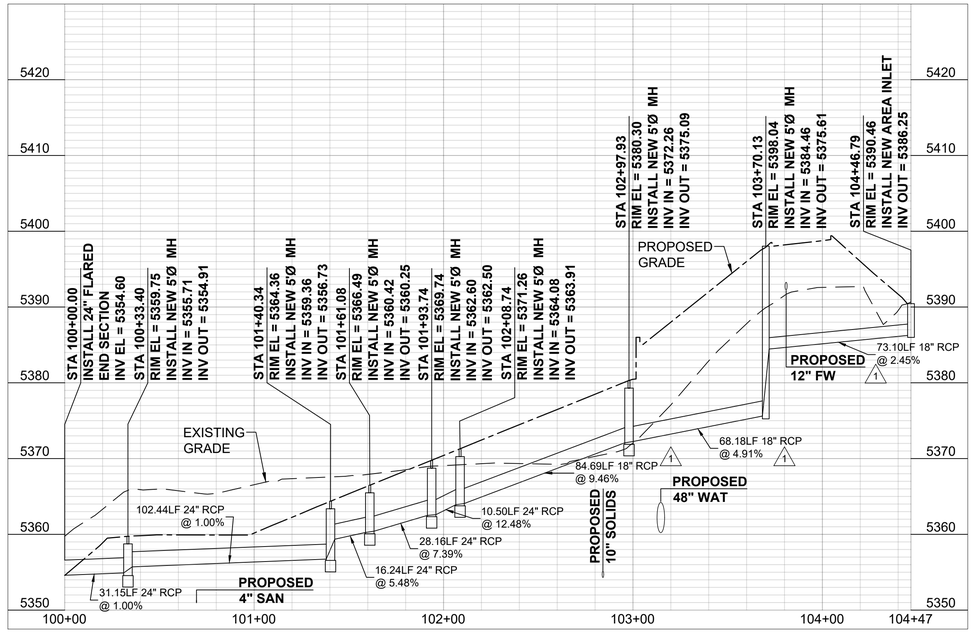
**CITY OF THORNTON**
**TTP - PACKAGE 3**
STRIPING AND SIGNING PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** C111 | **rev.** 1 |
| **sheet** 36 **of** 542 sheets | |
| **file** 98101 C_111.DWG | |




ST-1




ST-2

NOTES:

1. ALL DISTURBED SURFACES SHALL BE RESTORED TO EXISTING OR BETTER CONDITIONS.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STORMWATER PLAN I

| project | contract |
|---|---|
| 98101 | |

drawing **C112** – rev. **1**

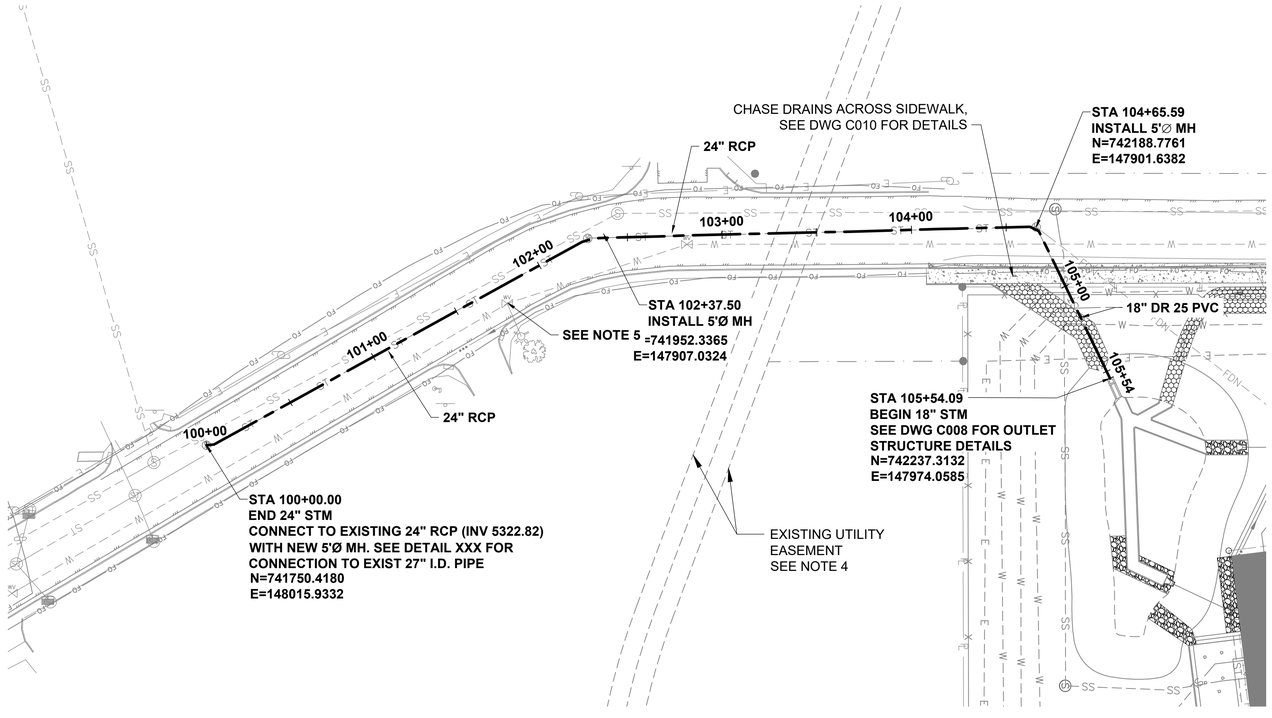
sheet 37 of 542 sheets

file 98101 C_112.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

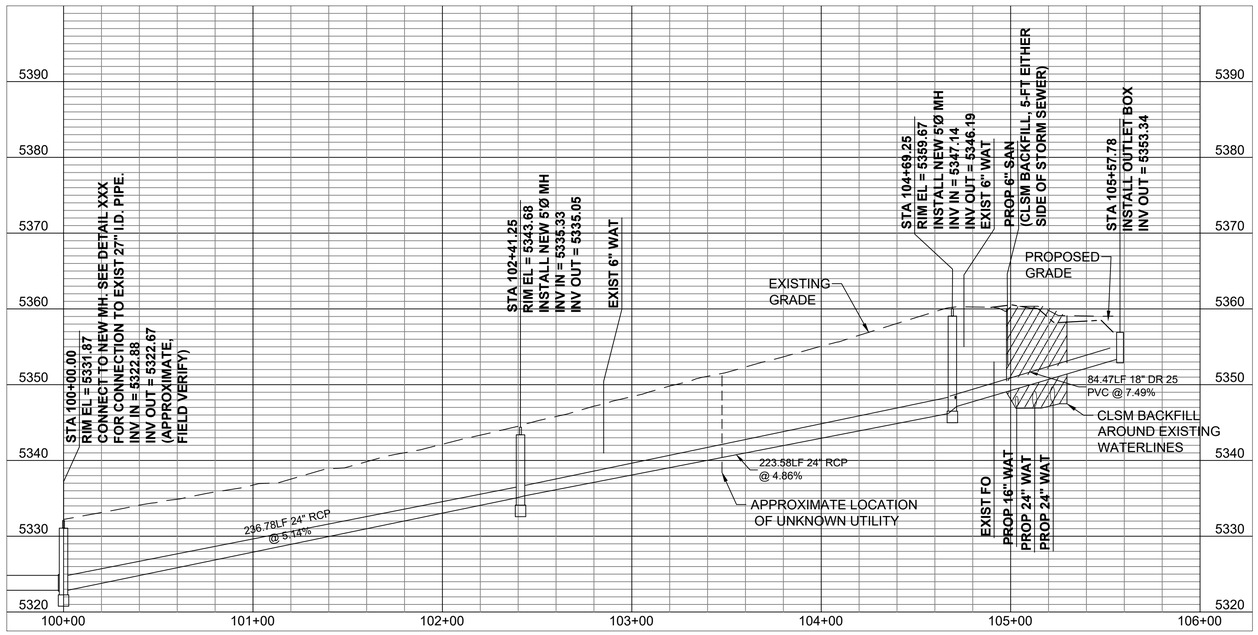
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_112.DWG 10/21/2020 6:12 PM MDSTROBEL







CONCRETE COLLAR DETAIL




ST-3

NOTES:

1. ALL DISTURBED SURFACES SHALL BE RESTORED TO EXISTING OR BETTER CONDITIONS.
2. ASPHALT SHALL BE REPLACED WHERE DEMOLISHED DUE TO PIPE INSTALLATION. SEE ASPHALT PAVING DETAIL DWG C003.
3. DESIGN-BUILDER TO FIELD VERIFY EXISTING STORM SEWER INVERT ELEVATION AT TIE-IN LOCATION, AND REPORT ANY DISCREPANCIES TO ENGINEER.
4. DESIGN-BUILDER SHALL FIELD VERIFY LOCATION AND DEPTH OF EXISTING UTILITY WITHIN EASEMENT SHOWN.
5. DESIGN-BUILDER SHALL FIELD VERIFY LOCATION OF HYDRANT LINE AND VALVE, PRIOR TO STORM SEWER CONSTRUCTION.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STORMWATER PLAN II

| project | contract |
|---|---|
| 98101 | |

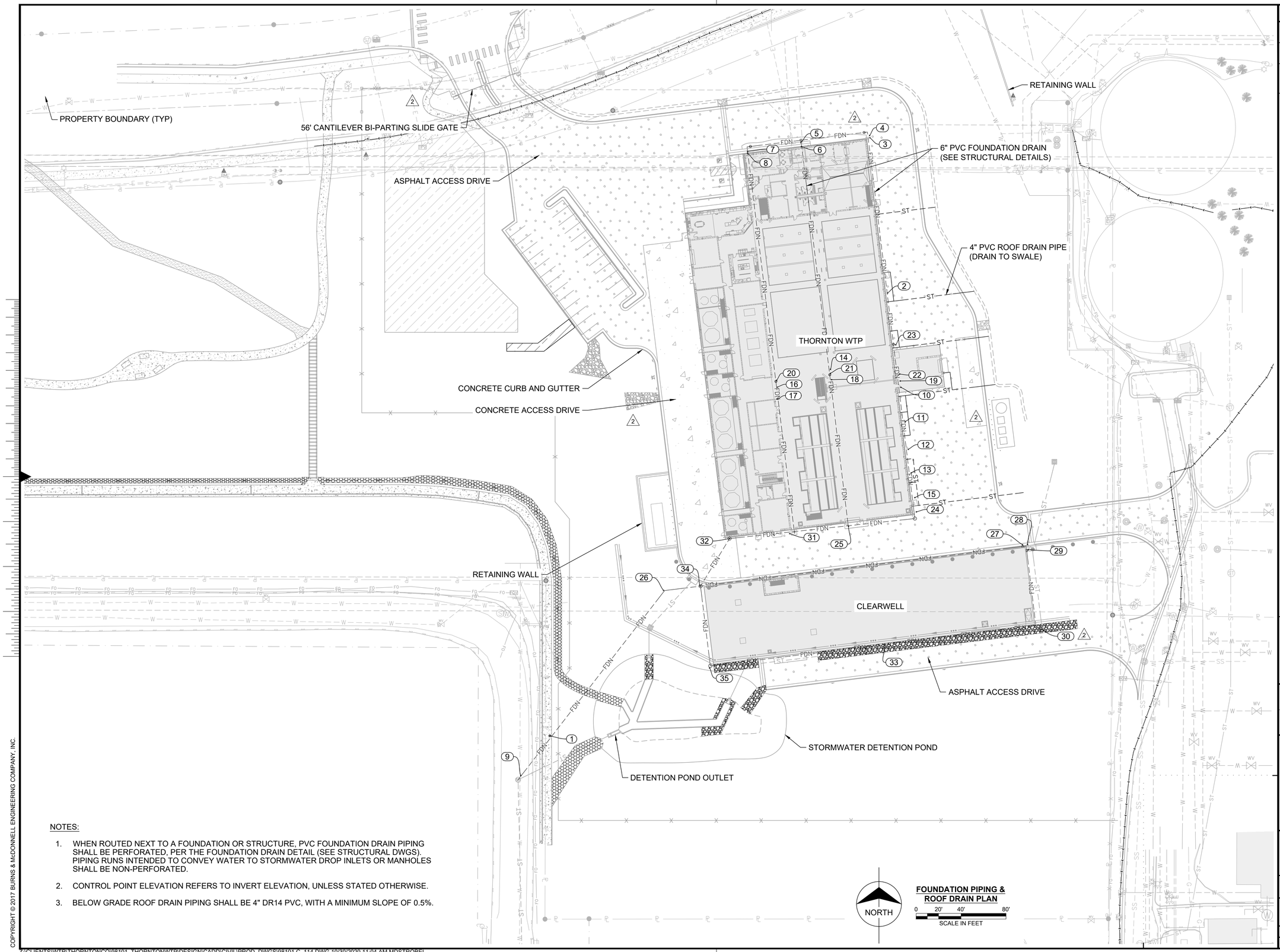
drawing **C113** – rev. **1**

sheet 38 of 542 sheets

file 98101 C_113.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:

1. WHEN ROUTED NEXT TO A FOUNDATION OR STRUCTURE, PVC FOUNDATION DRAIN PIPING SHALL BE PERFORATED, PER THE FOUNDATION DRAIN DETAIL (SEE STRUCTURAL DWGS). PIPING RUNS INTENDED TO CONVEY WATER TO STORMWATER DROP INLETS OR MANHOLES SHALL BE NON-PERFORATED.
2. CONTROL POINT ELEVATION REFERS TO INVERT ELEVATION, UNLESS STATED OTHERWISE.
3. BELOW GRADE ROOF DRAIN PIPING SHALL BE 4" DR14 PVC, WITH A MINIMUM SLOPE OF 0.5%.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | EV | NT | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FOUNDATION PIPING & ROOF DRAIN PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing C114 | rev. 2 |
| sheet 39 of 542 sheets | |
| file 98101 C_114.DWG | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_114.DWG 10/30/2020 11:04 AM MDSTROBEL

1 2 3 4 5 6 7 8 9 10 11 12 13

A B C D E F G H I

△1

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 1 | 274651.43 | 163527.25 | 5349.50 | 6" PVC CLEANOUT |
| 2 | 275045.85 | 163827.74 | 5372.40 | TOP 6" UD |
| 3 | 275183.99 | 163811.86 | 5373.79 | 6" PVC CLEANOUT |
| 4 | 275186.01 | 163811.65 | 5373.88 | 6" PVC 90 DEG BEND |
| 5 | 275179.57 | 163750.43 | 5373.89 | 6" PVC TEE |
| 6 | 275176.04 | 163750.88 | 5373.51 | 6" PVC CLEANOUT |
| 7 | 275171.75 | 163702.95 | 5373.77 | 6" PVC 90 DEG BEND |
| 8 | 275170.17 | 163703.01 | 5373.68 | 6" PVC CLEANOUT |
| 9 | 274616.05 | 163501.38 | 5348.74 | 6" PVC TIE TO MANHOLE |
| 10 | 274961.85 | 163839.62 | 5364.41 | TOP 6" FOUND DRAIN EAST FILTER |
| 11 | 274931.19 | 163843.35 | 5364.02 | TOP 6"  FOUND DRAIN EAST FILTER |
| 12 | 274906.67 | 163846.21 | 5363.83 | TOP 6" FOUND DRAIN EAST FILTER |
| 13 | 274885.77 | 163848.90 | 5363.61 | TOP 6" FOUND DRAIN EAST FILTER |
| 14 | 274977.81 | 163776.89 | 5366.33 | 6" PVC CLEANOUT (CONNECTION INTO STRUCTURE WILL BE IN WP3) |
| 15 | 274863.71 | 163852.07 | 5363.14 | TOP 6" FOUND DRAIN EAST FILTER |
| 16 | 274961.89 | 163729.31 | 5370.99 | 6" PVC VERTICAL 45 DEG BEND |
| 17 | 274951.33 | 163729.91 | 5364.65 | 6" PVC VERTICAL 45 DEG BEND |
| 18 | 274968.62 | 163777.82 | 5370.93 | 6" PVC VERTICAL 45 DEG BEND |
| 19 | 274967.50 | 163838.97 | 5363.50 | 6" PVC VERTICAL 45 DEG BEND |
| 20 | 274968.07 | 163729.01 | 5370.24 | 6" PVC CLEANOUT (CONNENCTION INTO STRUCTURE WILL BE IN WP3) |
| 21 | 274974.26 | 163776.85 | 5370.05 | 6" PVC VERTICAL 45 DEG BEND |
| 22 | 274973.70 | 163838.47 | 5368.31 | 6" PVC VERTICAL 45 DEG BEND |
| 23 | 274999.68 | 163835.00 | 5369.45 | 6" PVC CLEANOUT |
| 24 | 274850.98 | 163853.46 | 5363.14 | 24" VERTICAL PVC INSPECTION PIPE |
| 25 | 274838.27 | 163793.07 | 5361.87 | 6" PVC TEE |
| 26 | 274781.01 | 163628.36 | 5351.08 | 6" PVC 45 DEG BEND |
| 27 | 274821.86 | 163947.95 | 5357.16 | 6" PVC CLEANOUT |
| 28 | 274822.09 | 163952.42 | 5356.16 | 6" PVC 90 DEG BEND |
| 29 | 274817.45 | 163953.03 | 5357.14 | 6" PVC CLEANOUT |
| 30 | 274748.26 | 163961.58 | 5349.50 | 6" PVC 90 DEG BEND |
| 31 | 274831.54 | 163740.72 | 5361.93 | 6" PVC TEE |
| 32 | 274827.11 | 163687.12 | 5354.44 | 24" VERTICAL PVC INSPECTION PIPE |
| 33 | 274730.40 | 163825.30 | 5356.17 | 6" PVC CLEANOUT |
| 34 | 274784.95 | 163660.94 | 5352.00 | 24" VERTICAL PVC INSPECTION PIPE |
| 35 | 274711.85 | 163669.52 | 5352.61 | 24" VERTICAL PVC INSPECTION PIPE |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FOUNDATION PIPING & ROOF DRAIN
CONTROL POINT TABLE

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** C115 – **rev.** 1

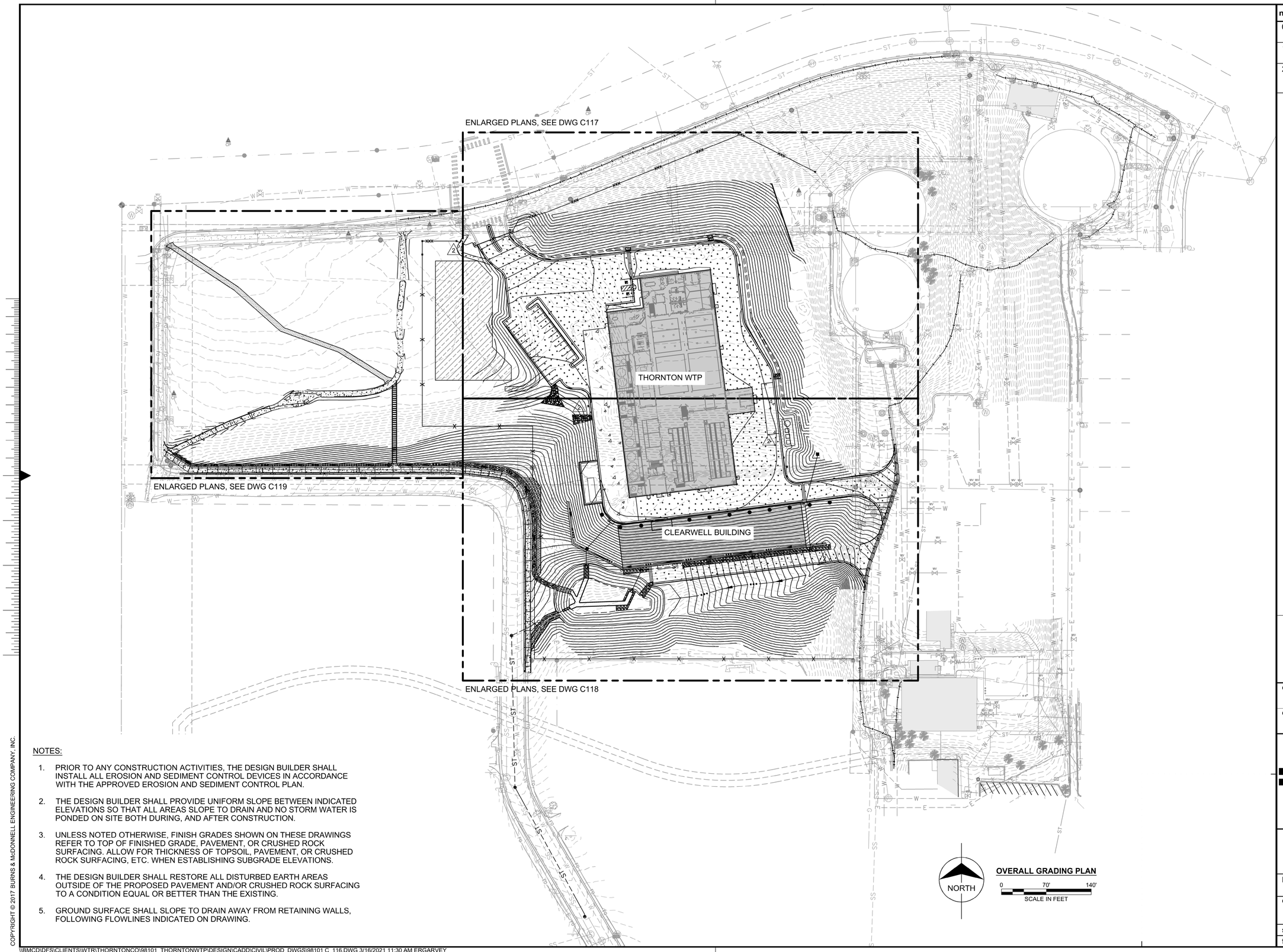
**sheet** 40 **of** 542 sheets

**file** 98101 C_114.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_114.DWG 10/30/2020 11:04 AM MDSTROBEL




**OVERALL GRADING PLAN**

NOTES:

1. PRIOR TO ANY CONSTRUCTION ACTIVITIES, THE DESIGN BUILDER SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
2. THE DESIGN BUILDER SHALL PROVIDE UNIFORM SLOPE BETWEEN INDICATED ELEVATIONS SO THAT ALL AREAS SLOPE TO DRAIN AND NO STORM WATER IS PONDED ON SITE BOTH DURING, AND AFTER CONSTRUCTION.
3. UNLESS NOTED OTHERWISE, FINISH GRADES SHOWN ON THESE DRAWINGS REFER TO TOP OF FINISHED GRADE, PAVEMENT, OR CRUSHED ROCK SURFACING. ALLOW FOR THICKNESS OF TOPSOIL, PAVEMENT, OR CRUSHED ROCK SURFACING, ETC. WHEN ESTABLISHING SUBGRADE ELEVATIONS.
4. THE DESIGN BUILDER SHALL RESTORE ALL DISTURBED EARTH AREAS OUTSIDE OF THE PROPOSED PAVEMENT AND/OR CRUSHED ROCK SURFACING TO A CONDITION EQUAL OR BETTER THAN THE EXISTING.
5. GROUND SURFACE SHALL SLOPE TO DRAIN AWAY FROM RETAINING WALLS, FOLLOWING FLOWLINES INDICATED ON DRAWING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | EV | NT | WP1 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 3/31/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** MARCH 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

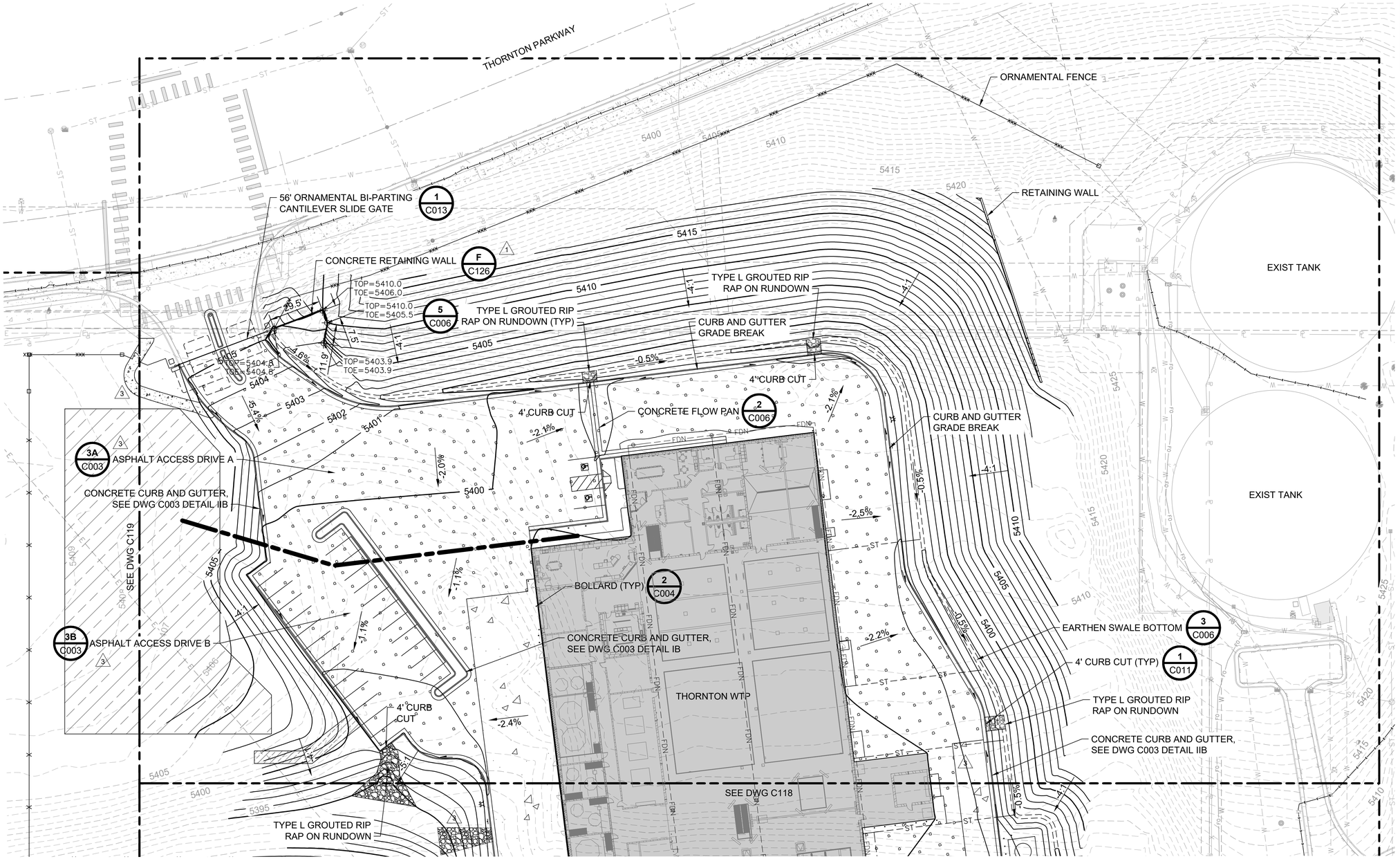
**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL GRADING PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** C116 | **rev.** 2 |
| **sheet** 41 **of** 542 sheets | |
| **file** 98101 C_116.DWG | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_116.DWG 3/16/2021 11:30 AM ERGARVEY




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 9/2/20 | NT | NT | ISSUED FOR REVISION |
| 3 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GRADING PLAN I

| project | contract |
|---|---|
| 98101 | |

drawing **C117** – rev. **3**

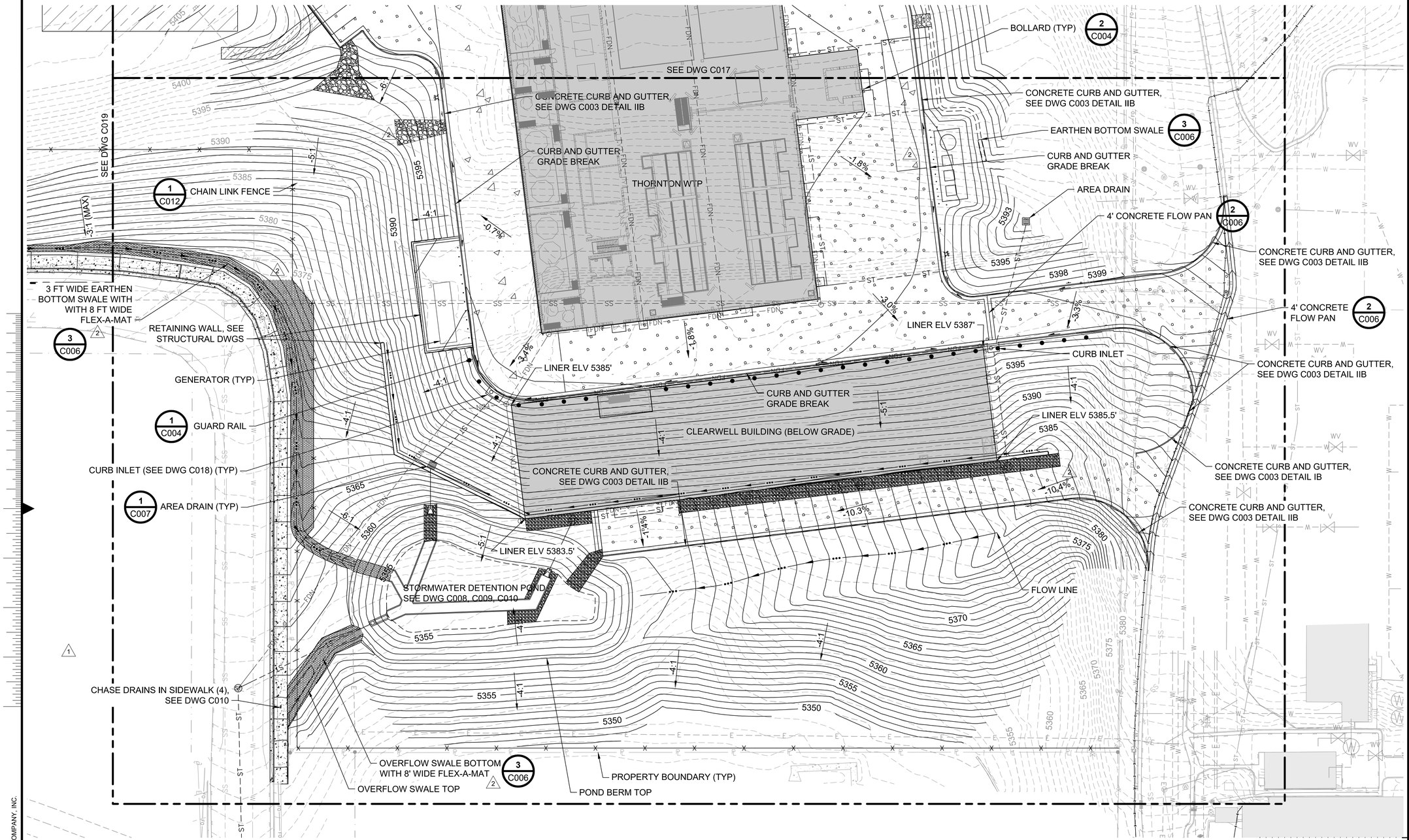
sheet 42 of 542 sheets

file 98101 C_117.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_117.DWG 3/24/2021 1:57 PM MDSTROBEL




NORTH

**GRADING PLAN II**

0 30' 60'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GRADING PLAN II

| | |
|---|---|
| **project** 98101 | **contract** |

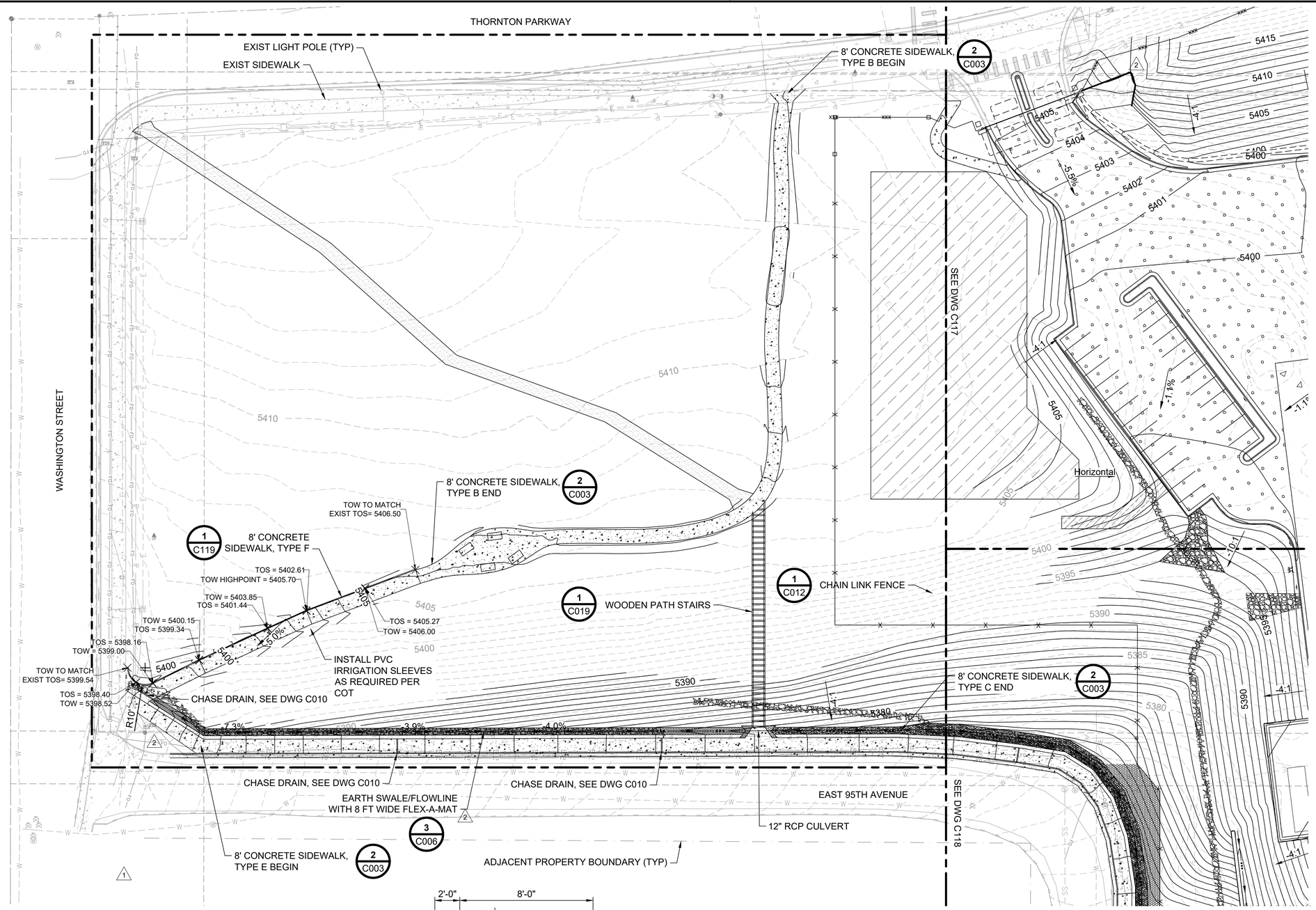
**drawing** C118 – **rev.** 2

**sheet** 43 **of** 542 sheets

**file** 98101 C_118.DWG

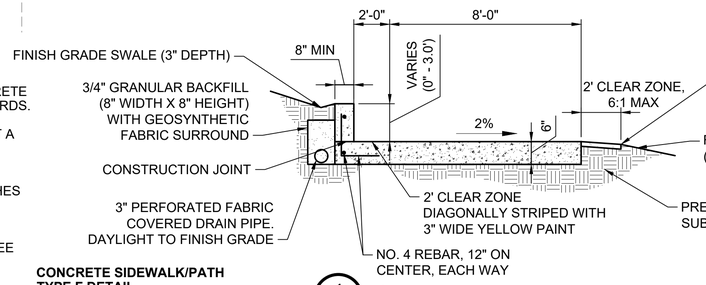
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




NOTES:

1. ALL EXTERIOR CONCRETE SHALL BE 4500 PSI CONCRETE AND FIBERMESH REINFORCEMENT PER COT STANDARDS.
2. PROVIDE SAWED CONSTRUCTION JOINTS SPACED AT A DISTANCE EQUAL TO PATH WIDTH. PROVIDE SAWED CONTRACTION JOINTS PER COT STANDARDS.
3. ANTI-SKATE CLEATS SHALL BE INSTALLED AT 36-INCHES ON CENTER ON TOP OF CONCRETE WALL PER SKATESTOPPER FA 902.5 OR APPROVED EQUAL.
4. CURB SHALL TAPER TO ZERO, WITHIN THE LAST THREE FEET, TO MATCH EXISTING SIDEWALK ELEVATION.




**CONCRETE SIDEWALK/PATH TYPE F DETAIL**
1 2
**NOT TO SCALE**

NORTH

**GRADING PLAN III**
0 30' 60'
SCALE IN FEET

ABBREVIATIONS

| | |
|---|---|
| TOS | TOP OF SIDEWALK |
| TOW | TOP OF WALL |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GRADING PLAN III

| project | contract |
|---|---|
| 98101 | |

drawing **C119** – rev. **2**

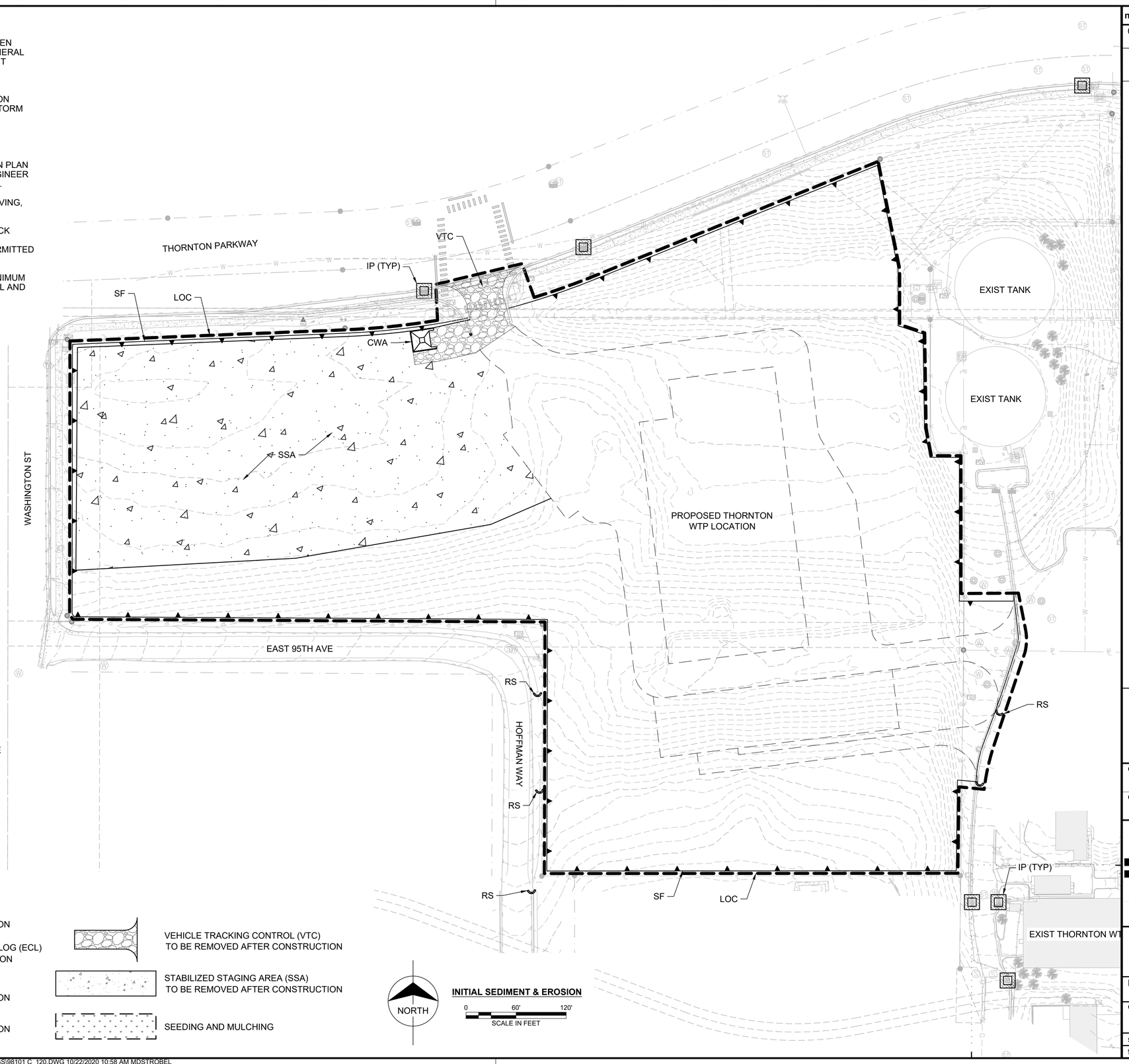
sheet 44 of 542 sheets

file 98101 C_119.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:

1. THIS EROSION AND SEDIMENT CONTROL PLAN HAS BEEN SUBMITTED TO THE CITY OF THORNTON AND IS IN GENERAL CONFORMANCE WITH THE CITY'S EROSION & SEDIMENT CONTROL STANDARDS.
2. SEE OTHER CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAWINGS, AND OUTLET PROTECTION.
3. ALL TREES NOT SHOWN TO BE REMOVED SHALL BE PRESERVED.
4. DESIGN BUILDER SHALL REPORT ANY DISCREPANCY IN PLAN VERSUS FIELD CONDITIONS IMMEDIATELY TO THE ENGINEER PRIOR TO CONTINUING WITH THAT PORTION OF WORK.
5. WHERE POSSIBLE, DO NOT DISTURB THE EXISTING PAVING, STRUCTURES, OR LANDSCAPING.
6. THE USE OF AN EROSION CONTROL LOG OR ROCK SOCK SHALL BE THE CHOICE OF THE CONTRACTOR ON ALL EARTHEN SURFACES. ONLY ROCK SOCKS WILL BE PERMITTED WERE SHOWN ON PAVED SURFACES.
7. STABILIZED STAGING AREA SHALL BE RIPPED TO A MINIMUM DEPTH OF 12 INCHES PRIOR TO REPLACEMENT OF SOIL AND SEEDING.




SEDIMENT & EROSION CONTROL LEGEND

- 5530 EXISTING MAJOR CONTOUR
- 5531 EXISTING MINOR CONTOUR
- 5530 MAJOR CONTOUR
- 5531 MINOR CONTOUR
- DRAINAGE DITCH/SWALE CENTERLINE
- LIMITS OF CONSTRUCTION (LOC)
- CHECK DAM (CD)
- CONCRETE WASHOUT AREA (CWA)
- EROSION CONTROL BLANKET (ECB)
- INLET PROTECTION (IP) TO BE REM. AFTER FINAL STABLIZATION
- ROCK SOCK (RS)/EROSION CONTROL LOG (ECL) TO BE REM. AFTER FINAL STABILIZATION
- SEDIMENT CONTROL LOG (SCL) TO BE REM. AFTER FINAL STABILZATION
- SILT FENCE (SF) TO BE REM. AFTER FINAL STABLIZATION
- VEHICLE TRACKING CONTROL (VTC) TO BE REMOVED AFTER CONSTRUCTION
- STABILIZED STAGING AREA (SSA) TO BE REMOVED AFTER CONSTRUCTION
- SEEDING AND MULCHING

NORTH

**INITIAL SEDIMENT & EROSION**

0 60' 120'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** E. VIK |
| **designed** E. VIK | **checked** N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
INITIAL SEDIMENT & EROSION CONTROL PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** C120 | **rev.** 0 |
| **sheet** 45 **of** 542 sheets | |
| **file** 98101 C_120.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

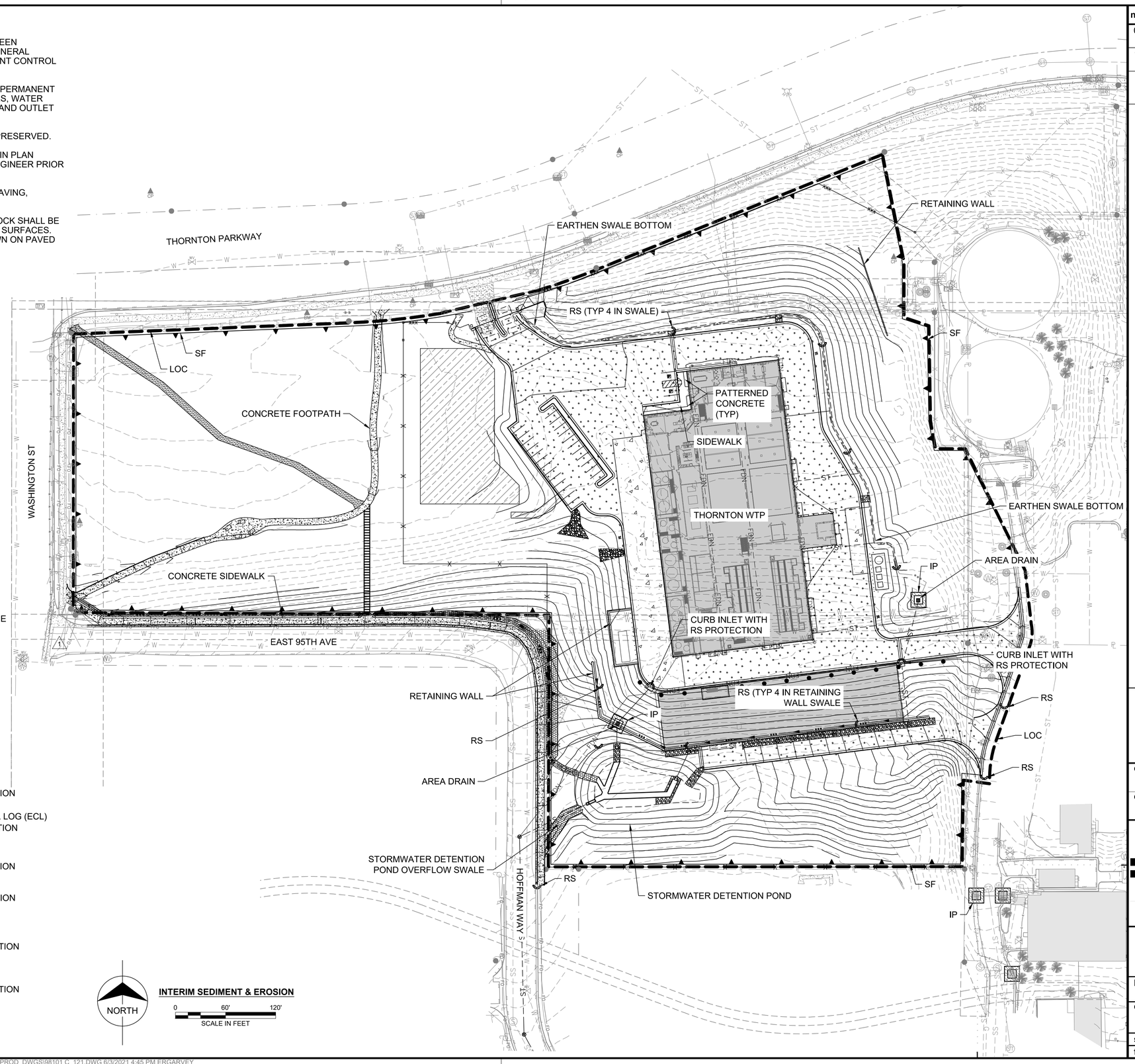
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_120.DWG 10/22/2020 10:58 AM MDSTROBEL

NOTES:

1. THIS EROSION AND SEDIMENT CONTROL PLAN HAS BEEN SUBMITTED TO THE CITY OF THORNTON AND IS IN GENERAL CONFORMANCE WITH THE CITY'S EROSION & SEDIMENT CONTROL STANDARDS.
2. SEE OTHER CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAWINGS, AND OUTLET PROTECTION.
3. ALL TREES NOT SHOWN TO BE REMOVED SHALL BE PRESERVED.
4. DESIGN BUILDER SHALL REPORT ANY DISCREPANCY IN PLAN VERSUS FIELD CONDITIONS IMMEDIATELY TO THE ENGINEER PRIOR TO CONTINUING WITH THAT PORTION OF WORK.
5. WHERE POSSIBLE, DO NOT DISTURB THE EXISTING PAVING, STRUCTURES, OR LANDSCAPING.
6. THE USE OF AN EROSION CONTROL LOG OR ROCK SOCK SHALL BE THE CHOICE OF THE CONTRACTOR ON ALL EARTHEN SURFACES. ONLY ROCK SOCKS WILL BE PERMITTED WERE SHOWN ON PAVED SURFACES.

SEDIMENT & EROSION CONTROL LEGEND

- 5530 — EXISTING MAJOR CONTOUR
- 5531 — EXISTING MINOR CONTOUR
- 5530 — MAJOR CONTOUR
- 5531 — MINOR CONTOUR
- DRAINAGE DITCH/SWALE CENTERLINE
- LIMITS OF CONSTRUCTION (LOC)
- CHECK DAM (CD)
- CONCRETE WASHOUT AREA (CWA)
- EROSION CONTROL BLANKET (ECB)
- INLET PROTECTION (IP) TO BE REM. AFTER FINAL STABLIZATION
- ROCK SOCK (RS)/EROSION CONTROL LOG (ECL) TO BE REM. AFTER FINAL STABILIZATION
- SEDIMENT CONTROL LOG (SCL) TO BE REM. AFTER FINAL STABILZATION
- SILT FENCE (SF) TO BE REM. AFTER FINAL STABLIZATION
- VEHICLE TRACKING CONTROL (VTC) TO BE REMOVED AFTER CONSTRUCTION
- STABILIZED STAGING AREA (SSA) TO BE REMOVED AFTER CONSTRUCTION
- SEEDING AND MULCHING




NORTH

INTERIM SEDIMENT & EROSION

0 60' 120'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| | 04/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
INTERIM SEDIMENT & EROSION CONTROL PLAN

| project | contract |
|---|---|
| 98101 | |

drawing C121 — rev. 1

sheet 46 of 542 sheets

file 98101 C_121.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

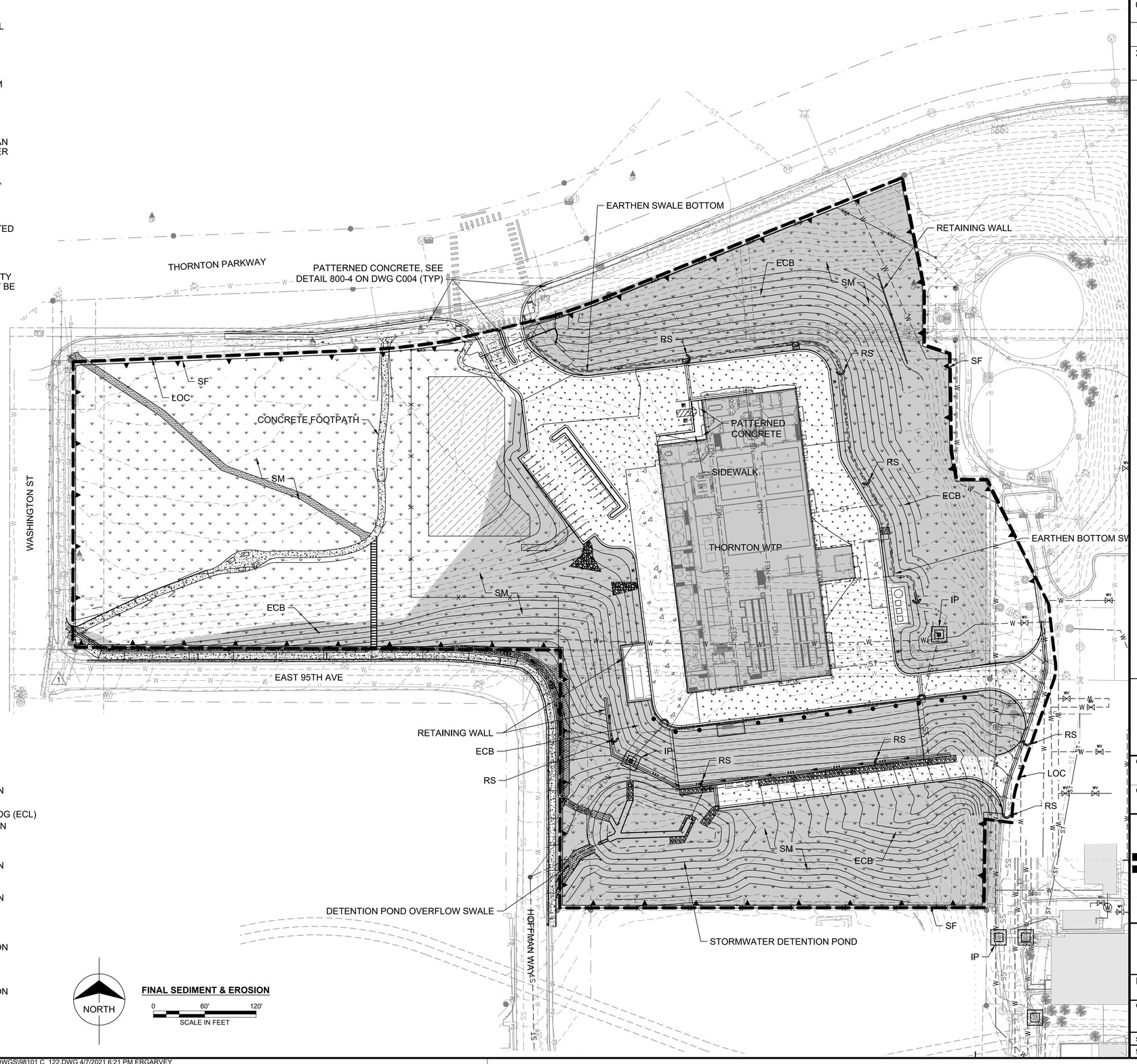
\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_121.DWG 6/3/2021 4:45 PM ERGARVEY

NOTES:

1. THIS EROSION AND SEDIMENT CONTROL PLAN HAS BEEN SUBMITTED TO THE CITY OF THORNTON AND IS IN GENERAL CONFORMANCE WITH THE CITY'S EROSION & SEDIMENT CONTROL STANDARDS.
2. SEE OTHER CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITY FACILITIES, CULVERTS, STORM DRAWINGS, AND OUTLET PROTECTION.
3. ALL TREES NOT SHOWN TO BE REMOVED SHALL BE PRESERVED.
4. DESIGN BUILDER SHALL REPORT ANY DISCREPANCY IN PLAN VERSUS FIELD CONDITIONS IMMEDIATELY TO THE ENGINEER PRIOR TO CONTINUING WITH THAT PORTION OF WORK.
5. WHERE POSSIBLE, DO NOT DISTURB THE EXISTING PAVING, STRUCTURES, OR LANDSCAPING.
6. THE USE OF AN EROSION CONTROL LOG OR ROCK SOCK SHALL BE THE CHOICE OF THE CONTRACTOR ON ALL EARTHEN SURFACES. ONLY ROCK SOCKS WILL BE PERMITTED WERE SHOWN ON PAVED SURFACES.
7. HYDROMULCHING MAY BE USED IN PLACE OF EROSION CONTROL BLANKETS TO STABILIZE SLOPES AS RECOMMENDED BY MANUFACTURER AND APPROVED BY CITY OF THORNTON. SLOPES IN SWALE AND STORM POND MUST BE PROTECTED WITH ECB. (2)
8. ALL DISTURBED SLOPES TO BE PROTECTED.

SEDIMENT & EROSION CONTROL LEGEND

- 5530 EXISTING MAJOR CONTOUR
- 5531 EXISTING MINOR CONTOUR
- 5530 MAJOR CONTOUR
- 5531 MINOR CONTOUR
- DRAINAGE DITCH/SWALE CENTERLINE
- LIMITS OF CONSTRUCTION
- CHECK DAM (CD)
- CONCRETE WASHOUT AREA (CWA)
- EROSION CONTROL BLANKET (ECB)
- INLET PROTECTION (IP) TO BE REM. AFTER FINAL STABLIZATION
- ROCK SOCK (RS)/EROSION CONTROL LOG (ECL) TO BE REM. AFTER FINAL STABILIZATION
- SEDIMENT CONTROL LOG (SCL) TO BE REM. AFTER FINAL STABILZATION
- SILT FENCE (SF) TO BE REM. AFTER FINAL STABLIZATION
- VEHICLE TRACKING CONTROL (VTC) TO BE REMOVED AFTER CONSTRUCTION
- STABILIZED STAGING AREA (SSA) TO BE REMOVED AFTER CONSTRUCTION
- SEEDING AND MULCHING (SM)




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | E. VIK |
| designed | checked |
| E. VIK | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FINAL SEDIMENT & EROSION CONTROL PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **C122** – rev. **2**

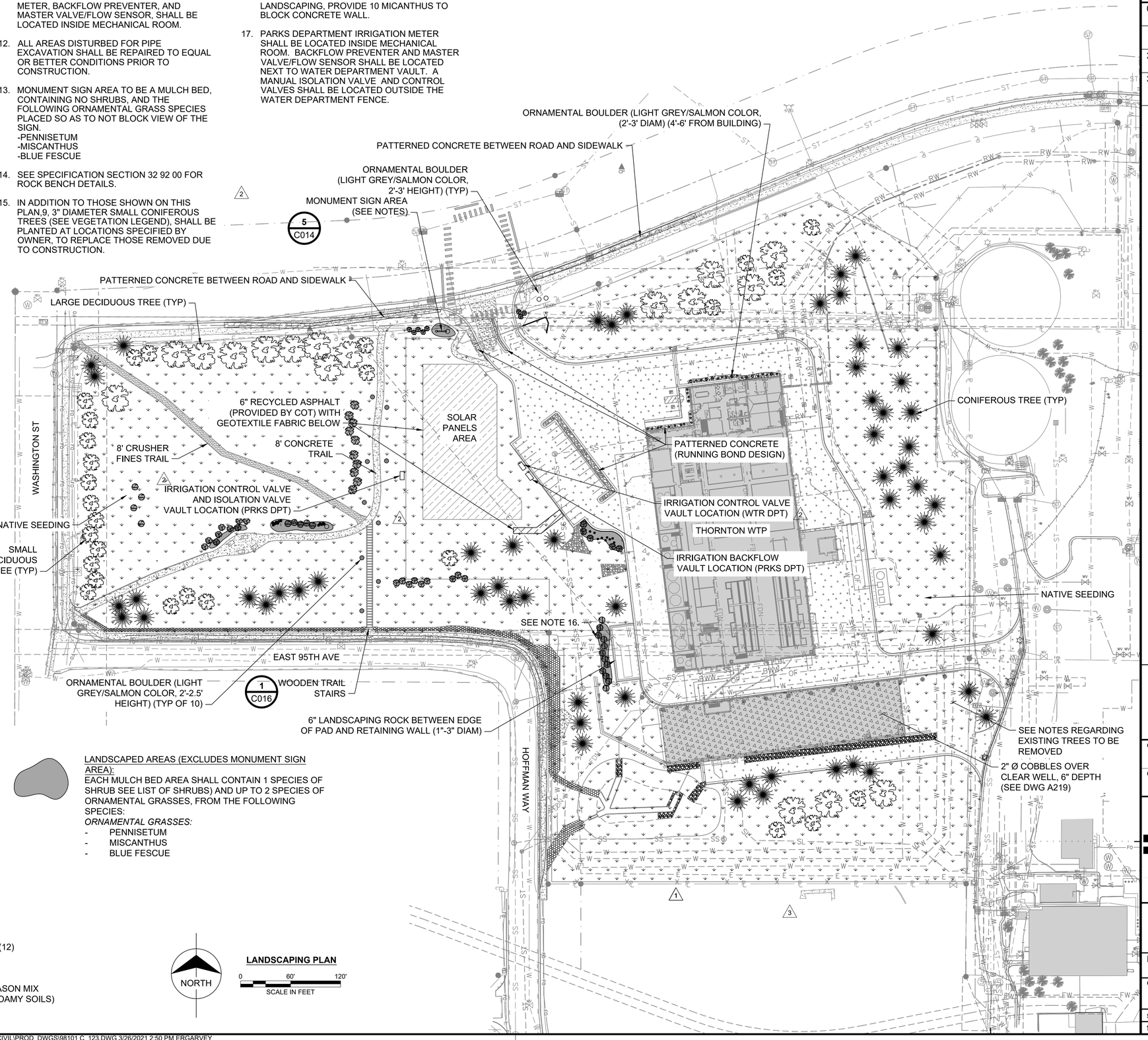
sheet 47 of 542 sheets

file 98101 C_122.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:

1. ALL TREES NOT SHOWN TO BE REMOVED SHALL BE PRESERVED.
2. ALL LANDSCAPED AREAS ARE TO RECEIVE SOIL PREPARATION PER SPECIFICATION SECTION 31 20 00 AND 32 92 00.
3. ALL DISTURBED AREAS NOT RECEIVING HARD SURFACING SHALL BE SEEDED AND MULCHED PER SPECIFICATION 32 92 00.
4. DESIGN-BUILDER SHALL REPORT ANY DISCREPANCY IN PLAN VERSUS FIELD CONDITIONS IMMEDIATELY TO THE ENGINEER PRIOR TO CONTINUING WITH THAT PORTION OF WORK.
5. WHERE POSSIBLE, DO NOT DISTURB THE EXISTING PAVING, STRUCTURES, OR LANDSCAPING.
6. TREES AND SHRUBS SHALL BE PLANTED IN A RANDOM FASHION, WITHIN THE GENERAL LIMITS SHOWN ON THIS DRAWING. PLANT LAYOUT STAKING SHALL BE APPROVED BY OWNER.
7. DESIGN-BUILDER SHALL SUBMIT ON LOCATION AND QUANTITIES OF TREE AND ORNAMENTAL GRASS SPECIES.
8. DESIGN-BUILDER SHALL DESIGN AND SUBMIT, FOR ENGINEER'S AND OWNER'S APPROVAL, DRIP IRRIGATION SYSTEM FOR ALL TREES, SHRUBS, AND ORNAMENTAL GRASSED AREAS ON SITE.
9. SPRAY IRRIGATION FOR DRY LAND SEEDING SHALL NOT BE DONE.
10. IRRIGATED AREA SHALL BE DIVIDED INTO INDIVIDUAL ZONES, AS NECESSARY, TO SUPPLY SUFFICIENT WATER PRESSURE AND FLOW RATE FOR THE RESPECTIVE WATER DEMAND. EACH ZONE SHALL CONTAIN A RAIN BIRD QUICK COUPLER VALVE CONNECTION, IN VAULT, AND NECESSARY AUTOMATIC CONTROL VALVES.
11. WATER DEPARTMENT IRRIGATION SYSTEM METER, BACKFLOW PREVENTER, AND MASTER VALVE/FLOW SENSOR, SHALL BE LOCATED INSIDE MECHANICAL ROOM.
12. ALL AREAS DISTURBED FOR PIPE EXCAVATION SHALL BE REPAIRED TO EQUAL OR BETTER CONDITIONS PRIOR TO CONSTRUCTION.
13. MONUMENT SIGN AREA TO BE A MULCH BED, CONTAINING NO SHRUBS, AND THE FOLLOWING ORNAMENTAL GRASS SPECIES PLACED SO AS TO NOT BLOCK VIEW OF THE SIGN.
    -PENNISETUM
    -MISCANTHUS
    -BLUE FESCUE
14. SEE SPECIFICATION SECTION 32 92 00 FOR ROCK BENCH DETAILS.
15. IN ADDITION TO THOSE SHOWN ON THIS PLAN,9, 3" DIAMETER SMALL CONIFEROUS TREES (SEE VEGETATION LEGEND), SHALL BE PLANTED AT LOCATIONS SPECIFIED BY OWNER, TO REPLACE THOSE REMOVED DUE TO CONSTRUCTION.
16. IN ADDITION TO THE SPECIFIED LANDSCAPING, PROVIDE 10 MICANTHUS TO BLOCK CONCRETE WALL.
17. PARKS DEPARTMENT IRRIGATION METER SHALL BE LOCATED INSIDE MECHANICAL ROOM. BACKFLOW PREVENTER AND MASTER VALVE/FLOW SENSOR SHALL BE LOCATED NEXT TO WATER DEPARTMENT VAULT. A MANUAL ISOLATION VALVE AND CONTROL VALVES SHALL BE LOCATED OUTSIDE THE WATER DEPARTMENT FENCE.




3 VEGETATION LEGEND

CONIFEROUS:
- PINION PINE (23)
- AUSTRIAN PINE (21)
- BOSNIAN PINE (13)

LARGE DECIDUOUS:
- CHINKAPIN OAK (11)
- HACKBERRY (6)

SMALL DECIDUOUS:
- WINTER KING HAWTHORN (9)
- HOT WINGS MAPLE (8)
- GOLDEN RAIN TREE (6)
- GAMBEL OAK (4)

DECIDUOUS SHRUBS:
- RUSSIAN HAWTHORN (19)
- APACHE PLUME (17)
- SNOWBELLE MOCKORANGE (5)
- NEW MEXICO PRIVET (7)
- WILD PLUM (9)
- GRO-LOW SUMAC (3)
- FERNBUSH (5)
- TALL GREEN RABBITBRUSH (9)
- DWARF BLUE RABBITBRUSH (12)

EVERGREEN SHRUBS
- WOODWARD COLUMNAR JUNIPER (12)
- TANNENBAUM MUGO PINE (4)

NATIVE SEEDING:
- THORNTON SIGNATURE WARM SEASON MIX
- UDFCD UPLAND SEEM MIX (CLAY/LOAMY SOILS)

LANDSCAPED AREAS (EXCLUDES MONUMENT SIGN AREA):
EACH MULCH BED AREA SHALL CONTAIN 1 SPECIES OF SHRUB SEE LIST OF SHRUBS) AND UP TO 2 SPECIES OF ORNAMENTAL GRASSES, FROM THE FOLLOWING SPECIES:
*ORNAMENTAL GRASSES:*
- PENNISETUM
- MISCANTHUS
- BLUE FESCUE

NORTH

**LANDSCAPING PLAN**

0 60' 120'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | EV | NT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | EV | NT | ISSUED FOR COR 034 |
| 2 | 10/10/19 | EV | NT | REVISED PER COR-XX |
| 3 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed E. VIK |
| designed E. VIK | checked N. TESSITORE |

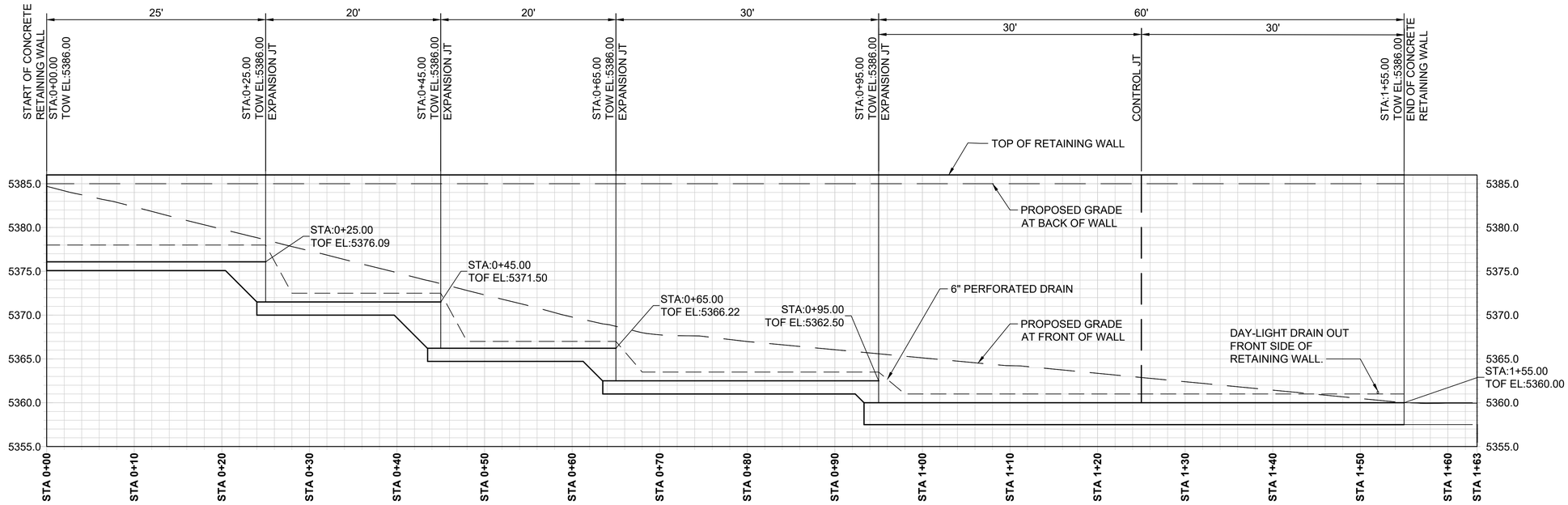
City of Thornton

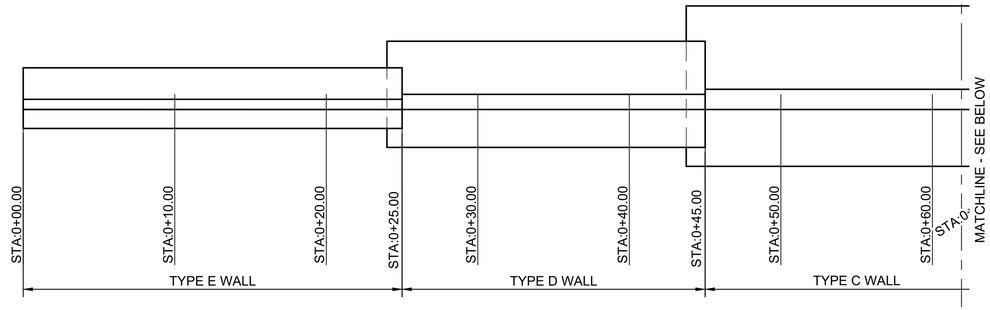
**CITY OF THORNTON**
**TTP - PACKAGE 3**
LANDSCAPING PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing **C123** – | rev. 3 |
| sheet 48 of 542 sheets | |
| file 98101 C_123.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



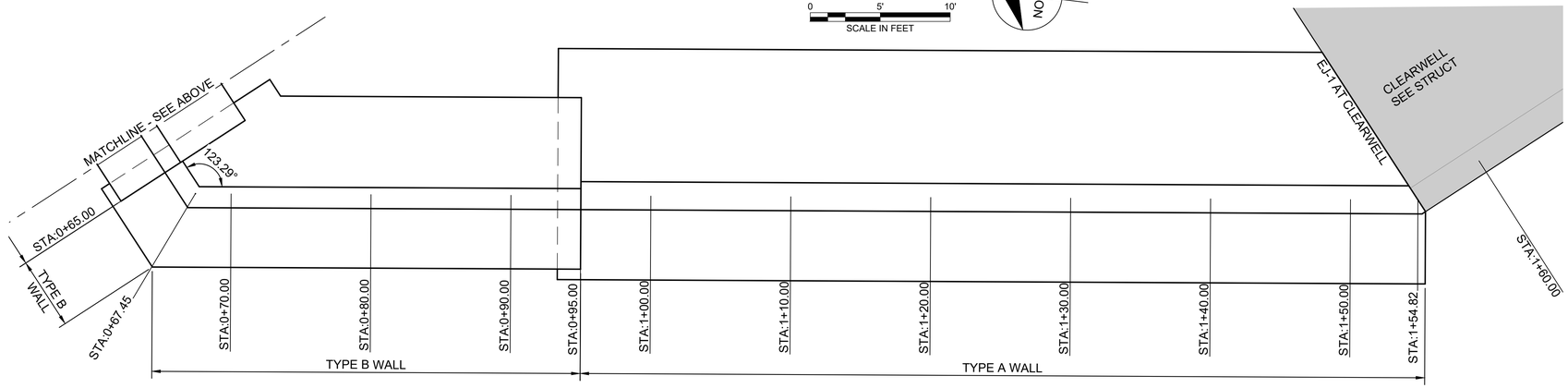




**SOUTH RETAINING WALL PLAN & PROFILE**

0 5' 10'

SCALE IN FEET

NORTH




**SOUTH RETAINING WALL PLAN & PROFILE**

0 5' 10'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 4/1/19 | KT | NT | ISSUED FOR PCO 029 |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SOUTH RETAINING WALL PLAN & PROFILE

| project | contract |
|---|---|
| 98101 | |

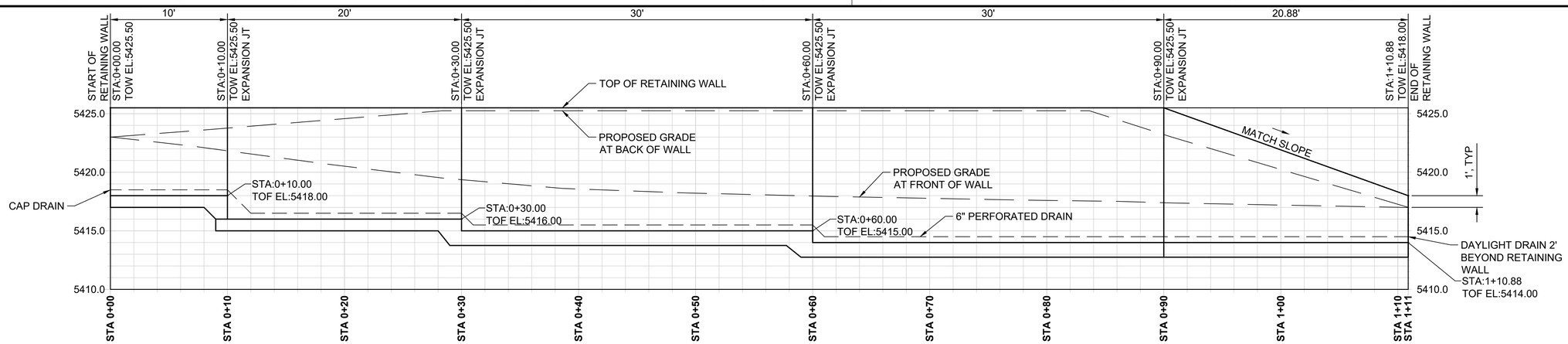
drawing **C124** – rev. **0**

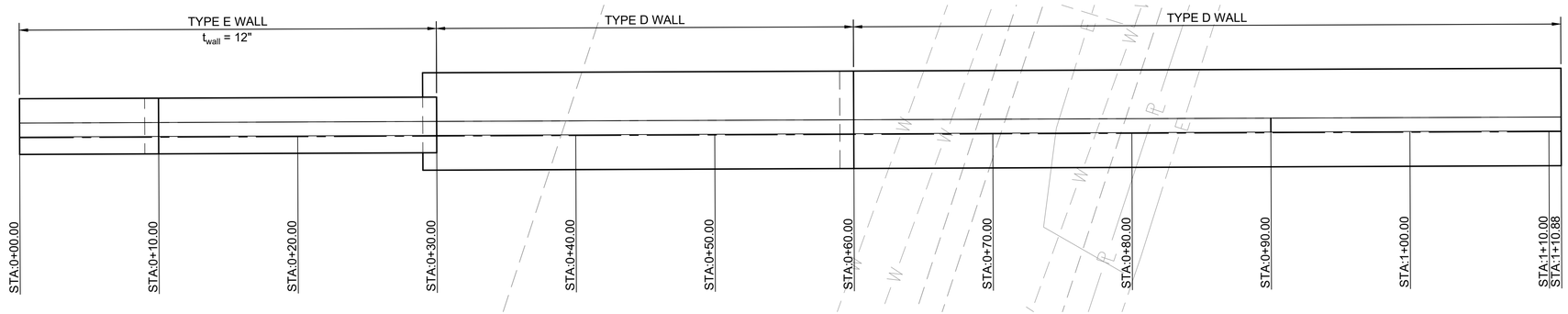
sheet 49 of 542 sheets

file 98101 C_124.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**NORTH RETAINING WALL PLAN & PROFILE**

0 5' 10'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 4/1/19 | KT | NT | ISSUED FOR PCO 029 |
| | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
NORTH RETAINING WALL PLAN & PROFILE

| project | contract |
|---|---|
| 98101 | |

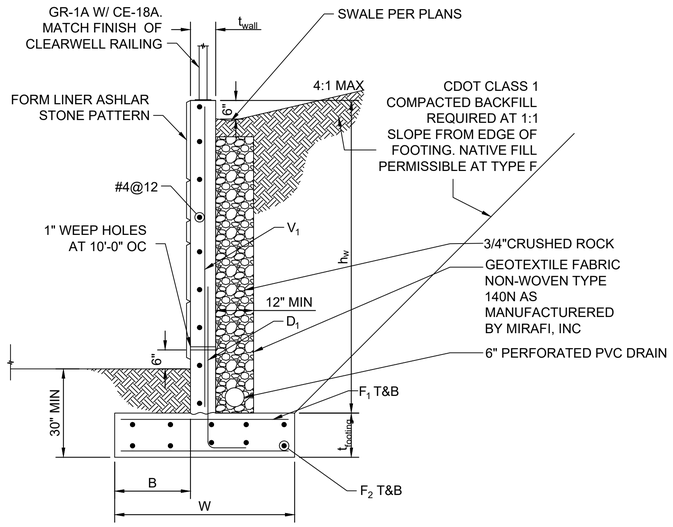
**drawing** C125 – **rev.** 0

**sheet** 50 **of** 542 sheets

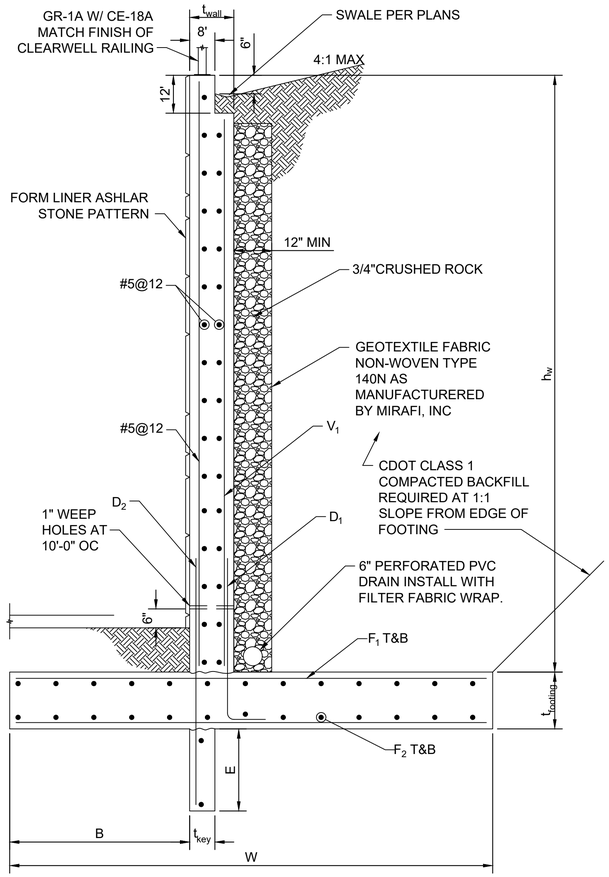
**file** 98101 C_125.DWG

COPYRIGHT © 2019 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**WALL SECTION (WALL E,F)**
NOT TO SCALE 1




**WALL SECTION (WALLS A, B ,C ,D)**
NOT TO SCALE

NOTES:
1. SEE STRUCTURAL DRAWING S001 FOR GENERAL CONCRETE AND REINFORCING NOTES.
2. SEE STRUCTURAL DRAWING S004 AND S005 FOR CONCRETE JOINT, CORNER AND LAP SPLICE DETAILS.
3. SHEAR KEY MAY BE EARTH FORMED. WHERE BEDROCK IS ENCOUNTERED DESIGN-BUILDER SHOULD TAKE CARE TO MINIMIZE OVERSIZED OVEREXCAVATION

WALL SCHEDULE

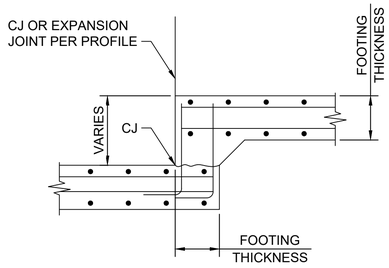
| TYPE | $h_{wall}$ (MAX) | W | $t_{footing}$ | $t_{key}$ | $t_{wall}$ | B | E |
|---|---|---|---|---|---|---|---|
| A | 26'-6" | 16'-6" | 2'-0" | 2'-0" | 2'-0" | 5'-0" | 2'-0" |
| B | 23'-6" | 12'-3" | 1'-8" | 1'-6" | 1'-6" | 4'-3" | 2'-0" |
| C | 19'-6" | 10'-7" | 1'-6" | NA | 1'-4" | 3'-9" | NA |
| D | 15'-0" | 7'-0" | 1'-3" | NA | 1'-0" | 2'-6" | NA |
| E | 10'-0" | 4'-0" | 1'-0" | NA | 0'-8" | 1'-3" | NA |
| F | 5'-0" | 3'-0" | 0'-9" | NA | 0'-6" | 2'-0" | NA |

1

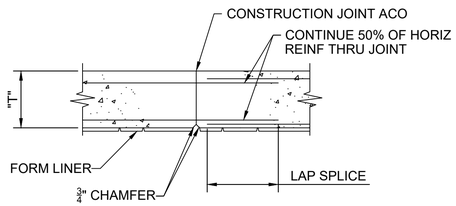
BAR SCHEDULE

| Type | F1 | F2 | D1 | D2 | V1 | REMARKS |
|---|---|---|---|---|---|---|
| A | #9@6 | #5@12 | #9@6 | #5@12 | #9@6 | SHEAR KEY REQUIRED |
| B | #8@6 | #5@12 | #8@6 | #5@12 | #8@6 | SHEAR KEY REQUIRED |
| C | #8@12 | #5@12 | #8@6 | #5@12 | #8@6 | |
| D | #6@12 | #5@12 | #8@6 | #5@12 | #8@6 | |
| E | #5@12 | #5@12 | #6@12 | #5@12 | #6@12 | |
| F | #5@12 | #5@12 | #5@12 | NA | #5@12 | |

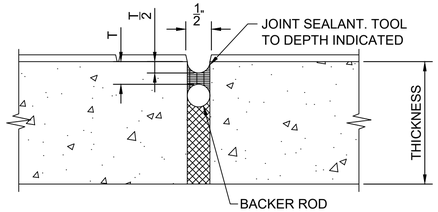
1




**TYPICAL STEP FOOTING DETAIL**
NOT TO SCALE




**CJ (CONTROL JOINT)**
NOT TO SCALE




NOTES:
1. "T" SHALL BE $\frac{1}{2}$" UNO
2. SEE RETAINING WALL LAYOUT FOR LOCATIONS

**TYPICAL EXPANSION JOINT DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 4/1/19 | KT | NT | ISSUED FOR PCO 029 |
| 1 | 4/26/21 | MS | NT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
RETAINING WALL DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **C126** – rev. **1**

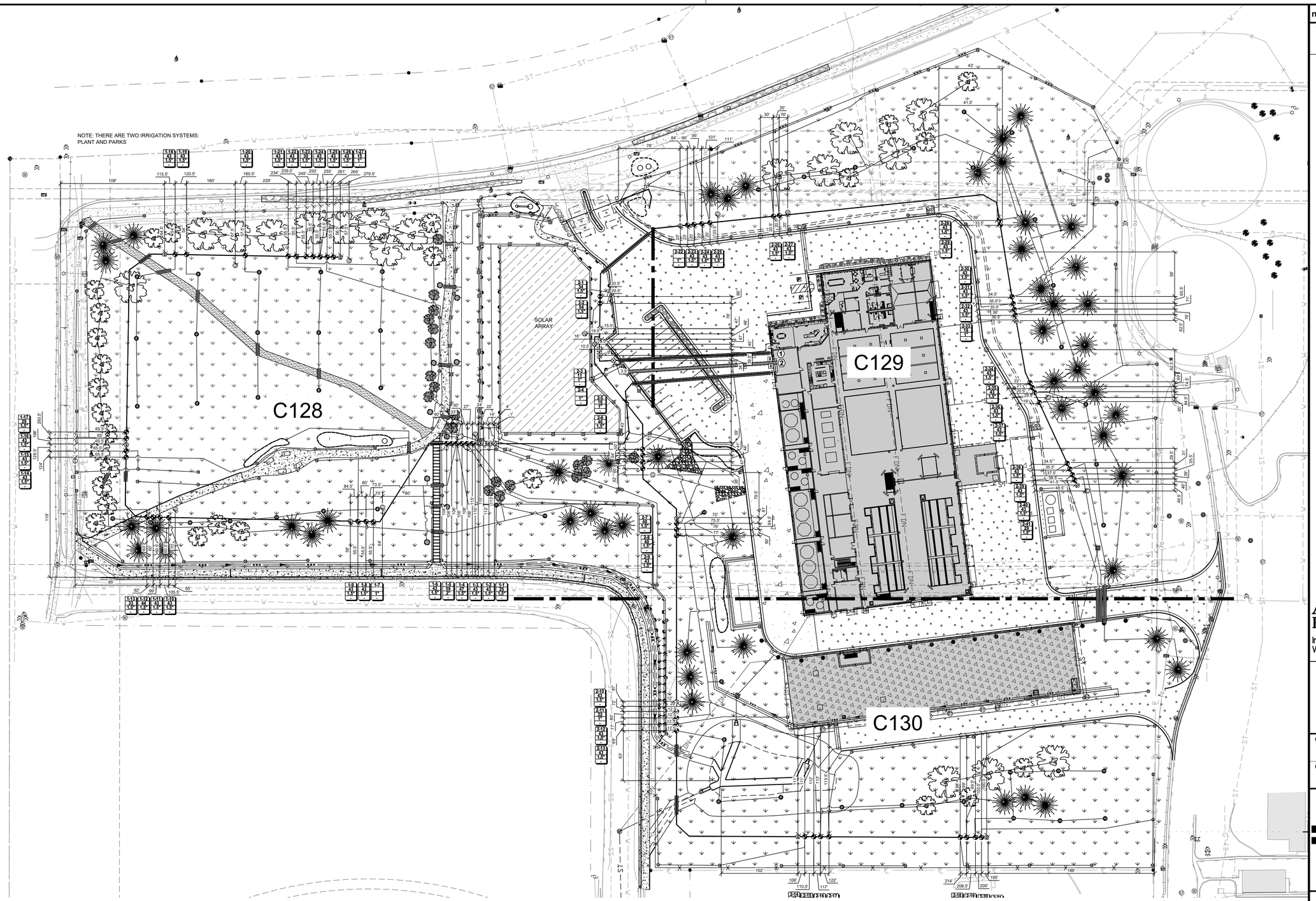
sheet 51 of 542 sheets

file 98101 C_126.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\98101 C_126.DWG 10/23/2020 12:02 PM MDSTROBEL




**ASBUILT NOTES**

1. USE DIRECT PATH BETWEEN FIXED POINT AND IRRIGATION COMPONENT. LINEAR DIMENSION LINES USED FOR NEATNESS PURPOSES ONLY.
2. IRRIGATION DESIGN AND IMPLEMENTATION COMPLETED BY AQUA ENGINEERING, INC. BURNS AND MCDONNELL DOES NOT TAKE RESPONSIBILITY FOR DESIGN COMPLETED AND IMPLEMENTED BY AQUA ENGINEERING, INC.

ASBUILT LEGEND

- (G) GROUNDING
- (W) WIRE SPLICE
- (P) LIGHT POLE

NORTH

0 30' 60'
SCALE IN FEET

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 1 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |

Aqua Engineering Inc.
Innovative Water Solutions
375 E. Horsetooth Road, Building 2-202
Fort Collins, CO 80525-3196
970.229.9668
www.aquaengineering.com

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | AQUA ENG. |
| **designed** | **checked** |
| AQUA ENG. | N. TESSITORE |

City of Thornton

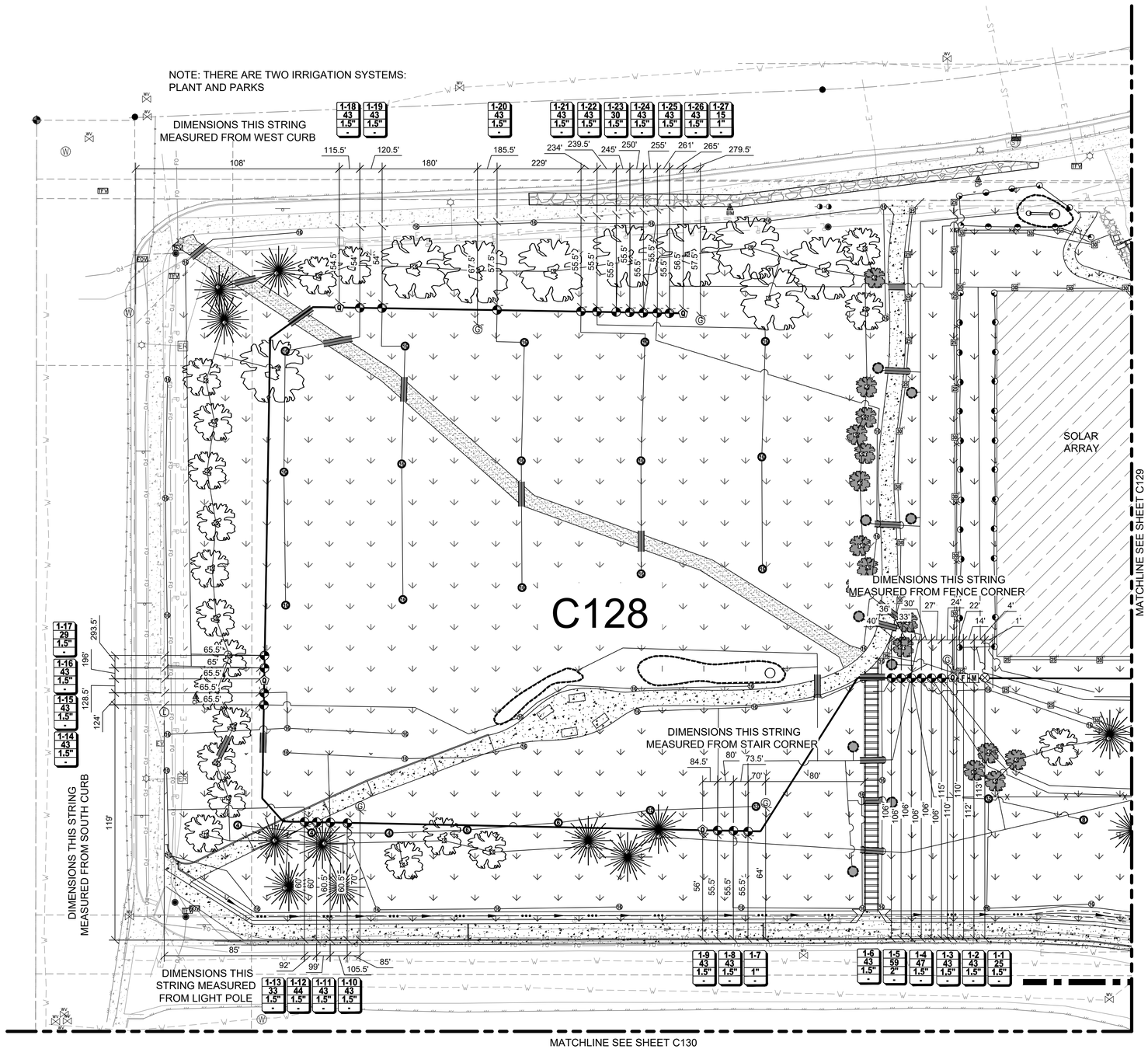
**CITY OF THORNTON**
**TTP - PACKAGE 3**
IRRIGATION PLAN I

| project | contract |
|---|---|
| 98101 | |

drawing **C127** – rev. **1**

sheet 53 of 542 sheets

file 98101 C_127.DWG




**ASBUILT NOTES**

1. USE DIRECT PATH BETWEEN FIXED POINT AND IRRIGATION COMPONENT. LINEAR DIMENSION LINES USED FOR NEATNESS PURPOSES ONLY.
2. IRRIGATION DESIGN AND IMPLEMENTATION COMPLETED BY AQUA ENGINEERING, INC. BURNS AND MCDONNELL DOES NOT TAKE RESPONSIBILITY FOR DESIGN COMPLETED AND IMPLEMENTED BY AQUA ENGINEERING, INC.

ASBUILT LEGEND

- (G) GROUNDING
- (W) WIRE SPLICE
- (P) LIGHT POLE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 1 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |


Aqua Engineering Inc.
Innovative Water Solutions
375 E. Horsetooth Road, Building 2-202
Fort Collins, CO 80525-3196
970.229.9668
www.aquaengineering.com

BURNS McDONNELL


| date | detailed |
|---|---|
| APRIL 2021 | AQUA ENG. |
| **designed** | **checked** |
| AQUA ENG. | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
IRRIGATION PLAN II

| project | contract |
|---|---|
| 98101 | |

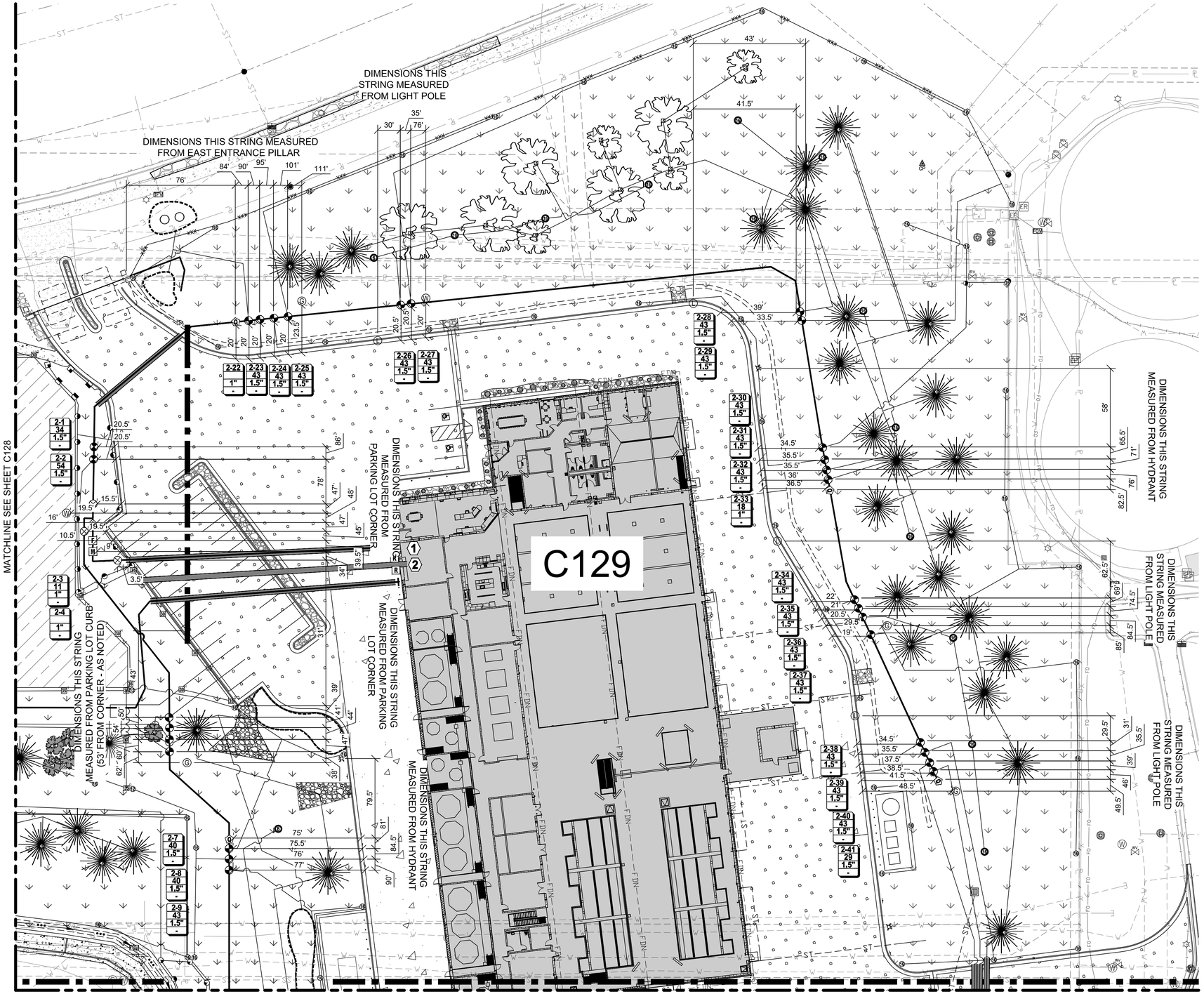
drawing **C128** – rev. **1**

sheet 54 of 542 sheets

file 98101 C_127.DWG


COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.


Scale For Microfilming
Millimeters
Inches




**ASBUILT NOTES**

1. USE DIRECT PATH BETWEEN FIXED POINT AND IRRIGATION COMPONENT. LINEAR DIMENSION LINES USED FOR NEATNESS PURPOSES ONLY.
2. IRRIGATION DESIGN AND IMPLEMENTATION COMPLETED BY AQUA ENGINEERING, INC. BURNS AND MCDONNELL DOES NOT TAKE RESPONSIBILITY FOR DESIGN COMPLETED AND IMPLEMENTED BY AQUA ENGINEERING, INC.

ASBUILT LEGEND

- (G) GROUNDING
- (W) WIRE SPLICE
- (P) LIGHT POLE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 1 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |


Aqua Engineering Inc.
Innovative Water Solutions
375 E. Horsetooth Road, Building 2-202
Fort Collins, CO 80525-3196
970.229.9668
www.aquaengineering.com


BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | AQUA ENG. |
| **designed** | **checked** |
| AQUA ENG. | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
IRRIGATION PLANS III

| project | contract |
|---|---|
| 98101 | |

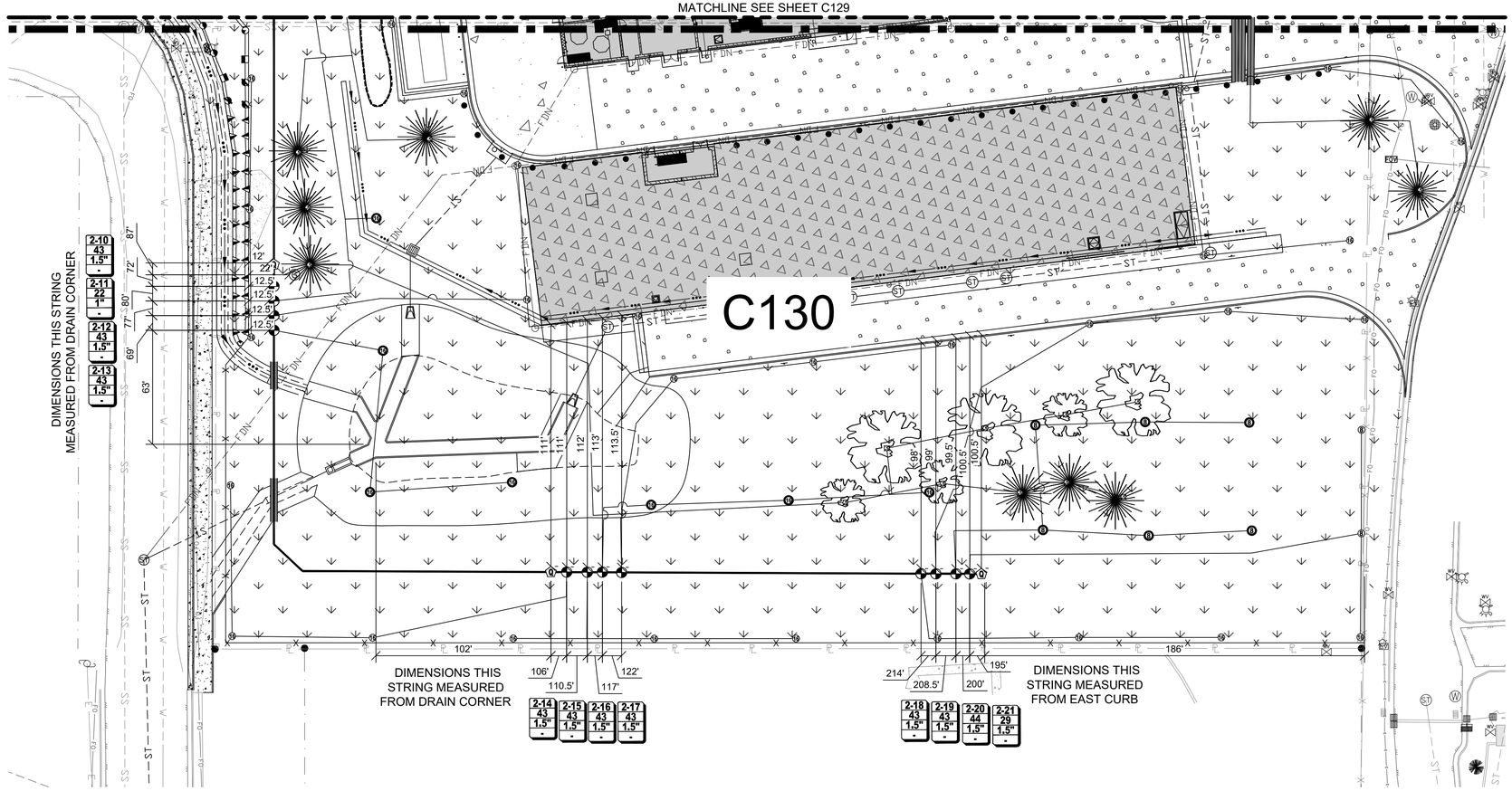
**drawing** C129 – **rev.** 1

**sheet** 55 **of** 542 sheets

**file** 98101 C_127.DWG


COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.


Scale For Microfilming: Millimeters / Inches




**ASBUILT NOTES**

1. USE DIRECT PATH BETWEEN FIXED POINT AND IRRIGATION COMPONENT. LINEAR DIMENSION LINES USED FOR NEATNESS PURPOSES ONLY.
2. IRRIGATION DESIGN AND IMPLEMENTATION COMPLETED BY AQUA ENGINEERING, INC. BURNS AND MCDONNELL DOES NOT TAKE RESPONSIBILITY FOR DESIGN COMPLETED AND IMPLEMENTED BY AQUA ENGINEERING, INC.

ASBUILT LEGEND

- (G) GROUNDING
- (W) WIRE SPLICE
- (P) LIGHT POLE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 1 | 4/26/21 | LG | NT | CONFORMING TO CONSTRUCTION RECORDS |

Aqua Engineering Inc.
Innovative Water Solutions
375 E. Horsetooth Road, Building 2-202
Fort Collins, CO 80525-3196
970.229.9668
www.aquaengineering.com

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | AQUA ENG. |
| designed | checked |
| AQUA ENG. | N. TESSITORE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
IRRIGATION PLAN IV

| project | contract |
|---|---|
| 98101 | |

drawing **C130** – rev. **1**

sheet 56 of 542 sheets

file 98101 C_127.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

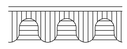
## STANDARD ABBREVIATIONS

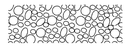
| | |
|---|---|
| AA | - ALUMINUM ASSOCIATION |
| AB | - ANCHOR BOLT |
| ABT | - ABOUT |
| ACI | - AMERICAN CONCRETE INSTITUTE |
| ADH | - ADHESIVE |
| AGGR | - AGGREGATE |
| AHR | - ANCHOR |
| AISI | - AMERICAN IRON AND STEEL INSTITUTE |
| AISC | - AMERICAN INSTITUTE OF STEEL CONSTRUCTION |
| AL, ALUM | - ALUMINUM |
| ALTN | - ALTERNATE |
| ANSI | - AMERICAN NATIONAL STANDARDS INSTITUTE |
| ARCH | - ARCHITECT |
| ASTM | - AMERICAN SOCIETY FOR TESTING OF MATERIALS |
| AWS | - AMERICAN WELDING SOCIETY |
| (B) | - BOTTOM |
| BC | - BOLT CIRCLE |
| BETW | - BETWEEN |
| BLDG | - BUILDING |
| BM | - BEAM |
| BO | - BOTTOM OF |
| BOC | - BOTTOM OF CONCRETE |
| BOS | - BOTTOM OF STEEL |
| BOT | - BOTTOM |
| B/P | - BASE OF PIER |
| BRG | - BEARING |
| BRKT | - BRACKET |
| C/C | - CENTER TO CENTER |
| CL | - CENTER LINE |
| CF | - CUBIC FEET |
| CHKR | - CHECKER |
| CIR | - CIRCLE |
| CJ | - CONSTRUCTION JOINT |
| CLR | - CLEAR |
| CLJ | - CONTROL JOINT |
| CMU | - CONCRETE MASONRY UNIT |
| CO | - CONCRETE OPENING |
| CONC | - CONCRETE |
| CONT | - CONTINUOUS |
| COL | - COLUMN |
| COTR | - CONTRACTING OFFICER |
| COR | - CORNER |
| COORD | - COORDINATE |
| CRSI | - CONCRETE REINFORCING STEEL INSTITUTE |
| CTR | - CENTER |
| CTRD | - CENTERED |
| CY | - CUBIC YARD |
| DBL | - DOUBLE |
| DET | - DETAIL |
| DIAG | - DIAGONAL |
| DIA | - DIAMETER |
| DIM | - DIMENSION |
| DK | - DECKING |
| DL | - DEAD LOAD |
| DN | - DOWN |
| DWL | - DOWEL |
| DWG | - DRAWING |
| E | - EAST |
| EA | - EACH |
| EF | - EACH FACE |
| EJ | - EXPANSION JOINT |
| EL | - ELEVATION |
| ELEC | - ELECTRICAL |
| EMBED | - EMBEDMENT |
| EQ | - EQUAL |
| EQUIV | - EQUIVALENT |
| EQ SP | - EQUALLY SPACED |
| EQUIP | - EQUIPMENT |
| EXIST | - EXISTING |
| EW | - EACH WAY |
| FD | - FLOOR DRAIN |
| FDN | - FOUNDATION |
| FTG | - FOOTING |
| FF | - FAR FACE |
| FL | - FLOOR |
| FNSH | - FINISH |
| FS | - FAR SIDE |
| FT | - FEET |
| GA | - GAGE |
| GALV | - GALVANIZE |
| GB | - GRADE BEAM |
| GND | - GROUND |
| GR | - GRADE |
| GRTG | - GRATING |
| HG | - HIGH |
| HR | - HANDRAIL |
| HPT | - HIGH POINT |
| HORIZ | - HORIZONTAL |
| HS | - HIGH STRENGTH |
| IBC | - INTERNATIONAL BUILDING CODE |
| ID | - INSIDE DIAMETER |
| IF | - INSIDE FACE |
| IJ | - ISOLATION JOINT |
| IN | - INCHES |
| JT | - JOINT |
| KSI | - KIPS PER SQUARE INCH |
| L | - ANGLE |
| LB | - POUND |
| LD | - DEVELOPMENT LENGTH |
| LG | - LONG |
| LL | - LIVE LOAD |
| LLH | - LONG LEG HORIZONTAL |
| LLO | - LONG LEG OUTSTANDING |
| LLV | - LONG LEG VERTICAL |
| LONG | - LONGITUDINAL |
| LPT | - LOW POINT |
| LS | - LAP SPLICE |
| MATL | - MATERIAL |
| MAX | - MAXIMUM |
| MC | - MOMENT CONNECTION |
| MECH | - MECHANICAL |
| MFR | - MANUFACTURER |
| MH | - MANHOLE |
| MIN | - MINIMUM |
| MISC | - MISCELLANEOUS |
| MK | - MARK |
| NA | - NOT APPLICABLE |
| NF | - NEAR FACE |
| NOM | - NOMINAL |
| NIC | - NOT IN CONTRACT |
| NTS | - NOT TO SCALE |
| NO | - NUMBER |
| NS | - NEAR SIDE |
| OC | - ON CENTER |
| OD | - OUTSIDE DIAMETER |
| OF | - OUTSIDE FACE |
| OPNG | - OPENING |
| OPP | - OPPOSITE |
| OSHA | - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION |
| OZ | - OUNCE |
| PCF | - POUNDS PER CUBIC FOOT |
| PERP | - PERPENDICULAR |
| PL | - PLATE |
| PLC | - PLACES |
| PLF | - POUNDS PER LINEAR FOOT |
| PREFAB | - PREFABRICATED |
| PS | - PIPE SUPPORT |
| PSF | - POUNDS PER SQUARE FOOT |
| PSI | - POUNDS PER SQUARE INCH |
| PVC | - POLYVINYL CHLORIDE |
| RAD | - RADIUS |
| RD | - ROOF DRAIN |
| REF | - REFERENCE |
| REINF | - REINFORCE |
| REQD | - REQUIRED |
| REV | - REVISION |
| RM | - ROOM |
| S | - SOUTH |
| SB | - SHEAR BAR |
| SCHED | - SCHEDULE |
| SH | - SHEET |
| SIM | - SIMILAR |
| SLP | - SLOPE |
| SP | - SPACE |
| SPEC | - SPECIFICATION |
| SQ | - SQUARE |
| SST | - STAINLESS STEEL |
| STD | - STANDARD |
| STL | - STEEL |
| STIF | - STIFFENER |
| STR | - STRAIGHT |
| STRL | - STRUCTURAL |
| STRUC | - STRUCTURE |
| SYMM | - SYMMETRICAL |
| T | - TON |
| TEMP | - TEMPORARY |
| THK | - THICK |
| THRU | - THROUGH |
| (T) | - TOP |
| T/ | - TOP OF |
| TOA | - TOP OF ALUMINUM |
| TOB | - TOP OF BOLT |
| TOC | - TOP OF CONCRETE |
| TOG | - TOP OF GRATING |
| TOM | - TOP OF MASONRY |
| TOS | - TOP OF STEEL |
| T/P | - TOP OF PIER |
| T&B | - TOP AND BOTTOM |
| TYP | - TYPICAL |
| UNO | - UNLESS NOTED OTHERWISE |
| VAR | - VARIES |
| VERT | - VERTICAL |
| VEF | - VERTICAL EACH FACE |
| WD | - WIDE |
| W/ | - WITH |
| W/O | - WITHOUT |
| WP | - WORK POINT |
| WS | - WATERSTOP |
| WT | - WEIGHT |
| WWF | - WELDED WIRE FABRIC |
| @ | - AT |
| & | - AND |
| # | - POUNDS OR NUMBER |
| % | - PERCENT |

## MATERIAL LEGEND


EARTH


COMPACTED FILL


ROCK


GRANULAR FILL

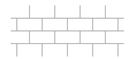

SAND


CONCRETE


GROUT
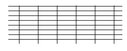

CONCRETE MASONRY UNITS


CONCRETE MASONRY VENEER


CONCRETE MASONRY UNIT (ELEVATION)


WATER


STEEL (LARGE SCALE)


GRATING

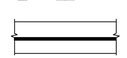

ALUMINUM


CHECKERED PLATE

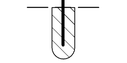

EXPANDED POLYSTYRENE FOAM


VOID FORM


STRUCTURAL STEEL (SMALL SCALE)


CONCRETE W/ REINFORCING BAR


ADHESIVE/EPOXY ANCHOR


EXPANSION ANCHOR



TYPICAL BOND BEAM


CONTINUOUS BOND BEAM

### GENERAL NOTES

1. DESIGN BUILDER SHALL COORDINATE ALL STRUCTURAL WORK WITH WORK SHOWN ON ALL OTHER DRAWINGS.
2. IN NO CASE SHALL WORKING DIMENSIONS BE SCALED FROM THE STRUCTURAL DRAWINGS.
3. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. DESIGN BUILDER SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, SHORING AND TEMPORARY BRACING TO PROVIDE STRUCTURAL STABILITY DURING CONSTRUCTION.
4. IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR ON THE CONTRACT DRAWINGS OR SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE SHOWN OR CALLED FOR, WITH THE APPROVAL OF THE OWNER.
5. ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN INSTRUCTIONS AND RECOMMENDATIONS, UNLESS NOTED OTHERWISE.

### CAST-IN-PLACE CONCRETE

1. ALL CONCRETE SHALL BE DESIGNED AND PLACED IN ACCORDANCE WITH ACI 318-14 & ACI 350-06.
2. ALL CONCRETE SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   - f'c: 4500 PSI AT 28 DAYS
   - SLUMP: 4"-6"
   - AIR: 6%±1.5%
3. BEFORE CONCRETE WORK BEGINS, THE PROPOSED CONCRETE MIX DESIGN, ALONG WITH COLLABORATING DATA SHOWING COMPLIANCE WITH THESE REQUIREMENTS, SHALL BE SUBMITTED FOR APPROVAL.
4. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNO

### REINFORCING

1. ALL REINFORCING BARS SHALL BE ASTM A615, GRADE 60.
2. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A1064 AND SHALL BE FLAT SHEET. ROLLED FABRIC WILL NOT BE ALLOWED.
3. UNLESS OTHERWISE INDICATED, THE MINIMUM LENGTH OF LAP SPLICES AND EMBEDMENTS SHALL BE AS NOTED IN THE TABLE ON SHEET S004.
4. NO WELDED OR MECHANICAL SPLICES SHALL BE ALLOWED.
5. HEATING OF REINFORCING BARS SHALL NOT BE ALLOWED.
6. POSITION OF REINFORCING STEEL SHALL BE MAINTAINED BY BOLSTERS, CHAIRS AND ACCESSORIES IN ACCORDANCE WITH ACI-117 AND THE CRSI MANUAL OF STANDARD PRACTICE.
7. REPOSITIONING OF REINFORCING TO AVOID INTERFERENCE WITH EMBEDDED ITEMS SHALL BE APPROVED BY THE ENGINEER PRIOR TO WORK.

### PROTECTION FOR REINFORCEMENT

1. THE FOLLOWING CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT (UNLESS OTHERWISE NOTED). SEE ACI 117 FOR CONSTRUCTION TOLERANCES:
   - CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH = 3"
   - CONCRETE EXPOSED TO EARTH, LIQUID, WEATHER OR CAST AGAINST A CONCRETE WORK MAT:
     SLABS, WALLS & FOOTINGS = 2"
     BEAMS & COLUMNS:
     STIRRUPS, SPIRALS & TIES = 2"
     PRIMARY REINFORCEMENT = 2 1/2"
   - CONDITIONS NOT COVERED ABOVE:
     SLABS AND WALLS = 1 1/2"
     BEAMS AND COLUMNS:
     STIRRUPS, SPIRALS & TIES = 1 1/2"
     PRIMARY REINFORCEMENT = 2"

### CONCRETE ANCHORS

1. POST INSTALLED CONCRETE ANCHOR MANUFACTURERS AND ADHESIVES FOR POST INSTALLED REINFORCING BARS SHALL BE THOSE LISTED IN SPECIFICATION 05 05 19. ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USE. SUBSTITUTIONS REQUIRE STAMPED CALCULATIONS SEE SPECIFICATIONS.
2. ALL PERSONNEL INSTALLING ADHESIVE ANCHORS SHALL BE ACI ADHESIVE ANCHOR CERTIFIED.
3. INSTALL ANCHORS PER THE MANUFACTURER INSTRUCTIONS, AS INCLUDED IN THE ANCHOR PACKAGING.
4. THE DESIGN-BUILDER OR SUBCONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED.
5. ANCHOR CAPACITY IS DEPENDANT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
6. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. REINFORCING BARS SHALL NOT BE CUT UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT. CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD WHEN INTERFERENCES OCCUR.
7. ADHESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS AT TIME OF ANCHOR INSTALLATION.
8. ALL ANCHORS IN SUBMERGED APPLICATIONS SHALL BE 316 SST EPOXY ANCHORS.

### MASONRY

1. SEE DRAWING S007 FOR MASONRY DETAILS AND DESIGN NOTES.
2. SEE MASONRY ELEVATION SHEETS S245 TO S252 FOR REINFORCEMENT LAYOUT.

### MISCELLANEOUS MATERIALS

1. GROUT FOR EQUIPMENT BASE PLATES SHALL BE NON-SHRINK NON-METALLIC HIGH STRENGTH GROUT. GROUT SHALL BE FIVE STAR GROUT BY U.S. GROUT CORPORATION OR APPROVED EQUAL. ALL GROUTING REQUIRES CURING THE EXPOSED SURFACE WITH CURING AND SEALING COMPOUND IMMEDIATELY AFTER INSTALLATION.
2. BONDING AGENT SHALL BE SIKADUR 32, HI-MOD BY SIKA CORPORATION OR APPROVED EQUAL.
3. EXPANDED POLYSTYRENE FOAM SHALL CONFORM TO REQUIREMENTS OF ASTM D6817.

### JOINTS

1. EXPANSION, CONSTRUCTION, AND CRACK CONTROL JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH STANDARD DETAILS AND AS LOCATED OR DETAILED ON THE DRAWINGS. ANY OTHERS DEEMED NECESSARY SHALL BE APPROVED BY THE ENGINEER PRIOR TO WORK.
2. CONCRETE EDGES THAT ARE TO RECEIVE JOINT SEALANT SHALL BE PLACED AGAINST NON-OILED FORMS. THE NON-OILED PORTION SHALL EXTEND A MINIMUM OF 2 1/2" FROM THE EDGE TO BE SEALED.
3. JOINTS RECEIVING SEALANT SHALL BE COATED WITH PRIMER, IF REQUIRED BY THE SEALANT MANUFACTURER. JOINT PREPARATION AND APPLICATION PRIMER AND SEALANT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

### GEOTECHNICAL

1. ALL INFORMATION CONTAINED ON THE FOUNDATION DRAWINGS IS BASED ON A REPORT ENTITLED "GEOTECHNICAL ENGINEERING STUDY, THORNTON WATER TREATMENT PLANT" PREPARED BY KUMAR & ASSOCIATES, INC. PROJECT NO.17-1-300, 2017". IN THE EVENT OF DISCREPANCIES BETWEEN THE ABOVE DOCUMENT AND THE FOUNDATION DRAWINGS, THE FOUNDATION DRAWINGS SHALL GOVERN.

### GRATING

1. METAL GRATING AND STAIR TREADS SHALL CONFORM TO THE "METAL BAR GRATING MANUAL" OF THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS.
2. GRATING AND STAIR TREADS SHALL BE ALUMINUM I-BAR SHAPE AT 15/16" C-C SPACING WITH SWAGE LOCKED CROSS BARS SPACED AT 4" OC. GRATING SHALL BE 1-1/2" DEEP UNLESS NOTED OTHERWISE ON THE DRAWINGS. STAIR TREADS UP TO 3'-6" WIDE SHALL BE 1-1/2" DEEP WITH CAST NOSING. TOP SURFACE OF GRATING AND TREADS SHALL BE MECHANICALLY COATED FOR SLIP RESISTANCE.
3. GRATING FOR EXTERIOR PLATFORMS AND EXTERIOR STAIR TREADS SHALL BE RECTANGULAR SHAPE AND SHALL BE SERRATED.

### STRUCTURAL ALUMINUM

1. ALL DESIGN, FABRICATION, AND ERECTION SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE ALUMINUM ASSOCIATION ALUMINUM DESIGN MANUAL SPECIFICATIONS, THE AWS CODE, AND THE OSHA STANDARDS.
2. STRUCTURAL SHAPES: ASTM B308, ALLOY 6061 T6
   SHEET AND PLATE: ASTM B209, ALLOY 6061 T6
3. UNLESS NOTED OTHERWISE, PRIMARY BOLTED CONNECTIONS SHALL BE BEARING TYPE USING 316 STAINLESS STEEL BOLTS CONFORMING TO ASTM F593 WITH NUTS CONFORMING TO ASTM F594. SIZE OF BOLTS SHALL BE 3/4"Ø UNLESS OTHERWISE NOTED ON THE DRAWINGS AND SHALL HAVE ONE PLAIN WASHER. BOLT AND NUT THREADS SHALL BE LUBRICATED.
4. WELDS SHALL COMPLY WITH AWS D1.2 WITH FILLER ALLOY TYPE 4043
5. MINIMUM BOLT HOLE EDGE DISTANCE SHALL BE MAINTAINED PER AA ALUMINUM DESIGN MANUAL.
6. SUBSTITUTIONS OF SPECIFIED MEMBER SIZE OR CHANGE IN DETAILS OR DIMENSIONS OF ANY KIND SHALL NOT BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
7. FIELD CUTTING IS NOT PERMITTED EXCEPT BY THE SPECIFIC APPROVAL OF THE FIELD ENGINEER.
8. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL HAVE A BITUMASTIC COATING.

### ANCHOR BOLTS

1. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 USING A36 STEEL.
2. EXPOSED ANCHOR BOLTS IN AREAS WITH WATER CONTAINING BASINS SHALL BE 304 STAINLESS STEEL CONFORMING TO ASTM F593B.
3. ANCHOR BOLT GROUPS SHALL BE SUPPORTED AND SET USING A TEMPLATE WITH THE EMBEDDED PARTS SECURELY TIED TO PREVENT DISPLACEMENT DURING CONCRETE PLACEMENT. ANCHOR BOLTS SHALL BE INSTALLED PLUMB AND SHALL BE WITHIN 1/16" OF THE POSITION INDICATED ON THE DRAWINGS.
4. FIELD WELDING OF TEMPLATE TO REINFORCING, PIPE SLEEVES, OR ANCHOR BOLTS IS PROHIBITED.
5. INSERTING ANCHOR BOLTS OR DOWELS INTO FRESH OR PARTIALLY HARDENED CONCRETE IS PROHIBITED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/2621 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ABBREVIATIONS, LEGEND & GENERAL NOTES

| | |
|---|---|
| project 98101 | contract |
| drawing **S001** | rev. **2** |
| sheet 57 of 542 sheets | |
| file 98101_S | |

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## STRUCTURAL STEEL

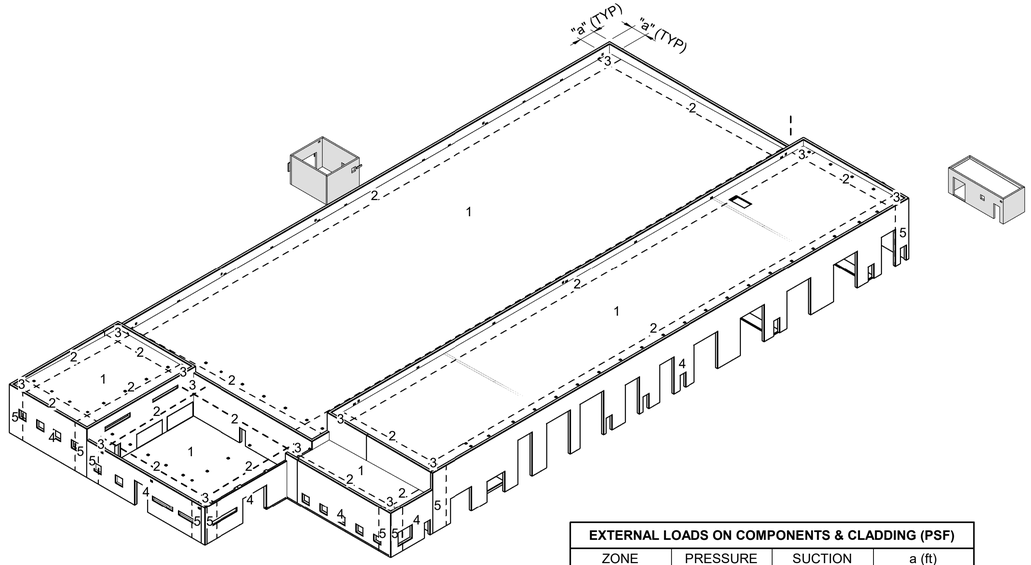
1. ALL DESIGN, FABRICATION, AND ERECTION SHALL BE DONE IN ACCORDANCE WITH THE EDITION OF THE AISC SPECIFICATIONS, THE AWS CODE, AND THE OSHA STANDARDS REFERENCED BY THE ADOPTED CODE.
2. STRUCTURAL WIDE FLANGE SHAPES: ASTM A992, GRADE 50
   STRUCTURAL TUBES: ASTM A500 GRADE B
   STRUCTURAL PIPE: ASTM A53, GRADE B (t>0.625")
   ASTM A500, GRADE B (t<0.625")
   PLATES AND BARS: ASTM A36
   OTHER STRUCTURAL SHAPES: ASTM A36
3. UNLESS NOTED OTHERWISE, PRIMARY BOLTED CONNECTIONS SHALL BE BEARING TYPE USING HIGH-STRENGTH BOLTS CONFORMING TO ASTM F3125 GRADE A325 WITH NUTS CONFORMING TO ASTM A563, GRADE DH. SIZE OF BOLTS SHALL BE 3/4"Ø UNLESS OTHERWISE NOTED ON THE DRAWINGS AND SHALL HAVE ONE PLAIN HARDENED WASHER AND BE SNUG TIGHT. BOLT AND NUT THREADS SHALL BE LUBRICATED. PRIMARY BOLTED CONNECTIONS SHALL CONFORM TO AISC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING HIGH STRENGHT BOLTS".
4. ALL PRIMARY CONNECTIONS SHALL HAVE A MINIMUM OF 2 BOLTS, UNO.
5. WELDING ELECTRODES SHALL BE SERIES E70XX CONFORMING TO THE AMERICAN WELDING SOCIETY SPECIFICATIONS A5.1 OR A5.5
6. ERECTION BOLTS, COLUMN BASE PLATE SHIMS AND TEMPORARY FASTENINGS REQUIRED FOR ERECTION SHALL BE FURNISHED BY THE STEEL ERECTOR.
7. MINIMUM BOLT HOLE EDGE DISTANCE SHALL BE MAINTAINED PER TABLE J3.4
8. AXIALLY STRESSED MEMBERS MEETING AT A POINT SHALL HAVE THEIR GRAVITY AXIS MEET AT A POINT (UNO).
9. SUBSTITUTIONS OF SPECIFIED MEMBER SIZE OR CHANGE IN DETAILS OR DIMENSIONS OF ANY KIND SHALL NOT BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER.
10. FIELD BURNING AND CUTTING IS NOT PERMITTED EXCEPT BY THE SPECIFIC APPROVAL OF THE FIELD ENGINEER.
11. THE CONTRACTOR SHALL PROVIDE ADDITIONAL GUYS AND BRACING DURING CONSTRUCTION TO RESIST STRESSES DUE TO WIND LOADS, PILES OF MATERIAL OR ERECTION LOADS.
12. ALL EXPOSED STEEL SHALL BE COATED PER SYSTEM D-1 IN SPECIFICATION SECTION 09 90 00 OR GALVANIZED PER SPECIFICATION SECTION 05 05 13, AS NOTED ON DRAWINGS.

## PRECAST CONCRETE

1. ALL EXPOSED CONNECTIONS IN AREAS B,C,D, & E SHALL BE 304SST.
2. CONNECTIONS IN AREAS OTHER THAN THOSE LISTED IN NOTE 1 SHALL BE CARBON STEEL.

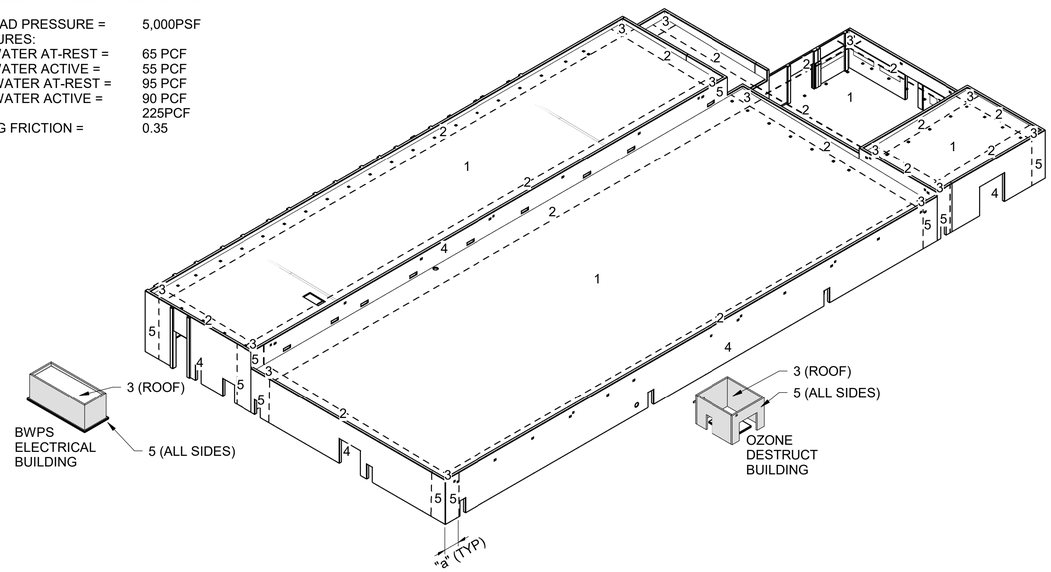
## DESIGN NOTES:

A. STRUCTURAL DESIGN WAS PREPARED USING THE FOLLOWING DATA:
   a. INTERNATIONAL BUILDING CODE, 2015 EDITION W/ CITY OF THORTON AMENDMENTS ADOPTED 9/6/2016
   b. ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 2014 EDITION
   c. ACI 350 BUILDING CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, 2006 EDITION
   d. AISC MANUAL FOR STEEL CONSTRUCTION, 14TH EDITION
   e. AA ALUMINUM DESIGN MANUAL PART 1, 2015 EDITION
   f. ACI 530 BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, 2013 EDITION
   g. ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, 2010 EDITION
B. LIVE LOADS:
   1. ADMINISTRATIVE AREA - 100 PSF
   2. MAINTENANCE STORAGE - 125PSF & HS-20
   3. STAIRS, WALKWAYS, PLATFORMS - 100 PSF (UNREDUCIBLE) & OSHA CLASS IV 3-TON FORKLIFT
   4. ELECTRICAL ROOMS, SCADA & IT ROOMS - 250 PSF (UNREDUCIBLE)
C. SNOW LOADS:
   1. GROUND SNOW LOAD ($P_g$) - 30 PSF
   2. FLAT-ROOF SNOW LOAD ($P_f$) - 30 PSF (MIN PER CITY OF THORNTON CODE)
   3. SNOW EXPOSURE FACTOR ($C_e$) - 1.0
   4. SNOW LOAD IMPORTANCE FACTOR ($I_s$) - 1.1
   5. THERMAL FACTOR ($C_t$) - 1.0
   6. DRIFT SURCHARGE LOADS ($P_d$) - SEE ROOF PLAN SHEET S211
D. WIND DESIGN DATA:
   1. ULTIMATE DESIGN WIND SPEED ($V_{ult}$) - 120 MPH
   2. NOMINAL DESIGN WIND SPEED ($V_{asd}$) - 93 MPH
   3. RISK CATEGORY III
   4. EXPOSURE CATEGORY C
   5. INTERNAL PRESSURE COEFFICIENT - ±0.18
   6. COMPONENTS AND CLADDING LOADS:
      a. SEE ISO DIAGRAM THIS SHEET
E. SEISMIC DESIGN DATA:
   1. RISK CATEGORY III
   2. SEISMIC IMPORTANCE FACTOR ($I_e$) - 1.25
   3. MAPPED SPECTRAL RESPONSE PARAMETERS:
      a. $S_S$ = 0.179
      b. $S_1$ = 0.058
   4. SOIL SITE CLASS D
   5. DESIGN SPECTRAL RESPONSE PARAMETERS:
      a. $S_{DS}$ = 0.191
      b. $S_{D1}$ =0.093
   6. SEISMIC DESIGN CATEGORY B
   7. BASIC SEISMIC FORCE RESISTING SYSTEMS:
      a. ORDINARY REINFORCED MASONRY SHEAR WALLS
   8. DESIGN BASE SHEAR: V = 1324 KIPS
   9. SEISMIC RESPONSE COEFFICIENT: $C_S$ = 0.119
   10. RESPONSE MODIFICATION COEFFICIENT: R = 2
   11. ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE
F. GEOTECHNICAL INFORMATION & SOIL PROPERTIES:
   1. SOIL ALLOWABLE BEARING PRESSURE:
      a. FOOTINGS = 3,500 PSF
      b. MAT FOUNDATIONS = 4,000 PSF
   2. DRILLED SHAFT INFORMATION (15' MINIMUM BEDROCK PENTRATION):
      a. ALLOWABLE END BEARING = 25,000 PSF
      b. ALLOWABLE SKIN FRICTION = 2,500 PSF
         1. FOR UPLIFT USE 75%+ALLOWANCE FOR PEIR WEIGHT
      c. MIMIMUM DEAD LOAD PRESSURE = 5,000PSF
   3. LATERAL EARTH PRESSURES:
      a. ABOVE GROUND WATER AT-REST = 65 PCF
      b. ABOVE GROUND WATER ACTIVE = 55 PCF
      c. BELOW GROUND WATER AT-REST = 95 PCF
      d. BLEOW GROUND WATER ACTIVE = 90 PCF
      e. PASSIVE = 225PCF
   4. COEFFICIENT OF SLIDING FRICTION = 0.35




**EXTERNAL LOADS ON COMPONENTS & CLADDING (PSF)**

| ZONE | PRESSURE | SUCTION | a (ft) |
|---|---|---|---|
| 1 | 16 | 33 | |
| 2 | 28 | 39 | |
| 3 | 28 | 39 | 6.5 |
| 4 | 28 | 31 | |
| 5 | 28 | 34 | |




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GENERAL NOTES

| project | contract |
|---|---|
| 98101 | |

drawing **S002** rev. **1**

sheet 58 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

**NOTES:**

1. STATEMENT OF SPECIAL INSPECTIONS
   - A. THIS "STATEMENT OF SPECIAL INSPECTIONS" HAS BEEN PREPARED IN ACCORDANCE WITH IBC 2015, SECTION 1704.
   - B. SPECIAL INSPECTIONS SHALL BE PERFORMED DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2015, CHAPTER 17.
   - C. INSPECTION REPORTS SHALL BE SUBMITTED DURING CONSTRUCTION FOR VERIFICATION, INCLUDING FINAL REPORTS IN ACCORDANCE WITH IBC 2015 SECTION 1704.2.4.
   - D. SPECIAL INSPECTOR SHALL USE THE LATEST ISSUE OF THE STRUCTURAL DRAWINGS FOR ALL INSPECTIONS. SHOP FABRICATION DRAWINGS SHALL NOT BE USED FOR SUCH PURPOSES.
   - E. THE FOLLOWING TABLE IDENTIFIES THE MATERIALS, SYSTEMS, AND COMPONENTS FOR WHICH SPECIAL INSPECTION IS REQUIRED.
2. TESTING REQUIREMENTS
   - A. CONTRACTOR SHALL RETAIN PRE-COORDINATED AND GOVERNMENT-APPROVED THIRD-PARTY TESTING AGENCIES TO PROVIDE STRUCTURAL TESTING DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2015, CHAPTER 17.
   - B. TESTING AGENCY SHALL SUBMIT TEST RESULTS DURING CONSTRUCTION FOR VERIFICATION INCLUDING A FINAL REPORT IN ACCORDANCE WITH IBC 2015, 1704.2.4.
   - C. THE TABLE BELOW IDENTIFIES THE STRUCTURAL TESTS REQUIRED FOR THIS PROJECT.
3. STRUCTURAL OBSERVATIONS
   - A. A REGISTERED DESIGN PROFESSIONAL SHALL PROVIDE STRUCTURAL OBSERVATIONS DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2015, CHAPTER 17.
   - B. EACH STRUCTURAL OBSERVER SHALL SUBMIT WRITTEN STATEMENTS IDENTIFYING FREQUENCY AND EXTENT OF STRUCTURAL OBSERVATIONS AND ANY REPORTED DEFICIENCIES WHICH, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.

## SPECIAL INSPECTION REQUIREMENTS

| MATERIAL/SYSTEM | TYPE & EXTENT OF SPECIAL INSPECTION | CONT/PERIODIC INSPECTION | TYPE & EXTENT OF TESTING | CODE REFERENCE |
|---|---|---|---|---|
| SUBGRADE PREPERATION | VERIFY DEPTH, MATERIALS AND COMPACTION | P | DENSITY TEST ON COMPACTED FILL, PROOFROLL UNDISTRUBED NATIVE MATERIAL | |
| MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS HIGH-STRENGTH BOLTS | IDENTIFICATION OF ASTM MARKINGS, MFR'S CERTIFICATE OF COMPLIANCE MFR'S CERTIFICATE OF COMPLIANCE | P | | ASTM A325, AISC 360 -SECTION A3.3 |
| HIGH-STRENGTH BOLTING | VISUAL INSPECTION | P | | AISC 360, SECTION M2.5 |
| MATERIAL VERIFICATION OF STRUCTURAL STEEL STRUCTURAL STEEL | IDENTIFICATION OF ASTM MARKINGS, MILL TEST REPORTS | P | | ASTM A6 OR ASTM A568 |
| MATERIAL VERIFICATION OF WELD FILLER MAT'LS | IDENTIFICATION OF AWS MARKINGS, MFR'S CERTIFICATE OF COMPLIANCE | P | | AISC 360, SECTION A3.5 |
| CJP AND PARTIAL PEN GROOVE WELDS | VISUAL INSPECTION | C | | AWS D1.1 |
| MULIT-PASS FILLET WELDS | VISUAL INSPECTION | C | | AWS D1.1 |
| SINGLE PASS FILLET WELDS> 5/16" | VISUAL INSPECTION | C | | AWS D1.1 |
| SINGLE PASS FILLET WELDS<= 5/16" | VISUAL INSPECTION | P | | AWS D1.1 |
| STEEL FRAME JOINT DETAILS | DETAILS OF BRACING, STIFFENING, ETC. MEMBER LOCATIONS, APPLICATION OF STD JOINT DETAILS | P | | |
| MATERAIL VERIFICATION OF COLD-FORMED STEEL DECK | IDENTIFICATION OF ASTM MARKINGS, MFR'S CERTIFICATE OF COMPLIANCE | P | | ASTM |
| COLD-FORMED ROOF DECK WELDS | VISUAL INSPECTION | P | | AWS D1.3 |
| CONCRETE FORM WORK | SHAPE, LOCATION, AND DIMENSIONS OF CONCRETE MEMBER | P | | |
| REINFORCEMENT | SIZE AND PLACEMENT | P | | ACI 318 |
| CONCRETE MIX DESIGN | VERIFICATON OF PROPERTIES | P | | ACI 318 |
| CAST-IN-PLACE CONCRETE | PLACEMENT OF CONCRETE | C | TEMPERATURE, STRENGTH, SLUMP, AIR ENTRAINMENT | ACI 318 |
| CONCRETE CURING | MAINTENANCE OF CURING TEMPURATURE AND TECHNIQUES | P | | ACI 318 |
| ANCHORS CAST IN CONCRETE | SIZE AND PLACEMENT | P | | ACI 318 |
| ANCHORS POST INSTALLED IN HARDENED CONCRETE | SIZE, PLACEMENT, AND CONFORMANCE TO MFR'S INSTALLATION PROCEDURES | C | | ACI 318 |
| MASONRY CONSTRUCTION | COMPLIANCE WITH CONSTRUCTION DOCUMENTS AND APPROVED SUBMITTALS | P | MORTAR JOINTS, HOT AND COLD WEATHER PLACEMENT | ACI 530 |
| MASONRY STRENGTH | VERIFICATION OF f'm | P | PRIOR TO CONSTRUCTION AND EVERY 5000 SQ FT | ACI 530 |
| PREMIXED MORTAR AND GROUT | VERIFICATION OF PROPERTIES | P | | ACI 530 |
| SITE PREPARED MORTAR AND GROUT | VERIFICATION OF PROPERTIES | P | | ACI 530 |
| MASONRY CONSTRUCTION | SIZE, PLACEMENT AND CONDITIONS | P | MORTAR JOINTS, HOT AND COLD WEATHER PLACEMENT | ACI 530 |
| GROUT | GROUT SPACE PRIOR TO GROUT, PLACEMENT OF GROUT | C | | ACI 530 |
| PRECAST CONCRETE | ERECTION OF PRECAST CONCRETE | P | | ACI 318 |
| WATERSTOPS | INSTALLATION IN FORMS AND INTEGRITY OF SPLICES | P | | |
| CAST-IN-PLACE DEEP FOUNDATION ELEMENTS | SIZE, PLACEMENT, PLUMBNESS, LENGHTS, BEDROCK EMBEDMENT AND CONCRETE VOLUMES | C | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STATEMENT OF SPECIAL INSPECTIONS

| project | contract |
|---|---|
| 98101 | |

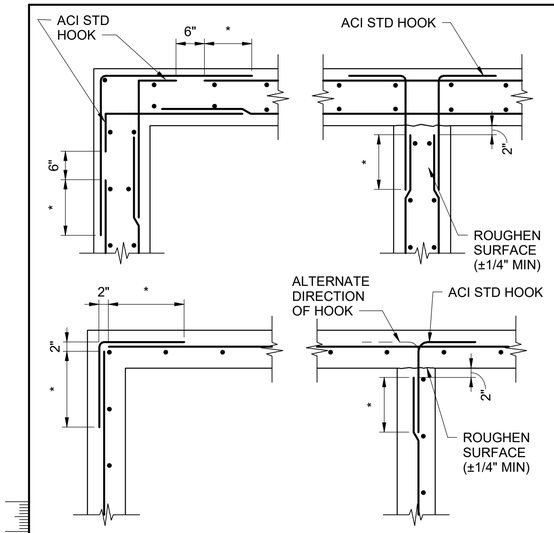
**drawing** **S003 — 1** **rev.**

**sheet** 59 **of** 542 **sheets**

**file** 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches




1. USE AT ALL CORNERS FOR ALL CONCRETE MEMBERS INCLUDING THICKENED SLAB ON GRADE, WALLS, CURBS, BEAMS, GRADE BEAMS AND SLABS, UNLESS INDICATED OTHERWISE.
2. * TYPICAL CONCRETE REINFORCEMENT LAP SLICE PER TABLE (THIS SHEET) UNLESS INDICATED OTHERWISE.

**TYPICAL CORNER BAR DETAILS**
NOT TO SCALE




**EQUIPMENT PAD NOTES:**

1. PROVIDE EP-1 EQUIPMENT PAD FOUNDATION FOR ALL EQUIPMENT AND TANKS WHEN OTHER FOUNDATIONS HAVE NOT BEEN INDICATED.
2. PROVIDE ANCHOR BOLTS AND GROUT AS REQUIRED BY EQUIPMENT OR TANK MANUFACTURER.
3. EQUIPMENT PAD FOUNDATIONS SHALL CONFORM TO THIS DETAIL, EQUIPMENT OR TANK MANUFACTURER'S REQUIREMENTS AND THE FOLLOWING:
   - A. REINFORCE PAD TO CONFORM WITH THIS DETAIL. IF THE FLOOR IS CONSTRUCTED BEFORE THE DOWELS ARE PLACED, THE DOWELS SHALL BE EPOXY GROUTED INTO THE FLOOR SLAB WITH A MINIMUM EMBEDMENT = 5".
   - B. PROVIDE DOWELS AT 12" OC SPACING AROUND PERIMETER OF PAD.
   - C. GROUT SHALL BE NON-SHRINK FLOWABLE, UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MFR.
   - D. EQUIPMENT OR TANK ANCHOR BOLTS SHALL BE STANDARD TYPE II ANCHORS, UNLESS RECOMMENDED BY THE EQUIPMENT MFR. POST INSTALLED ANCHORS WILL ONLY BE ALLOWED IF PROVIDED WITH CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO.
   - E. DIMENSION SHALL BE 4" MINIMUM FOR PADS WITH 1"Ø ANCHORS AND 6" MINIMUM FOR PADS WITH ANCHORS >1"Ø.
4. FOR TANK PADS, PROVIDE NOTCH AS REQUIRED FOR TANK DRAIN OUTLET.

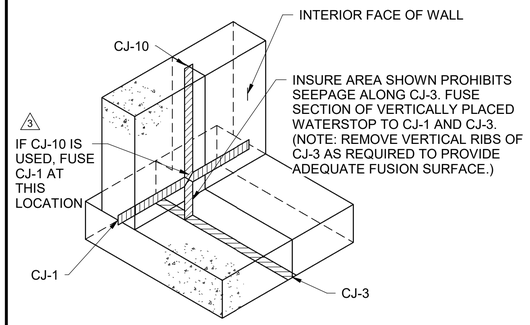
**EP-1**
NOT TO SCALE

## CONCRETE REINFORCEMENT SPLICE AND EMBEDMENT TABLE

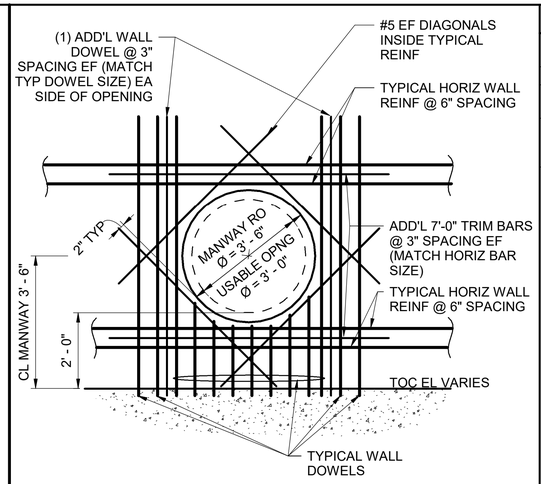
| BAR SIZE | SPLICES (IN) | | EMBEDMENT (IN) | | |
|---|---|---|---|---|---|
| | TOP BARS | OTHER BARS | TOP BARS | OTHER BARS | HOOKED BARS |
| 3 | 15 | 12 | 12 | 12 | 5 |
| 4 | 20 | 15 | 15 | 12 | 7 |
| 5 | 25 | 19 | 19 | 15 | 9 |
| 6 | 29 | 23 | 23 | 18 | 10 |
| 7 | 48 | 37 | 37 | 29 | 12 |
| 8 | 61 | 47 | 47 | 36 | 14 |
| 9 | 75 | 58 | 58 | 44 | 15 |
| 10 | 91 | 70 | 70 | 54 | 17 |
| 11 | 109 | 84 | 84 | 65 | 19 |
| 14 | NOT ALLOWED | | 113 | 87 | 33 |
| 18 | | | 180 | 138 | 43 |

1. TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW THE BAR.
2. LAP SPLICES REQUIRED FOR MASONRY ARE INDICATED ON DRAWING S007.

**LAP SPLICE TABLE**
NOT TO SCALE

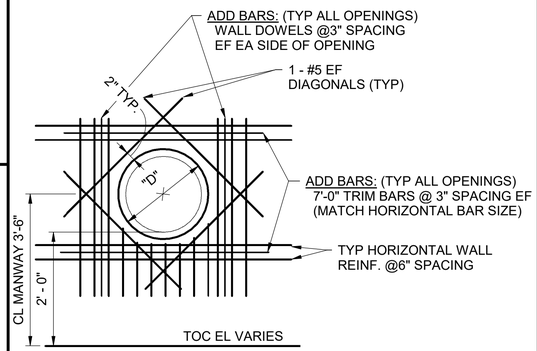



**CONSTRUCTION JOINT INTERSECTION**
NOT TO SCALE



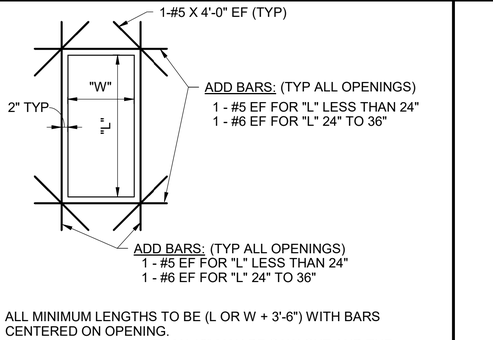

**CO-4** 1
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 6/12/18 | BLS | KDT | REVISED PER RFI#28 |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 3 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |



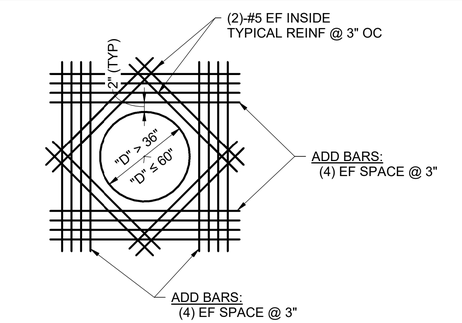

1. MANWAY RO DIAMETER IS 3'-6".
2. USEABLE OPENING DIAMETER OF MANWAY IS 3'-0".
3. ALL BAR MINIMUM LENGTHS TO BE ("D" + 3'-6") WITH BARS CENTERED ON OPENINGS.
4. HOOK ADDITIONAL BARS WHEN PERPENDICULAR WALL OR SLAB PROHIBITS ADD'L BARS FROM BEING CENTERED ON THE OPENING.

3
**CO-1**
NOT TO SCALE



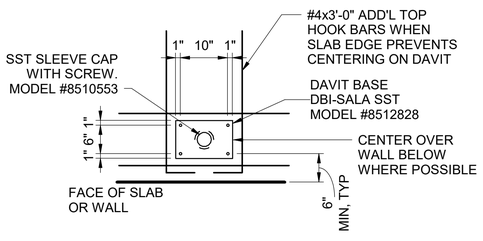

1. ALL MINIMUM LENGTHS TO BE (L OR W + 3'-6") WITH BARS CENTERED ON OPENING.
2. OPENINGS (W,L) LESS THAN 12" MAY BE SAW CUT AND THE ADD BARS ARE NOT REQUIRED.
3. HOOK ADDITIONAL BARS WHEN PERPENDICULAR WALL OR SLAB PROHIBITS ADD'L BARS FROM BEING CENTERED IN OPENING.
4. REINFORCE OPENINGS WITH "L" OR "W" LARGER THAN 36" AS INDICATED ON THE DRAWINGS. IF NOT INDICATED CONTACT THE ENGINEER.

**CO-2**
NOT TO SCALE




1. BAR SIZE TO MATCH HORIZONTAL, VERTICAL OR DOWEL SIZE IN AREA WHERE PENETRATION OCCURS.
2. ALL BAR MINIMUM LENGTHS TO BE ("D" + 4'-0") WITH BARS CENTERED ON OPENINGS.
3. HOOK ADDITIONAL BARS WHEN PERPENDICULAR WALL OR SLAB PROHIBITS ADD'L BARS FROM BEING CENTERED ON THE OPENING.
4. FOR OPENINGS LARGER THAN "D" = 60" CONTACT ENGINEER.

**CO-3**
NOT TO SCALE



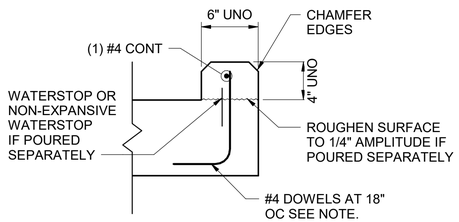

**PLAN**

**SECTION**

*DAVIT BASE DESIGNED FOR USE WITH DBI-SALA ADVANCED DAVIT MAST ONLY

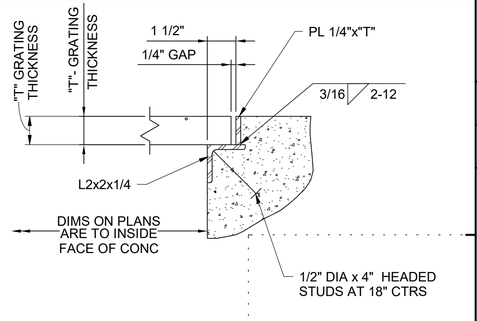
**FLUSH MOUNT DAVIT BASE**

**CE-10**
NOT TO SCALE




**NOTE:**
AT CONTRACTOR'S OPTION, DRILL AND SET DOWELS IN NON- SHRINK GROUT WITH 4" MINIMUM DEPTH.

**CE-8**
NOT TO SCALE




**NOTES:**

1. MITER, WELD AND SMOOTH GRIND ANGLES AT ALL CORNERS
2. ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL HAVE A BITUMASTIC COATING

**CE-4**
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD CONCRETE DETAILS I

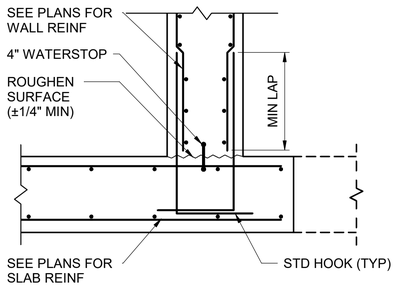
| project | contract |
|---|---|
| 98101 | |

drawing **S004 — 3** rev.

sheet 60 of 542 sheets
file 98101_S

Scale For Microfilming
Millimeters
Inches

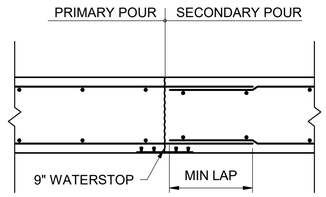
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




1. SEE SPEC SECTION 03 30 00 FOR BEDDING & GROUT REQUIRENTS.
2. WALL REINFORCEMENT MAY BE SINGLE LAYER, SEE PLANS.

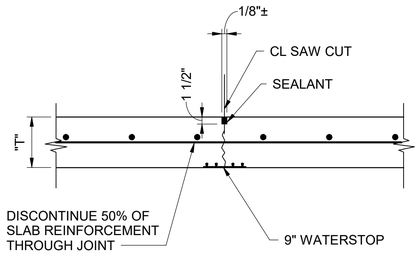
**CJ-1** - WITH WATERSTOP
**CJ-1A**- WITH SST OR TPE-R WATERSTOP
**CJ-2** - WITHOUT WATERSTOP

**CJ-1/CJ-2**
NOT TO SCALE



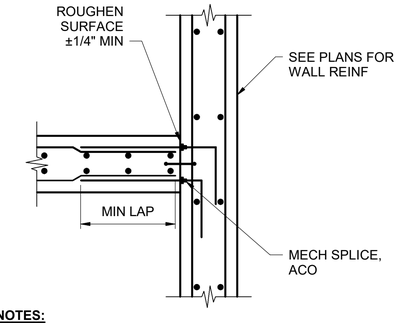

**CJ-3** - WITH WATERSTOP
**CJ-4** - WITHOUT WATERSTOP

**CJ-3/CJ-4**
NOT TO SCALE




**CJ-5** - WITH WATERSTOP
**CJ-6** - WITHOUT WATERSTOP
**CJ-6A** - WITHOUT WATERSTOP, DISCONTINUE ALL REINF

**CJ-5/CJ-6**
NOT TO SCALE

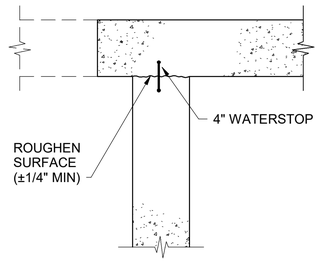



**NOTES:**

1. USE OF PLASTIC WATERSTOP AFTER WALL PLACEMENT IS ACCEPTABLE WITH THE FOLLOWING CONDITIONS:
   A. SLABS <10" THICK REQUIRE A NON-SWELLING WATERSTOP.
   B. MINIMUM CLEARANCE TO EDGE OF CONCRETE AS REQUIRED BY PRODUCT MFR MUST BE MAINTAINED.

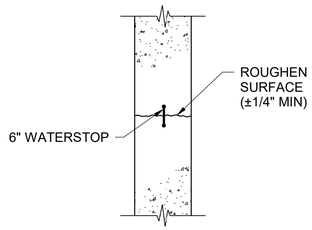
2 **CJ-7**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**CJ-8** - WITH WATERSTOP
**CJ-8A** - WITH SST WATERSTOP
**CJ-9** - WITHOUT WATERSTOP

**CJ-8/CJ-9**
NOT TO SCALE

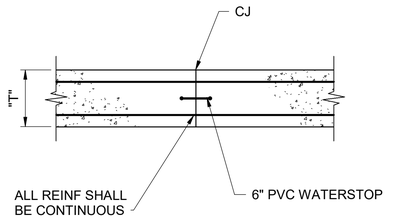



**NOTES:**

1. SEE SPEC SECTION 03 30 00 FOR BEDDING & GROUT REQUIREMENTS.
2. USE T-PER OR SST WATERSTOP AT JOINTS IN THE OZONE CONTACT CHAMBER

**CJ-10** - WITH WATERSTOP
**CJ-11** - WITHOUT WATERSTOP

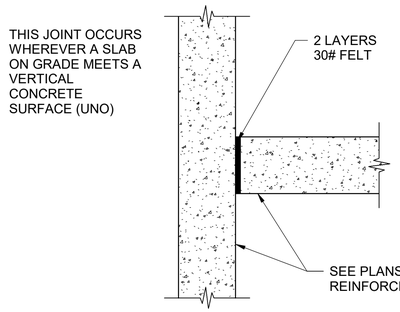
**CJ-10/CJ-11**
NOT TO SCALE




**NOTES:**

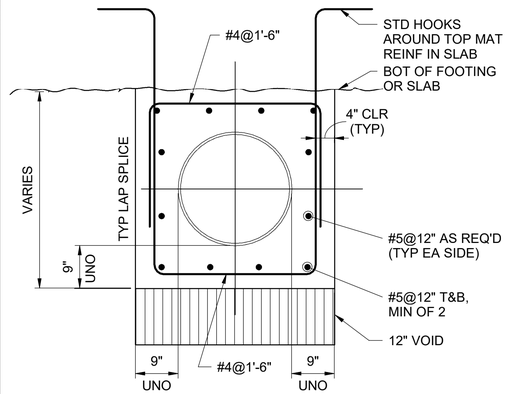
1. USE TPE-R OR SST WATERSTOP AT JOINTS IN THE OZONE CONTACT CHAMBER

**CJ-12**
NOT TO SCALE



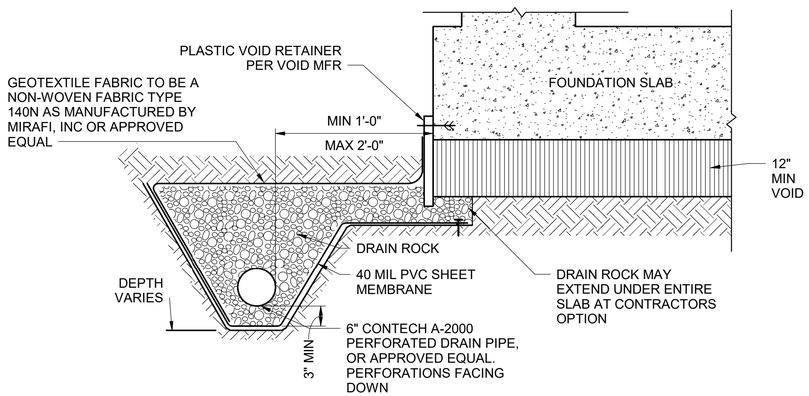

**TYPICAL ISOLATION JOINT**

**IJ-1**
NOT TO SCALE

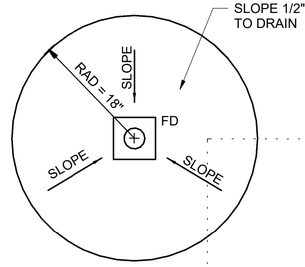



**TYPICAL BELOW SLAB PIPE ENCASEMENT**

**PE-1**
NOT TO SCALE




**TYPICAL FOUNDATION DRAIN**
NOT TO SCALE




**TYPICAL FLOOR DRAIN DETAIL**

**FD-1**
NOT TO SCALE

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

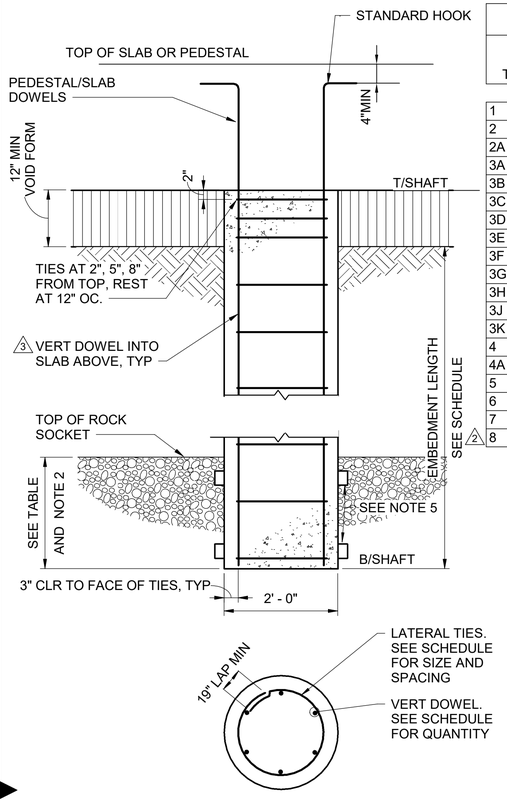
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD CONCRETE DETAILS II

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** S005 | **rev.** 2 |
| **sheet** 61 **of** 542 **sheets** | |
| **file** 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

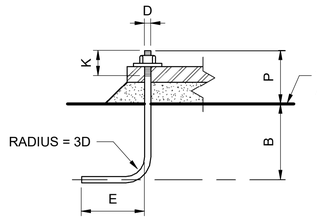



**TYPICAL DRILLED SHAFT**
NOT TO SCALE

| DRILLED SHAFT SCHEDULE | | | | | | |
|---|---|---|---|---|---|---|
| TYPE | DIAMETER | TOC/SHAFT ELEVATION | MINIMUM ROCK EMBEDMENT | MINIMUM LENGTH | VERT REINF | REMARKS |
| 1 | 24" | 5375.50' | 27' - 6" | 35' - 0" | (6)-#8 | #4 TIES |
| 2 | 24" | 5365.50' | 35' - 0" | 35' - 0" | (6)-#8 | #4 TIES |
| 2A | 24" | 5365.50' | 38' - 0" | 38' - 0" | (6)-#8 | #4 TIES |
| 3A | 36" | 5357.47' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3B | 36" | 5357.32' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3C | 36" | 5357.15' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3D | 36" | 5356.99' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3E | 36" | 5356.83' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3F | 36" | 5350.02' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3G | 36" | 5357.11' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3H | 36" | 5357.23' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3J | 36" | 5357.35' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 3K | 36" | 5357.47' | 35' - 0" | 35' - 0" | (24)-#9 | #4 TIES. SEE NOTE 6 & 8 |
| 4 | 24" | 5395.00' | 25' - 0" | 54' - 0" | (6)-#8 | #4 TIES |
| 4A | 24" | 5394.50' | 25' - 0" | 54' - 0" | (6)-#8 | #4 TIES |
| 5 | 24" | 5394.50' | 25' - 0" | 53' - 6" | (6)-#8 | #4 TIES |
| 6 | 24" | 5393.00' | 25' - 0" | 53' - 6" | (6)-#8 | #4 TIES |
| 7 | 24" | 5397.75' | 19' - 6" | 34' - 9" | (6)-#8 | #4 TIES |
| 2 8 | 24" | 5399.00' | 15' - 0" | 44' - 0" | (6)-#8 | #4 TIES |

**DRILLED SHAFT NOTES:**

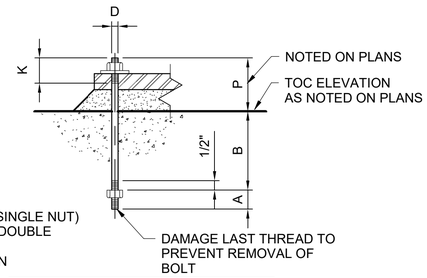
1. BASE OF SHAFT ELEVATIONS WILL VARY. EXTEND REINFORCEMENT FULL DEPTH OF SHAFT.
2. BOTH SPECIFIED ROCK SOCKET AND MINIMUM EMBEDMENT LENGTH PER SCHEDULE AND NOTES MUST BE SATISFIED.
3. REPRESENTATIVE FROM GEOTECHNICAL ENGINEER SHALL BE PRESENT FULL TIME DURING DRILLING AND INSTALLING SHAFTS. THE GEOTECHNICAL REPRESENTATIVE SHALL VERIFY THE TOTAL DEPTH OF EMBEDMENT OF EACH SHAFT SO THAT BOTH THE MINIMUM TOTAL EMBEDMENT AND MINIMUM ROCK SOCKET ARE ATTAINED.
4. IF THE GEOTECHNICAL REPRESENTATIVE REQUIRES INCREASE IN TOTAL EMBEDMENT LENGTH TO ATTAIN THE MINIMUM ROCK SOCKET, THE REINFORCING CAGE SHALL BE EXTENDED TO INCLUDE THE ADDITIONAL DEPTH IF GREATER THAN 2FT. REINFORCING CAGE EXTENSION SHALL USE STANDARD LAP SPLICES AS INDICATED ON S004.
5. THE BOTTOM 15 FEET OF BEDROCK PENETRATION IN ALL SHAFT HOLES SHALL BE ARTIFICIALLY ROUGHED USING HORIZONTAL GROVES. MINIMUM GROOVE HEIGHT IS 3" AND MINIMUM GROVE DEPTH IS 2". HORIZONTAL OR HELICAL GROVES SHALL BE VERTICALLY SPACED AT 1.5' ON CENTER.
6. WHERE NOTED IN THE DRILLED SHAFT SCHEDULE, IF CLAYSTONE BEDROCK IS NOT PRESENT AT THE T/SHAFT LOCATION, CONTACT THE ENGINEER FOR MODIFIED EMBEDMENT CRITERIA.
7. REFER TO SPEC SECTION 31 63 29 FOR ADDITIONAL REQUIREMENTS FOR DRILLED SHAFT INSTALLATION.
8. AT CORNERS AND EDGE LOCATIONS HOOK SHALL BE REPLACED WITH LENTON TERMINATOR D6 OR APPROVED EQUAL.




| SCHEDULE | | | |
|---|---|---|---|
| D | B | E | REMARKS |
| 3/8" | 5" | 5" | |
| 1/2" | 6" | 6" | |
| 5/8" | 8" | 7" | |
| 3/4" | 10" | 9" | |
| 7/8" | 1'-0" | 11" | |
| 1" | 1'-2" | 1'-1" | |

HOOKED BOLT
MATERIAL AS SPECIFIED IN GENERAL NOTES ON S001

**TYPE V ANCHOR BOLTS**
NOT TO SCALE




D = BOLT DIAMETER
K = THREADS (2D+2" SINGLE NUT) THREADS (3D+2" DOUBLE NUTS)
P = BOLT PROJECTION

| SCHEDULE | | | |
|---|---|---|---|
| D | A* | B | REMARKS |
| 3/8" | 2" | 6" | |
| 1/2" | 2" | 7" | |
| 5/8" | 2" | 10" | |
| 3/4" | 2" | 1'-0" | |
| 7/8" | 3" | 1'-2" | |
| 1" | 3" | 1'-4" | |

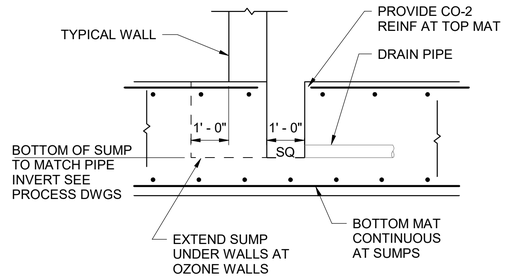
**NOTES:**
1. * NOT REQUIRED FOR MACHINE BOLTS.
2. CONTRACTOR HAS THE OPTION OF USING HEADED MACHINE BOLTS IN LIEU OF THREADED RODS.
3. FULLY THREADED RODS ARE NOT PERMITTED.
4. MATERIAL AS SPECIFIED IN GENERAL NOTES ON S001.

**TYPE VII ANCHOR BOLTS**
NOT TO SCALE

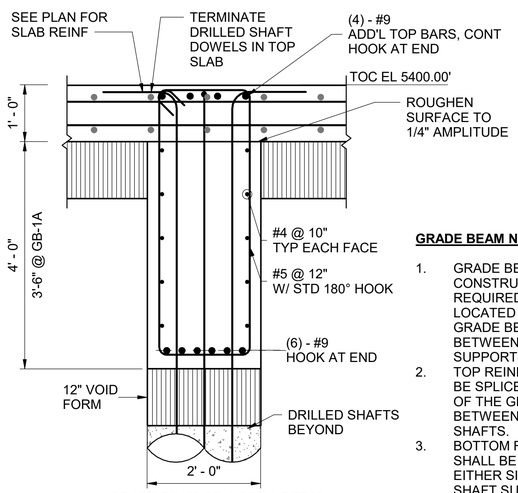
**GENERAL NOTES:**

1. FOR MATERIAL PROPERTIES OF VARIOUS BOLT TYPES, SEE SPECIFICATIONS AND GENERAL NOTES.
2. ALL BOLTS TO HAVE "UNC"-CLASS 2A THREADS, HEX NUTS AND STANDARD CUT WASHERS, UNLESS NOTED OTHERWISE. HEAVY HEX NUTS SHALL BE PROVIDED FOR HIGH STRENGTH ANCHOR BOLTS. PROVIDE PLATE WASHERS AT OVERSIZED BASE PLATE HOLES
3. WELDING TO ANCHOR BOLTS WILL NOT BE PERMITTED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/1/19 | KDT | BLS | ISSUED FOR PCO 029 |
| 3 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**TYPICAL DRAIN SUMP**
NOT TO SCALE

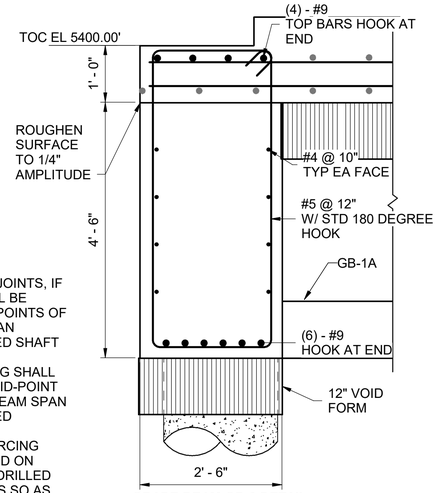



**GRADE BEAM GB-1/GB-1A DETAIL**

0 1' 2' 3'
SCALE IN FEET

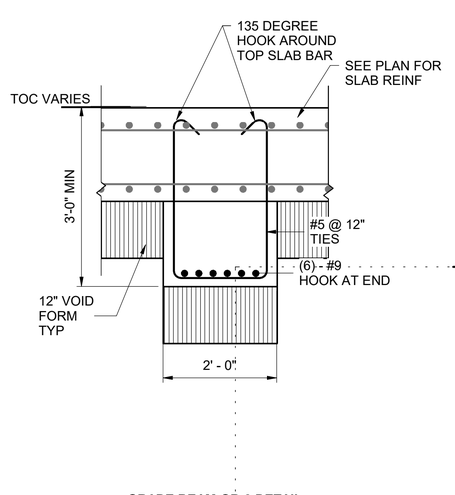
**GRADE BEAM NOTES:**

1. GRADE BEAM CONSTRUCTION JOINTS, IF REQUIRED, SHALL BE LOCATED AT 1/3 POINTS OF GRADE BEAM SPAN BETWEEN DRILLED SHAFT SUPPORTS.
2. TOP REINFORCING SHALL BE SPLICED AT MID-POINT OF THE GRADE BEAM SPAN BETWEEN DRILLED SHAFTS.
3. BOTTOM REINFORCING SHALL BE SPLICED ON EITHER SIDE OF DRILLED SHAFT SUPPORTS SO AS NOT TO INTERFER WITH SHAFT DOWELS.




**GRADE BEAM GB-2 DETAIL**

0 1' 2' 3'
SCALE IN FEET




**GRADE BEAM GB-3 DETAIL**

0 1' 2' 3'
SCALE IN FEET

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

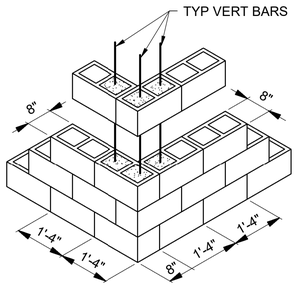
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD CONCRETE DETAILS III

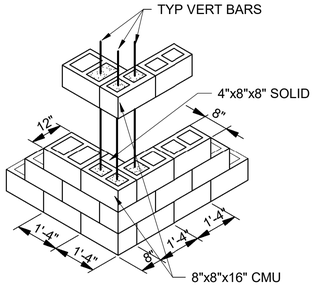
| project | contract |
|---|---|
| 98101 | |

drawing **S006** rev. **3**

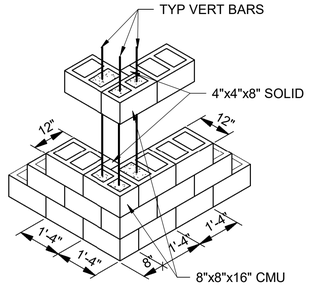
sheet 62 of 542 sheets
file 98101_S




**(2) - 8" WALLS**




**12" TO 8" WALL**

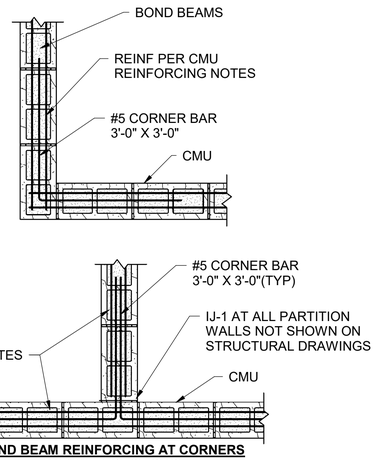



**(2) - 12" WALLS**

**NOTES:**
1. THIS DETAIL TYPICAL AT ALL EXTERIOR CORNERS OF BUILDING.

**TYPICAL CMU CORNER REINFORCING DETAIL**
NOT TO SCALE

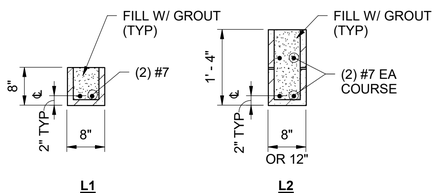
**NOTES:**
SEE MASONRY PLANS FOR VERTICAL REINFORCEMENT




**BOND BEAM REINFORCING AT CORNERS AND INTERSECTIONS**
NOT TO SCALE

**MASONRY GENERAL NOTES:**

1. ENGINEERED MASONRY IS DESIGNED IN ACCORDANCE WITH "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES" ACI 530/TMS 402, 2013 EDITION.
2. MATERIALS:
   A. CMU: NORMAL WEIGHT MASONRY WITH TYPE S MORTAR: $f'_m$ = 2000psi
   B. GRADE 60 STEEL REINFORCING: $F_y$=60ksi
3. ALL WALLS SHALL BE RUNNING BOND TYPE CONSTRUCTION.
4. ALL CMU CELLS SHALL BE FILLED WITH SELF CONSOLIDATING GROUT. SEE SPECIFICATION SECTION 04 22 00. SITE MIXED GROUT MAY BE APPROVED FOR SMALL AREAS AT THE DISCRETION OF THE ENGINEER.
5. ALL VERTICAL CMU WALL REINFORCING SHALL HAVE FULL CONTACT LAP SPICES WITH DOWELS FROM FOUNDATION.
6. INSERTING DOWELS INTO FRESH OR PARTIALLY HARDENED CONCRETE OR GROUT IS PROHIBITED.
7. ALL CMU BOND BEAMS SHALL BE KNOCKOUT TYPE.
8. CMU IS DESIGNED FOR FULL STRESSES. SPECIAL INSPECTION IS REQUIRED PER IBC 2015.
9. VERTICAL CMU REINFORCEMENT SHALL BE CONTINUOUS THROUGH LINTELS AND SHALL EXTEND THE ENTIRE HEIGHT OF THE WALL.
10. BOND BEAMS LOCATED BELOW BEARING ELEVATIONS, ABOVE DOUBLE TEE FLANGES, AND TOP OF WALLS ARE STRUCTURAL BOND BEAMS AND SHALL HAVE REINFORCEMENT CONTINUOUS THROUGH CONTROL JOINTS.
11. JOINT REINFORCING AND INTERMEDIATE BOND BEAM (THOSE NOT INCLUDED IN NOTE 10 ABOVE) REINFORCING SHALL BE DISCONTINUOUS AT CONTROL JOINTS.
12. JOINT REINFORCING TO BE LADDER TYPE WITH A SINGLE PAIR OF 9 GAUGE SIDE RODS X 9 GAUGE CROSS RODS. SPACE AT 16" OC, UNO.
13. FILL GAPS BENEATH BEARING PLATES WITH SIKADUR 32 OR EQUIVALENT PRODUCT.
14. REINFORCING LAP SPLICE LENGTHS (UNO):
    A. #5 - 40 INCHES
    B. #6 - 48 INCHES
    C. #7 - 56 INCHES
15. INTERIOR (NON-LOAD BEARING) WALL REINFORCING (UNO)
    A. BOND BEAMS
       a. 1-#5, LOCATE AT TOP OF WALL, FIRST COURSE ABOVE FOUNDATION AND AT 4'-0" OC MAX.
    B. HORIZONTAL JOINT REINFORCING
       a. LADDER TYPE WITH A SINGLE PAIR OF 9 GAUGE SIDE RODS X 9 GAUGE CROSS RODS. SPACE AT 16" OC, UNO.
    C. CORNERS
       a. 1-#5 PER DETAIL THIS SHEET @ BOND BEAMS
    D. CONTROL JOINTS SPACE AT 25'-0" MAX.
       a. 1-#5 EACH CELL ADJACENT TO THE JOINT.
    E. VERTICAL REINFORCING
       a. 1-#5 @ 48" OC MAX, CENTERED IN CELL. SEE MS-1 DETAIL FOR CONNECTION AT BASE.



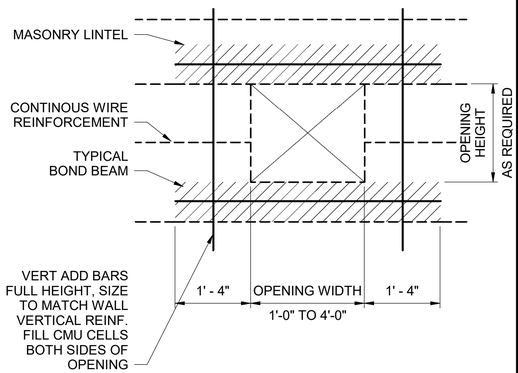

**NOTES:**
1. ALL LINTELS SHALL EXTEND 1'-4" BEYOND EACH SIDE OF OPENING WHEREVER POSSIBLE, UNLESS NOTED OTHERWISE.
2. VERTICAL BARS ABOVE LINTELS SHALL BE EMBEDDED IN LINTELS WITH STD HOOK AT BOTTOM.

**CMU LINTELS FOR UNSCHEDULED OPENINGS**
(UNLESS NOTED OTHERWISE)

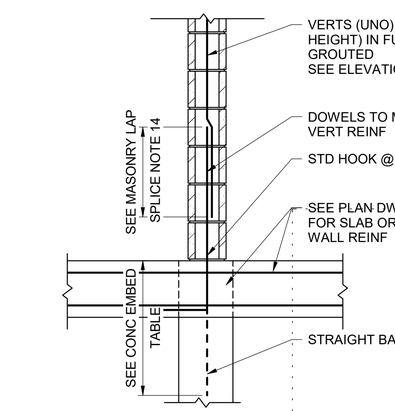
| LINTELTYPE | OPENING WIDTH | |
|---|---|---|
| | 8" CMU | 12" CMU |
| L1 | UP TO 3'-6" | UP TO 2'-0" |
| L2 | >3'-6" TO 7'-0" | >2'-0" TO 4'-6" |
| L3 | 7'-0" TO 10'-0" | 4'-6" TO 7'-0" |
| L4 | 10'-0" TO 16'-0" | 7'-0" TO 10'-0" |



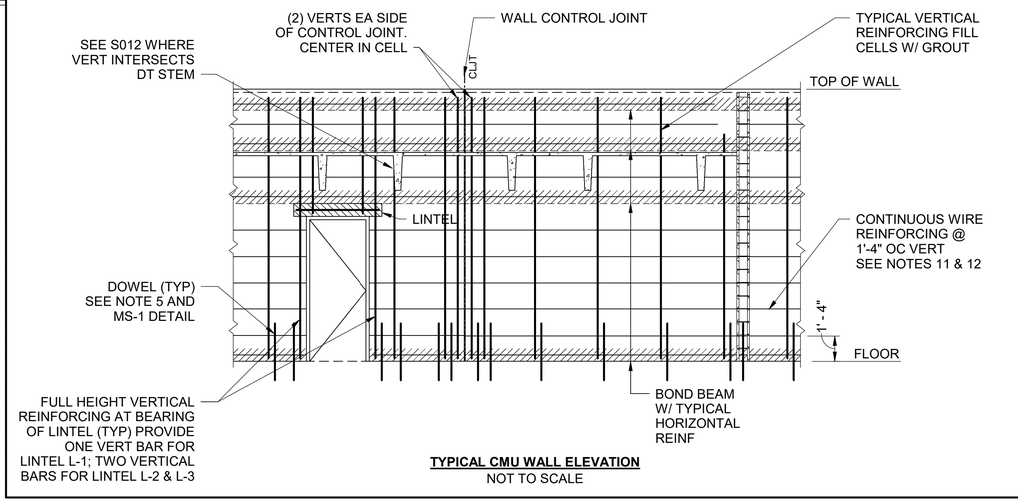

**CMU LINTEL TYPES**
NOT TO SCALE



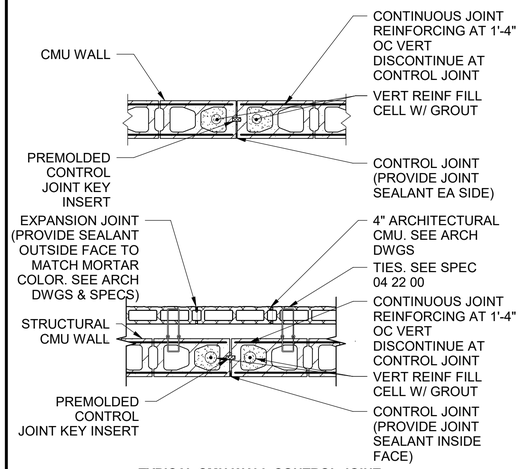

**MO-1**
**CMU WALL OPENING**
NOT TO SCALE




**TYPICAL BOND BEAM**
NOT TO SCALE




**TYPICAL CMU WALL ELEVATION**
NOT TO SCALE




**TYPICAL CMU WALL CONTROL JOINT DETAILS**
NOT TO SCALE




**MS-1**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD MASONRY DETAILS I

| project | contract |
|---|---|
| 98101 | |

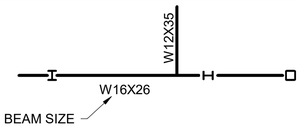
drawing **S007** rev. **0**

sheet 63 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

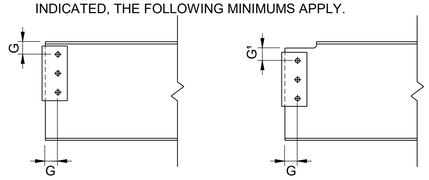
Scale For Microfilming: Millimeters / Inches




**STANDARD FRAMED BEAM CONNECTIONS**

**NOTES:**

1. UNLESS NOTED OTHERWISE, ALL BEAM TO W COLUMN CONNECTIONS SHALL BE AISC TABLE 10-2 CASE 1 WITH SHOP WELDS.
2. UNLESS NOTED OTHERWISE, ALL BEAM TO HSS COLUMN CONNECTIONS SHALL BE AISC TABLE 10-10A WITH SHOP WELDS.
3. UNLESS NOTED OTHERWISE ALL BEAM TO BEAM CONNECTIONS SHALL BE AISC TABLE 10-2 CASE 1 WITH SHOP WELDS.
4. THE SYMBOL NUMBER INDICATES THE MINIMUM NUMBER OF ROWS OF HIGH STRENGTH BOLTS FOR THAT END CONNECTION. END CONNECTIONS SHALL BE STANDARD "FRAMED BEAM" OF AISC STEEL CONSTRUCTION MANUAL 14TH EDITION. UNLESS OTHERWISE INDICATED, THE FOLLOWING MINIMUMS APPLY.

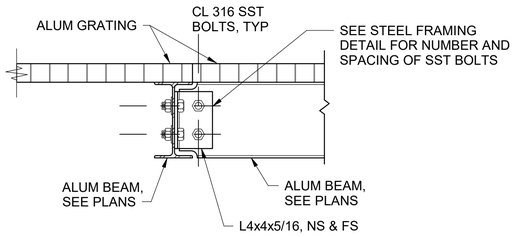



G & G' = 2" MIN FOR STD HOLES (G' = 1 1/4" MIN FOR BEAMS LESS THAN A W12).
MINIMUM CLIP ANGLE THICKNESS SHALL BE 5/16" BEAM TO BEAM CONNECTION. TABLE 10-2 CASE 1 WELDS TO BE 3/16".
MINIMUM CLIP ANGLE THICKNESS SHALL BE 3/8" BEAM TO COLUMN CONNECTION. TABLE 10-2 CASE 1 WELDS TO BE 3/16".
MINIMUM SHEAR TAB THICKNESS SHALL BE 3/8" BEAM TO COLUMN CONNECTION. TABLE 10-10 WELDS SHALL BE MINIMUM 1/4".

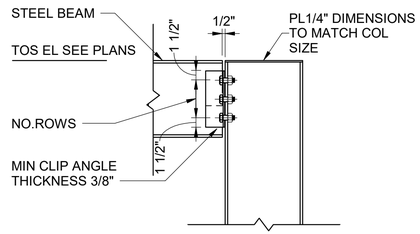
5. WHERE NO STANDARD "FRAMED BEAM" CONNECTIONS SYMBOL ( ⟨X⟩ ) IS INDICATED, BEAM END CONNECTIONS SHALL BE IN ACCORDANCE WITH THESE NOTES AND WITH THE FOLLOWING MINIMUM NUMBER OF HIGH STRENGTH BOLTS:

| | | | |
|---|---|---|---|
| C6, W6, OR LESS | = 2 ROWS | W21 | = 4 ROWS |
| C8 OR W8 | = 2 ROWS | W24 | = 5 ROWS |
| C10 OR W10 | = 2 ROWS | W27 | = 7 ROWS |
| C12 OR W12 | = 2 ROWS | W30 | = 7 ROWS |
| W14 | = 3 ROWS | W33 | = 8 ROWS |
| C15 OR W16 | = 3 ROWS | W36 | = 8 ROWS |
| W 18 | = 4 ROWS | | |

6. THE NUMBER OF BOLTS AND NUMBER OF ROWS OF BOLTS INDICATED OR STATED IS THE MINIMUM NUMBER OF BOLTS OR ROWS. PROVIDE ADDITIONAL BOLTS OR CONNECTION DEVICES, IF NECESSARY, TO COMPLY WITH OSHA REGULATION 29CFR1926 SUBPART R-STEEL ERECTION.
7. ROWS OF BOLTS: THE NUMBER OF FASTENERS IN A VERTICAL LINE.
8. BEAM CONNECTIONS ARE BASED ON THE USE OF STANDARD HOLES AS DEFINED BY AISC STEEL CONSTRUCTION MANUAL 14TH EDITION. OVERSIZED AND LONG-SLOTTED HOLES ARE NOT PERMITTED.
9. BEAM CONNECTION GAGE SHALL BE 5 1/2" MAX. GAGE MAY BE REDUCED AT FABRICATOR'S OPTION.

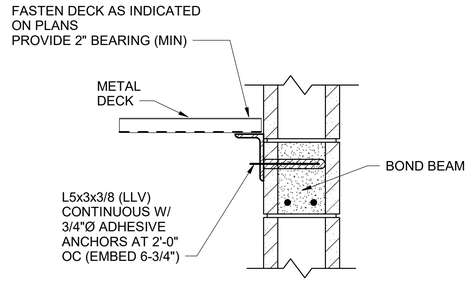



**ALUMINUM BEAM TO BEAM CONNECTION**
NOT TO SCALE

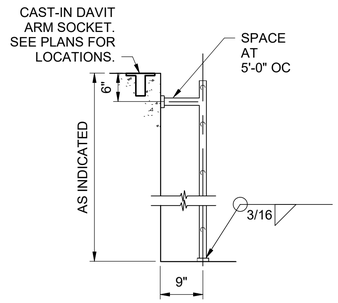


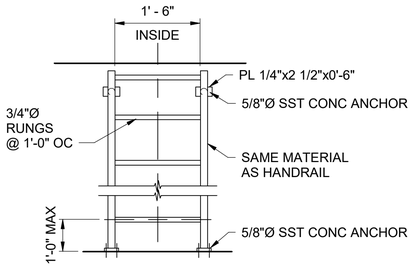

(SIM @ BEAM TO BEAM CONNECTIONS)

**STANDARD BEAM TO COLUMN CONNECTION**
NOT TO SCALE

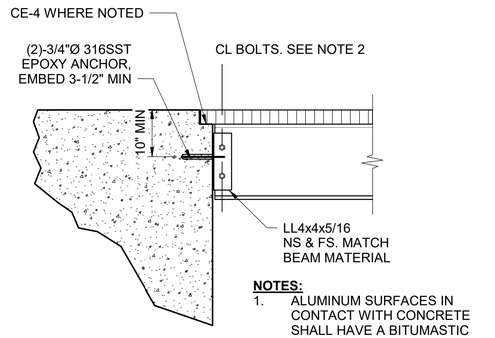



**DECK LEDGER ANGLE**
NOT TO SCALE



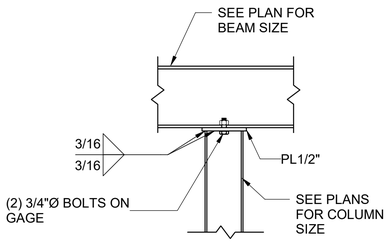

**L-3**
NOT TO SCALE



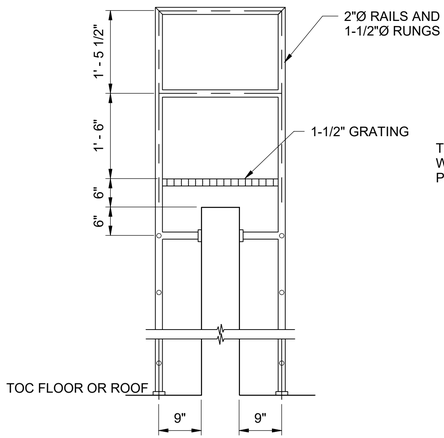

**NOTES:**

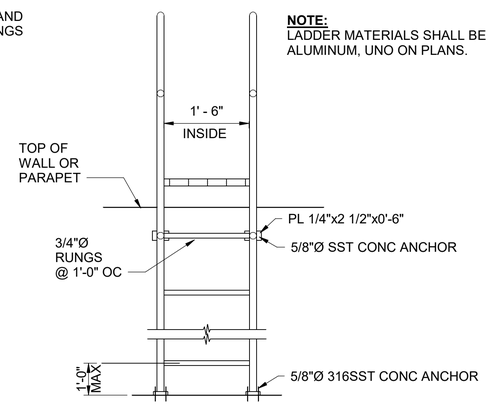
1. ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL HAVE A BITUMASTIC COATING.
2. FOR ALUMINUM AND STAINLESS STEEL MEMBERS USE 316 SST BOLTS.
3. FOR CONNECTIONS TO MASONRY USE HILTI HY270 EPOXY. EMBED 4.5" MIN.

**BEAM TO CONCRETE CONNECTION**
NOT TO SCALE

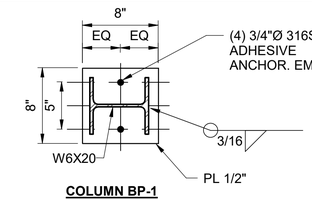



**STEEL BEAM OVER COLUMN**
NOT TO SCALE

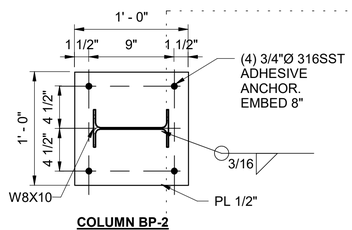



**L-4**
NOT TO SCALE




**COLUMN BP-1**




**COLUMN BP-2**

**TYPICAL BASE PLATES**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

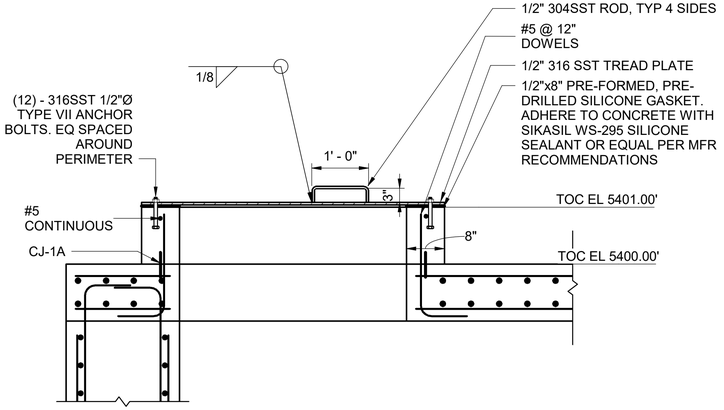
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD STRUCTURAL DETAILS I

| | |
|---|---|
| project 98101 | contract |
| drawing **S008** | rev. **0** |
| sheet 64 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

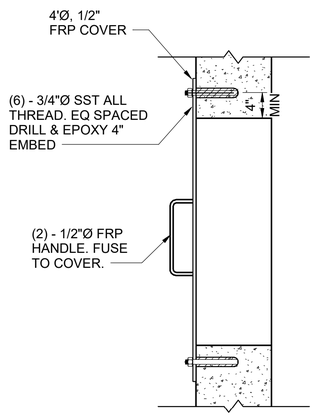
Millimeters
Scale For Microfilming
Inches




**OZONE HATCH** 1 S207

0 1' 2' 3'

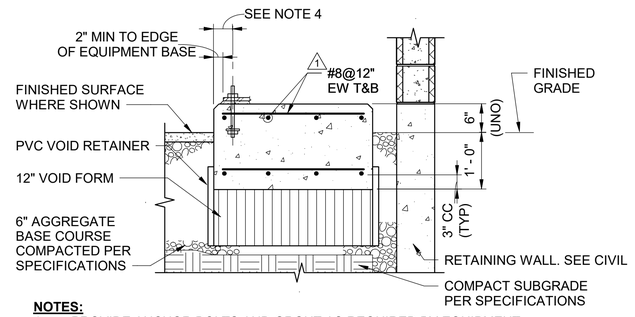
SCALE IN FEET




**FRP MANYWAY COVER** 2 S204

0 1/2' 1' 2'

SCALE IN FEET

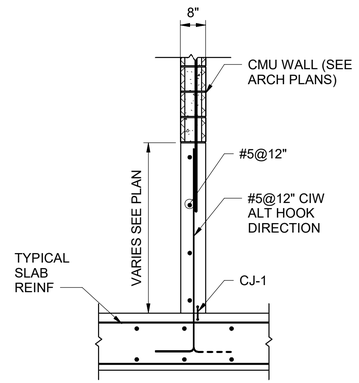



**NOTES:**

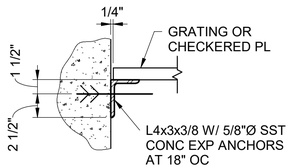
1. PROVIDE ANCHOR BOLTS AND GROUT AS REQUIRED BY EQUIPMENT MANUFACTURER.
2. PROVIDE ISOLATION JOINT WHERE PAD MEETS VERTICAL CONCRETE SURFACE.
3. EQUIPMENT PAD FOUNDATIONS SHALL CONFORM TO THIS DETAIL, EQUIPMENT MANUFACTURER'S REQUIREMENTS, AND THE FOLLOWING:
   A. EQUIPMENT SHALL BE GROUTED IN PLACE WITH NON-SHRINK GROUT, UNLESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
   B. EQUIPMENT ANCHOR BOLTS SHALL BE STANDARD TYPE II ANCHOR BOLTS, LESS OTHERWISE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
4. DIMENSION SHALL BE 4" MINIMUM FOR PADS WITH 1" DIAMETER ANCHOR BOLTS, 6" MINIMUM FOR PADS WITH ANCHOR BOLTS GREATER THAN 1" DIAMETER.
5. EXTERIOR EQUIPMENT PAD SHALL HAVE A LIGHT BROOM FINISH.

**GENERATOR PAD**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | KDT | BLS | ISSUED FOR PCO 029 |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

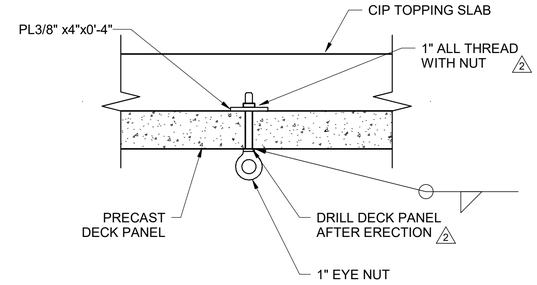



**TYPICAL CONTAINMENT WALL**
NOT TO SCALE

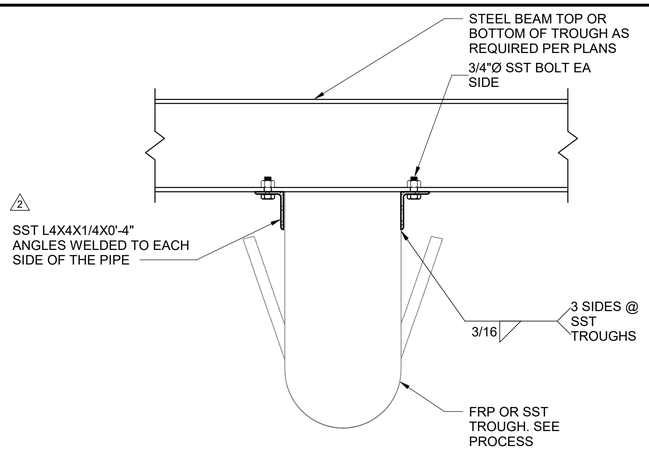



**GS-1** - ALUMINUM
**GS-2** - GALVANIZED STEEL

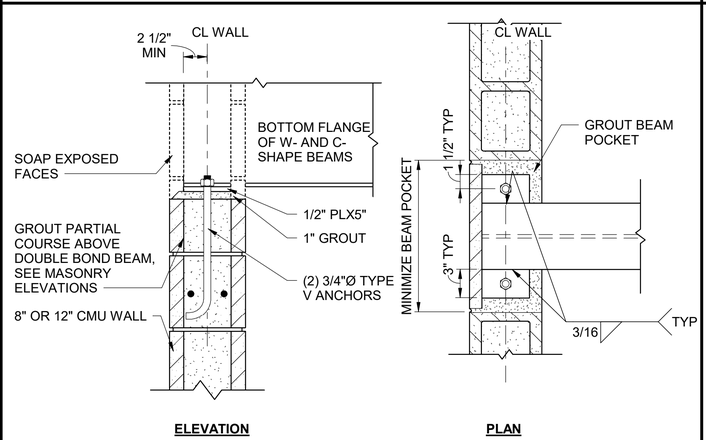
**GS-1/GS-2**
NOT TO SCALE




**PICK POINT ANCHORS**
NOT TO SCALE




**TYPICAL TROUGH SUPPORT DETAIL**
NOT TO SCALE




**BBP-1**
**STEEL BEARING @ MASONRY**
NOT TO SCALE

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

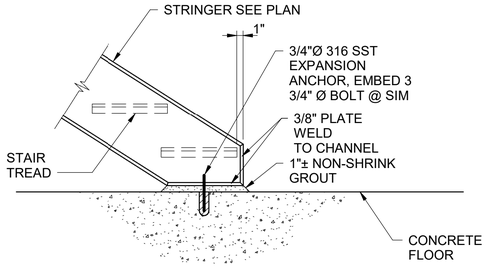
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD STRUCTURAL DETAILS II

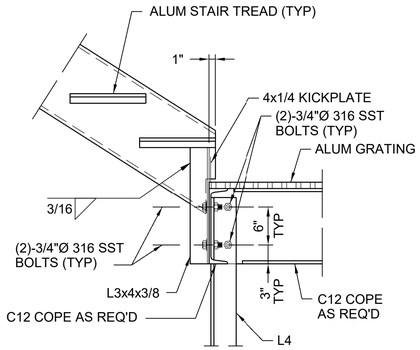
| | |
|---|---|
| project 98101 | contract |
| drawing S009 | rev. 2 |
| sheet 65 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

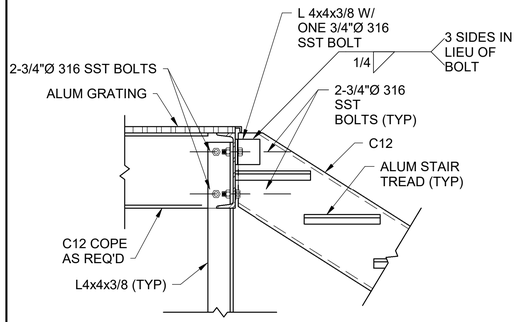
Scale For Microfilming
Millimeters
Inches



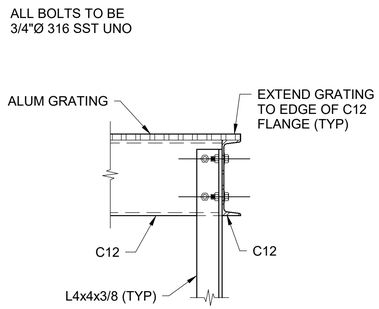

**SR-2A**
NOT TO SCALE




**SR-7A**
NOT TO SCALE

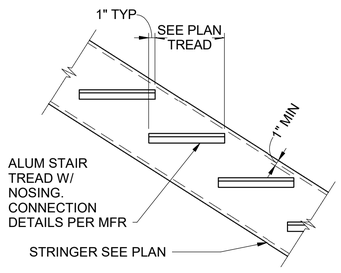



**SR-8A**
NOT TO SCALE

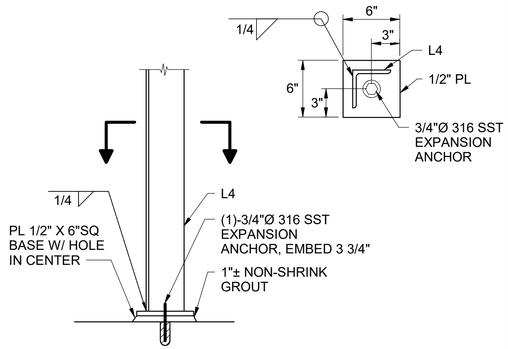



**SR-10A**
NOT TO SCALE

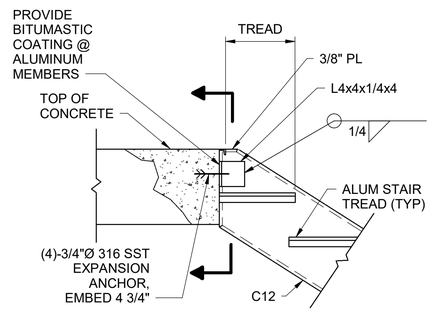
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |



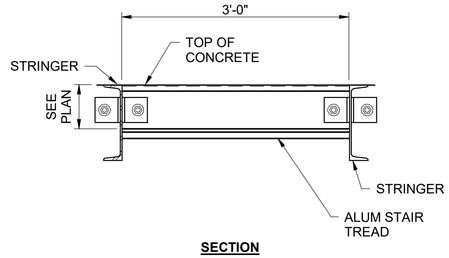

**SR-11A**
NOT TO SCALE



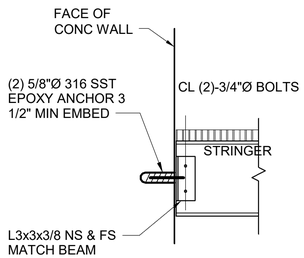

**SR-12A**
NOT TO SCALE




**SR-13A**
NOT TO SCALE

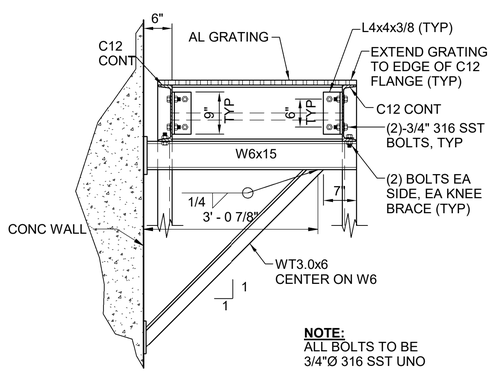



**SECTION**

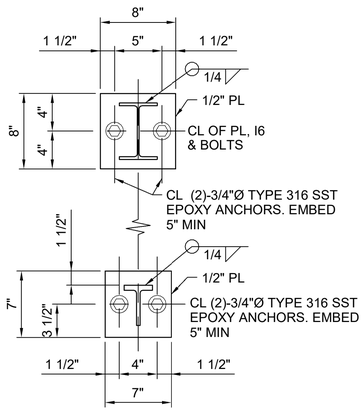



PROVIDE BITUMASTIC COATING AT CONC FACE FOR ALUMINUM MEMBERS

**SR-14A**
NOT TO SCALE




**NOTE:**
ALL BOLTS TO BE 3/4"Ø 316 SST UNO




**SECTION**

**SR-15A**
NOT TO SCALE

**NOTES:**
1. ALL STAIR FRAMING TO BE HOT DIP GALVANIZED STEEL PER SPECIFICATION SECTION 05 05 13, UNO.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD STAIR DETAILS I

| project | contract |
|---|---|
| 98101 | |

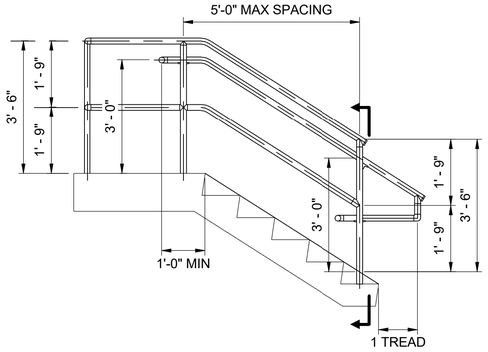
**drawing** **S010 — 0** **rev.**

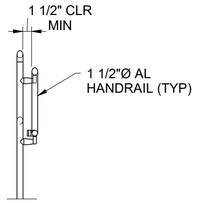
**sheet** 66 **of** 542 **sheets**

**file** 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

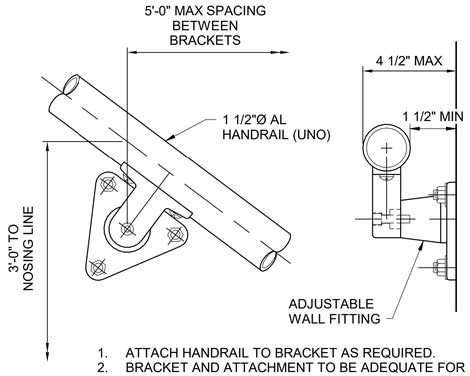
Scale For Microfilming
Millimeters
Inches



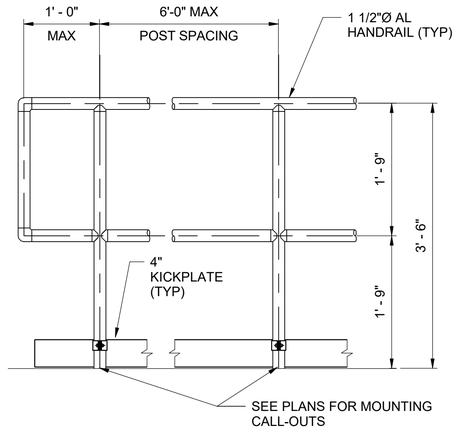

**SECTION**

**HR-2A**
NOT TO SCALE



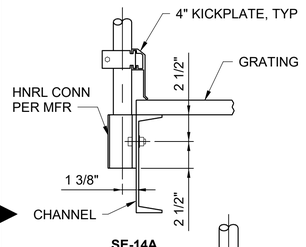

1. ATTACH HANDRAIL TO BRACKET AS REQUIRED.
2. BRACKET AND ATTACHMENT TO BE ADEQUATE FOR AT LEAST 200 POUNDS APPLIED IN ANY DIRECTION.

**HR-6A**
NOT TO SCALE

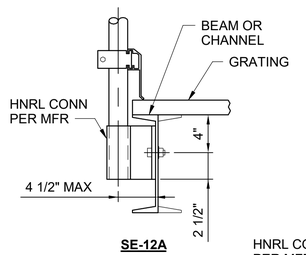



**GR-1A**
NOT TO SCALE

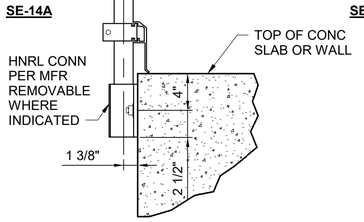
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**SE-14A**

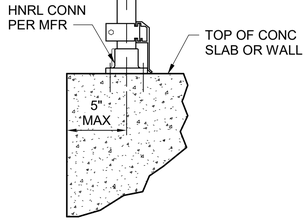



**SE-12A**



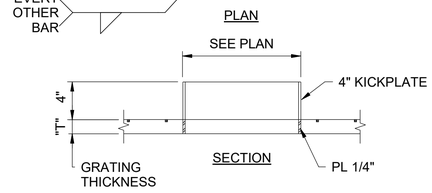

**CE-16A**

ALL ANCHORS ARE 316SST




**CE-18A**

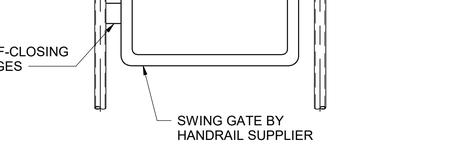
**ALUMINUM GUARDRAIL MOUNTING**
NOT TO SCALE




COVER ALL OPENINGS DURING CONSTRUCTION.

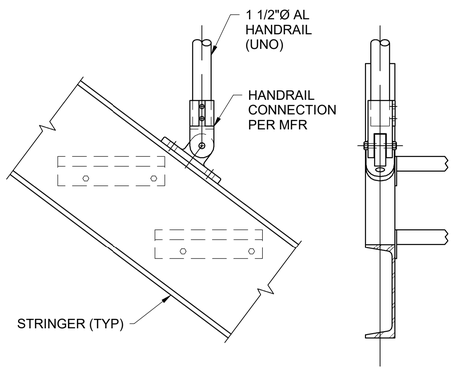
GO-1 WITH KICK PLATE
GO-2 WITHOUT KICK PLATE

**GO-1/GO-2**
NOT TO SCALE



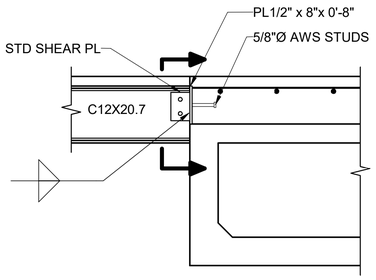

(TYPICAL @ LADDERS)

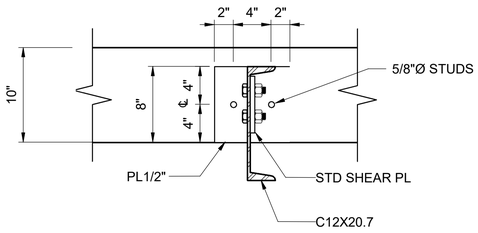
**AL GATE**
NOT TO SCALE




**TOP MOUNTED HANDRAIL TO STAIR**
NOT TO SCALE

FABRICATE EMBED PLATE AND SHEAR PLATE AS ONE PIECE AND HOT DIP GALVANIZE AFTER FABRICATION




**EMBED PLATE CONNECTION**
NOT TO SCALE

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

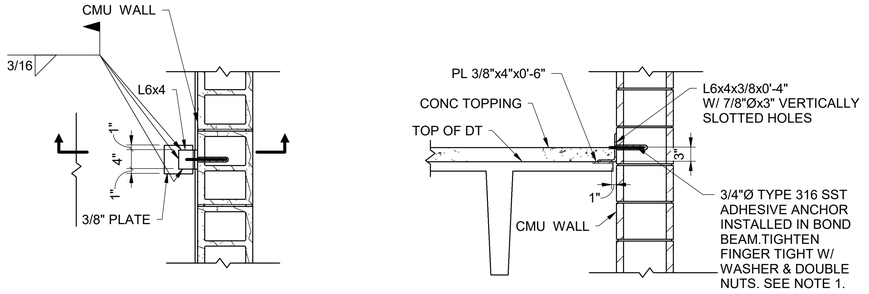
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD STAIR DETAILS II

| | |
|---|---|
| project 98101 | contract |
| drawing **S011** | rev. **0** |
| sheet 67 of 542 sheets | |
| file 98101_S | |

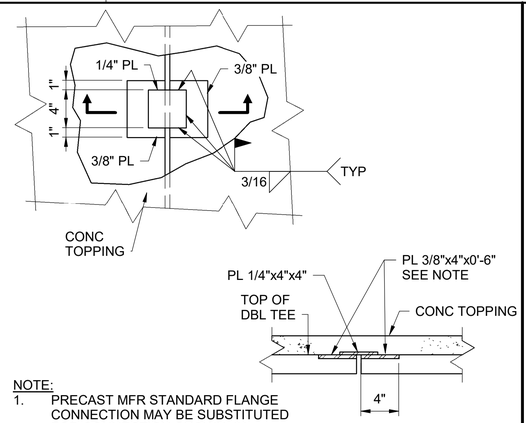
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches



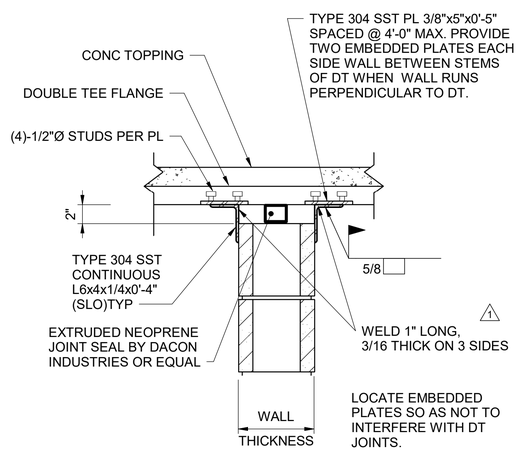

**NOTES:**
1. MINIMUM 6 3/4" ANCHOR EMBEDMENT TO MASONRY WALL.
2. PRECAST MFR TO DESIGN CONNECTION TO DT FLANGE FOR A MINIMUM OF 4000LBS (FACTORED) PERPENDICULAR TO THE PLANE OF THE WALL.

**DT-2**
NOT TO SCALE



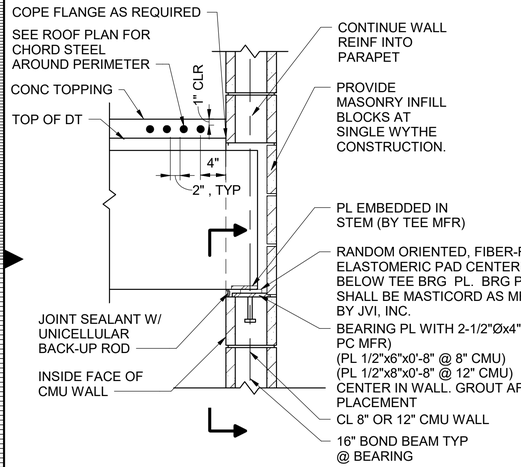

NOTE:
1. PRECAST MFR STANDARD FLANGE CONNECTION MAY BE SUBSTITUTED FOR CONNECTION SHOWN, IN ACCORDANCE WITH SPECIFICATIONS.

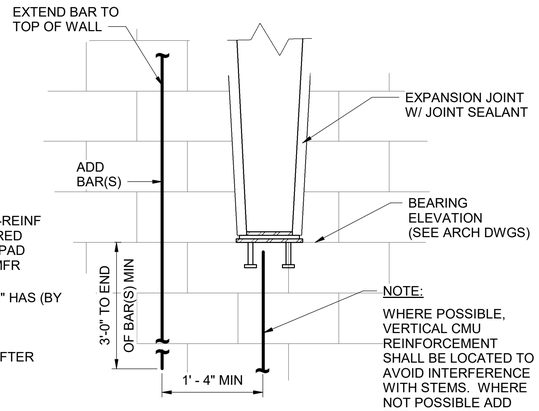
**DT-3**
NOT TO SCALE



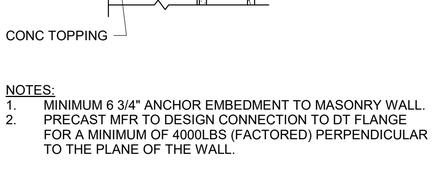

**DT-4**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**DOUBLE TEE CONNECTION**
NOT TO SCALE

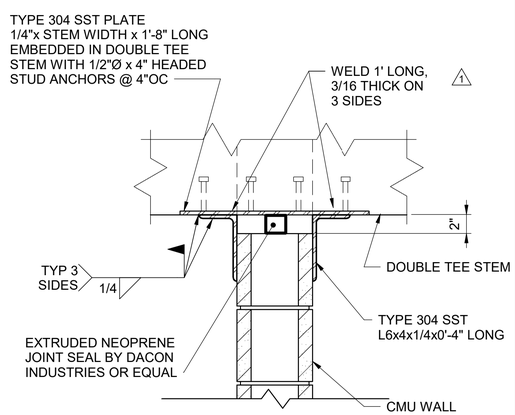




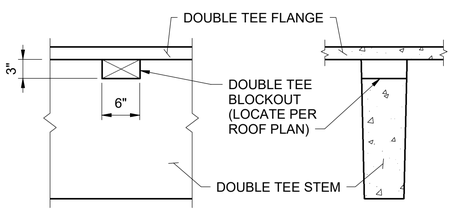


NOTES:
1. MINIMUM 6 3/4" ANCHOR EMBEDMENT TO MASONRY WALL.
2. PRECAST MFR TO DESIGN CONNECTION TO DT FLANGE FOR A MINIMUM OF 4000LBS (FACTORED) PERPENDICULAR TO THE PLANE OF THE WALL.

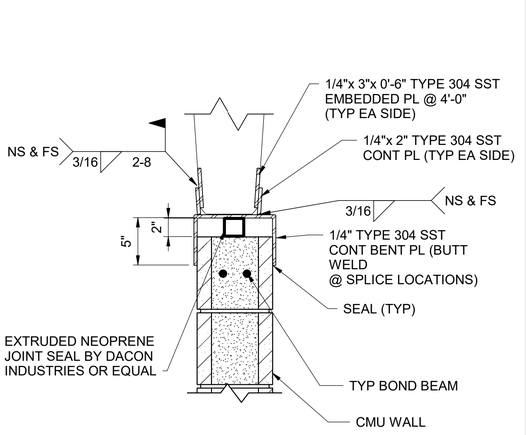
**DT-9**
NOT TO SCALE



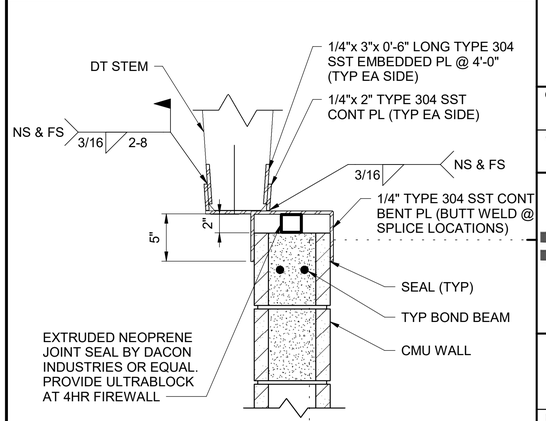

**DT-5**
NOT TO SCALE




**DOUBLE TEE STEM BLOCKOUT DETAIL**
NOT TO SCALE




**DT-10**
NOT TO SCALE




**DT-11**
NOT TO SCALE

BURNS McDONNELL

| | |
|---|---|
| date: APRIL 2021 | detailed: K. THURMAN |
| designed: K. THURMAN | checked: B. SNYDER |

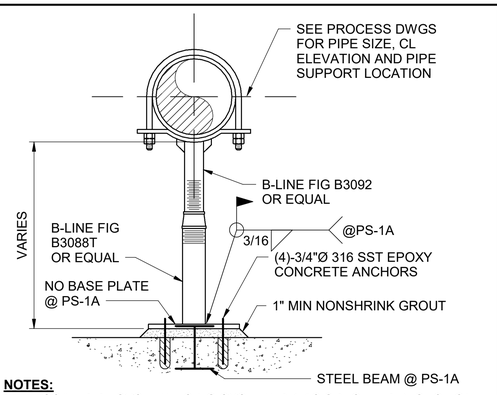
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDARD PRECAST DETAILS

| | |
|---|---|
| project: 98101 | contract: |
| drawing: **S012 — 1** | rev. |
| sheet 68 of 542 sheets | |
| file 98101_S | |

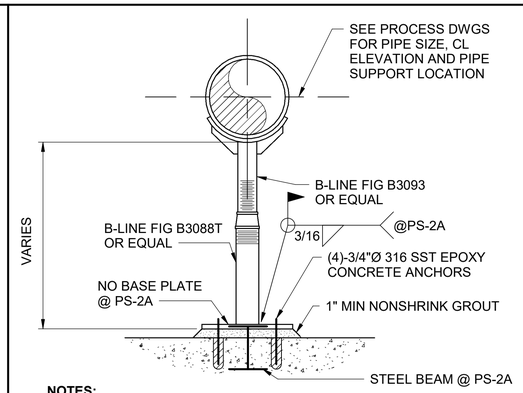
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches



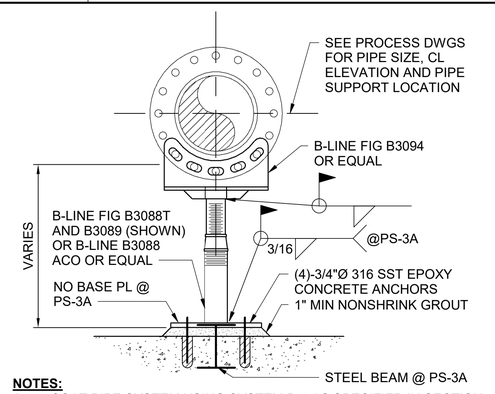

**NOTES:**
1. COAT PIPE SYSTEM USING SYSTEM D-1 AS SPECIFIED IN SECTION 099000.
2. PROVIDE STAINLESS STEEL SYSTEM WHERE PIPE SUPPORT IS CONTINUOUSLY SUBMERGED.

**ADJUSTABLE PIPE & VALVE SUPPORT**
**PS-1/PS-1A**
NOT TO SCALE



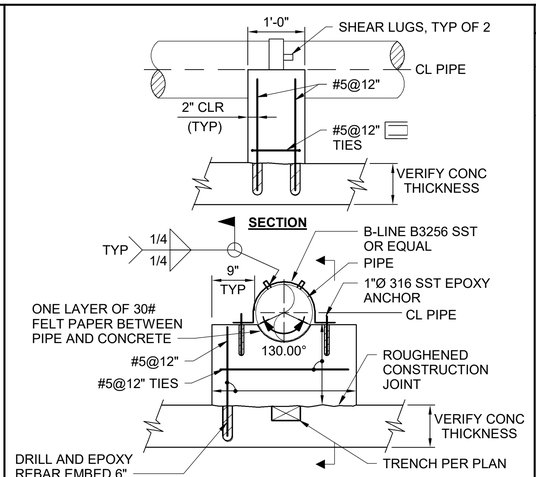

**NOTES:**
1. COAT PIPE SYSTEM USING SYSTEM D-1 AS SPECIFIED IN SECTION 099000.
2. PROVIDE STAINLESS STEEL SYSTEM WHERE PIPE SUPPORT IS CONTINUOUSLY SUBMERGED.

**ADJUSTABLE PIPE & VALVE SUPPORT**
**PS-2/PS-2A**
NOT TO SCALE

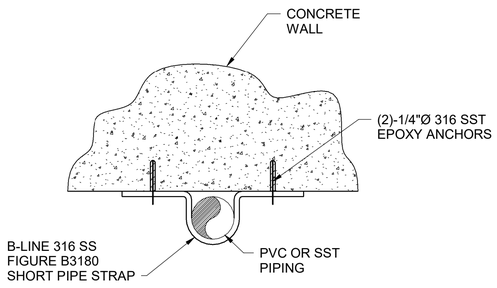



**NOTES:**
1. COAT PIPE SYSTEM USING SYSTEM D-1 AS SPECIFIED IN SECTION 099000.
2. PROVIDE STAINLESS STEEL SYSTEM WHERE PIPE SUPPORT IS CONTINUOUSLY SUBMERGED.

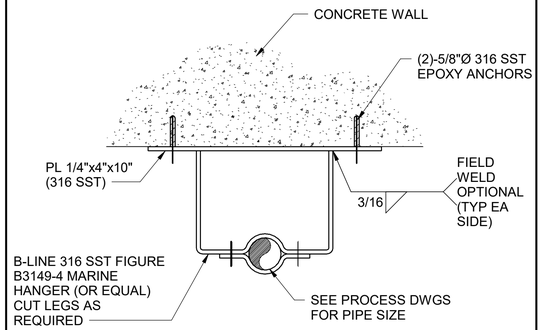
**ADJUSTABLE PIPE & VALVE SUPPORT**
**PS-3/PS-3A**
NOT TO SCALE



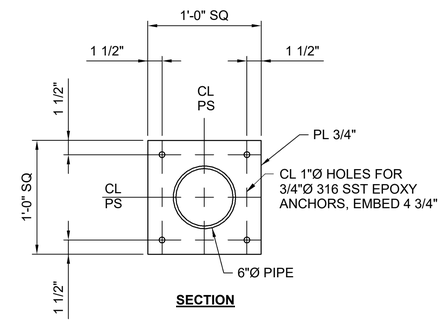

**CONCRETE PIPE SADDLE PS-4**
NOT TO SCALE



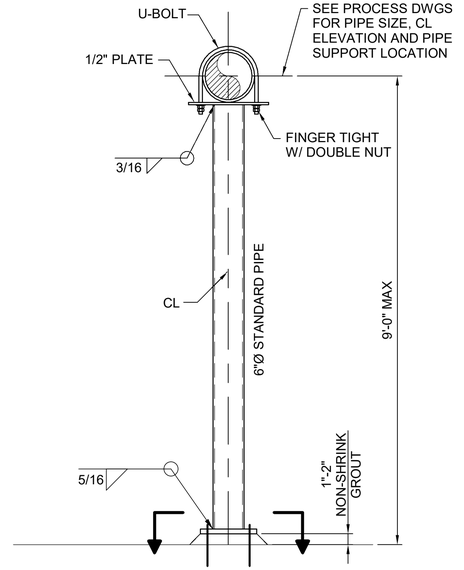

**TYPICAL PIPE SUPPORT PS-5**
NOT TO SCALE




**PIPE SUPPORT DETAIL PS-6**
NOT TO SCALE

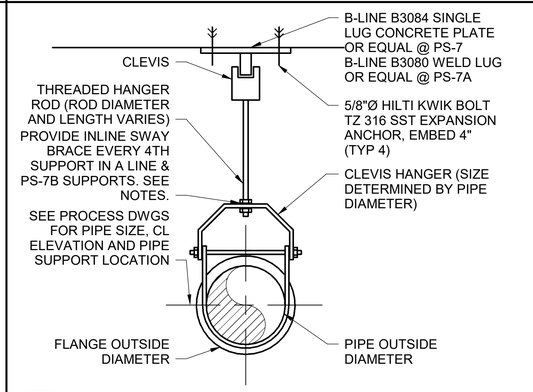



**SECTION**



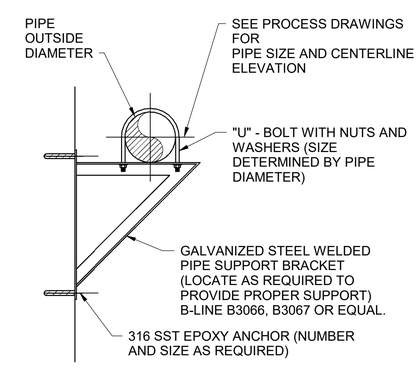

GALVANIZED PER SPECIFICATION SECTION 05 05 13, UNO.

**PIPE SUPPORT DETAIL PS-10**
NOT TO SCALE



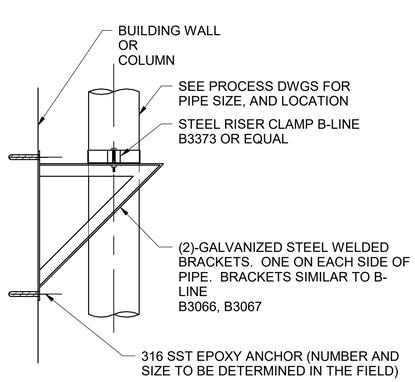

**NOTES:**
1. USE SST WHERE CALLED FOR ON PLANS OTHERWISE SHALL BE GALVANIZED.
2. **PS-7B** PROVIDE SWAY BRACE ASSEMBLY CONSTRUCTED USING B-LINE FIG 981 WITH 12GA CHANNEL BRACE OR EQUAL. ANCHOR TO CONCRETE WITH 5/8"Ø HILTI KWIK BOLT TZ EXPANSIONS ANCHOR EMBEDDED 4"

**PS-7/PS-7A/PS-7B**
NOT TO SCALE



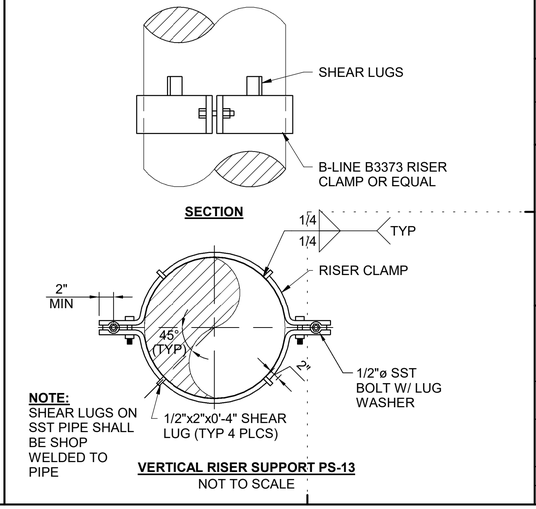

**NOTE:**
1. USE SST WHERE CALLED FOR ON PLANS

**WALL (HORIZONTAL) PIPE SUPPORT DETAIL PS-8**
NOT TO SCALE




**NOTE:**
1. USE SST WHERE CALLED FOR ON PLANS

**WALL (VERTICAL) PIPE SUPPORT DETAIL PS-9**
NOT TO SCALE




**NOTE:**
SHEAR LUGS ON SST PIPE SHALL BE SHOP WELDED TO PIPE

**VERTICAL RISER SUPPORT PS-13**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

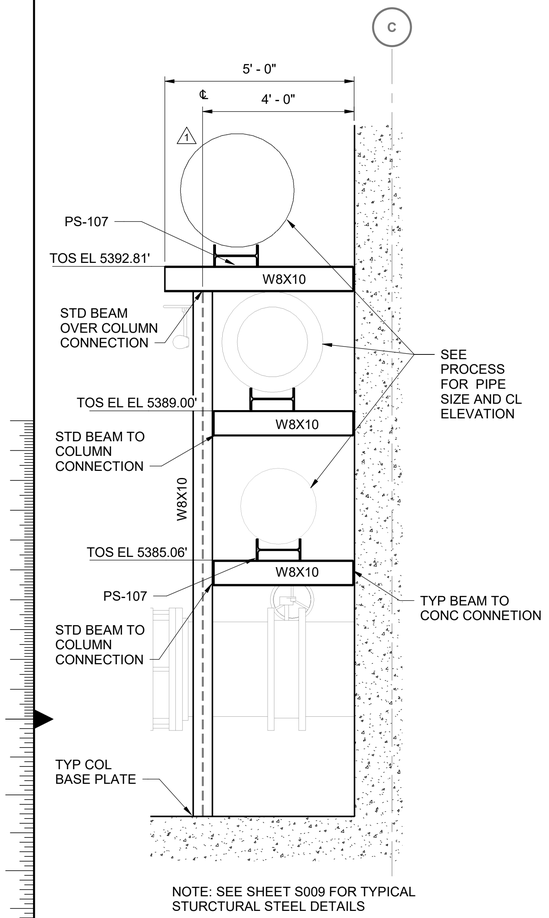
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PIPE SUPPORTS I

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |
| **S013** | **0** |
| sheet 69 of 542 sheets | |
| file 98101_S | |

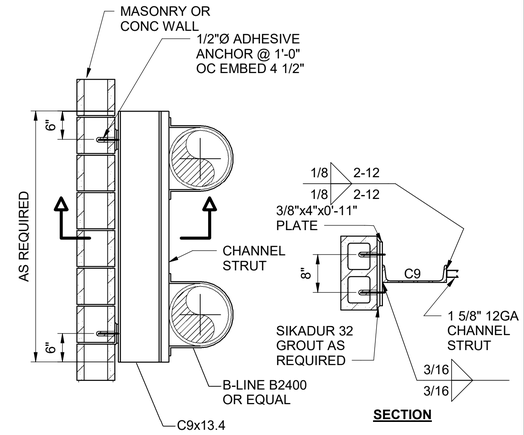
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



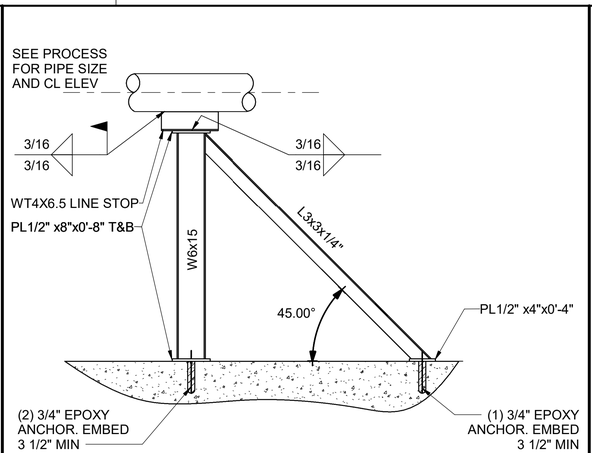

NOTE: SEE SHEET S009 FOR TYPICAL STURCTURAL STEEL DETAILS

**PS-100**
NOT TO SCALE

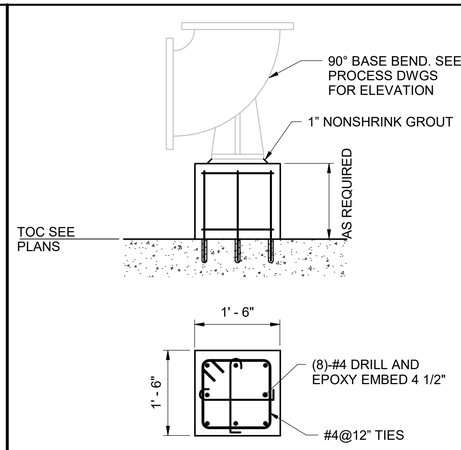



**SECTION**

**PS-101**
NOT TO SCALE

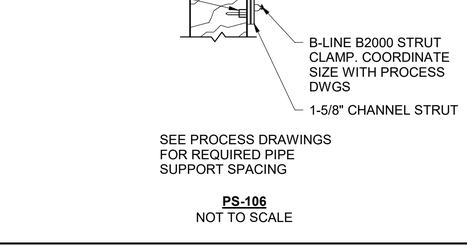



**PS-102**
NOT TO SCALE




**PS-103**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**PS-16**
NOT TO SCALE




**PLAN**




**ELEVATION**

**PS-104**
NOT TO SCALE




**PS-105**
NOT TO SCALE




SEE PROCESS DRAWINGS FOR REQUIRED PIPE SUPPORT SPACING

**PS-106**
NOT TO SCALE




**PS-107**
NOT TO SCALE

**GENERAL PIPE SUPPORT NOTES:**

1. MATERIAL FOR ALL PIPE SUPPORTS SHALL BE GALVANIZED STEEL WITH THE FOLLOWING EXCEPTIONS:
   A. SUBMERGED PIPE SUPPORTS SHALL BE 316 SST.
   B. PIPE SUPPORTS IN THE CHLORINE CONTACT BASIN SHALL BE FRP WITH 316SST ANCHORS.
2. REFER TO THE PROCESS DRAWINGS (DXXX) FOR PIPE SUPPORT LOCATIONS.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PIPE SUPPORTS II

| project | contract |
|---|---|
| 98101 | |

drawing **S014 — 1** rev.

sheet 70 of 542 sheets
file 98101_S

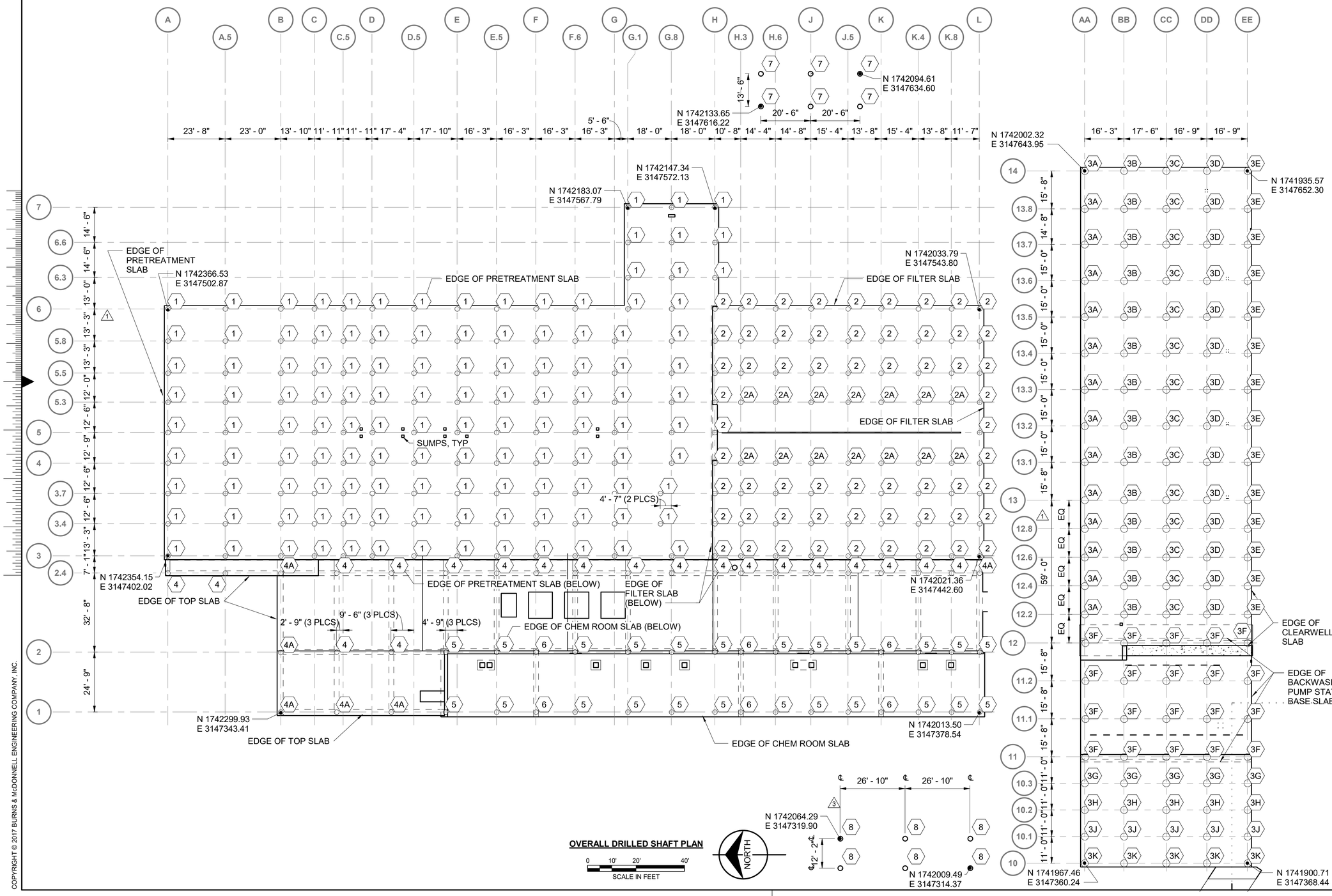
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**DRILLED SHAFT NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. 〈X〉 INDICATES DRILLED SHAFT TYPE. SEE S006 FOR DRILLED SHAFT DETAILS AND SCHEDULE.
3. SEE SPECIFICATION SECTION 03 30 05 FOR VOID FORM REQUIREMENTS.

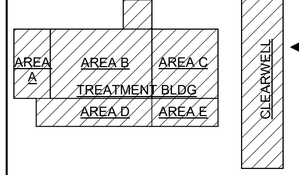
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 4/16/18 | BLS | KDT | REVISED PER RFI #9 |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 3 | 4/1/19 | KDT | BLS | ISSUED FOR PCO 029 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**OVERALL DRILLED SHAFT PLAN**

0 10' 20' 40'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL DRILLED SHAFT PLAN

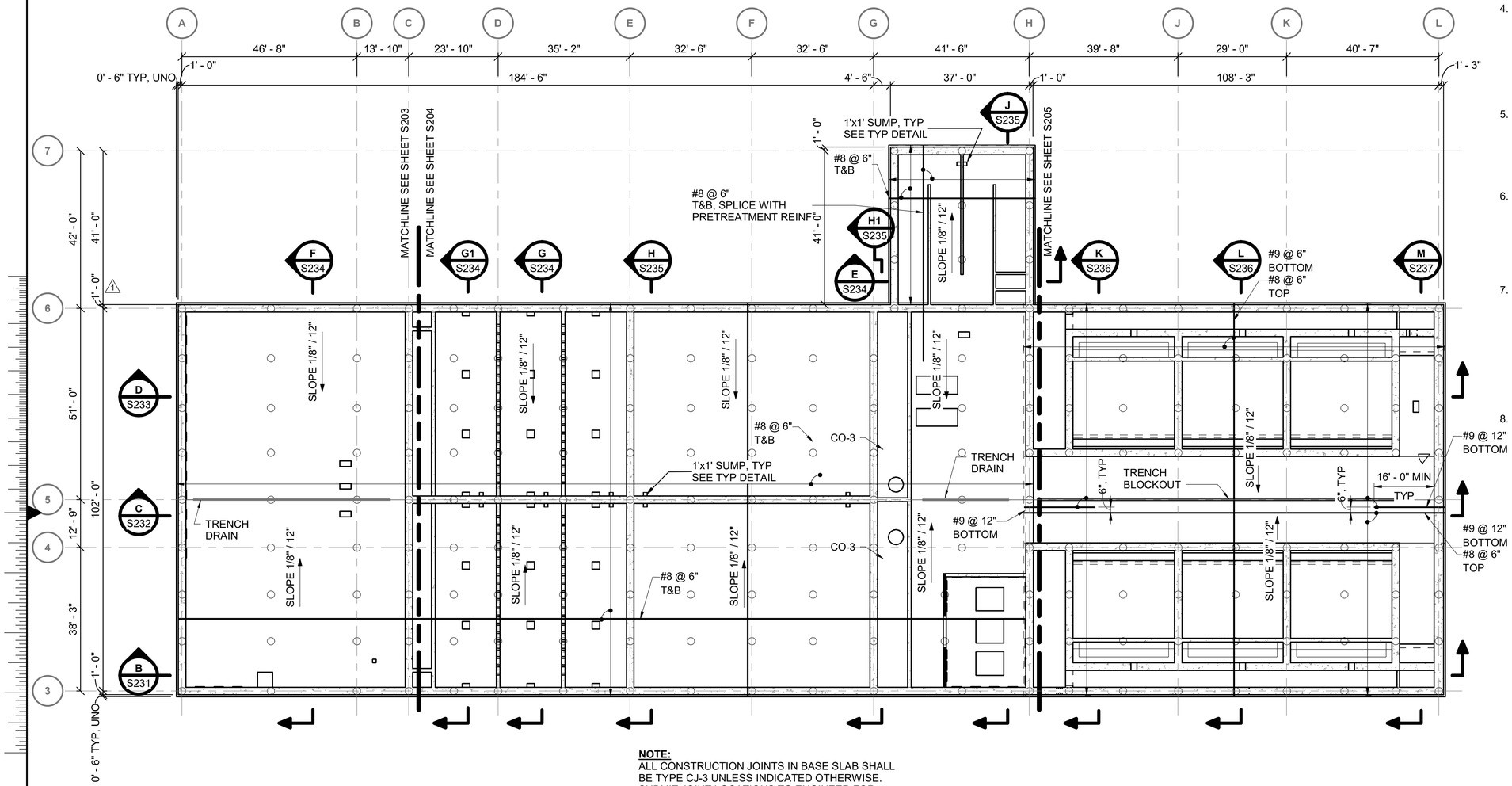
| project | contract |
|---|---|
| 98101 | |

drawing **S200 — 3** rev.

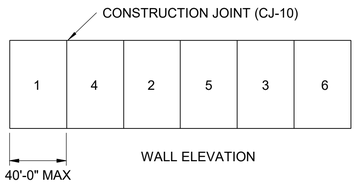
sheet 71 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTE:**
ALL CONSTRUCTION JOINTS IN BASE SLAB SHALL BE TYPE CJ-3 UNLESS INDICATED OTHERWISE. SUBMIT JOINT LOCATIONS TO ENGINEER FOR APPROVAL PRIOR TO PLACING CONCRETE. SEE SPEC SECTION 03 30 00 FOR LIMITATIONS.




**WALL PLACEMENT SEQUENCE DIAGRAM**

**NOTE:**

MAXIMUM LENGTH OF WALL TO BE PLACED IN SINGLE PLACEMENT SHALL BE 40'-0" AND SHALL BE ALTERNATED AS SHOWN IN DIAGRAM ABOVE. ALLOW 14 DAY CURE TIME PRIOR TO PLACING CONCRETE ADJACENT TO PREVIOUSLY PLACED CONCRETE OR CURE TIME APPROVED BY ENGINEER. NUMBER INDICATES PLACEMENT SEQUENCE (EXAMPLE ONLY).

**OVERALL TREATMENT FOUNDATION PLAN**

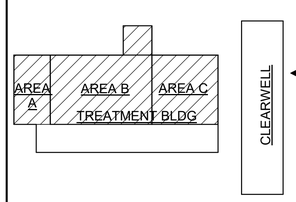
0 8' 16' 32'
SCALE IN FEET

NORTH

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT. PARTIAL BACKFILL IS ACCEPTABLE WITH APPROVAL OF EOR.
5. → INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
7. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCE PER CO-4 DETAIL.
8. EFFLUENT TROUGH SLOPE MAY BE ACHIEVED BY USING 2" MIN THICKNESS FIBER REINFORCED TOPPING SLAB. FIBER REINFORCEMENT SHALL MEET ASTM 1116 TYPE III AND $F_{e3}$ VALUE SHALL BE DETERMINED BY SUPPLIER. SURFACE OF PRIMARY SLAB SHALL BE ROUGHEND TO 1/4" AMPLITUDE. MAXIMUM TOPPING THICKNESS IS 4".

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 4/16/18 | BLS | KDT | REVISED PER RFI #9 |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

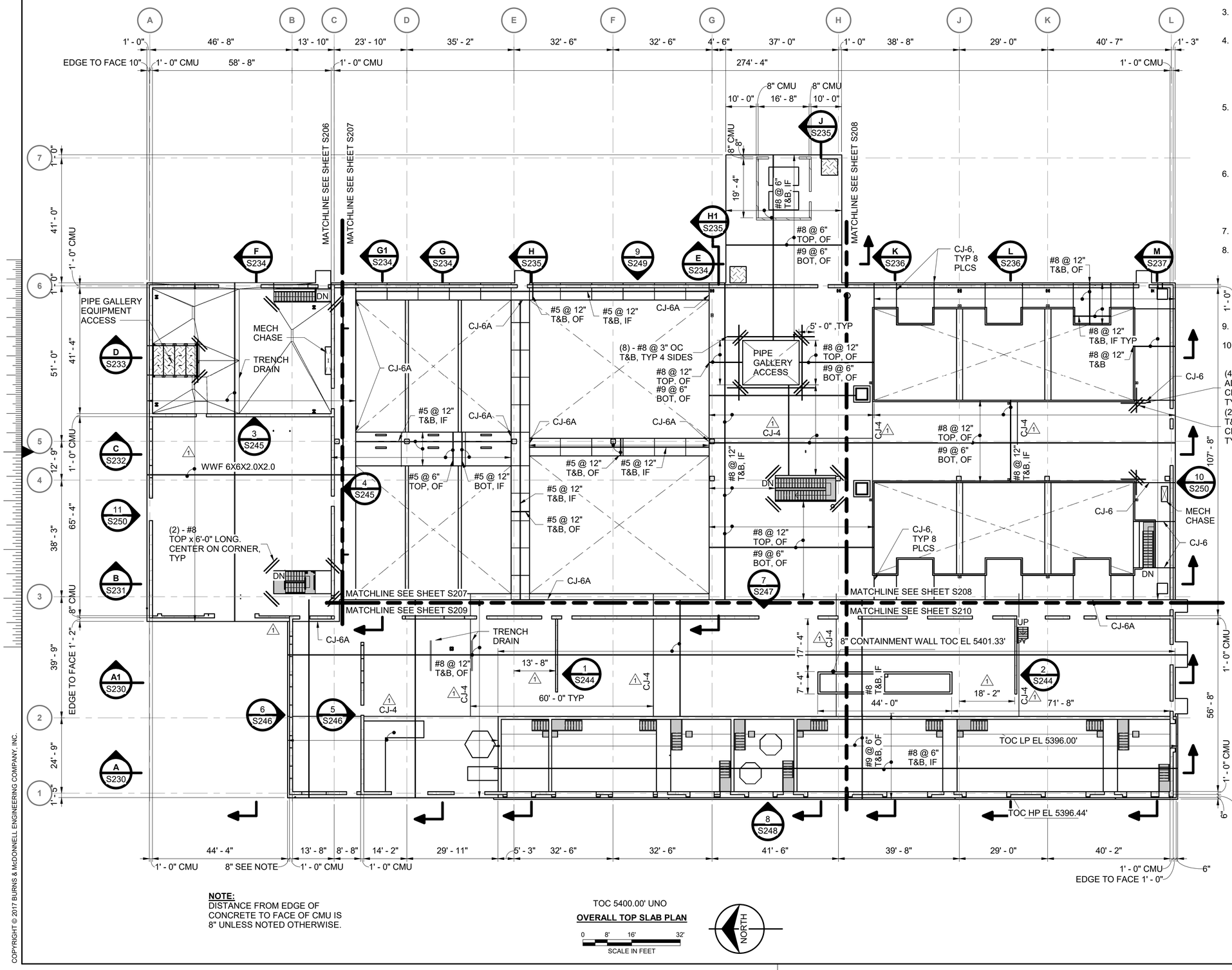
| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL LOWER LEVEL FOUNDATION PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** S201 — 2 | **rev.** |
| **sheet** 72 **of** 542 **sheets** | |
| **file** 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**NOTE:**
DISTANCE FROM EDGE OF CONCRETE TO FACE OF CMU IS 8" UNLESS NOTED OTHERWISE.

TOC 5400.00' UNO

**OVERALL TOP SLAB PLAN**

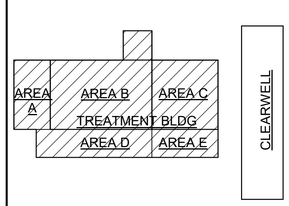
0 8' 16' 32'
SCALE IN FEET

NORTH

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——→ INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL TOP SLAB PLAN

| project | contract |
|---|---|
| 98101 | |

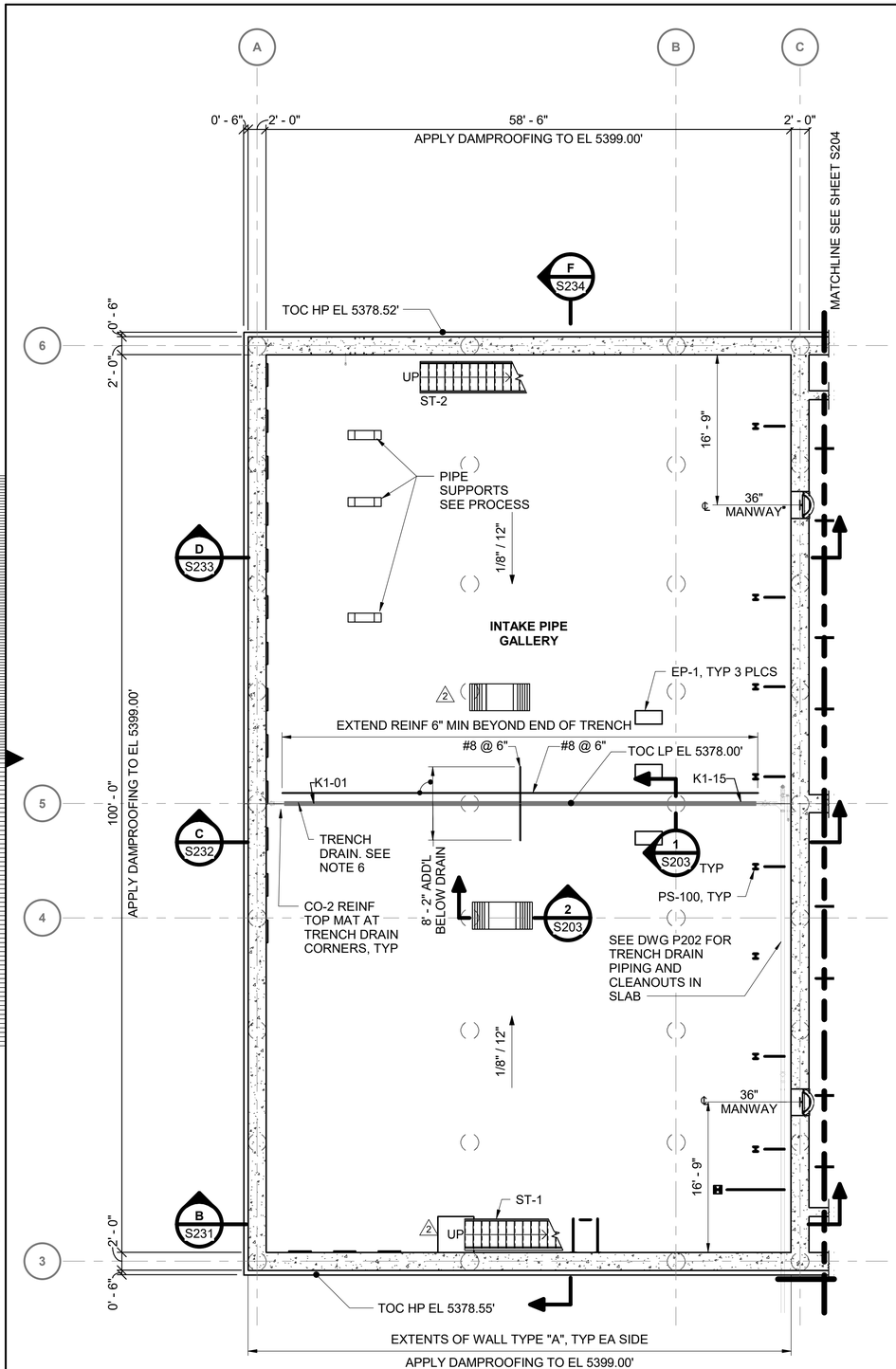
drawing **S202 — 1** rev.

sheet 73 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

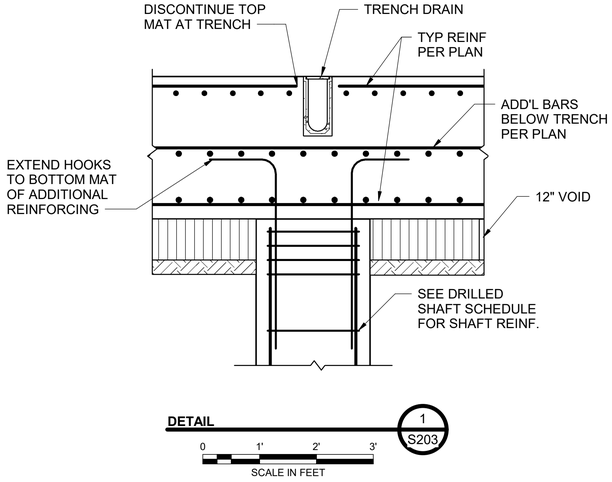



**LOWER LEVEL FOUNDATION PLAN**

0 4' 8' 16'

SCALE IN FEET

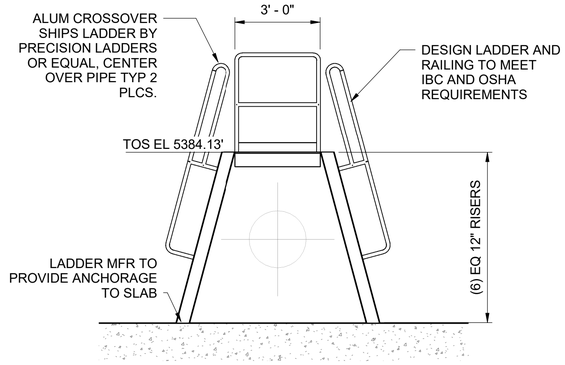
NORTH




**DETAIL** 1 S203

0 1' 2' 3'

SCALE IN FEET




**CROSSOVER SHIPS LADDER** 2 S203

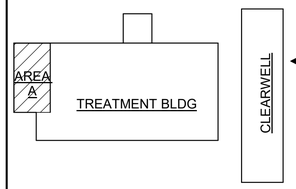
0 2' 4' 6'

SCALE IN FEET

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT. PARTIAL BACKFILL IS ACCEPTABLE WITH APPROVAL OF EOR.
5. ——→ INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
7. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCE PER CO-4 DETAIL.
8. EFFLUENT TROUGH SLOPE MAY BE ACHIEVED BY USING 2" MIN THICKNESS FIBER REINFORCED TOPPING SLAB. FIBER REINFORCEMENT SHALL MEET ASTM 1116 TYPE III AND $F_{e3}$ VALUE SHALL BE DETERMINED BY SUPPLIER. SURFACE OF PRIMARY SLAB SHALL BE ROUGHEND TO 1/4" AMPLITUDE. MAXIMUM TOPPING THICKNESS IS 4".

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL FOUNDATION PLAN AREA A

| project | contract |
|---|---|
| 98101 | |

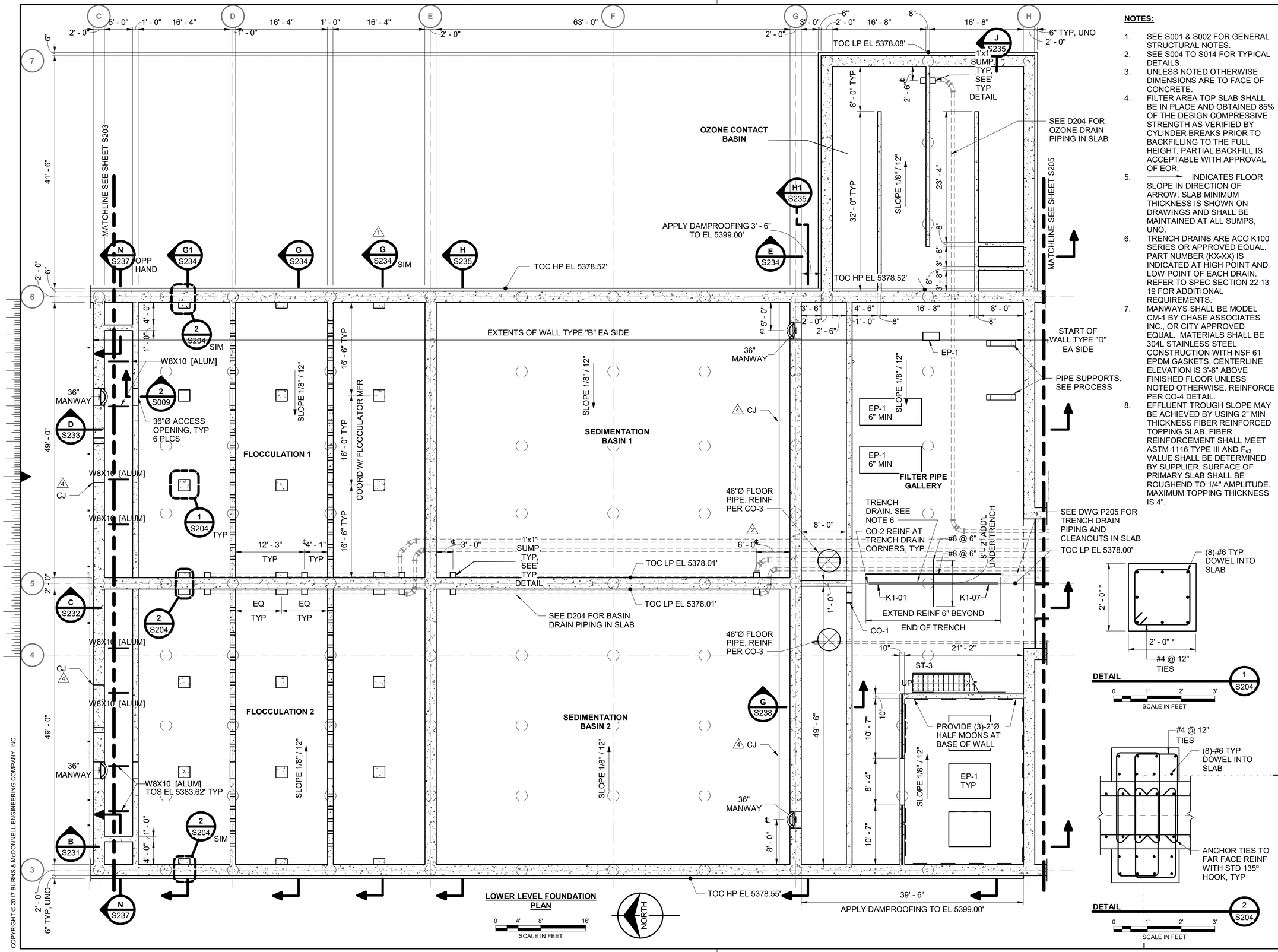
drawing **S203** rev. **2**

sheet 74 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



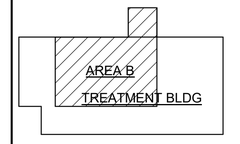

**LOWER LEVEL FOUNDATION PLAN**

0 4' 8' 16'
SCALE IN FEET

NORTH

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT. PARTIAL BACKFILL IS ACCEPTABLE WITH APPROVAL OF EOR.
5. → INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
7. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCE PER CO-4 DETAIL.
8. EFFLUENT TROUGH SLOPE MAY BE ACHIEVED BY USING 2" MIN THICKNESS FIBER REINFORCED TOPPING SLAB. FIBER REINFORCEMENT SHALL MEET ASTM 1116 TYPE III AND $F_{e3}$ VALUE SHALL BE DETERMINED BY SUPPLIER. SURFACE OF PRIMARY SLAB SHALL BE ROUGHEND TO 1/4" AMPLITUDE. MAXIMUM TOPPING THICKNESS IS 4".







**DETAIL** 1 S204

0 1' 2' 3'
SCALE IN FEET




**DETAIL** 2 S204

0 1' 2' 3'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 4/12/18 | KDT | BLS | REVISED PER RFI #10 |
| 2 | 6/14/18 | KDT | BLS | REVISED PER RFI #31 |
| 3 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 4 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

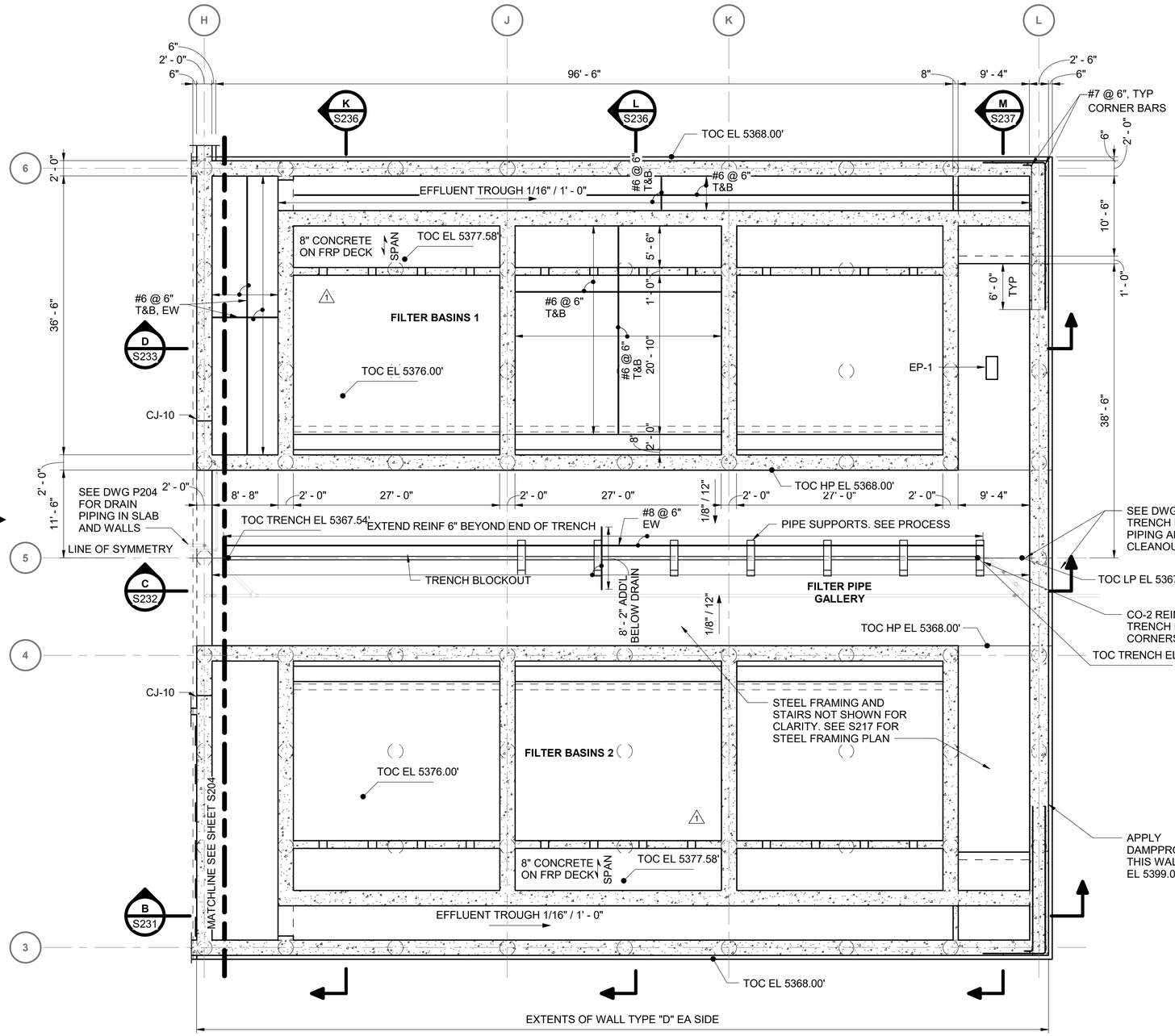
| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL FOUNDATION PLAN AREA B

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. 4 |

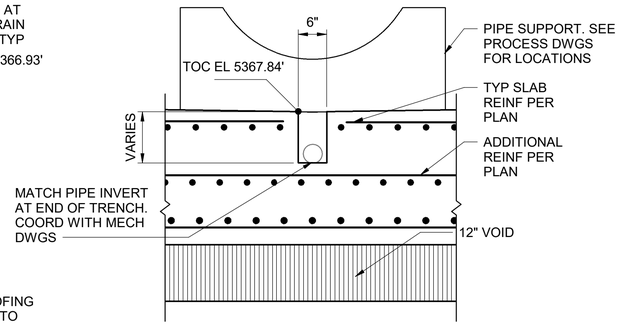
sheet 75 of 542 sheets
file 98101_S




**LOWER LEVEL FOUNDATION PLAN**

0 4' 8' 16'
SCALE IN FEET

NORTH

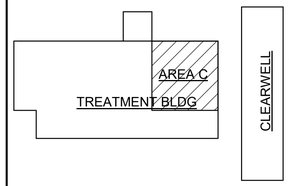



**TYPICAL TRENCH BLOCKOUT**
NOT TO SCALE

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT. PARTIAL BACKFILL IS ACCEPTABLE WITH APPROVAL OF EOR.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
7. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCE PER CO-4 DETAIL.
8. EFFLUENT TROUGH SLOPE MAY BE ACHIEVED BY USING 2" MIN THICKNESS FIBER REINFORCED TOPPING SLAB. FIBER REINFORCEMENT SHALL MEET ASTM 1116 TYPE III AND $F_{e3}$ VALUE SHALL BE DETERMINED BY SUPPLIER. SURFACE OF PRIMARY SLAB SHALL BE ROUGHEND TO 1/4" AMPLITUDE. MAXIMUM TOPPING THICKNESS IS 4".

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 11/13/18 | KDT | BLS | REVISED PER CDPHE COMMENTS |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL FOUNDATION PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

drawing **S205** rev. **2**

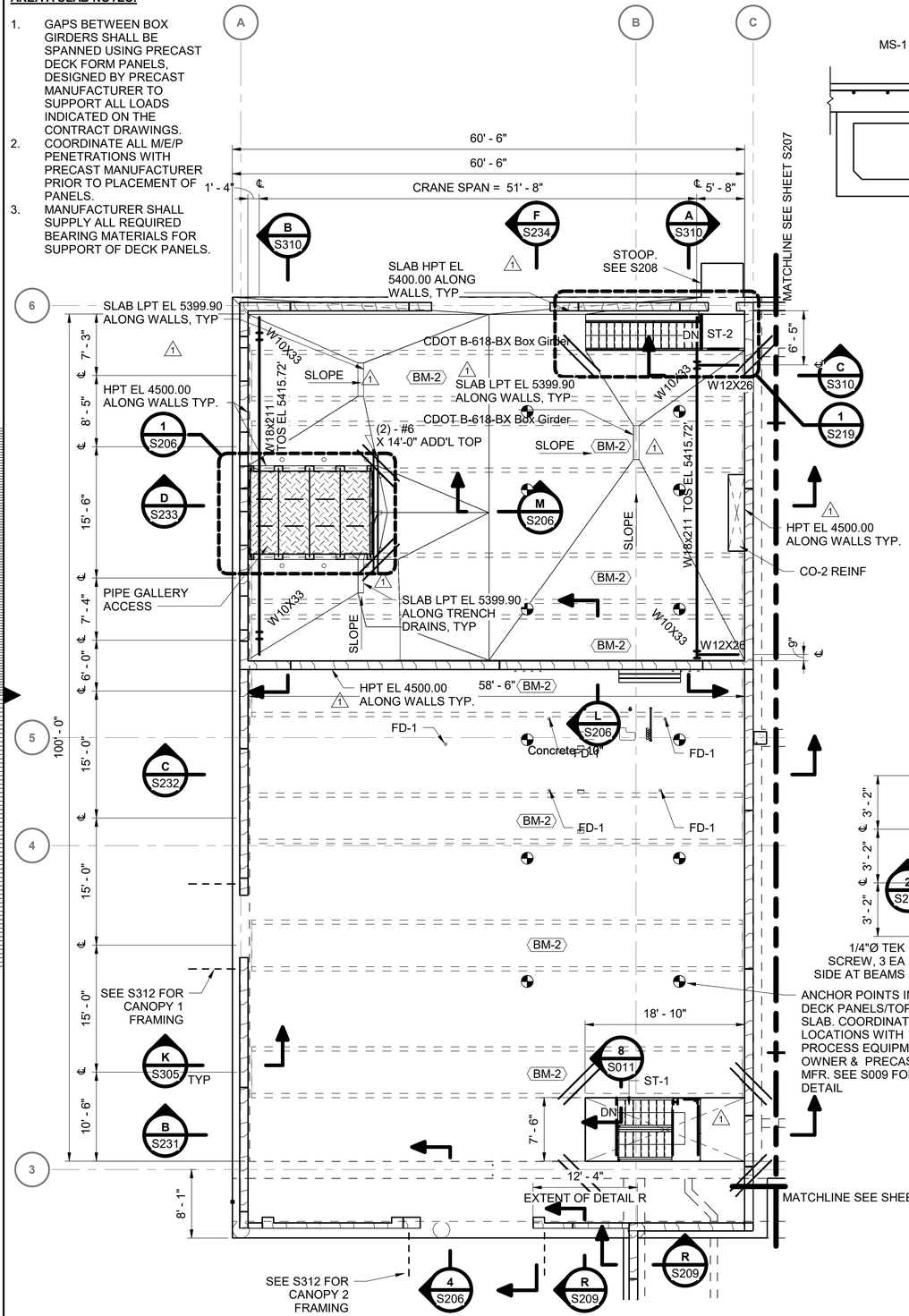
sheet 76 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**AREA A SLAB NOTES:**

1. GAPS BETWEEN BOX GIRDERS SHALL BE SPANNED USING PRECAST DECK FORM PANELS, DESIGNED BY PRECAST MANUFACTURER TO SUPPORT ALL LOADS INDICATED ON THE CONTRACT DRAWINGS.
2. COORDINATE ALL M/E/P PENETRATIONS WITH PRECAST MANUFACTURER PRIOR TO PLACEMENT OF PANELS.
3. MANUFACTURER SHALL SUPPLY ALL REQUIRED BEARING MATERIALS FOR SUPPORT OF DECK PANELS.

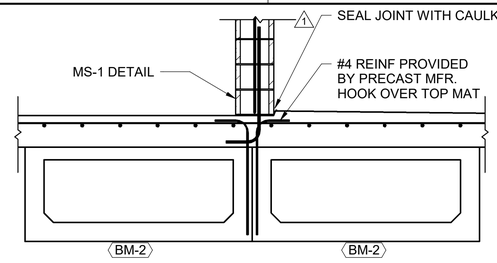



**UPPER LEVEL TOP SLAB PLAN**

0 4' 8' 16'

SCALE IN FEET

NORTH

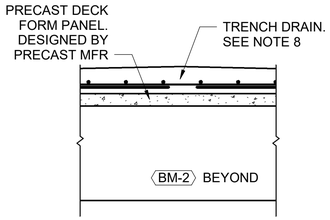



SEE S305 FOR DETAIL

**SECTION** L S206

0 1' 2' 3'

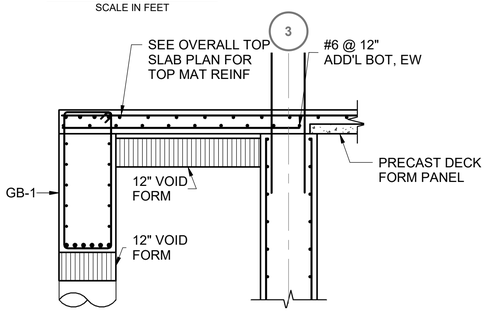
SCALE IN FEET




**SECTION** M S206

0 1' 2' 4'

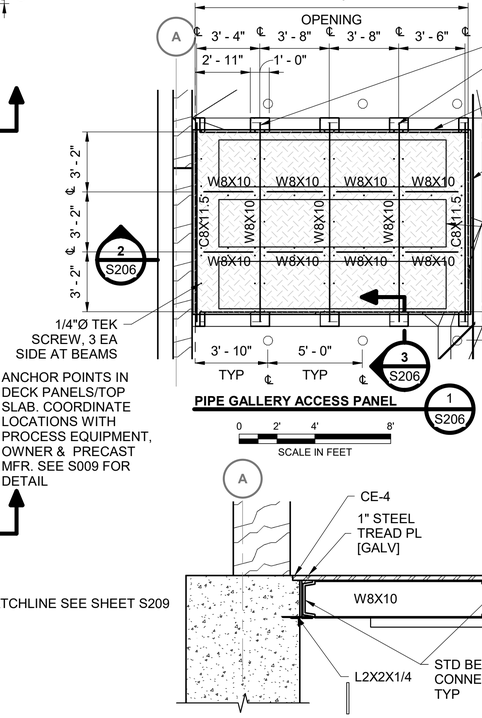
SCALE IN FEET




**ENTRY SLAB SECTION** 4 S206

0 2' 4' 6'

SCALE IN FEET




**PIPE GALLERY ACCESS PANEL** 1 S206

0 2' 4' 8'

SCALE IN FEET

NORTH



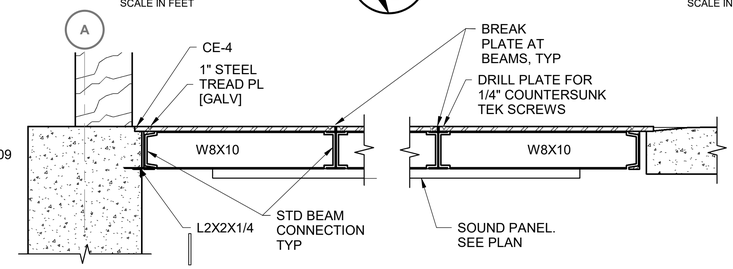

**DETAIL** 3 S206

0 1' 2' 3'

SCALE IN FEET

POST INSTALLED ANCHORS NOT PERMITTED IN HATCHED AREA, TYP ALL BEAMS. POST INSTALLED LIFTING ANCHORS ARE PERMITTED IN SIDES OF BEAMS ABOVE HATCHED AREA.

ANCHOR POINTS IN DECK PANELS/TOP SLAB. COORDINATE LOCATIONS WITH PROCESS EQUIPMENT, OWNER & PRECAST MFR. SEE S009 FOR DETAIL




**NOTE:**
ALL STEEL TO BE HOT DIP GALVANIZED PER SPECIFICATION 05 05 13. COLD GALVANIZE FIELD WELDS

**DETAIL** 2 S206

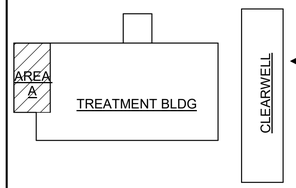
0 1' 2' 3'

SCALE IN FEET

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

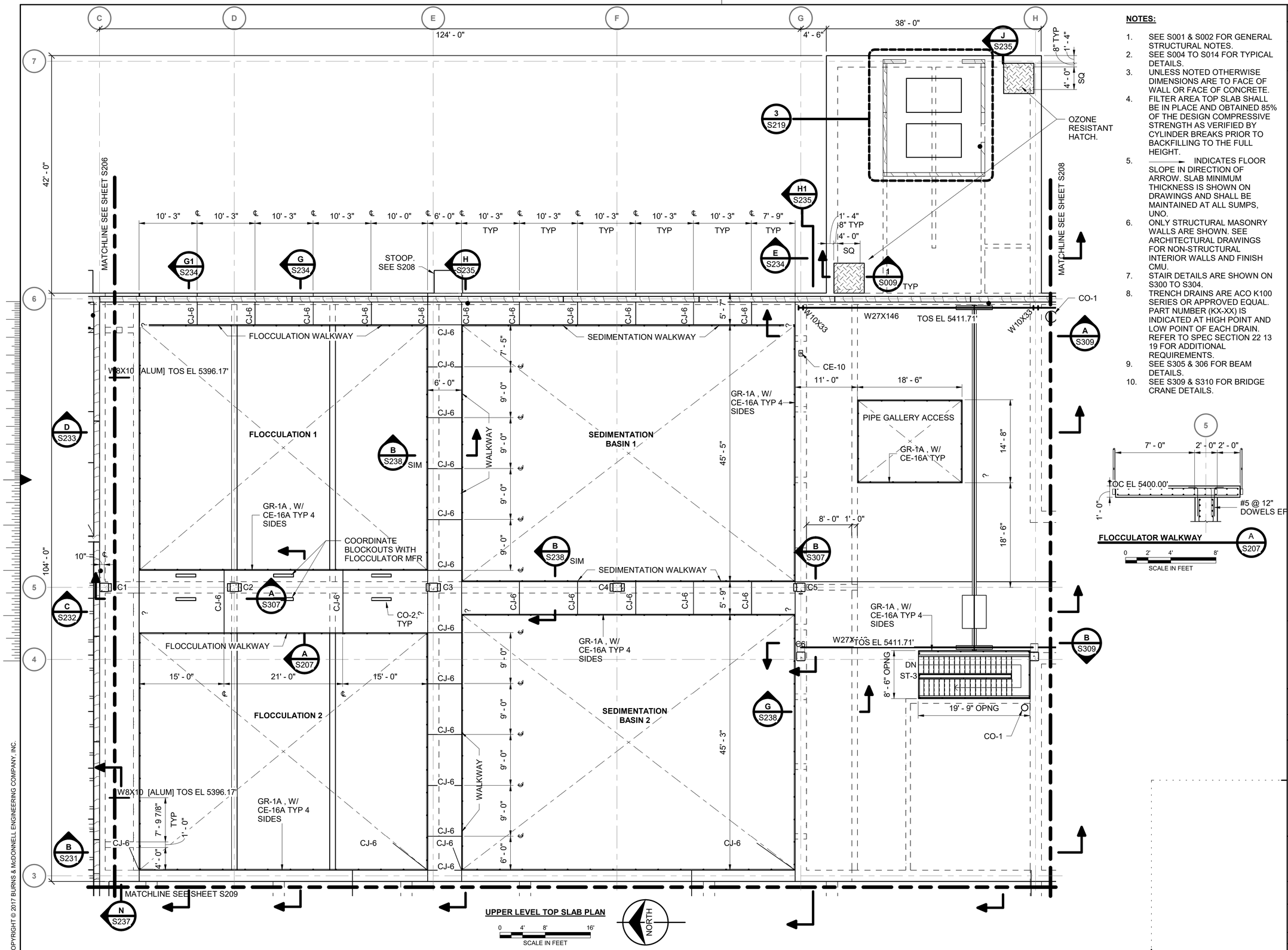
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL TOP SLAB PLAN AREA A

| | |
|---|---|
| project 98101 | contract |
| drawing **S206** | rev. **1** |
| sheet 77 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

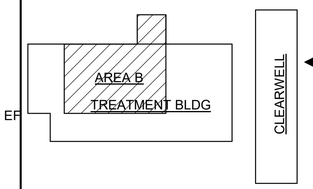
Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL TOP SLAB PLAN AREA B

| project | contract |
|---|---|
| 98101 | |

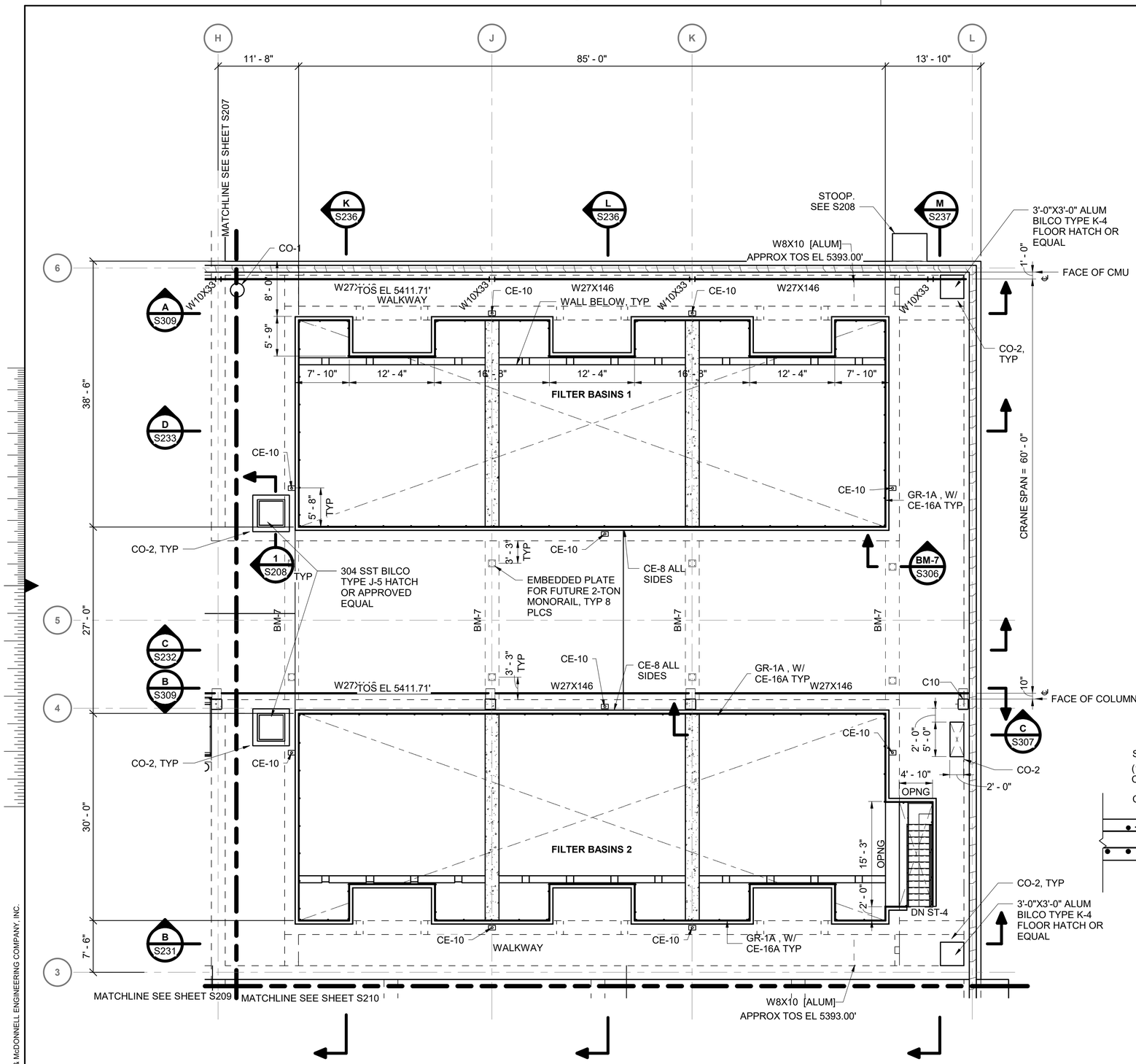
drawing **S207** rev. **0**

sheet 78 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



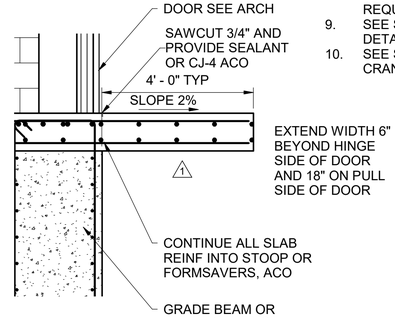

**UPPER LEVEL TOP SLAB PLAN**

0 4' 8' 16'
SCALE IN FEET

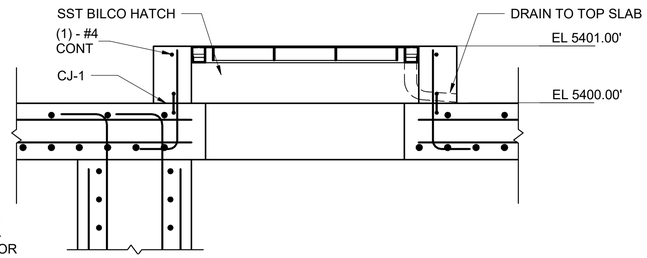
NORTH

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.



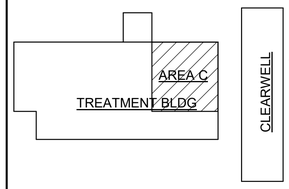

**STOOP DETAIL**
NOT TO SCALE




**FILTER HATCH** 1 S208

0 1' 2' 3'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL TOP SLAB PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

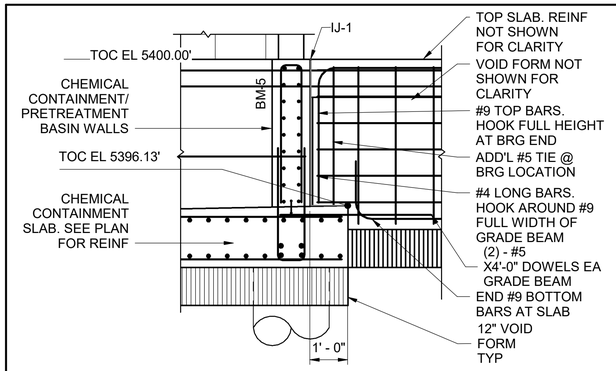
drawing **S208** rev. **1**

sheet 79 of 542 sheets

file 98101_S

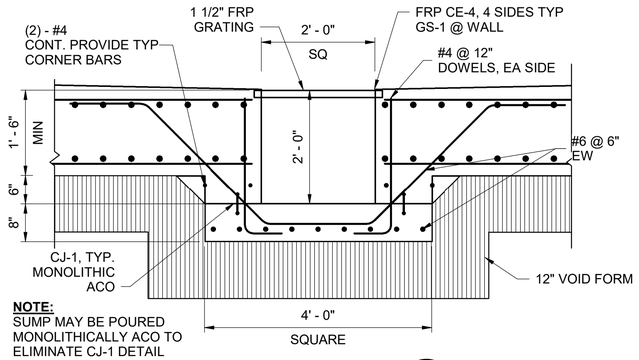
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**TYP GRADE BEAM TO WALL JOINT** N S209

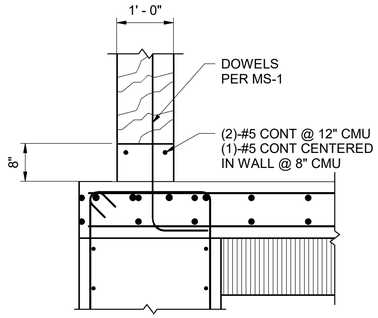
SCALE IN FEET 0 1' 2' 4'




**NOTE:**
SUMP MAY BE POURED MONOLITHICALLY ACO TO ELIMINATE CJ-1 DETAIL

**2'X2' SUMP DETAIL** P S209

SCALE IN FEET 0 1' 2' 3'



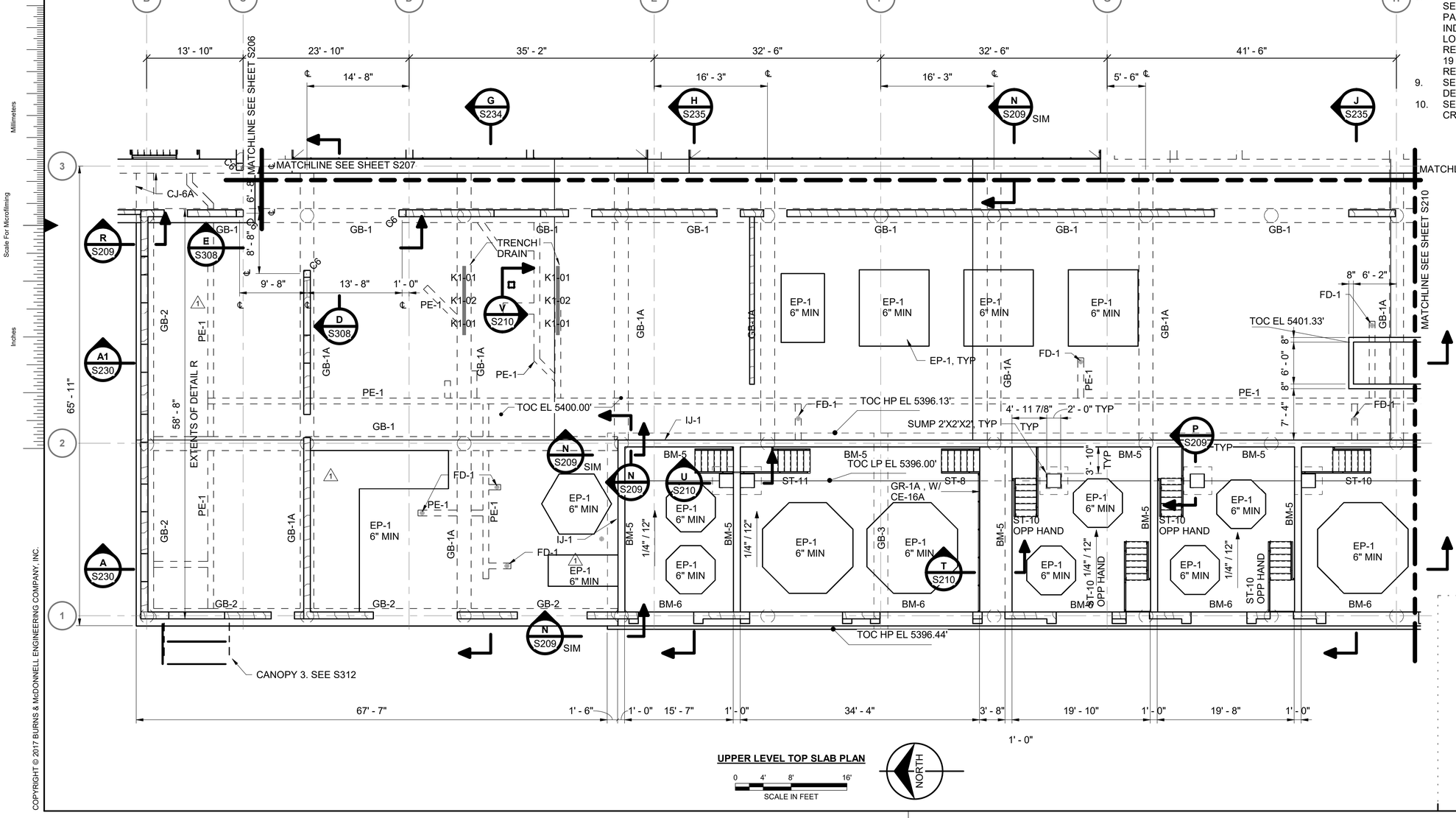

**CONCRETE CURB DETAIL** R S206

SCALE IN FEET 0 1' 2' 3'

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.

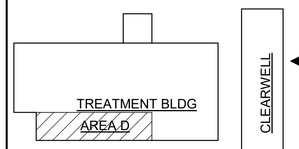
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL TOP SLAB PLAN**

SCALE IN FEET 0 4' 8' 16'

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL TOP SLAB PLAN AREA D

| project | contract |
|---|---|
| 98101 | |

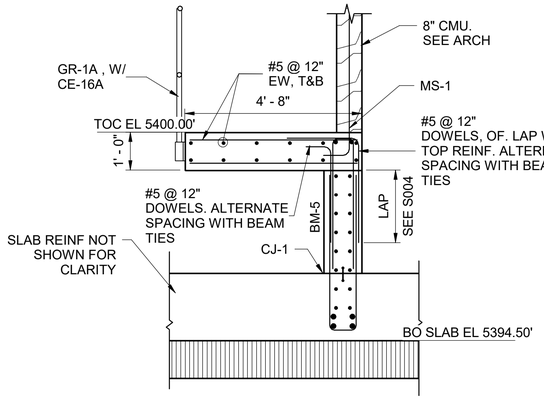
drawing **S209 — 1** rev.

sheet 80 of 542 sheets

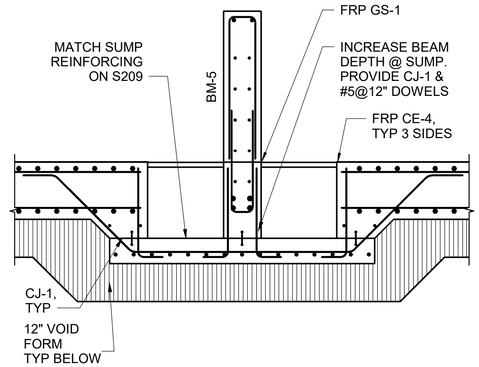
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**CHEM WALKWAY SECTION** — T / S209

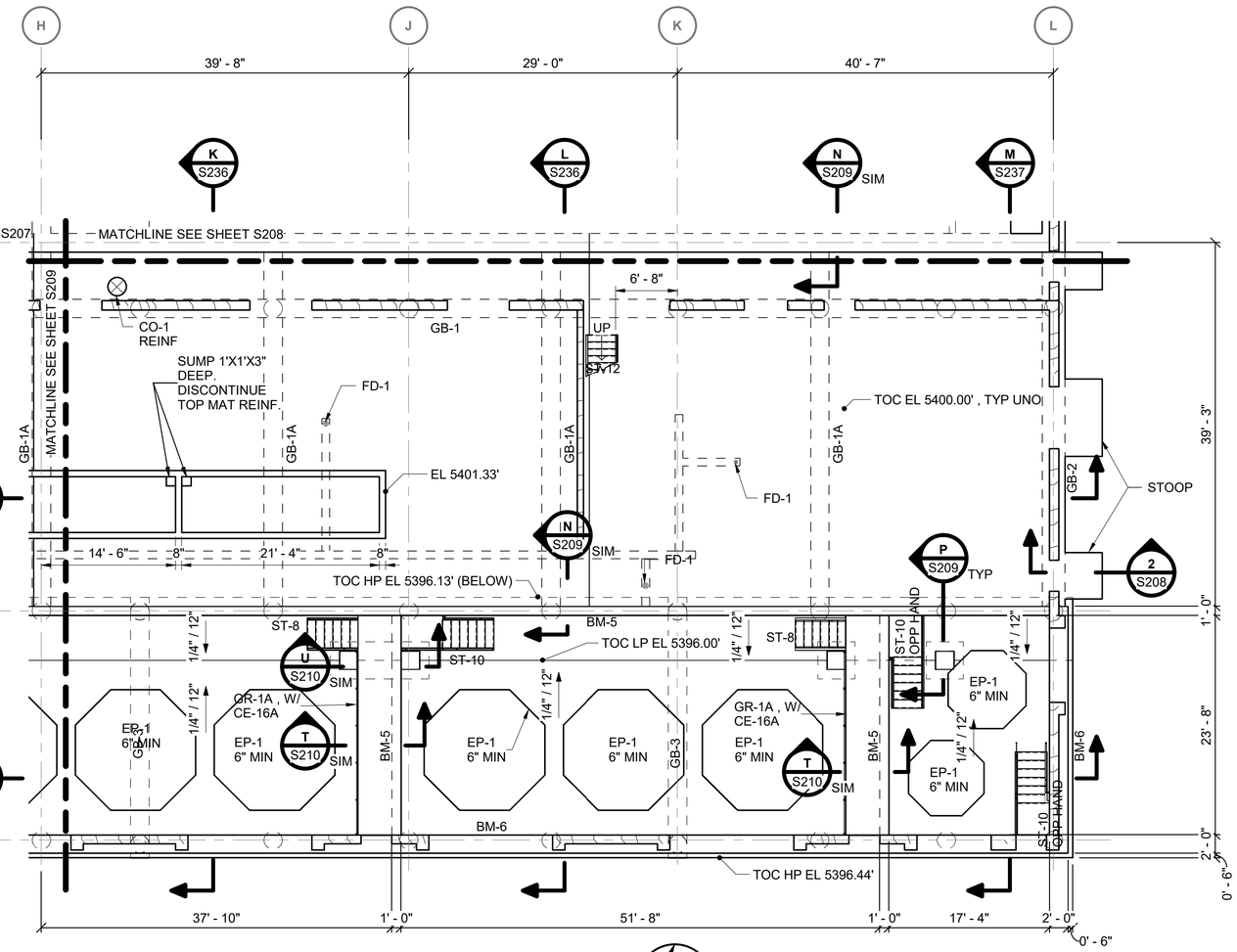



**BM-5 @ SUMP** — U / S209

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——→ INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.

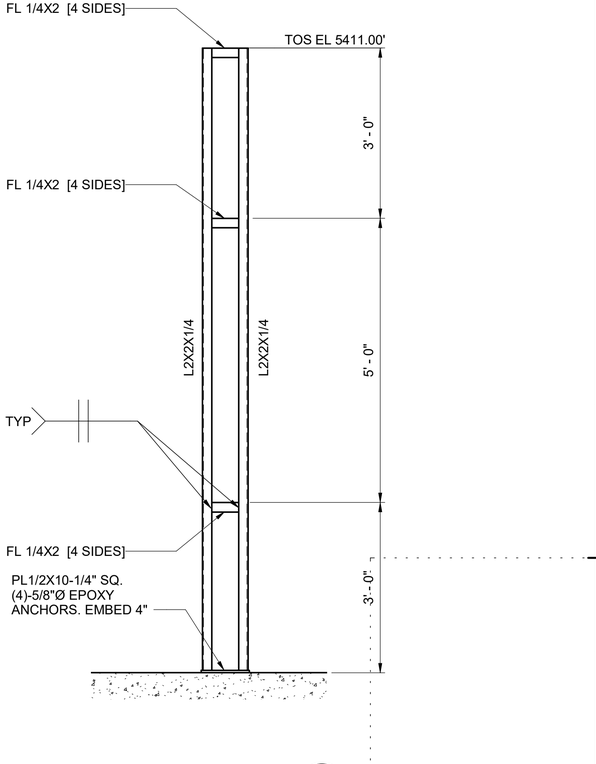
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 11/11/19 | KDT | AEH | REVISED PER RFI #149 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL TOP SLAB PLAN**

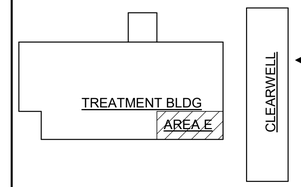
0 4' 8' 16'
SCALE IN FEET

NORTH




⚠1 **LAB PLUMBING CHASE FRAME** — V / S209

0 1' 2' 3'
SCALE IN FEET




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL TOP SLAB PLAN AREA E

| project | contract |
|---|---|
| 98101 | |

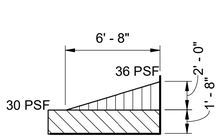
drawing **S210** rev. **1**

sheet 81 of 542 sheets

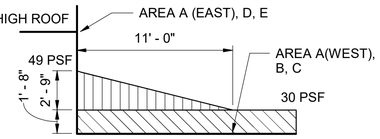
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

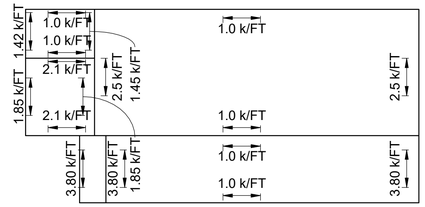



DRIFT @ PARAPETS



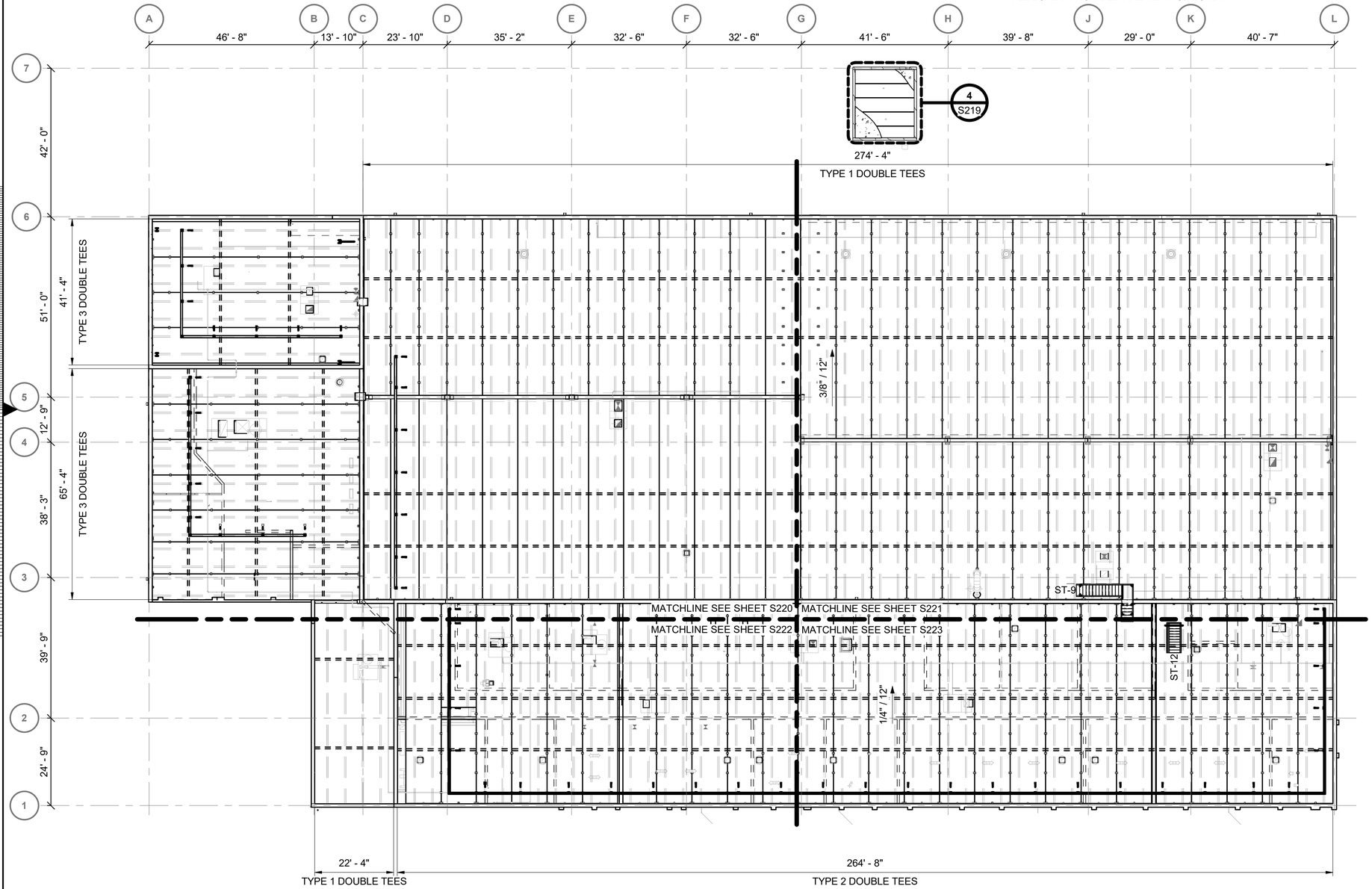

DRIFT @ LOW ROOFS

**SNOW DRIFT DIAGRAM**
NOT TO SCALE




**DIAPRAGM SHEAR DIAGRAM**
ALL LOADS PROVIDED ARE SERVICE LOADS

**NOTE:**
DESIGN DIAPHRAGM AND CONNECTIONS FOR LOADS SHOWN (UNIFORMLY DISTRIBUTED OVER ROOF AREA) AND FOR REVERSAL OF SEISMIC LOAD DIRECTION. (ALLOWABLE STRESS DESIGN LOADS PROVIDED)



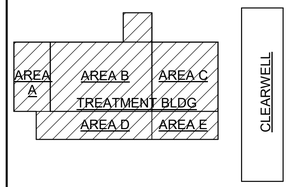

**OVERALL ROOF PLAN**
0 8' 16' 32'
SCALE IN FEET

NORTH

**NOTES FOR PRECAST/PRESTRESSED ROOF MEMBERS:**

1. SEE S012 FOR TYPICAL PRECAST DETAILS.
2. SEE S307 AND S308 FOR PRECAST COLUMN AND BEAM DETAILS.
3. SEE ARCH DWGS AND MASONRY ELEVATIONS FOR DT BEARING ELEVATIONS.
4. DESIGN LOADS:
   A. SUPERIMPOSED DEAD LOAD = 50.0 PSF (INCLUDES 5 PSF FOR MECH/ELEC LOADS, 5 PSF ROOFING, 2.0 PSF MISCELLANEOUS AND 38 PSF FOR TOPPING WEIGHT.)
      a. ADD 10 PSF TO TYPE 1 DOUBLE TEES FOR SOLAR PANELS.
   B. SUPERIMPOSED ROOF SNOW LOAD = 26 PSF, DRIFT LOADS PER ASCE 7-10. SEE DIAGRAMS THIS SHEET.
   C. SEE DIAPHRAGM LOAD DIAGRAM THIS DWG.
5. MECHANICAL SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TO THE PRECAST CONCRETE MANUFACTURER THE MAGNITUDES AND LOCATIONS OF ALL LOADS RESULTING FROM THE ATTACHMENT OF EQUIPMENT TO THE PRECAST/PRESTRESSED ROOF MEMBERS WHERE THE EQUIPMENT WEIGHS IN EXCESS OF 12 PSF ON THE HORIZONTAL PROJECTED AREA OF THE EQUIPMENT.
6. SEE ARCHITECTURAL, MECHANICAL, PROCESS AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR PENETRATIONS NOT SHOWN.
7. NO HAND OR EXPLOSIVE-DRIVEN INSERTS, PINS, ANCHORS, OR DRIVE-INS OF ANY KIND SHALL BE USED FOR ATTACHMENT OF PIPING, CONDUITS, HANGERS, OR SIMILAR ITEMS TO THE STEMS OF THE DOUBLE TEE MEMBERS UNLESS OTHERWISE INDICATED. ALL FIELD CUT OR DRILLED OPENINGS SHALL BE APPROVED BY THE PRECAST CONCRETE MANUFACTURER AS TO SIZE AND LOCATION PRIOR TO CUTTING AND DRILLING.
8. PRECAST MANUFACTURER TO OPTIMIZE DOUBLE TEE LAYOUT BASED ON PROVIDED OPENINGS AND INTERSECTING WALLS. PROVIDE DT-4, DT-5, DT-10 AND DT-11 CONNECTIONS AS REQUIRED AT CMU WALLS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

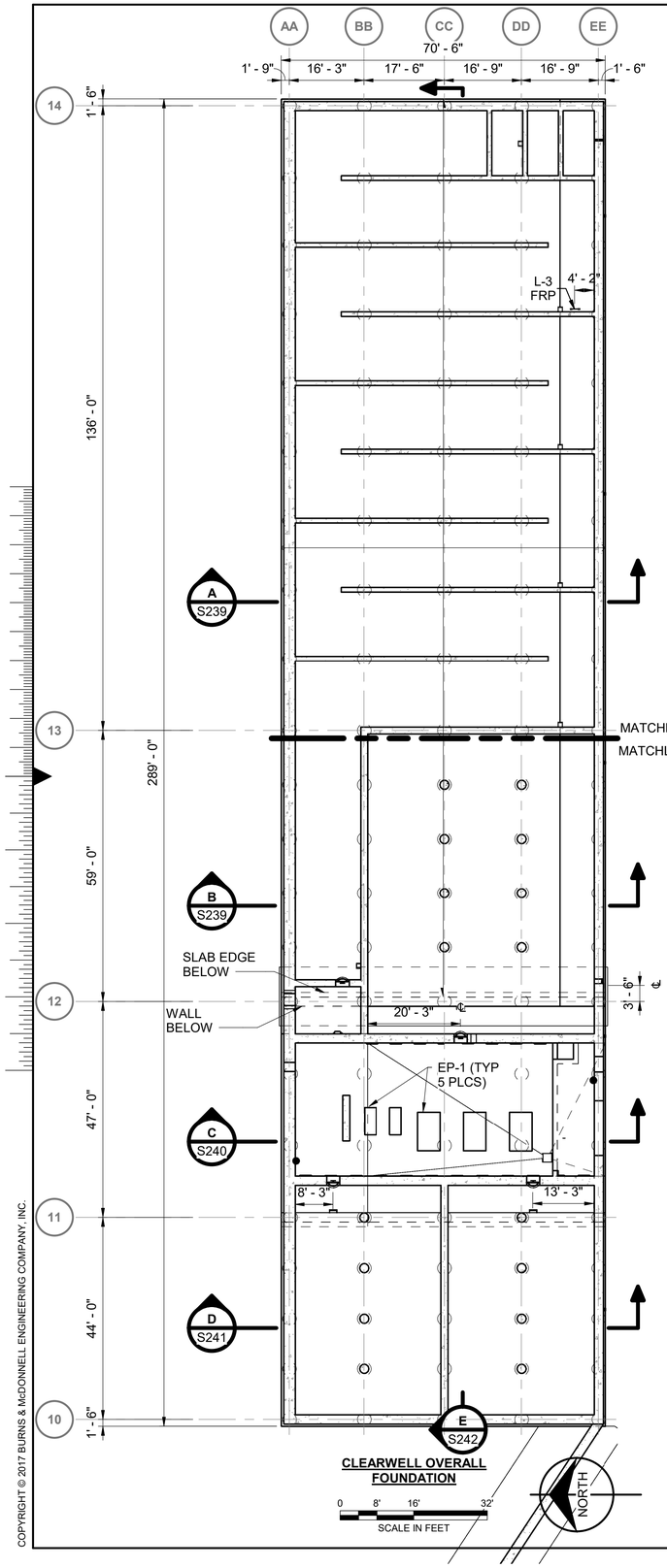
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF PLAN

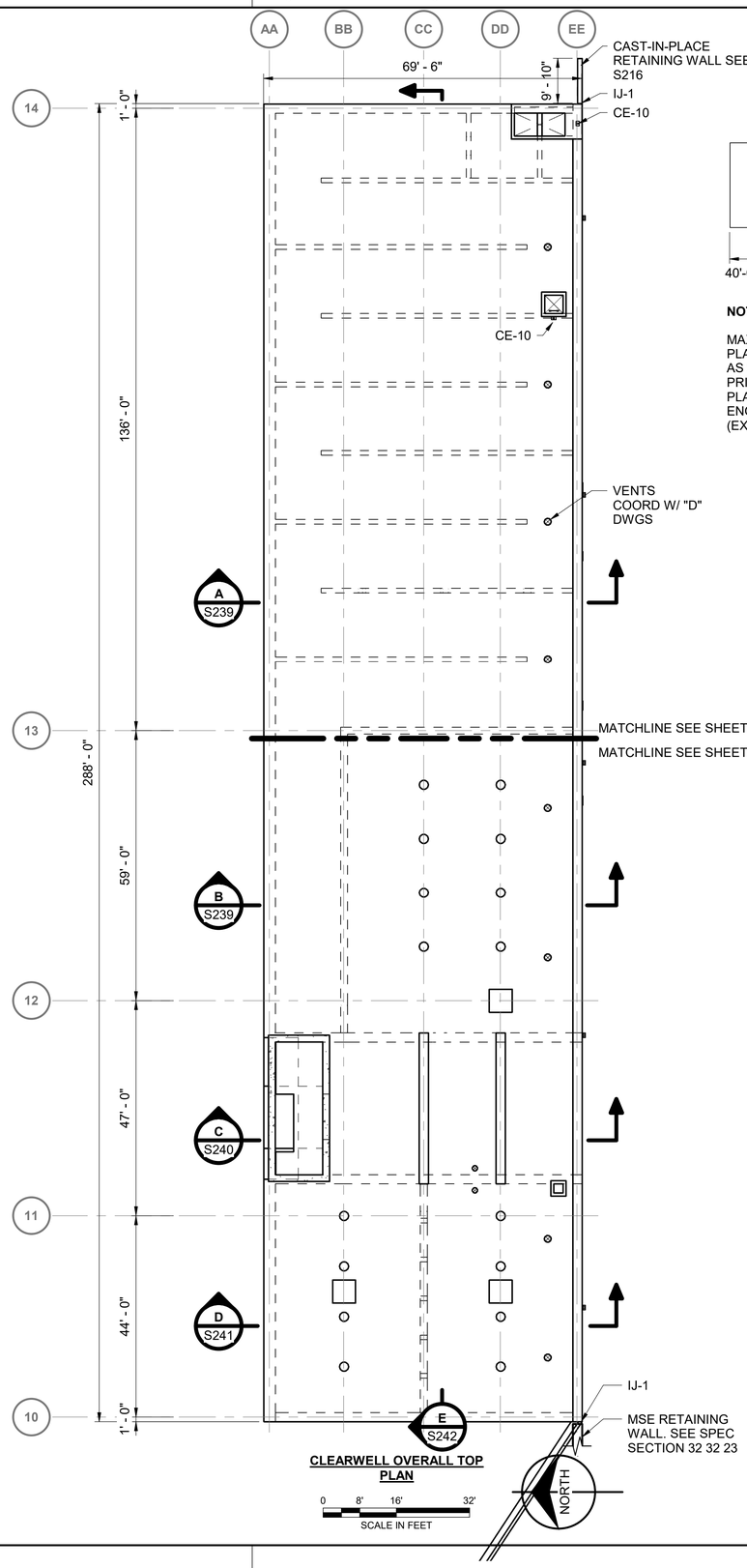
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** **S211** | **rev.** 0 |
| **sheet** 82 **of** 542 **sheets** | |
| **file** 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

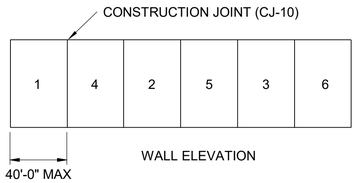
Scale For Microfilming
Millimeters
Inches




**CLEARWELL OVERALL FOUNDATION**




**CLEARWELL OVERALL TOP PLAN**




**WALL PLACEMENT SEQUENCE DIAGRAM**

**NOTE:**

MAXIMUM LENGTH OF WALL TO BE PLACED IN SINGLE PLACEMENT SHALL BE 40'-0" AND SHALL BE ALTERNATED AS SHOWN IN DIAGRAM ABOVE. ALLOW 14 DAY CURE TIME PRIOR TO PLACING CONCRETE ADJACENT TO PREVIOUSLY PLACED CONCRETE OR CURE TIME APPROVED BY ENGINEER. NUMBER INDICATES PLACEMENT SEQUENCE (EXAMPLE ONLY).

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** B. SNYDER |
| **designed** B. SNYDER | **checked** K. THURMAN |

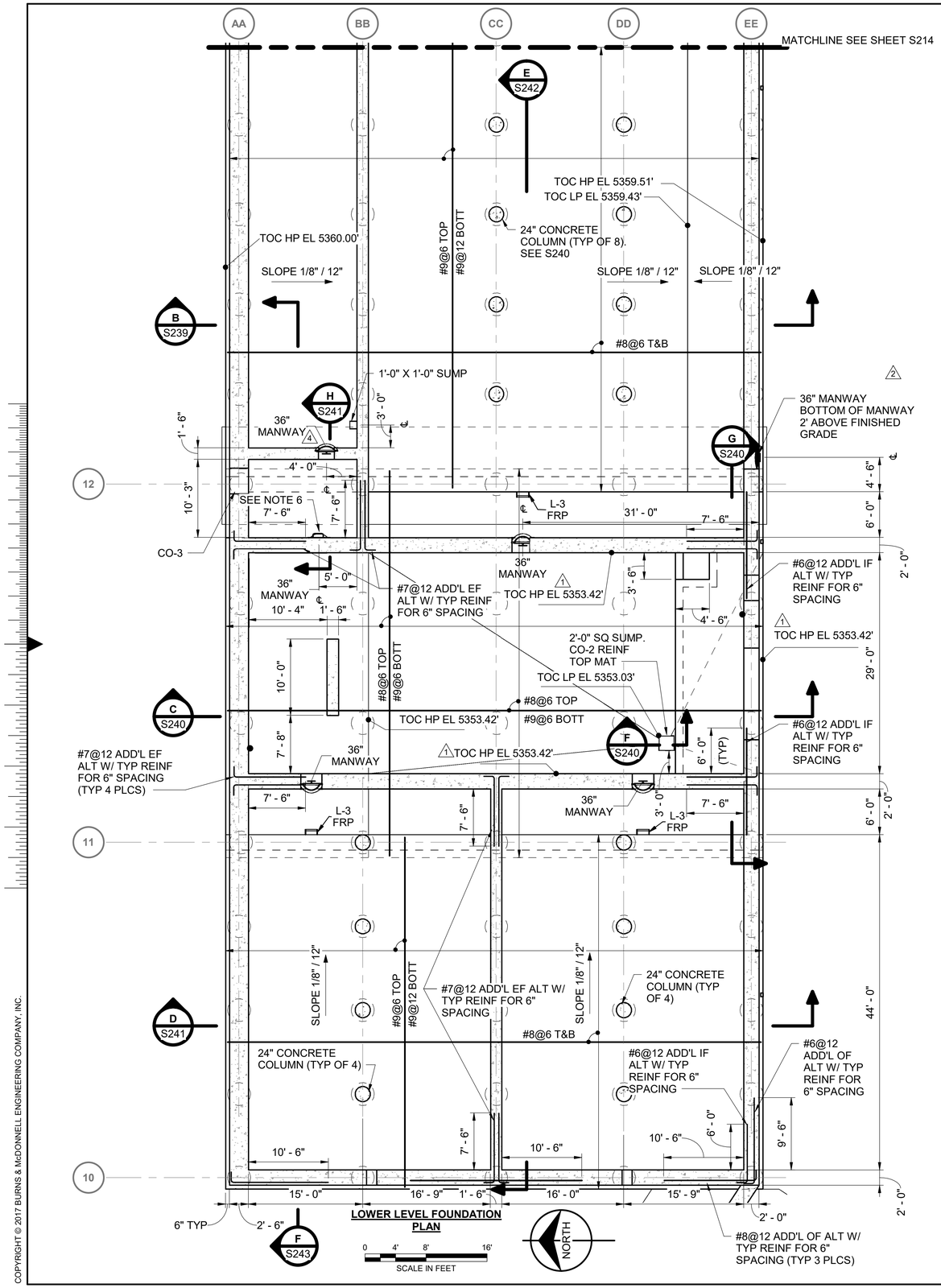
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL CLEARWELL PLAN

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** S212 | **rev.** 1 |
| **sheet** 83 of 542 sheets | |
| **file** 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. SEE DWG S0[illegible] GENERAL NOTES. ENLARGED PLAN SEE SHEET S001.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. (X) * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

4 6. MANWAY SHALL BE MODEL CM-12 BY CHASE ASSOCIATES INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 6/13/18 | KDT | BLS | REVISED PER RFI #29 |
| 2 | 11/6/18 | KDT | BLS | REVISED PER RFI #53 |
| 3 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 4 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. SNYDER |
| designed | checked |
| B. SNYDER | K. THURMAN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL FOUNDATION PLAN
CLEARWELL WEST

| project | contract |
|---|---|
| 98101 | |

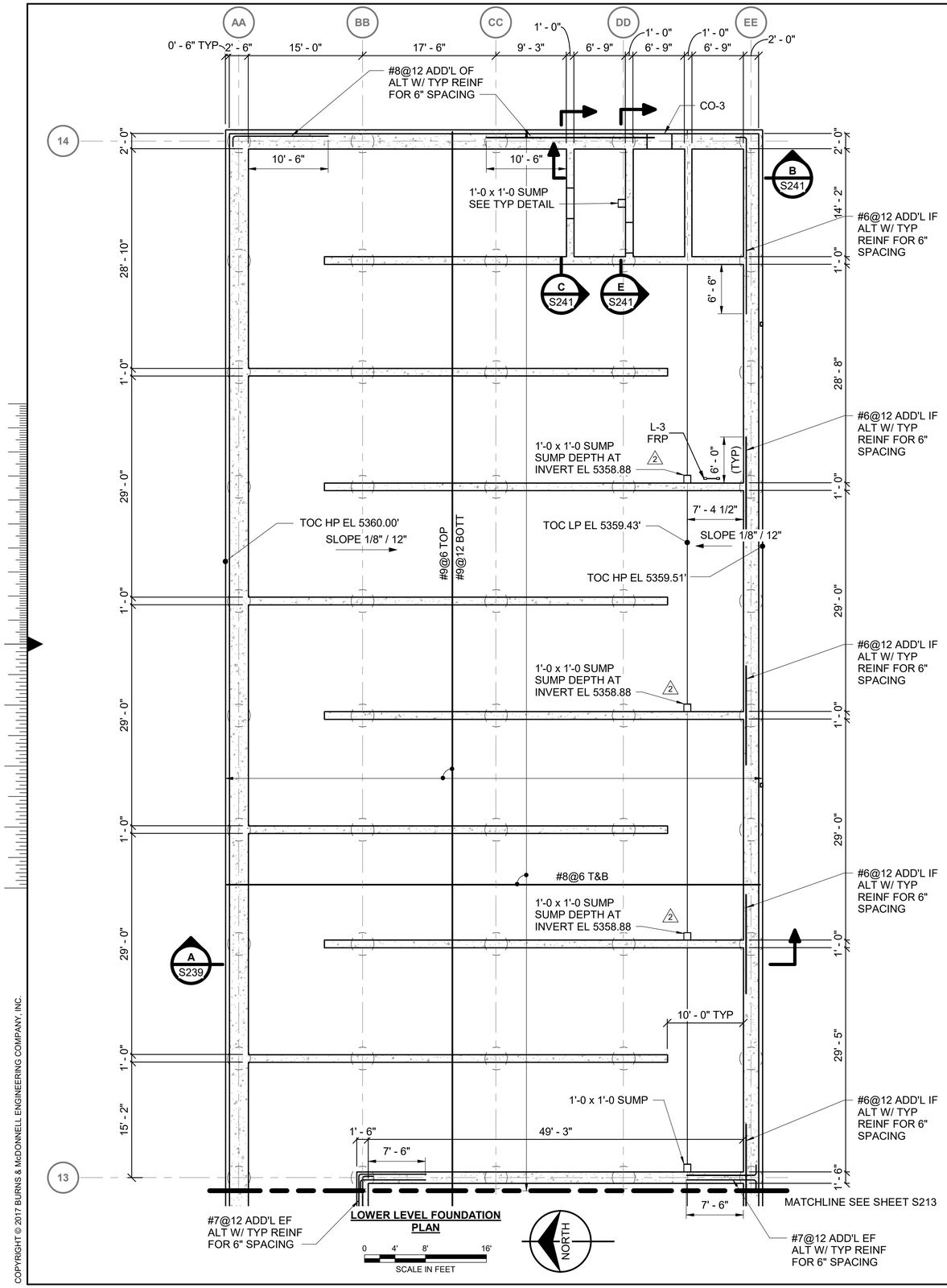
drawing **S213 — 4** rev.

sheet 84 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. SEE DWG S001 FOR GENERAL NOTES. ENLARGED PLAN SEE SHEET S001
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. (X) * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL FOUNDATION PLAN
CLEARWELL EAST

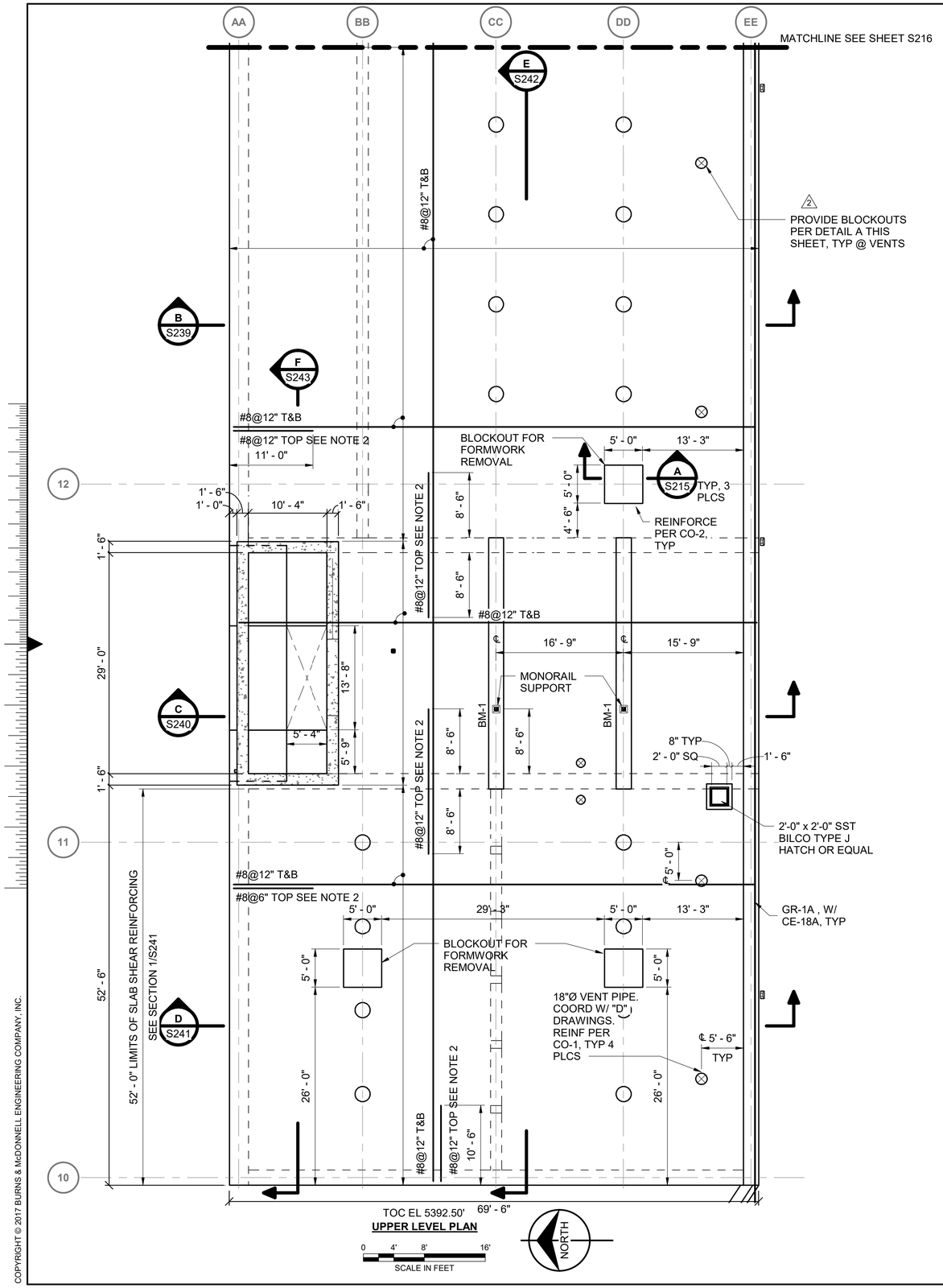
| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**S214 — 2**

sheet 85 of 542 sheets
file 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




TOC EL 5392.50'

**UPPER LEVEL PLAN**

0 4' 8' 16'

SCALE IN FEET

NORTH

BLOCKOUT WIDTH

CJ-12 SIM, TYP ROUGHEN SURFACE TO 1/4" AMPLITUDE

FULL CONTACT LAP SPLICE

MECHANICAL SPLICE, TYP

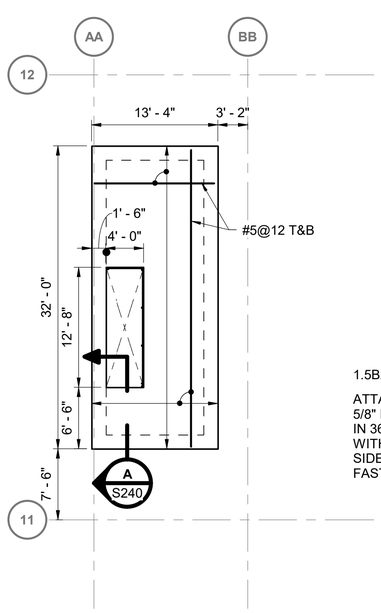
**TYP SLAB BLOCKOUT DETAIL** A S215

0 1' 2' 3'

SCALE IN FEET

**NOTES:**

1. SEE DWG S001 FOR GENERAL NOTES. ENLARGED PLAN SEE SHEET S001
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. (X) * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.



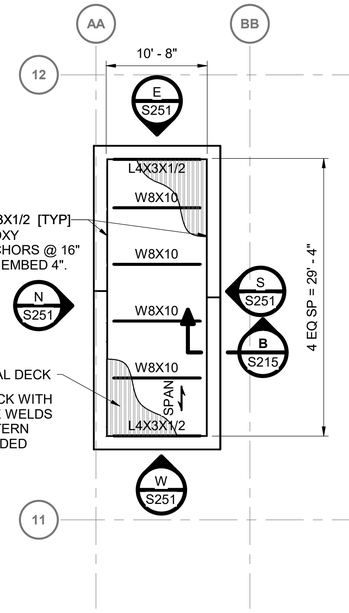

TOC EL 5400.00

**CLEARWELL STAIR TOP**

0 4' 8' 16'

SCALE IN FEET

NORTH

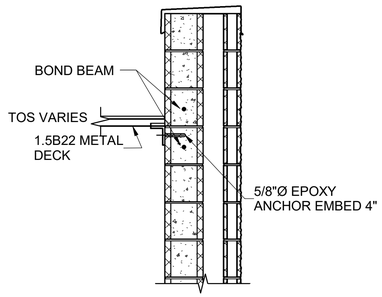



**CLEARWELL STAIR ROOF PLAN**

0 4' 8' 16'

SCALE IN FEET

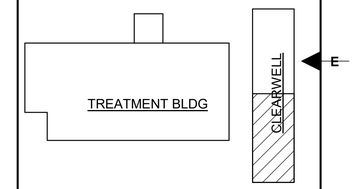
NORTH




**BWPS ROOF SECTION** B S215

0 1' 2' 3'

SCALE IN FEET




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. SNYDER |
| **designed** | **checked** |
| B. SNYDER | K. THURMAN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST

| project | contract |
|---|---|
| 98101 | |

drawing **S215 — 2** rev.

sheet 86 of 542 sheets

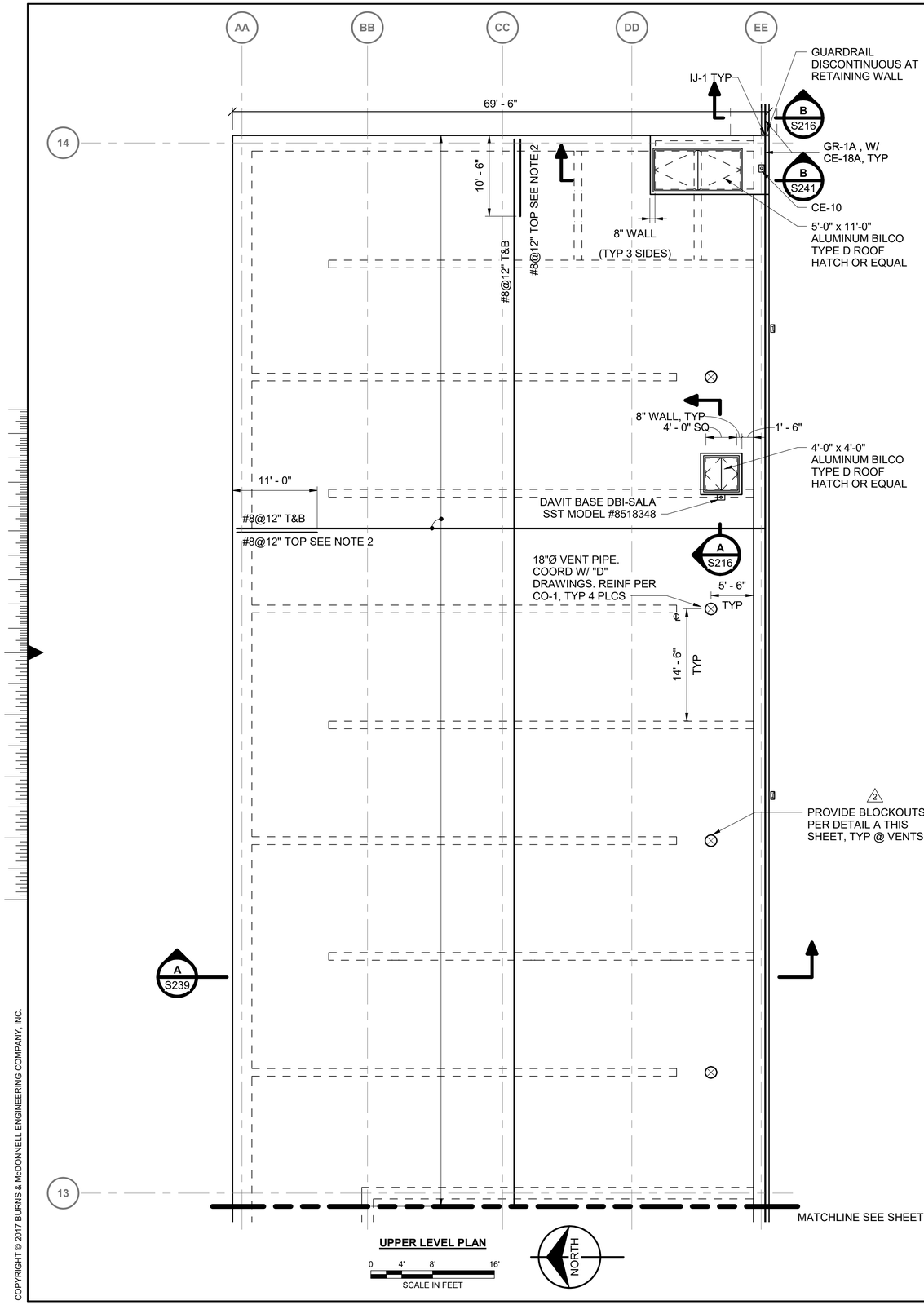
file 98101_S

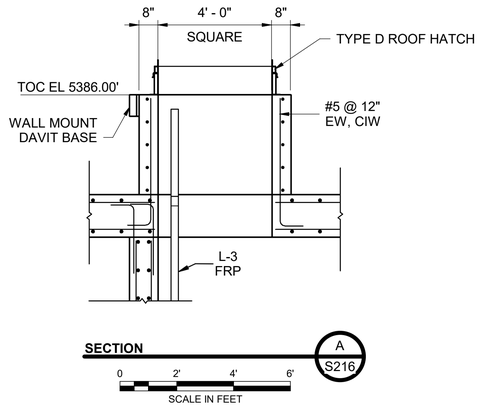
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

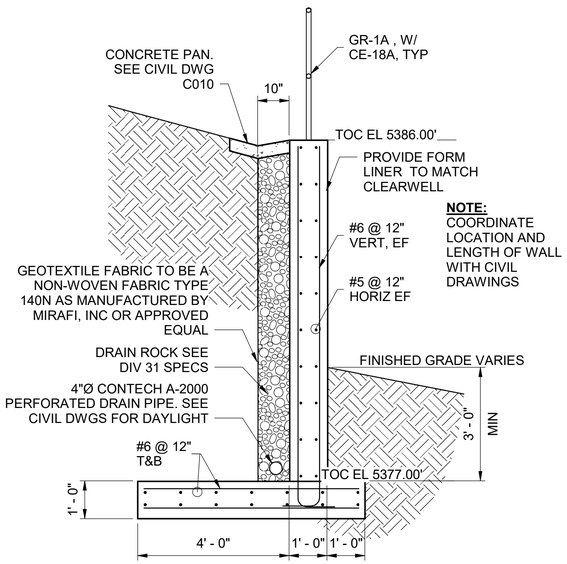
Millimeters

Scale For Microfilming

Inches



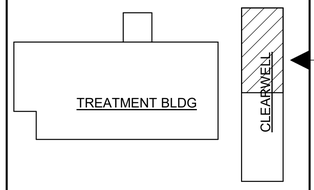




**NOTES:**

1. SEE DWG S0C ENLARGED PLAN SEE SHEET S001 NERAL NOTES.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. ⟨X⟩ * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. SNYDER |
| **designed** | **checked** |
| B. SNYDER | K. THURMAN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL EAST

| project | contract |
|---|---|
| 98101 | |

drawing **S216** rev. **2**

sheet 87 of 542 sheets
file 98101_S

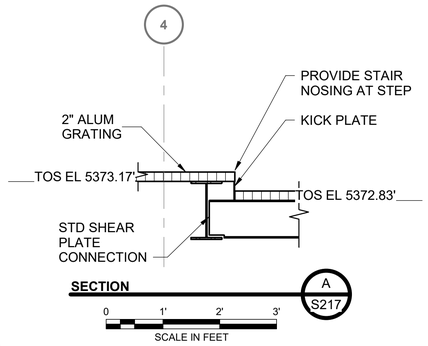
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

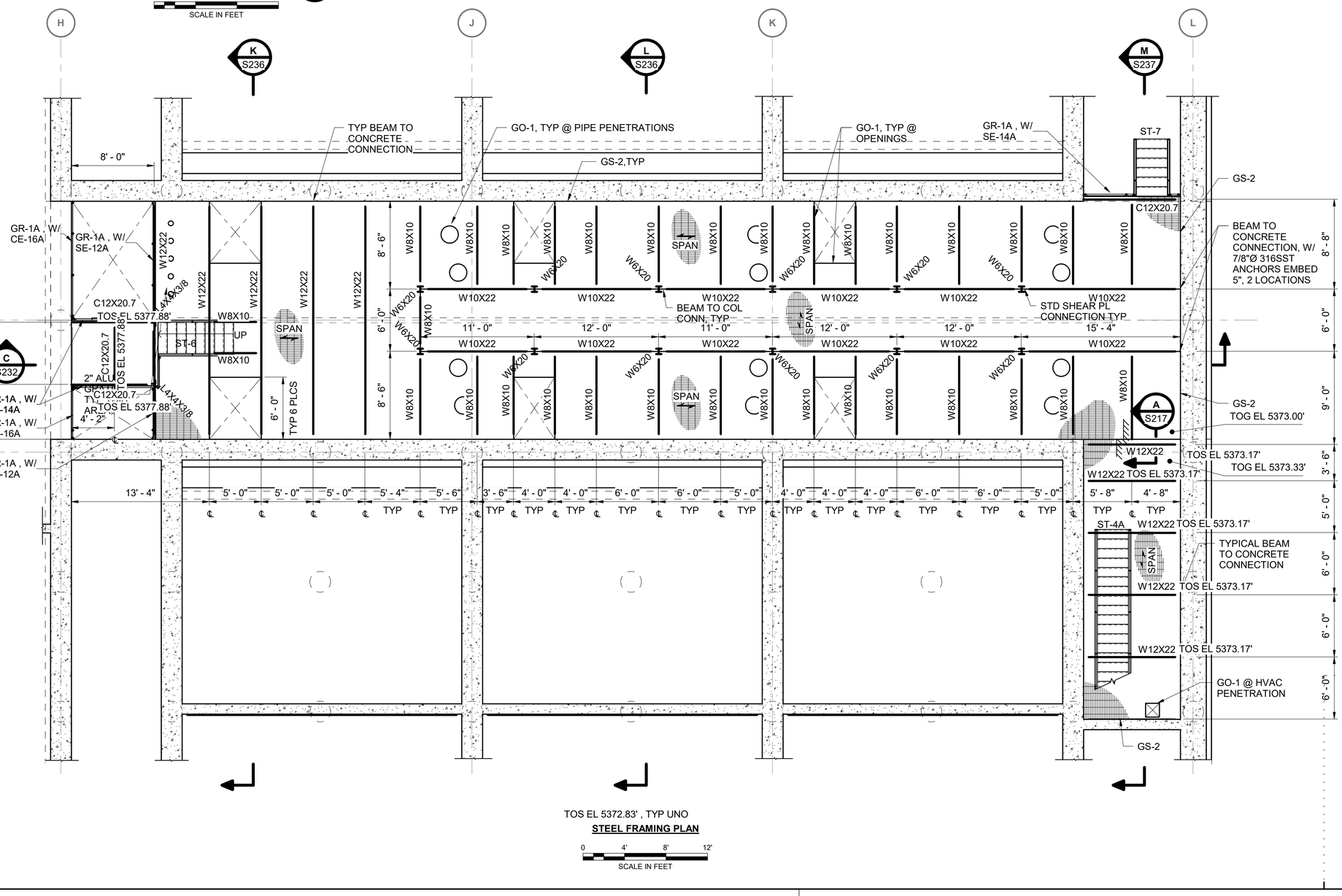
Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. SEE S300 TO S304 FOR STAIR DETAILS.
4. ALL STEEL IS TO BE HOT DIPPED GALVANIZED PER SPECIFICATION SECTION 05 05 13.
5. SEE PROCESS DRAWINGS FOR PIPE SUPPORT CALLOUTS IN THIS AREA.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

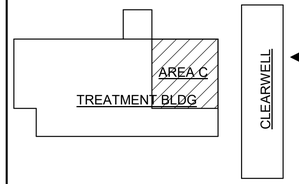



TOS EL 5372.83' , TYP UNO

**STEEL FRAMING PLAN**

0 4' 8' 12'
SCALE IN FEET




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER GALLERY STEEL FRAMING PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **S217** rev. **0**

sheet 88 of 542 sheets

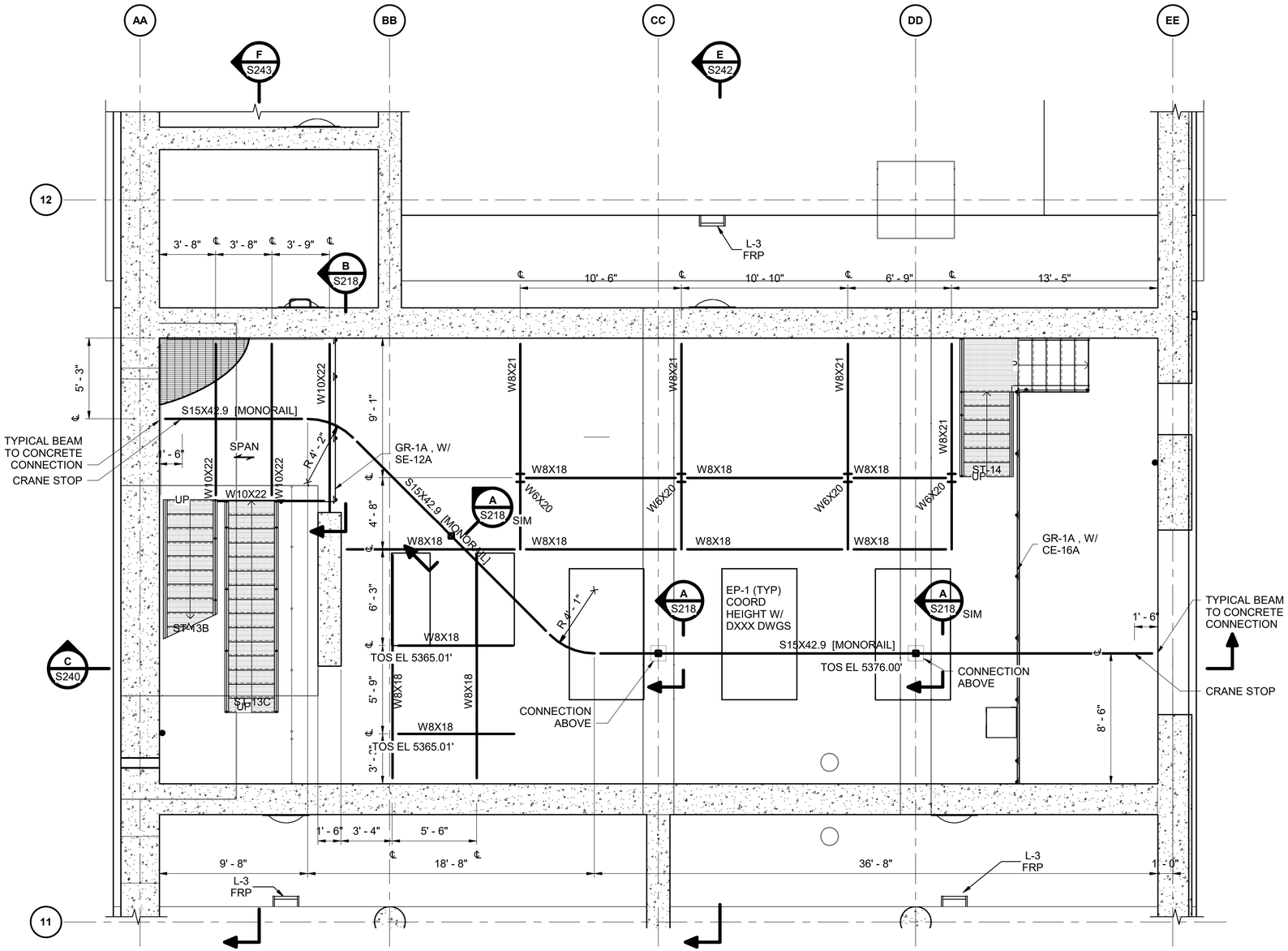
file 98101_S

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. SEE S300 TO S304 FOR STAIR DETAILS.
4. ALL STEEL IS TO BE HOT DIPPED GALVANIZED PER SPECIFICATION SECTION 05 05 13.
5. SEE PROCESS DRAWINGS FOR PIPE SUPPORT CALLOUTS.

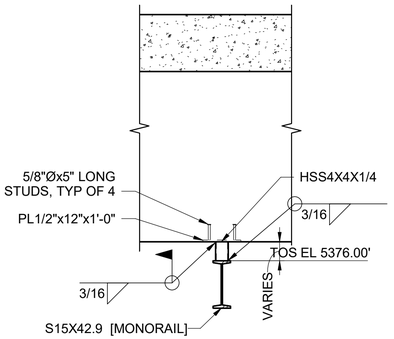
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**BACKWASH PUMP STATION STEEL FRAMING PLAN**

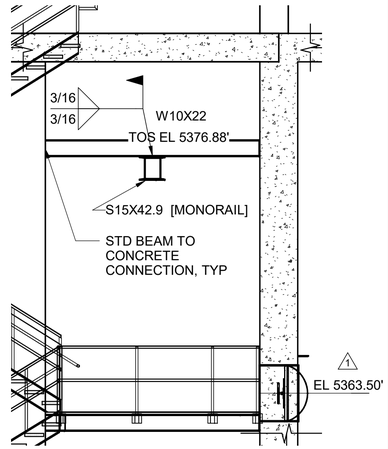
0 2' 4' 8'
SCALE IN FEET

NORTH



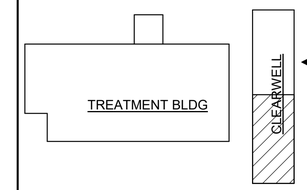

**MONORAIL CONNECTION DETAIL 1** A S218

0 1' 2' 4'
SCALE IN FEET




**MONORAIL CONNECTION DETAIL 2** B S218

0 2' 4' 8'
SCALE IN FEET




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

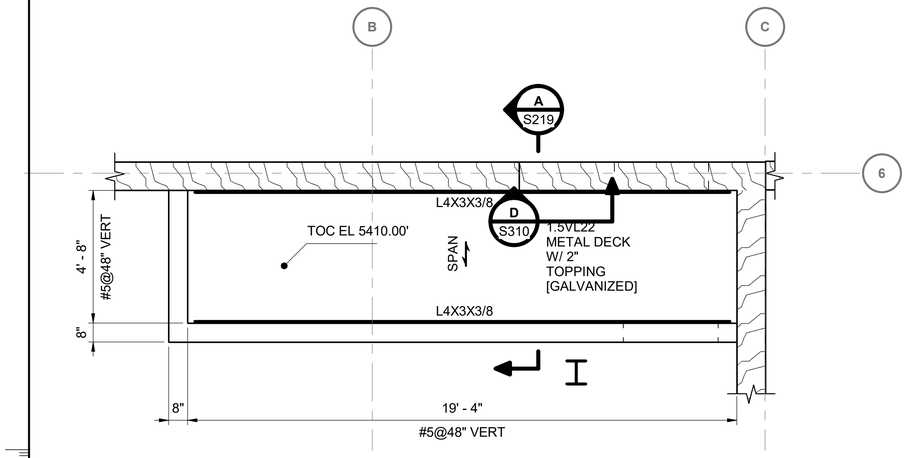
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BACKWASH PUMP STATION STEEL FRAMING PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing S218 | rev. 1 |
| sheet 89 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

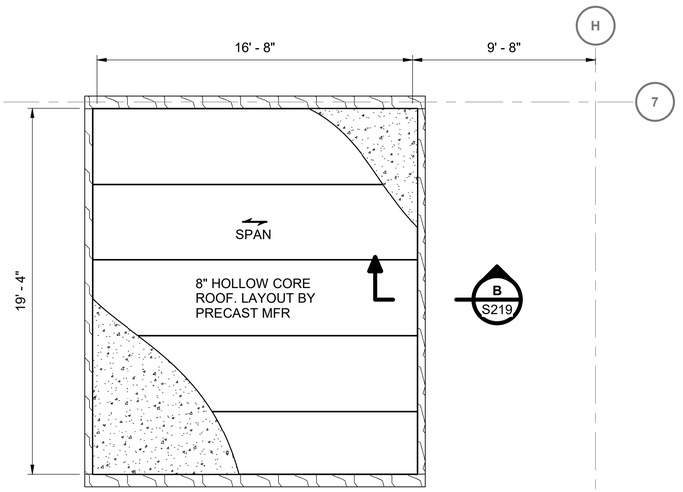



**MAINTENANCE GARAGE STAIR CORE ROOF** — 1 / S206

0 2' 4' 6'

SCALE IN FEET

NORTH




**OZONE DESTRUCT ROOF** — 4 / S211

0 2' 4' 8'

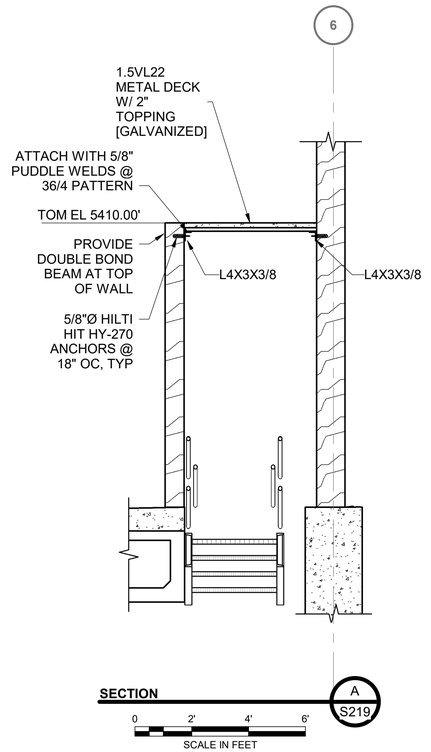
SCALE IN FEET

NORTH

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.

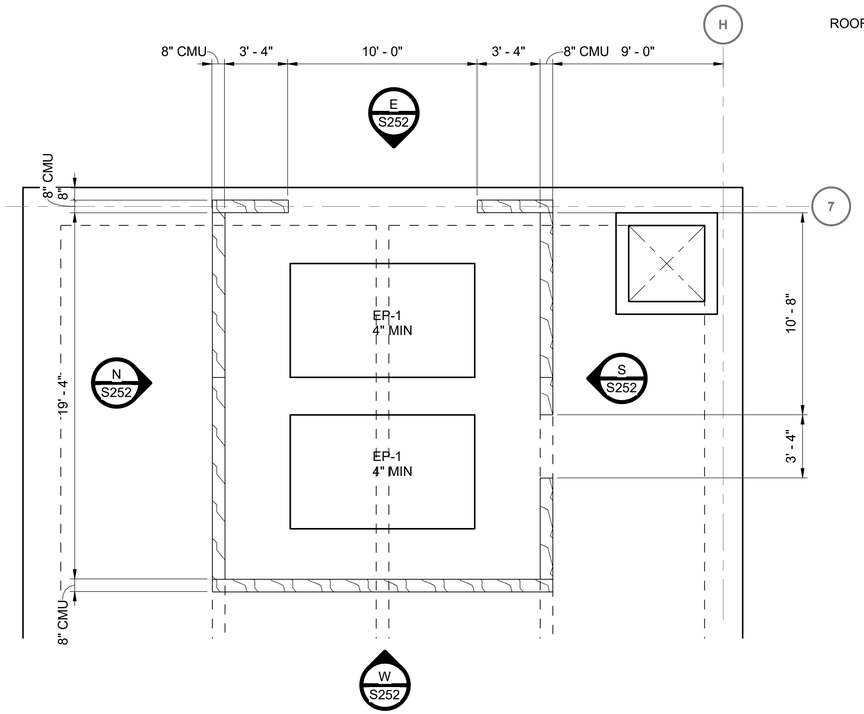
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**SECTION** — A / S219

0 2' 4' 6'

SCALE IN FEET

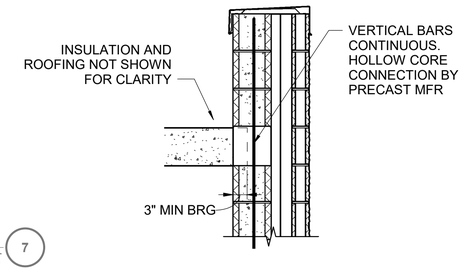



**OZONE DESTRUCT ENLARGED PLAN** — 3 / S207

0 2' 4' 8'

SCALE IN FEET

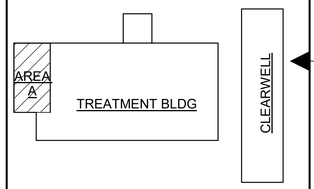
NORTH




**SECTION** — B / S219

0 1' 2' 3'

SCALE IN FEET




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL ENLARGED PLANS

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**S219 — 0**

sheet 90 of 542 sheets

file 98101_S

Scale For Microfilming
Millimeters
Inches

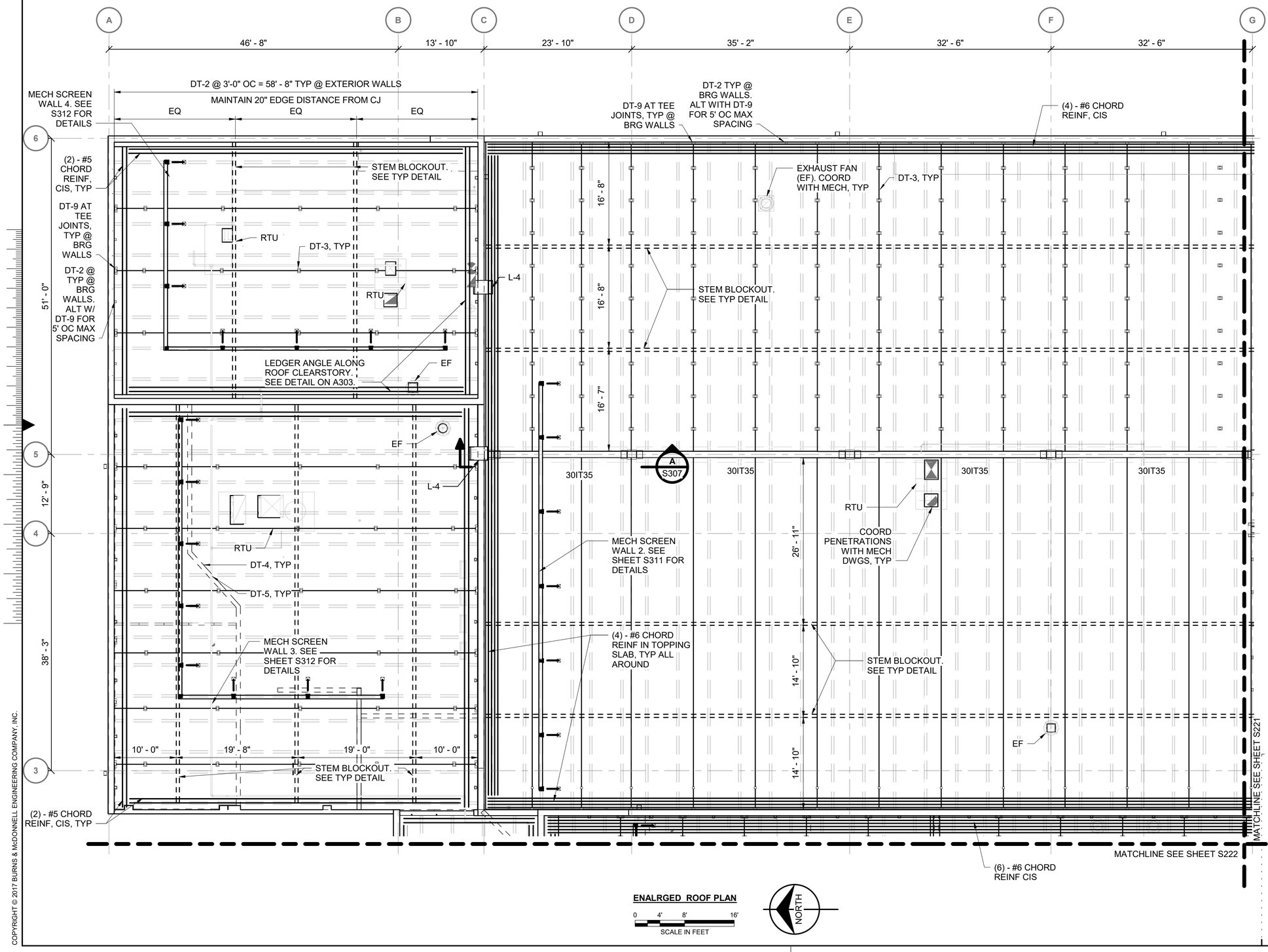
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. SEE S211 FOR OVERALL ROOF PLAN.
2. SEE S012 FOR TYPICAL PRECAST CONNECTIONS AND DETAILS.
3. SEE S307 AND S308 FOR PRECAST COLUMN AND BEAM DETAILS.
4. EXHAUST FAN AND MECHANICAL OPENING SIZES AND LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE WITH MECH DRAWINGS AND EQUIPMENT SUBMITTALS AND ADJUST LOCATIONS AS NEED TO AVOID DT STEMS.
5. INVERTED TEE BEAM SIZES SHOWN ARE PRELIMINARY. PRECAST MANUFACTURER TO DETERMINE FINAL SIZING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**ENALRGED ROOF PLAN**

0 4' 8' 16'
SCALE IN FEET

NORTH

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

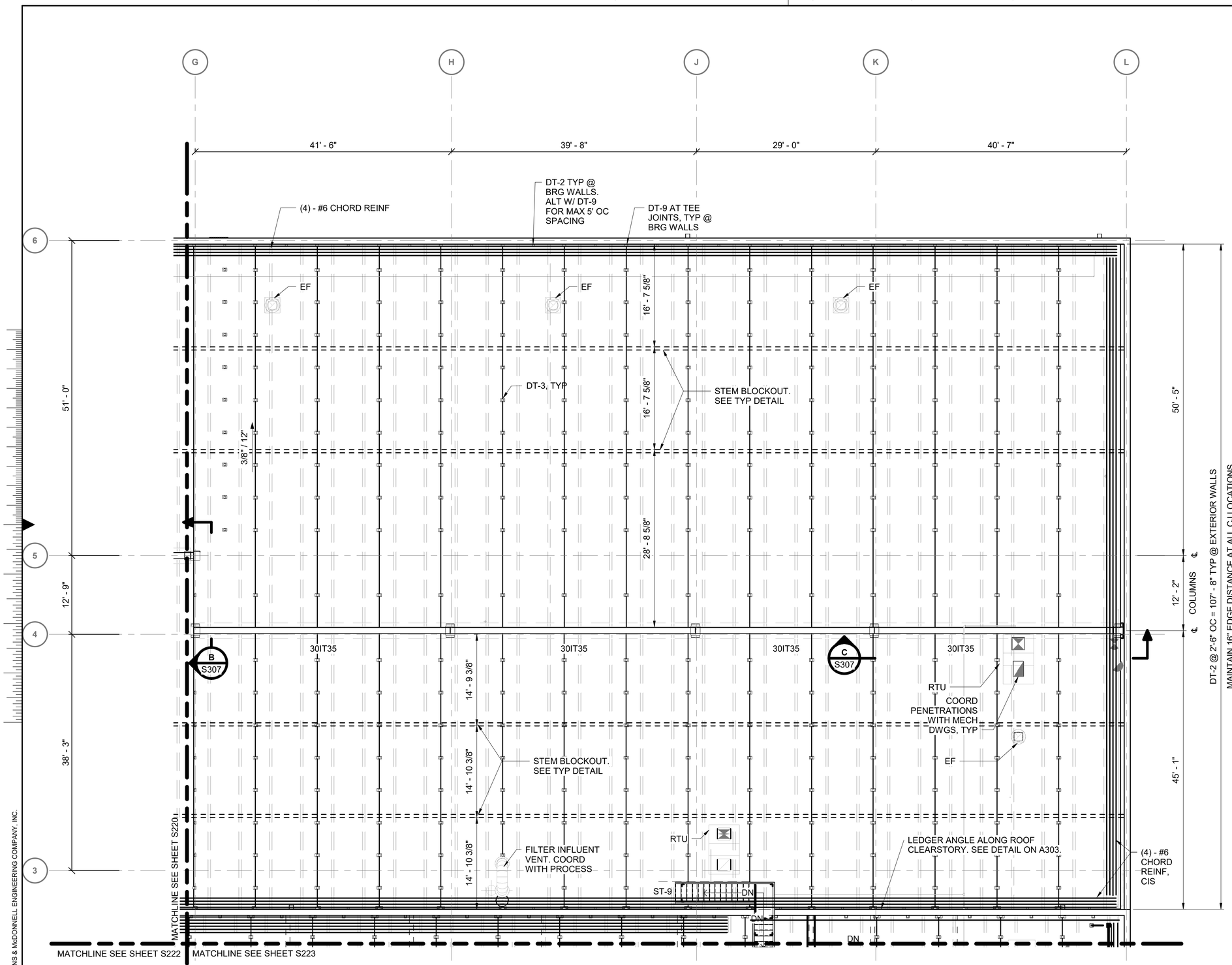
BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ROOF ENLARGED PLAN I

| | |
|---|---|
| project 98101 | contract |
| drawing **S220** | rev. **0** |
| sheet 91 of 542 sheets | |
| file 98101_S | |




**ENALRGED ROOF PLAN**

0 4' 8' 16'

SCALE IN FEET

NORTH

**NOTES:**

1. SEE S211 FOR OVERALL ROOF PLAN.
2. SEE S012 FOR TYPICAL PRECAST CONNECTIONS AND DETAILS.
3. SEE S307 AND S308 FOR PRECAST COLUMN AND BEAM DETAILS.
4. EXHAUST FAN AND MECHANICAL OPENING SIZES AND LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE WITH MECH DRAWINGS AND EQUIPMENT SUBMITTALS AND ADJUST LOCATIONS AS NEED TO AVOID DT STEMS.
5. INVERTED TEE BEAM SIZES SHOWN ARE PRELIMINARY. PRECAST MANUFACTURER TO DETERMINE FINAL SIZING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

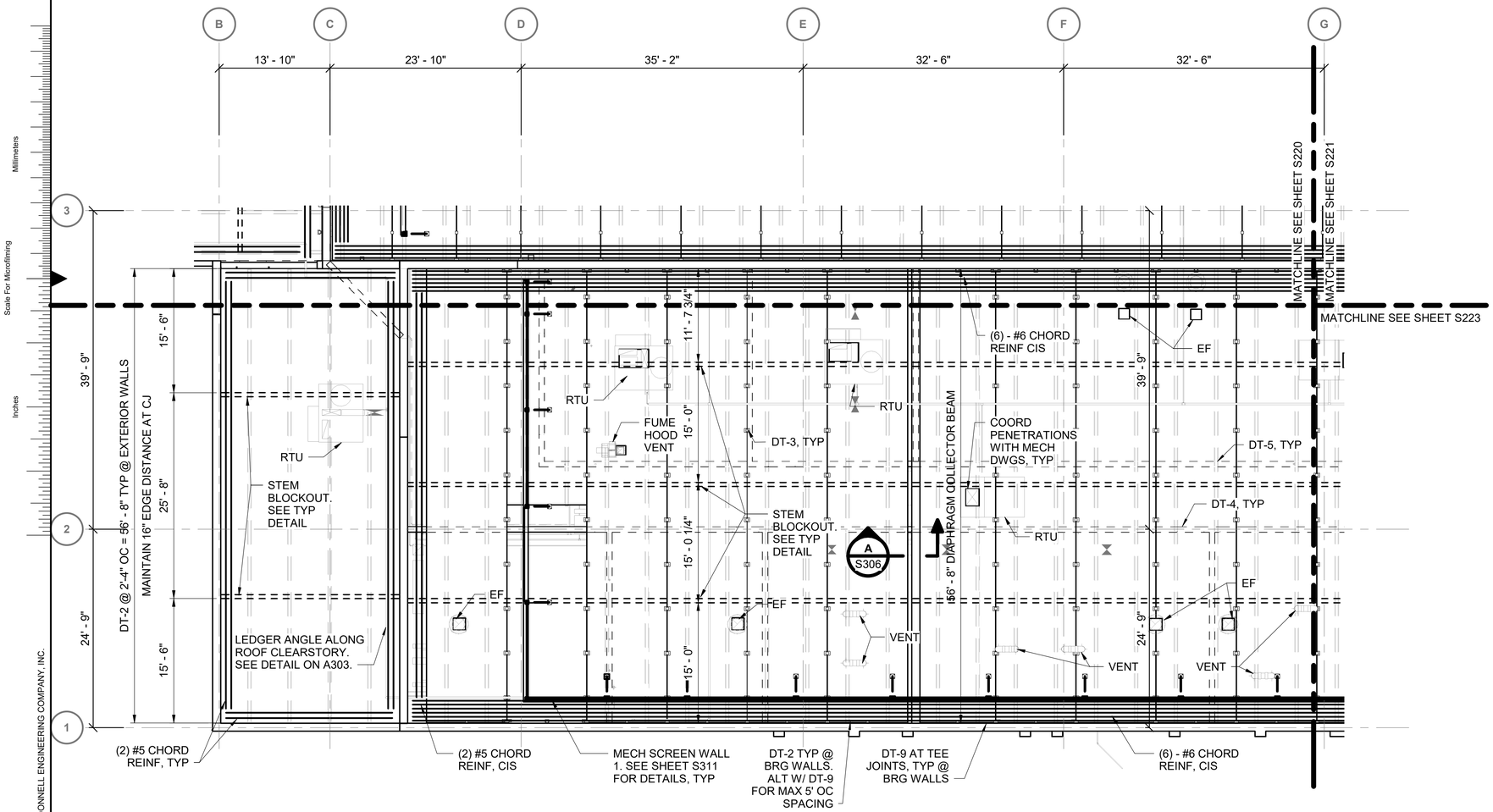
**CITY OF THORNTON**
**TTP - PACKAGE 3**
ROOF ENLARGED PLAN II

| | |
|---|---|
| project 98101 | contract |
| drawing S221 | rev. 0 |
| sheet 92 of 542 sheets | |
| file 98101_S | |

**NOTES:**

1. SEE S211 FOR OVERALL ROOF PLAN.
2. SEE S012 FOR TYPICAL PRECAST CONNECTIONS AND DETAILS.
3. SEE S307 AND S308 FOR PRECAST COLUMN AND BEAM DETAILS.
4. EXHAUST FAN AND MECHANICAL OPENING SIZES AND LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE WITH MECH DRAWINGS AND EQUIPMENT SUBMITTALS AND ADJUST LOCATIONS AS NEED TO AVOID DT STEMS.
5. INVERTED TEE BEAM SIZES SHOWN ARE PRELIMINARY. PRECAST MANUFACTURER TO DETERMINE FINAL SIZING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**ENALRGED ROOF PLAN**

0 4' 8' 16'
SCALE IN FEET

NORTH

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ROOF ENLARGED PLAN III

| | |
|---|---|
| project 98101 | contract |
| drawing **S222** | rev. **0** |
| sheet 93 of 542 sheets | |
| file 98101_S | |

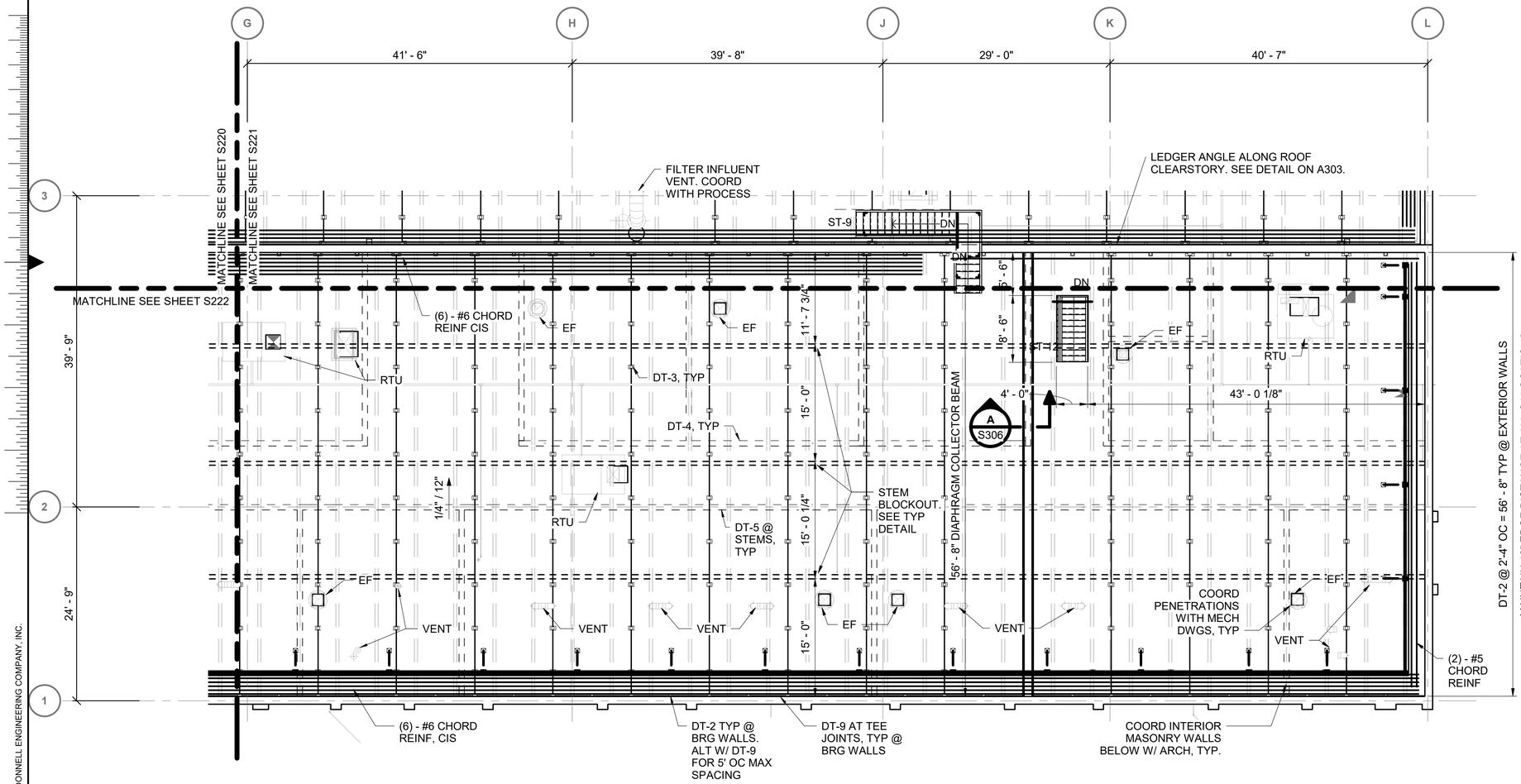
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. SEE S211 FOR OVERALL ROOF PLAN.
2. SEE S012 FOR TYPICAL PRECAST CONNECTIONS AND DETAILS.
3. SEE S307 AND S308 FOR PRECAST COLUMN AND BEAM DETAILS.
4. EXHAUST FAN AND MECHANICAL OPENING SIZES AND LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE WITH MECH DRAWINGS AND EQUIPMENT SUBMITTALS AND ADJUST LOCATIONS AS NEED TO AVOID DT STEMS.
5. INVERTED TEE BEAM SIZES SHOWN ARE PRELIMINARY. PRECAST MANUFACTURER TO DETERMINE FINAL SIZING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**ENLARGED ROOF PLAN - SOUTHWEST**

0 4' 8' 16'
SCALE IN FEET

NORTH

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

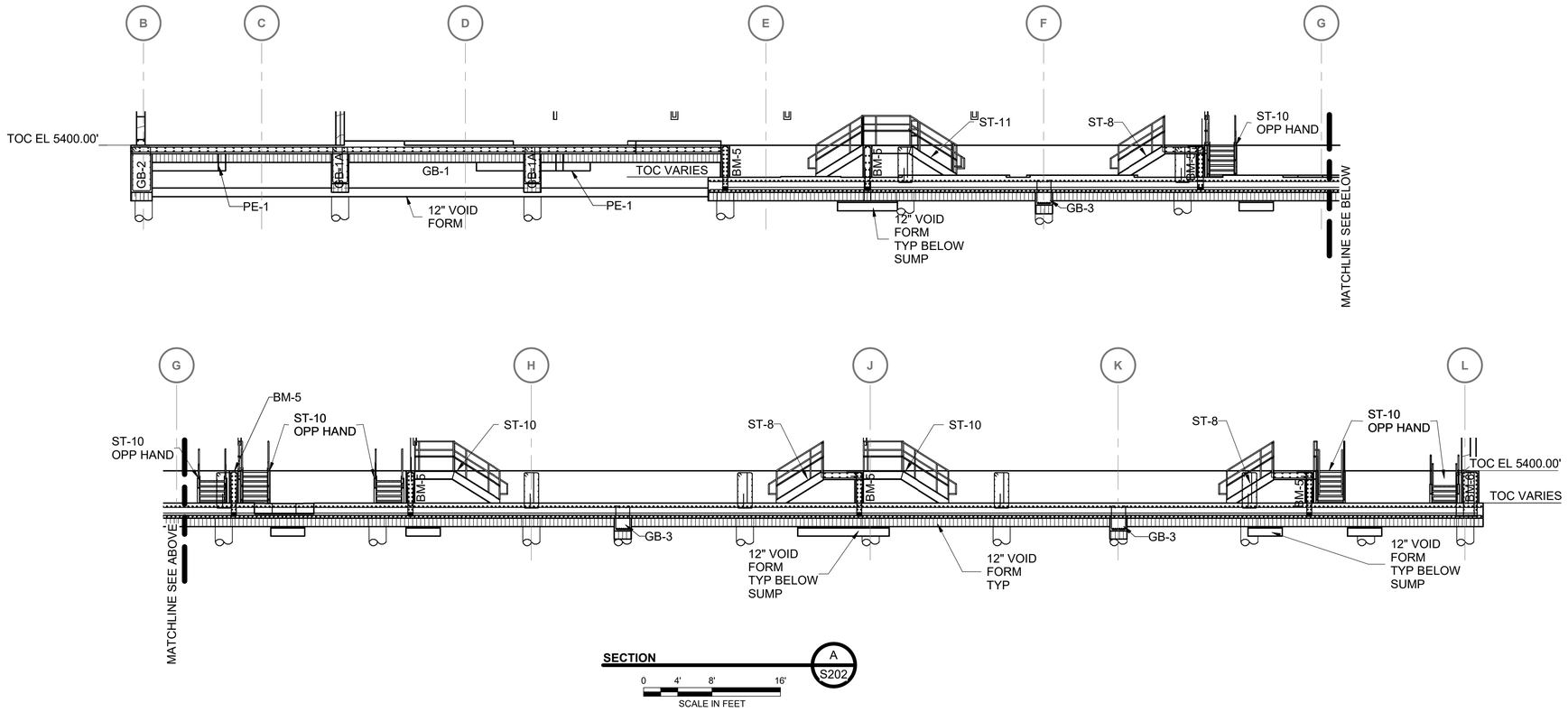
**CITY OF THORNTON**
**TTP - PACKAGE 3**
ROOF ENLARGED PLAN IV

| project | contract |
|---|---|
| 98101 | |

drawing **S223** rev. **0**

sheet 84 of 542 sheets

file 98101_S



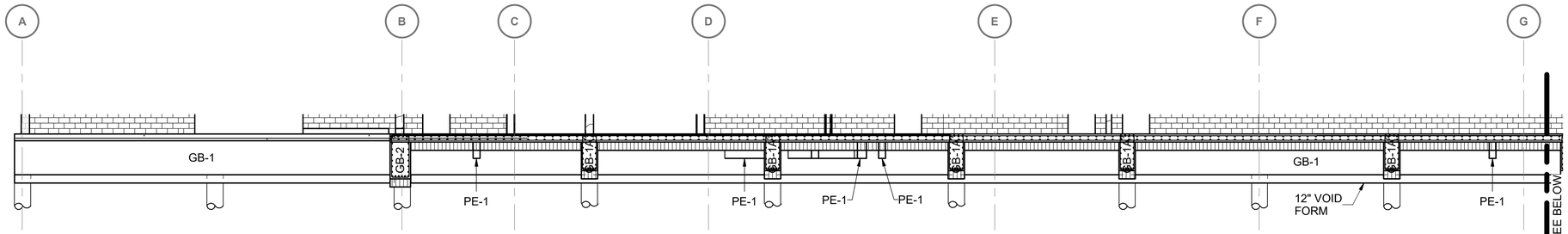


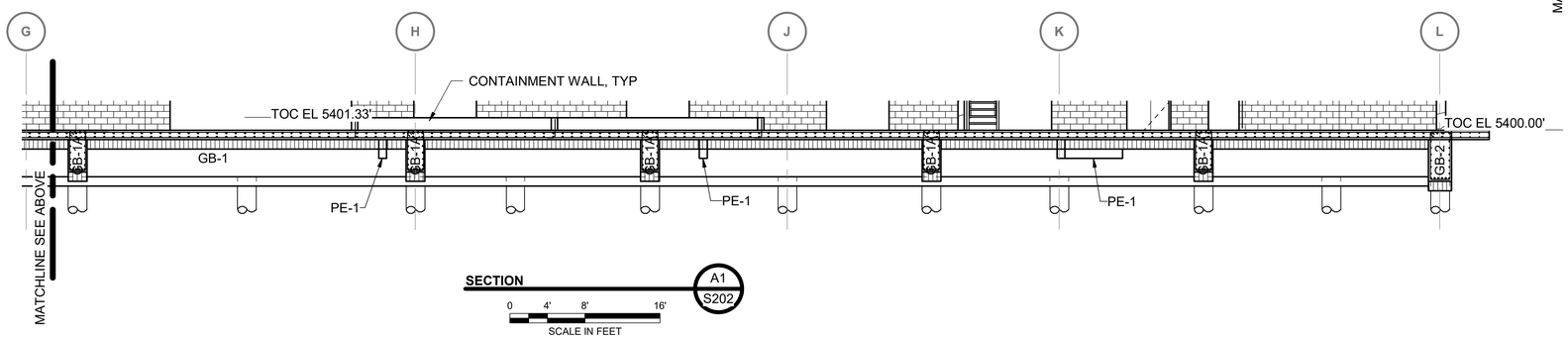


**SECTION** A / S202

0 4' 8' 16'

SCALE IN FEET




**SECTION** A1 / S202

0 4' 8' 16'

SCALE IN FEET

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. UNLESS NOTED OTHERWISE DIMENSIONS ARE TO FACE OF WALL OR FACE OF CONCRETE.
4. FILTER AREA TOP SLAB SHALL BE IN PLACE AND OBTAINED 85% OF THE DESIGN COMPRESSIVE STRENGTH AS VERIFIED BY CYLINDER BREAKS PRIOR TO BACKFILLING TO THE FULL HEIGHT.
5. ——► INDICATES FLOOR SLOPE IN DIRECTION OF ARROW. SLAB MINIMUM THICKNESS IS SHOWN ON DRAWINGS AND SHALL BE MAINTAINED AT ALL SUMPS, UNO.
6. ONLY STRUCTURAL MASONRY WALLS ARE SHOWN. SEE ARCHITECTURAL DRAWINGS FOR NON-STRUCTURAL INTERIOR WALLS AND FINISH CMU.
7. STAIR DETAILS ARE SHOWN ON S300 TO S304.
8. TRENCH DRAINS ARE ACO K100 SERIES OR APPROVED EQUAL. PART NUMBER (KX-XX) IS INDICATED AT HIGH POINT AND LOW POINT OF EACH DRAIN. REFER TO SPEC SECTION 22 13 19 FOR ADDITIONAL REQUIREMENTS.
9. SEE S305 & 306 FOR BEAM DETAILS.
10. SEE S309 & S310 FOR BRIDGE CRANE DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS I

| | |
|---|---|
| **project** 98101 | **contract** |

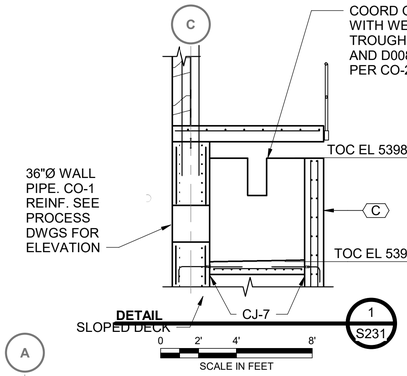
**drawing** **S230** **rev.** **0**

**sheet** 95 **of** 542 **sheets**

**file** 98101_S

Scale For Microfilming
Millimeters
Inches

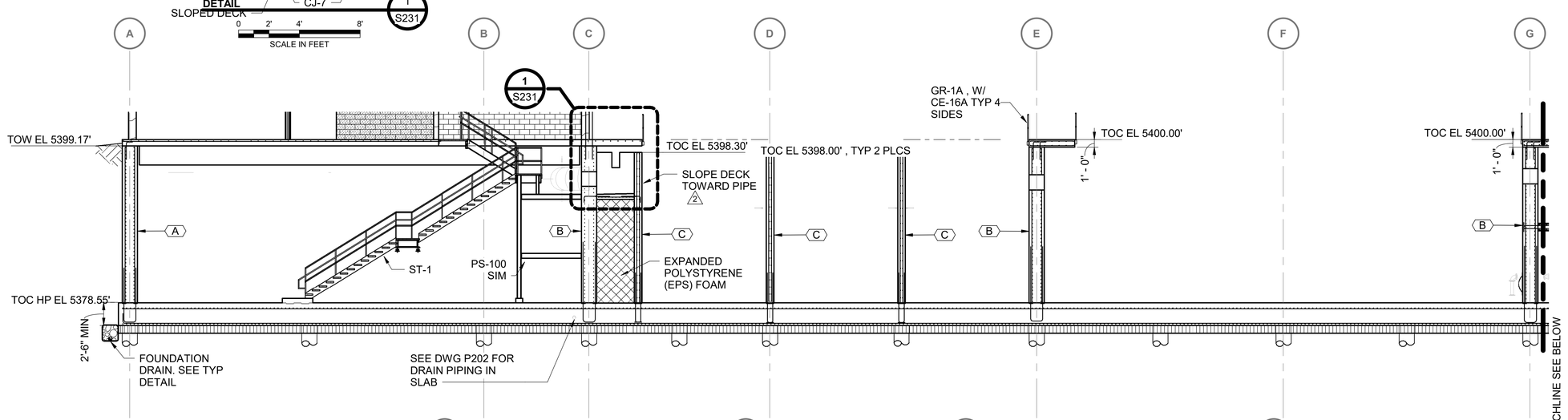
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

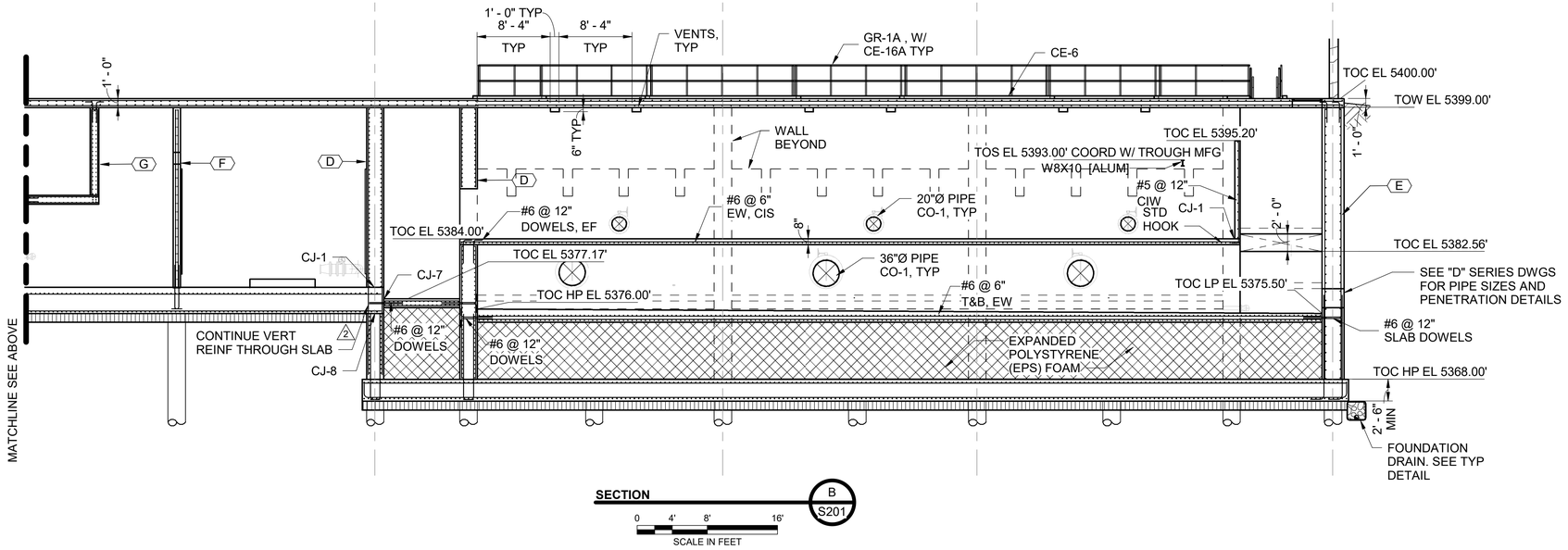



**NOTES:**

1. (X) INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |







BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS II

| project | contract |
|---|---|
| 98101 | |

drawing **S231 — 2** rev.

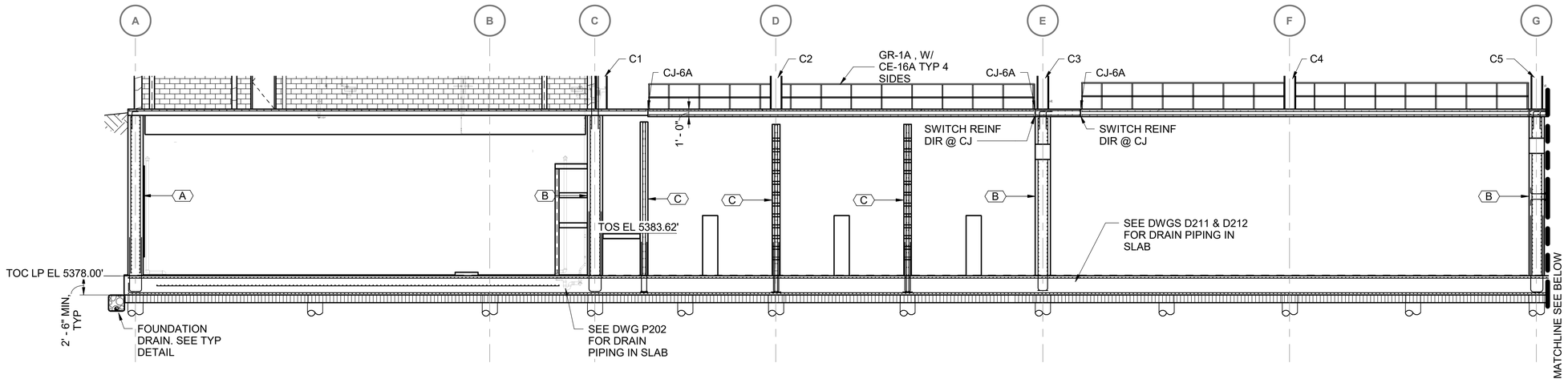
sheet 96 of 542 sheets
file 98101_S

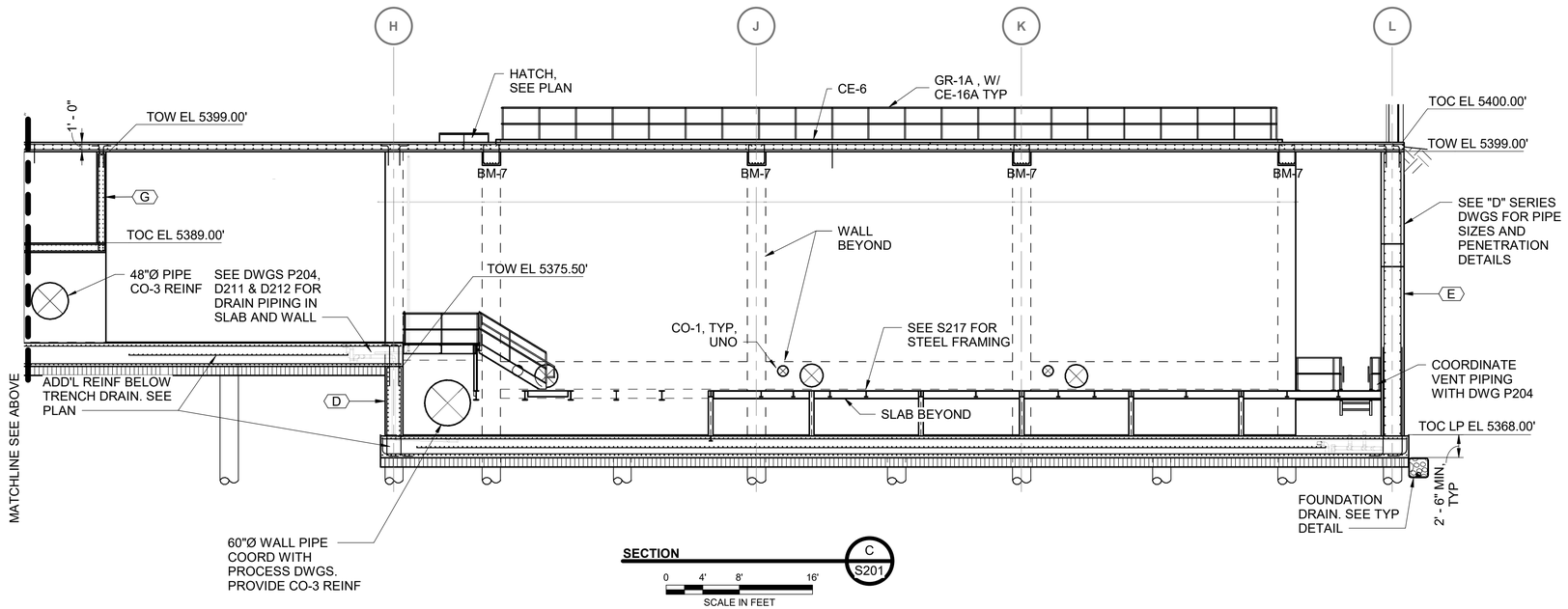
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. ⟨X⟩ INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS III

| project | contract |
|---|---|
| 98101 | |

drawing **S232** rev. **1**

sheet 97 of 542 sheets

file 98101_S

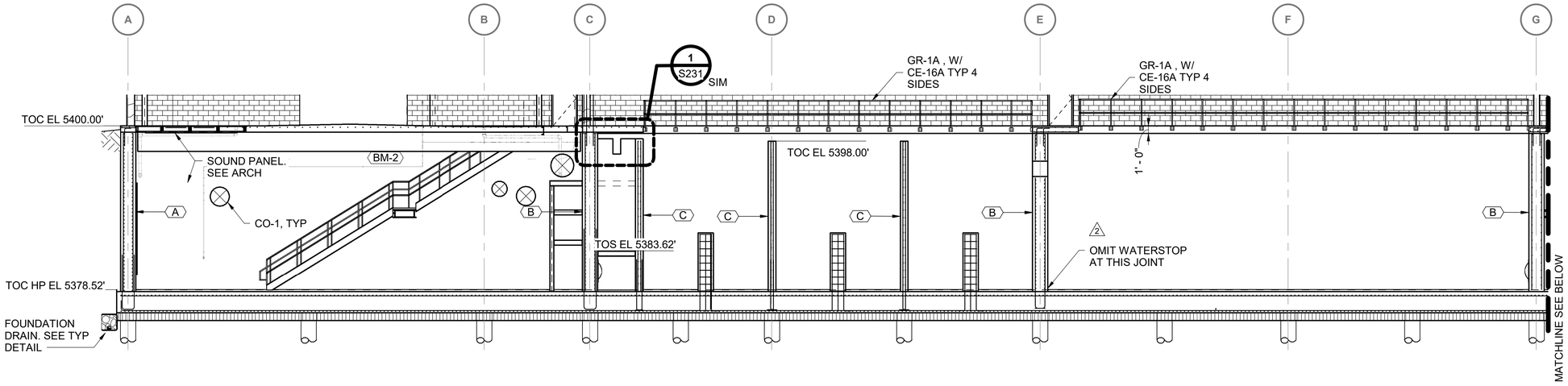
Scale For Microfilming: Millimeters / Inches

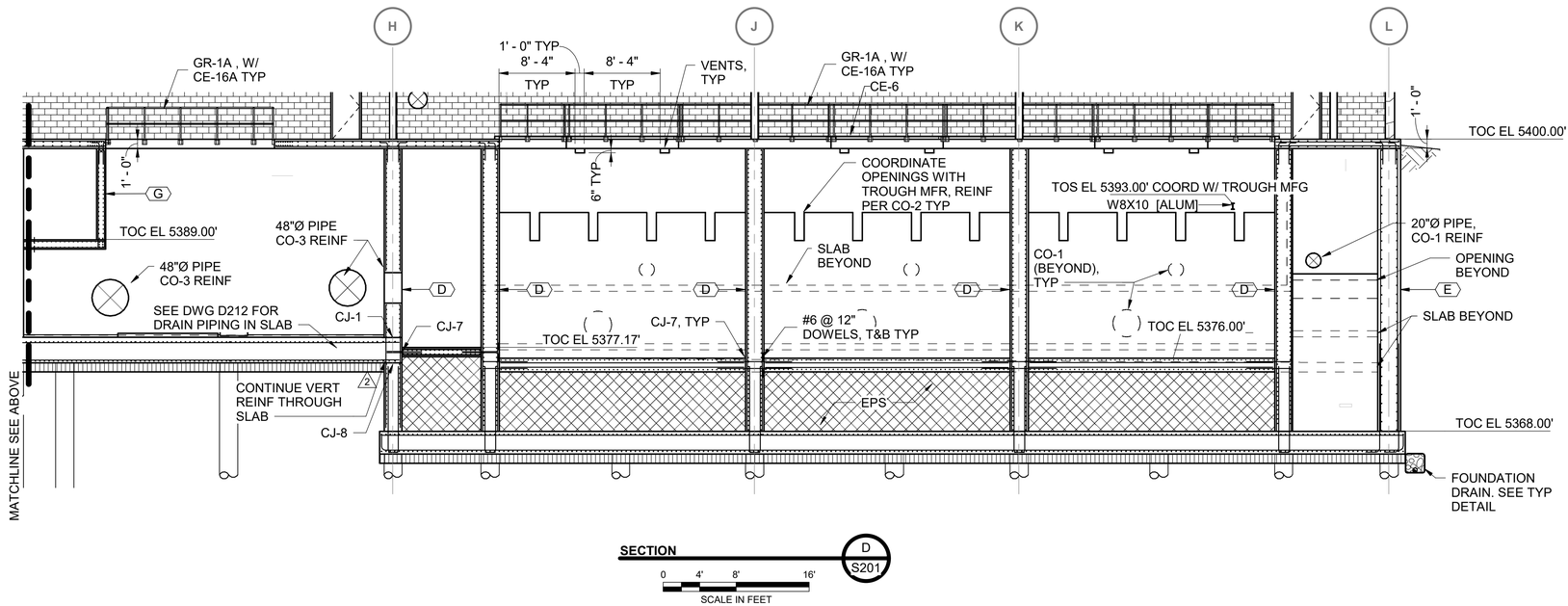
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. ⟨X⟩ INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**SECTION** D / S201

0 4' 8' 16'

SCALE IN FEET

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

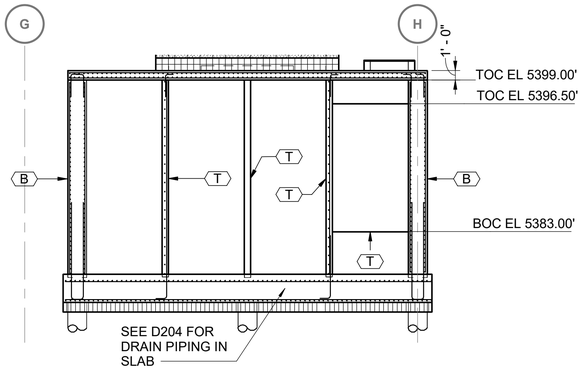
**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS IV

| project | contract |
|---|---|
| 98101 | |

drawing **S233 — 2** rev.

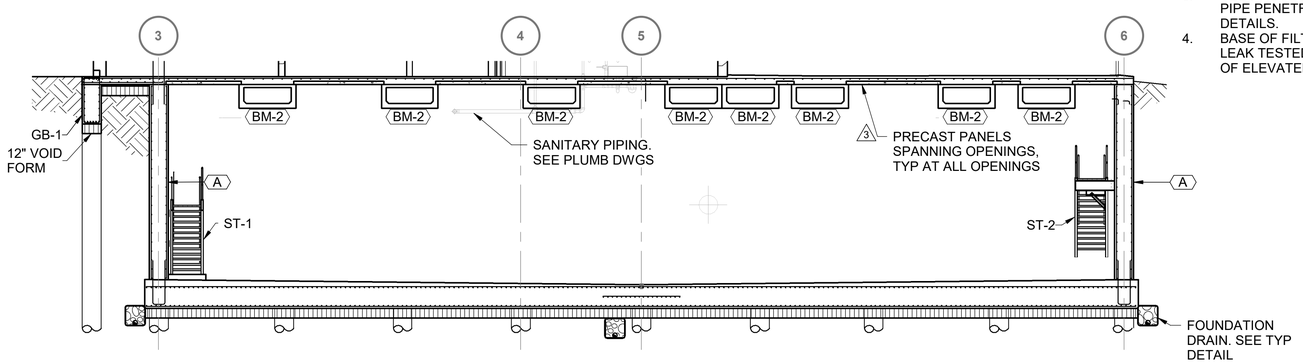
sheet 98 of 542 sheets

file 98101_S



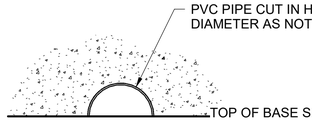

SECTION E S201

SCALE IN FEET



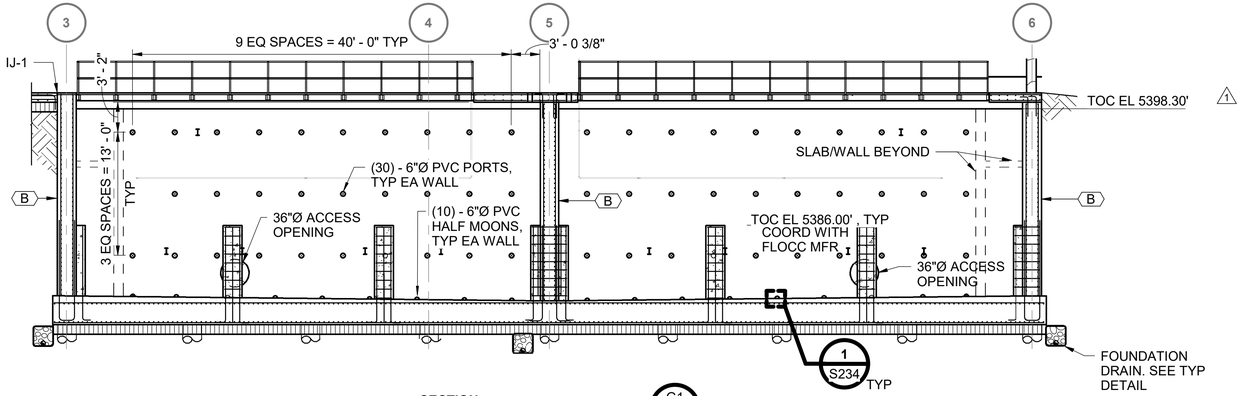

SECTION F S201

SCALE IN FEET



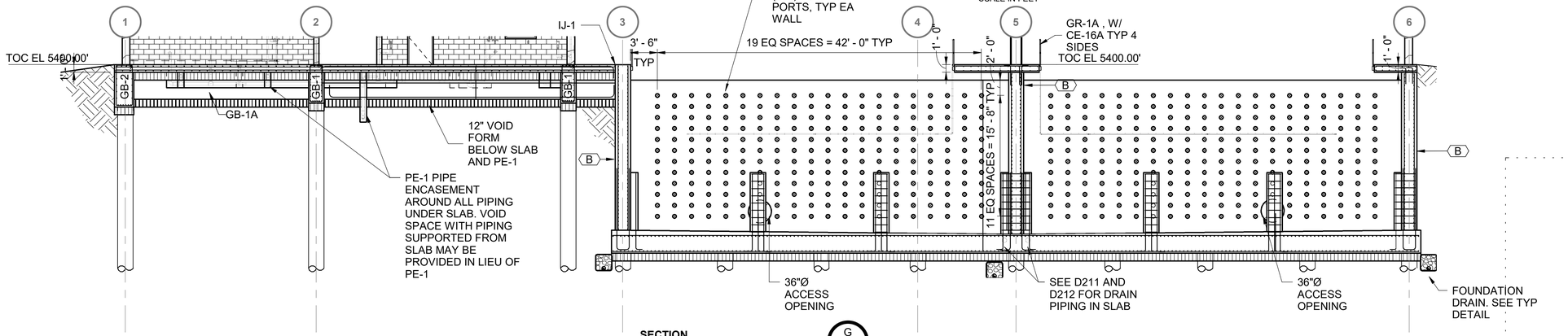

DETAIL 1 S234

NOT TO SCALE




SECTION G1 S201

SCALE IN FEET




SECTION G S201

SCALE IN FEET

**NOTES:**

1. (X) INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 4/25/18 | KDT | BLS | REVISED PER RFI #16 |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 3 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS V

| | |
|---|---|
| project 98101 | contract |
| drawing S234 | rev. 3 |
| sheet 99 of 542 sheets | |
| file 98101_S | |

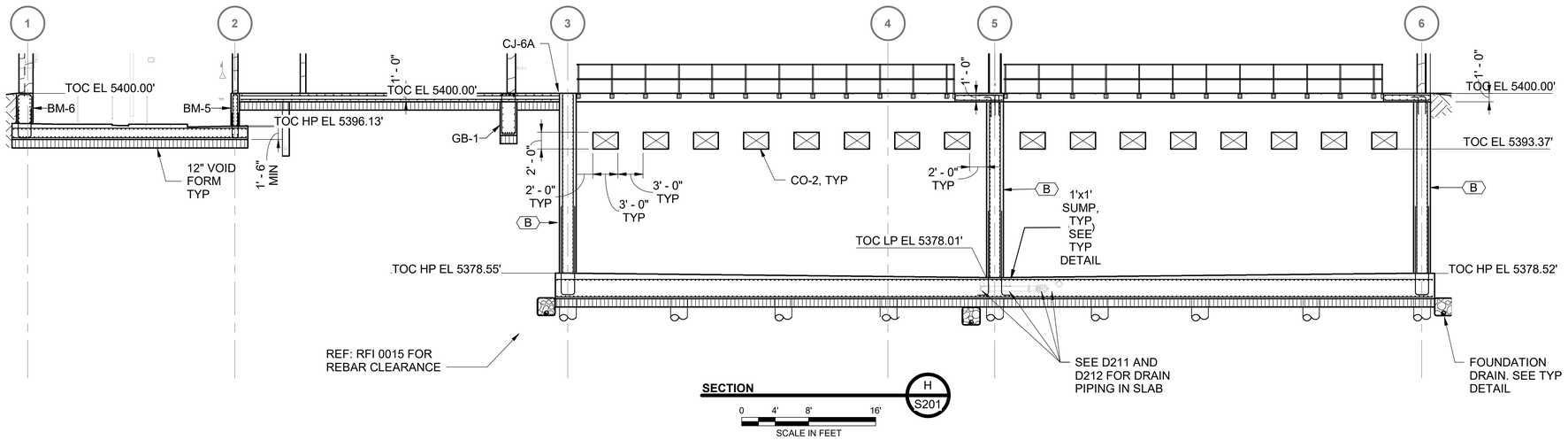
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

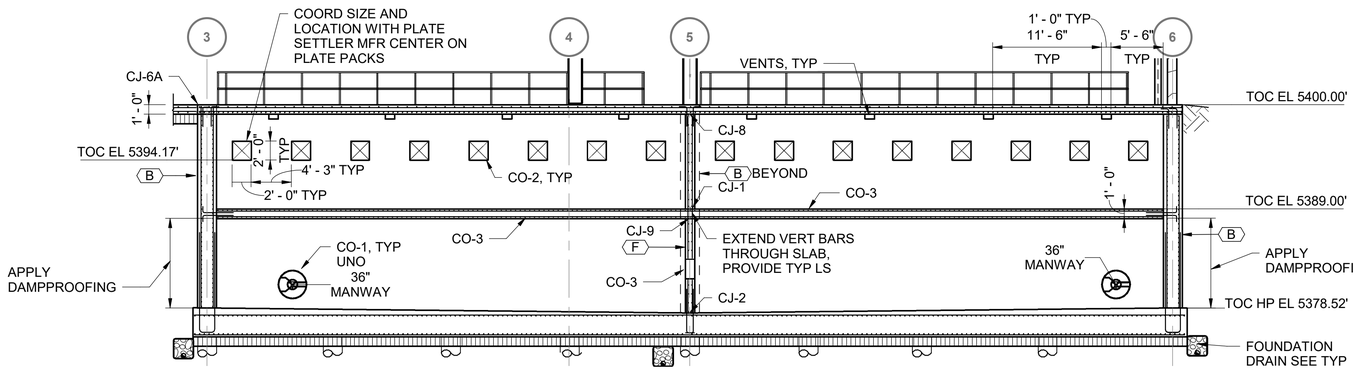
Scale For Microfilming
Millimeters
Inches

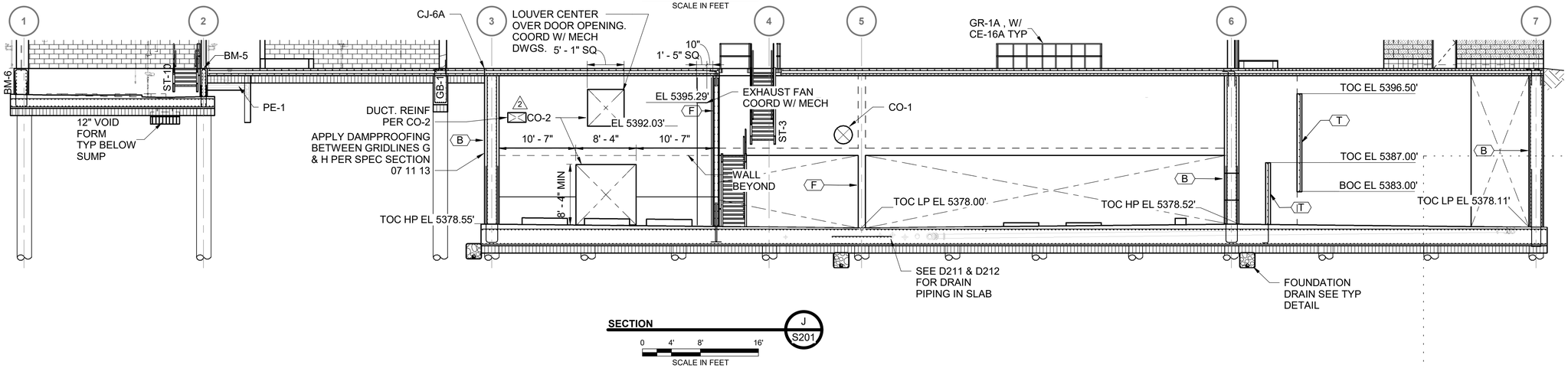
**NOTES:**

1. (X) INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

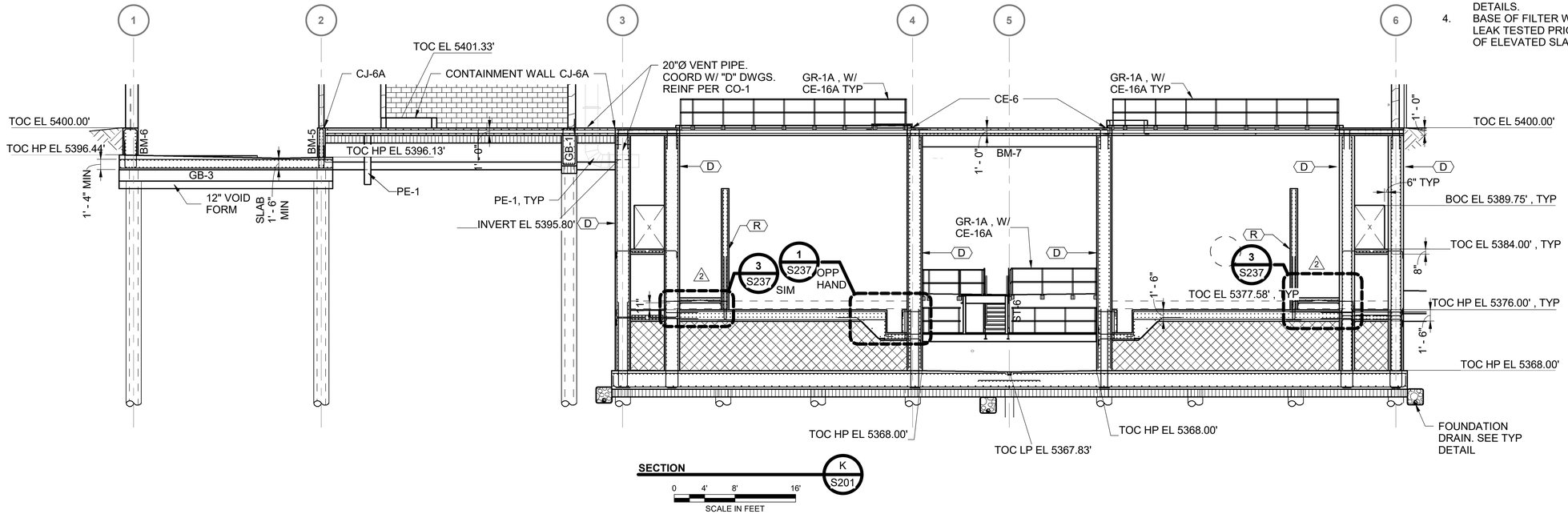
**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VI

| | |
|---|---|
| project 98101 | contract |
| drawing **S235** | rev. **2** |
| sheet 100 of 542 sheets | |
| file 98101_S | |

**NOTES:**

1. (X) INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

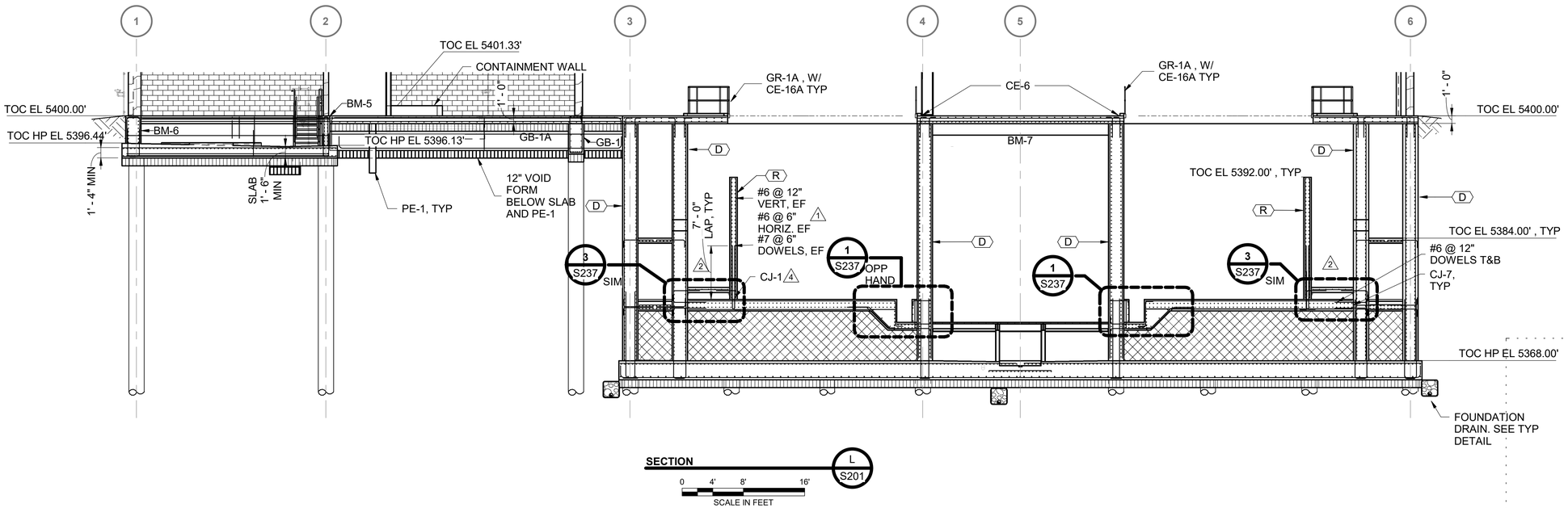
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 5/8/18 | KDT | BLS | REVISED PER RFI #20 |
| 2 | 11/13/18 | KDT | BLS | REVISED PER CDPHE COMMENTS |
| 3 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 4 | 4/8/19 | KDT | BLS | REVISED PER RFI #102 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**SECTION** K S201

0 4' 8' 16'

SCALE IN FEET




**SECTION** L S201

0 4' 8' 16'

SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VII

| project | contract |
|---|---|
| 98101 | |

drawing **S236** rev. **4**

sheet 101 of 542 sheets

file 98101_S

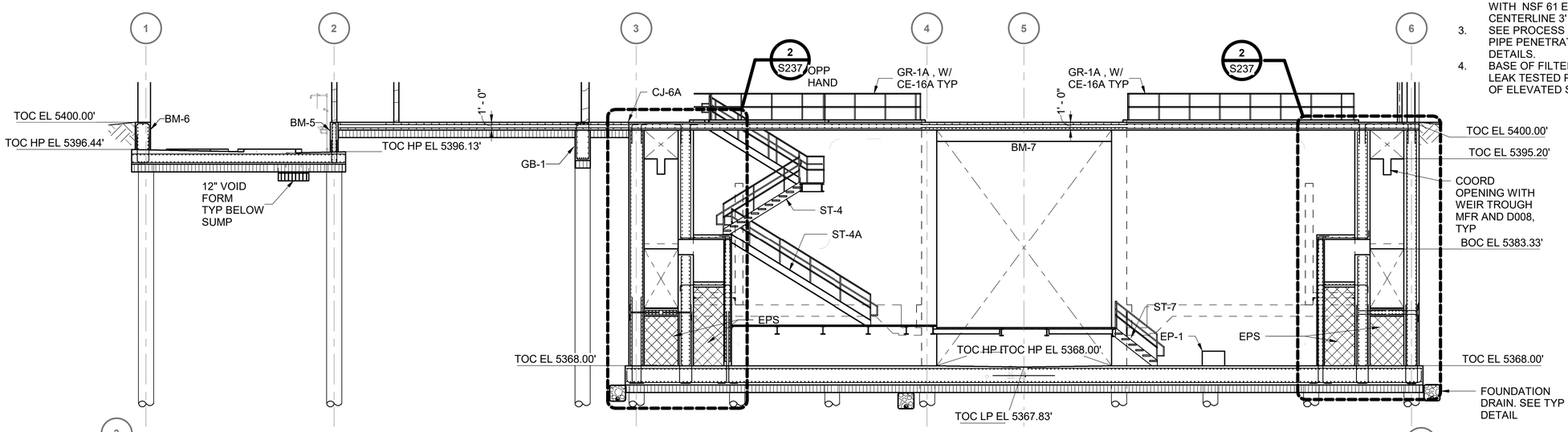
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

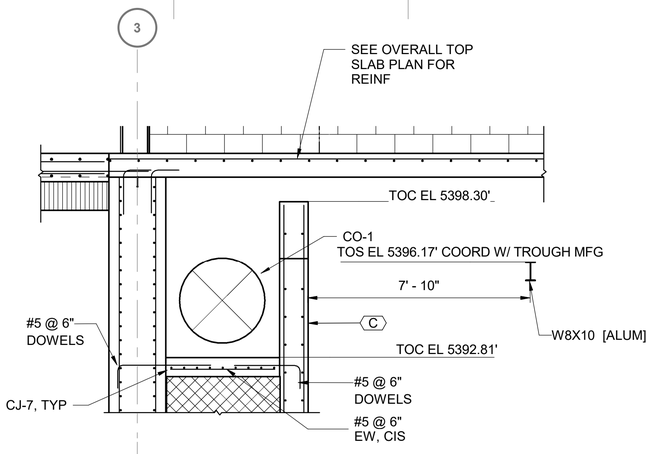
1. (X) INDICATES WALL TYPE. SEE S237 & S238 FOR TYPICAL REINFORCING.
2. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC. MATERIALS SHALL BE 304L STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE 3' AFF, UNO.
3. SEE PROCESS DRAWINGS FOR ALL PIPE PENETRATION SIZES AND DETAILS.
4. BASE OF FILTER WALLS SHALL BE LEAK TESTED PRIOR TO PLACEMENT OF ELEVATED SLABS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 11/13/18 | KDT | BLS | REVISED PER CDPHE COMMENTS |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 3 | 4/8/19 | KDT | BLS | REVISED PER RFI #102 |
| 4 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |



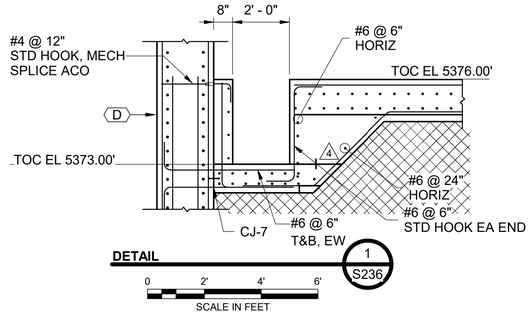

**SECTION** M S201

SCALE IN FEET



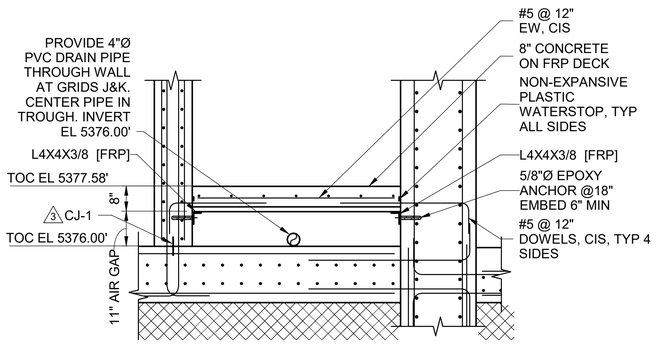

**SECTION** N S204

SCALE IN FEET



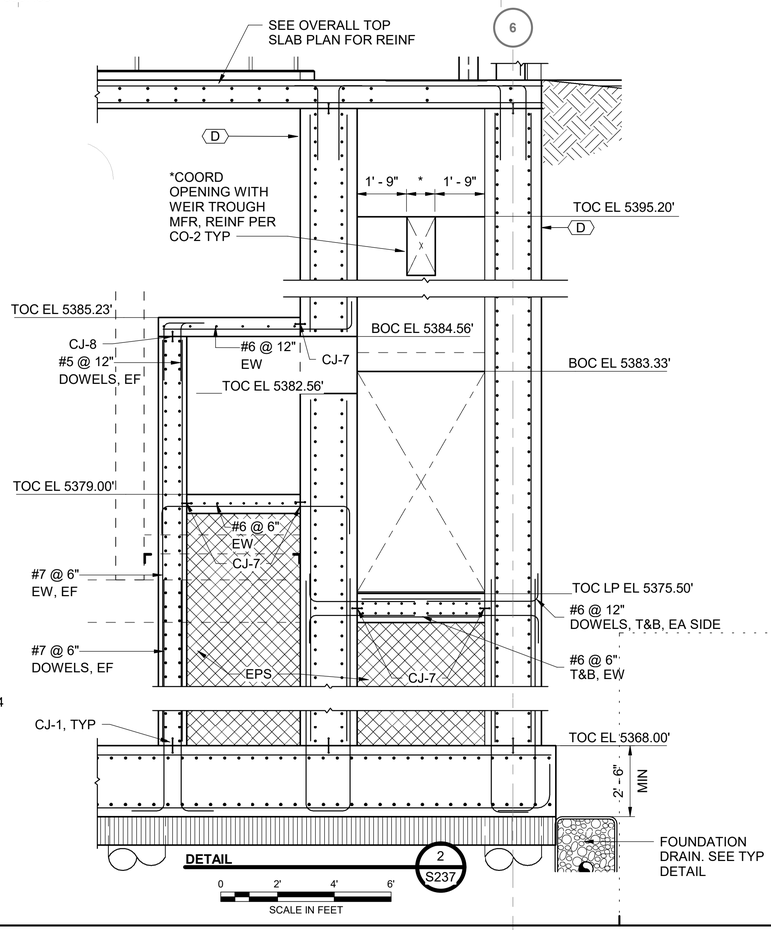

**DETAIL** 1 S236

SCALE IN FEET




1 **FILTER AIR GAP DETAIL** 3 S236

SCALE IN FEET




**DETAIL** 2 S237

SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VIII

| project | contract |
|---|---|
| 98101 | |

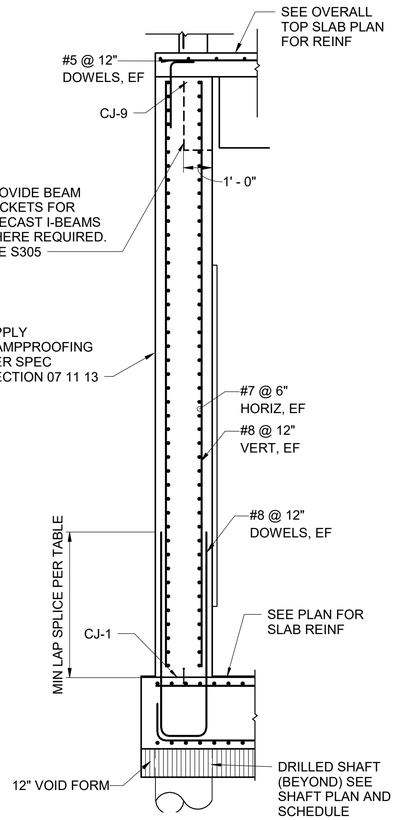
drawing **S237 — 4** rev.

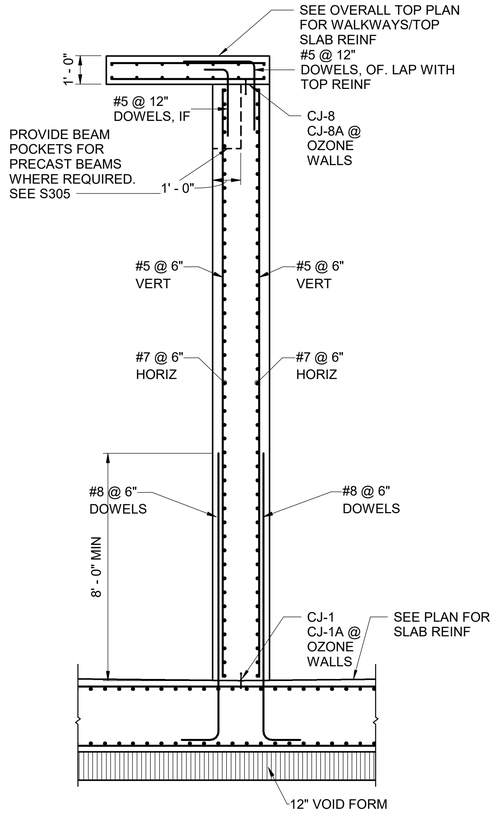
sheet 102 of 542 sheets

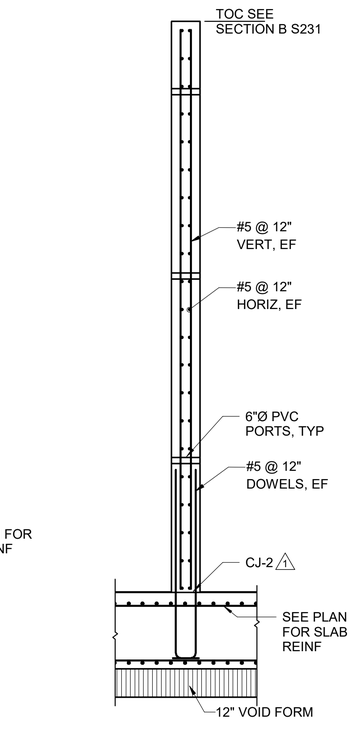
file 98101_S

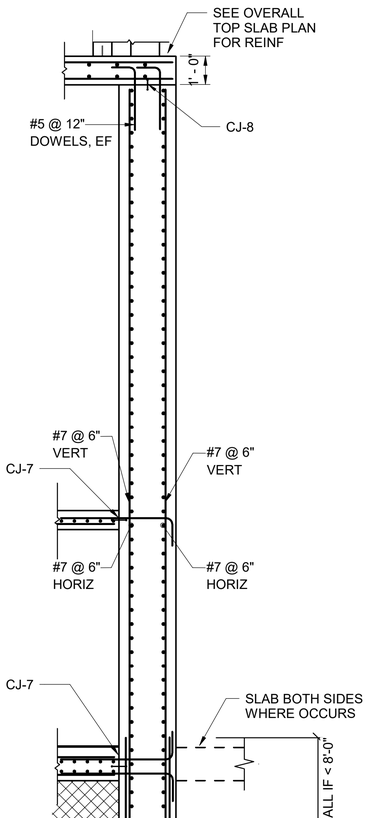
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

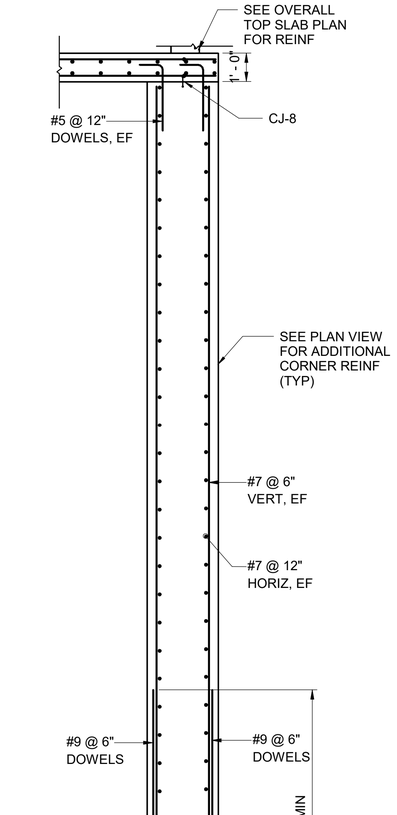
Scale For Microfilming: Millimeters / Inches

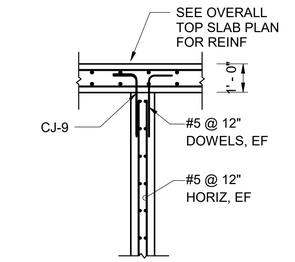


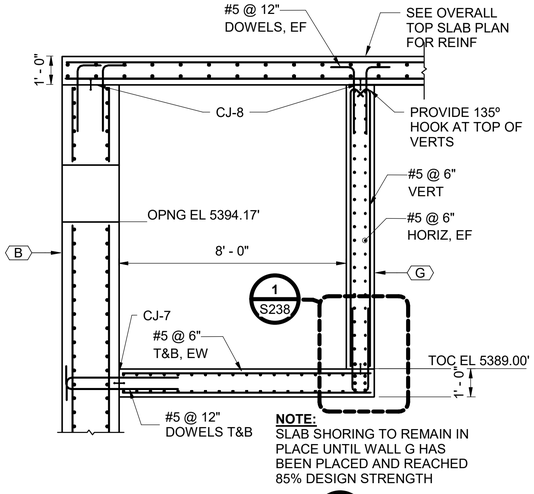



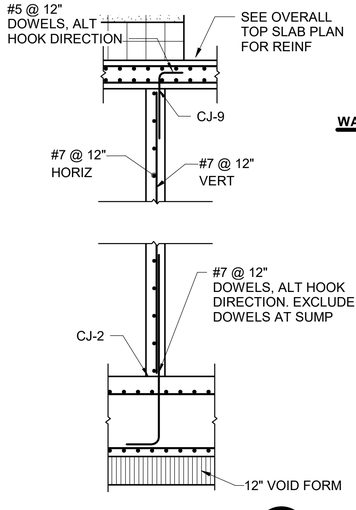



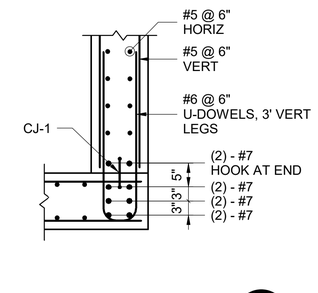




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KDT | BLS | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 5/8/18 | KDT | BLS | REVISED PER RFI #23 |
| 2 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
TYPICAL WALL TYPES

| project | contract |
|---|---|
| 98101 | |

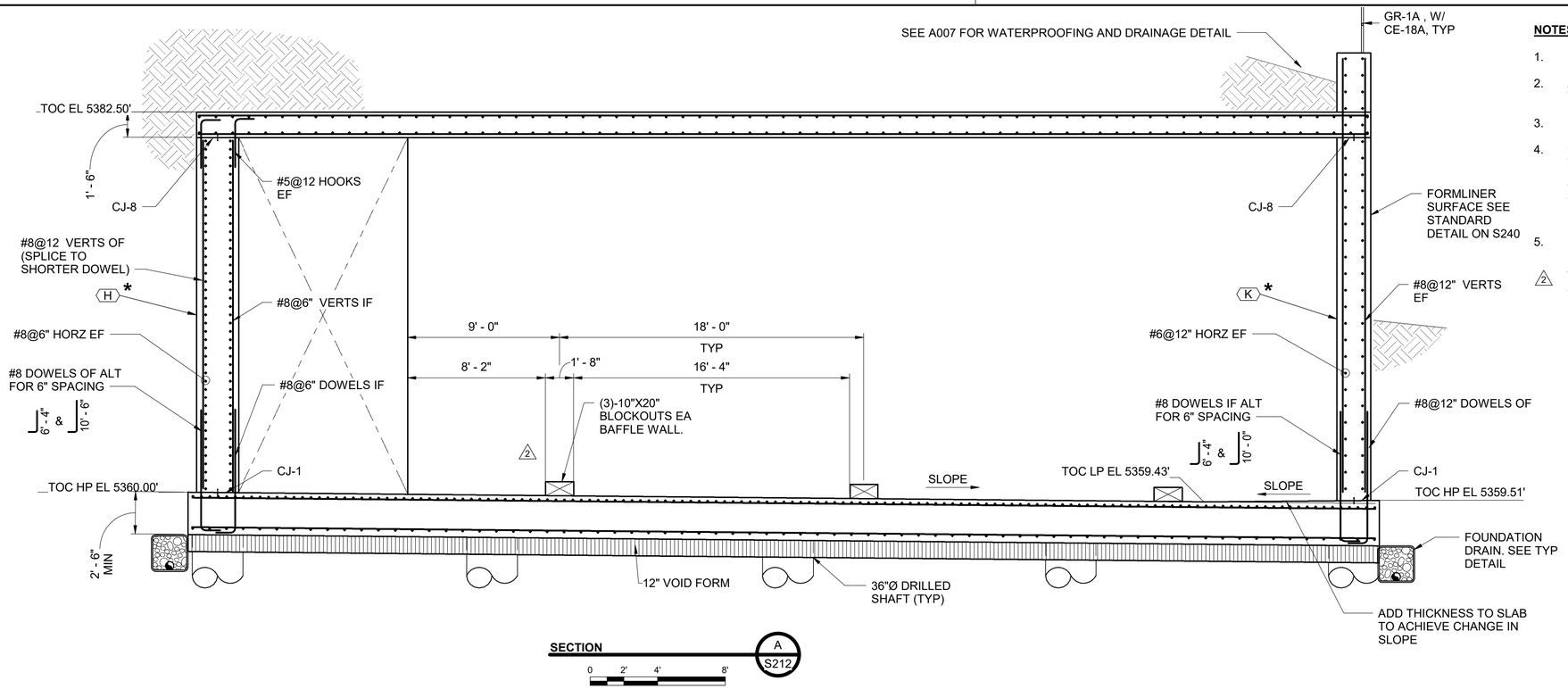
drawing S238 — 2 (rev.)

sheet 103 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

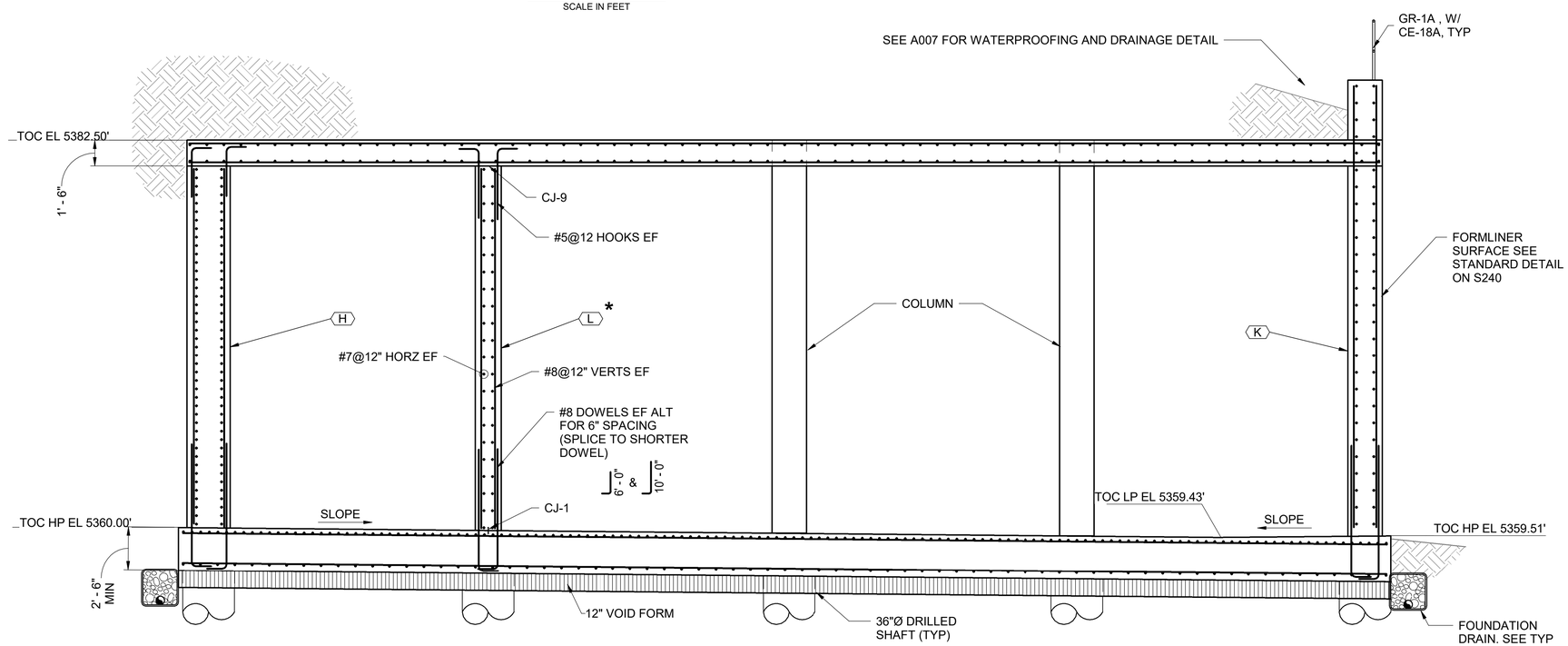
Scale For Microfilming
Millimeters
Inches




**SECTION** A S212

0 2' 4' 8'

SCALE IN FEET




**SECTION** B S212

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE DWG S001 & S002 FOR GENERAL NOTES.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. (X) * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

△2

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

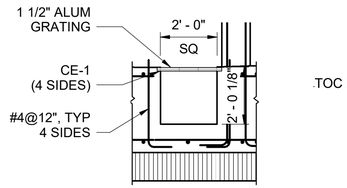
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL SECTIONS I

| | |
|---|---|
| project 98101 | contract |
| drawing **S239** | rev. **2** |
| sheet 104 of 542 sheets | |
| file 98101_S | |

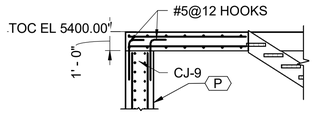
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



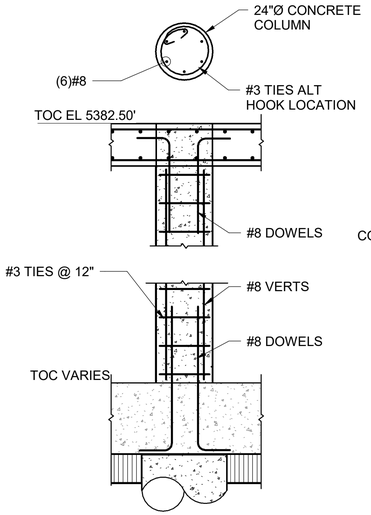

SECTION F S213



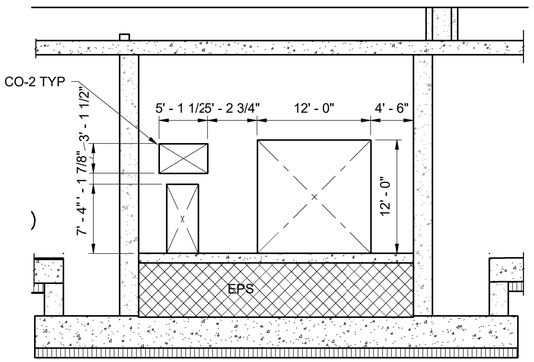

SECTION A S215




**TYPICAL CLEARWELL COLUMN**



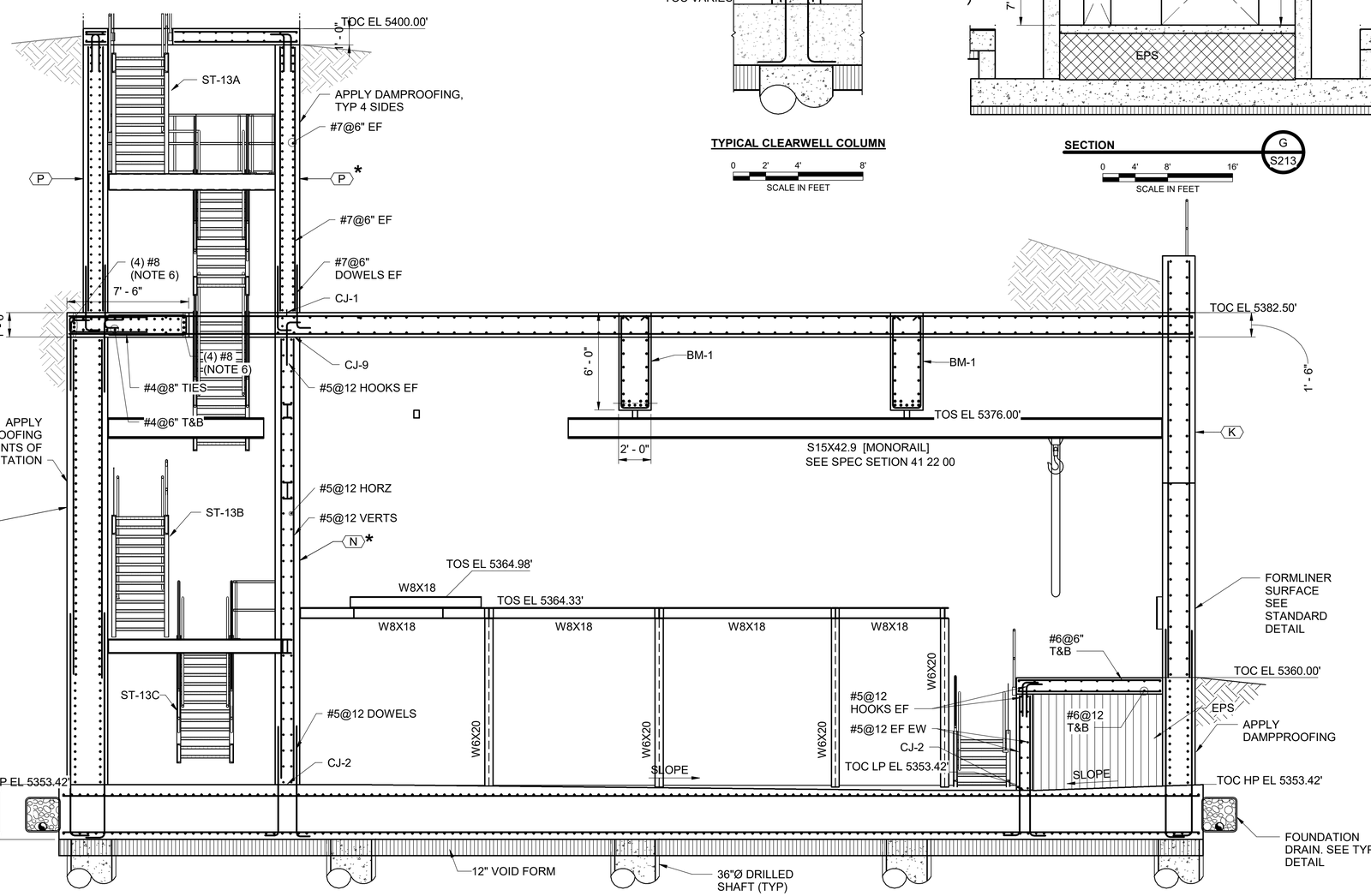




SECTION G S213



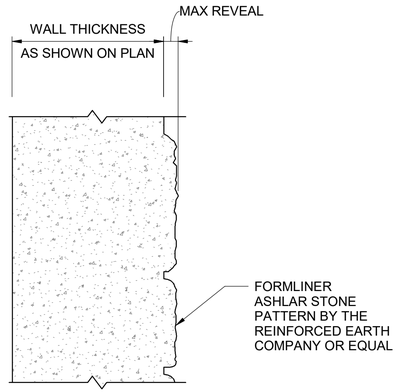

**NOTES:**

1. SEE DWG S001 & S002 FOR GENERAL NOTES.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. ⟨X⟩ * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 △3
6. EXTEND REINFORCING A MINIMUM EMBED LENGTH BEYOND EDGES OF STAIR OPENING.
7. EXTEND BEAMS 1'-0" INTO BEAM POCKETS IN BEARING WALLS AT EACH END. PROVIDE STANDARD HOOKS ON BARS.




SECTION C S212




**TYPICAL FORM LINER DETAIL** △1
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 6/5/18 | BLS | KDT | REVISED PER RFI #27 |
| 2 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 3 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

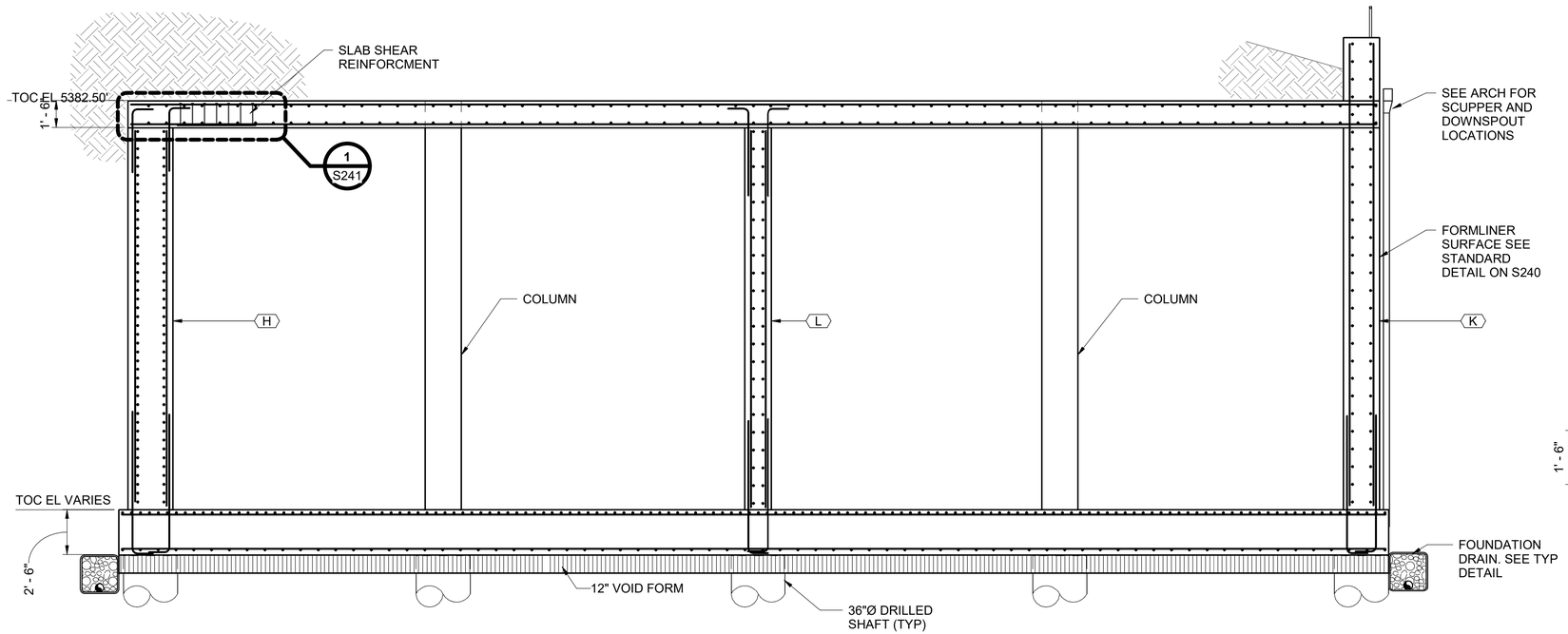
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL SECTIONS II

| | |
|---|---|
| project 98101 | contract |
| drawing **S240 — 3** | rev. |
| sheet 107 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



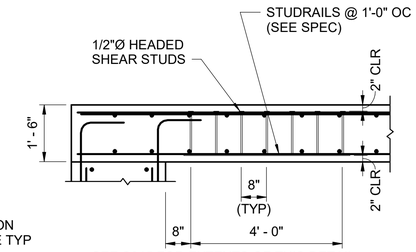

**SECTION** D S212

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE DWG S001 & S002 FOR GENERAL NOTES.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ⟶ INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. ⟨X⟩ * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE △2 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

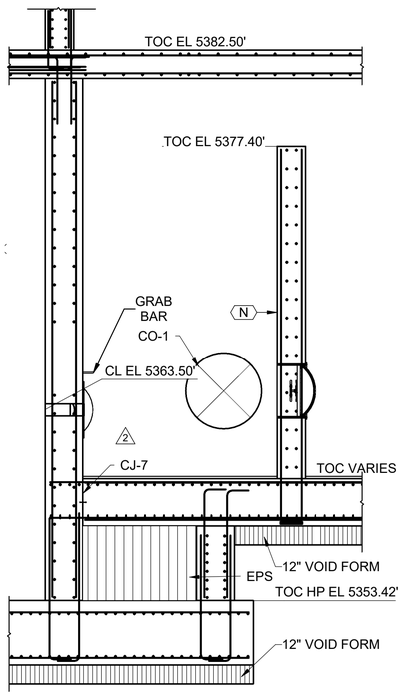



SEE S215 FOR EXTENTS OF THIS DETAIL

**DETAIL** 1 S241

0 1' 2' 4'

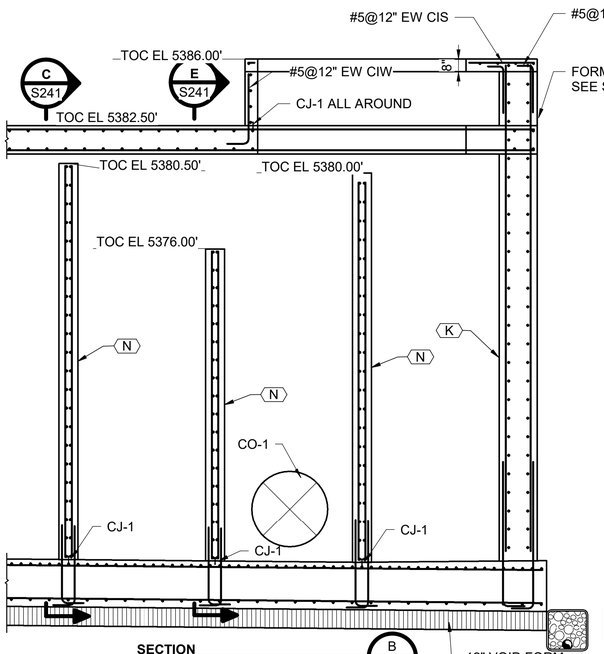
SCALE IN FEET




**SECTION** H S213

0 2' 4' 8'

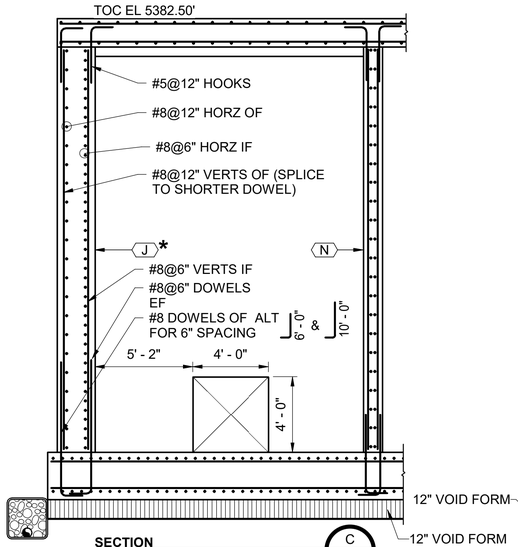
SCALE IN FEET




**SECTION** B S214

0 2' 4' 8'

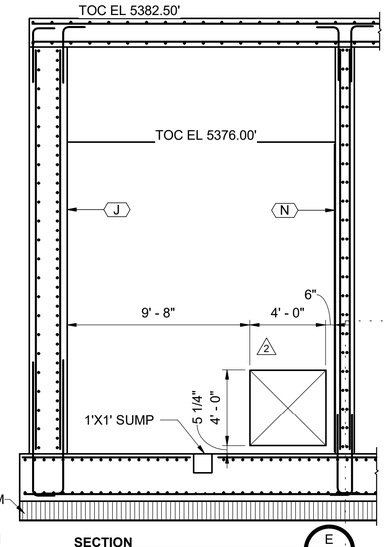
SCALE IN FEET




**SECTION** C S214

0 2' 4' 8'

SCALE IN FEET




**SECTION** E S214

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

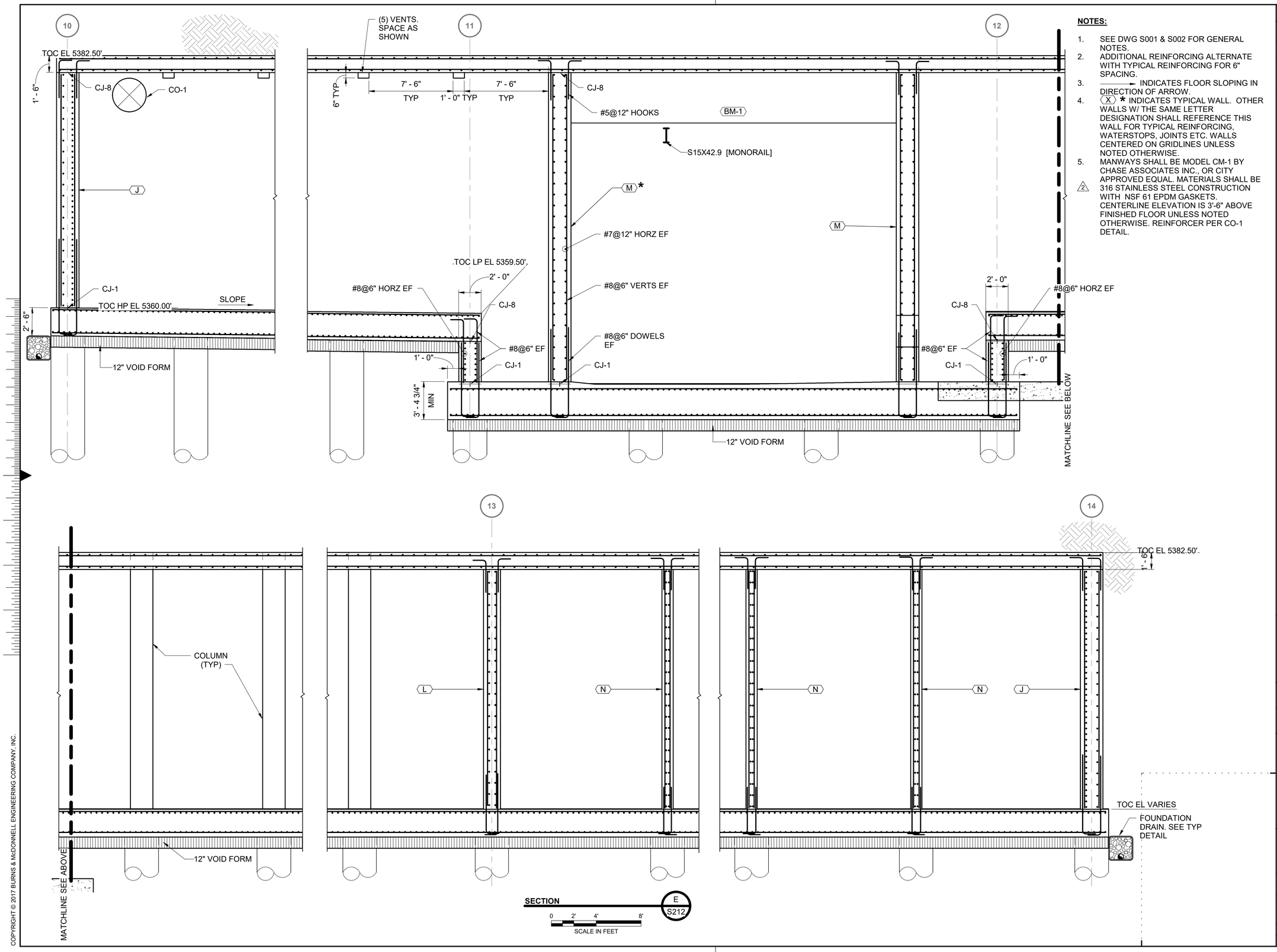
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL SECTIONS III

| | |
|---|---|
| project 98101 | contract |
| drawing S241 | rev. 2 |
| sheet 106 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. SEE DWG S001 & S002 FOR GENERAL NOTES.
2. ADDITIONAL REINFORCING ALTERNATE WITH TYPICAL REINFORCING FOR 6" SPACING.
3. ——► INDICATES FLOOR SLOPING IN DIRECTION OF ARROW.
4. (X) * INDICATES TYPICAL WALL. OTHER WALLS W/ THE SAME LETTER DESIGNATION SHALL REFERENCE THIS WALL FOR TYPICAL REINFORCING, WATERSTOPS, JOINTS ETC. WALLS CENTERED ON GRIDLINES UNLESS NOTED OTHERWISE.
5. MANWAYS SHALL BE MODEL CM-1 BY CHASE ASSOCIATES INC., OR CITY APPROVED EQUAL. MATERIALS SHALL BE 316 STAINLESS STEEL CONSTRUCTION WITH NSF 61 EPDM GASKETS. CENTERLINE ELEVATION IS 3'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. REINFORCER PER CO-1 DETAIL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BLS | KDT | WP2- ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

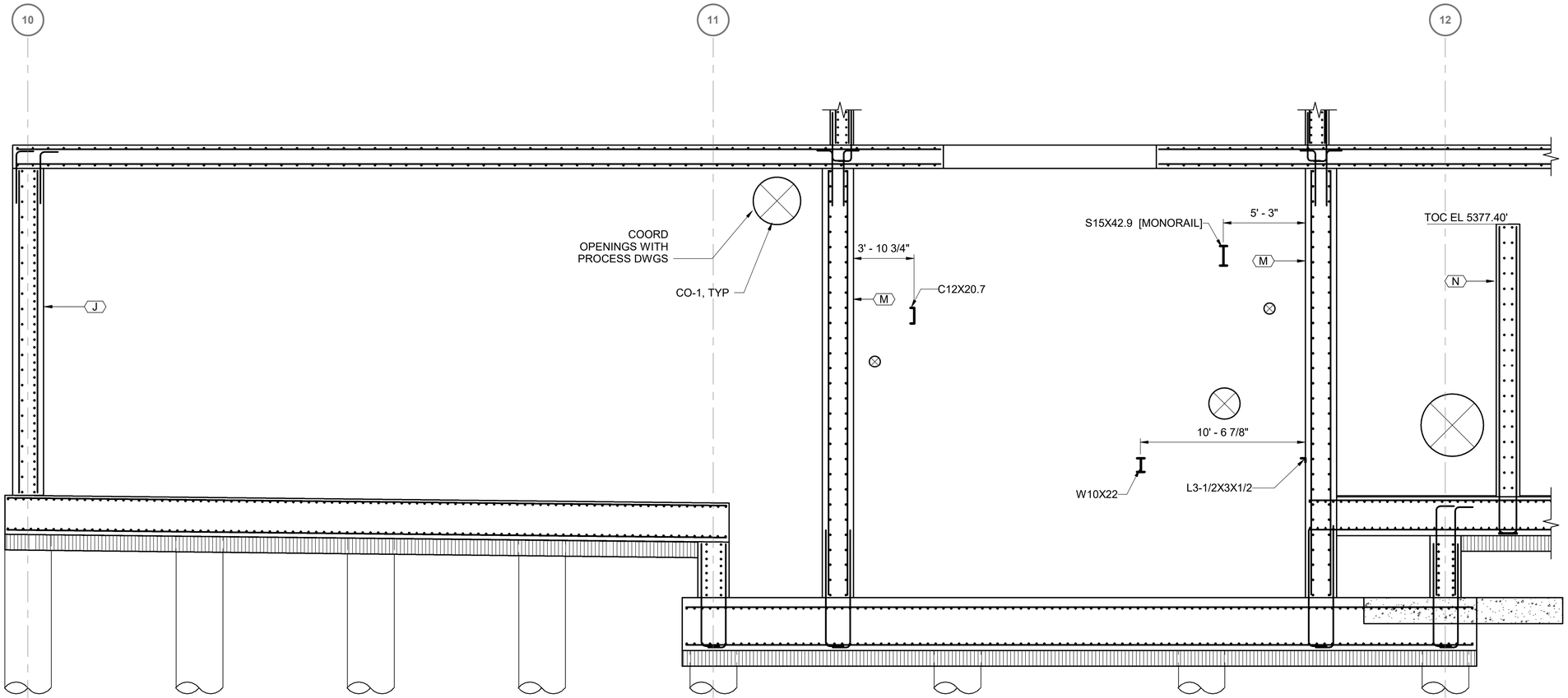
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL SECTIONS IV

| | |
|---|---|
| project 98101 | contract |
| drawing **S242 — 2** | rev. |
| sheet 107 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




CLEARWELL NORTH WALL — F / S213

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. SNYDER |
| **designed** | **checked** |
| B. SNYDER | K. THURMAN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL SECTIONS V

| project | contract |
|---|---|
| 98101 | |

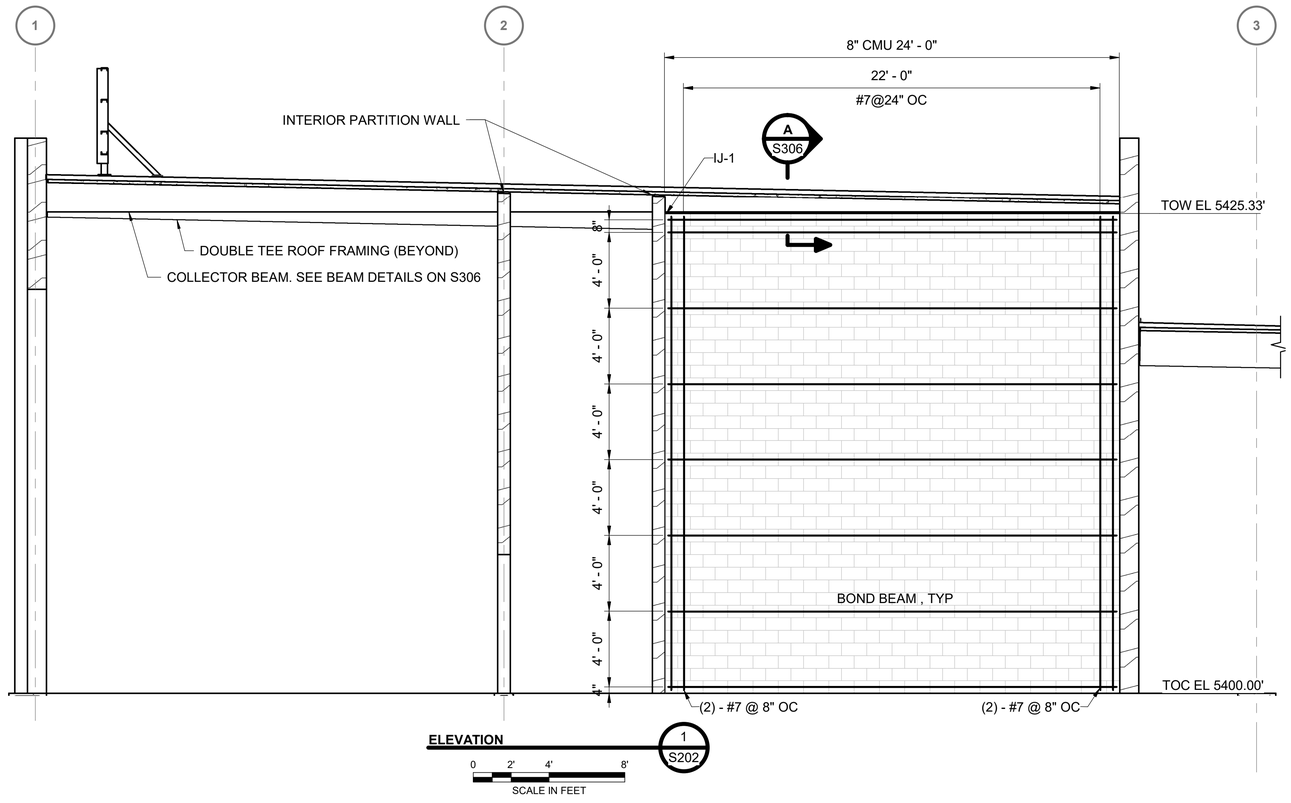
**drawing** S243 **rev.** 0

**sheet** 108 **of** 542 **sheets**

**file** 98101_S

Scale For Microfilming
Millimeters
Inches

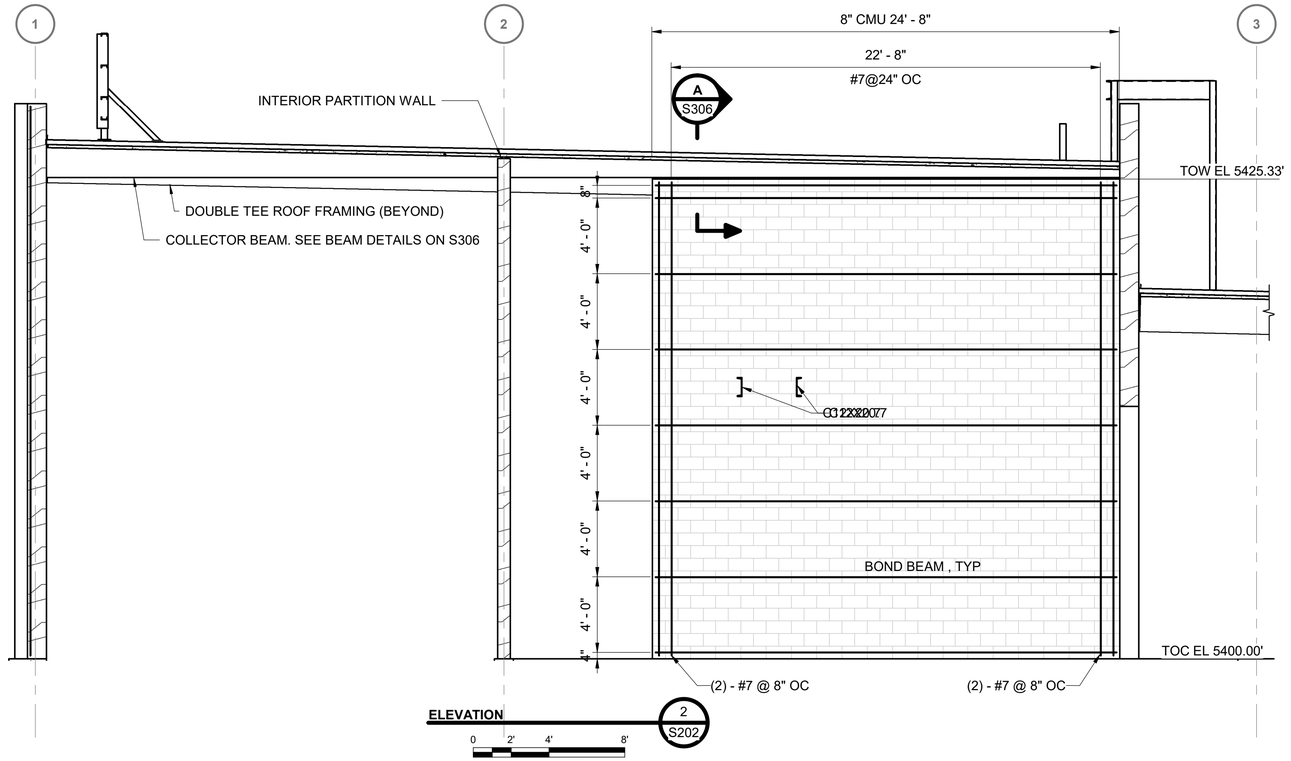
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**ELEVATION** 1 S202

0 2' 4' 8'

SCALE IN FEET




**ELEVATION** 2 S202

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

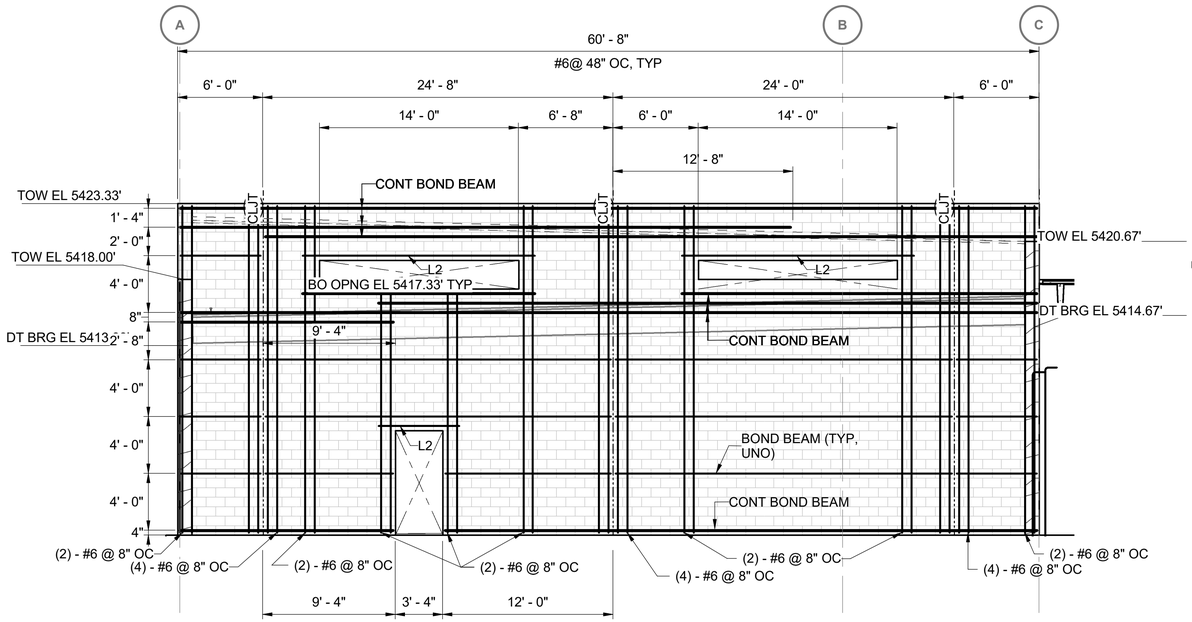
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS I

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** S244 | **rev.** 0 |
| **sheet** 109 **of** 542 **sheets** | |
| **file** 98101_S | |

Scale For Microfilming
Millimeters
Inches

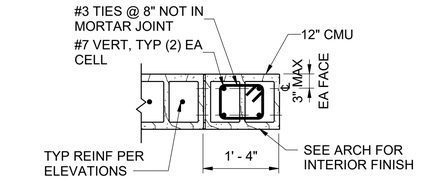
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



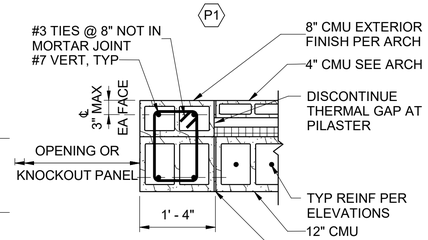

**ELEVATION** 3 S202

0 2' 4' 8'

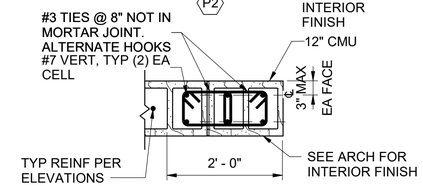
SCALE IN FEET



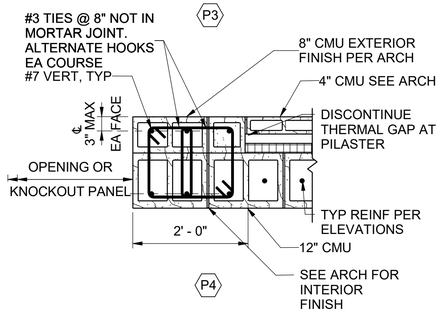

P1



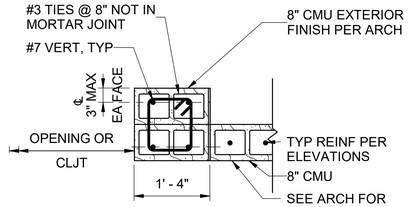

P2



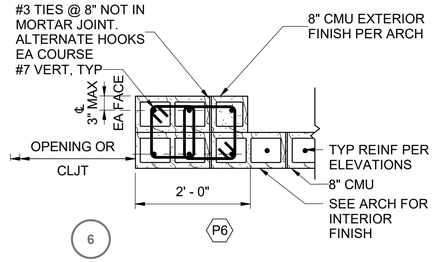

P3




P4



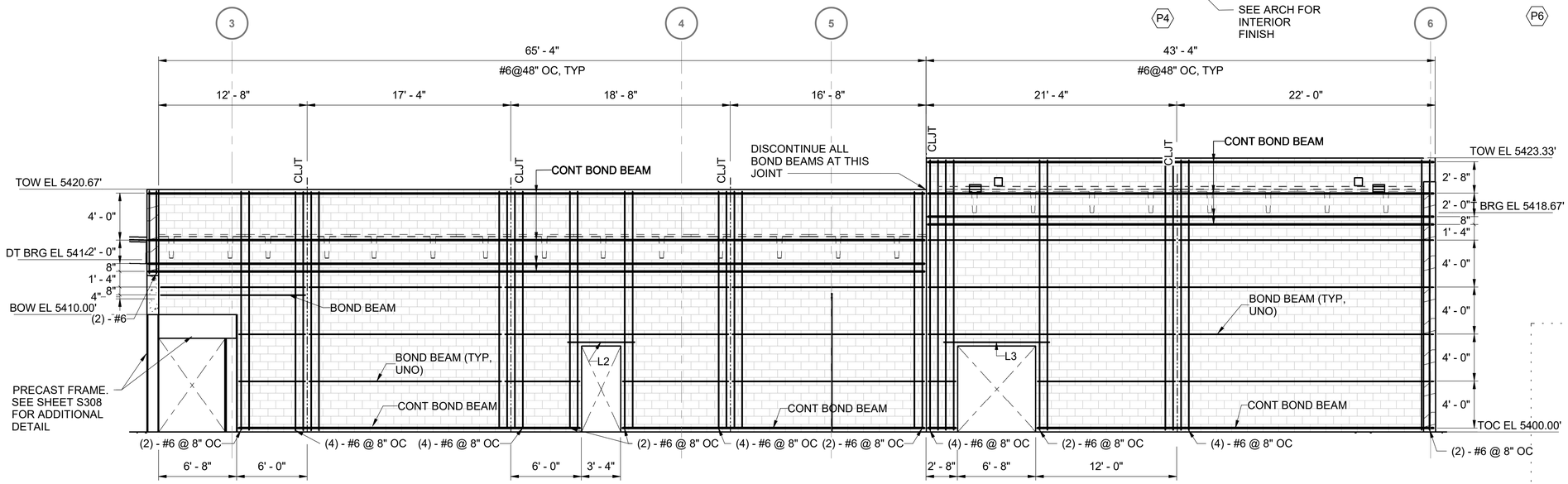

P5




P6

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.




**ELEVATION** 4 S202

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

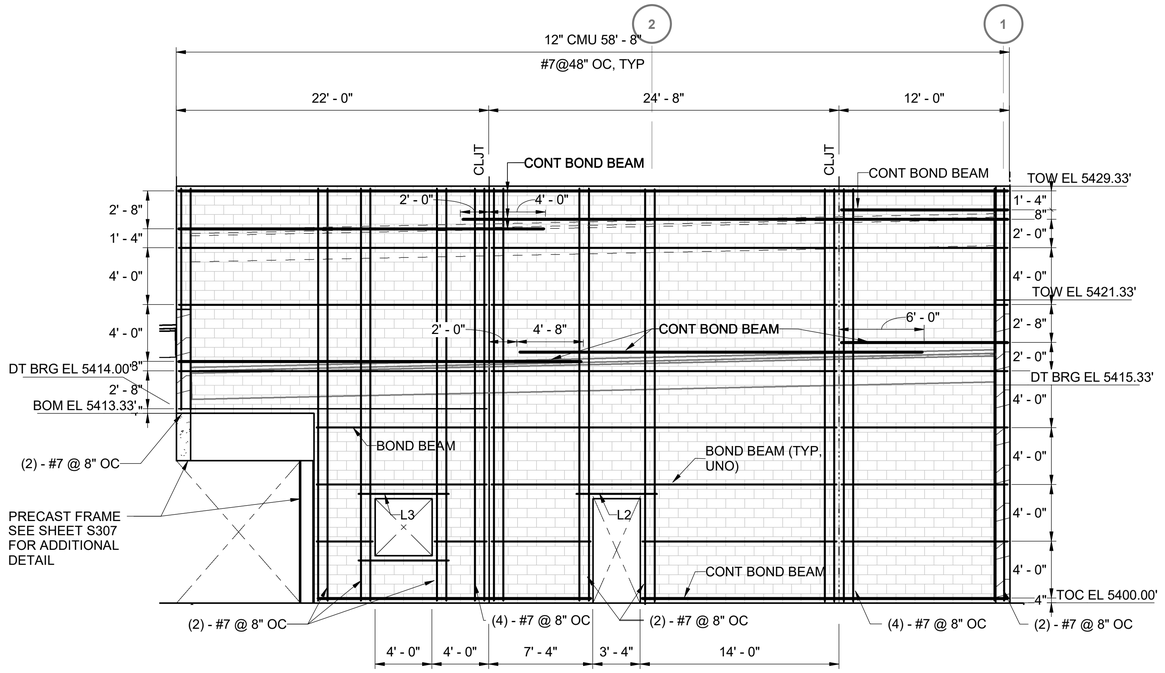
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS II

| | |
|---|---|
| project 98101 | contract |
| drawing S245 | rev. 0 |
| sheet 110 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

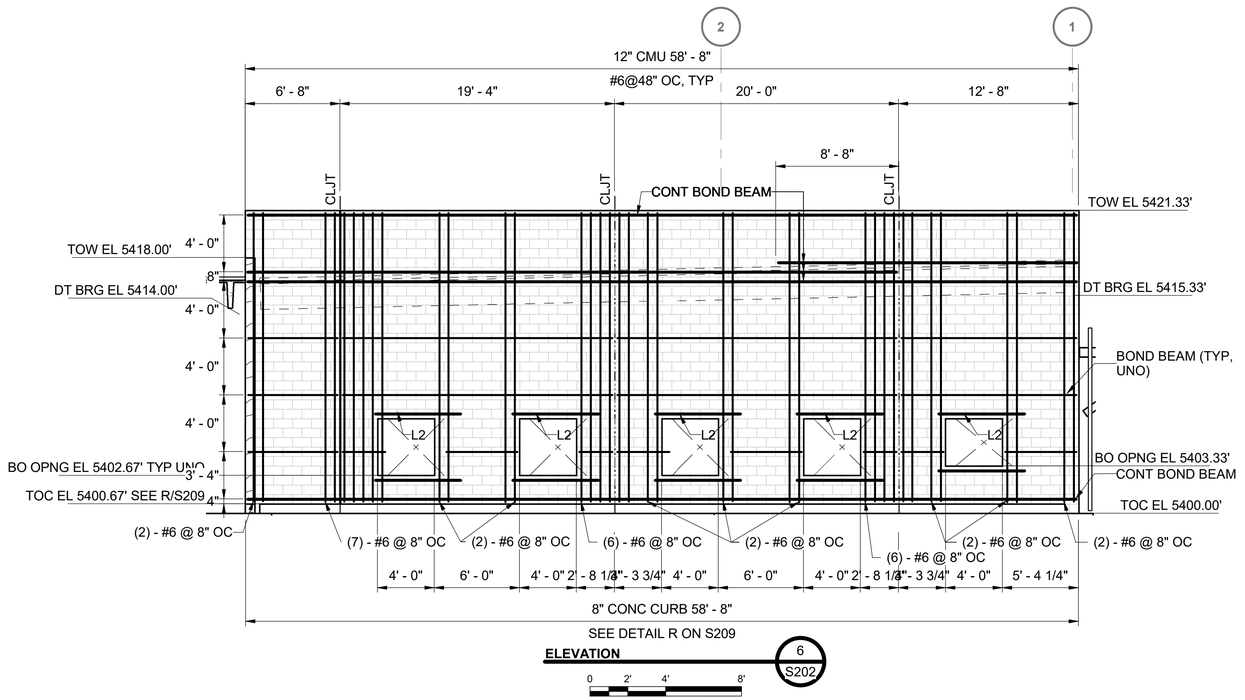
Millimeters
Scale For Microfilming
Inches




**ELEVATION** 5 / S202

0 2' 4' 8'

SCALE IN FEET




**ELEVATION** 6 / S202

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters

Inches

Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

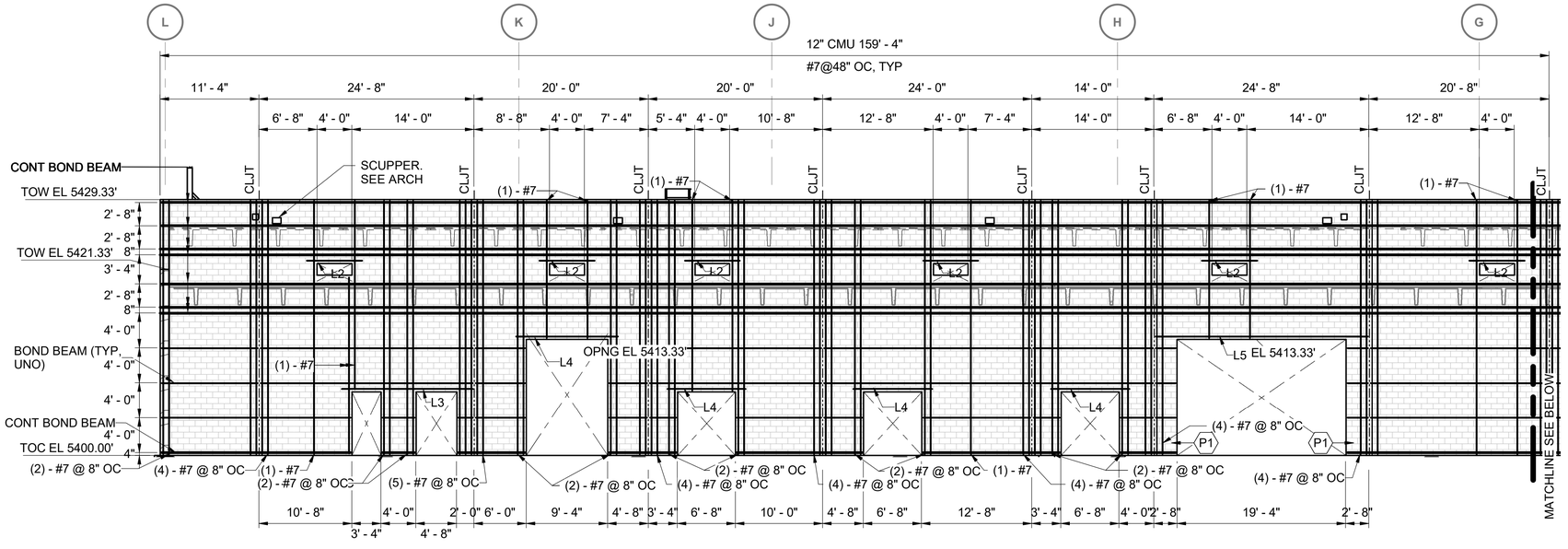
City of Thornton

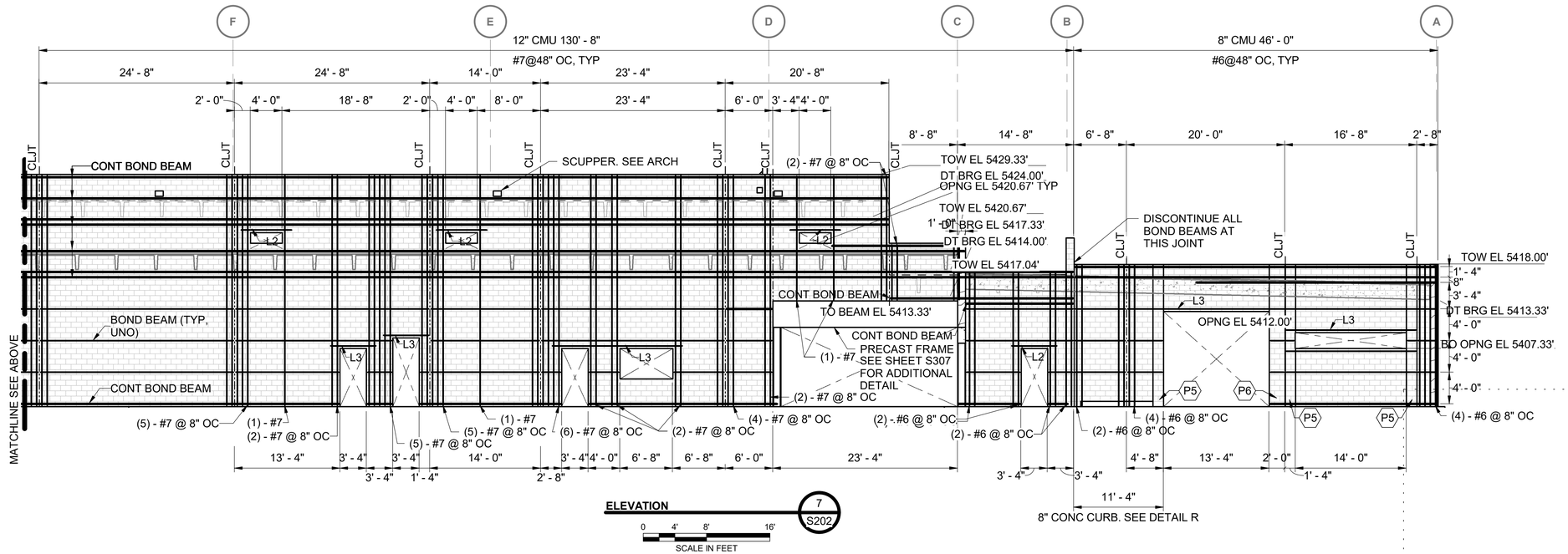
**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS III

| | |
|---|---|
| project 98101 | contract |
| drawing **S246** | rev. **0** |
| sheet 111 of 542 sheets | |
| file 98101_S | |

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.




**ELEVATION** 7 / S202

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS IV

| project | contract |
|---|---|
| 98101 | |

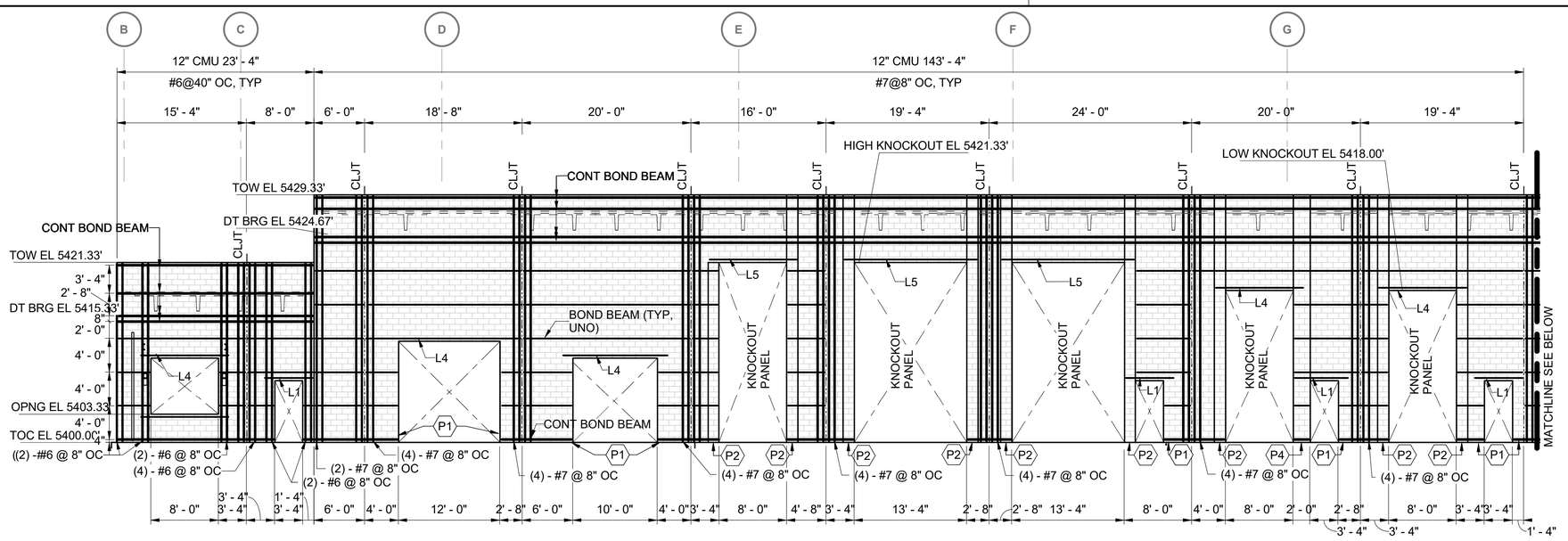
drawing **S247** rev. **0**

sheet 112 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

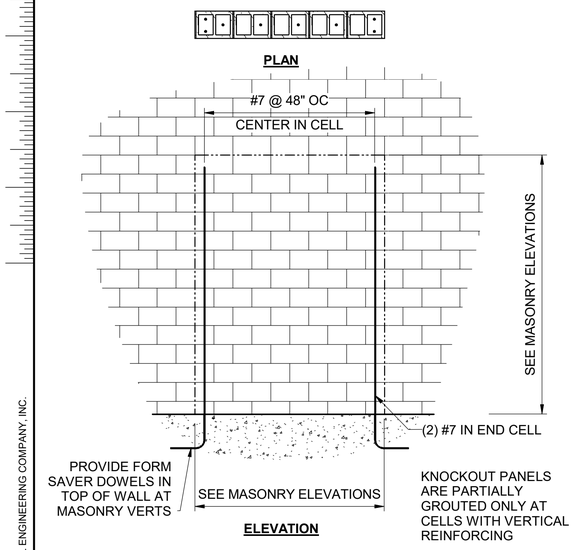
Scale For Microfilming: Millimeters / Inches



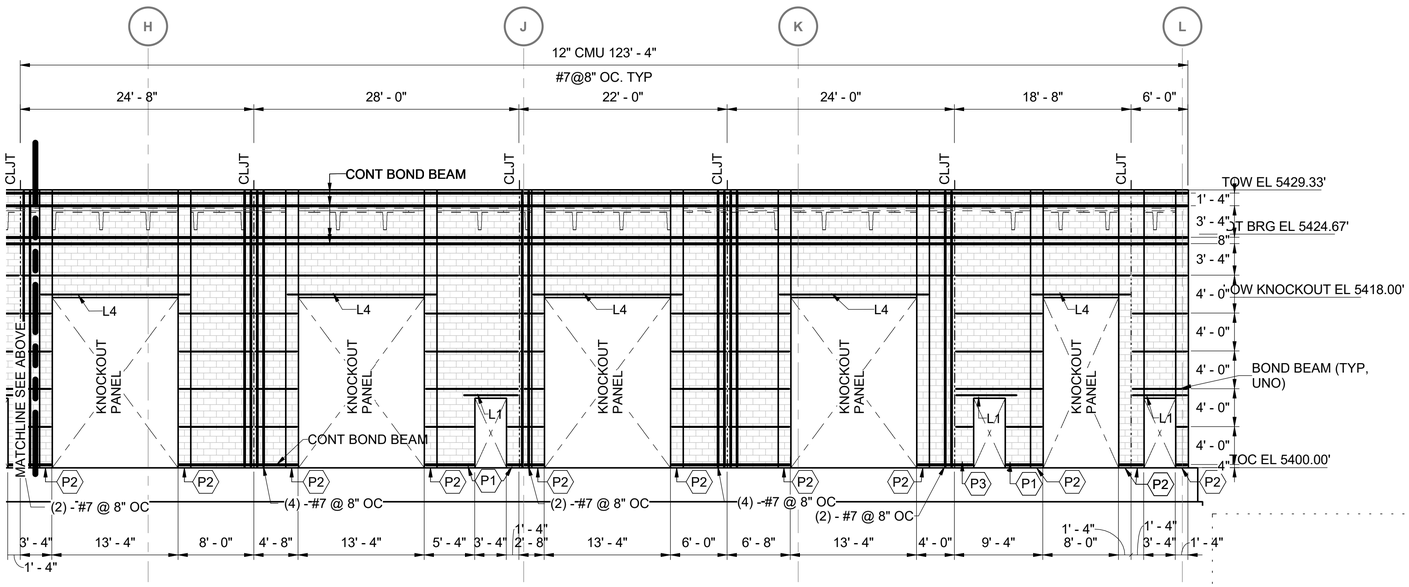

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**KNOCKOUT PANEL**
NOT TO SCALE




**WEST ELEVATION** 8 S202

0 4' 8' 16'
SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS V

| project | contract |
|---|---|
| 98101 | |

drawing **S248** rev. **0**

sheet 113 of 542 sheets

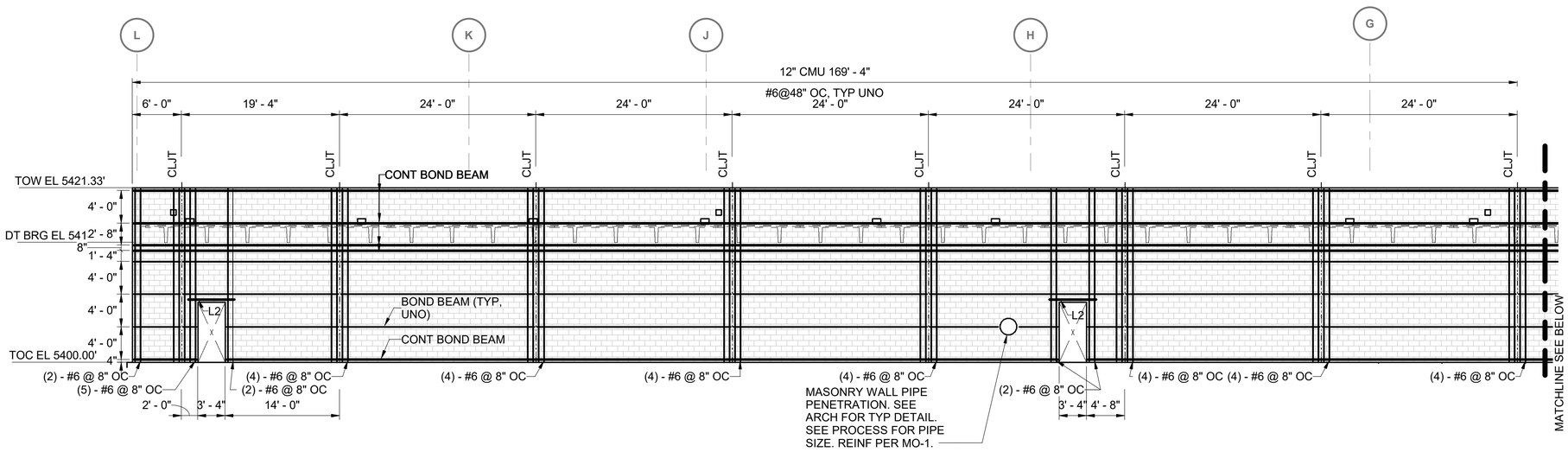
file 98101_S

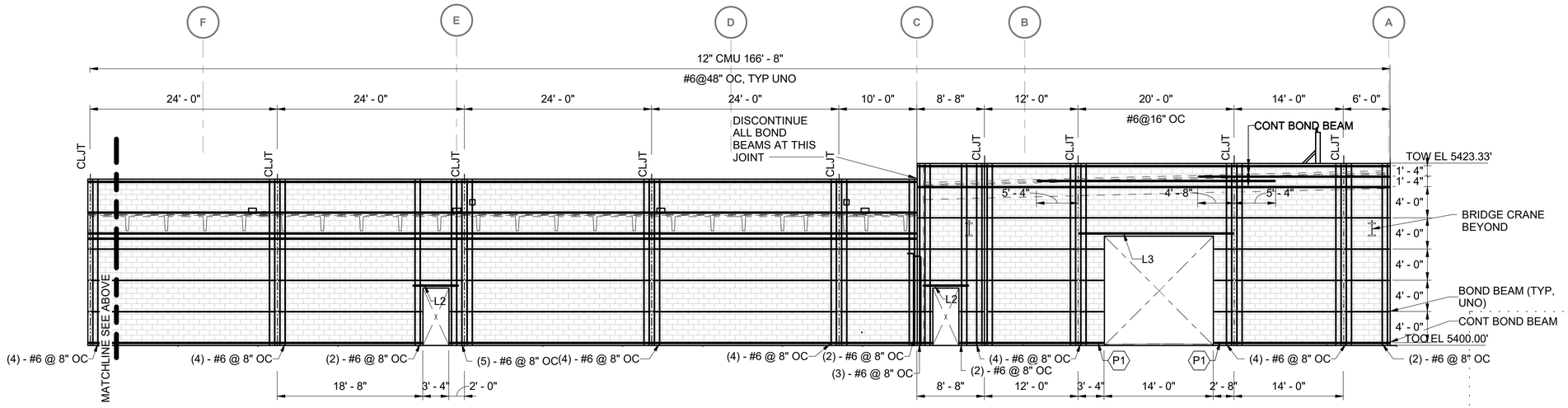
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.




**EAST ELEVATION** 9 S202

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS VI

| project | contract |
|---|---|
| 98101 | |

**drawing** **S249** **rev.** **0**

**sheet** 114 **of** 542 **sheets**

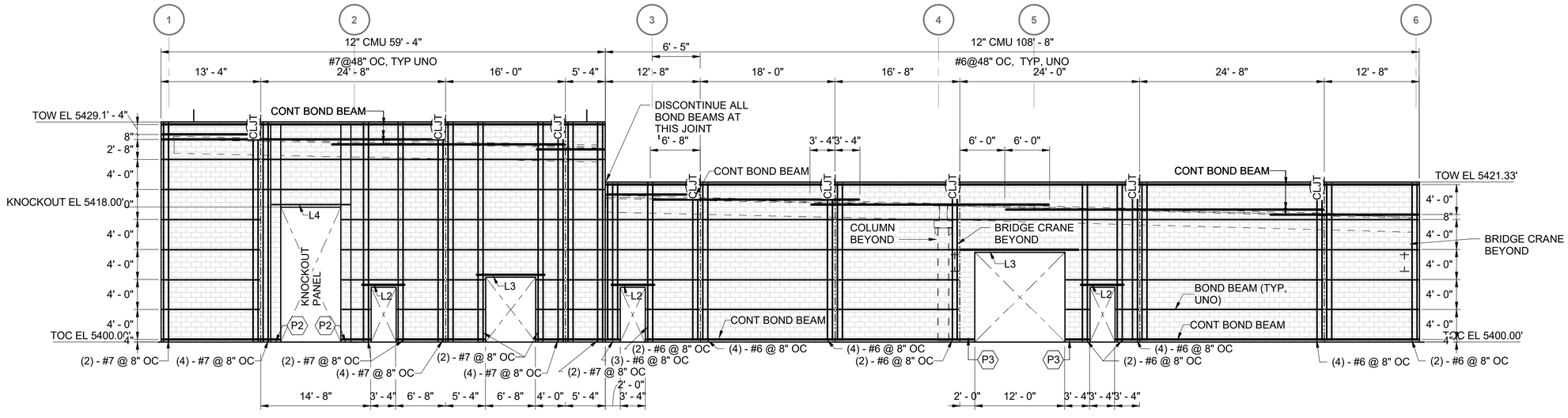
**file** 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

**NOTES:**

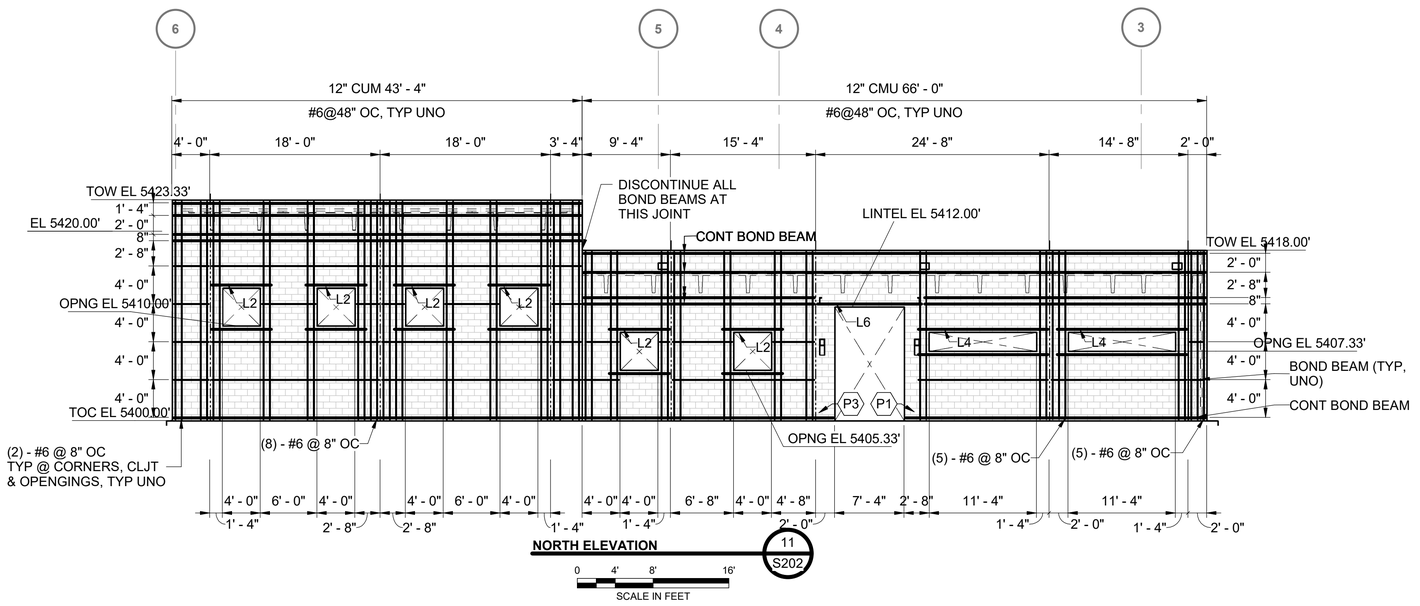
1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES LOADS.
2. SEE SHEET S007 FOR TYPICAL MASONRY NOTES AND DETAILS.
3. PILASTER REINFORCING IS NOT SHOWN FOR CLAIRITY. SEE TYPICAL PILASTER DETAILS ON S245.
4. COORDINATE ALL DOOR AND WINDOW OPENING DIMENSIONS AND ELVATIONS WITH ARCHITECTURAL DRAWINGS.




**SOUTH ELEVATION** — 10 / S202

0 4' 8' 16'

SCALE IN FEET




**NORTH ELEVATION** — 11 / S202

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS VII

| project | contract |
|---|---|
| 98101 | |

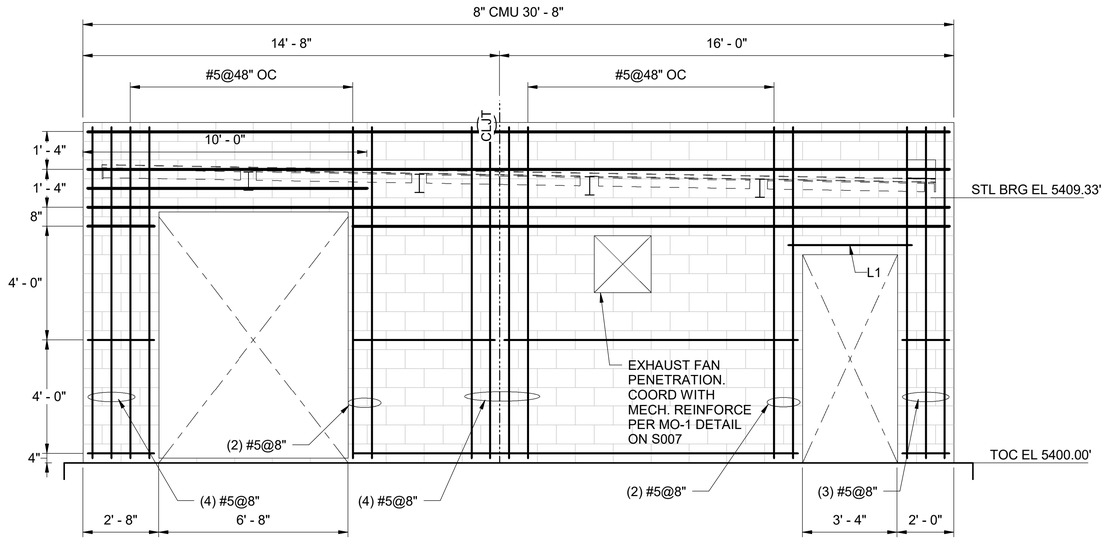
drawing **S250** rev. **0**

sheet 115 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

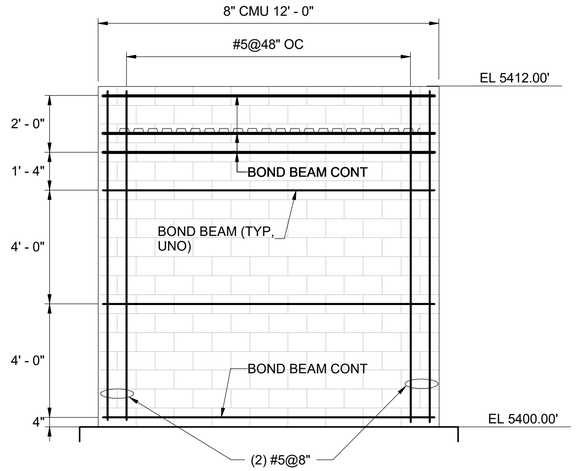
Scale For Microfilming: Millimeters / Inches




**NORTH ELEVATION** N S215

0 2' 4' 6'

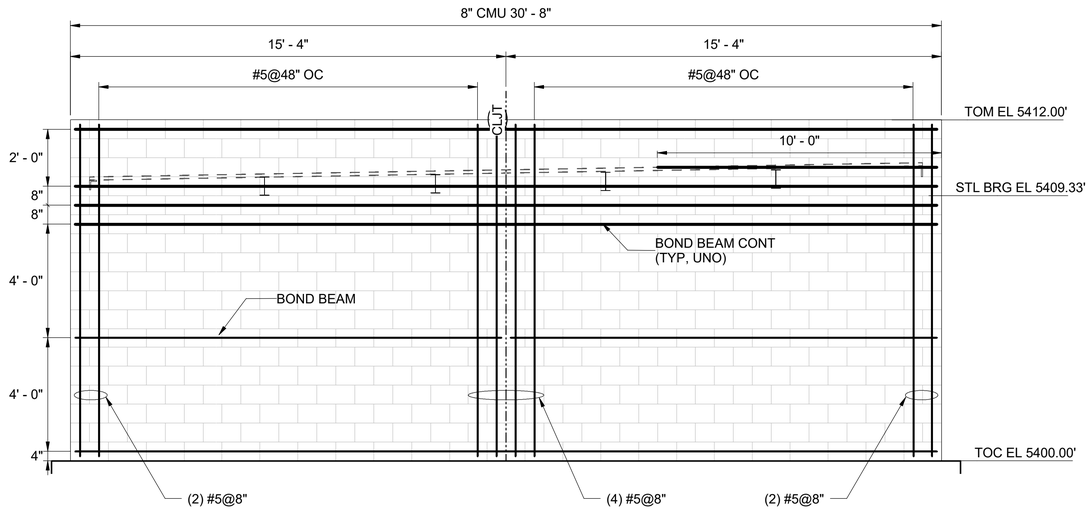
SCALE IN FEET




**EAST ELEVATION** E S215

0 2' 4' 6'

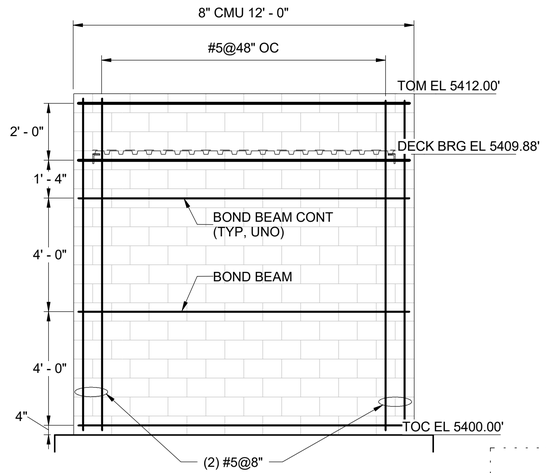
SCALE IN FEET




**SOUTH ELEVATION** S S215

0 2' 4' 6'

SCALE IN FEET




**WEST ELEVATION** W S215

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

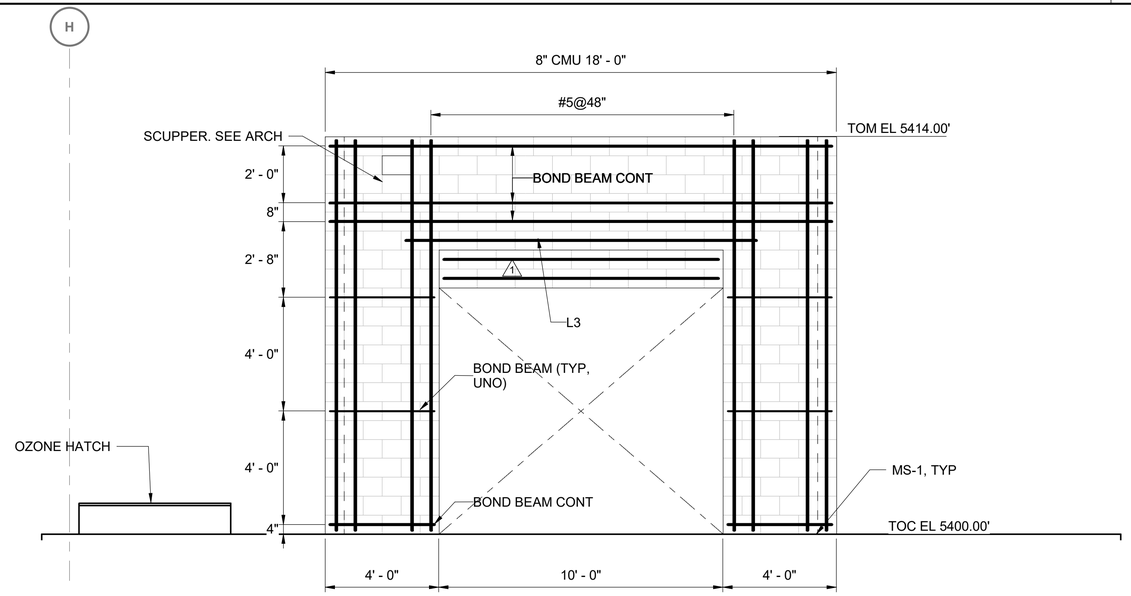
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS VIII - BWPS
ELECTRICAL BUILDING

| | |
|---|---|
| project 98101 | contract |
| drawing **S251** | rev. **0** |
| sheet 116 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

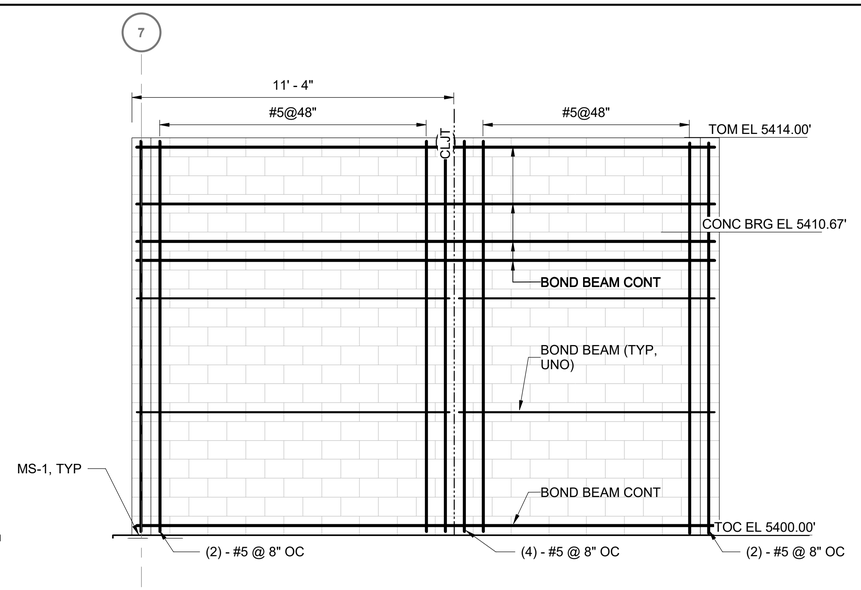
Scale For Microfilming
Millimeters
Inches




**EAST ELEVATION** E S219

0 2' 4' 6'

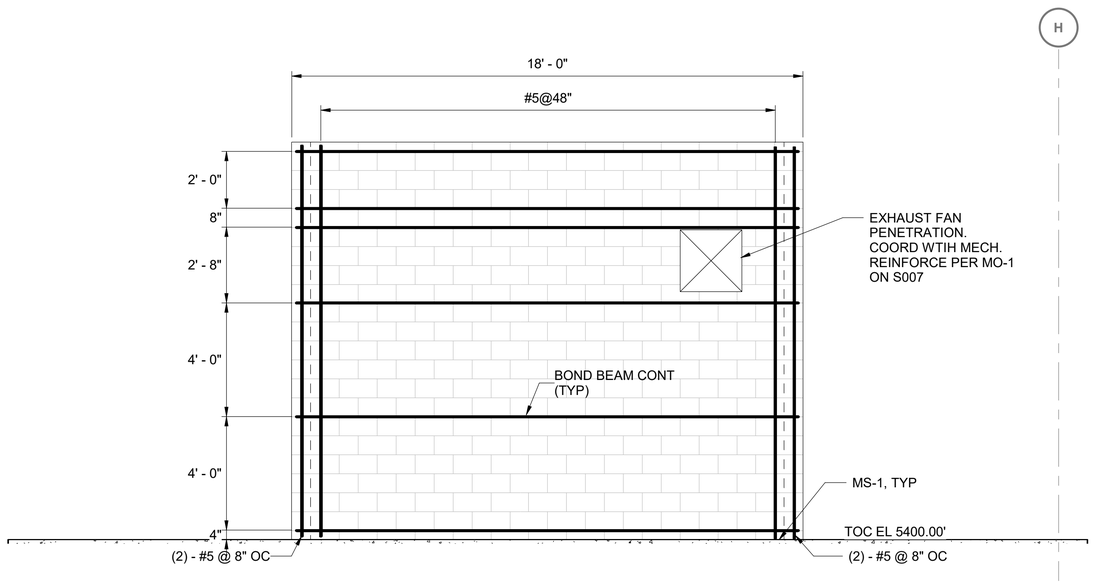
SCALE IN FEET




**NORTH ELEVATION** N S219

0 2' 4' 6'

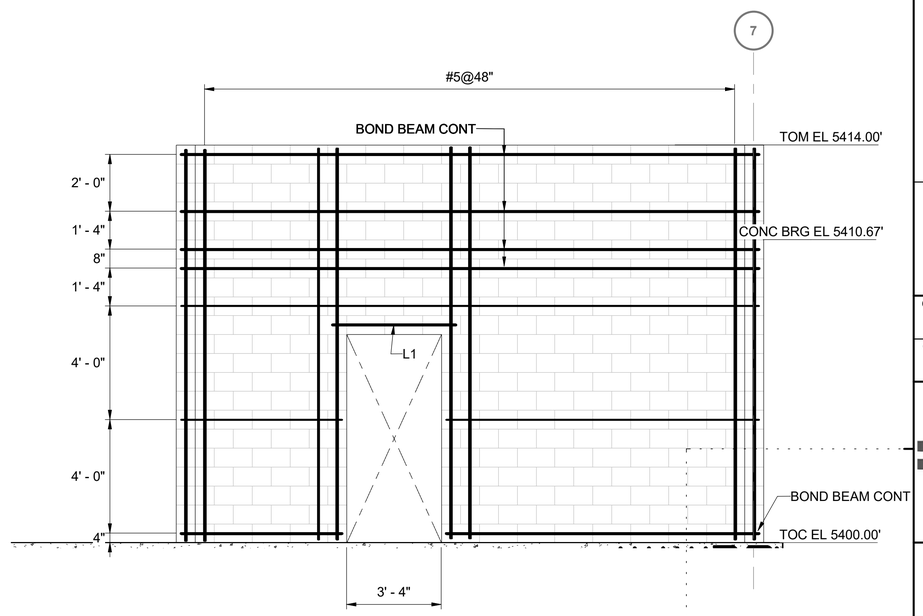
SCALE IN FEET




**WEST ELEVATION** W S219

0 2' 4' 6'

SCALE IN FEET




**SOUTH ELEVATION** S S219

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MASONRY ELEVATIONS IX - OZONE DESTRUCT BUILDING

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**

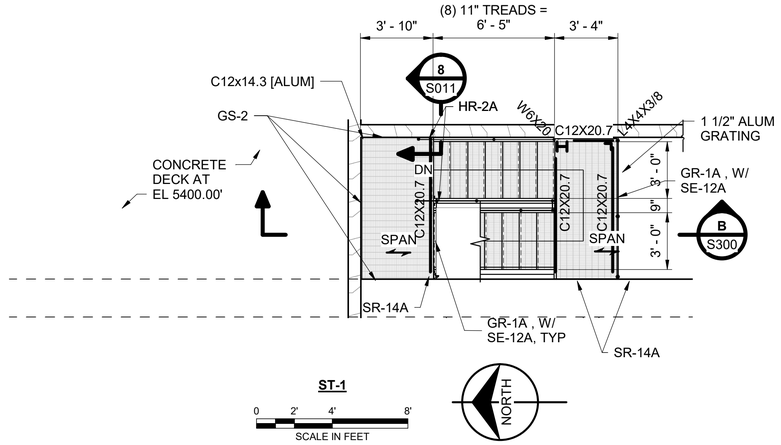
**S252 — 1**

**sheet** 117 **of** 542 **sheets**

**file** 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

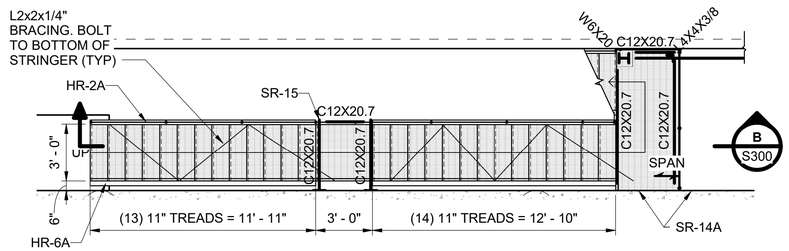



**ST-1**

0 2' 4' 8'

SCALE IN FEET

NORTH

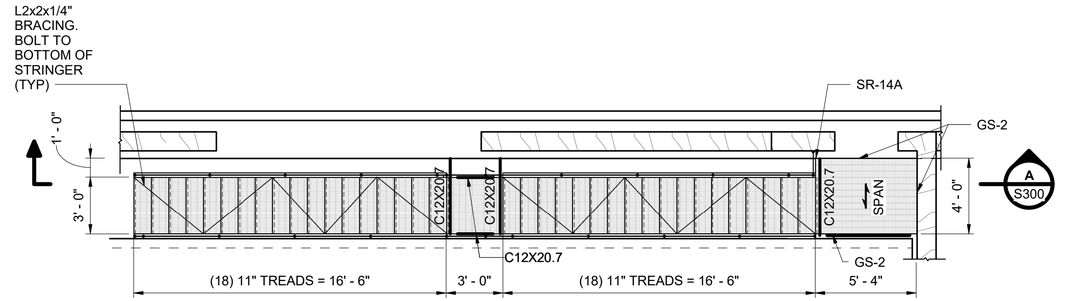



**ST-1A**

0 2' 4' 8'

SCALE IN FEET

NORTH



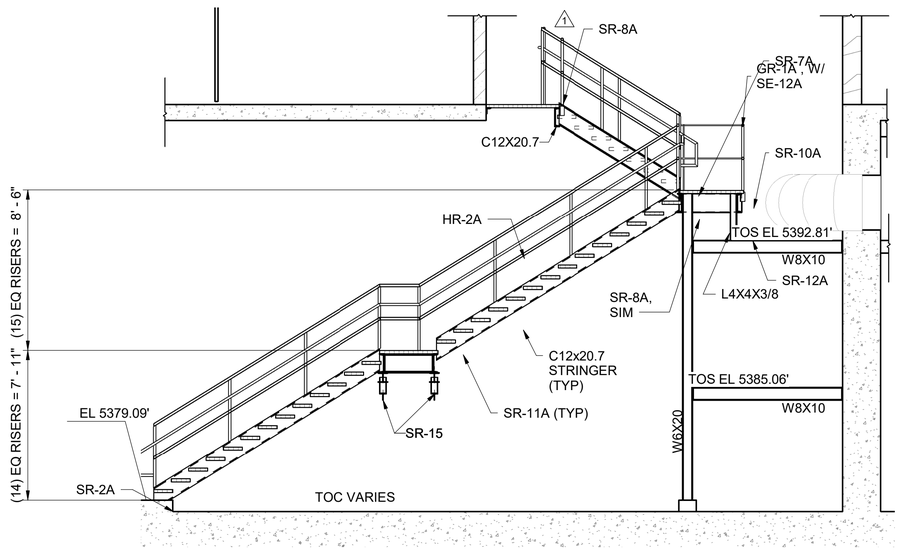

CONCRETE DECK AT EL 5400.00' AND WALLS ABOVE NOT SHOWN FOR CLARITY

**ST-2**

0 2' 4' 8'

SCALE IN FEET

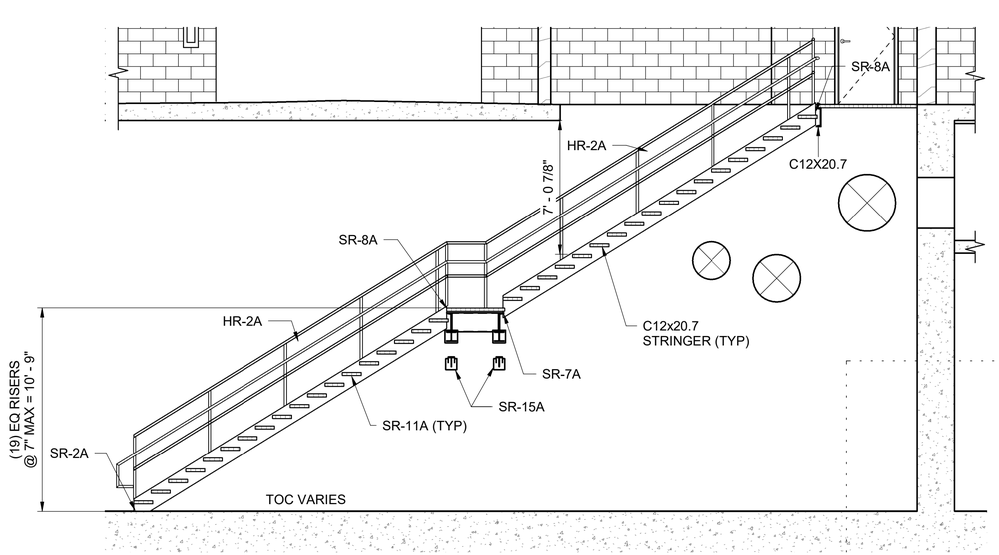
NORTH




**SECTION** B S300

0 2' 4' 8'

SCALE IN FEET




**SECTION** A S300

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE S010 & S011 FOR STANDARD STAIR DETAILS.
2. ALL STAIR STRINGERS AND SUPPORTS ARE STEEL AND SHALL BE HOT-DIP GALVANIZED PER SPECIFACTION SECTION 05 05 13 UNLESS NOTED OTHERWISE.
3. STAIR TREADS AND RAILINGS SHALL BE ALUMINUM PER SPECIFICATION 05 45 00.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

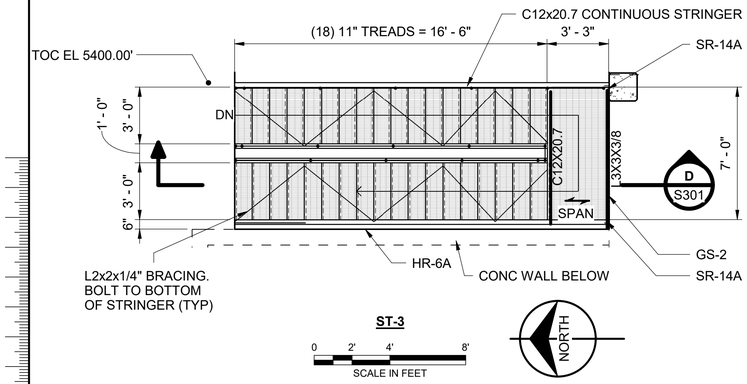
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STAIRS I

| | |
|---|---|
| project 98101 | contract |
| drawing **S300** | rev. **1** |
| sheet 118 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

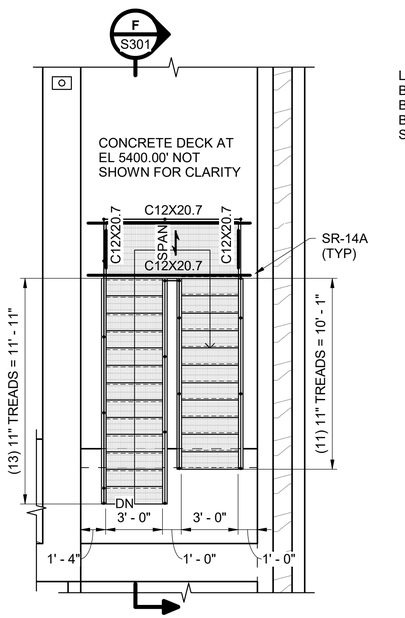



**ST-3**

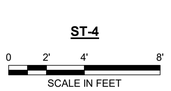


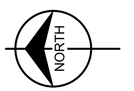


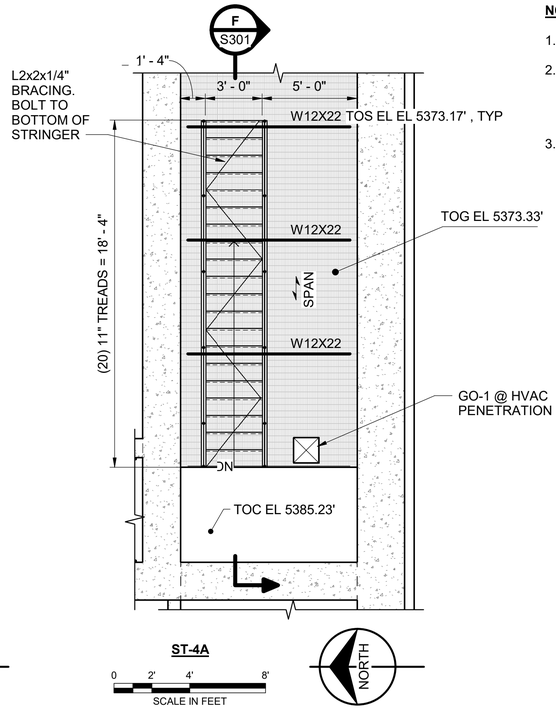





**ST-4**




**ST-4A**



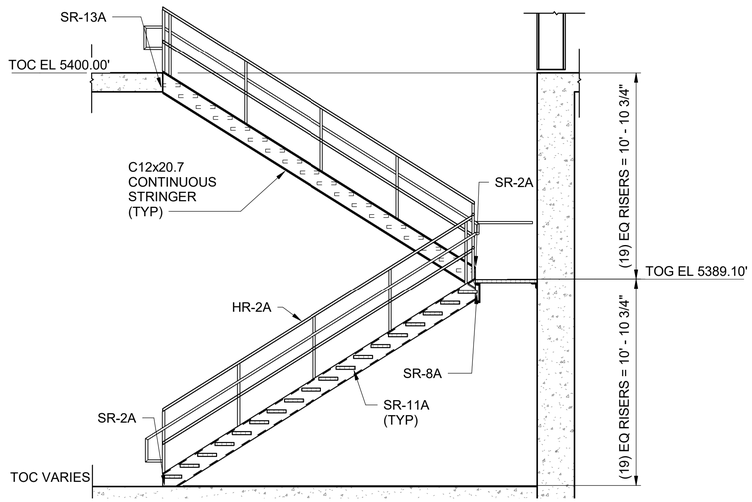




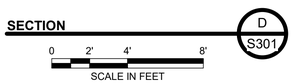
**NOTES:**

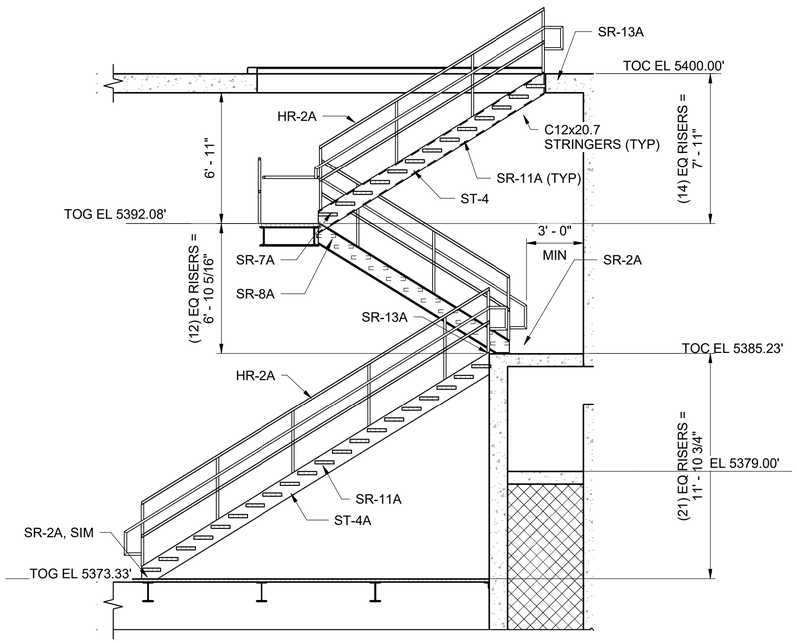
1. SEE S010 & S011 FOR STANDARD STAIR DETAILS.
2. ALL STAIR STRINGERS AND SUPPORTS ARE STEEL AND SHALL BE HOT-DIP GALVANIZED PER SPECIFACTION SECTION 05 05 13 UNLESS NOTED OTHERWISE.
3. STAIR TREADS AND RAILINGS SHALL BE ALUMINUM PER SPECIFICATION 05 45 00.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**SECTION** D S301




**SECTION** F S301




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** K. THURMAN | **checked** B. SNYDER |

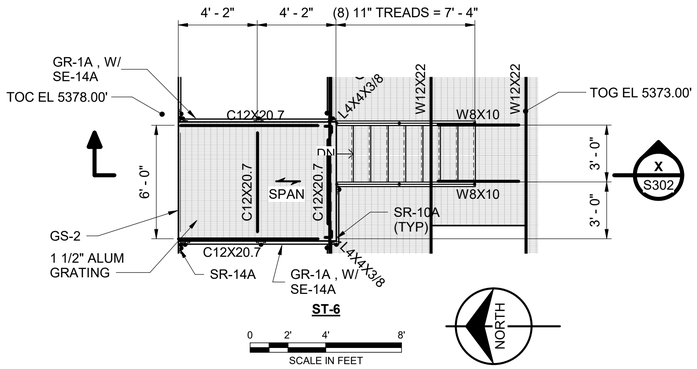
City of Thornton

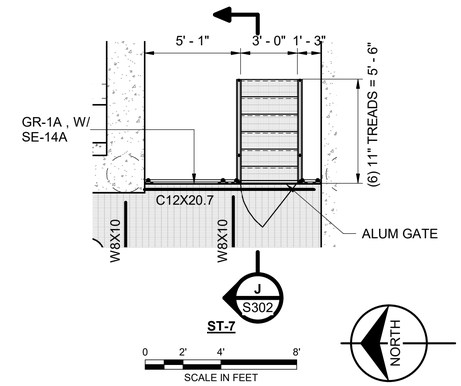
**CITY OF THORNTON**
**TTP - PACKAGE 3**
STAIRS II

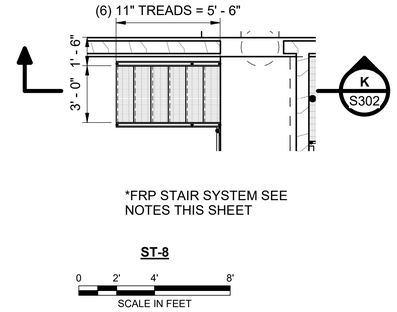
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** S301 | **rev.** 0 |
| **sheet** 119 **of** 542 **sheets** | |
| **file** 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

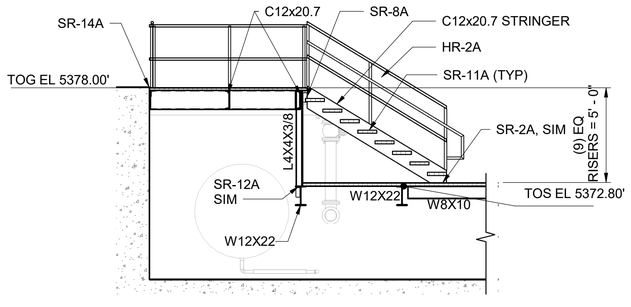


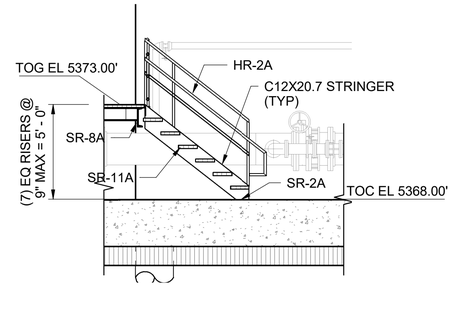



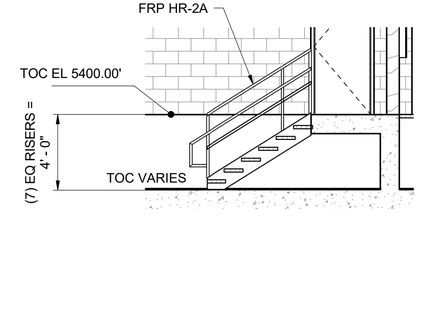



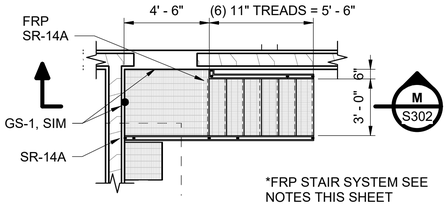

**NOTES:**

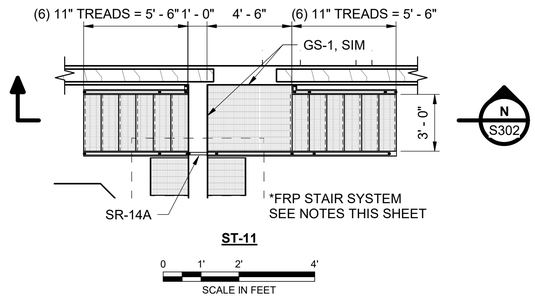
1. SEE S010 & S011 FOR STANDARD STAIR DETAILS.
2. ALL STAIR STRINGERS AND SUPPORTS ARE STEEL AND SHALL BE HOT-DIP GALVANIZED PER SPECIFACTION SECTION 05 05 13 UNLESS NOTED OTHERWISE.
3. STAIR TREADS AND RAILINGS SHALL BE ALUMINUM PER SPECIFICATION 05 45 00.

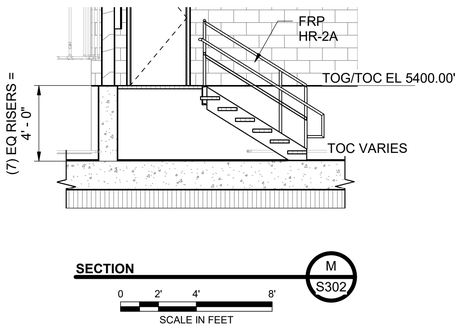


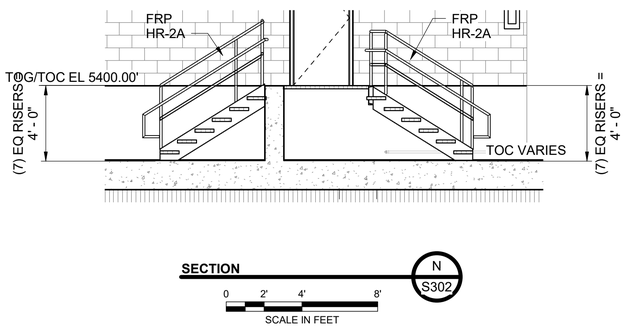




**FRP NOTES:**

1. FRP STAIRS, HANDRAIL AND LANDINGS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF COLORADO.
2. STAIRS AND LANDINGS SHALL BE DESIGNED FOR A UNIFORM DISTRIBUTED LOAD OF 100PSF OR A CONCENTRATED LOAD OF 300LBS.
3. STRUCTURAL FRAMING SHALL USE MANUFACTURERS STANDARD SHAPES AND BE CONNECTED BY THE FRP STAIR ENGINEER.
4. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. HANDRAIL SHALL BE DESIGNED FOR LOADS PER ACSE 7-10 SECTION 4.5.1.
6. CONNECTION TO CONCRETE SHALL BE STAINLESS STEEL EPOXY ANCHORS DESIGNED BY MFR.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STAIRS III

| project | contract |
|---|---|
| 98101 | |

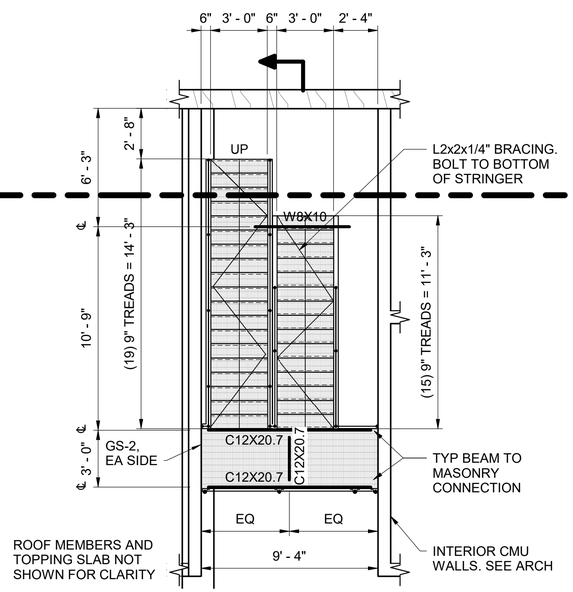
drawing **S302** rev. **0**

sheet 120 of 542 sheets

file 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

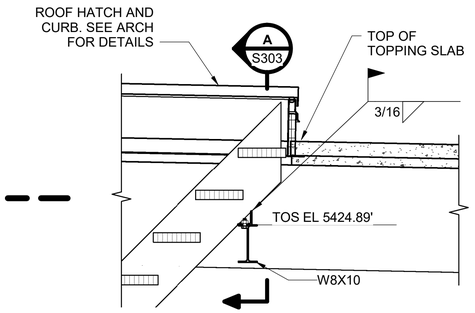



**ST-12**

0 2' 4' 8'

SCALE IN FEET

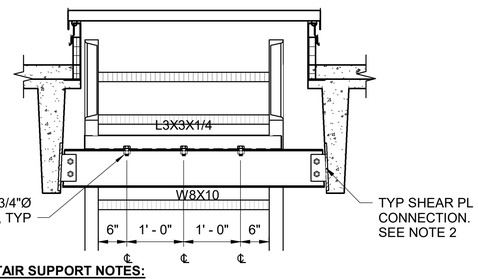
NORTH




**DETAIL** 1 S303

0 1' 2' 3'

SCALE IN FEET



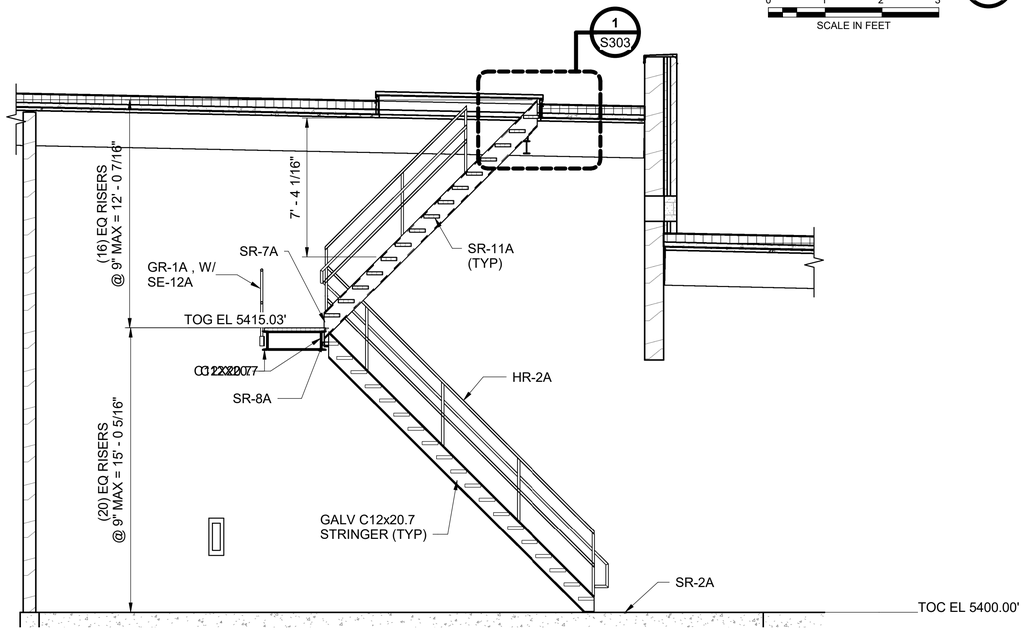

**STAIR SUPPORT NOTES:**

1. PRECAST MFR SHALL DESIGN ANCHORAGE OF EMBED PLATE TO RESIST 2.0 KIPS VERTICAL (DL = 0.50KIPS, LL = 1.5KIPS) AND 0.5 KIPS LATERAL LOAD (SERVICE LOADS).
2. PROVIDE HORIZONTAL SHORT SLOTTED HOLES IN BEAM AT EACH END.

**SECTION** A S303

0 1' 2' 3'

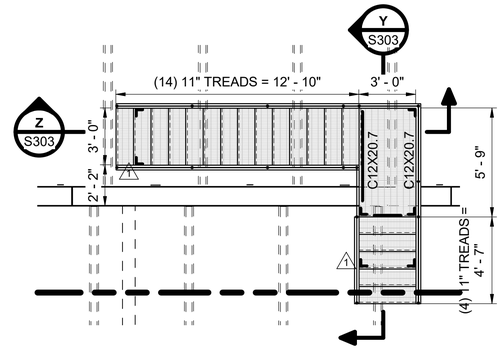
SCALE IN FEET




**SECTION** X S303

0 2' 4' 8'

SCALE IN FEET

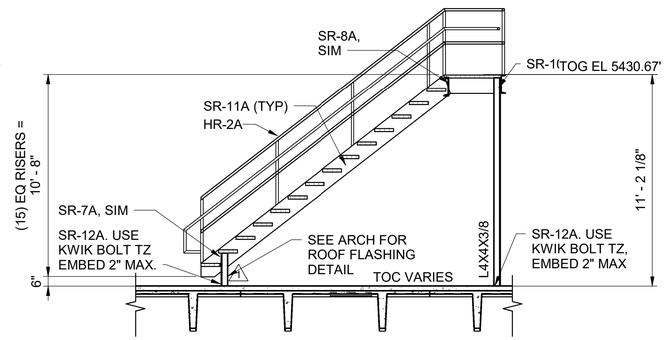



**ST-9**

0 2' 4' 8'

SCALE IN FEET

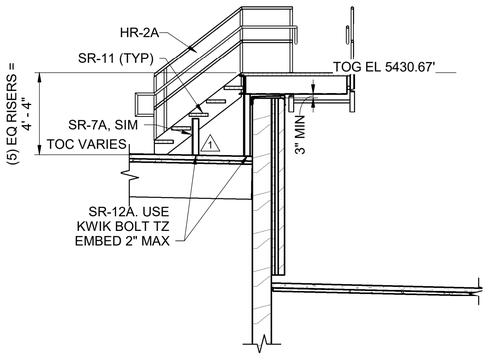
NORTH




**SECTION** Z S303

0 2' 4' 8'

SCALE IN FEET




**SECTION** Y S303

0 2' 4' 8'

SCALE IN FEET

**NOTES:**

1. SEE S010 & S011 FOR STANDARD STAIR DETAILS.
2. ALL STAIR STRINGERS AND SUPPORTS ARE STEEL AND SHALL BE HOT-DIP GALVANIZED PER SPECIFACTION SECTION 05 05 13 UNLESS NOTED OTHERWISE.
3. STAIR TREADS AND RAILINGS SHALL BE ALUMINUM PER SPECIFICATION 05 45 00.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/17/19 | KDT | JJK | REVISED PER RFI #140 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

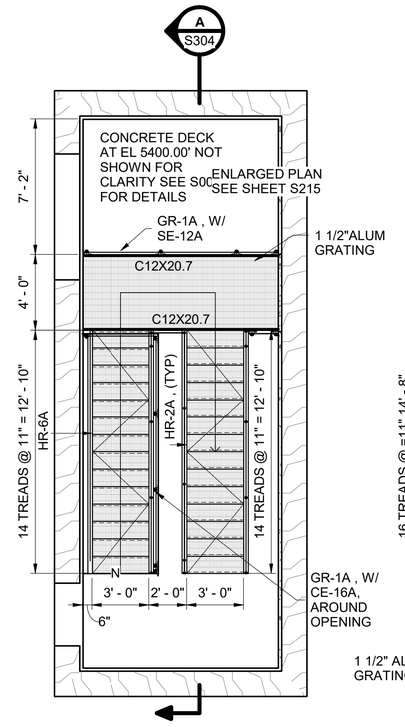
City of Thornton

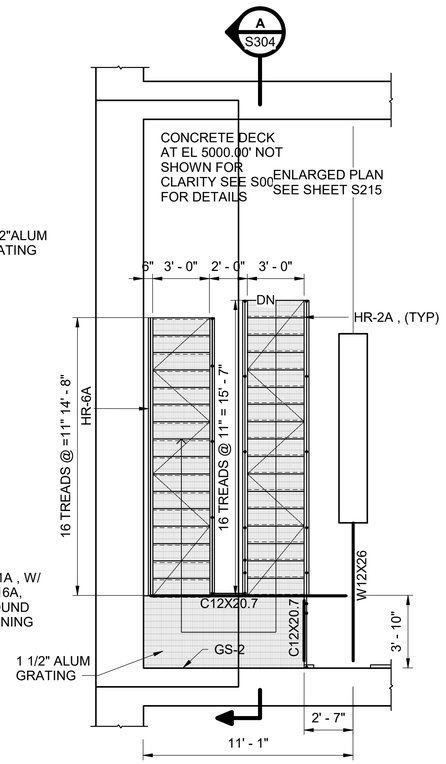
**CITY OF THORNTON**
**TTP - PACKAGE 3**
STAIRS IV

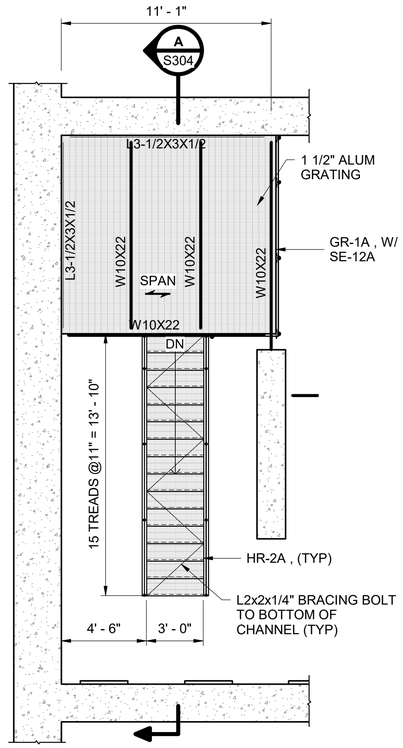
| | |
|---|---|
| project 98101 | contract |
| drawing **S303 — 1** | rev. |
| sheet 121 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

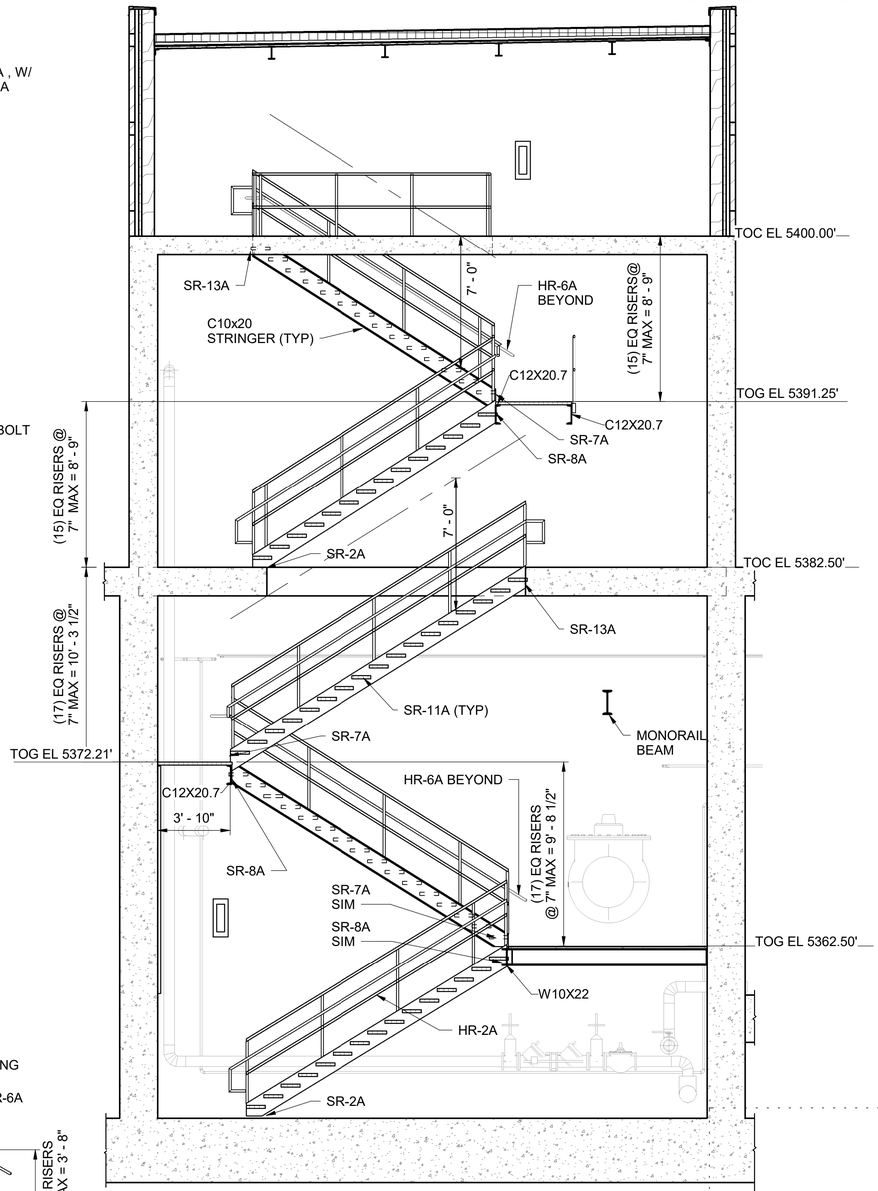


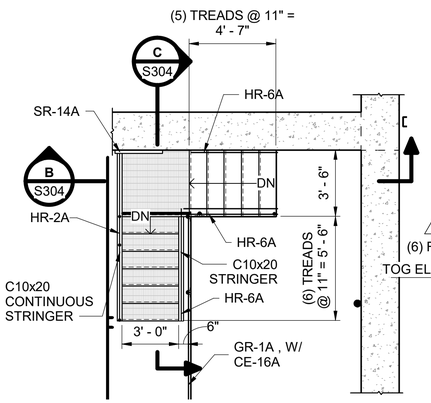



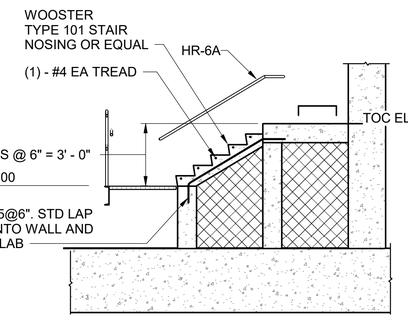



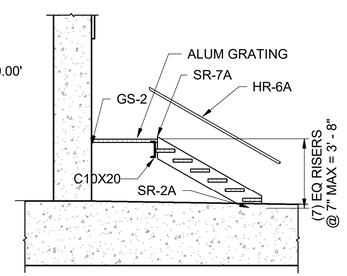

**NOTES:**

1. SEE S010 & S011 FOR STANDARD STAIR DETAILS.
2. ALL STAIR STRINGERS AND SUPPORTS ARE STEEL AND SHALL BE HOT-DIP GALVANIZED PER SPECIFACTION SECTION 05 05 13 UNLESS NOTED OTHERWISE.
3. STAIR TREADS AND RAILINGS SHALL BE ALUMINUM PER SPECIFICATION 05 45 00.




**ST-13A**
(LANDING EL 5400.00')
0 2' 4' 8'
SCALE IN FEET

NORTH

**ST-13B**
(LANDING EL 5882.50')
0 2' 4' 8'
SCALE IN FEET

NORTH

**ST-13C**
(LANDING EL 5362.50')
0 2' 4' 8'
SCALE IN FEET

NORTH

**ST-14**
0 2' 4' 8'
SCALE IN FEET

NORTH

**SECTION** B S304
0 2' 4' 8'
SCALE IN FEET

**SECTION** C S304
0 2' 4' 8'
SCALE IN FEET

**SECTION** A S304
0 2' 4' 8'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BLS | KDT | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. SNYDER |
| designed B. SNYDER | checked K. THURMAN |

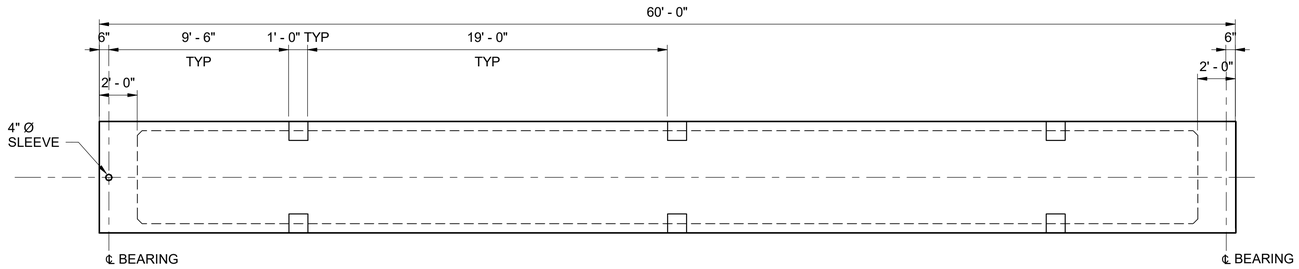
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL STAIRS

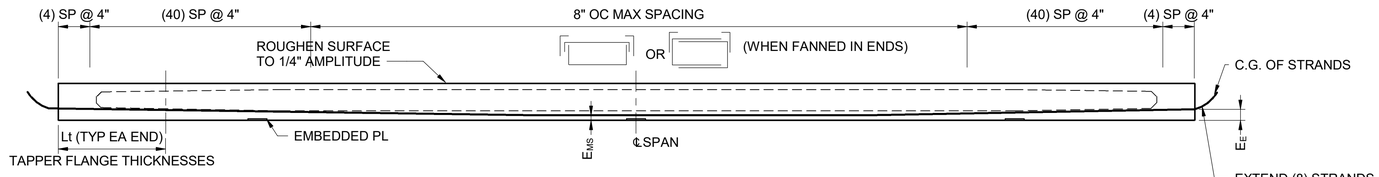
| | |
|---|---|
| project 98101 | contract |
| drawing **S304 — 1** | rev. |
| sheet 122 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

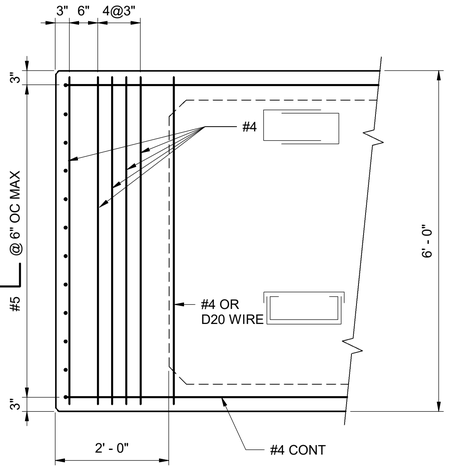
Scale For Microfilming
Millimeters
Inches



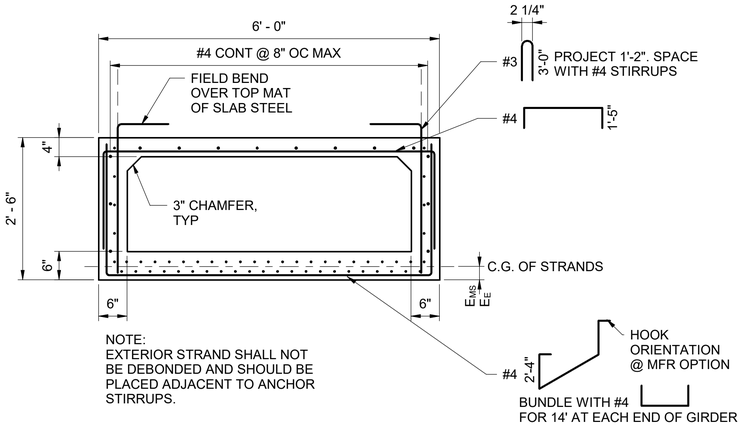

**PLAN**



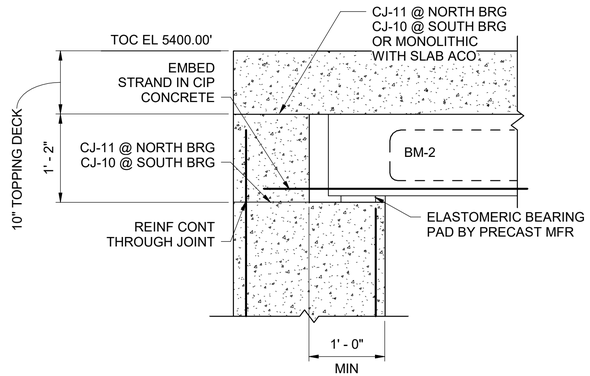

**ELEVATION**




**END DETAIL**



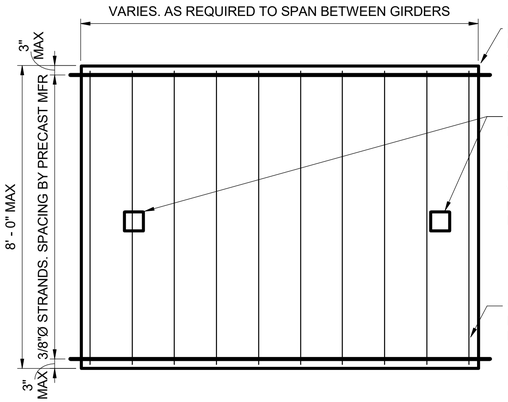

**TYPICAL SECTION**



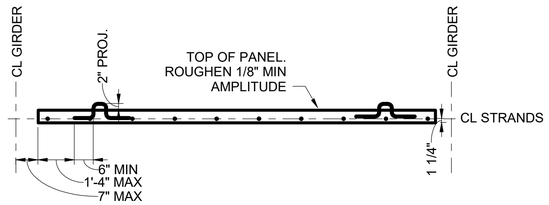

**BM-2 DETAIL**
NOT TO SCALE

**TYPICAL BOX BEAM BEARING** K S206

0 1/2' 1' 2'
SCALE IN FEET




**PLAN**




**DECK FORM PANELS**
NOT TO SCALE

**SECTION**

**PRESTRESSED BOX GIRDER NOTES:**

1. THE MINIMUM COVER FOR REINFORCING STEEL IS 1".
2. WELDED WIRE FABRIC MAY BE USED WITH D20 WIRES IN LIEU OF THE #4 BARS SHOWN.
3. USE LOW RELAXATION STRANDS MEETING THE REQUIREMENTS OF ASTM A-416 GRADE 270. THE MINIMUM CLEAR DISTANCE BETWEEN GROUPS OR INDIVIDUAL STRANDS SHALL BE $2.3*d_S$ BUT NOT LESS THAN 1-1/4". THE MINIMUM COVER FOR PRESTRESSING STEEL IS 1-1/2".
4. CONCRETE SHALL MEET REQUIREMENTS OF SPECIFICATION SECTION 03 41 00.
5. ENTRAINED AIR IS NOT REQUIRED FOR GIRDER CONCRETE.
6. END BLOCKS SHALL BE USED ON ALL GIRDERS, UNLESS NOTED OTHERWISE.
7. USE 3/4" CHAMFER ON ALL EXPOSED CORNERS, UNLESS NOTED OTHERWISE.
8. PREDICTED CAMBER IS THE CAMBER OF THE GIRDER ALONE AT 90 DAYS. THE INSTALLER SHALL LIMIT THE CAMBER GROWTH TO A VALUE NOT TO EXCEED THE PREDICTED CAMBER PLUS 1" PRIOR TO THE DECK POUR BY WEIGHTING, SCHEDULING FABRICATION, POST TENSIONING OR OTHER MEANS AND MUST REPORT TO THE ENGINEER OF RECORD VALUES OF CAMBER WHICH EXCEED THE PREDICTED CAMBER PLUS 1". REMEDIAL MEASURES, AS APPROVED BY THE ENGINEER OF RECORD, SHALL BE TAKEN IF THE PREDICTED CAMBER PLUS 1" IS EXCEEDED.
9. SIDE BY SIDE BOXES SHALL NOT HAVE CAMBERS OF ADJACENT BOXES DIFFER BY MORE THAN 1" PRIOR TO THE DECK POUR. PRIOR TO PLACING DECK REINFORCING DIFFERENTIAL SHALL BE ADJUSTED TO THIS LIMIT BY SORTING BOXES TO MINIMIZE DIFFERENTIALS.
10. DEPTH TOLERANCE SHALL BE +1/2" TO -1/4".
11. DEFINITIONS:
    - $A_S^*$ = MINIMUM AREA OF THE PRESTRESSING STEEL.
    - $d_s$ = NOMINAL STRAND DIAMETER
    - $f'_s$ = ULTIMATE STRENGTH OF PRESTRESSING STEEL
    - $f'_{ci}$ = REQUIRED CONCRETE STRENGTH AT RELEASE OF PRESTRESS FORCE
    - $f'_c$ = REQUIRED CONCRETE STRENGTH AT 28 DAYS
    - $\Delta$ = DEFLECTION AT CENTERLINE OF SPAN DUE TO CAST-IN-PLACE SLAB &

**DESIGN LOADS FOR GIRDERS:**

1. SUPERIMPOSED DEAD LOADS:
   A. 10" CIP DECK MAXIMUM SPAN OF 9'-6" TRIBUTARY TO BEAM
   B. 2.7 K/FT WALL LOAD CENTERED OVER BOX FLANGE
   C. 10PSF M/E/P LOADS
2. LIVE LOADS:
   A. VEHICLE LOAD HS-20
   B. UNIFORM LOAD 100PSF
   C. UNIFORM LOAD CONCURRENT W/ HS-20 LOAD
3. DEFLECTION SHALL BE LIMITED TO L/240 AT CENTERLINE OF SPAN

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

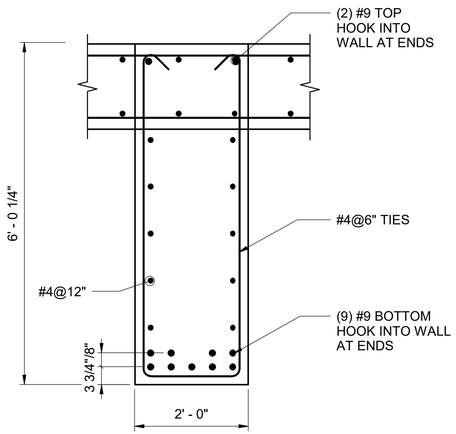
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BOX GIRDER DETAILS

| | |
|---|---|
| project 98101 | contract |
| drawing **S305** | rev. **0** |
| sheet 123 of 542 sheets | |
| file 98101_S | |

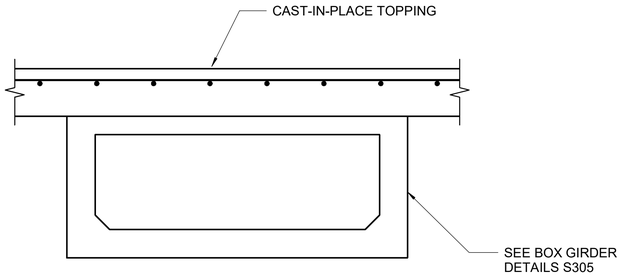
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches



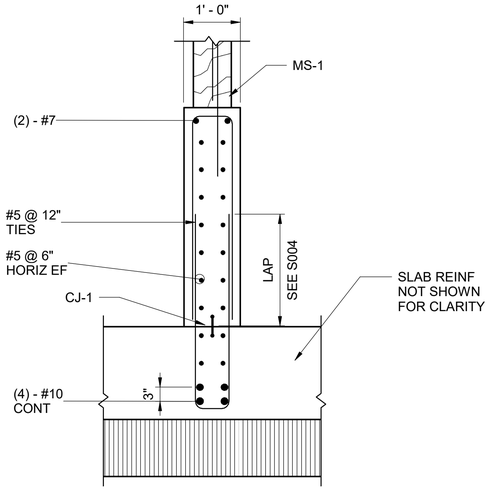

**BM-1**



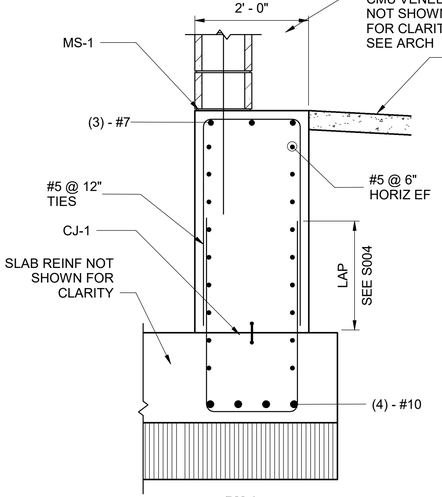

**BM-2**




**BM-5**

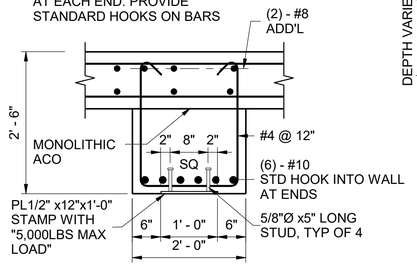



**BM-6**

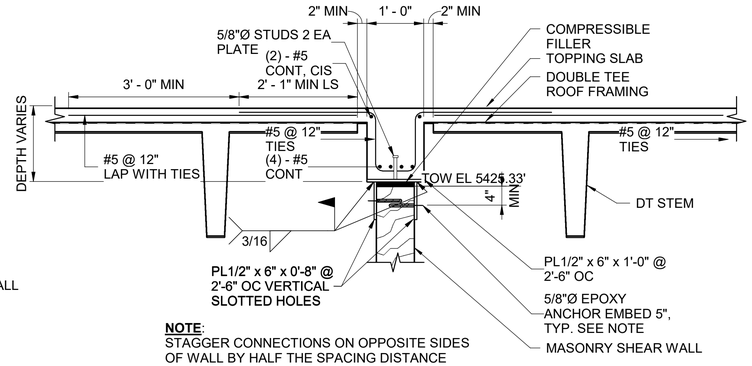



**NOTE:**
EXTEND BEAM 1'-0" INTO BEAM POCKETS IN BEARING WALLS AT EACH END. PROVIDE STANDARD HOOKS ON BARS



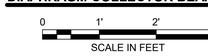

**BM-7**




**NOTE**:
STAGGER CONNECTIONS ON OPPOSITE SIDES OF WALL BY HALF THE SPACING DISTANCE

**DIAPHRAGM COLLECTOR BEAM** A S220




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

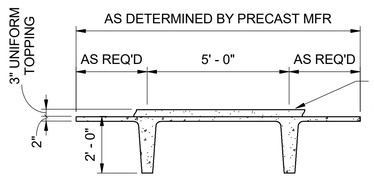
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BEAM DETAILS

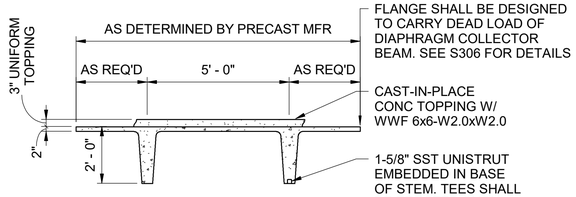
| | |
|---|---|
| project 98101 | contract |
| drawing **S306** | rev. **0** |
| sheet 124 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

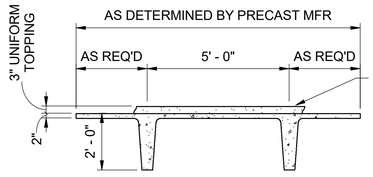
Scale For Microfilming
Millimeters
Inches



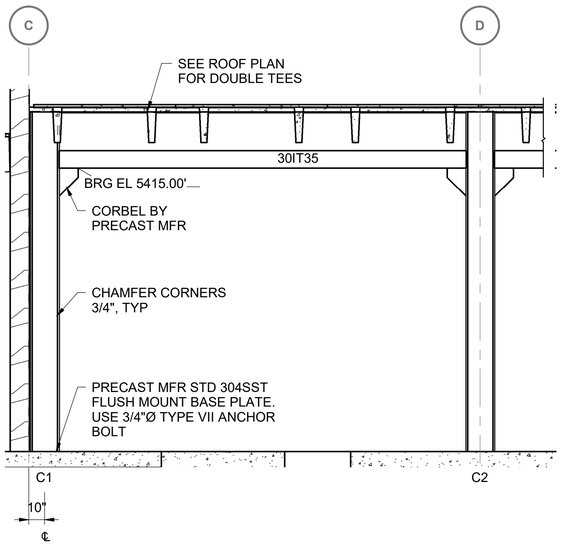

**TYPE 1 DOUBLE TEE**




**TYPE 2 DOUBLE TEE**



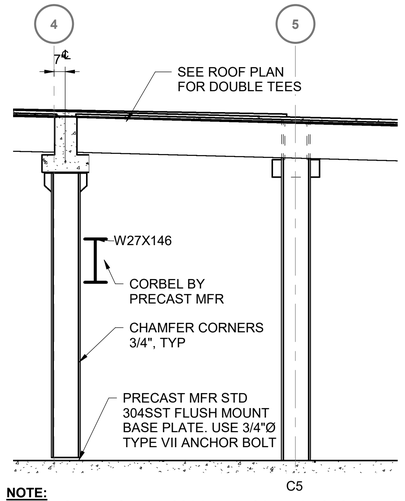

**TYPE 3 DOUBLE TEE**




**SECTION TYP @ GRID 5** — A / S207

0 2' 4' 8'

SCALE IN FEET

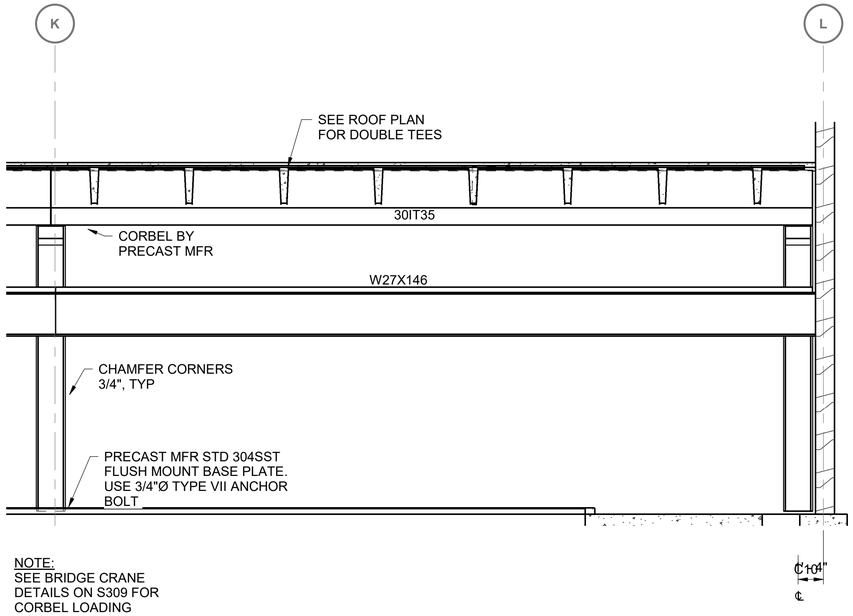



**NOTE:**
COLUMNS, BEAMS AND ASSOCIATED CONNECTIONS ARE TO BE DESIGNED BY THE PRECAST MFR USING PROVIDED LOADS ON S002, S211 AND ELSEWHERE ON THESE DRAWINGS. ANY DEVIATION FROM SIZES SHOWN SHALL BE APPROVED BY THE ENGINEER OF RECORD.

**SECTION** — B / S207

0 2' 4' 8'

SCALE IN FEET




NOTE:
SEE BRIDGE CRANE DETAILS ON S309 FOR CORBEL LOADING

**SECTION TYP @ GRID 4** — C / S208

0 2' 4' 8'

SCALE IN FEET

**PRECAST COLUMN SCHEDULE**

| MARK | COLUMN SIZE | GRID INTESECTION | HEIGHT | REMARKS |
|---|---|---|---|---|
| C1 | 18"x18" | C(0' - 10")-5 | 18' - 0" | |
| C10 | 18"x18" | L(-1' - 4")-4 | 15' - 1" | BRIDGE CRANE SUPPORT |
| C4 | 18"x18" | F-5 | 18' - 0" | |
| C3 | 18"x18" | E-5 | 18' - 0" | |
| C2 | 18"x18" | D-5 | 18' - 0" | |
| C6 | 18"x18" | G-4 | 15' - 1" | BRIDGE CRANE SUPPORT |
| | 18"x18" | K-4 | 15' - 1" | BRIDGE CRANE SUPPORT |
| | 18"x18" | J-4 | 15' - 1" | BRIDGE CRANE SUPPORT |
| | 18"x18" | H-4 | 15' - 1" | BRIDGE CRANE SUPPORT |
| C5 | 18"x18" | G-5 | 18' - 0" | |
| C11 | 12"x12" | D(-1' - 0")-2.4 | 10' - 0" | |
| C12 | 12"x12" | C.5(-2' - 9")-2.4(-8' - 4") | 10' - 0" | |
| C13 | 12"x12" | C-2.4 | 10' - 0" | |
| C14 | 12"x12" | C-3 | 8' - 0" | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PRECAST DETAILS I

| project | contract |
|---|---|
| 98101 | |

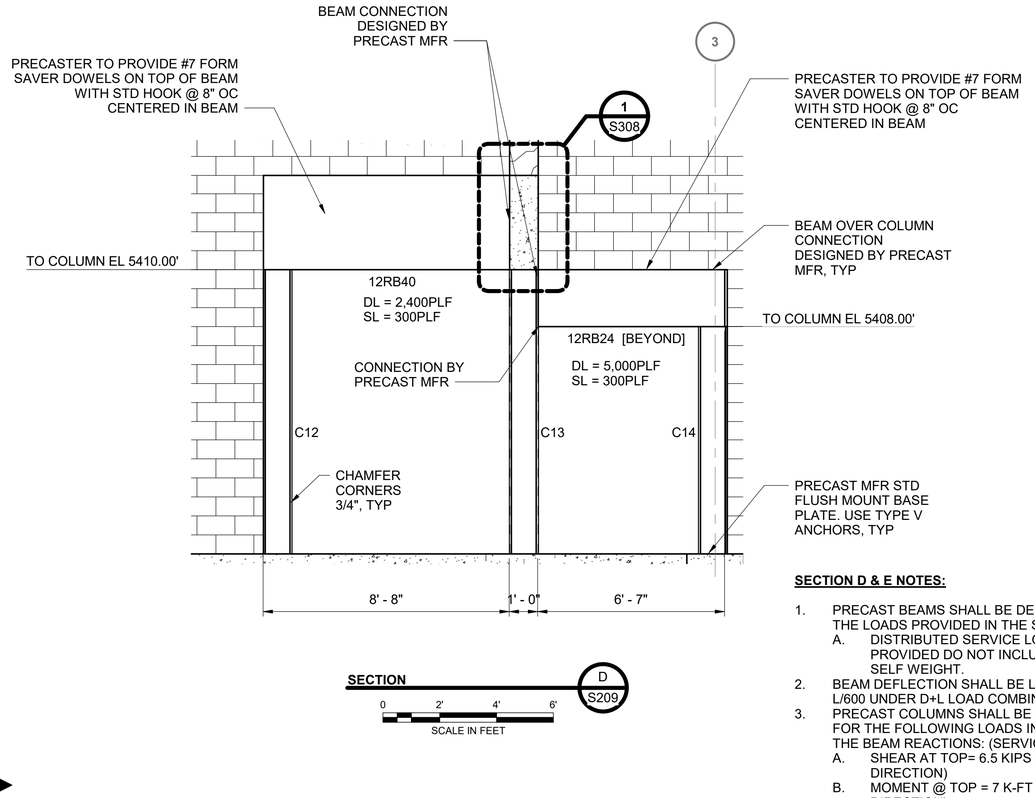
drawing **S307** rev. **0**

sheet 125 of 542 sheets

file 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



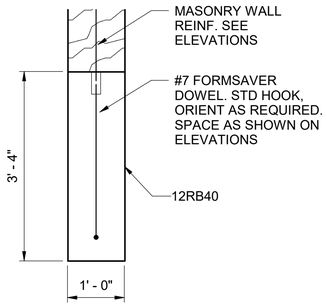

**SECTION** D S209

0 2' 4' 6'

SCALE IN FEET

**SECTION D & E NOTES:**

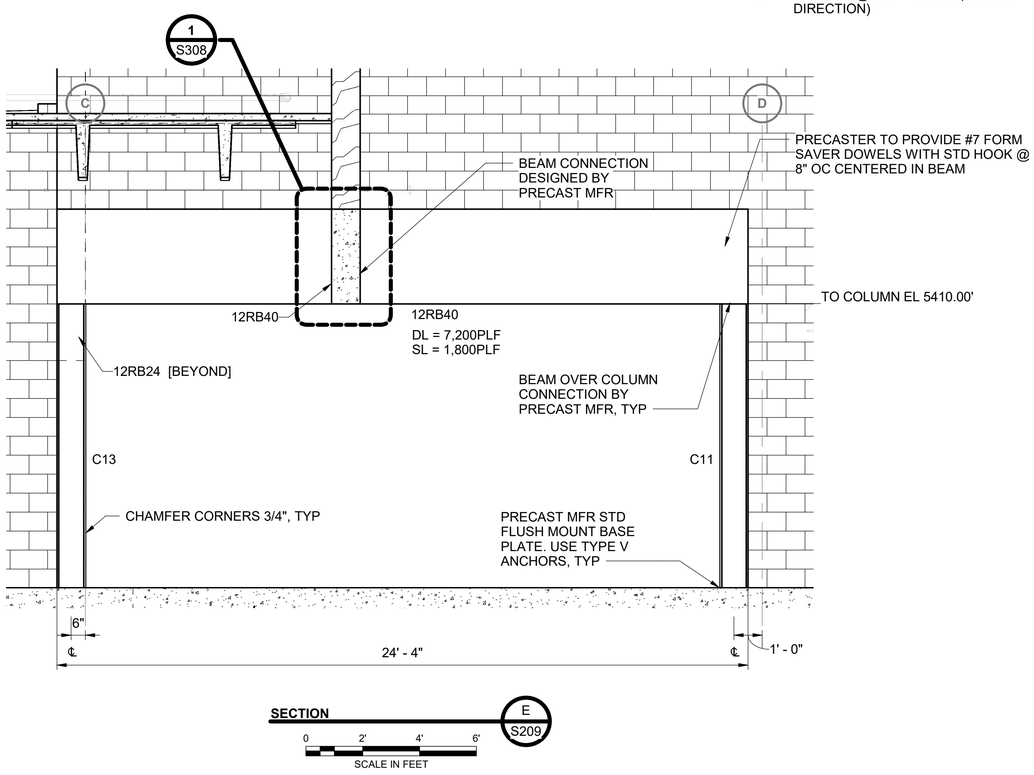
1. PRECAST BEAMS SHALL BE DESIGNED FOR THE LOADS PROVIDED IN THE SECTIONS.
   A. DISTRIBUTED SERVICE LOADS PROVIDED DO NOT INCLUDE THE BEAM SELF WEIGHT.
2. BEAM DEFLECTION SHALL BE LIMITED TO L/600 UNDER D+L LOAD COMBINATION.
3. PRECAST COLUMNS SHALL BE DESIGNED FOR THE FOLLOWING LOADS IN ADDITION TO THE BEAM REACTIONS: (SERVICE LOADS)
   A. SHEAR AT TOP= 6.5 KIPS (ANY DIRECTION)
   B. MOMENT @ TOP = 7 K-FT (EITHER DIRECTION)




**DETAIL** 1 S308

0 1' 2' 3'

SCALE IN FEET




**SECTION** E S209

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PRECAST DETAILS II

| project | contract |
|---|---|
| 98101 | |

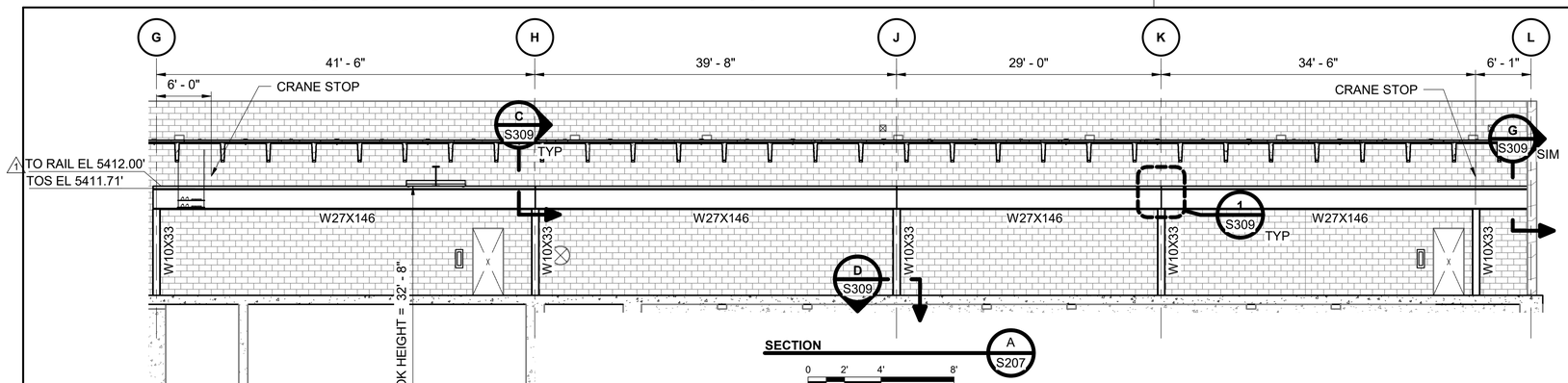
drawing **S308** rev. **0**

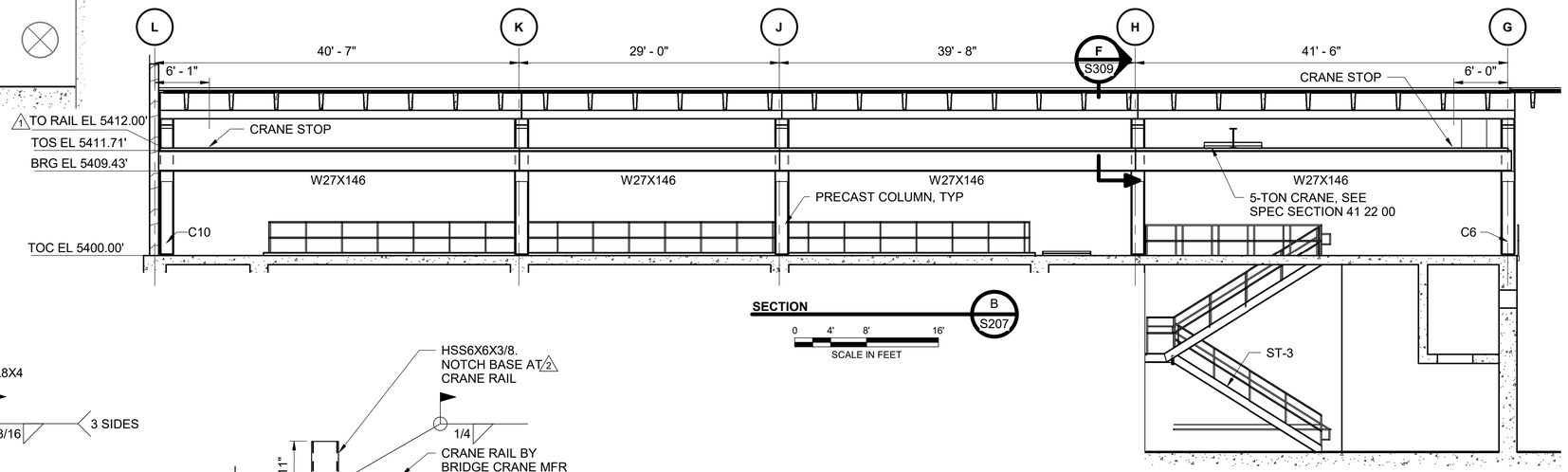
sheet 126 of 542 sheets

file 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



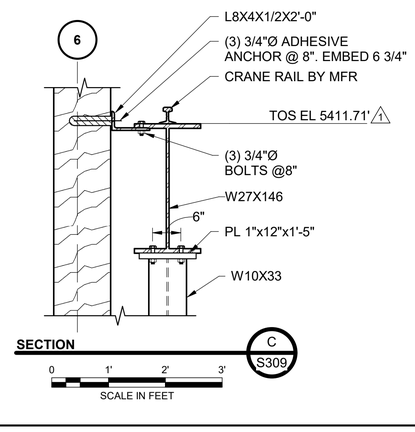



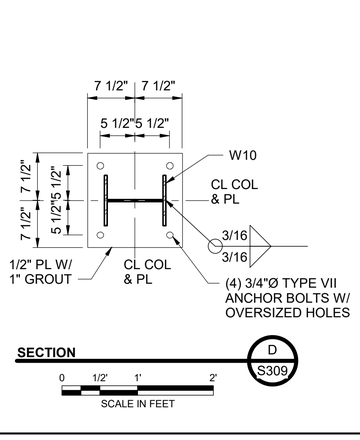


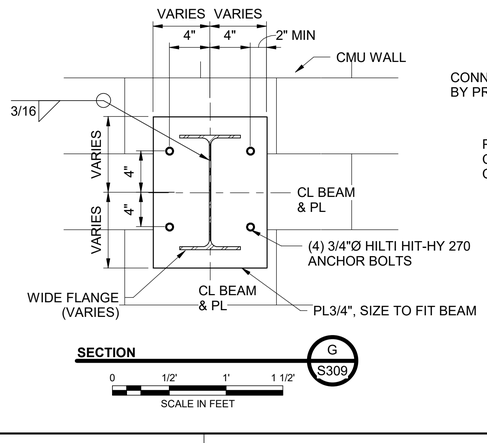


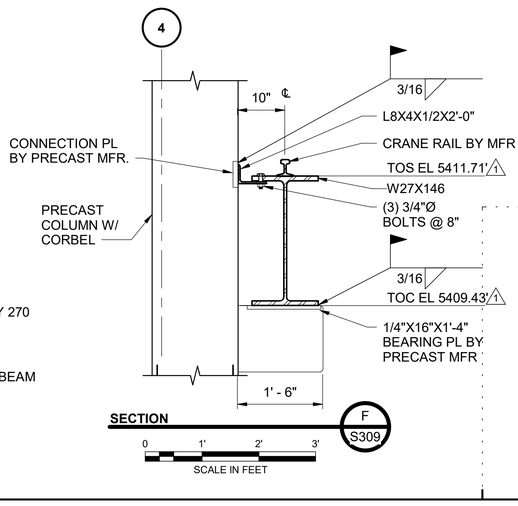



**CRANE STOP DETAIL (TYP EA END OF RUNWAY)**
NOT TO SCALE




**NOTES:**

1. SEE DWG S001 FOR GENERAL NOTES.
2. CRANE RAIL ATTACHMENT AND END STOP CONNECTIONS PER BRIDGE CRANE MANUFACTURER.
3. LOADING FOR PRECAST CORBELS (STRENGTH LEVEL LOADS):
   SHEAR = 3 KIPS
   BEARING = 38 KIPS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BK | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/8/19 | KDT | BLS | REVISED PER RFI #102 |
| 2 | 10/17/19 | KDT | JJK | REVISED PER RFI #140 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. KIELTY |
| designed B. KIELTY | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BRIDGE CRANE DETAILS I

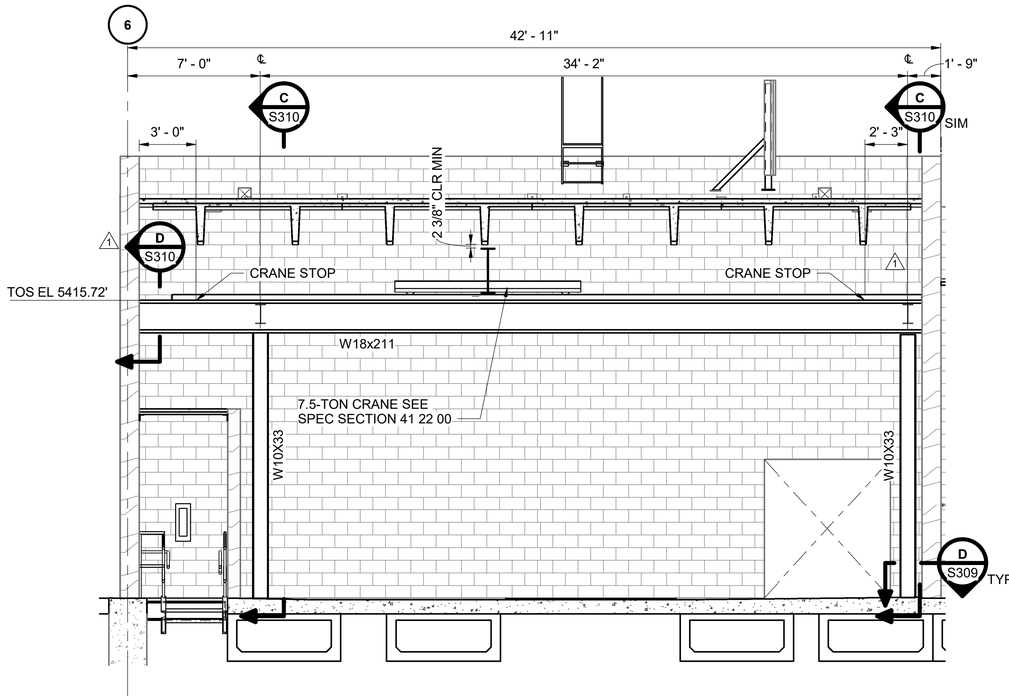
| | |
|---|---|
| project 98101 | contract |
| drawing S309 | rev. 2 |
| sheet 127 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

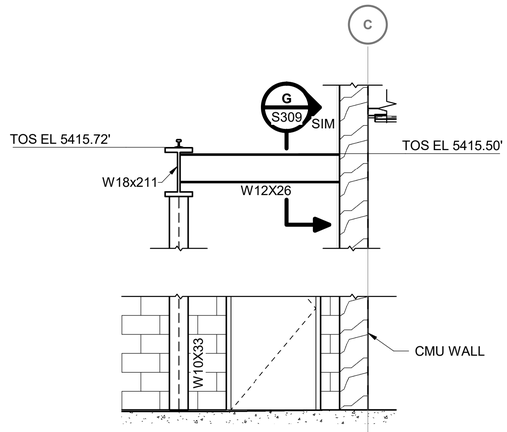
**NOTES:**

1. SEE DWG S001 FOR GENERAL NOTES.
2. CRANE RAIL ATTACHMENT AND END STOP CONNECTIONS PER BRIDGE CRANE MANUFACTURER.
3. LOADING FOR PRECAST CORBELS (STRENGTH LEVEL LOADS):
   SHEAR = 3 KIPS
   BEARING = 38 KIPS



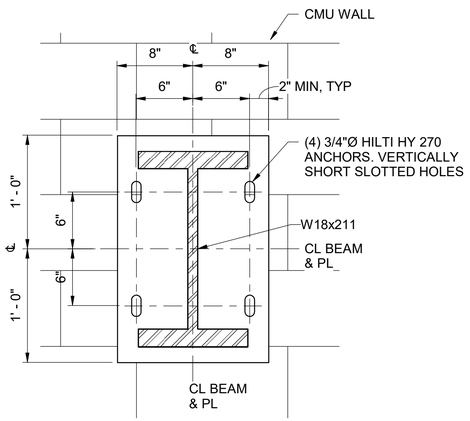

SECTION A S206

SCALE IN FEET



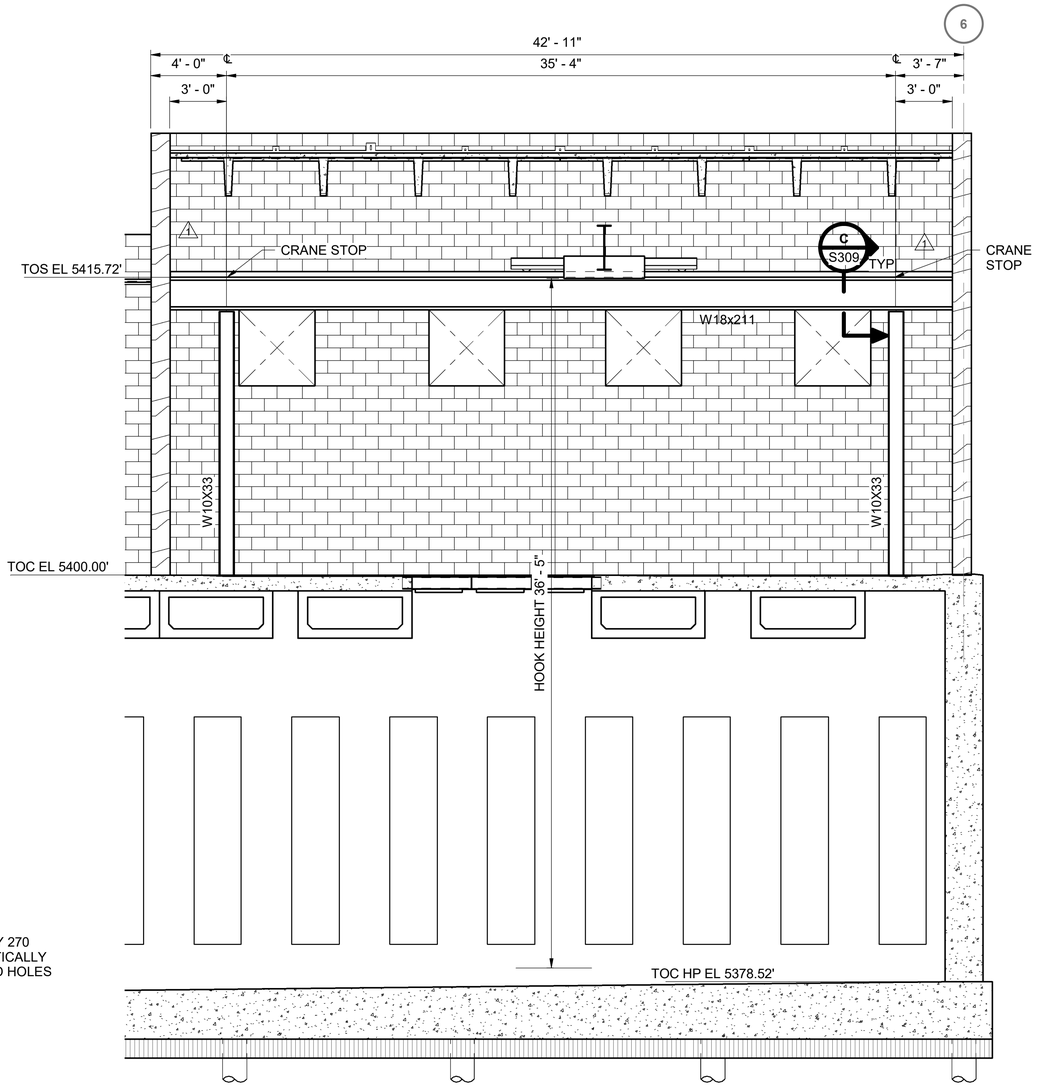

SECTION C S206

SCALE IN FEET




SECTION D S219 /1

SCALE IN FEET




SECTION B S206

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BK | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/8/19 | KDT | BLS | REVISED PER RFI #100 |
| | 4/26/21/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. KIELTY |
| designed B. KIELTY | checked B. SNYDER |

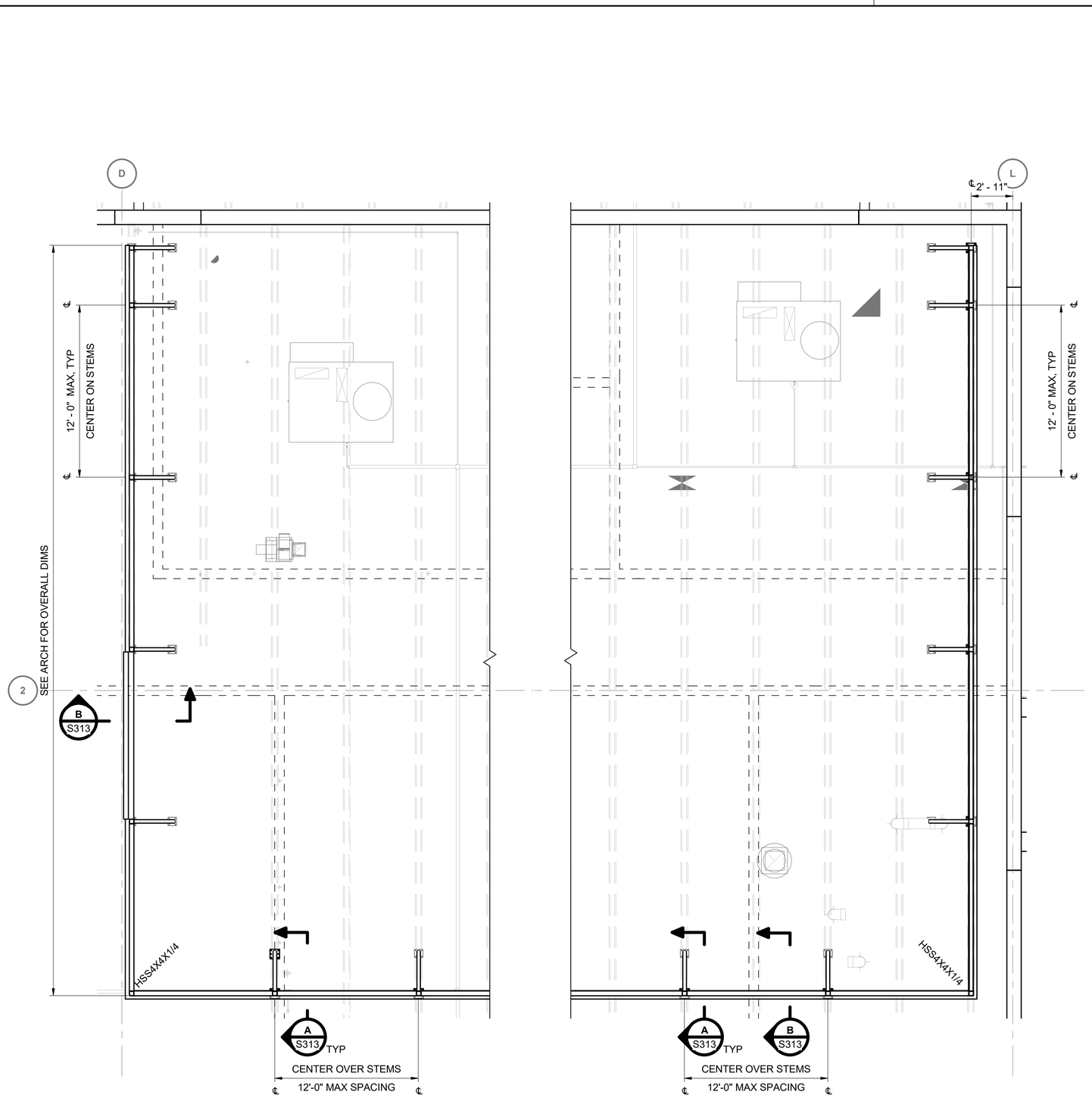
City of Thornton

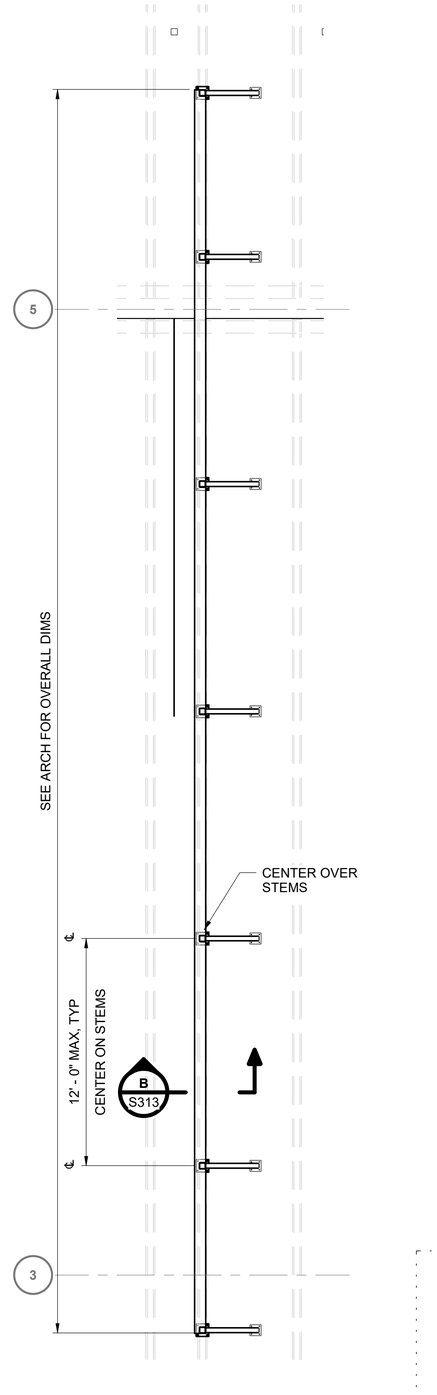
**CITY OF THORNTON**
**TTP - PACKAGE 3**
BRIDGE CRANE DETAILS II

| | |
|---|---|
| project 98101 | contract |
| drawing **S310** | rev. **1** |
| sheet 128 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | SD | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | S. DALGLISH |
| designed | checked |
| S. DALGLISH | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SCREEN WALL AND CANOPY PLANS I

| project | contract |
|---|---|
| 98101 | |

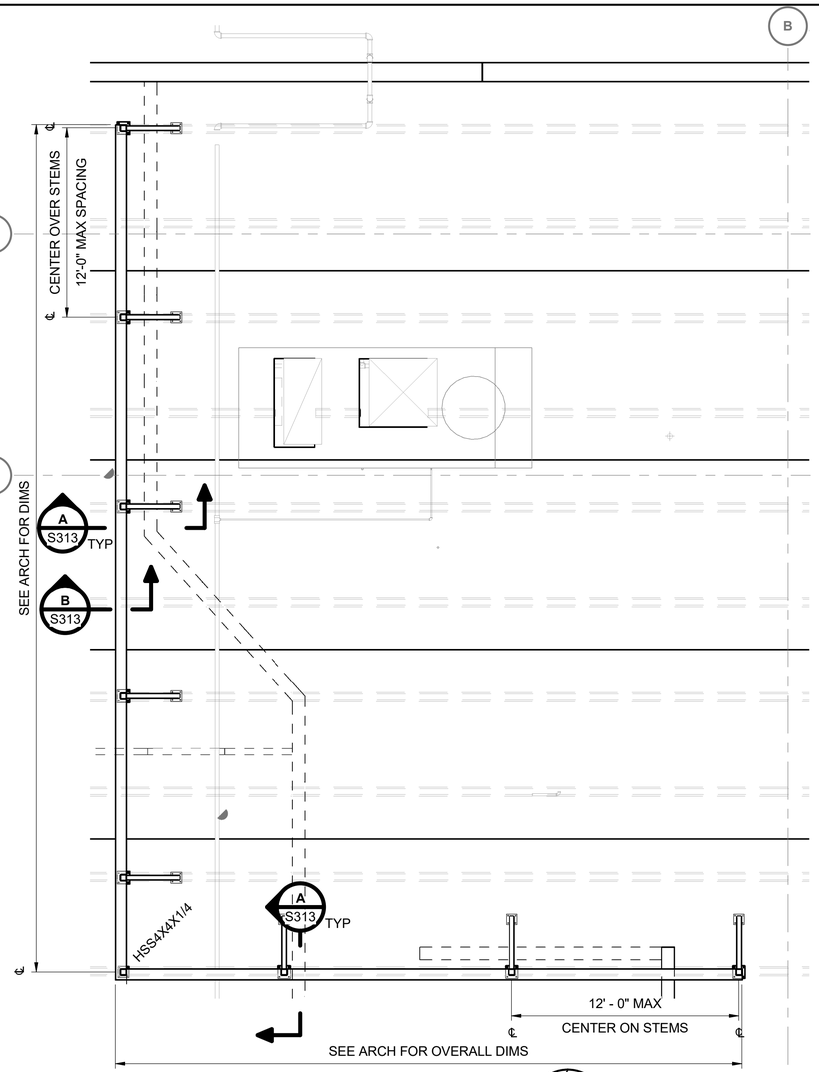
drawing **S311 — 0** rev.

sheet 129 of 542 sheets

file 98101_S

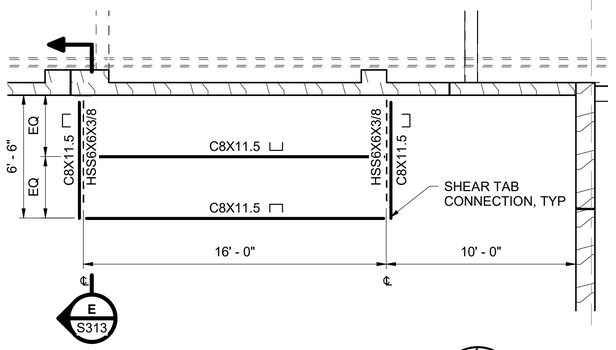
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**MECHANICAL SCREEN WALL 3**

0 2' 4' 8'
SCALE IN FEET



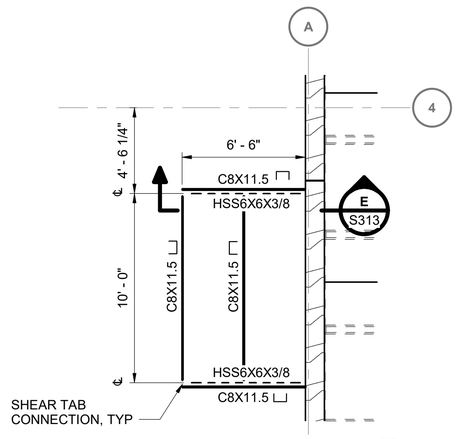

**CANOPY 1 ENLARGED PLAN**

0 2' 4' 8'
SCALE IN FEET



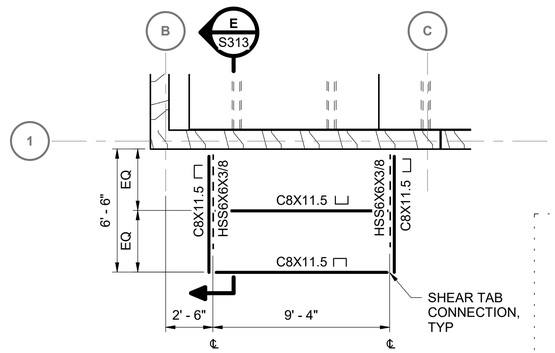

**MECHANICAL SCREEN WALL 4**

0 2' 4' 8'
SCALE IN FEET




**CANOPY 2 ENLARGED PLAN**

0 2' 4' 8'
SCALE IN FEET




**CANOPY 3 ENLARGED PLAN**

0 2' 4' 8'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | SD | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | S. DALGLISH |
| **designed** | **checked** |
| S. DALGLISH | B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SCREEN WALL AND CANOPY PLANS II

| project | contract |
|---|---|
| 98101 | |

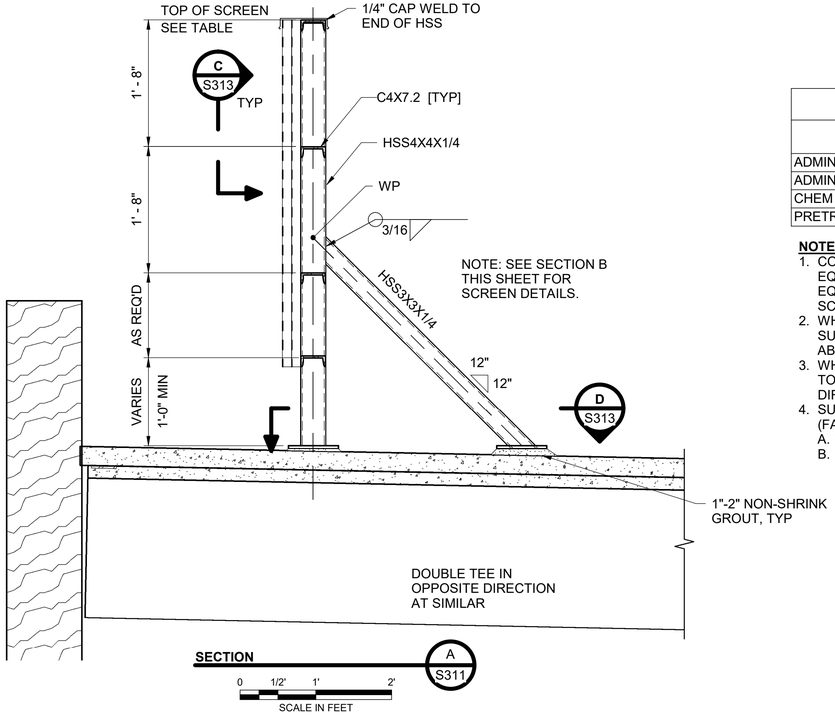
**drawing** **S312** **rev. 0**

**sheet** 130 **of** 542 **sheets**

**file** 98101_S

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECTION** A S311

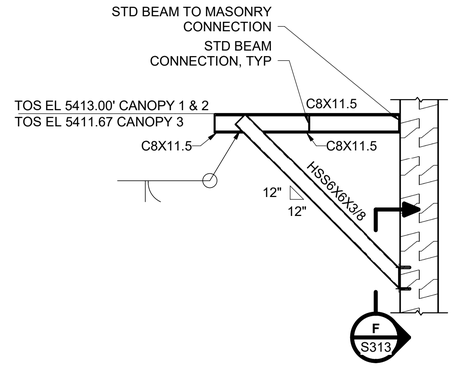
0 1/2" 1' 2'

SCALE IN FEET

| MECHANICAL SCREEN WALL | |
|---|---|
| LOCATION | APPROX TOP OF SCREEN WALL ELEVATION (FT) |
| ADMIN AREA 1 ROOF | 5425.25 |
| ADMIN AREA 2 ROOF | 5422.83 |
| CHEM AREA ROOF | 5433.0 |
| PRETREATMENT AREA ROOF | 5427.25 |

**NOTES:**

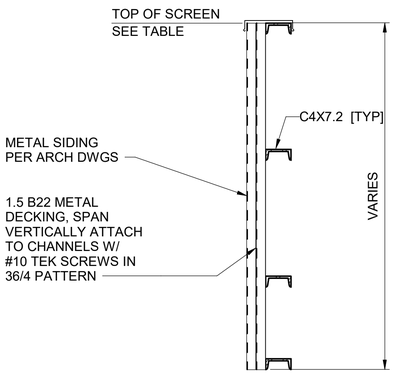
1. COORDINATE TOP OF SCREEN W/ ROOFTOP MECH EQUIPMENT SUBMITTALS. CONTACT ENGINEER IF TOP OF EQUIPMENT ELEVATION, AS INSTALLED, EXCEEDS TOP OF SCREEN ELEVATION.
2. WHERE DOUBLE TEE ROOF MEMBERS RUN PARALLEL TO THE SUPPORT FRAME, LOCATE SUPPORT FRAMES DIRECTLY ABOVE DOUBLE TEE STEMS.
3. WHERE DOUBLE TEE ROOF MEMBERS RUN PERPENDICULAR TO THE SUPPORT FRAMES, LOCATE BRACE ANCHORS DIRECTLY ABOVE THE DOUBLE TEE STEMS.
4. SUPPORT FRAME REACTIONS FOR PRECAST DESIGN (FACTORED LOADS):
   A. VERTICAL: 2.3 KIPS
   B. SHEAR: 2.4KIPS




**CANOPY BRACE DETAIL** E S312

0 2' 4' 6'

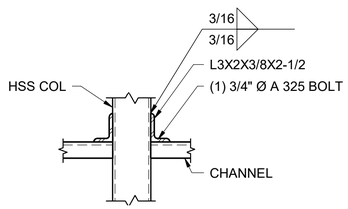
SCALE IN FEET




**SECTION** B S311

0 1/2" 1' 2'

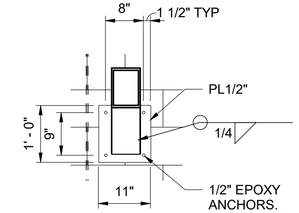
SCALE IN FEET




**SECTION** C S313

0 1/2' 1' 1 1/2'

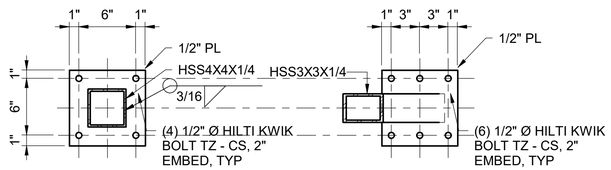
SCALE IN FEET




**SECTION** F S313

0 1' 2' 3'

SCALE IN FEET




**SECTION** D S313

0 1/2' 1' 1 1/2'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | SD | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed S. DALGLISH |
| designed S. DALGLISH | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SCREEN WALL AND CANOPY SECTIONS

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

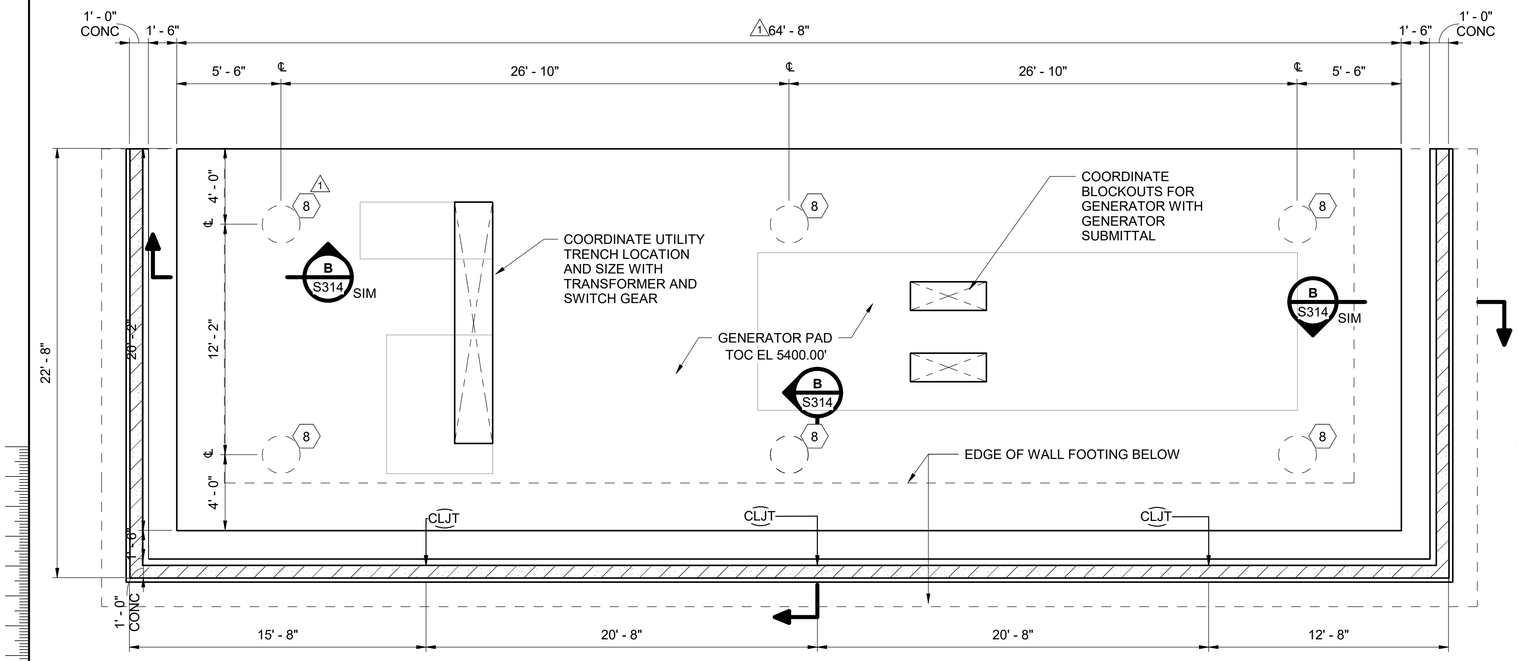
**S313 — 0**

sheet 131 of 54r sheets

file 98101_S

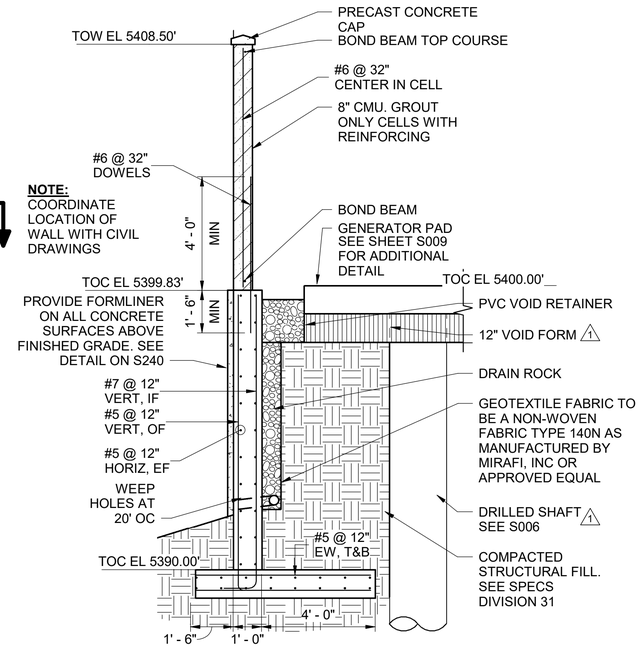
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. SEE S001 & S002 FOR GENERAL STRUCTURAL NOTES.
2. SEE S004 TO S014 FOR TYPICAL DETAILS.
3. SEE CIVIL PLANS FOR LOCATIONS.




**GENERATOR ENCLOSURE**

0 2' 4' 8'

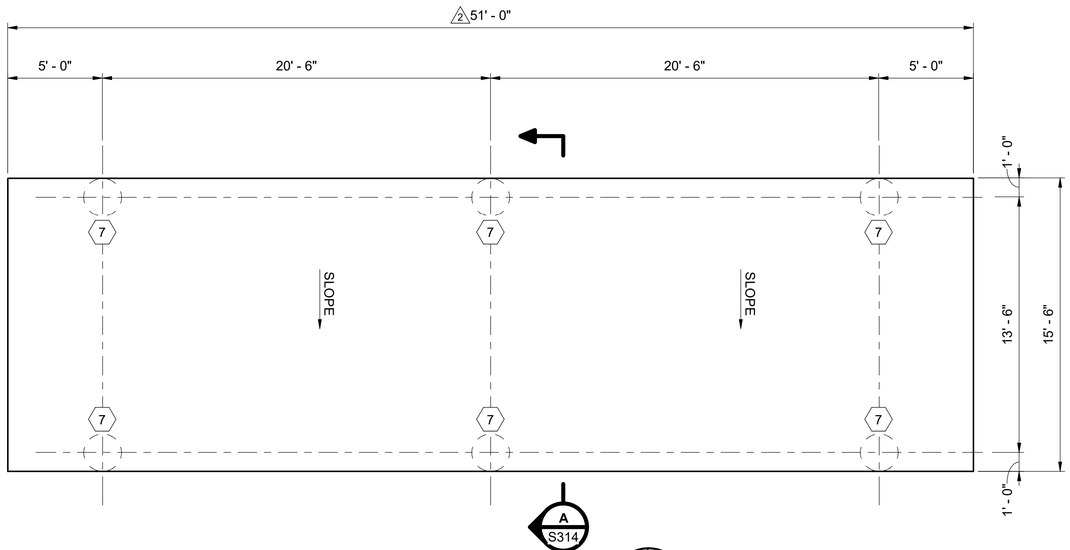
SCALE IN FEET

NORTH

**GENERATOR ENCLOSURE** — B S314

0 2' 4' 6'

SCALE IN FEET




**LOX TANK FOUNDATION**

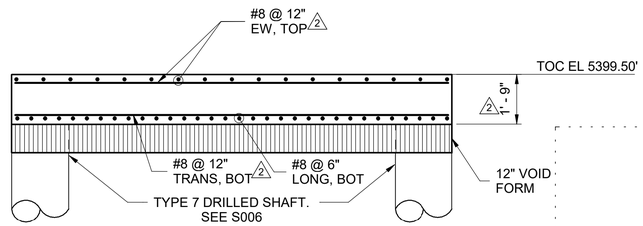
0 2' 4' 8'

SCALE IN FEET

NORTH

**LOX FOUNDATION DESIGN CRITERIA:**

1. SLAB DESIGN IS BASED ON THE FOLLOWING LOADS:
   - A. UNIFORM LIVE LOAD = 100PSF
   - B. CHART® O&D VS-11000 COLD STRECH TANK:
     - a. EMPTY TANK WEIGHT = 52,400LBS
     - b. FULL TANK (LIQUID $O_2$) = 159,800LBS
   - C. CRYOQUIP® VAI-836-FL12 AMBIENT VAPORIZER:
     - a. DRY WEIGHT = 2160LBS
     - b. ICED WEIGHT = 6480LBS
2. SEE LOX SUPPLIER SUBMITTAL DRAWINGS FOR LOCATION AND ORIENTATION OF EQUIPMENT.
3. CONTRACTOR SHALL DETERMINE SLAB SLOPE DIRECTION TO PREVENT POOLING WATER ON SLAB




**SECTION** — A S314

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | KDT | BLS | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | KDT | BLS | ISSUED FOR PCO 029 |
| 2 | 7/29/19 | KDT | JJK | REVISED PER LOX MFR SUBMITTAL |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed K. THURMAN | checked B. SNYDER |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOX TANK & GENERATOR ENCLOSURE FOUNDATION

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

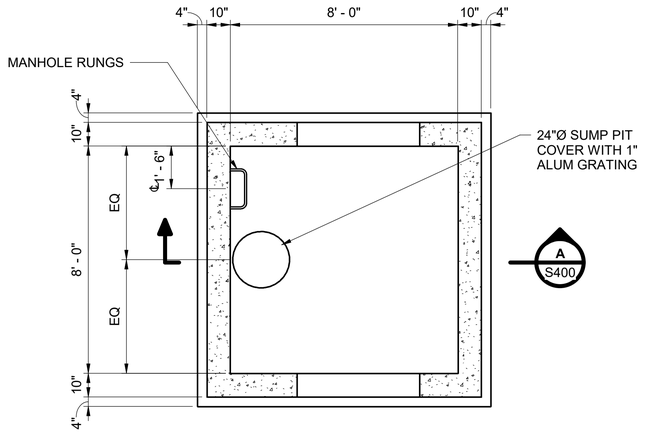
**S314 — 2**

sheet 132 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

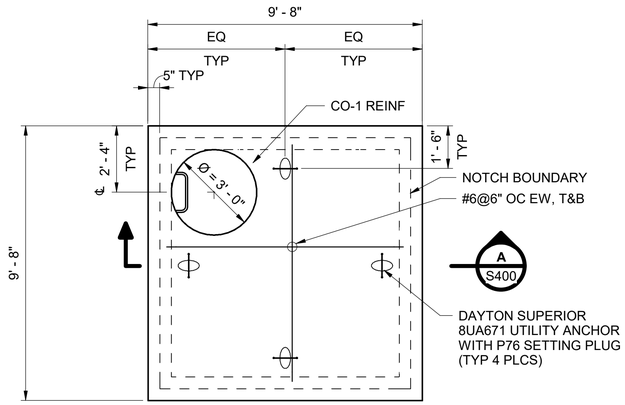
Scale For Microfilming: Millimeters / Inches




**FOUNDATION PLAN**

0 2' 4' 6'

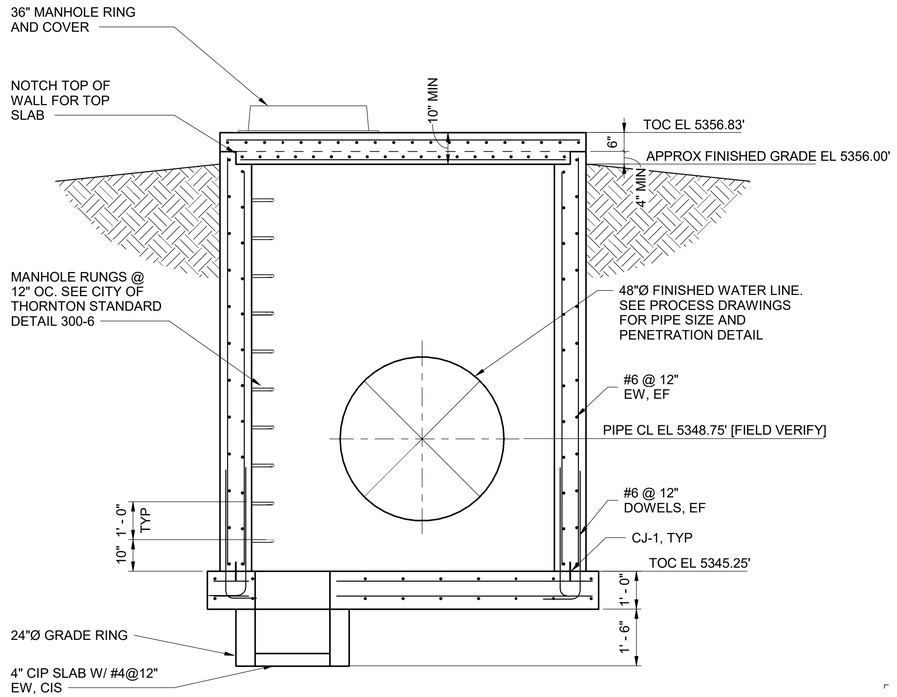
SCALE IN FEET




**TOP PLAN**

0 2' 4' 6'

SCALE IN FEET




**SECTION**

0 1' 2' 4'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| K. THURMAN | J. KIENHOLZ |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
48" FINISHED WATERLINE BFV VAULT

| project | contract |
|---|---|
| 98101 | |

drawing **S400** rev. **0**

sheet 133 of 542 sheets

file 98101_S

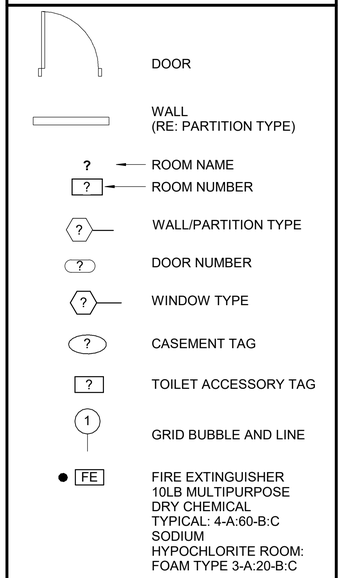
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

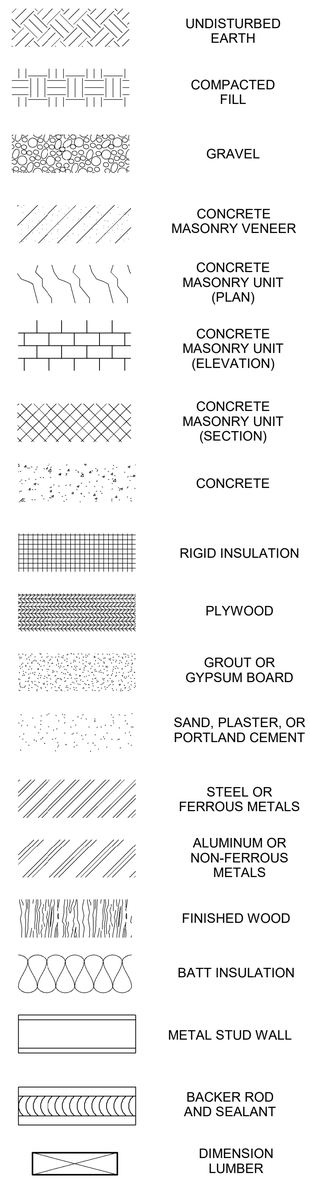
# ABBREVIATIONS

| | |
|---|---|
| | -A- |
| A/E | ARCHITECT/ENGINEER |
| ADJ | ADJACENT, ADJUSTABLE |
| AFF | ABOVE FINISH FLOOR |
| AHJ | AUTHORITY HAVING JURISDICTION |
| ALT | ALTERNATE |
| ALUM | ALUMINUM |
| ANOD | ANNODIZED |
| APPROX | APPROXIMATE |
| ARCH | ARCHITECTURE, ARCHITECT |
| | -B- |
| BD | BOARD |
| BITUM | BITUMINOUS |
| BLDG | BUILDING |
| BLKG | BLOCKING |
| BO | BOTTOM OF, AS IN "BO STEEL" |
| BTWN | BETWEEN |
| | -C- |
| CAB | CABINET |
| CCTV | CLOSED CIRCUIT TELEVISION |
| CID | COMPREHENSIVE INTERIOR DESIGN |
| CJ | CONTROL JOINT, CONSTRUCTION JOINT |
| CL | CENTER LINE |
| CLG | CEILING |
| CLR | CLEAR |
| CMU | CONCRETE MASONRY UNIT |
| CO | CLEANOUT |
| COL | COLUMN |
| COMM | COMMUNICATION |
| CONC | CONCRETE |
| CONSTR | CONSTRUCTION |
| CONT | CONTINUOUS |
| CONTR | CONTRACT, CONTRACTOR |
| COORD | COORDINATE |
| CORR | CORRUGATED OR CORRIDOR |
| CU | CUBIC |
| °C | CELSIUS |
| | -D- |
| DBL | DOUBLE |
| DEMO | DEMOLITION |
| DESCR | DESCRIPTION |
| DET | DETAIL |
| DIA | DIAMETER |
| DIAG | DIAGONAL |
| DIM | DIMENSION |
| DN | DOWN |
| DR | DOOR |
| DS | DOWNSPOUT |
| DWG | DRAWING |
| | -E- |
| E | EAST |
| EA | EACH |
| EEW | EMERGENCY EYEWASH |
| EEWS | EMERGENCY EYEWASH & SHOWER |
| EF | EXHAUST FAN |
| EJ | EXPANSION JOINT |
| EL | ELEVATION, AS IN HEIGHT |
| ELAST | ELASTOMERIC |
| ELEC | ELECTRIC / ELECTRICAL |
| ELEV | ELEVATOR, OR ELEVATION AS IN NORTH ELEV |
| EQ | EQUAL |
| EQUIP | EQUIPMENT |
| ETC | AND SO FORTH (ETCETERA) |
| EW | EACH WAY |
| EWC | ELECTRIC WATER COOLER |
| EXH | EXHAUST |
| EXIST | EXISTING |
| EXP | EXPANSION |
| EXT | EXTERIOR |
| | -F- |
| FD | FLOOR DRAIN |
| FDN | FOUNDATION |
| FE | FIRE EXTINGUISHER WITH WALL BRACKET |
| FEC | FIRE EXTINGUISHER CABINET |
| FF | FINISH FLOOR |
| FF&E | FURNITURE, FIXTURES & EQUIPMENT |
| FHC | FIRE HOSE CABINET (WITH EXTINGUISHER & BRACKET) |
| FHR | FIRE HOSE REEL (WITH EXTINGUISHER & BRACKET) |
| FIN | FINISHED, FINISH |
| FLR | FLOOR |
| FT | FEET / FOOT |
| FV | FIELD VERIFY |
| °F | FAHRENHEIT |
| | -G- |
| GA | GAUGE |
| GALV | GALVANIZED |
| GL | GIRT LINE |
| GRTG | GRATING |
| GYP | GYPSUM |
| | -H- |
| H | HIGH |
| HD | HAND |
| HDWR | HARDWARE |
| HM | HOLLOW METAL |
| HORIZ | HORIZONTAL |
| HT | HEIGHT |
| HVAC | HEATING, VENTILATION & AIR CONDITIONING |
| | -I- |
| ID | INSIDE DIAMETER |
| IN | INCH |
| INSUL | INSULATION |
| INT | INTERIOR |
| | -J- |
| JAN | JANITOR'S CLOSET |
| | -K- |
| KS | KNEE SPACE |
| | -L- |
| L | LEFT, LONG, LENGTH |
| LAB | LABORATORY |
| LAT | LATITUDE |
| LAV | LAVATORY |
| LB or # | POUND |
| LH | LEFT HAND |
| LONG | LONGITUDE |
| LVR | LOUVER |
| | -M- |
| M | METER |
| MACH | MACHINE |
| MAINT | MAINTENANCE |
| MAS | MASONRY |
| MATL | MATERIAL |
| MAX | MAXIMUM |
| MECH | MECHANICAL |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| MJ | MOVEMENT JOINT |
| MM | MILLIMETER |
| MO | MASONRY OPENING |
| MTD | MOUNTED |
| MTL | METAL |
| | -N- |
| N | NORTH |
| N/A | NOT APPLICABLE |
| NIC | NOT IN CONTRACT |
| NO | NUMBER |
| NOM | NOMINAL |
| NTP | NOTICE TO PROCEED |
| NTS | NOT TO SCALE |
| | -O- |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OFF | OFFICE |
| OPNG | OPENING |
| OPP | OPPOSITE |
| | -P- |
| PA | PUBLIC ADDRESS |
| PC | PRECAST CONCRETE |
| PERIM | PERIMETER |
| PKG | PACKAGE |
| PL | PLATE |
| PLMB | PLUMBING |
| PLYWD | PLYWOOD |
| PROJ | PROJECT |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| PVC | POLYVINYL CHLORIDE |
| | -R- |
| R | RADIUS |
| R/A | RETURN AIR |
| RCP | REFLECTIVE CEILING PLAN |
| RD | ROOF DRAIN |
| RECP | RECEPTACLE |
| REFER | REFERENCE |
| REINF | REINFORCED |
| REQ'D | REQUIRED |
| REV | REVISION |
| RH | RIGHT HAND |
| RO | ROUGH OPENING |
| | -S- |
| S | SOUTH |
| S/A | SUPPLY AIR |
| SCHED | SCHEDULE |
| SECT | SECTION |
| SF | SQUARE FOOT |
| SIM | SIMILAR |
| SPEC | SPECIFICATION |
| SQ | SQUARE, AS IN "SQ FT" |
| STC | SOUND TRANSMISSION COEFFICIENT |
| STD | STANDARD |
| STOR | STORAGE |
| STRUCT | STRUCTURAL |
| SUPP | SUPPORT |
| SUSP | SUSPENDED |
| SYS | SYSTEM |
| | -T- |
| TD | TRENCH DRAIN |
| TECH | TECHNICAL |
| THRU | THROUGH |
| TLT | TOILET |
| TO | TOP OF, AS IN "TO STEEL" |
| TYP | TYPICAL |
| | -U- |
| UL | UNDERWRITERS LABORATORY |
| UNO | UNLESS NOTED OTHERWISE |
| UTIL | UTILITY |
| | -V- |
| VENT | VENTILATE, VENTILATOR |
| VERT | VERTICAL |
| VOL | VOLUME |
| | -W- |
| W | WEST, WIDTH |
| W/ | WITH |
| W/O | WITHOUT |
| WC | WATER CLOSET |
| WD | WOOD |
| WH | WATER HEATER |
| WT | WEIGHT |

# PLAN LEGEND

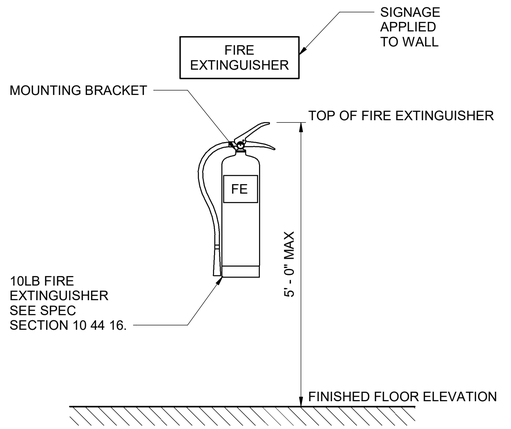



# MATERIAL SYMBOLS




# ARCHITECTURAL GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES AND STANDARDS AS LISTED OR REFERENCED ON LIFE SAFETY PLAN AND LIFE SAFETY CRITERIA.
2. DIMENSIONS SHALL GOVERN. DETAILS SHALL GOVERN OVER PLANS AND ELEVATIONS. LARGE SCALE DETAILS OR PLANS SHALL GOVERN OVER SMALL SCALE DETAILS OR PLANS. DO NOT SCALE DRAWINGS.
3. THE DESIGN-BUILDER SHALL PROVIDE AND INSTALL EXIT SIGNS, EMERGENCY LIGHTING SYSTEMS, ALARM SYSTEMS AND AUTOMATIC SPRINKLER SYSTEMS AS REQUIRED BY APPLICABLE CODES AND STANDARDS.
4. ALL FLOORS SHALL BE INSPECTED FOR DAMAGE, WARPING OR OTHER NOTICEABLE DEVIATIONS AND PATCHED AND LEVELED PRIOR TO COVERING WITH FLOOR FINISHES, OR ERECTION AND INSTALLATION OF COLD-FORMED FRAMING.
5. THE DESIGN-BUILDER WILL PROVIDE ALL MANUFACTURER'S RECOMMENDED MAINTENANCE PROCEDURES AND SCHEDULES.
6. ANY MANUFACTURER'S OR BRAND NAME PRODUCTS INDICATED OR SPECIFIED ARE DONE SO TO ESTABLISH A SIMILAR LEVEL OF QUALITY.
7. THE LETTERS I, O, AND Q ARE NOT USED TO INDICATE DETAILS, SECTIONS OR ELEVATIONS.
8. DESIGN-BUILDER WILL PROVIDE PRESERVATIVE-TREATED WOOD AT ALL LOCATIONS WHERE WOOD IS IN DIRECT CONTACT WITH CONCRETE OR MASONRY.
9. DESIGN-BUILDER WILL PROVIDE 3/4" FIRE-RETARDANT TREATED PLYWOOD BACKING AT ALL ELECTRICAL, PHONE, AND SECURITY SYSTEM PANELS.
10. DESIGN-BUILDER WILL PROVIDE FIRE-RESISTANT TREATED WOOD BLOCKING FOR SECURE ANCHORAGE OF ALL SHELVES, RUNNING TRIM, RAILINGS, SUSPENDED ITEMS, DOOR-STOPS, GRAB-BARS, AND OTHER SIMILAR WOODWORK, HARDWARE, SPECIALTIES, ACCESSORIES, FIXTURES, OR EQUIPMENT.
11. DESIGN-BUILDER WILL PROVIDE CEMENT BOARD SHEATHING AT ALL AREAS WHERE A TILE SURFACE IS TO BE INSTALLED ON METAL STUD WALLS.
12. DESIGN-BUILDER WILL PROVIDE WATER-RESISTANT GYPSUM BOARD AT ALL WET OR UNCONDITIONED AREAS INCLUDING, BUT NOT LIMITED TO, PARTITIONS BEHIND SINKS.
13. PAINT, STAIN, OR COAT EXPOSED SURFACES OF CONSTRUCTION AS INDICATED IN SPECIFICATIONS.
14. ALL OPENING DIMENSIONS ARE NOMINAL. THE DESIGN-BUILDER SHALL FIELD MEASURE OPENINGS AND COORDINATE WITH THE APPROPRIATE SUPPLIER FOR DOORS AND WINDOWS.
15. DESIGN-BUILDER WILL PROVIDE GALVANIC PROTECTION BETWEEN DISSIMILAR MATERIALS, WHERE REQUIRED.
16. CERAMIC TILE TO BE INSTALLED UP TO 4'-0" ABOVE FINISH FLOOR AND 1'-0" TO EITHER SIDE AT ALL MOP SINK LOCATIONS. EXTENT OF TILE VARIES BY LOCATION.
17. ARCHITECTURAL DETAILS ARE APPLICABLE WHERE INDICATED BY SECTION CUT, BY NOTE, OR BY DETAIL TITLE. DESIGN-BUILDER WILL INCORPORATE SIMILAR DETAILS AT SIMILAR CONDITIONS UNLESS NOTED OTHERWISE.
18. PROVIDE FIRE-STOPPING SYSTEMS AT TOP OF AND AT PENETRATIONS THROUGH FIRE-RATED PARTITIONS.
19. SEAL EXTERIOR BUILDING JOINTS AT BOTH THE EXTERIOR AND INTERIOR SURFACES AGAINST MOISTURE AND AIR INFILTRATION.
20. SEAL AROUND DOOR AND WINDOW FRAMES, COUNTERTOPS, WALL-MOUNTED FIXTURES AND EQUIPMENT TO ADJACENT WALL SURFACES.
21. THE DESIGN-BUILDER WILL COORDINATE ALL PENETRATIONS IN THE STRUCTURE FOR THE PROPER INSTALLATION OF THE WORK. REFER TO STRUCTURAL DRAWINGS FOR SECONDARY FRAMING AND OR REINFORCING REQUIRED AT PENETRATIONS IN STEEL, CONCRETE OR MASONRY.
22. THE DESIGN-BUILDER SHALL PROVIDE ACCESS DOORS OR PANELS AS REQUIRED FOR SERVICING OF PIPING, DUCTWORK, CABLE TRAYS, FIRE DAMPERS AND SIMILAR APPLICATIONS. ALL PROPOSED ACCESS DOOR LOCATIONS TO BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION.
23. DESIGN-BUILDER WILL BRACE PARTITIONS, SUSPENDED CEILINGS, SOFFITS, SUSPENDED ITEMS, ETC. ONLY TO STRUCTURAL ELEMENTS ABOVE.
24. DESIGN-BUILDER WILL EXTEND ALL FLOORING AND WALL-BASE COMPLETELY INTO RECESSES, UNDER OPEN COUNTERTOPS, AND BEHIND EQUIPMENT.
25. ALL MATERIALS USED FOR CONSTRUCTION SHALL BE NEW AND UNDAMAGED. THE DESIGN-BUILDER SHALL SUBMIT SHOP DRAWINGS FOR WORK SHOWN.
26. "TYPICAL" (TYP) AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITIONS OR DIMENSION IS THE SAME OR REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT.
27. CONTROL JOINTS (CJ) SHALL BE INSTALLED AT ALL PARTITIONS. CJ AT GYPSUM PARTITIONS SHALL BE MAXIMUM 30'-0" O.C., CJ AT CONCRETE MASONRY UNIT PARTITIONS SHALL BE MAXIMUM 20'-0" O.C., UNLESS OTHERWISE NOTED ON DRAWINGS. REFER TO ELEVATION DRAWINGS FOR EXTERIOR CONTROL JOINT LOCATIONS.
28. NON-LOAD BEARING PARTITIONS SHALL BE ISOLATED FROM THE BUILDING STRUCTURE TO PREVENT TRANSFER OF BUILDING LOADS FROM THE STRUCTURE TO THE PARTITIONS.




**FIRE EXTINGUISHER MOUNTING DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GENERAL NOTES, ABBREVIATIONS AND LEGEND

| | |
|---|---|
| project 98101 | contract |
| drawing A001 | rev. 0 |
| sheet 134 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## IBC CODE REVIEW

| LOCATION | OCCUPANCY DESCRIPTION | CONSTRUCTION TYPE | GROUP | SPRINKLERED | ALLOWABLE HEIGHT: IBC TABLE 504.3 & 504.4 | | | | ALLOWABLE AREA: IBC 506 | | | | | OCCUPANCY LOAD: IBC TABLE 1004.1.2 | | IBC TABLE 1006.3.2(2) | | TABLE 1017.2 MAX TOTAL TRAVEL DISTANCE | SECTION 1005 EGRESS WIDTH (IN) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | MAXIMUM NO. OF STORIES | ACTUAL NO. OF STORIES | MAXIMUM HEIGHT ABOVE GRADE | ACTUAL HEIGHT ABOVE GRADE | ALLOWABLE FLOOR AREA | ALLOWABLE FLOOR AREA INCREASE* | ALLOWABLE FLOOR AREA INCLUDING INCREASE* | ACTUAL FLOOR AREA | RATIO OF ACTUAL TO ALLOWABLE FLOOR AREAS | OCCUPANT LOAD FACTOR | OCCUPANTS | MINIMUM NO. OF EXITS | MAX COMMON PATH | | |
| BACKWASH PUMP STATION | LOW HAZARD FACTORY AND INDUSTRIAL | II-A | F-2 | No | 5 | 1 | 65' - 0" | 21' - 4" | 37500 SF | 75% | 65625 SF | 2077 SF | 0.03 | 100 | 20 | 2 EXITS | 75 ft | 300 ft | 4 |
| | | | | | | | | | | | | | | | | | | | |
| LOWER LEVEL | LOW HAZARD FACTORY AND INDUSTRIAL | II-A | F-2 | No | 5 | 1 | 65' - 0" | 0' - 0" | 37500 SF | 75% | 65625 SF | 13011 SF | 0.20 | 100 | 131 | 2 EXITS | 75 ft | 300 ft | 26 |
| | | | | | | | | | | | | | | | | | | | |
| UPPER LEVEL | BUSINESS GROUP | II-A | B | No | 5 | 1 | 65' - 0" | 18' - 0" | 37500 SF | 75% | 65625 SF | 5835 SF | 0.09 | 100 | 59 | 2 EXITS | 75 ft | 200 ft | 12 |
| UPPER LEVEL | LOW HAZARD FACTORY AND INDUSTRIAL | II-A | F-2 | No | 5 | 1 | 65' - 0" | 21' - 4" | 37500 SF | 75% | 65625 SF | 36563 SF | 0.56 | 100 | 366 | 2 EXITS | 75 ft | 300 ft | 73 |
| UPPER LEVEL | PHYSICAL HAZARD | II-A | H-3 | Yes | 4 | 1 | 65' - 0" | 28' - 0" | 26500 SF | 75% | 46375 SF | 999 SF | 0.02 | 100 | 10 | 2 EXITS EACH ROOM | 75 ft | 150 ft | 2 |
| UPPER LEVEL | HEALTH HAZARD | II-A | H-4 | Yes | 5 | 1 | 65' - 0" | 28' - 0" | 150000 SF | 75% | 262500 SF | 7037 SF | 0.03 | 100 | 71 | 2 EXITS EACH ROOM | 75 ft | 175 ft | 14 |
| UPPER LEVEL | LOW HAZARD STORAGE GROUP | II-A | S-2 | No | 6 | 1 | 65' - 0" | 28' - 0" | 39000 SF | 75% | 68250 SF | 2491 SF | 0.04 | 100 | 25 | 1 EXIT | 75 ft | 300 ft | 5 |
| TOTALS | | | | | | | | | | | | 68013 SF | 0.96 | | 682 | | | | |

*AREA INCREASE FACTOR DUE TO FRONTAGE PER SECTION 506.3

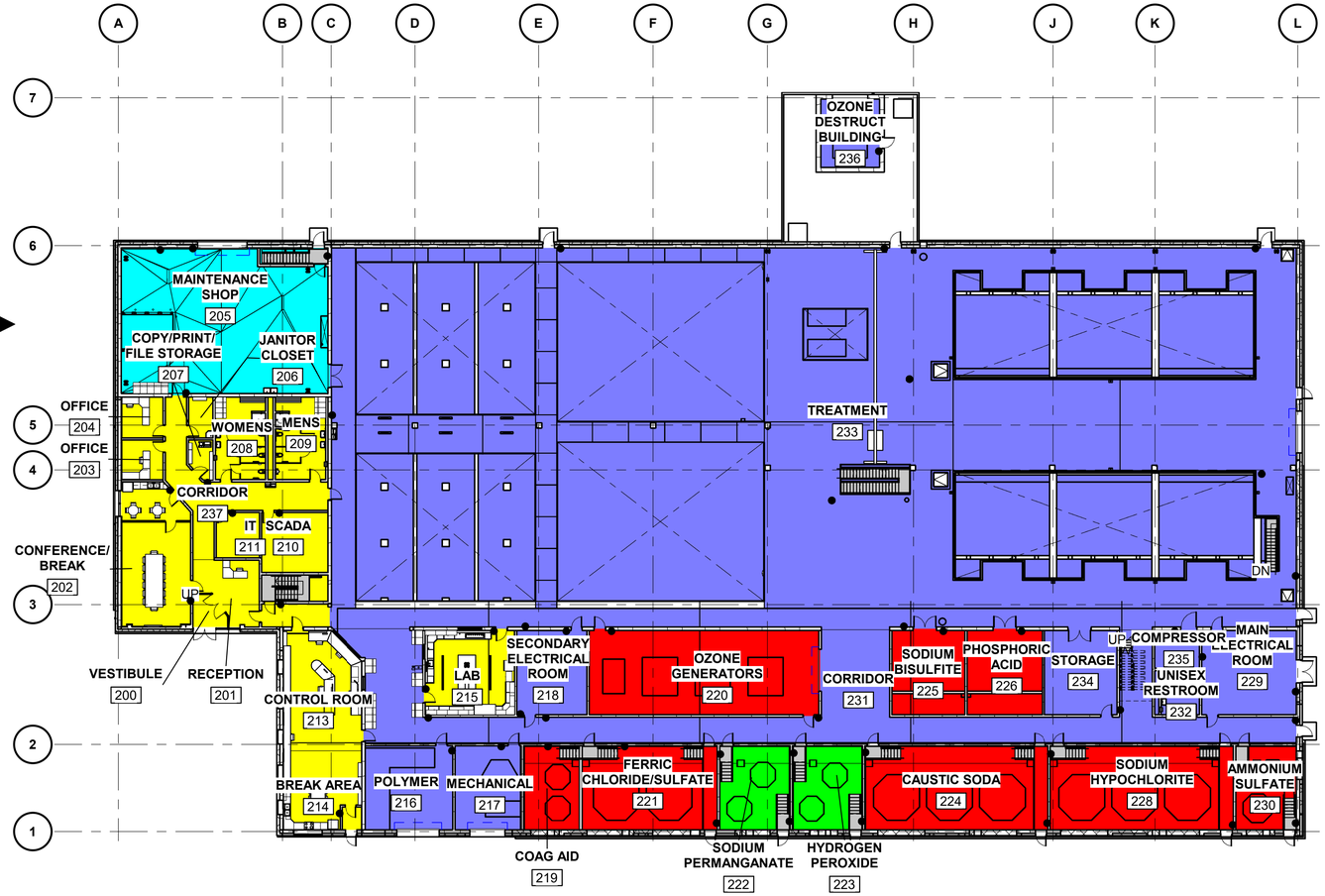
$I_F$ = [F/P-0.25]W/30

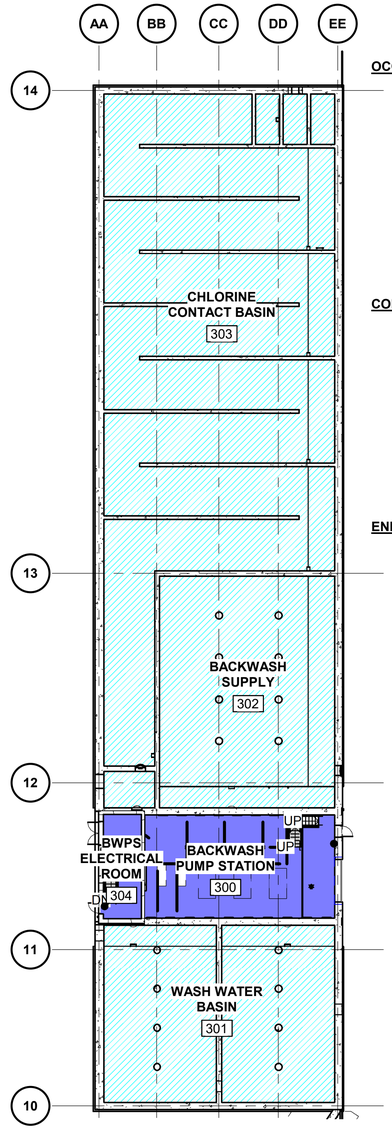
F = BUILDING PERIMETER THAT FRONTS A PUBLIC WAY OR OPEN SPACE HAVING 20 FEET OPEN MINIMUM WIDTH = 1048 FEET

P = PERIMETER OF ENTIRE BUILDING = 1048 FEET

W = WIDTH OF PUBLIC WAY OR OPEN SPACE = 30 FEET MINIMUM

$I_F$ = [1048/1048-0.25]30/30 = 0.75 = 75% ALLOWABLE INCREASE




**FIRE RATING KEY**

1-HR FIRE RATING

2-HR FIRE RATING

3-HR FIRE RATING

**AREA PLAN**
NOT TO SCALE

NORTH

**APPLICABLE CODE (CITY OF THORNTON, CO):**

INTERNATIONAL BUILDING CODE, 2015 EDITION
INTERNATIONAL MECHANICAL CODE, 2015 EDITION
INTERNATIONAL PLUMBING CODE, 2015 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE, 2015 EDITION
INTERNATIONAL FIRE CODE, 2015 EDITION
NATIONAL ELECTRICAL CODE, 2014 EDITION

**OCCUPANCY TYPE (SECTION 306 & 311):**

B, BUSINESS – ADMINISTRATIVE AREAS
F-2, LOW HAZARD FACTORY – PROCESS AREAS (TREATMENT, ELECTRICAL, LAB, BLOWERS, SODIUM BISULFITE, PHOSPHORIC ACID, POLYMER, COAGULANT AID, MECHANICAL ROOMS, BACKWASH PUMP STATION)
H-4, HEALTH HAZARD – CHEMICAL STORAGE (FERRIC CHLORIDE/SULFATE, CAUSTIC SODA, SODIUM HYPOCHLORITE, & AMMONIA)
H-3, PHYSICAL HAZARD – CHEMICAL STORAGE (SODIUM PERMANGANATE, HYDROGEN PEROXIDE, & OZONE GENERATORS)
S-2, LOW HAZARD STORAGE – MAINTENANCE SHOP

**CONSTRUCTION TYPE (TABLE 601):**

IIA (STRUCTURAL FRAME, BEARING WALLS, FLOOR AND ROOF CONSTRUCTION ARE CONCRETE OR CONCRETE MASONRY AND COMPLY WITH 1 HOUR FIRE RATING)

| OCCUPANCIES | REQ'D SEPARATION (HOURS) |
|---|---|
| B / F-2 | 2 |
| B / S-2 | 2 |
| H-3 / H-4 | 1 |
| S-2 / F-2 | NA |
| H-4 / F-2 | 3 |
| H-3 / F-2 | 3 |

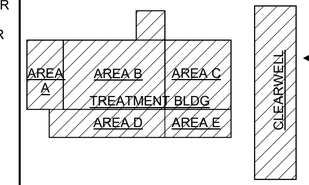
**ENERGY REQUIREMENTS:**

ROOF INSULATION: R-30 MINIMUM
WALL INSULATION: R-13 MINIMUM

OCCUPANCY TYPES

- B - ADMINISTRATION
- F-2 TREATMENT
- H-3 PHYSICAL HAZARDS
- H-4 HEALTH HAZARDS
- S - MAINTENANCE STORAGE
- UNOCCUPIED BASIN

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BUILDING CODE INFORMATION AND AREA PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing A002 | rev. 0 |
| sheet 135 of 542 sheets | |
| file 98101_S | |

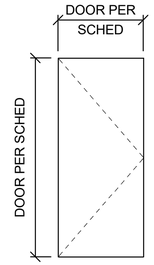
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

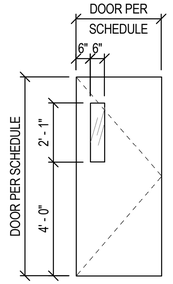
## DOOR SCHEDULE

| DOOR NUMBER | DOOR | | | | | | FRAME | | | ASSEMBLY RATING | DETAIL | | | HARDWARE SET | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PAIR | SIZE WIDTH | SIZE HEIGHT | TYPE | MATERIAL | FINISH | FRAME | MATERIAL | FINISH | | HEAD | JAMB | SILL | | |
| 100 | • | 4' - 0" | 8' - 2" | NL | HM | PAINT | F1 | HM | PAINT | | 2 | 2 | - | 114 | |
| 200 | • | 3' - 2" | 7' - 0" | | | | | | | | | | | 001C | STORE FRONT SYSTEM SEE W5 |
| 201 | • | 3' - 2" | 7' - 0" | | | | | | | | | | | 001 | STORE FRONT SYSTEM SEE SF3 |
| 202 | | 3' - 0" | 7' - 2" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 2 | 2 | - | 101 | |
| 203 | | 3' - 0" | 7' - 2" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 2 | 2 | - | 103 | |
| 204 | | 3' - 0" | 7' - 2" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 2 | 2 | - | 102 | |
| 205 | | 3' - 0" | 7' - 2" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 2 | 2 | - | 102 | |
| 206 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 105C | |
| 207 | | 3' - 0" | 7' - 0" | F | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 105 | |
| 208 | | 3' - 0" | 7' - 0" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 105 | |
| 209 | | 3' - 0" | 7' - 0" | F | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 104 | |
| 210 | | 3' - 0" | 7' - 0" | F | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 104 | |
| 212 | | 3' - 0" | 7' - 0" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 105C | |
| 213 | | 3' - 0" | 7' - 0" | NL | WOOD | STAIN | F1 | HM | PAINT | 45 | 4 | 4 | - | 105C | |
| 214 | | 3' - 0" | 7' - 2" | NL | WOOD | STAIN | F1 | HM | PAINT | 90 | 2 | 2 | - | 108C | |
| 215 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 109C | |
| 216 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 109C | |
| 217 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 109 | |
| 218 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 110 | |
| 219 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 109 | |
| 220 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 109 | |
| 221 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 111 | |
| 222 | | 10' - 0" | 10' - 0" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 223 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 111 | |
| 225 | | 3' - 0" | 8' - 6" | NL | HM | PAINT | F1 | HM | PAINT | | 2 | 2 | - | 111C | |
| 226 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 227 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 228 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 229 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 230 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 231 | | 3' - 0" | 7' - 2" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002 | ANODIZED HARDWARE TO MATCH |
| 232 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 233 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 234 | | 12' - 0" | 12' - 0" | OH | ALUM | ANOD | | - | - | 180 | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 235 | | 3' - 0" | 7' - 2" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002 | ANODIZED HARDWARE TO MATCH |
| 236 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 237 | • | 3' - 2" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 112 | |
| 238 | • | 3' - 2" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 112 | |
| 239 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 240 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 241 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 242 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 110 | |
| 243 | • | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 113 | |
| 244 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 111C | |
| 245 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 111C | |
| 246 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 247 | | 3' - 0" | 7' - 2" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002 | ANODIZED HARDWARE TO MATCH |
| 248 | | 3' - 0" | 7' - 2" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002 | ANODIZED HARDWARE TO MATCH |
| 249 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 180 | 2 | 2 | - | 111 | |
| 250 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 251 | • | 3' - 2" | 8' - 6" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 003 | ANODIZED HARDWARE TO MATCH |
| 252 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 253 | | 12' - 0" | 12' - 0" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 254 | | 3' - 0" | 7' - 2" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 255 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 256 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 257 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 258 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 259 | | 14' - 0" | 14' - 0" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 260 | • | 3' - 2" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | | 2 | 2 | - | 113C | |
| 261 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 90 | 2 | 2 | - | 108C | |
| 262 | | 3' - 0" | 7' - 2" | F | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 106 | |
| 263 | | 12' - 0" | 12' - 0" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 268 | | 3' - 0" | 7' - 0" | NL | WOOD | STAIN | F1 | HM | PAINT | | 4 | 4 | - | 104 | |
| 269 | | 10' - 0" | 8' - 8" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 270 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 271 | | 3' - 0" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | | 2 | 2 | - | 111C | |
| 272 | | 4' - 4" | 7' - 2" | NL | HM | PAINT | F1 | HM | PAINT | 45 | 2 | 2 | - | 110 | |
| 273 | | 3' - 0" | 7' - 2" | | | | | | | | | | | | MANUFACTURERS STANDARD |
| 299 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 300 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 301 | | 12' - 0" | 12' - 0" | OH | ALUM | ANOD | | - | - | | 3 | 3 | 3 | 005 | ANODIZED HARDWARE TO MATCH |
| 302 | | 3' - 0" | 7' - 2" | NL | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 002C | ANODIZED HARDWARE TO MATCH |
| 303 | • | 3' - 2" | 8' - 6" | F | ALUM | ANOD | F1 | ALUM | ANOD | | 1 | 1 | 1 | 003 | ANODIZED HARDWARE TO MATCH |

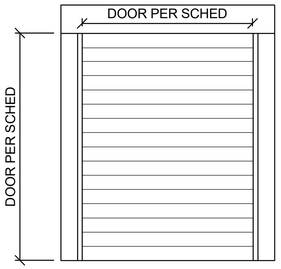
**NOTES:**
1. FINAL DOOR COLOR SELECTION TO BE MADE BY THE OWNER DURING THE SUBMITTAL REVIEW PROCESS.
2. HARDWARE SETS ARE INDICATED IN SPEC SECTION 08 70 50
3. SEE A004 FOR TYPICAL DOOR DETAILS
4. ALL DOORS TO H - OCCUPANCIES SHALL BE SELF CLOSING TYPE.



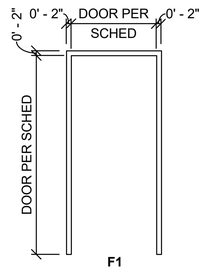
F



NL



OH



F1

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/17/19 | AEH | RL | REVISED PER RFI #129 |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

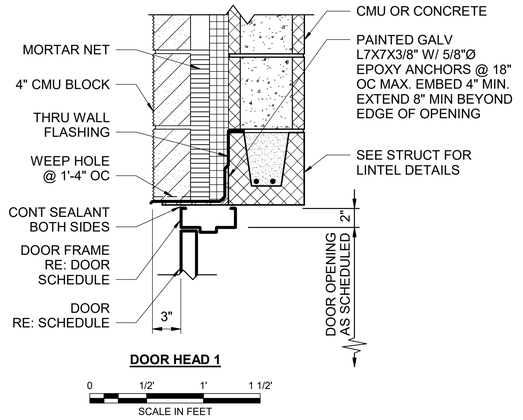
**CITY OF THORNTON**
**TTP - PACKAGE 3**
DOOR SCHEDULE AND DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **A003 — 2** rev.

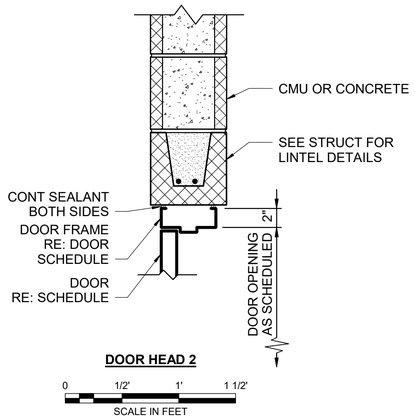
sheet 136 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.
Scale For Microfilming
Millimeters
Inches



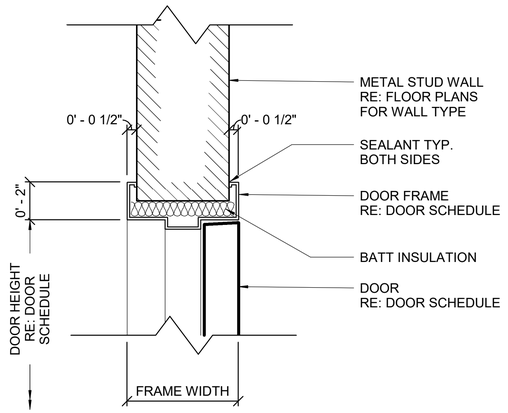

**DOOR HEAD 1**

0 1/2' 1' 1 1/2'
SCALE IN FEET



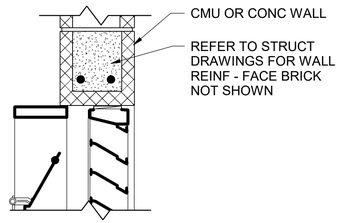

**DOOR HEAD 2**

0 1/2' 1' 1 1/2'
SCALE IN FEET

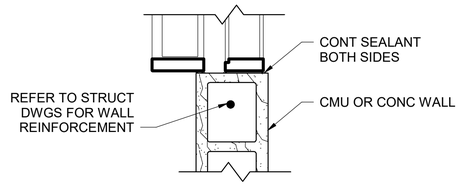



**DOOR HEAD 4**

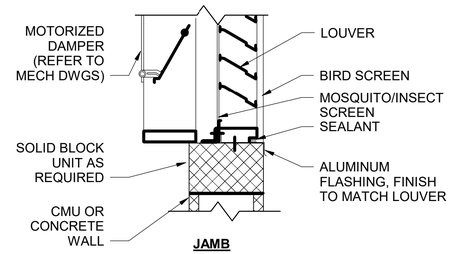
0 1/2' 1' 1 1/2'
SCALE IN FEET



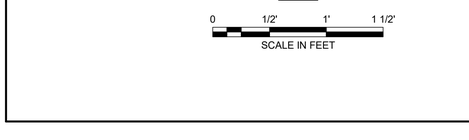

**HEAD**




**SILL**

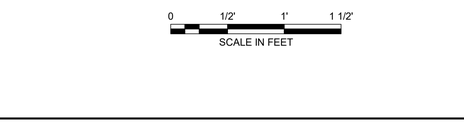



**JAMB**




**DOOR JAMB 1**

0 1/2' 1' 1 1/2'
SCALE IN FEET



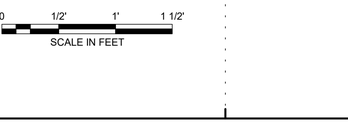

**DOOR JAMB 2**

0 1/2' 1' 1 1/2'
SCALE IN FEET



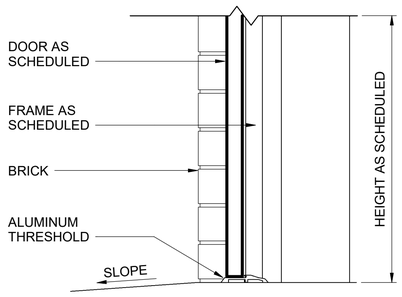

**DOOR JAMB 4**

0 1/2' 1' 1 1/2'
SCALE IN FEET



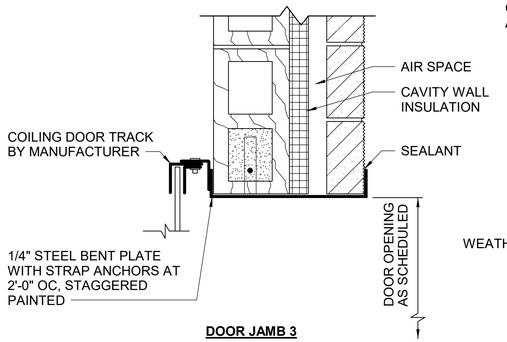

**LOUVER DETAILS**

0 1/2' 1' 1 1/2'
SCALE IN FEET



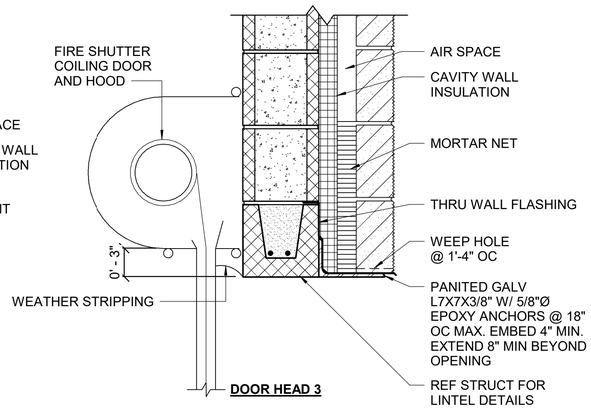

**SILL 1**

0 1/2' 1' 1 1/2'
SCALE IN FEET




**DOOR JAMB 3**

0 1/2' 1' 1 1/2'
SCALE IN FEET




**DOOR HEAD 3**

0 1/2' 1' 1 1/2'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

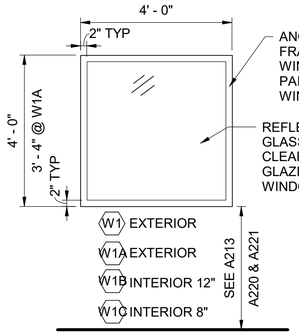
City of Thornton

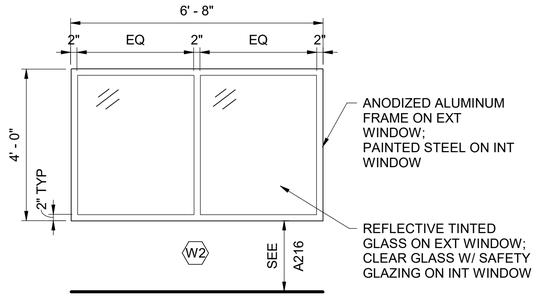
**CITY OF THORNTON**
**TTP - PACKAGE 3**
DOOR DETAILS

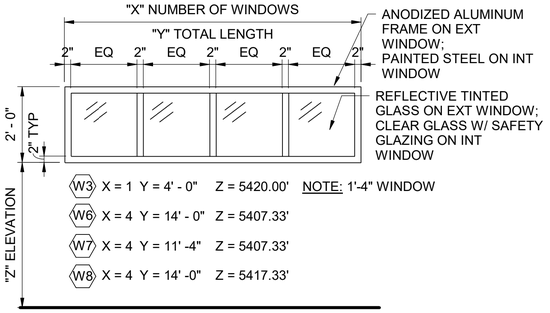
| | |
|---|---|
| project 98101 | contract |
| drawing A004 | rev. 0 |
| sheet 137 of 542 sheets | |
| file 98101_S | |

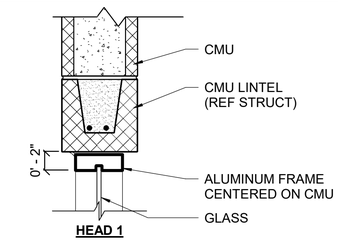
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

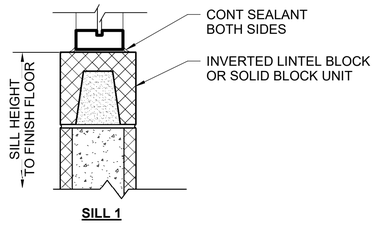


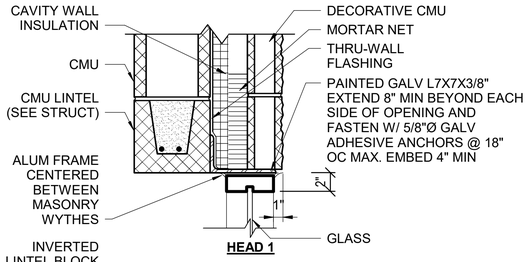

**HEAD 1**



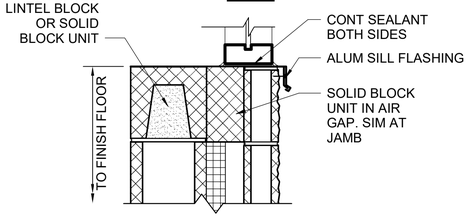

**SILL 1**

**INTERIOR WINDOW**



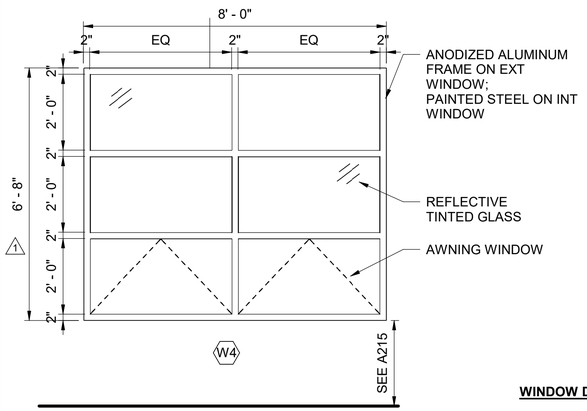

**HEAD 1**

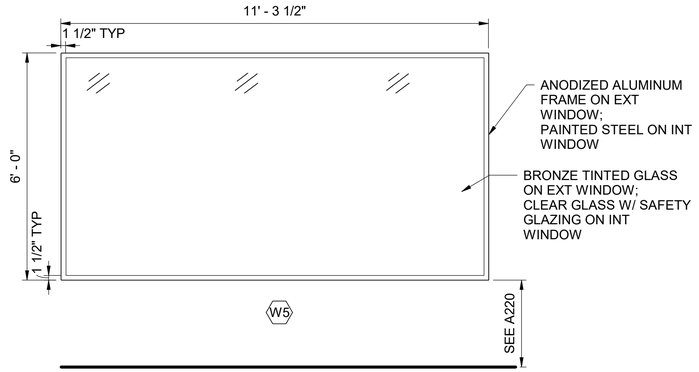



**SILL 1**

**EXTERIOR WINDOW**




**WINDOW DETAILS**




ROOM FINISH SCHEDULE

| ROOM NUMBER | ROOM NAME | FLOOR | BASE | WALLS | | | | CEILING | CEILING HEIGHT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | EAST | NORTH | SOUTH | WEST | | |
| 100 | INTAKE PIPE GALLERY | 14 | 20 | 30 | 30 | 30 | 30 | 40 | - |
| 101 | FILTER PIPE GALLERY | 14 | 20 | 30 | 30 | 30 | 30 | 40 | - |
| 103 | FLOCCULATION 1 | 10 | 20 | 30 | 30 | 30 | 30 | - | - |
| 104 | FLOCCULATION 2 | 10 | 20 | 30 | 30 | 30 | 30 | - | - |
| 105 | SEDIMENTATION BASIN 1 | 10 | 20 | 30 | 30 | 30 | 30 | - | - |
| 106 | SEDIMENTATION BASIN 2 | 10 | 20 | 30 | 30 | 30 | 30 | - | - |
| 107 | OZONE CONTACT BASIN | 10 | 20 | 30 | 30 | 30 | 30 | 40 | - |
| 108 | FILTER BASINS 1 | 11 | 20 | 30 | 30 | 30 | 30 | - | - |
| 109 | FILTER BASINS 2 | 11 | 20 | 30 | 30 | 30 | 30 | - | - |
| 110 | BLOWER ROOM | 14 | 20 | 30 | 30 | 30 | 30 | 40 | - |
| 200 | VESTIBULE | 12 | 20 | 38 | 33 | 38 | 38 | 41 | 10' - 0" |
| 201 | RECEPTION | 12 | 21 | 33 | 33 | 33 | 34 | 42 | 10' - 0" |
| 202 | CONFERENCE/ BREAK | 13/12 | 21 | 31 | 31 | 33 | 31 | 42 | 10' - 0" |
| 203 | OFFICE | 13 | 21 | 31 | 31 | 33 | 31 | 42 | 10' - 0" |
| 204 | OFFICE | 13 | 21 | 34 | 31 | 33 | 31 | 42 | 10' - 0" |
| 205 | MAINTENANCE SHOP | 14 | 20 | 34 | 34 | 34 | 34 | 40 | - |
| 206 | JANITOR CLOSET | 12 | 22 | 34 | 35 | 35 | 35 | 41 | 10' - 0" |
| 207 | COPY/PRINT/ FILE STORAGE | 12 | 21 | 31 | 31 | 31 | 31 | 42 | 10' - 0" |
| 208 | WOMENS | 12 | 22 | 37 | 35 | 35 | 35 | 41 | 10' - 0" |
| 209 | MENS | 12 | 22 | 37 | 35 | 35 | 35 | 41 | 10' - 0" |
| 210 | SCADA | 15 | 21 | 39 | 39 | 39 | 34 | 42 | 10' - 0" |
| 211 | IT | 15 | 21 | 39 | 39 | 39 | 34 | 42 | 10' - 0" |
| 213 | CONTROL ROOM | 13 | 21 | 34 | 34 | 34 | 34 | 42 | 10' - 0" |
| 214 | BREAK AREA | 12 | 21 | - | 34 | 34 | 34 | 42 | 10' - 0" |
| 215 | LAB | 15 | 21 | 34 | 34 | 34 | 34 | 42 | 10' - 0" |
| 216 | POLYMER | 16 | 23 | 34 | 34 | 34 | 34 | 40 | - |
| 217 | MECHANICAL | 14 | 20 | 34 | 34 | 34 | 34 | 40 | - |
| 218 | SECONDARY ELECTRICAL ROOM | 14 | 20 | 34 | 34 | 34 | 34 | 40 | - |
| 219 | COAG AID | 16 | 23 | 36 | 36 | 36 | 36 | 40 | - |
| 220 | OZONE GENERATORS | 14 | 20 | 34 | 34 | 34 | 34 | 40 | - |
| 221 | FERRIC CHLORIDE/SULFATE | 17 | 23 | 36 | 36 | 36 | 36 | 40 | |
| 222 | SODIUM PERMANGANATE | 17 | 23 | 36 | 36 | 36 | 36 | 40 | |
| 223 | HYDROGEN PEROXIDE | 14 | 20 | 36 | 36 | 36 | 36 | 40 | |
| 224 | CAUSTIC SODA | 14 | 20 | 36 | 36 | 36 | 36 | 40 | |
| 225 | SODIUM BISULFITE | 14 | 20 | 36 | 36 | 36 | 36 | 40 | |
| 226 | PHOSPHORIC ACID | 17 | 23 | 36 | 36 | 36 | 36 | 40 | |
| 228 | SODIUM HYPOCHLORITE | 17 | 23 | 36 | 36 | 36 | 36 | 40 | |
| 229 | MAIN ELECTRICAL ROOM | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 230 | AMMONIUM SULFATE | 14 | 20 | 36 | 36 | 36 | 36 | 40 | |
| 231 | CORRIDOR | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 232 | UNISEX RESTROOM | 14 | 20 | 34 | 35 | 34 | 34 | 41 | 10' - 0" |
| 233 | TREATMENT | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 234 | STORAGE | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 235 | COMPRESSOR | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 236 | OZONE DESTRUCT BUILDING | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |
| 237 | CORRIDOR | 12 | 20/21 | 31/34 | 33 | 31/34 | 31/34 | 42 | 10' - 0" |
| 300 | BACKWASH PUMP STATION | 10 | 20 | 30 | 30 | 30 | 30 | 40 | |
| 301 | WASH WATER BASIN | 10 | 20 | 30 | 30 | 30 | 30 | 40 | |
| 302 | BACKWASH SUPPLY | 10 | 20 | 30 | 30 | 30 | 30 | 40 | |
| 303 | CHLORINE CONTACT BASIN | 10 | 20 | 30 | 30 | 30 | 30 | 40 | |
| 304 | BWPS ELECTRICAL ROOM | 14 | 20 | 34 | 34 | 34 | 34 | 40 | |

ROOM FINISH LEGEND:

- ALL COLOR SELECTIONS WILL BE MADE BY THE OWNER DURING THE SUBMITTAL REVIEW PROCESS

10 - EXPOSED CONCRETE (MAG FLOAT FINISH)
11 - EXPOSED CONCRETE (1/8" BROOM FINISH)
12 - CERAMIC TILE
13 - CARPET TILE
14 - HARD TROWEL CONCRETE FINISH - SEALED
15 - VCT
16 - SLIP RESISTANT EPOXY COATING
17 - EPOXY FLOOR COATING
20 - NO BASE
21 - RUBBER BASE
22 - CERAMIC TILE COVE BASE
23 - EPOXY BASE
30 - EXPOSED CONCRETE (NO FINISH)
31 - GYPBOARD - PAINTED
32 - ALUMINUM FRAMED STORE FRONT SYSTEM
33 - EXPOSED SPLIT FACE CMU
34 - PAINT ON CMU / CONCRETE
35 - PAINT ON GYPSUM BOARD - 7' - 0" TILE WAINSCOT
36 - PAINT ON CMU - NO PAINT ON CONCRETE SECONDARY CONTAINMENT EXCEPT WHERE EPOXY FLOOR IS SPECIFIED
37 - PAINT ON CMU - 7'-0" TILE WAINSCOT
38 - STOREFRONT WINDOWS AND DOOR COMBINATION
39 - FIRE RATED AC PLYWOOD PANELS OVER GYPBOARD - PAINTED WHITE
40 - EXPOSED STRUCTURE
41 - GYPBOARD CEILING
42 - ACOUSTIC CEILING TILE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | Date 21 | AEH | RL | REVISED PER RFI #XX |
| 2 | 5/9/19 | AEH | RL | REVISED PER RFI #114 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

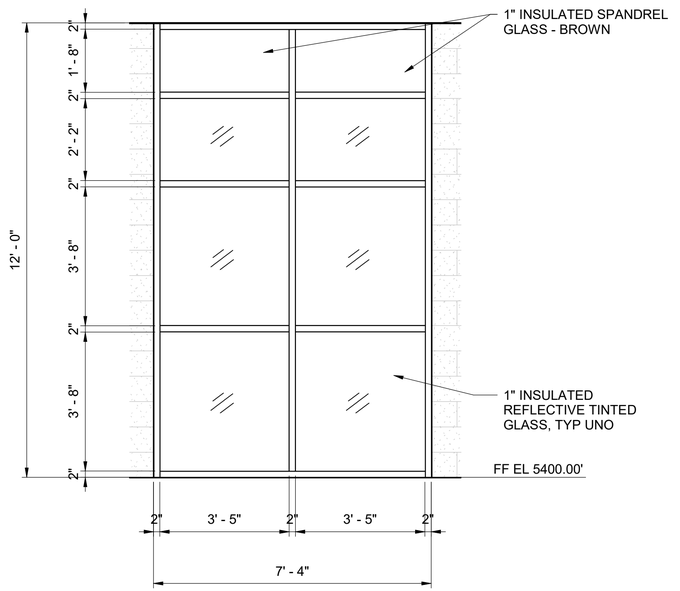
City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
FINISH SCHEDULE AND WINDOW DETAILS

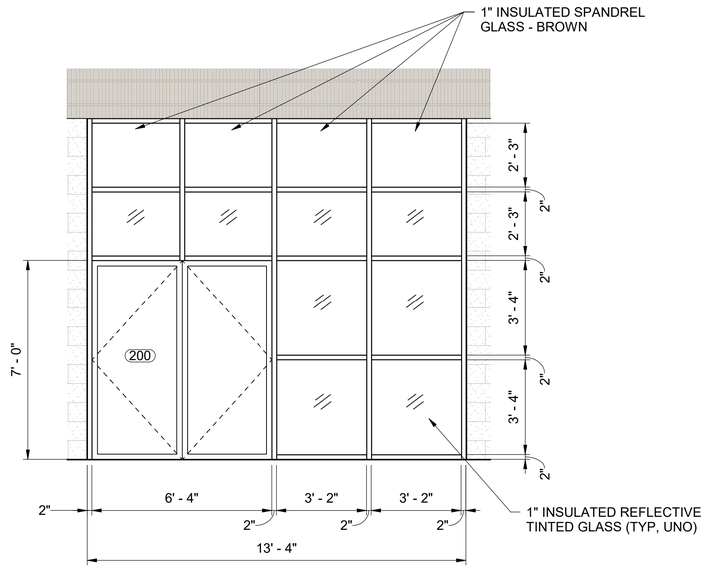
| | |
|---|---|
| project 98101 | contract |
| drawing A005 | rev. 2 |
| sheet 138 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

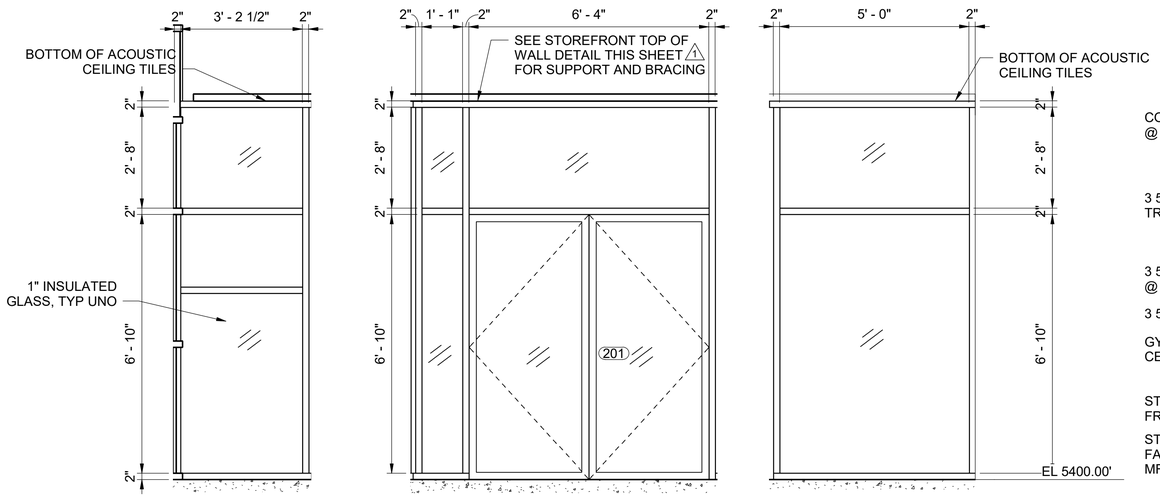
Scale For Microfilming
Millimeters
Inches



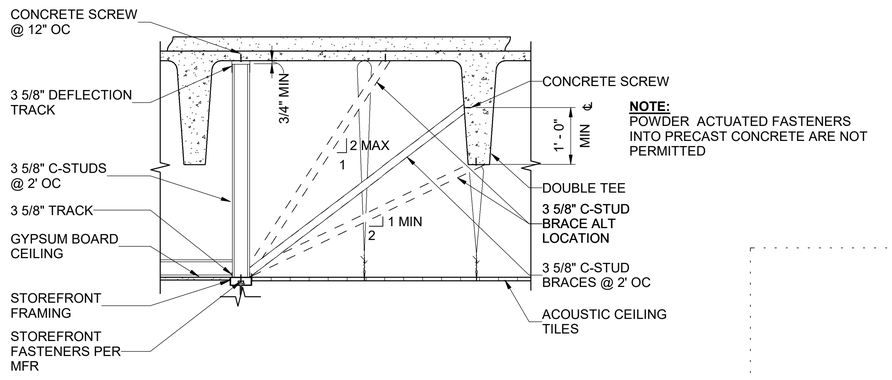

SF1




SF2




SF3




**NOTE:**
POWDER ACTUATED FASTENERS INTO PRECAST CONCRETE ARE NOT PERMITTED

1 **STOREFRONT TOP OF WALL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 1/2/20 | KDT | AEH | REVISED PER RFI #161 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STORE FRONT WINDOW ELEVATIONS

| project | contract |
|---|---|
| 98101 | |

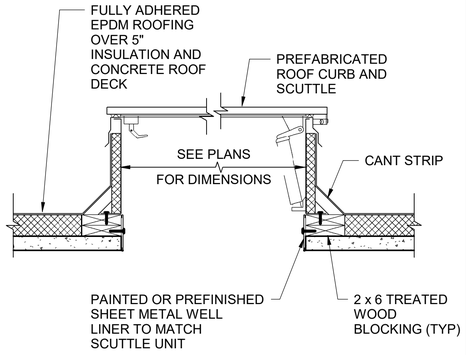
drawing **A006 — 1** rev.

sheet 139 of 542 sheets

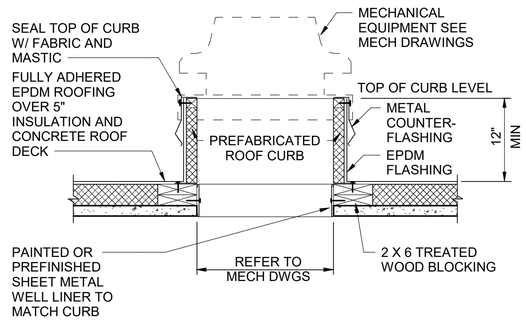
file 98101_S

Scale For Microfilming
Millimeters
Inches

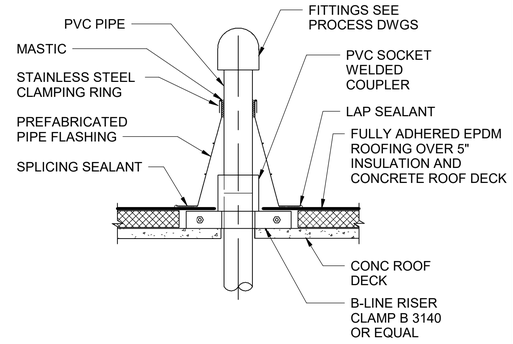
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



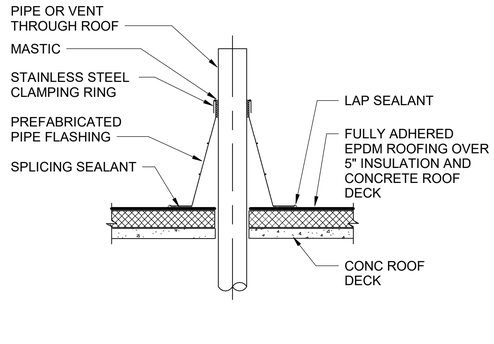

**TYP ROOF SCUTTLE DETAIL**
NOT TO SCALE




**TYP ROOF CURB DETAIL**
NOT TO SCALE

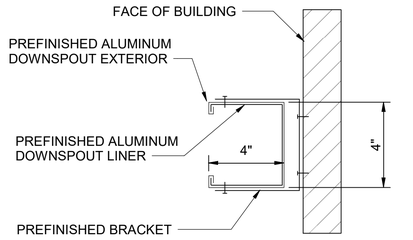



**TYP PVC VENT PIPE FLASHING DETAIL**
NOT TO SCALE




**TYP PIPE FLASHING DETAIL**
NOT TO SCALE

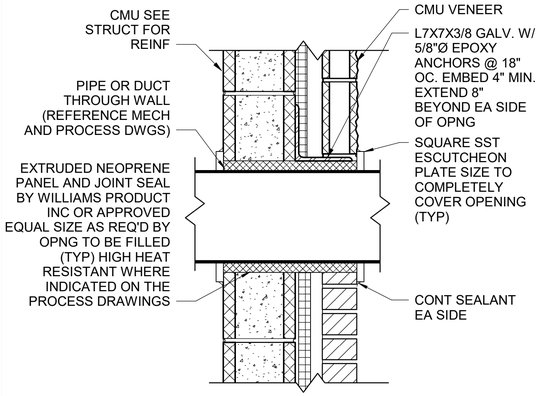
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |



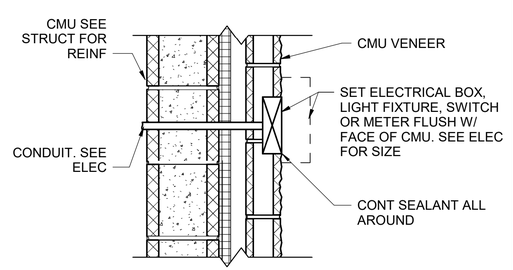

**NOTE:**

USE CLOSED FACE WHERE DOWNSPOUT IS NOT VERTICAL AND A MIN OF 12" BEYOND TRANSITION.

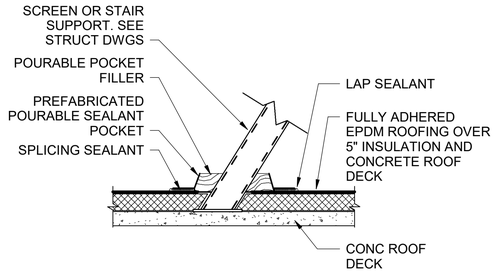
**TYPICAL DOWNSPOUT SECTION**
NOT TO SCALE



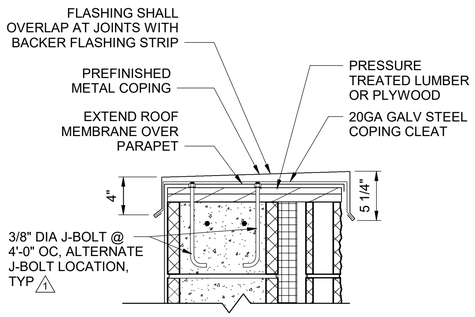

**PENETRATION IN MASONRY WALL DETAIL**
NOT TO SCALE



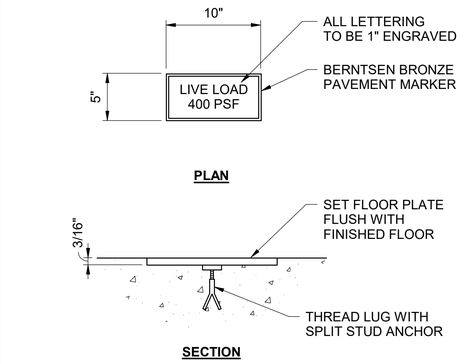

**TYPICAL ELECTRICAL DEVICE MOUNTING IN MASONRY WALL**
NOT TO SCALE




**SUPPORT FRAMING FLASHING DETAIL**
NOT TO SCALE

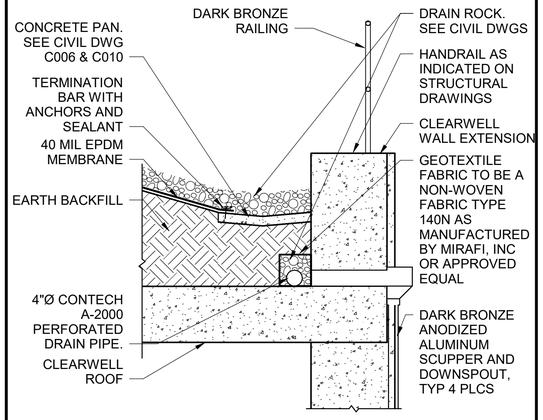



**TYPICAL COPING DETAIL**
NOT TO SCALE




**NOTE:**
SEE PLANS FOR LIVE LOADS AND PLATE LOCATIONS.

**DESIGN LIVE LOAD FLOOR PLATE**
NOT TO SCALE




**CLEARWELL ROOF MEMBRANE** A A219
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ARCHITECTURAL DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **A007 — 1** rev.

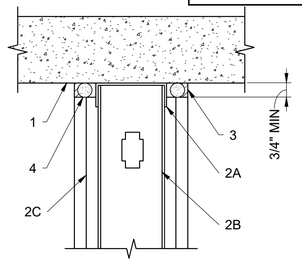
sheet 140 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

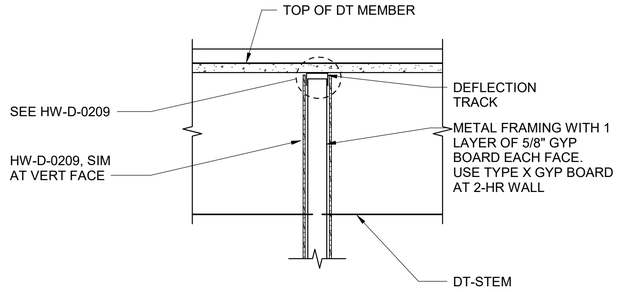
## FIRESTOP JOINT DETAIL AT ALL WALL SECTION
**System No. HW-D-0209**

| ANSI/UL2079 | CAN/ULC S115 |
|---|---|
| Assembly Ratings — 1 and 2 Hr (See Item 2) | F Ratings — 1 and 2 Hr (See Item 2) |
| Nominal Joint Width - 1 In. | FT Ratings — 1 and 2 Hr (See Item 2) |
| Class II Movement Capabilities — 19% Compression or Extension | FH Ratings — 1 and 2 Hr (See Item 2) |
| L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3) | FTH Ratings — 1 and 2 Hr (See Item 2) |
| L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3) | Nominal Joint Width - 1 In. |
| | Class II Movement Capabilities — 19% Compression or Extension |
| | L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3) |
| | L Rating At 400 F — LessSD Than 1 CFM/sq ft (See Item 3) |

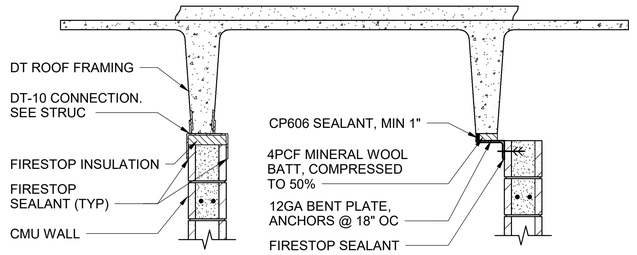



1. FLOOR ASSEMBLY — MIN 4-1/2 IN. (114 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) STRUCTURAL CONCRETE. FLOOR MAY ALSO BE CONSTRUCTED OF ANY 6 IN. (152 MM) THICK UL CLASSIFIED HOLLOW-CORE PRECAST CONCRETE UNITS*. SEE PRECAST CONCRETE UNITS CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURES.
2. WALL ASSEMBLY — THE 1 OR 2 H FIRE RATED GYPSUM BOARD/STEEL STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U400, V400 OR W400 SERIES WALL AND PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
   A. STEEL FLOOR AND CEILING RUNNERS — FLOOR AND CEILING RUNNERS OF WALL ASSEMBLY SHALL CONSIST OF MIN NO. 25 GAUGE GALV STEEL CHANNELS SIZED TO ACCOMMODATE STEEL STUDS (ITEM 2B).FLANGE HEIGHT OF CEILING RUNNER SHALL BE MIN 1/4 IN. (6 MM) GREATER THAN MAX EXTENDED JOINT WIDTH. CEILING RUNNER SECURED WITH MASONRY ANCHORS OR STEEL FASTENERS SPACED 24 IN. (610 MM) OC.
      1. LIGHT GAUGE FRAMING* — SLOTTED CEILING RUNNER - AS AN ALTERNATE TO THE CEILING RUNNER IN ITEM 2A, SLOTTED CEILING RUNNER TO CONSIST OF GALV STEEL CHANNEL WITH SLOTTED FLANGES SIZED TO ACCOMMODATE STEEL STUDS (ITEM 2B). SLOTTED CEILING RUNNER SECURED TO VALLEYS LOWER SURFACE OF FLOOR WITH STEEL FASTENERS SPACED MAX 24 IN. (610 MM) OC. CALIFORNIA EXPANDED METAL PRODUCTS CO — CST BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK. MARINO/WARE, DIV OF WARE INDUSTRIES INC — TYPE SLT
      2. LIGHT GAUGE FRAMING* — VERTICAL DEFLECTION CEILING RUNNER - AS AN ALTERNATE TO THE CEILING RUNNERS IN ITEMS 2A AND 2A1, VERTICAL DEFLECTION CEILING RUNNER TO CONSIST OF GALV STEEL CHANNEL WITH SLOTTED VERTICAL DEFLECTION CLIPS MECHANICALLY FASTENED WITHIN RUNNER. SLOTTED CLIPS PROVIDED WITH STEP BUSHINGS FOR PERMANENT FASTENING OF STEEL STUDS. FLANGES SIZED TO ACCOMMODATE STEEL STUDS (ITEM 2B). VERTICAL DEFLECTION CEILING RUNNER SECURED TO LOWER SURFACE OF FLOOR WITH STEEL FASTENERS SPACED MAX 24 IN. (610 MM) OC. THE STEEL NETWORK INC — VERTITRACK VTD250, VTD362, VTD400, VTD600 AND VTD800
   B. STUDS — STEEL STUDS TO BE MIN 3-1/2 IN. (89 MM) WIDE. STUDS CUT 1/2 TO 3/4 IN. (13 TO 19 MM) LESS IN LENGTH THAN ASSEMBLY HEIGHT WITH BOTTOM NESTING IN AND RESTING ON FLOOR RUNNER AND WITH TOP NESTING IN CEILING RUNNER WITHOUT ATTACHMENT. WHEN SLOTTED CEILING RUNNER (ITEM 2A1) IS USED, STEEL STUDS SECURED TO SLOTTED CEILING RUNNER WITH NO. 8 BY 1/2 IN. (13 MM) LONG WAFER HEAD STEEL SCREWS AT MIDHEIGHT OF SLOT ON EACH SIDE OF WALL. STUD SPACING NOT TO EXCEED 24 IN. (610 MM) OC. WHEN VERTICAL DEFLECTION CEILING RUNNER (ITEM 2A2) IS USED, STEEL STUDS SECURED TO SLOTTED VERTICAL DEFLECTION CLIPS, THROUGH THE BUSHINGS, WITH STEEL SCREWS AT MIDHEIGHT OF EACH SLOT. STUD SPACING NOT TO EXCEED 24 IN. (610 MM) OC.
   C. GYPSUM BOARD* — FOR 1 HR ASSEMBLY, ONE LAYER OF 5/8 IN. (16 MM) THICK GYPSUM BOARD IS REQUIRED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. FOR 2 HR ASSEMBLY, TWO LAYERS OF 5/8 IN. (16 MM) THICK GYPSUM BOARD IS REQUIRED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. WALL TO BE CONSTRUCTED AS SPECIFIED IN THE INDIVIDUAL U400 OR V400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY, EXCEPT THAT A MAX 1 IN. (25 MM) GAP SHALL BE MAINTAINED BETWEEN THE TOP OF GYPSUM BOARD AND BOTTOM OF CONCRETE FLOOR. THE SCREWS ATTACHING THE GYPSUM BOARD TO THE STUDS AT THE TOP OF THE FIRST LAYER SHALL BE LOCATED 4 IN. (102 MM) BELOW THE FLOOR. THE SCREWS ATTACHING THE SECOND LAYER TO THE STEEL STUDS SHALL BE INSTALLED INTO THE STUDS 3-1/2 IN. (89 MM) BELOW THE FLOOR. THE HOURLY FIRE RATING OF THE JOINT SYSTEM IS EQUAL TO THE HOURLY RATINGS OF THE WALLS.
3. FILL, VOID OR CAVITY MATERIAL* - SEALANT — MAX SEPARATION BETWEEN BOTTOM OF FLOOR AND TOP OF WALL IS 1 IN. (25 MM). THE JOINT SYSTEM IS DESIGNED TO ACCOMMODATE A MAX 17 PERCENT COMPRESSION OR EXTENSION FROM ITS INSTALLED WIDTH. MIN 5/8 IN. (16 MM) THICKNESS OF FILL MATERIAL INSTALLED ON EACH SIDE OF THE WALL BETWEEN THE TOP OF THE GYPSUM BOARD AND THE BOTTOM OF THE CONCRETE FLOOR, FLUSH WITH EACH SURFACE OF THE WALL. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S ELASTOMERIC FIRESTOP SEALANT OR CP606 FLEXIBLE FIRESTOP SEALANT OR CFS-S SIL GG SEALANT. L RATINGS APPLY ONLY WHEN CP606 OR CFS-S SIL GG SEALANT IS USED.
4. FORMING MATERIAL — MINERAL WOOL INSULATION, FIBERGLASS BATT INSULATION OR POLYURETHANE/POLYETHYLENE FOAM BACKER ROD. FORMING MATERIAL TO BE RECESSED FROM BOTH SURFACES OF THE 2 HR FIRE RATED WALL TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

*BEARING THE UL CLASSIFICATION MARK

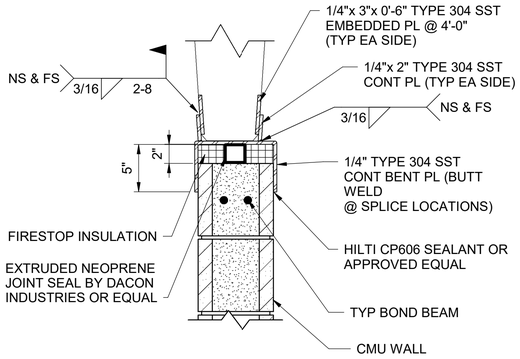



**1HR/2HR GYP WALL FIRESTOP DETAIL**
NOT TO SCALE

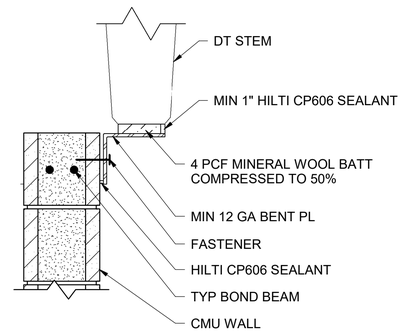



**DETAIL A** **DETAIL B**

**CMU 1HR FIRESTOP DETAIL**
NOT TO SCALE




2 **DETAIL** A A206
NOT TO SCALE




2 **DT FIRE PROTECTION DETAIL** B A206
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 11/26/19 | KDT | AEH | REVISED PER RFI #110 |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FIRE-RESISTIVE JOINTS

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**A008 — 2**

sheet 141 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

LEGEND

TREATMENT

UN-OCCUPIED FILLED WATER BASINS

**NOTES:**

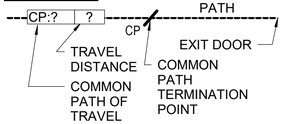
1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS.
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)




**EGREES NOTES**

1. REFER TO ARCHITECTURAL LEGEND FOR ADDITIONAL INFORMATION REGARDING SYMBOLS AND ABBREVIATIONS.
2. REFER TO THE ELECTRICAL LIGHTING PLANS FOR LOCATION OF EXIT SIGNS AND EMERGENCY LIGHTING.
3. REFER TO THE FIRE SUPPRESSION AND ALARM PLANS FOR LOCATION OF FIRE PROTECTION DEVICES.
4. FINAL LOCATION OF FIRE EXTINGUISHER AND HOSE REELS SHALL BE APPROVED BY THE AHJ PRIOR TO INSTALLATION

**EGRESS PATH**



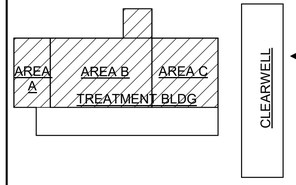

**LOWER LEVEL OVERALL PLAN**

0 8' 16' 32'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL LOWER LEVEL PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing A201 | rev. 0 |
| sheet 142 of 542 sheets | |
| file 98101_S | |

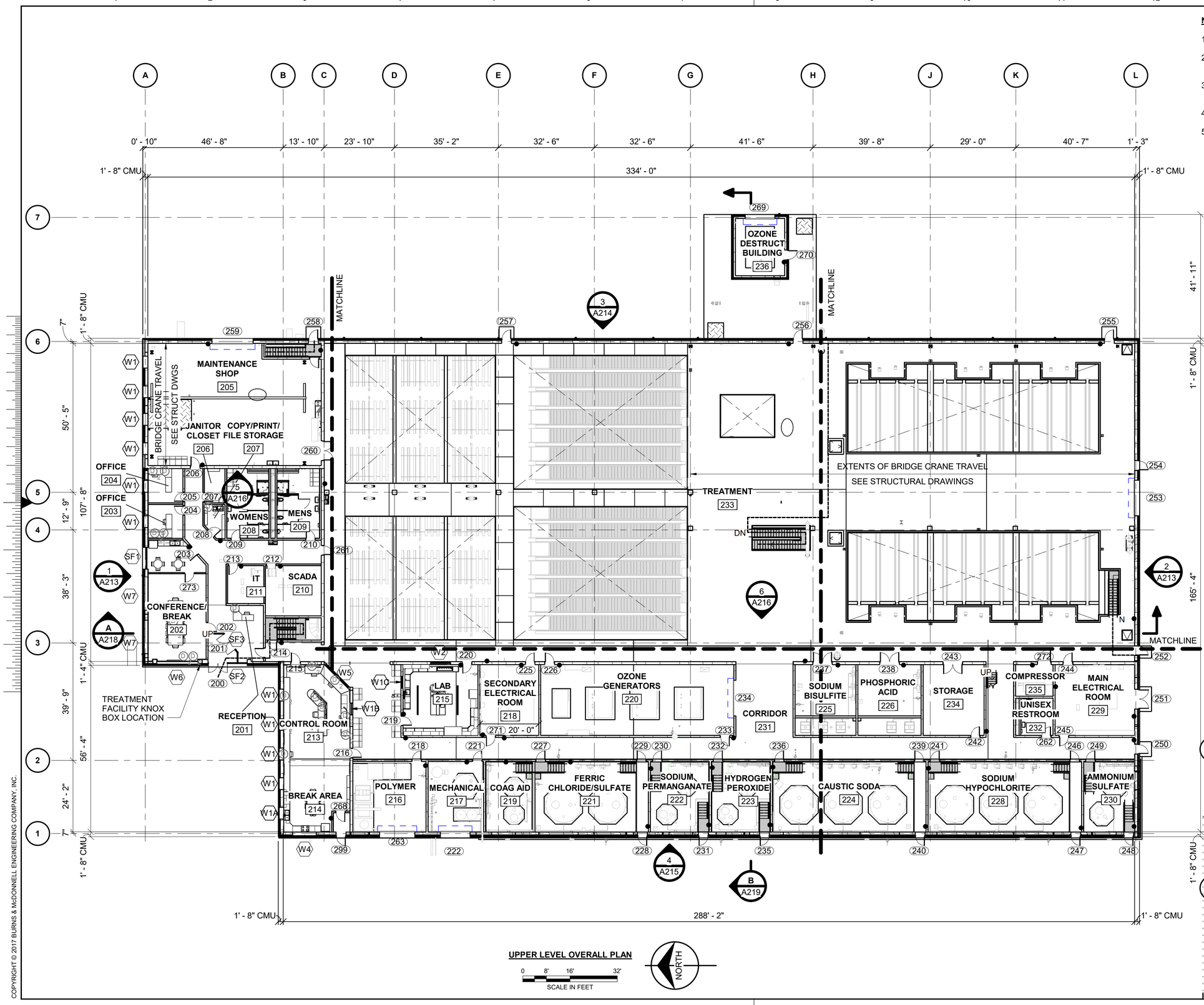
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL OVERALL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

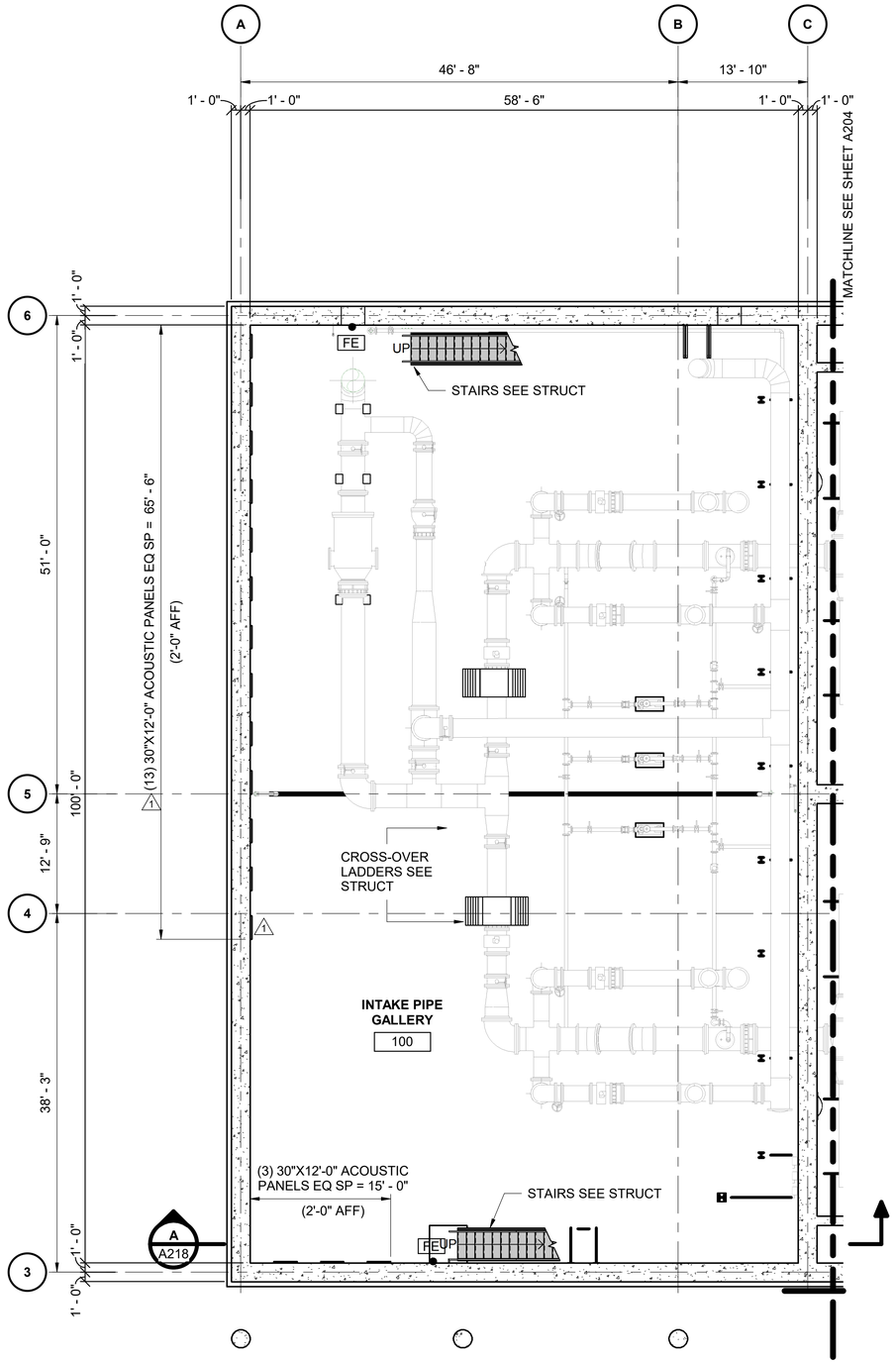
**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL TOP SLAB PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **A202** rev. **0**

sheet 143 of 542 sheets

file 98101_S




LOWER LEVEL PLAN AREA A

0 4' 8' 16'

SCALE IN FEET

NORTH

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A

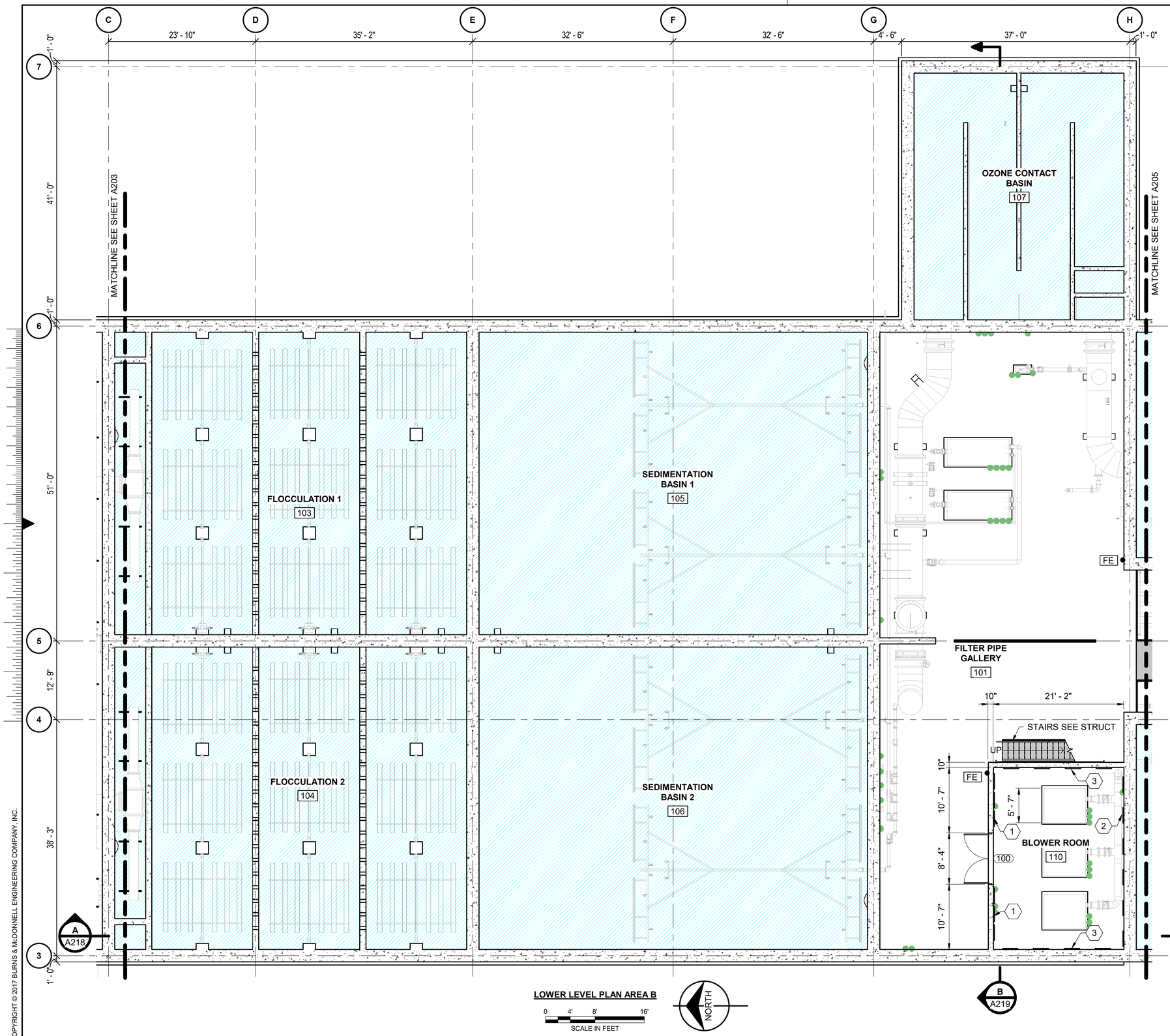
| project | contract |
|---|---|
| 98101 | |

drawing **A203** rev. **1**

sheet 144 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




LOWER LEVEL PLAN AREA B

0 4' 8' 16'

SCALE IN FEET

NORTH

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

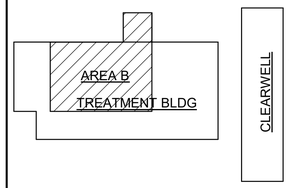
**KEYED NOTES:**

1. (3) 30"X12'-0" ACOUSTIC PANELS EQ SP (2'-0" AFF)
2. (6) 30"X12'-0" ACOUSTIC PANELS EQ SP (2'-0" AFF)
3. (4) 30"X12'-0" ACOUSTIC PANELS EQ SP (2'-0" AFF)

LEGEND

UN-OCCUPIED FILLED WATER BASINS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B

| project | contract |
|---|---|
| 98101 | |

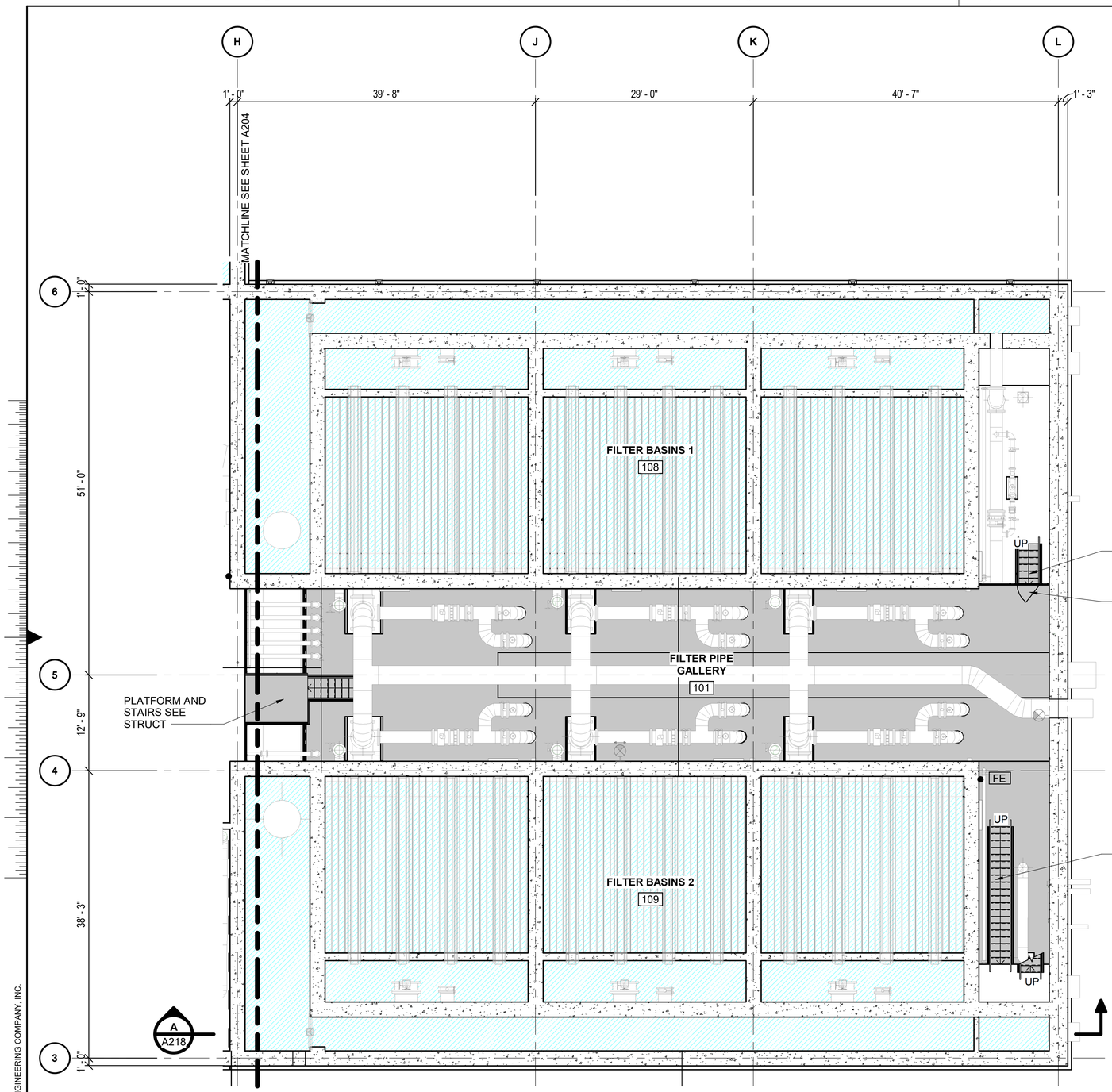
drawing **A204 — 1** rev.

sheet 145 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches




LOWER LEVEL PLAN AREA C

0 4' 8' 16'

SCALE IN FEET

NORTH

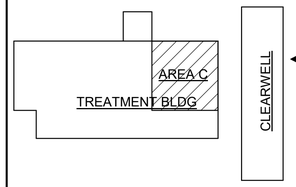
**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

LEGEND

UN-OCCUPIED FILLED WATER BASINS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

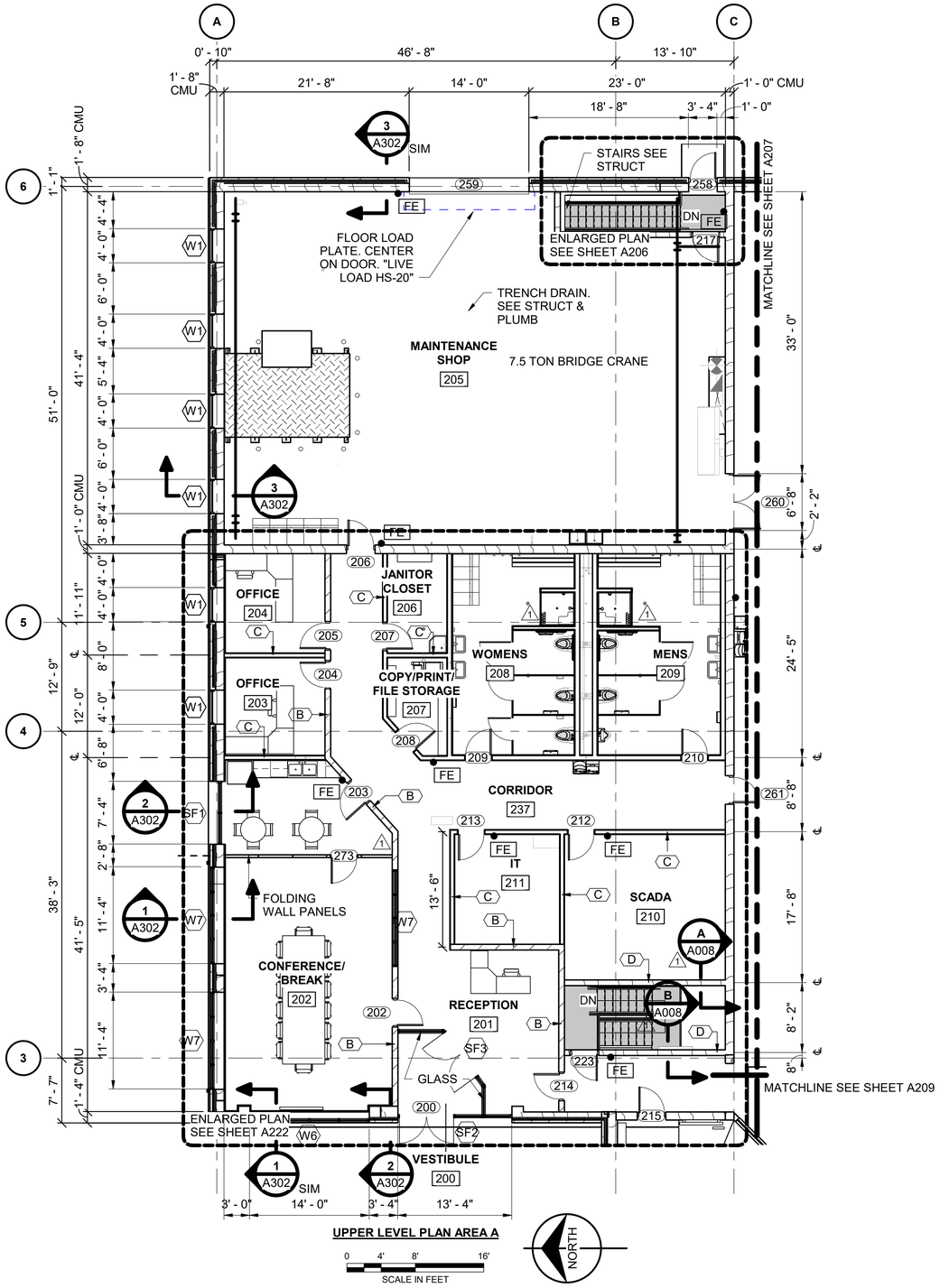
drawing **A205** rev. **0**

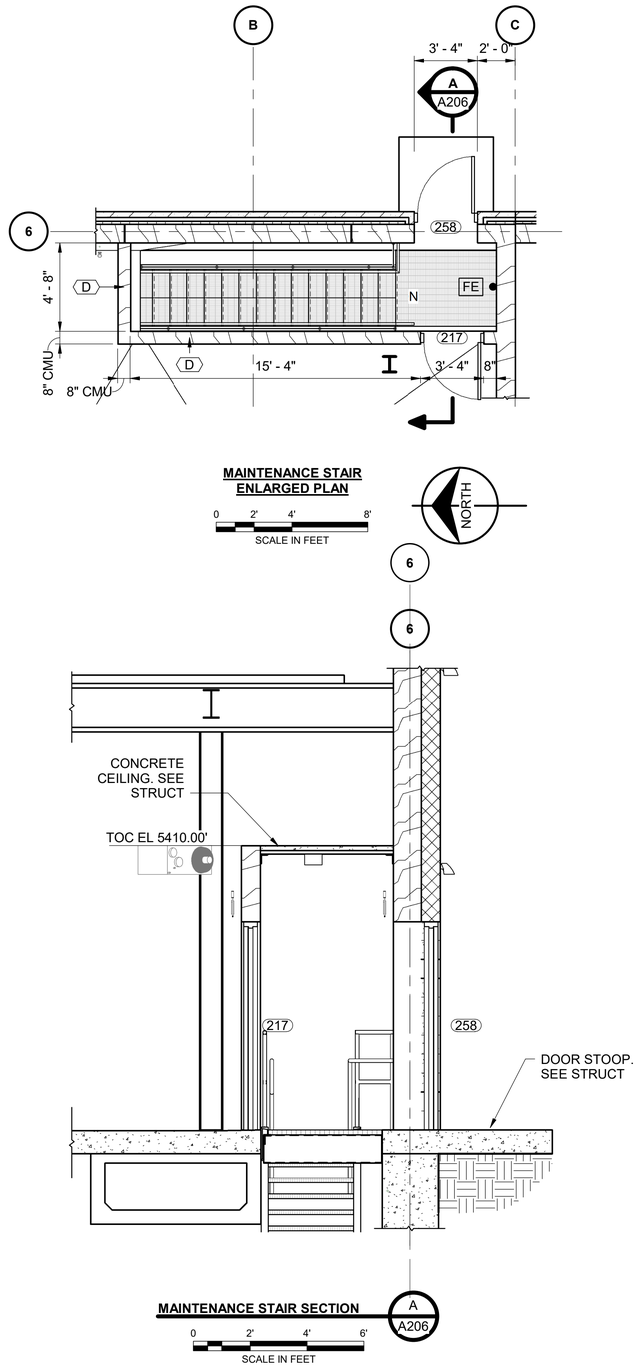
sheet 146 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A

| | |
|---|---|
| project 98101 | contract |
| drawing A206 | rev. 1 |
| sheet 147 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B

| | |
|---|---|
| project 98101 | contract |
| drawing A207 | rev. 0 |
| sheet 148 of 542 sheets | |
| file 98101_S | |

**UPPER LEVEL PLAN AREA B**

0 4' 8' 16'
SCALE IN FEET

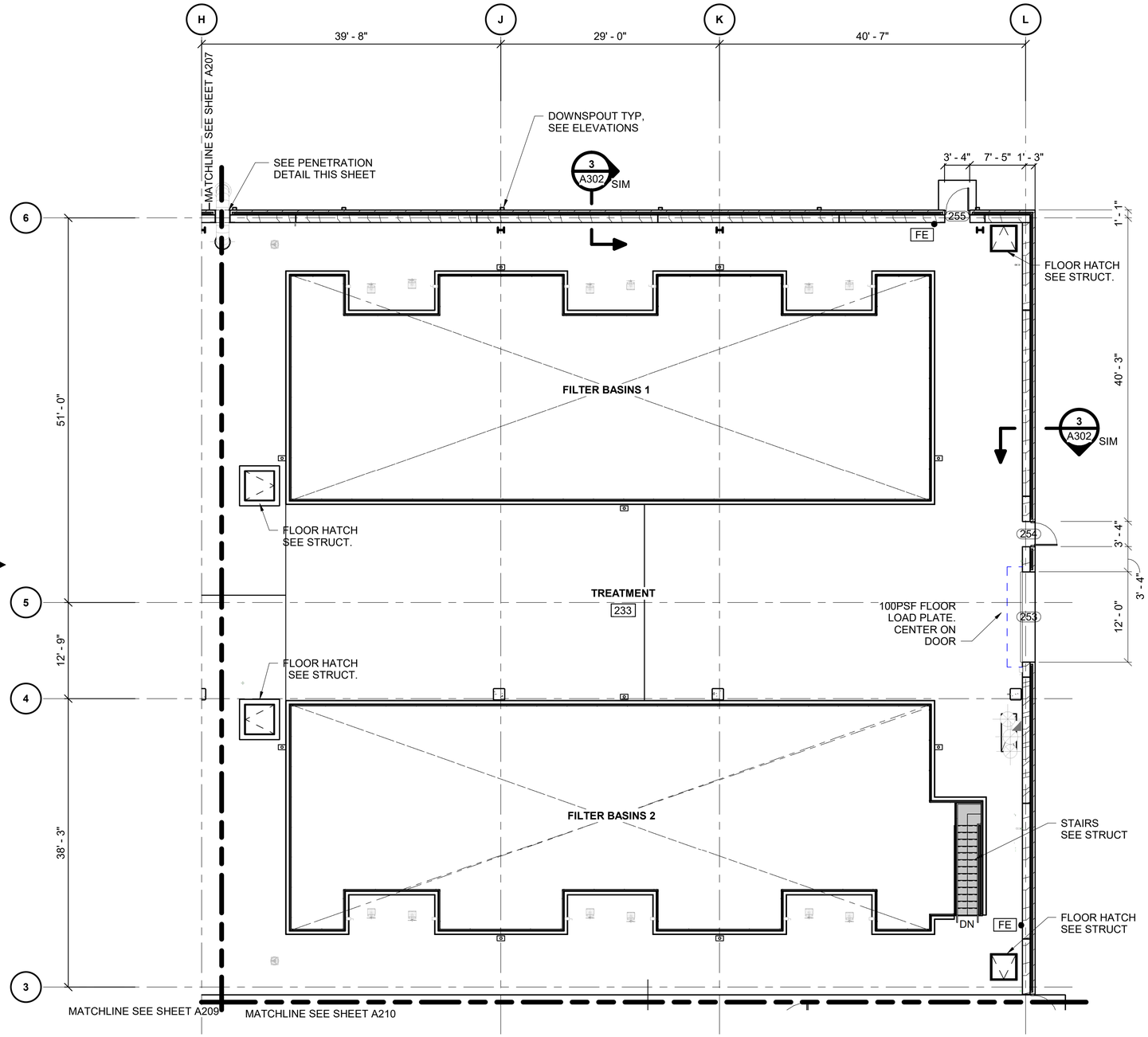
NORTH

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)




**UPPER LEVEL PLAN AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH

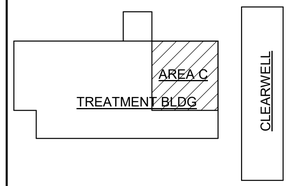
Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** A. HUNDLEY | **checked** R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** A208 | **rev.** 0 |
| **sheet** 149 **of** 542 **sheets** | |
| **file** 98101_S | |

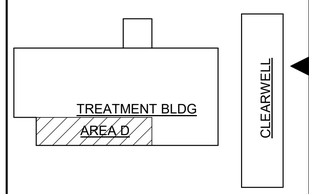
**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

**KEYED NOTES:**

(1) "VACUUMBRAND" LAB VACUUM PUMP MODEL ME4C NT OIL-FREE AND PIPING TO LAB FIXTURES

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D

| | |
|---|---|
| project 98101 | contract |
| drawing A209 | rev. 1 |
| sheet 150 of 542 sheets | |
| file 98101_S | |

**UPPER LEVEL PLAN AREA D**

0 4' 8' 16'
SCALE IN FEET

NORTH

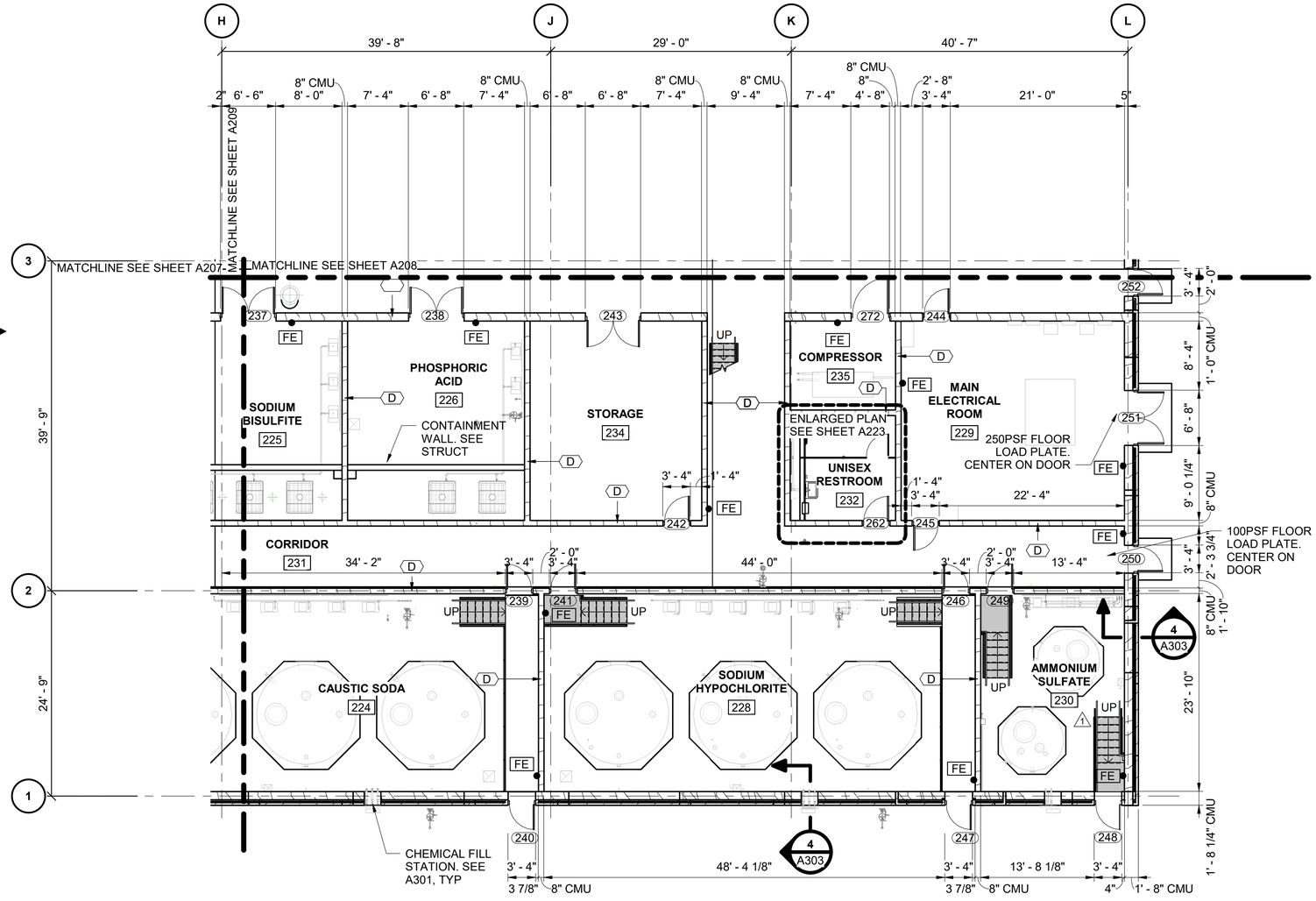
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

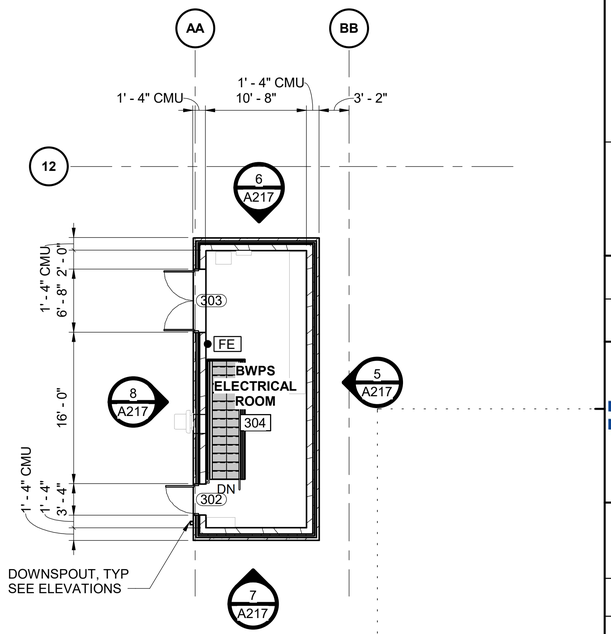
Millimeters
Scale For Microfilming
Inches

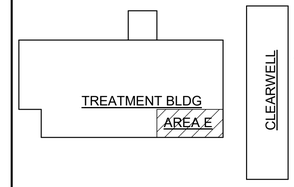
**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL PLAN AREA E**

0 4' 8' 16'

SCALE IN FEET

NORTH

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E

| | |
|---|---|
| project 98101 | contract |
| drawing A210 | rev. 1 |

sheet 151 of 542 sheets

file 98101_S

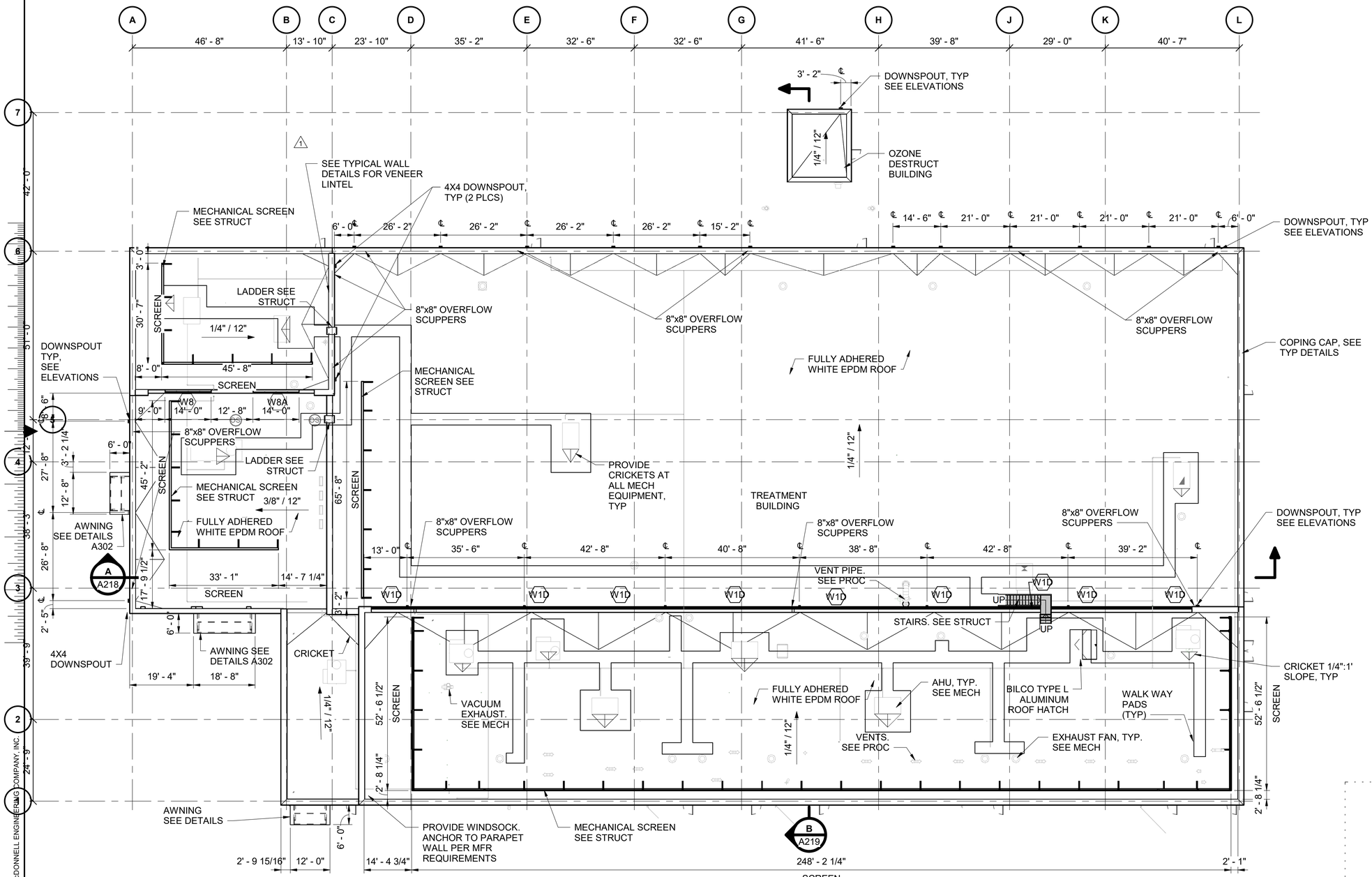
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. SEE DWG A007 FOR ROOF TYPICAL DETAILS.
2. SEE DWG A005 FOR WINDOW DETAILS.
3. SEE ELEVATIONS FOR SCREEN WALL FINISH.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

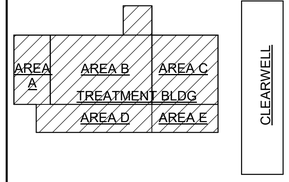



**OVERALL ROOF PLAN**

0 8' 16' 32'

SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **A211 — 1** rev.

sheet 152 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

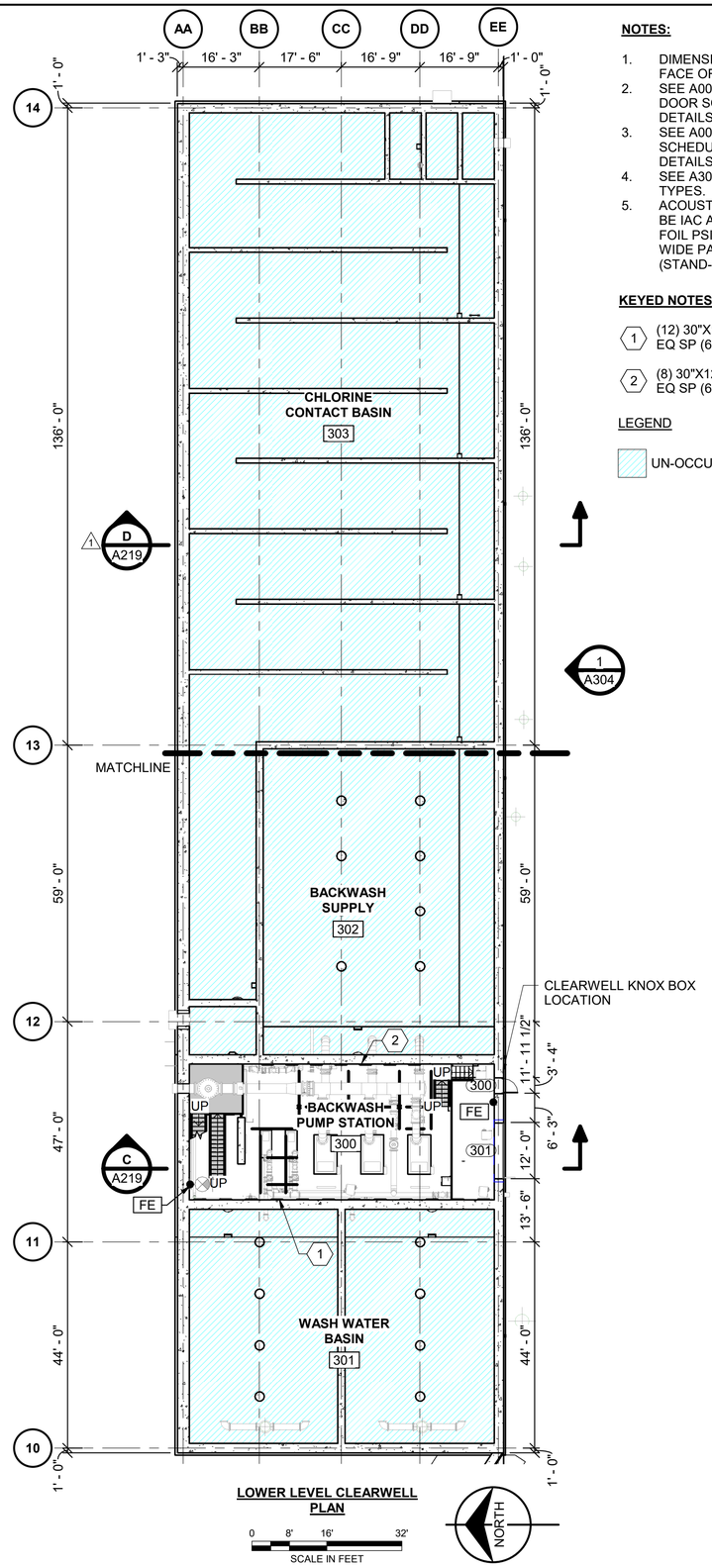
1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

**KEYED NOTES:**

1. (12) 30"X12'-0" ACOUSTIC PANELS EQ SP (6'-0" AFF)
2. (8) 30"X12'-0" ACOUSTIC PANELS EQ SP (6'-0" AFF)

LEGEND

UN-OCCUPIED FILLED WATER BASINS

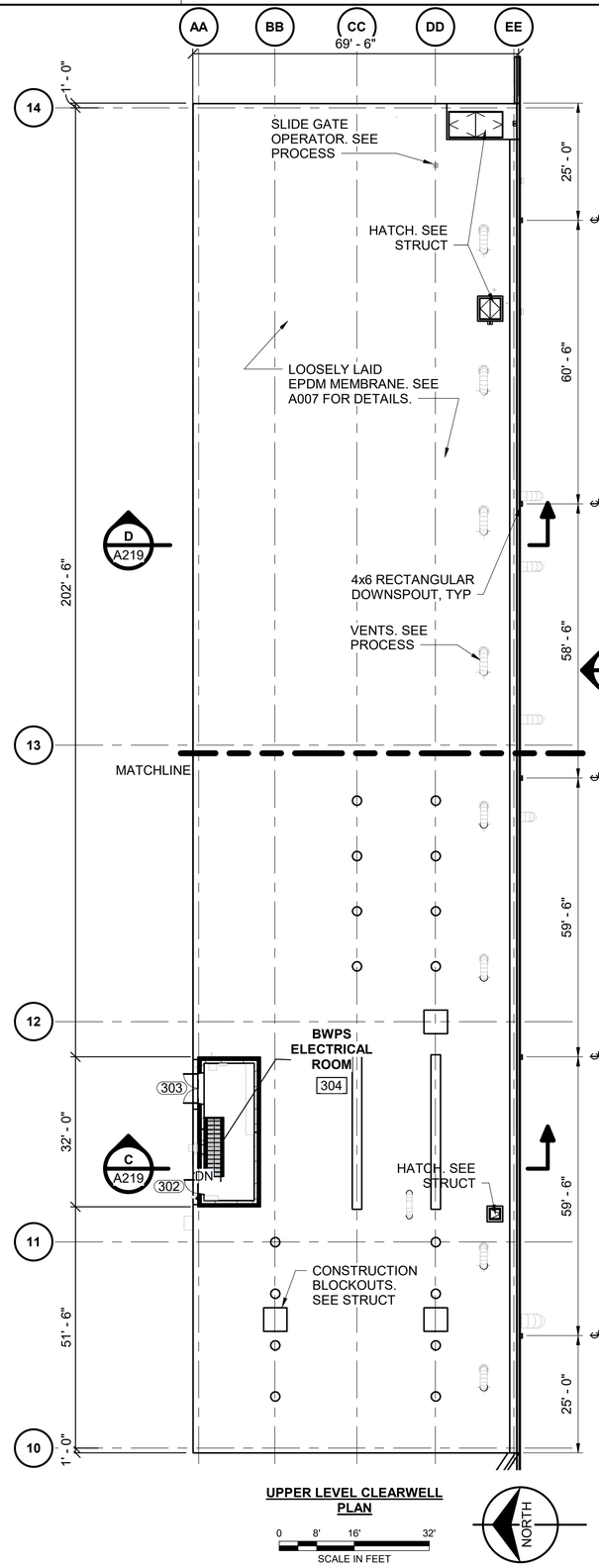



**LOWER LEVEL CLEARWELL PLAN**

0 8' 16' 32'

SCALE IN FEET

NORTH

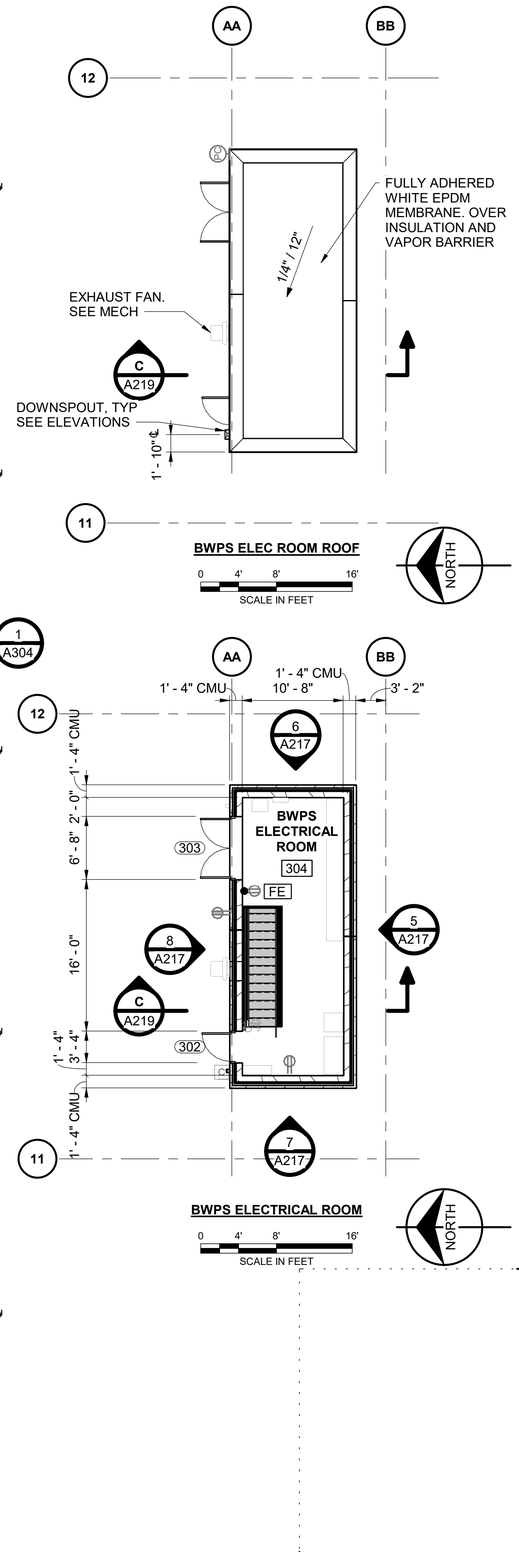



**UPPER LEVEL CLEARWELL PLAN**

0 8' 16' 32'

SCALE IN FEET

NORTH





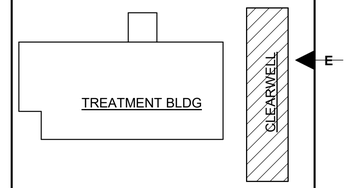


**BWPS ELECTRICAL ROOM**

0 4' 8' 16'

SCALE IN FEET

NORTH




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL CLEARWELL PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **A212 — 1** rev.

sheet 153 of 542 sheets

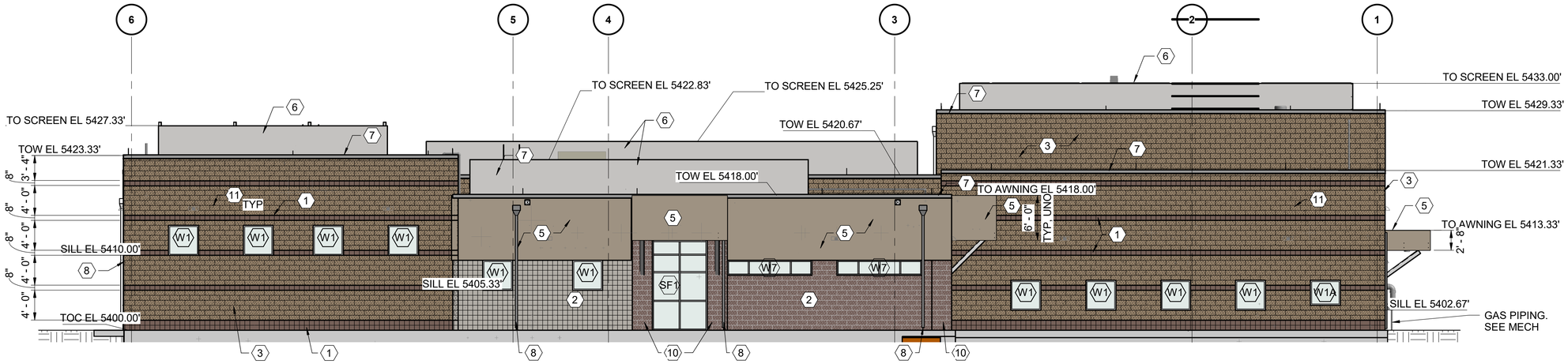
file 98101_S

Scale For Microfilming
Millimeters
Inches

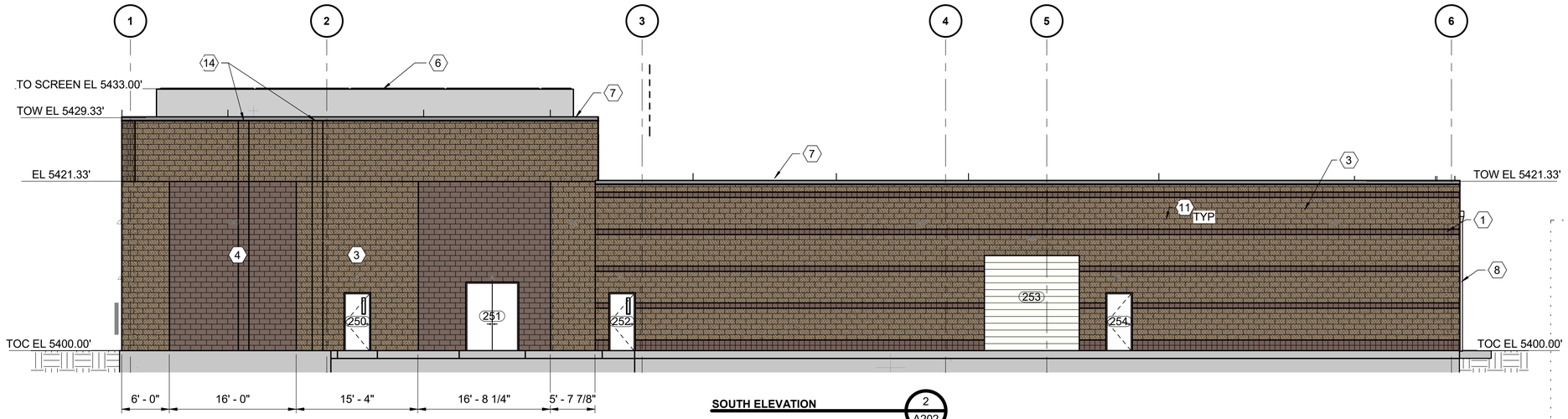
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

ELEVATION KEY NOTES (X)

1 SCORED SMOOTH FACE CMU BASALITE 668R WITH 24S PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2 SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
3 SPLIT FACE CMU, BASALITE 924R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4 COMB FACE CMU BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
5 BERRIDGE FLUTED FASCIA PANELS, CHAMPAGNE
6 HORIZONTAL BERRIDGE THIN LINE PANELS, CHAMPAGNE
7 PARAPET CAP TO MATCH METAL PANELS
8 FACTORY FINISHED DOWNSPOUT TO MATCH METAL PANELS
9 CHEMICAL BULKFILL STATIONS. SEE DETAIL ON A301. PAINT DOOR TO MATCH WALL.
10 SPLIT FACE CMU, BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
11 LIGHTING, SEE ELEC
12 PAINT ON CMU. SEE FINISH SCHEDULE
13 FIRE DEPARTMENT CONNECTION. SEE FX201
14 STRUCTURAL PILASTER. SEE S245 FOR DETAILS




NORTH ELEVATION 1 A202
0 4' 8' 16'
SCALE IN FEET




SOUTH ELEVATION 2 A202
0 4' 8' 16'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

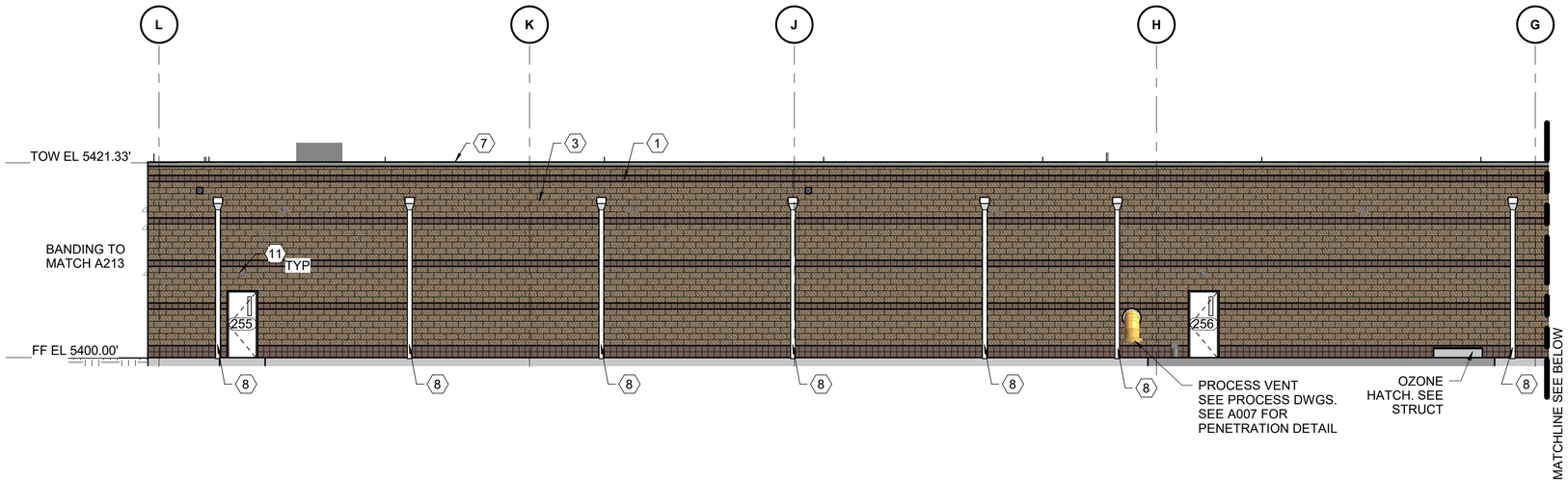
CITY OF THORNTON
TTP - PACKAGE 3
ARCHITECTURAL ELEVATIONS I

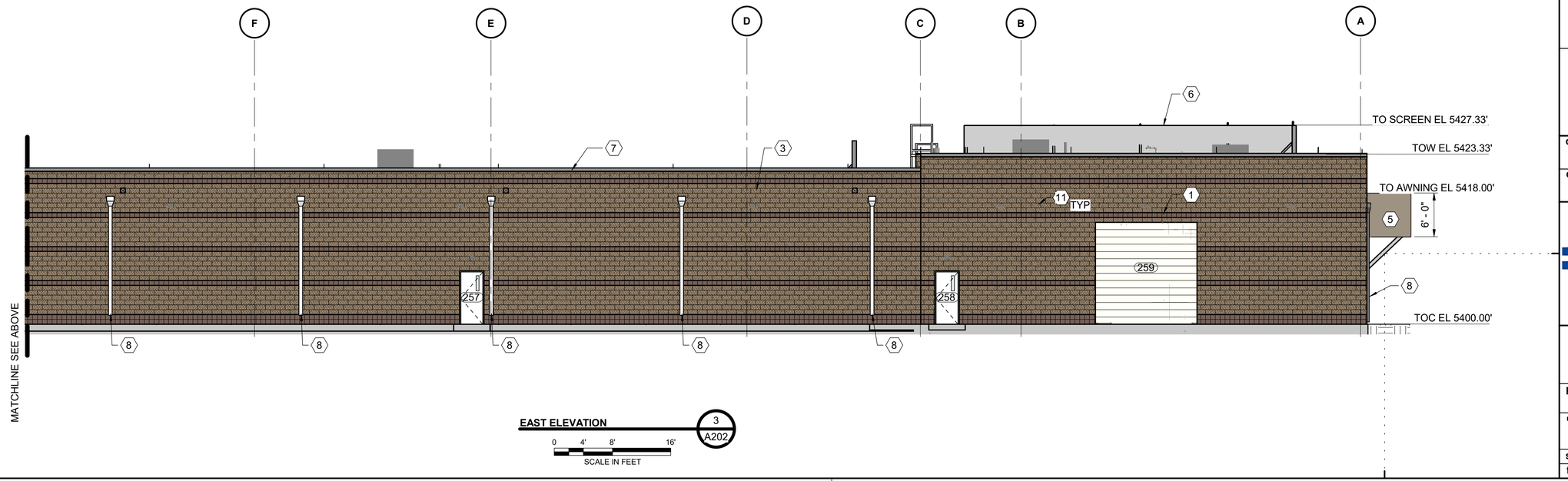
| | |
|---|---|
| project 98101 | contract |
| drawing A213 | rev. 0 |
| sheet 154 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

ELEVATION KEY NOTES (X)

1 SCORED SMOOTH FACE CMU BASALITE 668R WITH 24S PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2 SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
3 SPLIT FACE CMU, BASALITE 924R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4 COMB FACE CMU BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
5 BERRIDGE FLUTED FASCIA PANELS, CHAMPAGNE
6 HORIZONTAL BERRIDGE THIN LINE PANELS, CHAMPAGNE
7 PARAPET CAP TO MATCH METAL PANELS
8 FACTORY FINISHED DOWNSPOUT TO MATCH METAL PANELS
9 CHEMICAL BULKFILL STATIONS. SEE DETAIL ON A301. PAINT DOOR TO MATCH WALL.
10 SPLIT FACE CMU, BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
11 LIGHTING, SEE ELEC
12 PAINT ON CMU. SEE FINISH SCHEDULE
13 FIRE DEPARTMENT CONNECTION. SEE FX201
14 STRUCTURAL PILASTER. SEE S245 FOR DETAILS




EAST ELEVATION 3 A202

0 4' 8' 16'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ARCHITECTURAL ELEVATIONS II

| project | contract |
|---|---|
| 98101 | |

drawing A214 rev. 0

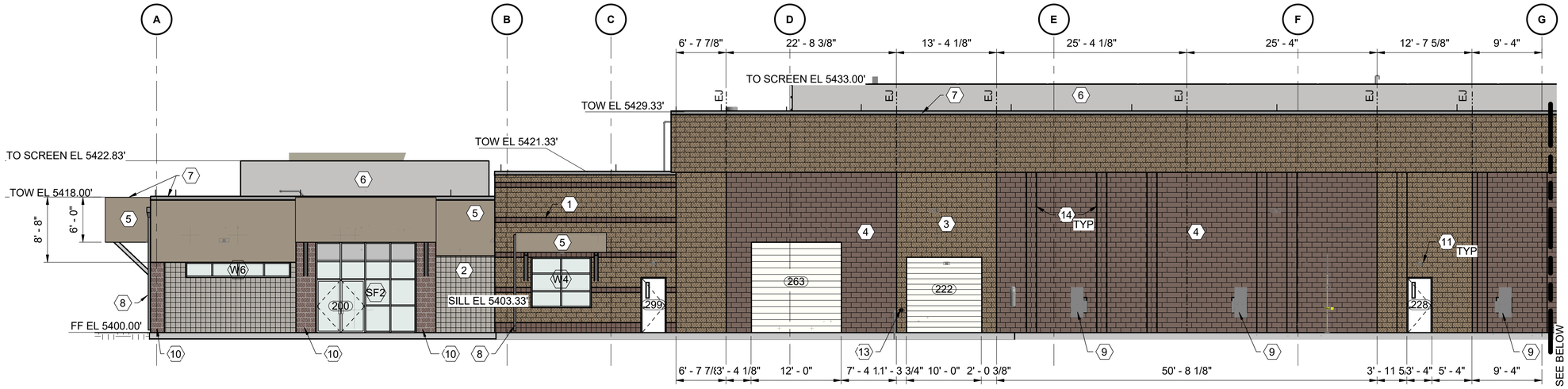
sheet 155 of 542 sheets
file 98101_S

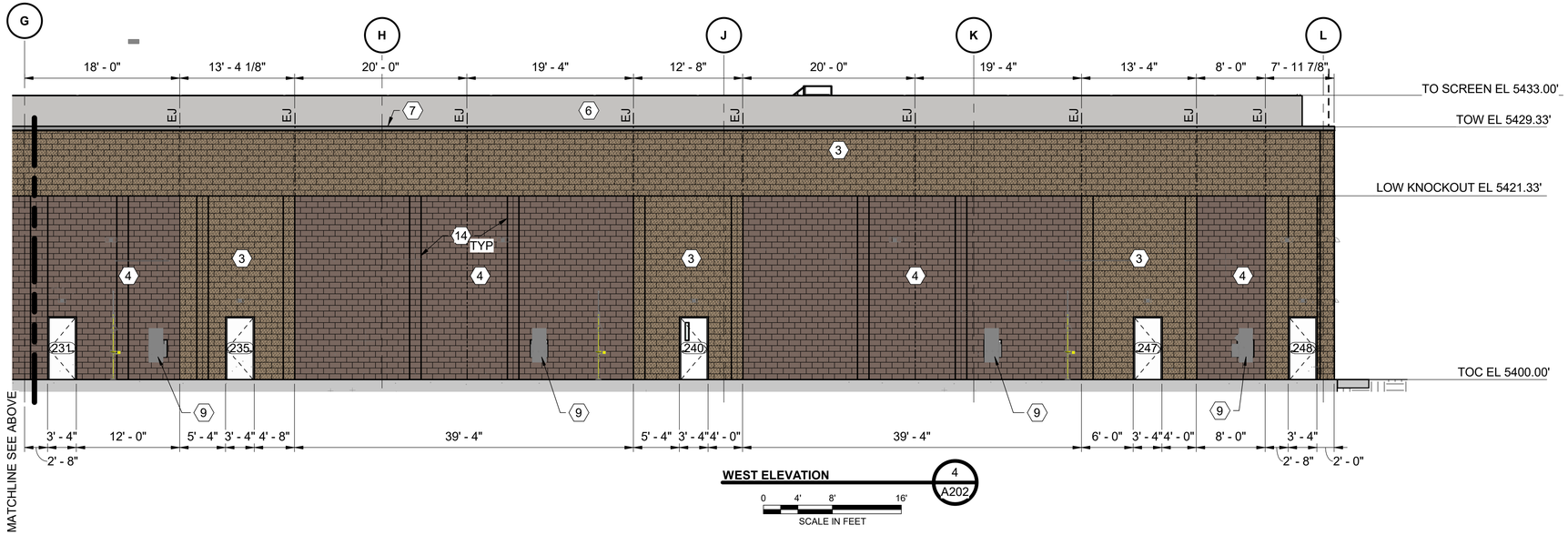
Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

ELEVATION KEY NOTES (X)

1 SCORED SMOOTH FACE CMU BASALITE 668R WITH 24S PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2 SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
3 SPLIT FACE CMU, BASALITE 924R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4 COMB FACE CMU BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
5 BERRIDGE FLUTED FASCIA PANELS, CHAMPAGNE
6 HORIZONTAL BERRIDGE THIN LINE PANELS, CHAMPAGNE
7 PARAPET CAP TO MATCH METAL PANELS
8 FACTORY FINISHED DOWNSPOUT TO MATCH METAL PANELS
9 CHEMICAL BULKFILL STATIONS. SEE DETAIL ON A301. PAINT DOOR TO MATCH WALL.
10 SPLIT FACE CMU, BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
11 LIGHTING, SEE ELEC
12 PAINT ON CMU. SEE FINISH SCHEDULE
13 FIRE DEPARTMENT CONNECTION. SEE FX201
14 STRUCTURAL PILASTER. SEE S245 FOR DETAILS




WEST ELEVATION 4 A202

0 4' 8' 16'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ARCHITECTURAL ELEVATIONS III

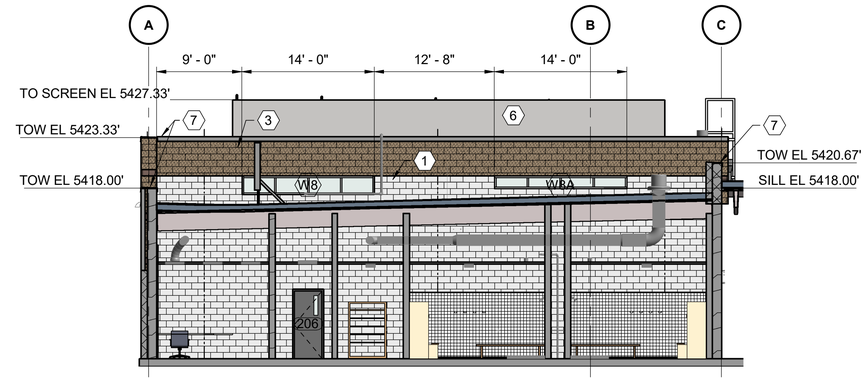
| project | contract |
|---|---|
| 98101 | |

drawing A215 rev. 0

sheet 156 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



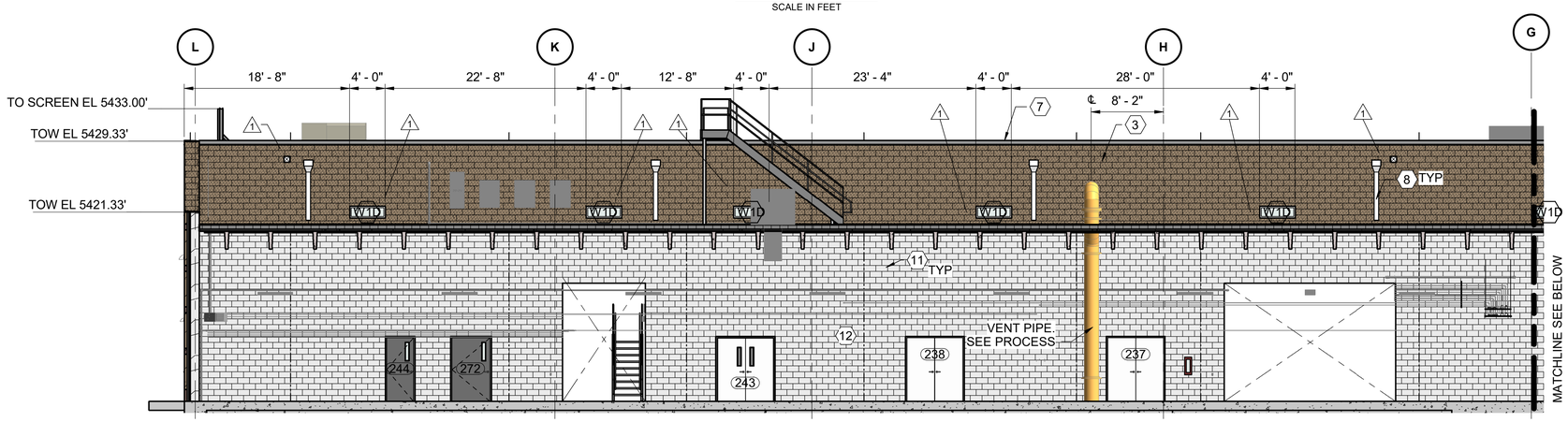

MAINTENANCE WEST WALL 5 / A202

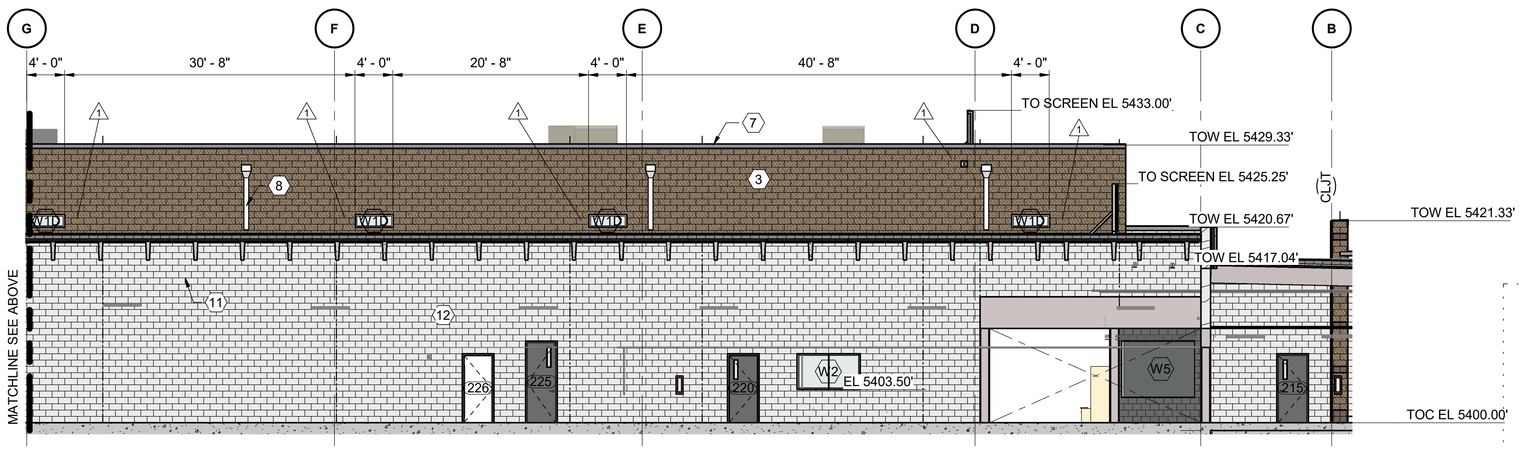
0 4' 8' 16'

SCALE IN FEET

ELEVATION KEY NOTES (X)

1. SCORED SMOOTH FACE CMU BASALITE 668R WITH 24S PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2. SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
3. SPLIT FACE CMU, BASALITE 924R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4. COMB FACE CMU BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
5. BERRIDGE FLUTED FASCIA PANELS, CHAMPAGNE
6. HORIZONTAL BERRIDGE THIN LINE PANELS, CHAMPAGNE
7. PARAPET CAP TO MATCH METAL PANELS
8. FACTORY FINISHED DOWNSPOUT TO MATCH METAL PANELS
9. CHEMICAL BULKFILL STATIONS. SEE DETAIL ON A301. PAINT DOOR TO MATCH WALL.
10. SPLIT FACE CMU, BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
11. LIGHTING, SEE ELEC
12. PAINT ON CMU. SEE FINISH SCHEDULE
13. FIRE DEPARTMENT CONNECTION. SEE FX201
14. STRUCTURAL PILASTER. SEE S245 FOR DETAILS




ELEVATION 6 / A202

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

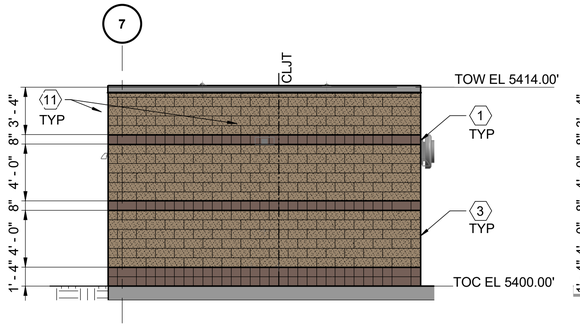
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ARCHITECTURAL ELEVATIONS IV

| | |
|---|---|
| project 98101 | contract |
| drawing A216 | rev. 1 |
| sheet 157 of 542 sheets | |
| file 98101_S | |

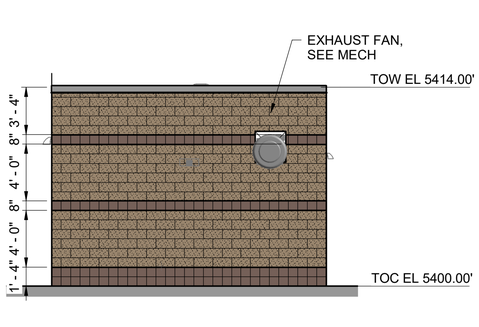
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



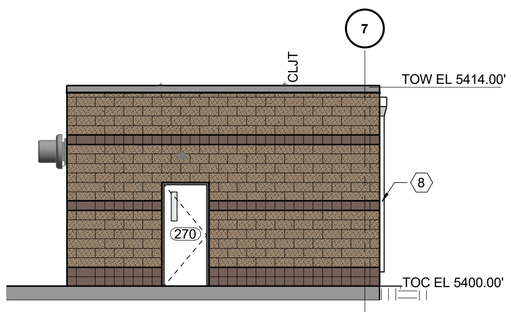

**OZONE DESTRUCT BUILDING**
**NORTH ELEVATION** — 1 / A207

0 2' 4' 8'
SCALE IN FEET



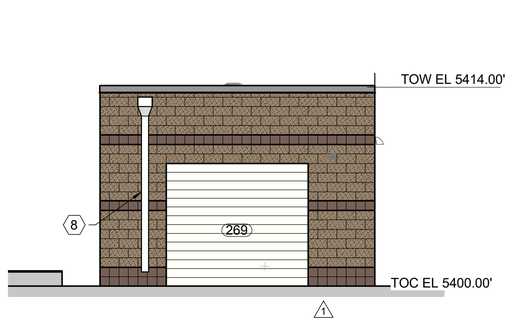

**OZONE DESTRUCT BUILDING**
**WEST ELEVATION** — 2 / A207

0 2' 4' 8'
SCALE IN FEET



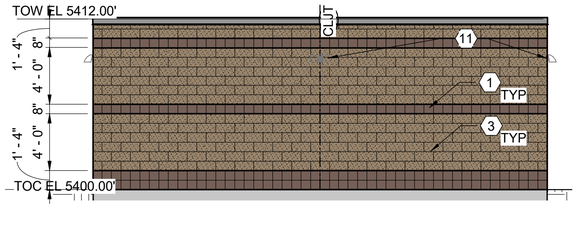

**OZONE DESTRUCT BUILDING**
**SOUTH ELEVATION** — 3 / A207

0 2' 4' 8'
SCALE IN FEET



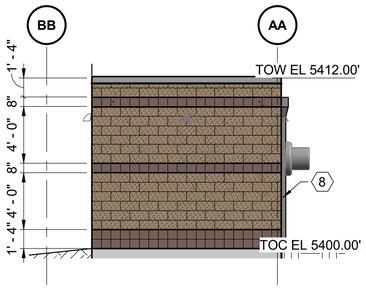

**OZONE DESTRUCT BUILDING**
**EAST ELEVATION** — 4 / A207

0 2' 4' 8'
SCALE IN FEET



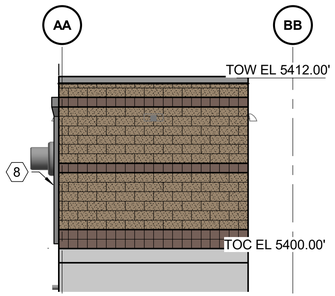

**BWPS**
**SOUTH ELEVATION** — 5 / A210

0 2' 4' 8'
SCALE IN FEET



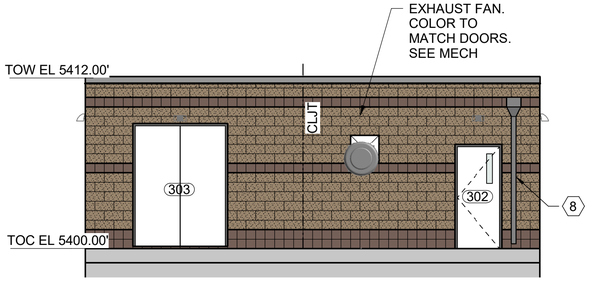

**BWPS**
**EAST ELEVATION** — 6 / A210

0 2' 4' 8'
SCALE IN FEET



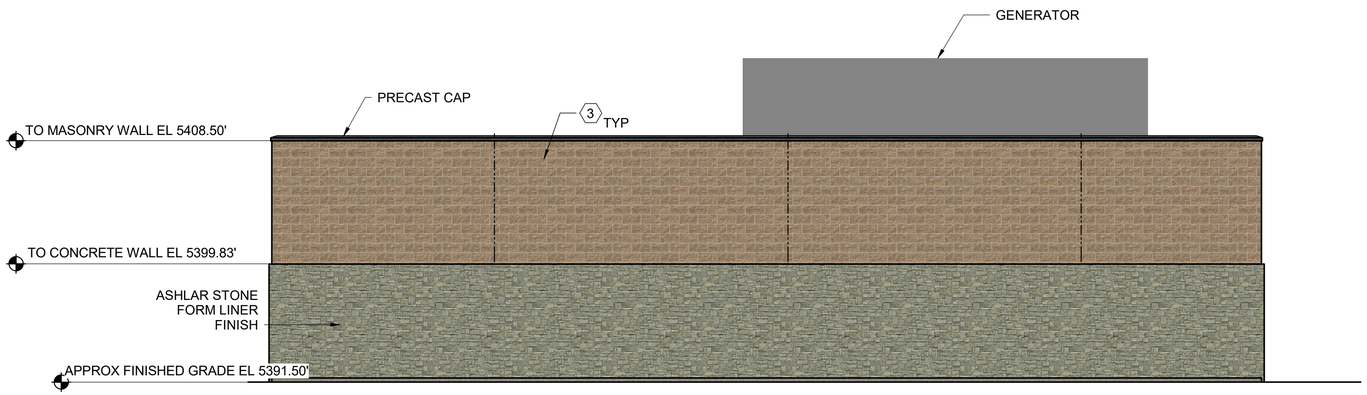

**BWPS**
**WEST ELEVATION** — 7 / A210

0 2' 4' 8'
SCALE IN FEET




**BWPS**
**NORTH ELEVATION** — 8 / A210

0 2' 4' 8'
SCALE IN FEET




**GENERATOR ENCLOSURE WEST WALL**
NORTH AND SOUTH WALL SIMILAR

0 4' 8' 12'
SCALE IN FEET

ELEVATION KEY NOTES (X)

1. SCORED SMOOTH FACE CMU BASALITE 668R WITH 24S PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
2. SCORED GROUND FACE CMU, BASALITE 900R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
3. SPLIT FACE CMU, BASALITE 924R, WITH PLAIN MORTAR, SCORED @ 8" OC, MORTAR ALL SCORES
4. COMB FACE CMU BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
5. BERRIDGE FLUTED FASCIA PANELS, CHAMPAGNE
6. HORIZONTAL BERRIDGE THIN LINE PANELS, CHAMPAGNE
7. PARAPET CAP TO MATCH METAL PANELS
8. FACTORY FINISHED DOWNSPOUT TO MATCH METAL PANELS
9. CHEMICAL BULKFILL STATIONS. SEE DETAIL ON A301. PAINT DOOR TO MATCH WALL.
10. SPLIT FACE CMU, BASALITE 668R, WITH PLAIN MORTAR. SCORED @ 8" OC, MORTAR ALL SCORES
11. LIGHTING, SEE ELEC
12. PAINT ON CMU. SEE FINISH SCHEDULE
13. FIRE DEPARTMENT CONNECTION. SEE FX201
14. STRUCTURAL PILASTER. SEE S245 FOR DETAILS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

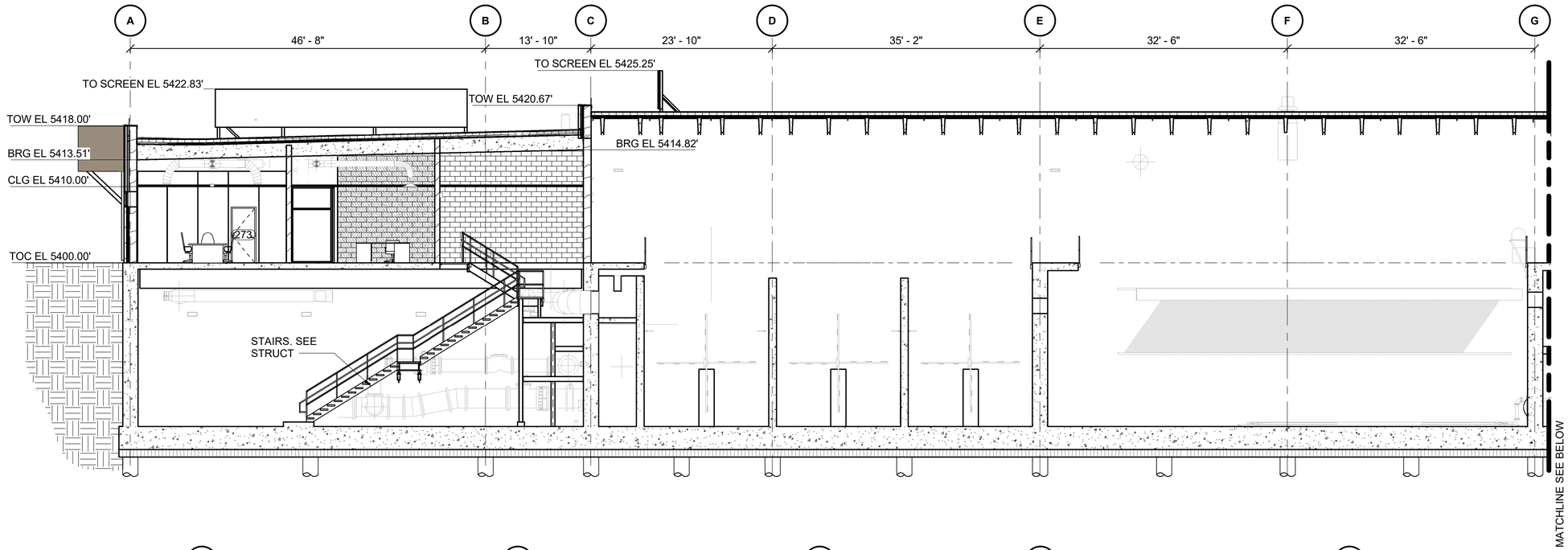
City of Thornton

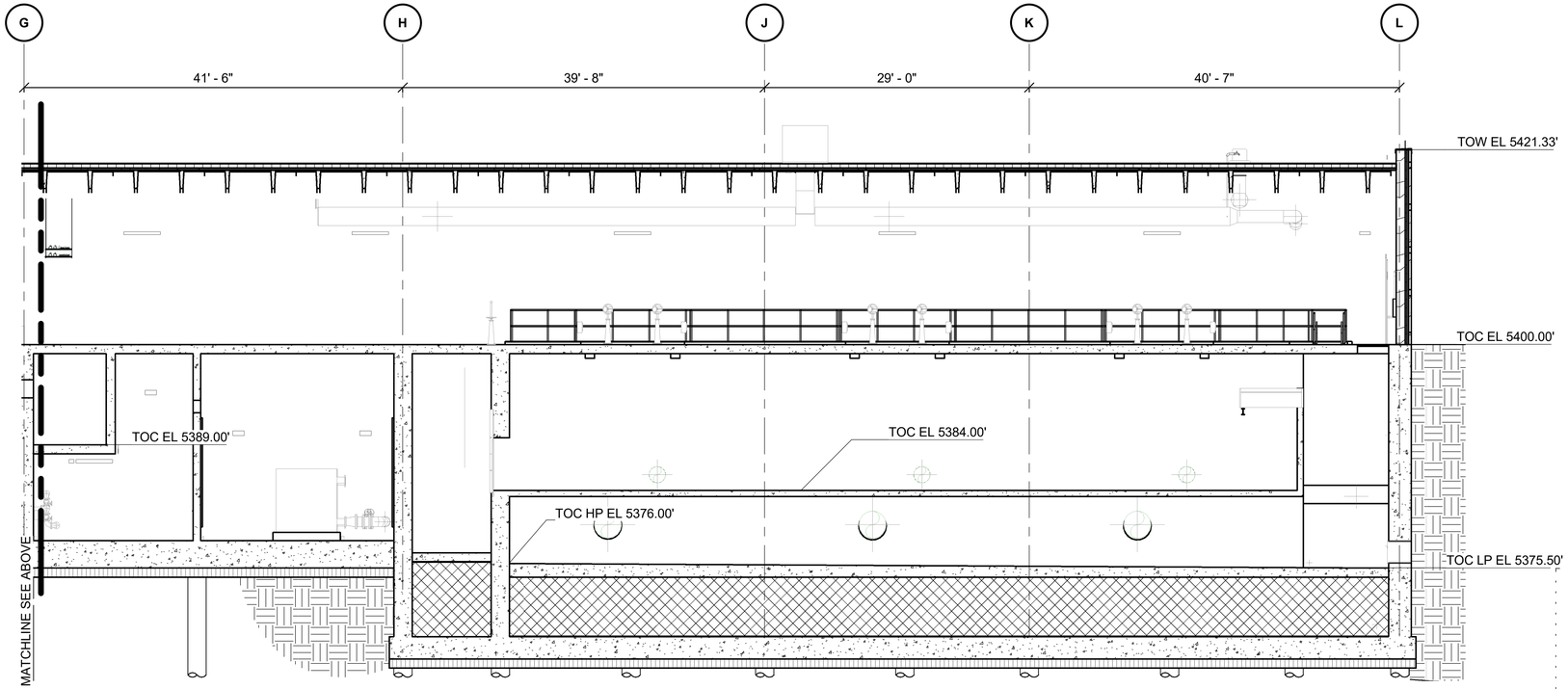
**CITY OF THORNTON**
**TTP - PACKAGE 3**
ARCHITECTURAL ELEVATIONS V

| | |
|---|---|
| project 98101 | contract |
| drawing A217 | rev. 1 |
| sheet 158 of 542 sheets | |
| file 98101_S | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




SECTION A / A201

0 4' 8' 16'

SCALE IN FEET

Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

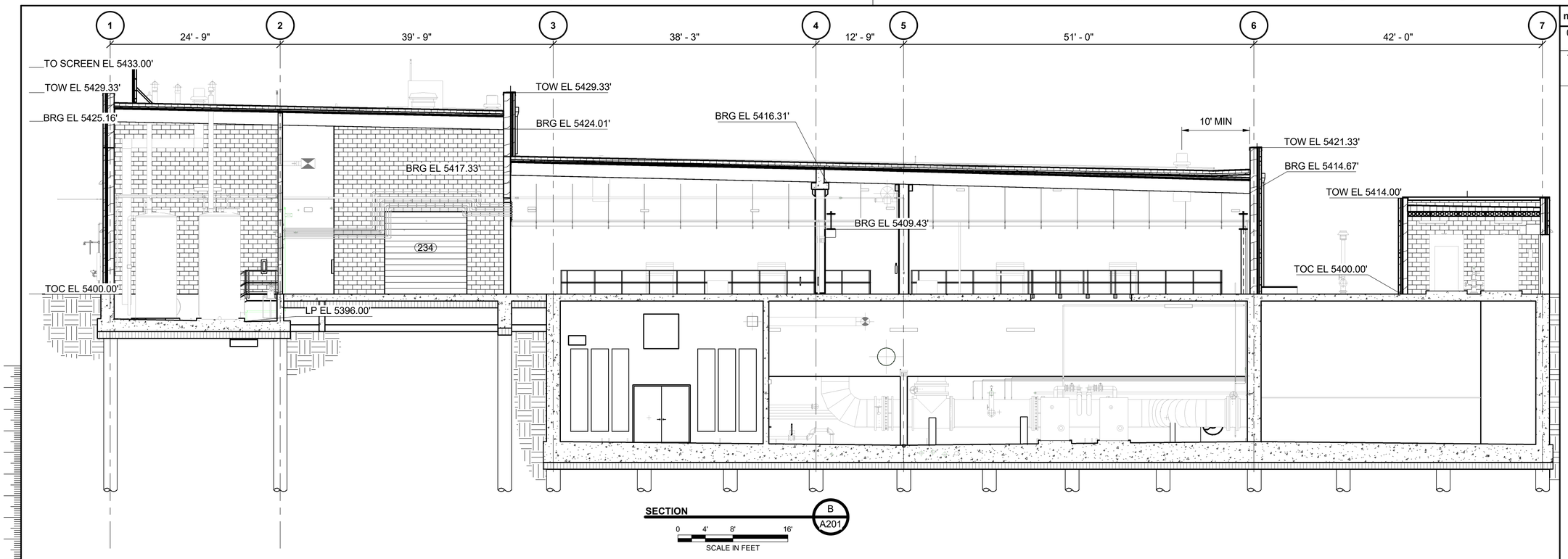
BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
BUILDING SECTIONS I

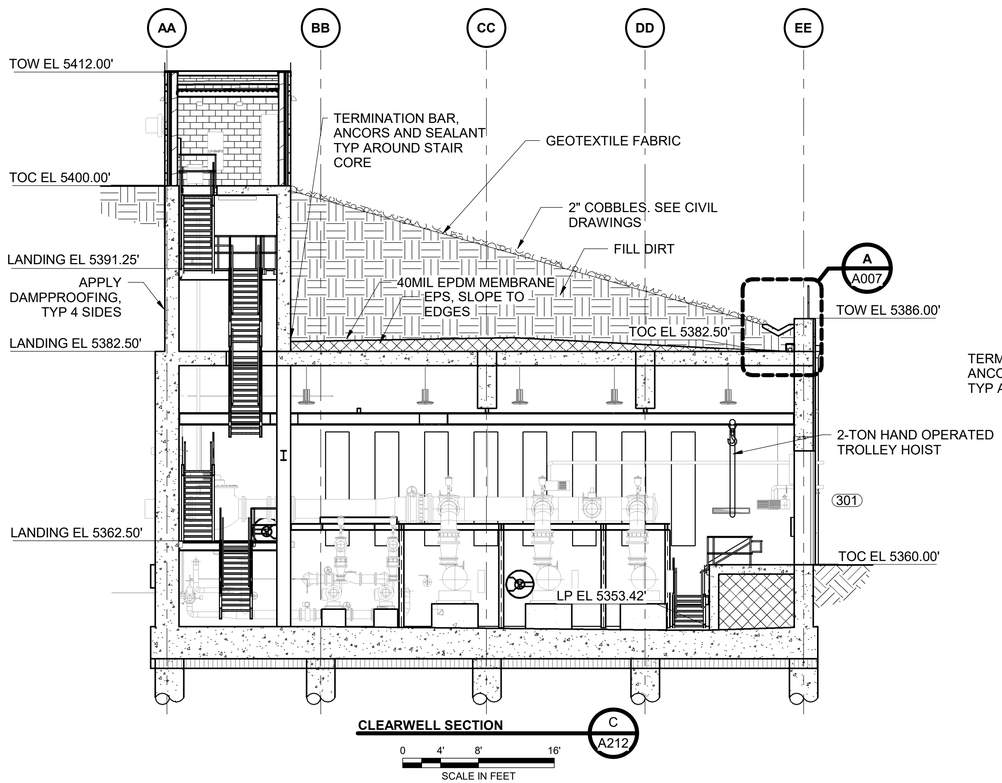
| | |
|---|---|
| project 98101 | contract |
| drawing A218 | rev. 0 |
| sheet 159 of 542 sheets | |
| file 98101_S | |




**SECTION** B / A201

0 4' 8' 16'

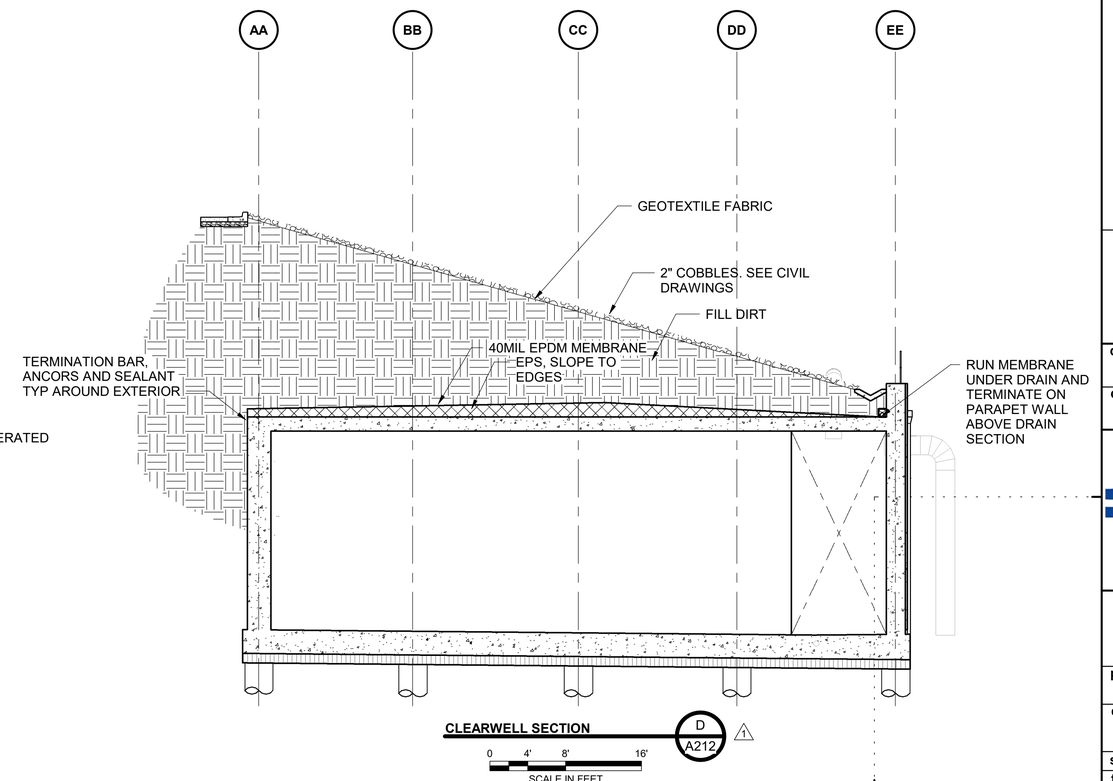
SCALE IN FEET




**CLEARWELL SECTION** C / A212

0 4' 8' 16'

SCALE IN FEET




**CLEARWELL SECTION** D / A212 (1)

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

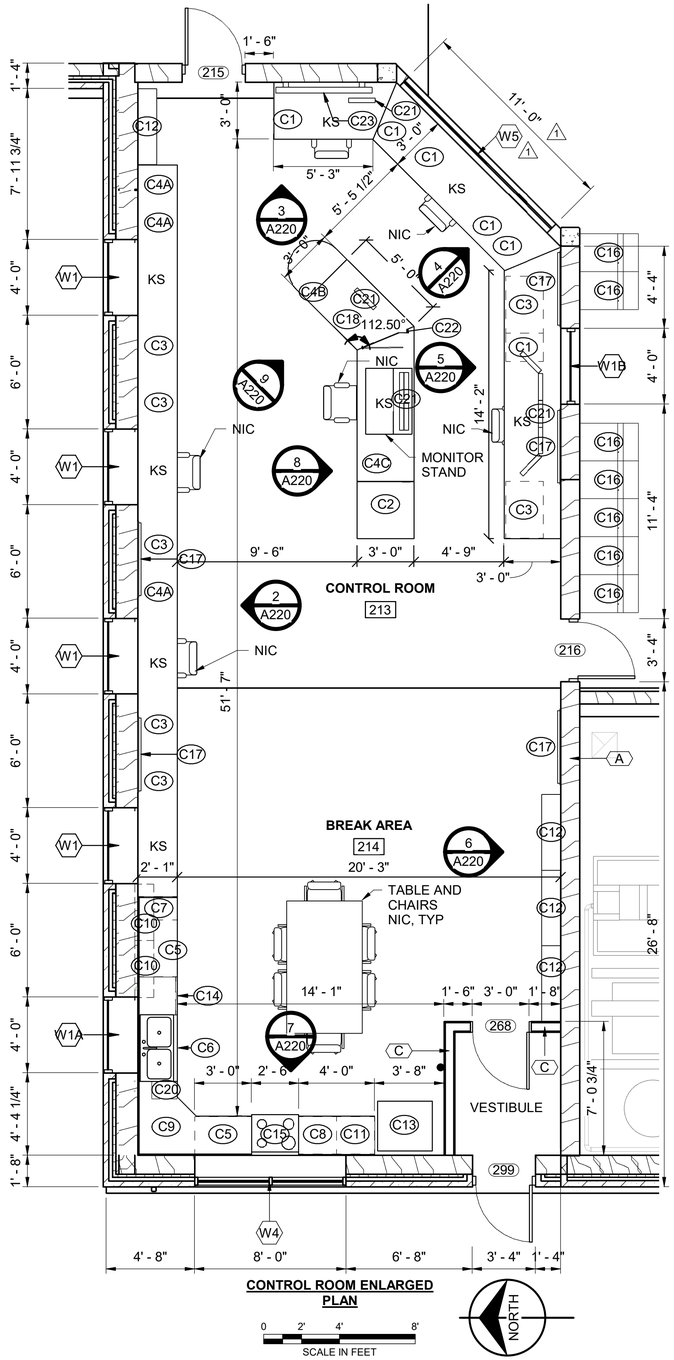
| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

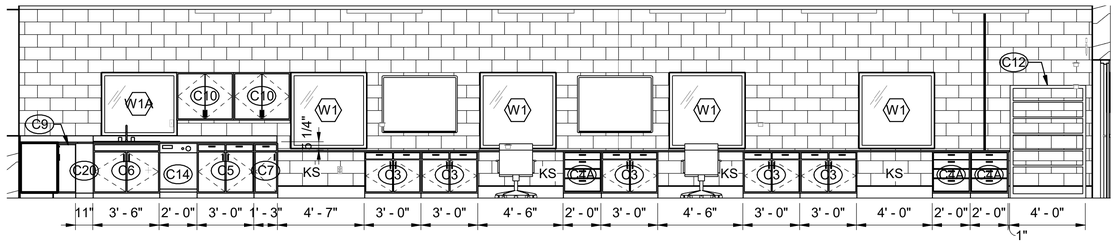
City of Thornton

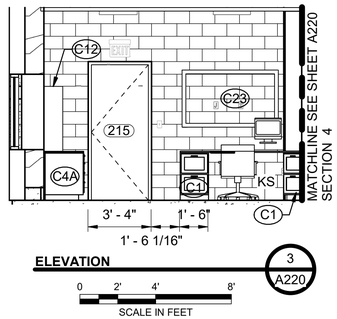
**CITY OF THORNTON**
**TTP - PACKAGE 3**
BUILDING SECTIONS II

| | |
|---|---|
| project 98101 | contract |
| drawing **A219** | rev. **1** |
| sheet 160 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

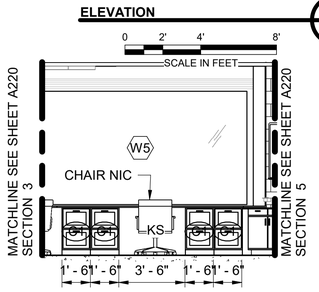



ELEVATION 3 / A220

SCALE IN FEET

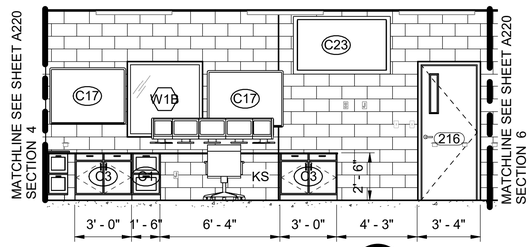



ELEVATION 4 / A220

SCALE IN FEET

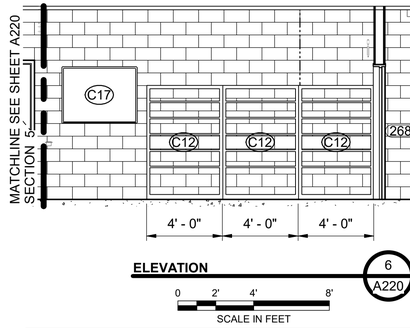
ELEVATION 2 / A220

SCALE IN FEET



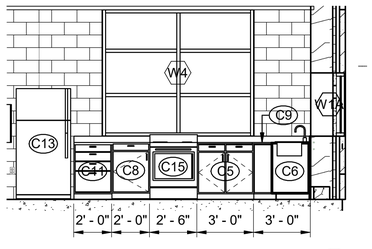

ELEVATION 5 / A220

SCALE IN FEET



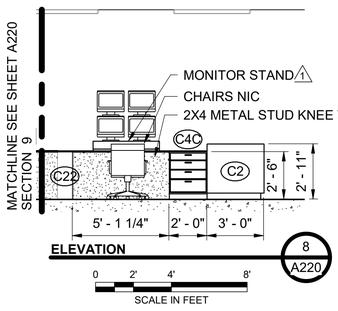

ELEVATION 6 / A220

SCALE IN FEET



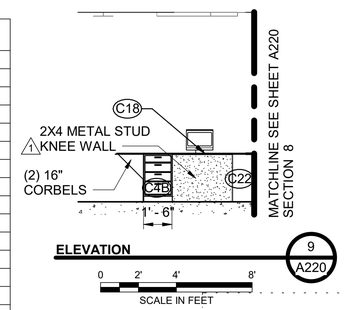

ELEVATION 7 / A220

SCALE IN FEET




ELEVATION 8 / A220

SCALE IN FEET




ELEVATION 9 / A220

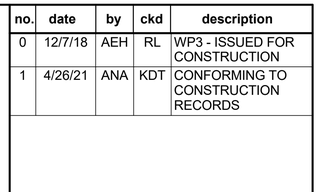
SCALE IN FEET

**CONTROL/ BREAK ROOM SCHEDULE**

| TAG ID | WxDxH | TYPE | REMARKS | QTY |
|---|---|---|---|---|
| C1 | 18"x24"x30" | LAMINATE BASE CABINET | 2 BINS | 6 |
| C2 | 36"x36"x35" | LAMINATE DIVIDED COMPARTMENT | DRAWING STORAGE | 1 |
| C3 | 36"x24"x30" | LAMINATE BASE CABINET | DRW/ DBL DOOR | 7 |
| C4A | 24"x24"x30" | LAMINATE BASE CABINET | 4 DRW | 3 |
| C4B | 18"x25-1/2"x30" | LAMINATE BASE CABINET | 4 DRW | 1 |
| C4C | 24"x25-1/2"x30" | LAMINATE BASE CABINET | 4 DRW | 1 |
| C5 | 12"x24"x35 1/4" | LAMINATE BASE CABINET | DRW/ DBL DOOR | 2 |
| C6 | 42"X24"X35 1/4" | LAMINATE BASE CABINET | SINK | 1 |
| C7 | 18"X24"X35 1/4" | LAMINATE BASE CABINET | DRW / DOOR | 1 |
| C8 | 18"X24"X35 1/4" | LAMINATE BASE CABINET | DRW / DOOR | 1 |
| C9 | 36"X36"X35 1/4" | LAMINATE BASE CABINET | CORNER BASE (45 DEGREE W/ LAZYS) | 1 |
| C10 | 36"x12"x30" | LAMINATE WALL CABINET | DBL DOOR | 2 |
| C11 | 24"x24"x35 1/4" | LAMINATE BASE CABINET | 4 DRW | 1 |
| C12 | 48"X12"X72" | LAMINATE SHELVING | ADJUSTABLE | 6 |
| C13 | | REFRIDGERATOR | PROVIDED BY OWNER | 1 |
| C14 | | DISHWASHER | PROVIDED BY OWNER | 1 |
| C15 | | 4 BURNER RANGE | PROVIDED BY OWNER | 1 |
| C16 | 24"x24"x72" | PERSONAL STORAGE LOCKER | SINGLE DOOR W/ BENCH DRAWER. SEE SPEC 10 51 13 | 7 |
| C17 | 48"x36" | DRY ERASE BOARD | PROVIDED BY OWNER | 5 |
| C18 | | SIT/STAND DESK | STAND STEADY ERGOTECH ONE TOUCH. 3-OVER-3 MONITOR CONFIGURATION | 1 |
| C20 | AS NEEDED | LAMINATE FILLER | BASE CABINET | 1 |
| C21 | | MONITOR - 24" DIAGONAL | LCD DISPLAY, PROVIDED BY OWNER | 11 |
| C22 | AS NEEDED | LAMINATE FILLER | END PANEL SUPPORT | 2 |
| C23 | | DISPLAY MONITOR | 50" DIAGONAL | 3 |
| CJ-4 | | CONTROL JOINT | | 8 |
| CJ-6 | | CONTROL JOINT | | 34 |

*SEE SPEC SECTION 06 40 23 FOR CABINET DETAILS AND CABINET MANUFACTURER REQUIREMENTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS I

| project | contract |
|---|---|
| 98101 | |

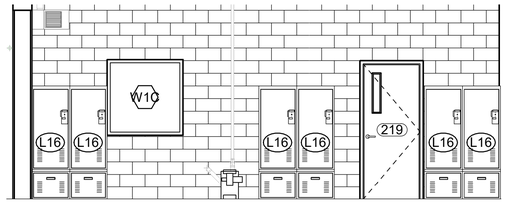
drawing **A220 — 1** rev.

sheet 161 of 542 sheets

file 98101_S

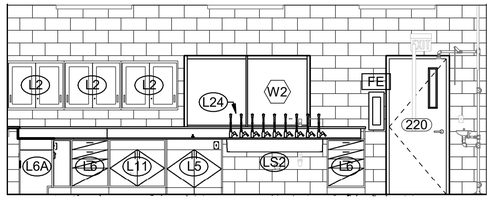
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



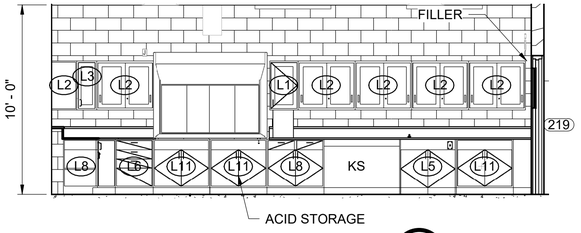

ELEVATION 1 A221

SCALE IN FEET 0 2' 4' 8'



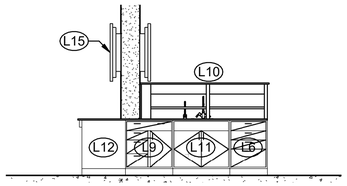

ELEVATION 2 A221

SCALE IN FEET 0 2' 4' 8'



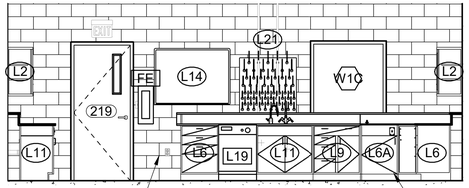

ELEVATION 3 A221

SCALE IN FEET 0 2' 4' 8'



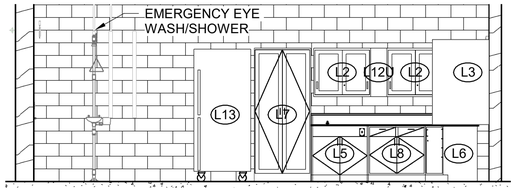

ELEVATION 6 A221

SCALE IN FEET 0 2' 4' 8'




ELEVATION 4 A221

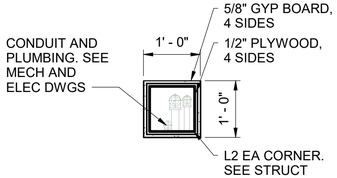
SCALE IN FEET 0 2' 4' 8'




ELEVATION 5 A221

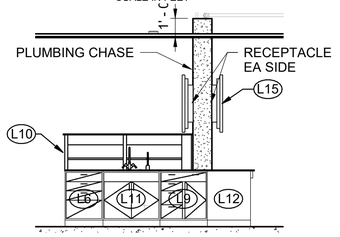
SCALE IN FEET 0 2' 4' 8'

| LAB SINK SCHEDULE | | |
|---|---|---|
| TAG | WXDXH | TYPE |
| LS1 | 16X24X10 | EPOXY SINK |
| LS2 | 12X60X8 | EPOXY SAMPLE SINK |
| LS3 | 20X16X10 | EPOXY SINK |
| LS4 | 6X10X8 | CUP SINK |



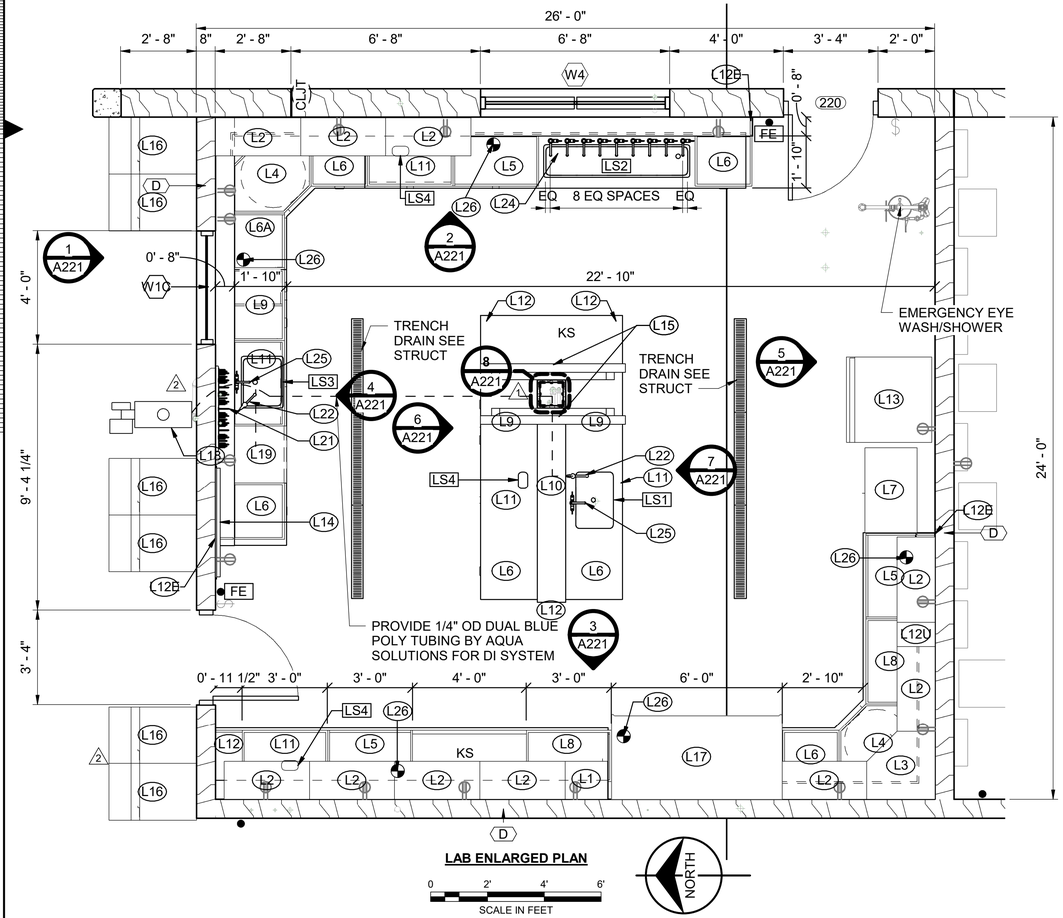

1 LAB ISLAND PLUMBING CHASE 8 A221

SCALE IN FEET 0 1' 2' 3'




ELEVATION 7 A221

SCALE IN FEET 0 2' 4' 8'




LAB ENLARGED PLAN

SCALE IN FEET 0 2' 4' 6'

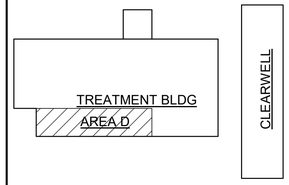
NORTH

**LAB SCHEDULE**

| TAG ID | WxDxH | TYPE | REMARKS | QTY |
|---|---|---|---|---|
| L1 | 18"x12"x31" | INSET STEEL WALL CABINET | SGL DOOR | 1 |
| L2 | 36"x12"x31" | INSET STEEL WALL CABINET | DBL SLIDING DOOR | 10 |
| L3 | 28 3/4"x16"x31" | INSET STEEL CORNER WALL CABINET | | 1 |
| L4 | 32 7/8"x21 5/8"x35 1/4" | INSET STEEL CORNER BASE CABINET | LAZY SUSAN | 2 |
| L5 | 36"x21 5/8"x35 1/4" | INSET STEEL VACUUM BASE CABINET | DBL DOOR | 3 |
| L6 | 24"x21 5/8"x35 1/4" | INSET STEEL BASE CABINET | 4 DRW | 6 |
| L6A | 24"x21 5/8"x35 1/4" | INSET STEEL VACUUM BASE CABINET | SGL DOOR | 1 |
| L7 | 36"x22"x96" | INSET STEEL TALL CABINET | DBL DOOR FULL HEIGHT CABINET WITH SHELVES | 1 |
| L8 | 36"x21 5/8"x35 1/4" | INSET STEEL BASE CABINET | DBL DRW/ DBL DOOR | 2 |
| L9 | 30"x21 5/8"x35 1/4" | INSET STEEL BASE CABINET | 4 DRW/ SGL DOOR | 3 |
| L10 | 12"x96"x35 1/4" | REAGENT RACK | PRE-PUNCHED ELECTRICAL/COMM OUTLETS IN UPRIGHTS | 1 |
| L11 | 36"x24"x36" | INSET STEEL BASE CABINET | SINK BASE | 7 |
| L12 | AS NEEDED | INSET STEEL FILLERS | CABINET BASE | 4 |
| L12E | AS NEEDED | INSET STEEL FILLERS | END PANEL | 3 |
| L12U | AS NEEDED | INSET STEEL FILLERS | WALL MOUNT PANEL | 1 |
| L13 | 30"x30"x72" | REFRIDGERATOR | PROVIDED BY OWNER, INSTALLED BY DB | 1 |
| L14 | 48"x36" | DRY ERASE BOARD | PROVIDED BY OWNER, INSTALLED BY DB | 1 |
| L15 | | DISPLAY MONITOR | 50" DIAGONAL. PROVIDE WITH ARTICULATING WALL MOUNT BRACKET | 2 |
| L16 | 24"x24"x72" | PERSONAL STORAGE LOCKER | SINGLE DOOR W/ BENCH DRAWER. SEE SPEC 10 51 13 | 6 |
| L17 | 6'-0" | FUME HOOD | KEWAUNEE H70T5472B00 | 1 |
| L18 | | RO+DI WATER FILTER | AQUA SOLUTIONS 20LPH W/ 130L STEEK TANK | 1 |
| L19 | 24"X24"X36" | GLASSWARE WASHER | SP SCIENTIFIC WITH DI RINSE (H-11/5) | 1 |
| L21 | 36"x1"x36" | PEG BOARD DRYING RACK | | 1 |
| L22 | | DECK MOUNT DI FAUCET | AQUA SOLUTIONS 2615F - RIGHT HAND | 2 |
| L24 | | SINGLE HANDLE SAMPLE FAUCET | CHICAGO FAUCETS 927-317XKPC | 9 |
| L25 | | DOUBLE HANDLE LAB FAUCET | CHICAGO FAUCETS 201-AGN2BVBE7-317 | 2 |
| L26 | | VACUUM PUMP VALVE FIXTURE | CHICAGO FAUCETS 980-909-957-3KA6V | 5 |

*SEE SPEC SECTION 12 35 53.13 FOR LAB CABINET DETAILS AND CABINET MANUFACTURER REQUIREMENTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 11/11/19 | KDT | AEH | REVISED PER RFI #149 |
| 2 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS II

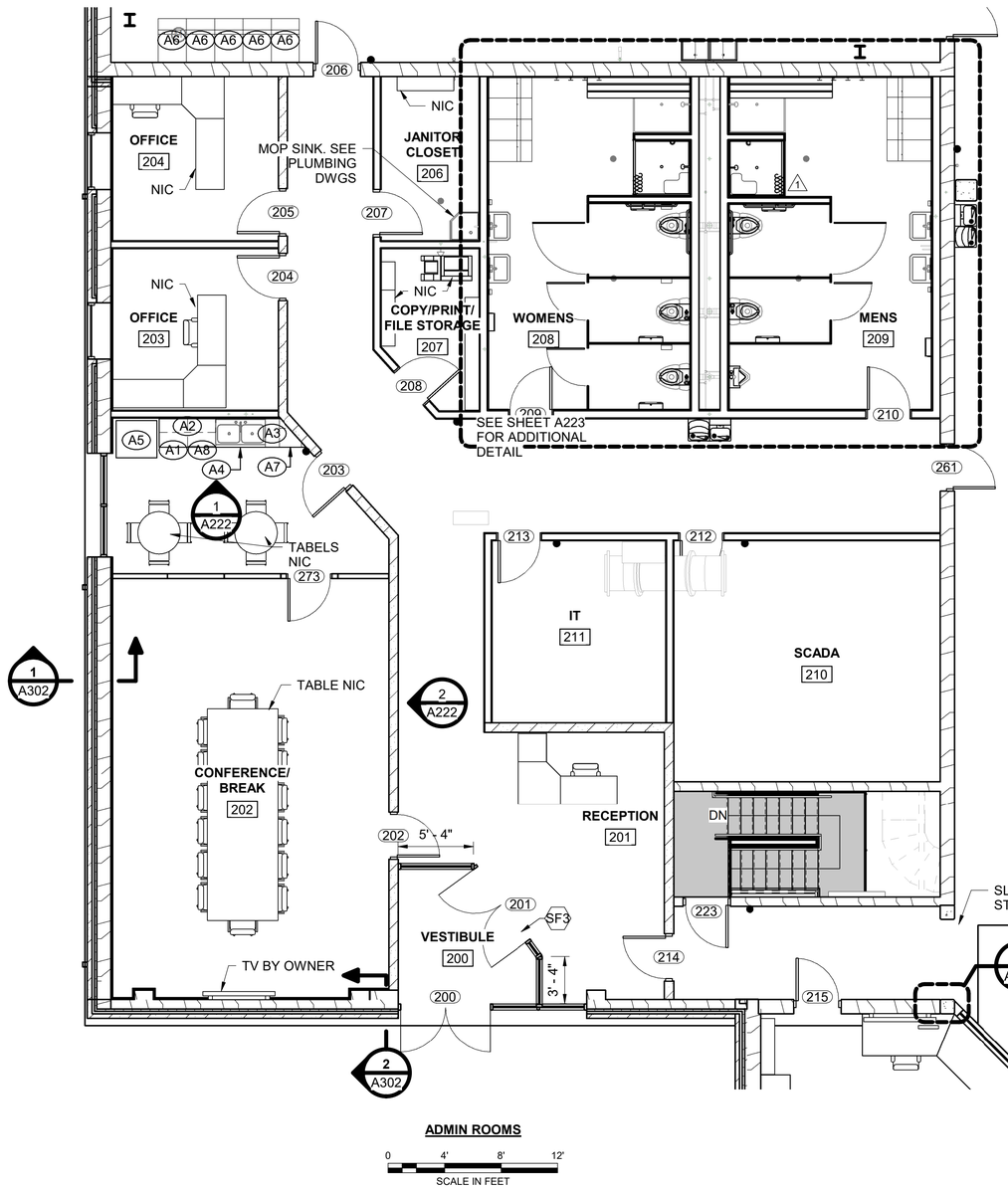
| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

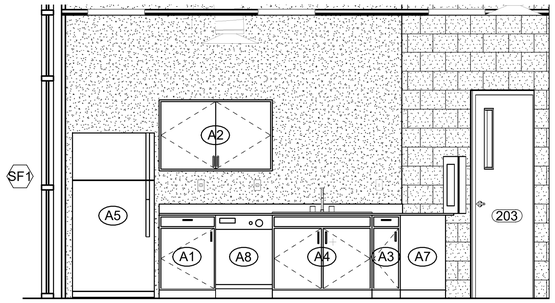
**A221 — 2**

sheet 162 of 542 sheets
file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

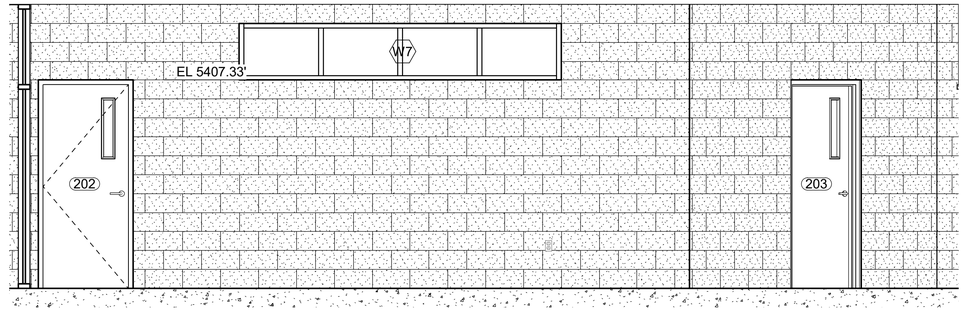



ELEVATION 1 A222

0 2' 4' 6'

SCALE IN FEET




ELEVATION 2 A222

0 2' 4' 6'

SCALE IN FEET

**ADMINISTRATION CASEWORK SCHEDULE**

| TAG ID | WxDxH | TYPE | REMARKS | QTY |
|---|---|---|---|---|
| A1 | 24"x24"x35 1/4" | LAMINATE BASE CABINET | DRW / DOOR | 1 |
| A2 | 48"x12"x31" | LAMINATE WALL CABINET | DBL DOOR | 1 |
| A3 | 12"x24"x35 1/4" | LAMINATE BASE CABINET | DRW / DOOR | 1 |
| A4 | SINK | LAMINATE BASE CABINET | SINK | 1 |
| A5 | | REFRIDGERATOR | PROVIDED BY OWNER, INSTALLED BY DB | 1 |
| A6 | 24"x24"x72" | PERSONAL STORAGE LOCKER | SINGLE DOOR W/ BENCH DRAWER. SEE SPEC 10 51 13 | 5 |
| A7 | AS REQUIRED | LAMINATE BASE FILLER | | 1 |
| A8 | | DISHWASHER | PROVIDED BY OWNER, INSTALLED BY DB | 1 |

*SEE SPEC SECTION 06 40 23 FOR CABINET DETAILS AND CABINET MANUFACTURER REQUIREMENTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | T. HAGUE |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS III

| project | contract |
|---|---|
| 98101 | |

drawing **A222** rev. **1**

sheet 163 of 542 sheets

file 98101_S

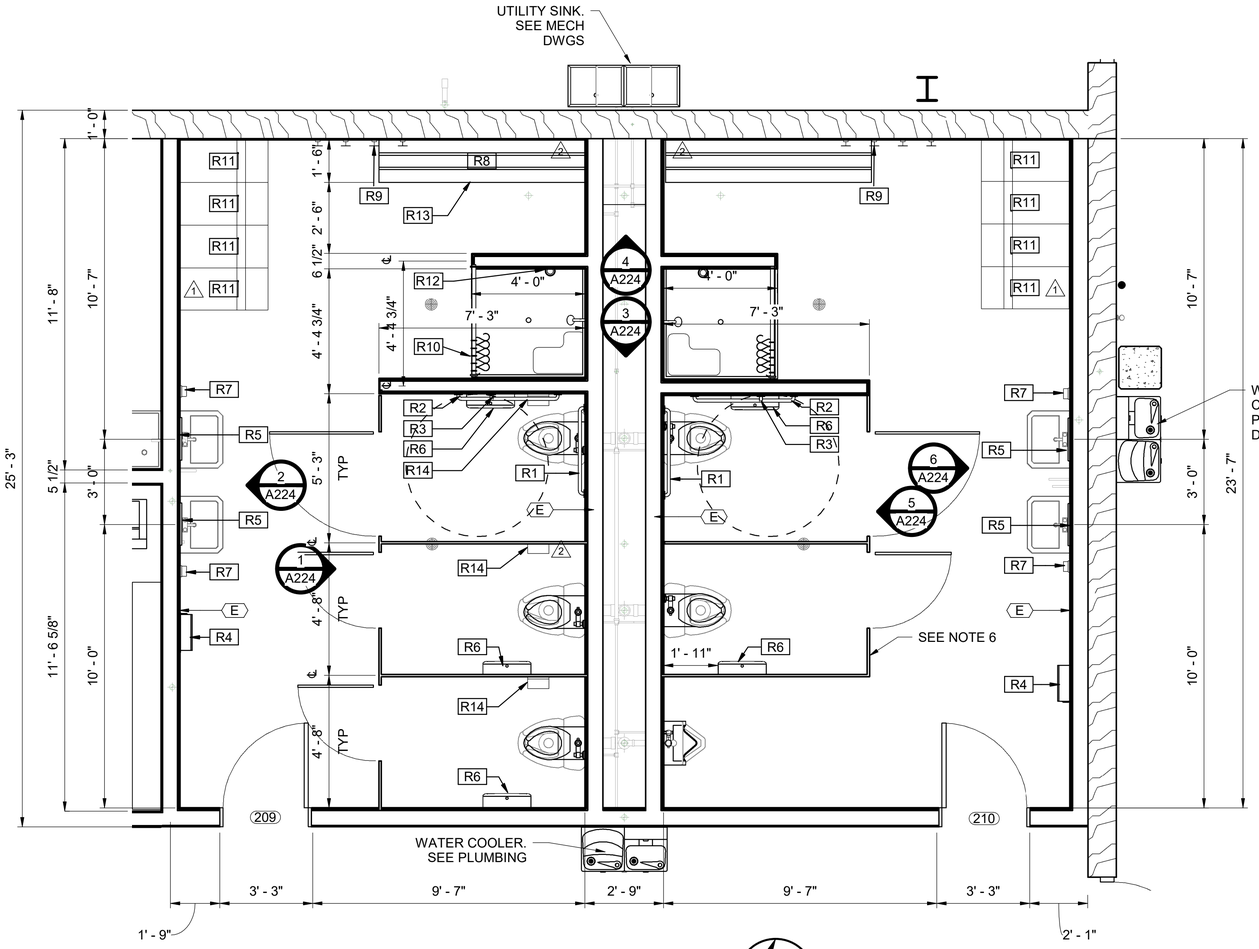
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. DIMENSIONS ARE TO FACE OF WALL, UNO.
2. SEE A003 & A004 FOR DOOR SCHEDULE AND DETAILS.
3. SEE A005 FOR FINISH SCHEDULE AND WINDOW DETAILS
4. SEE A300 FOR WALL TYPES.
5. ACOUSTIC PANELS SHALL BE IAC ACOUSTICS NOISE FOIL PSI 2" THICK BY 30" WIDE PANELS OR EQUAL (STAND-OFF MOUNT)

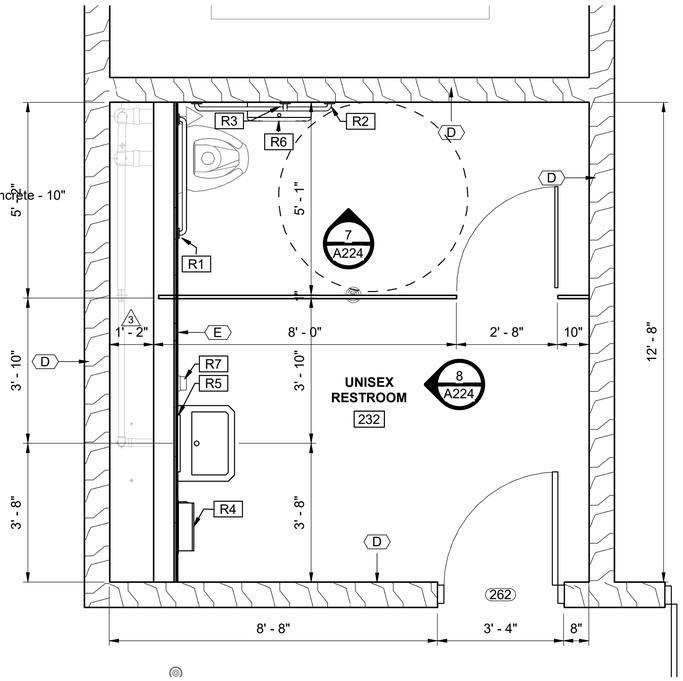
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/29/19 | STD | AEH | REVISED PER RFI #144 |
| 2 | 11/26/19 | STD | AEH | REVISED PER RFI #158 |
| 3 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**MALE/FEMALE RESTROOMS**

0 2' 4' 6'
SCALE IN FEET

NORTH




**UNISEX RESTROOM**

0 1' 2' 4'
SCALE IN FEET

NORTH

**BATHROOMS/LOCKER ROOM SCHEDULE**

| | TAG ID | WxDxH | TYPE | REMARKS | QTY |
|---|---|---|---|---|---|
| | R1 | | 3' GRAB BAR | | 3 |
| | R2 | | 3'-6" GRAB BAR | | 3 |
| | R3 | | 1'-6" GRAB BAR | | 3 |
| | R4 | | PAPER TOWEL AND WASTE BIN | | 3 |
| | R5 | | STAINLESS STEEL MIRROR | | 5 |
| | R6 | | TOILET PAPER DISPENSER | | 6 |
| | R7 | | SOAP DISPENSER | | 5 |
| | R8 | | TEAK BENCH | | 2 |
| | R9 | | CLASSIC SERIES SURFACE MOUNTED DOUBLE ROBE HOOK | BRIGHT POLISHED STAINLESS STEEL | 8 |
| | R10 | | SHOWER ROD AND CURTAIN | | 2 |
| 1 | R11 | 18-1/16"x33-1/2"x72" | PERSONAL STORAGE LOCKER | SINGLE DOOR W/ BENCH DRAWER. SEE SPEC 10 51 13 | 8 |
| 2 | R12 | | SOAP DISH | ATTACHED TO SHOWER WALL AT 42" HEIGHT | 2 |
| 2 | R13 | | ADA SHOWER BENCH | 19" MOUNTING HEIGHT | 2 |
| 2 | R14 | | SANITARY NAPKIN RECEPTACLE | SURFACE MOUNTED | 3 |

* SEE DRAWING A225 AND SPEC SECTION 10 28 00 FOR RESTROOM ACCESSORY MOUNTING HEIGHTS AND REQUIREMENTS

BURNS McDONNELL

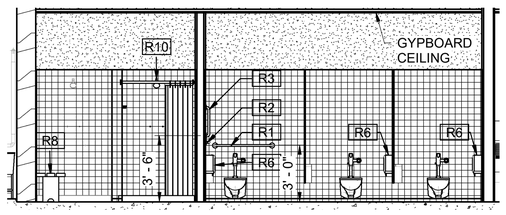
| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS IV

| | |
|---|---|
| project 98101 | contract |
| drawing A223 | rev. 3 |
| sheet 164 of 542 sheets | |
| file 98101_S | |

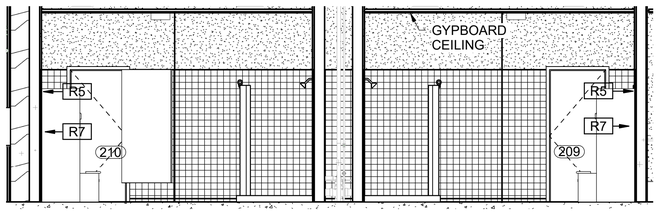
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




ELEVATION 1 A223

0 2' 4' 8'

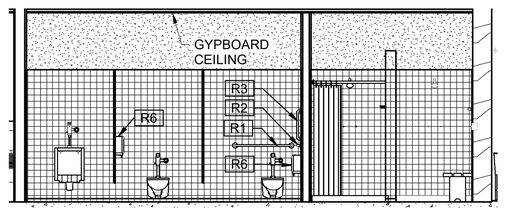
SCALE IN FEET




ELEVATION 3 A223

0 2' 4' 8'

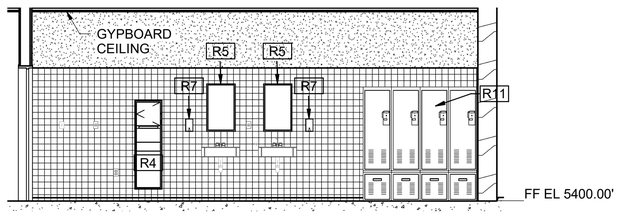
SCALE IN FEET




ELEVATION 5 A223

0 2' 4' 8'

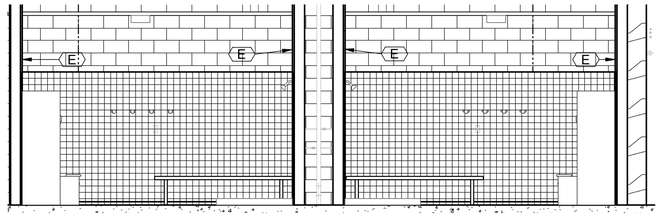
SCALE IN FEET




ELEVATION 2 A223

0 2' 4' 8'

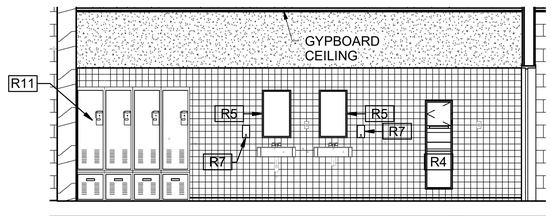
SCALE IN FEET




ELEVATION 4 A223

0 2' 4' 8'

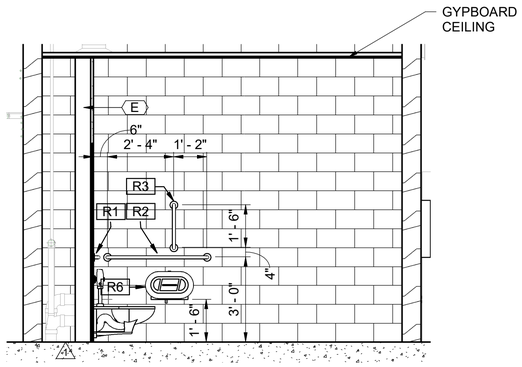
SCALE IN FEET




ELEVATION 6 A223

0 2' 4' 8'

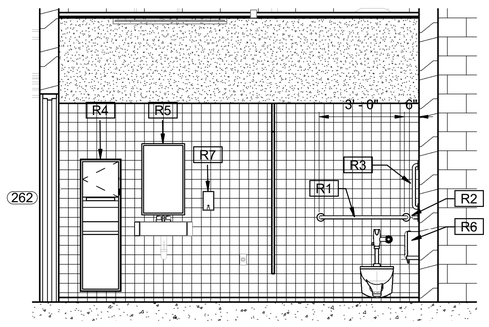
SCALE IN FEET




ELEVATION 7 A223

0 2' 4' 6'

SCALE IN FEET




ELEVATION 8 A223

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

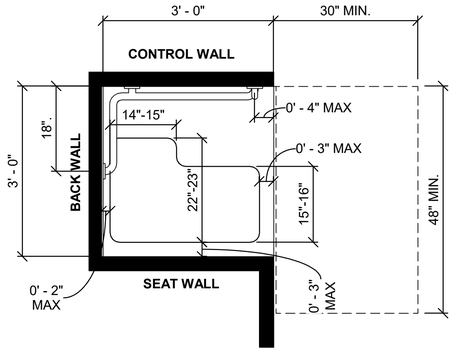
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS V

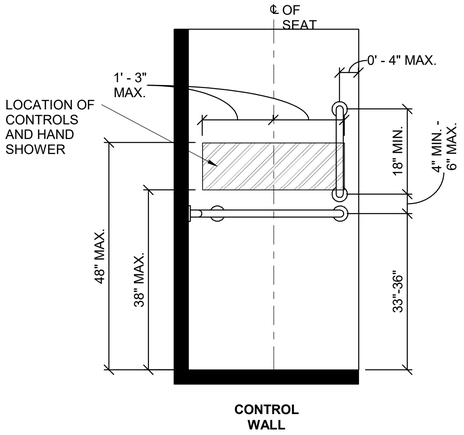
| | |
|---|---|
| project 98101 | contract |
| drawing **A224 — 1** | rev. |
| sheet 165 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

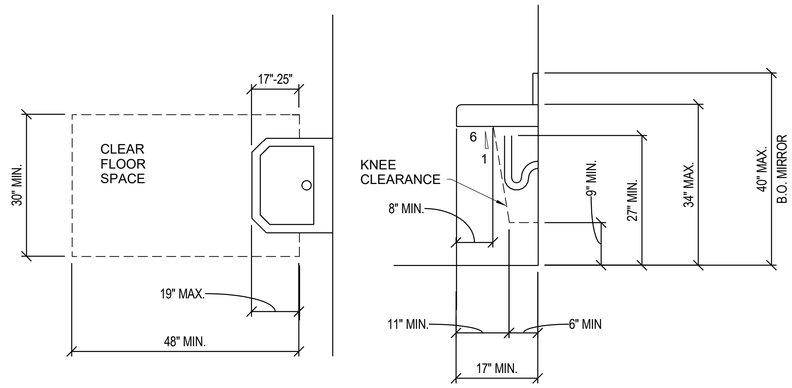



PLAN VIEW



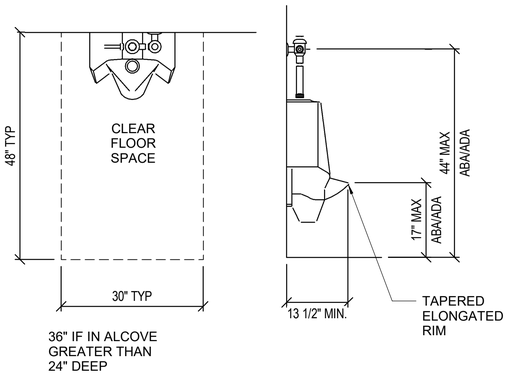

ELEVATION VIEW

**SHOWER STALLS**
NOT TO SCALE

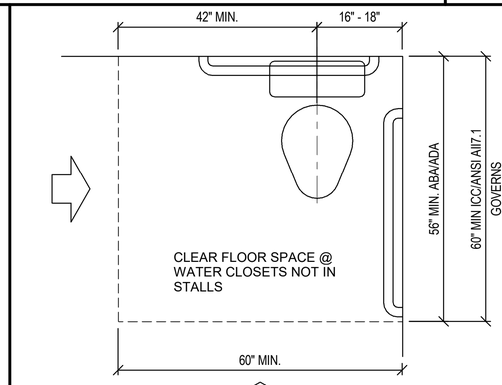



**LAVATORIES**
NOT TO SCALE

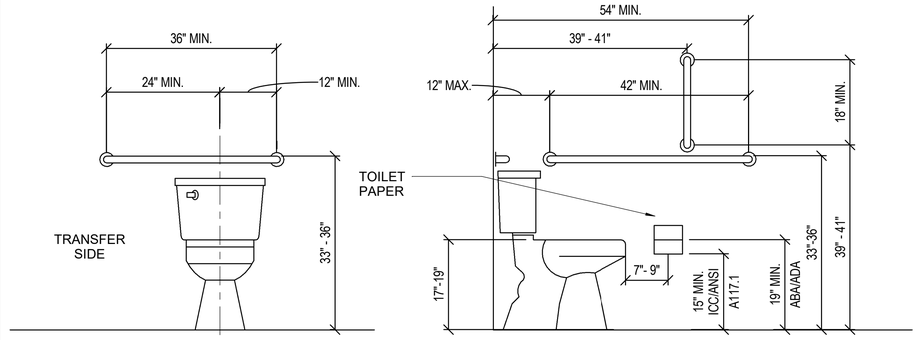
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |




**URINALS**
NOT TO SCALE

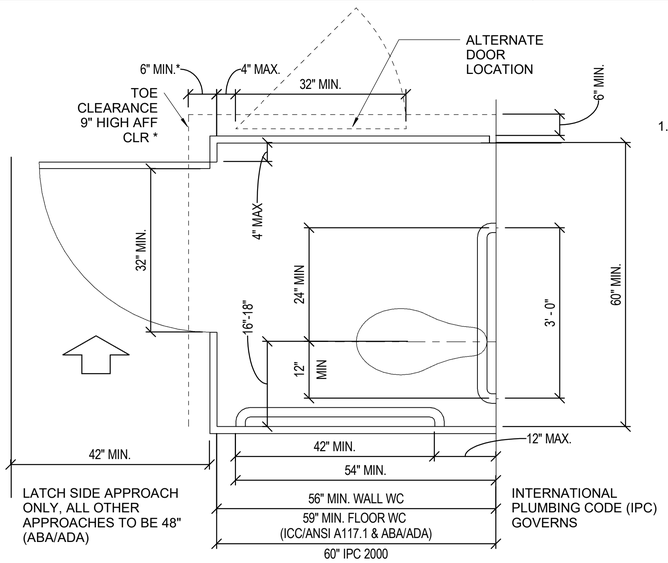



**WATER CLOSETS**
NOT TO SCALE




NOTE: FLUSH VALVE SHALL BE LOCATED ON WIDE SIDE OF STALLS

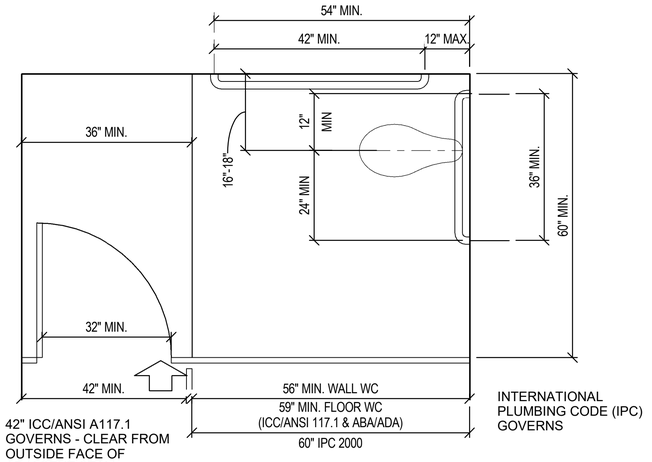
**GRAB BARS**
NOT TO SCALE




**STANDARD STALL**

1. WHERE "*" IS INDICATED - TOE CLEARANCE AT THE FRONT OF THE PARTITION IS NOT REQUIRED IN A COMPARTMENT GREATER THAN 62" DEEP WITH A WALL-HUNG WATER CLOSET OR 65" DEEP WITH A FLOOR-MOUNTED WATER CLOSET. TOE CLEARANCE AT THE SIDE IS NOT REQUIRED IN A COMPARTMENT GREATER THAN 66" WIDE (ICC/ANSI A117.1/ABA/ADA). TOE CLEARANCE IS EXCLUSIVE OF PARTITION SUPPORT MEMBERS.

**STANDARD STALLS**
NOT TO SCALE




**STANDARD STALL**

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | T. HAGUE |
| **designed** | **checked** |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
RESTROOM DETAILS

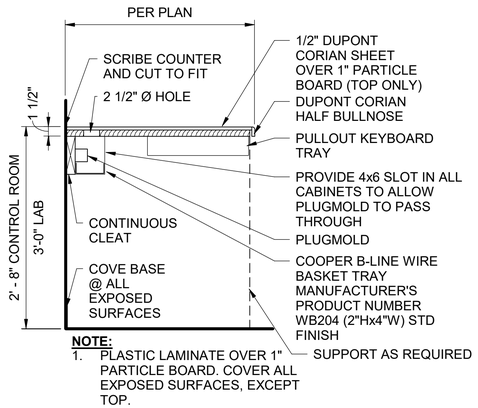
| project | contract |
|---|---|
| 98101 | |

drawing **A225 — 0** rev.

sheet 166 of 542 sheets
file 98101_S

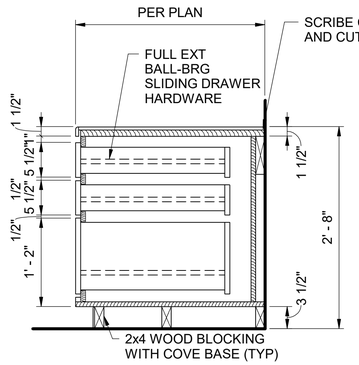
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

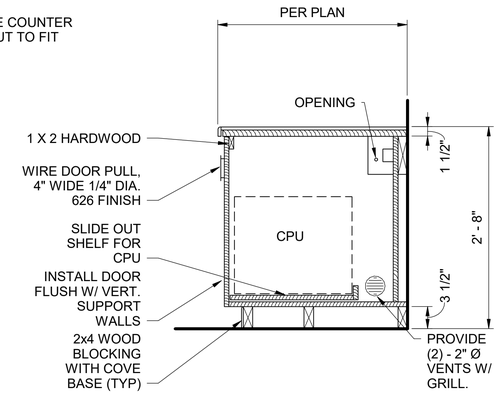



**NOTE:**
1. PLASTIC LAMINATE OVER 1" PARTICLE BOARD. COVER ALL EXPOSED SURFACES, EXCEPT TOP.

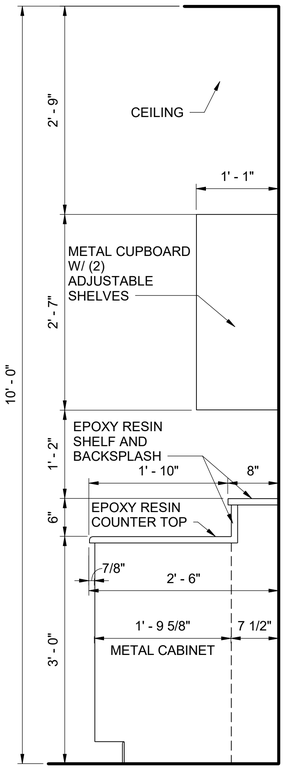
**TYPICAL DESK SECTION AT KNEESPACE**



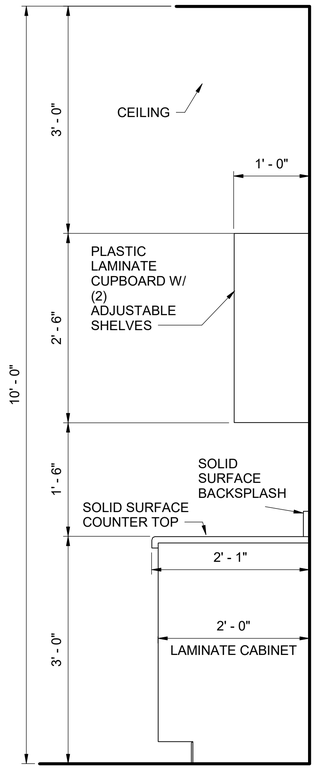

**TYPICAL DESK SECTION AT DRAWERS**



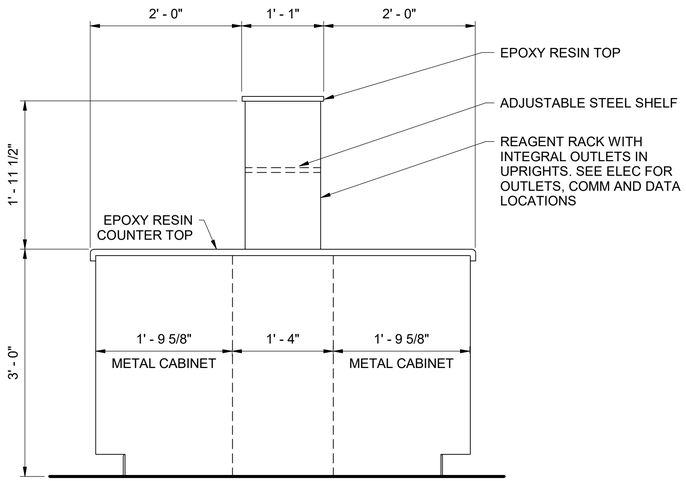

**TYPICAL DESK SECTION AT CPU CABINET**




**TYPICAL LAB CABINET SECTION**




**TYPICAL KITCHEN CABINET SECTION**




**TYPICAL LAB ISLAND SECTION**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

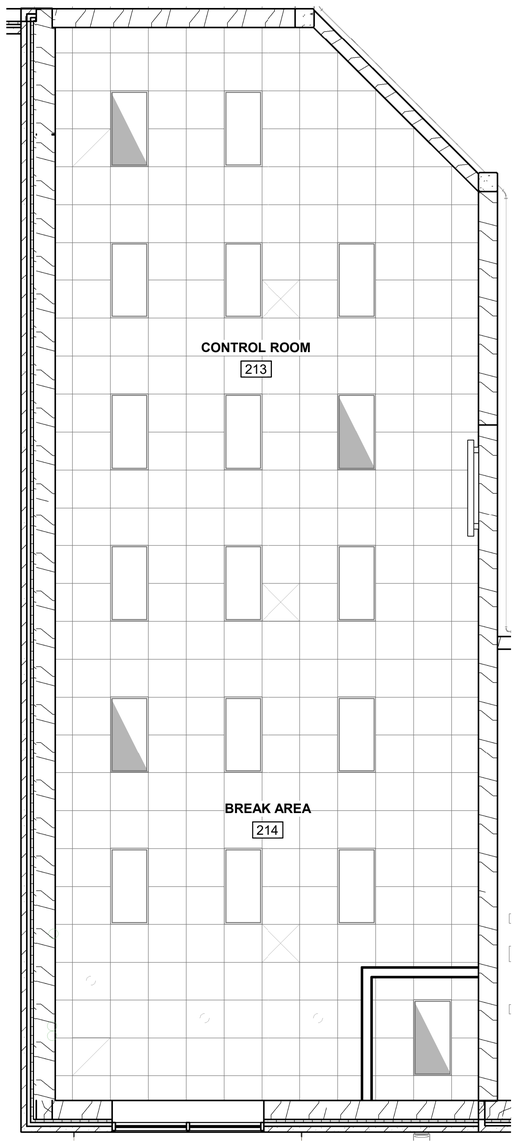
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CABINET DETAILS

| | |
|---|---|
| project 98101 | contract |
| drawing A226 | rev. 0 |
| sheet 167 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

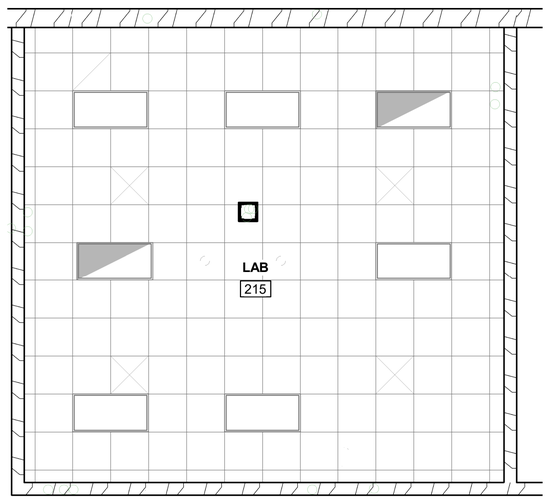



CONTROL ROOM

0 2' 4' 8'

SCALE IN FEET

NORTH

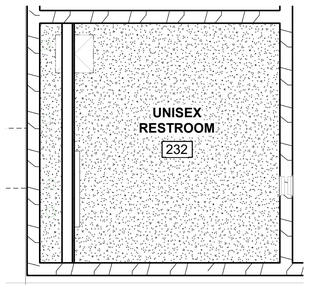



LAB

0 2' 4' 8'

SCALE IN FEET

NORTH




PRETREATMENT RESTROOM

0 2' 4' 8'

SCALE IN FEET

NORTH

LEGEND:

- 2x2 ACOUSTIC CEILING TILES AND GRID
- 2x4 RECESSED LIGHT
- 2x4 RECESSED EMERGENCY LIGHT
- RETURN AIR DIFFUSER
- SUPPLY AIR DIFFUSER
- GYPSUM BOARD CEILING
- RECESSED LIGHT

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

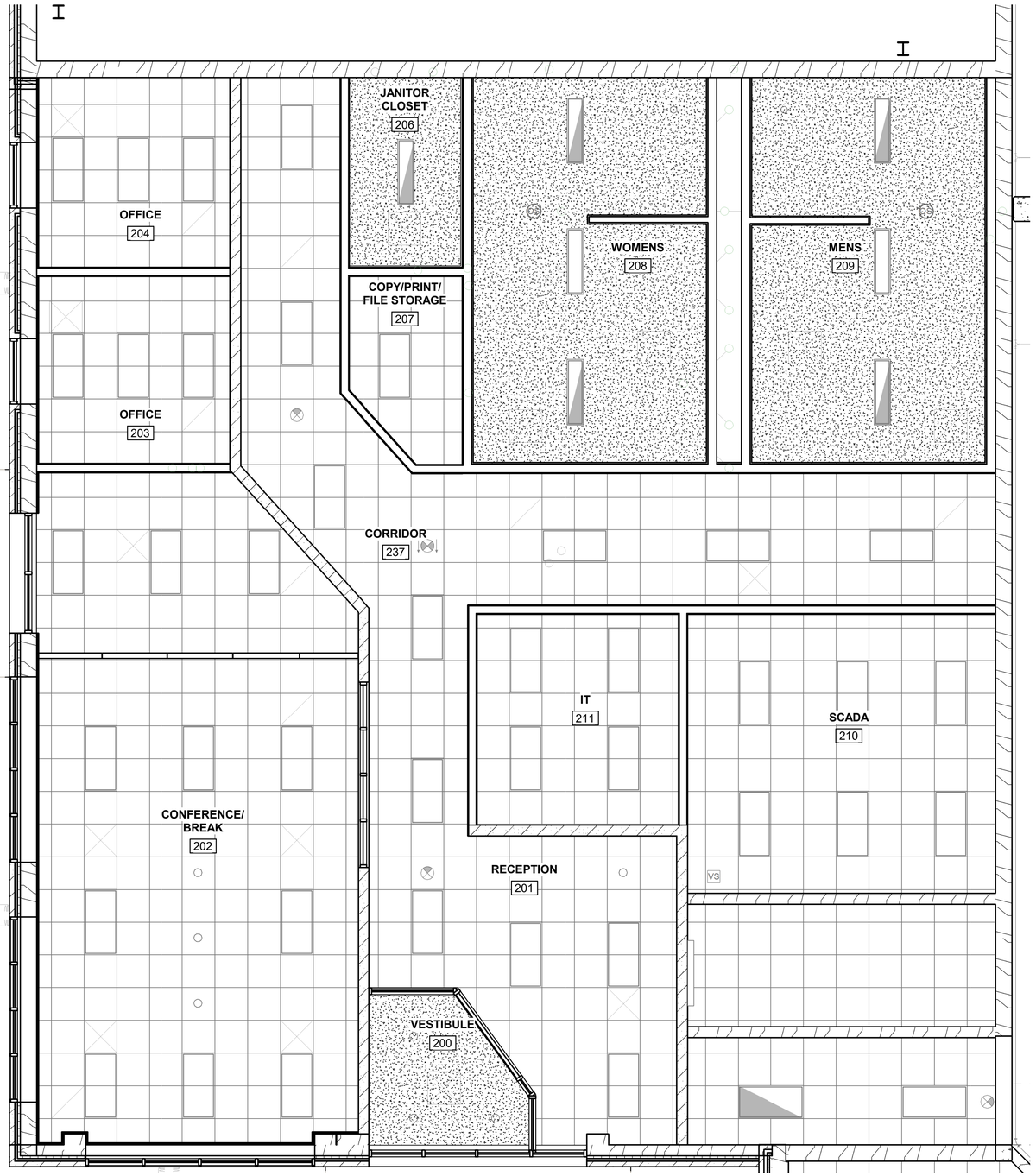
BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
REFLECTED CEILING PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing A227 | rev. 0 |
| sheet 168 of 542 sheets | |
| file 98101_S | |




**ADMINISTRATION AREA**

0 2' 4' 8'

SCALE IN FEET

NORTH

LEGEND:

- 2x2 ACOUSTIC CEILING TILES AND GRID
- 2x4 RECESSED LIGHT
- 2x4 RECESSED EMERGENCY LIGHT
- RETURN AIR DIFFUSER
- SUPPLY AIR DIFFUSER
- GYPSUM BOARD CEILING
- RECESSED LIGHT

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed T. HAGUE |
| designed A. HUNDLEY | checked R. LANG |

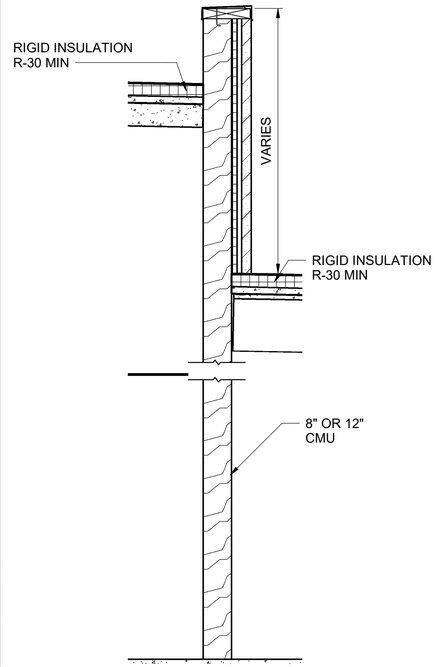
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
REFLECTED CEILING PLAN II

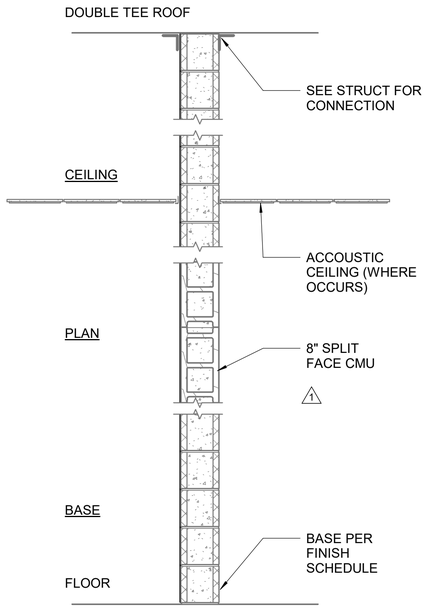
| | |
|---|---|
| project 98101 | contract |
| drawing A228 | rev. 0 |
| sheet 169 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

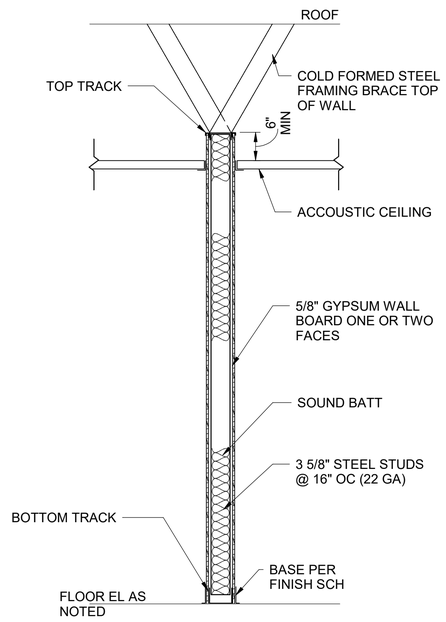



**WALL TYPE A**
NOT TO SCALE



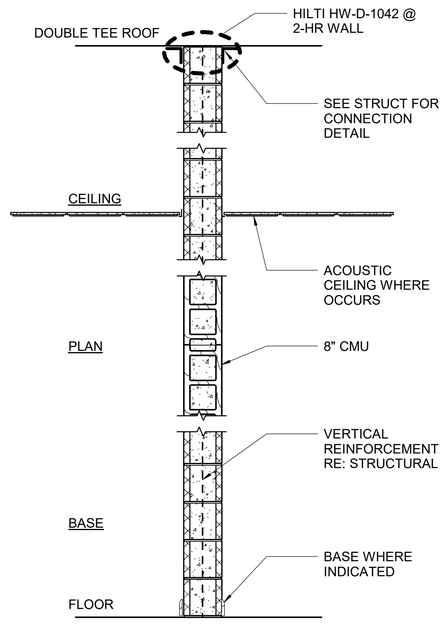

(2-HR RATED WHERE SHOWN)

**WALL TYPE B**
NOT TO SCALE



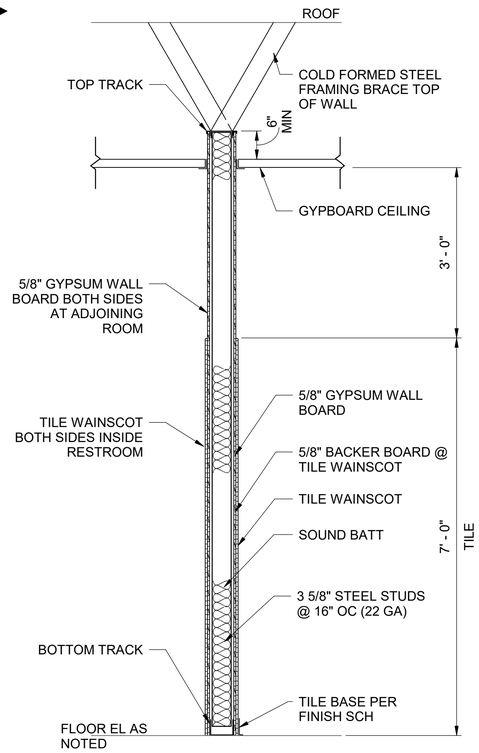

(1-HR RATED WHERE SHOWN

**WALL TYPE C**
NOT TO SCALE

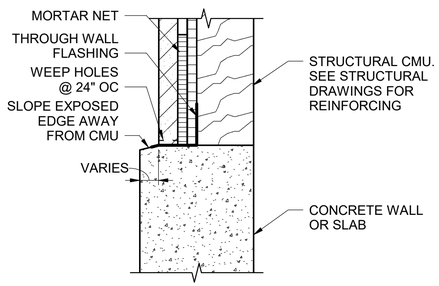



(1-HR, 2-HR 3-HR WHERE INDICATED)

**WALL TYPE D**
NOT TO SCALE




**WALL TYPE E**
NOT TO SCALE




**TYPICAL EXTERIOR WALL BASE DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 3/31/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |
| 1 | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed K. THURMAN |
| designed A. HUNDLEY | checked R. LANG |

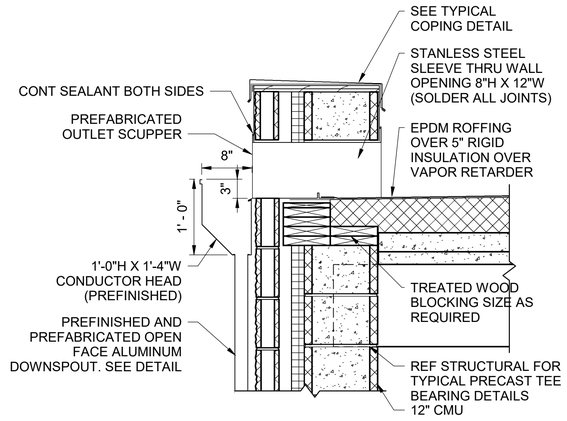
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WALL DETAILS I

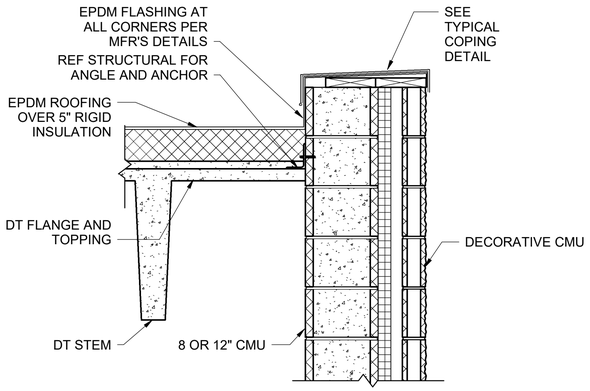
| | |
|---|---|
| project 98101 | contract |
| drawing A300 | rev. 1 |
| sheet 170 of 542 sheets | |
| file 98101_S | |

Scale For Microfilming
Millimeters
Inches

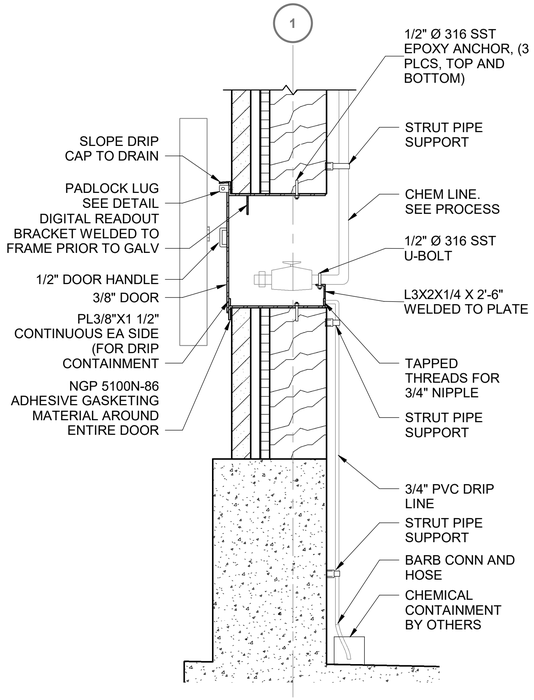
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



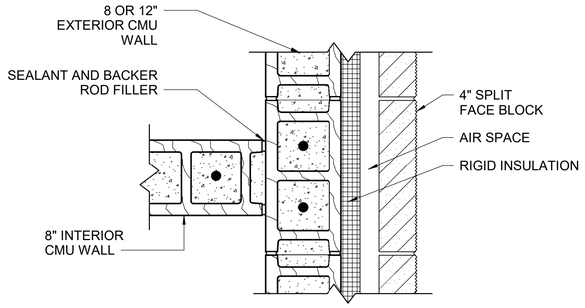

**TYPICAL WALL SECTION @ SCUPPER**
NOT TO SCALE



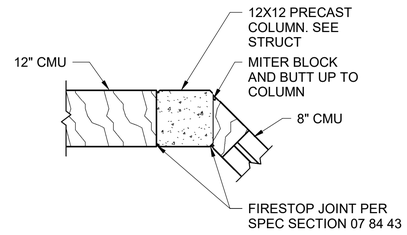

**TYPICALL WALL SECTION PARALLEL TO DOUBLE TEES**
NOT TO SCALE




**CHEMICAL BULK FILL STATION**

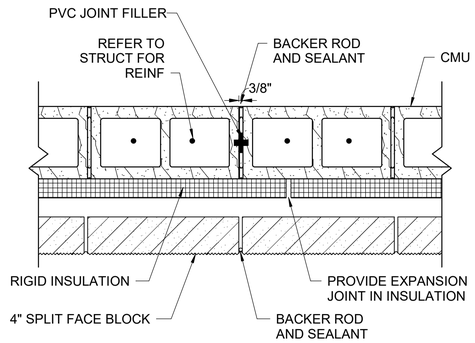



**JOINT @ EXTERIOR WALL DETAIL**
NOT TO SCALE



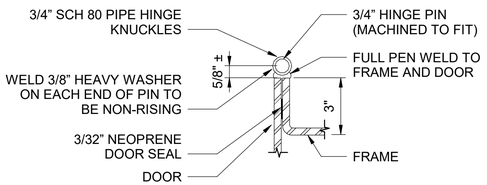

**DETAIL** 5 / A222

0 1' 2' 3'
SCALE IN FEET

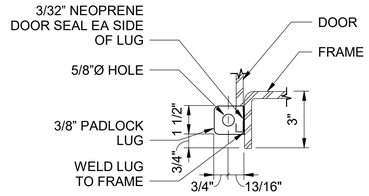



**NOTES:**
1. EXPANSION JOINT IN CMU MAY BE OFFSET A MAXIMUM OF 2" FROM THE EXPANSION JOINT IN VENEER.
2. EJ LOCATION AS INDICATED ON BUILDING ELEVATIONS.

**EXPANSION JOINT DETAIL @ EXTERIOR WALL (EJ)**
NOT TO SCALE

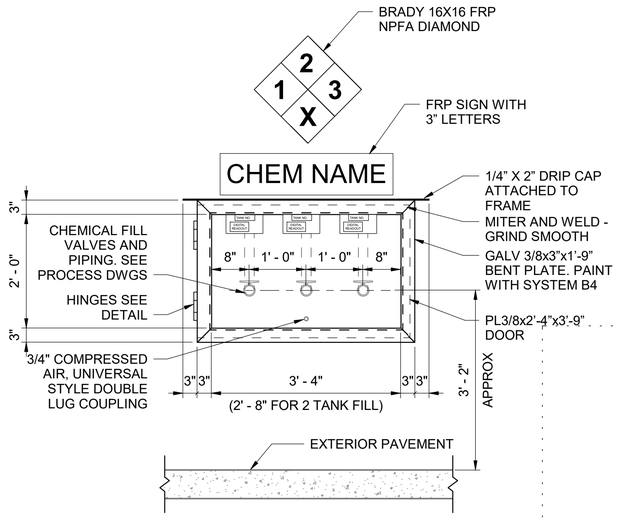



**HINGE DETAIL**




**LATCH DETAIL**

**HINGE & LATCH DETAIL**
NOT TO SCALE




**CHEMICAL BULK FILL STATION ELEVATION**

0 1' 2' 3'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| **designed** | **checked** |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WALL DETAILS II

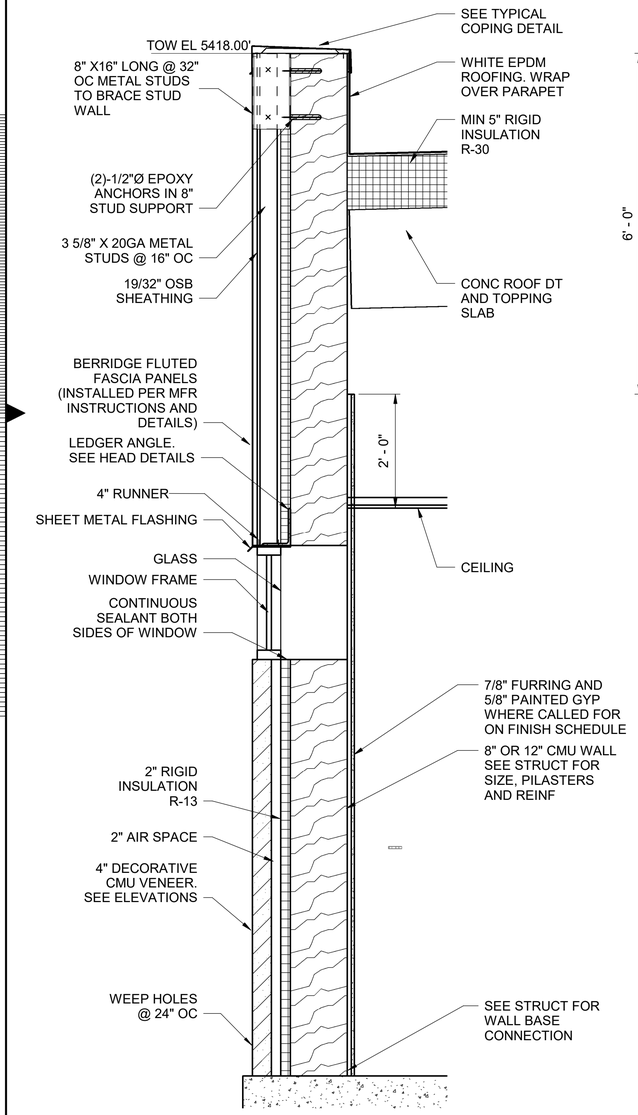
| project | contract |
|---|---|
| 98101 | |

**drawing** A301 — 0 **rev.**

**sheet** 171 **of** 542 **sheets**
**file** 98101_S

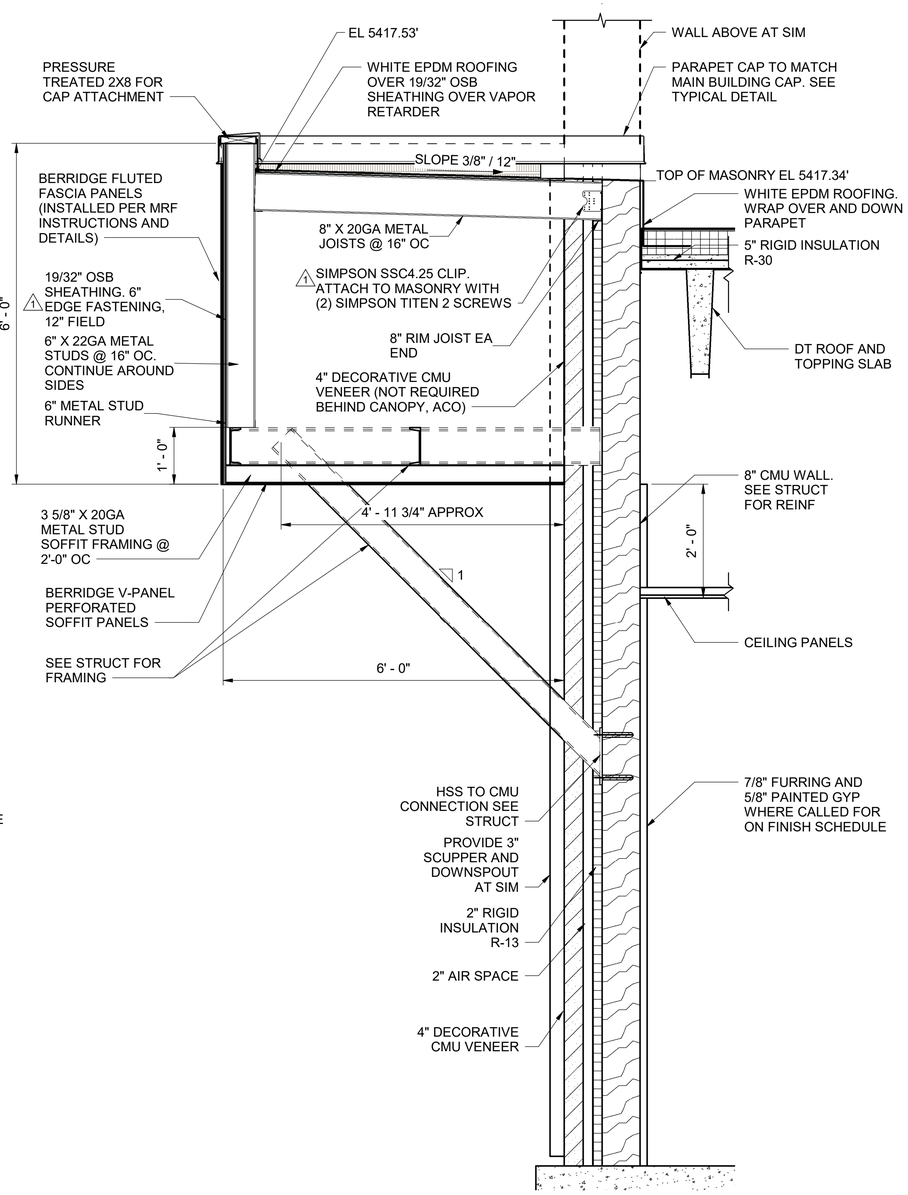
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches



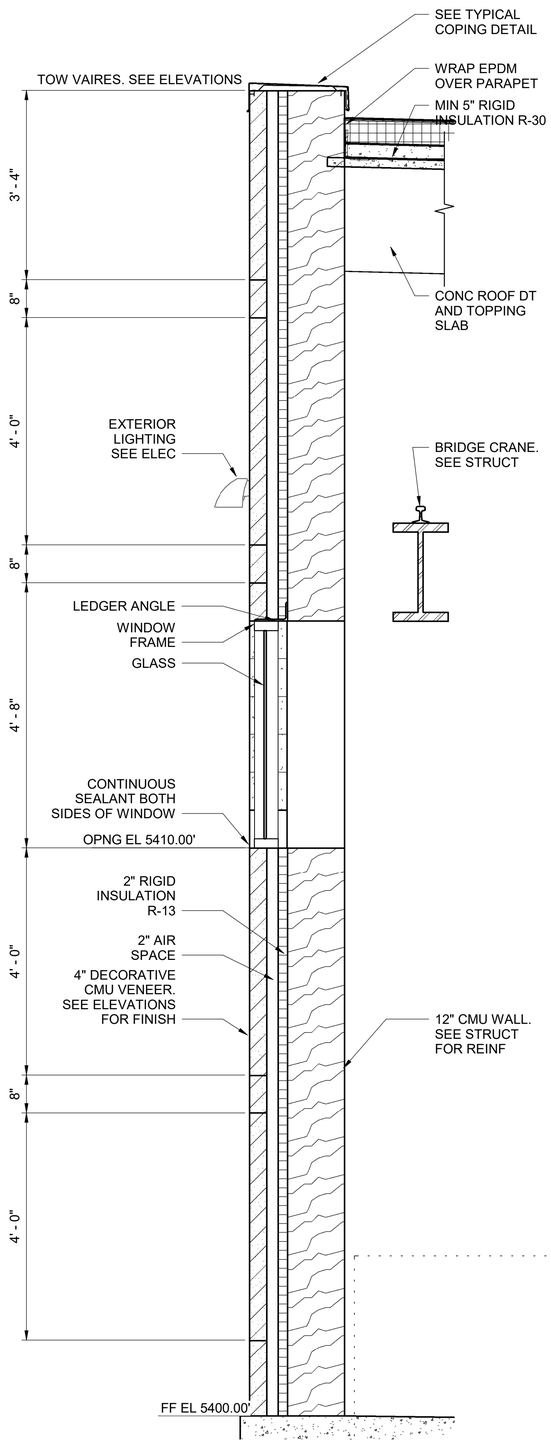

**TYPICAL WALL SECTION**
**ADMIN WALLS** — 1 / A206

0 1' 2' 3'
SCALE IN FEET




**TYPICAL WALL SECTION**
**AWNINGS** — 2 / A206

0 1' 2' 3'
SCALE IN FEET




**TYPICAL WALL SECTION**
**MAINTENANCE GARAGE** — 3 / A206

0 1' 2' 3'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 6/17/19 | KDT | JJK | CANOPY FIELD ORDER |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** K. THURMAN |
| **designed** A. HUNDLEY | **checked** R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WALL DETAILS III

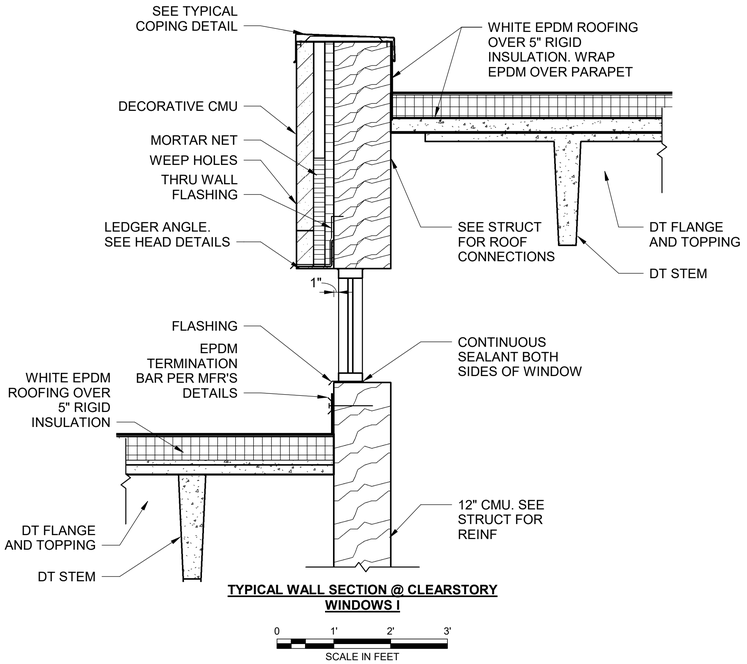
| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **A302 — 1** **rev.**

**sheet** 172 **of** 542 **sheets**
**file** 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

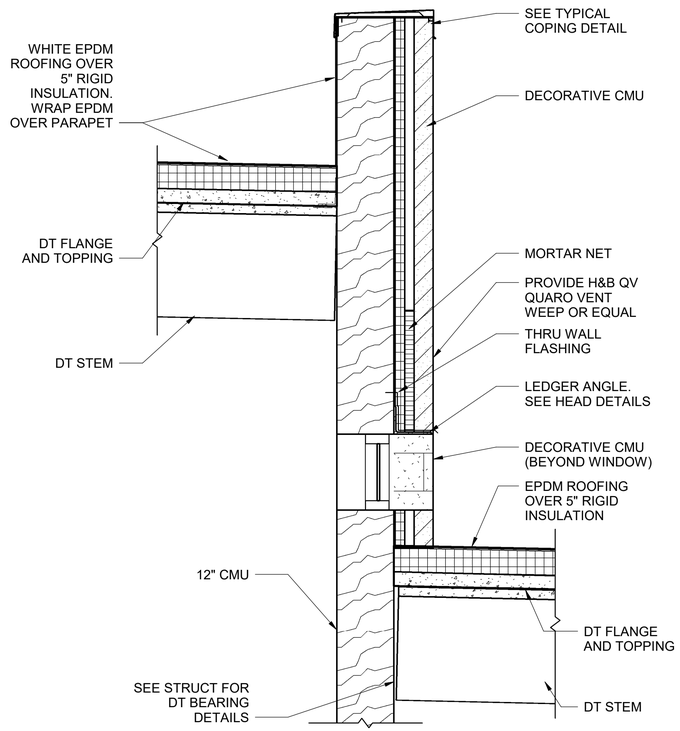
Scale For Microfilming
Millimeters
Inches




**TYPICAL WALL SECTION @ CLEARSTORY WINDOWS I**

0 1' 2' 3'

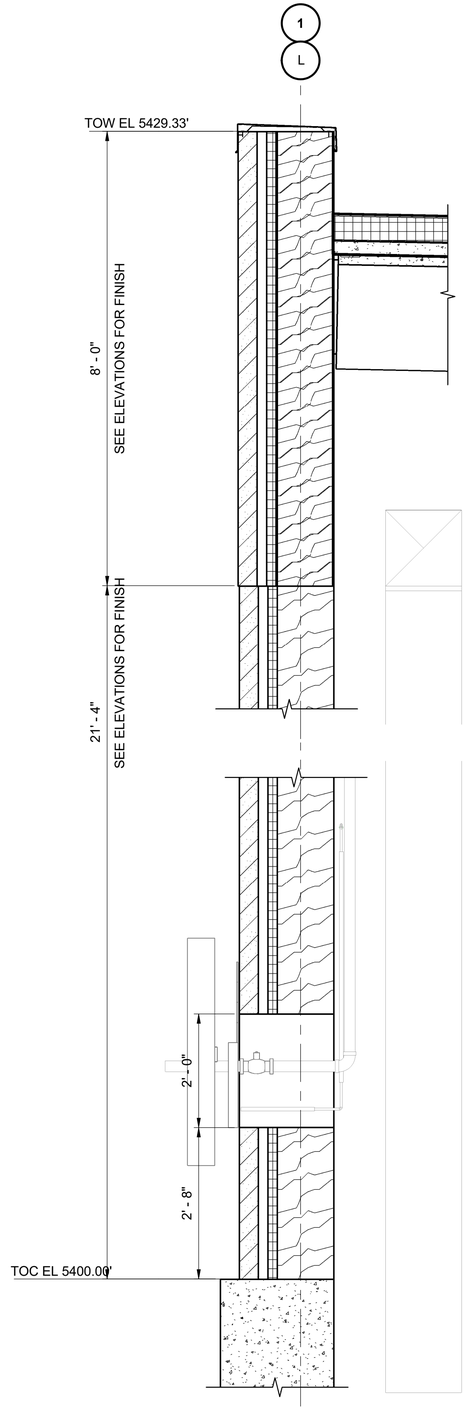
SCALE IN FEET




**TYPICAL WALL SECTION AT CLEARSTORY WINDOWS II**

0 1' 2' 3'

SCALE IN FEET




**TYPICAL WALL SECTION** 4 / A209

0 1' 2' 3'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 5/9/19 | AEH | RL | REVISED PER RFI #114 |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
WALL DETAILS IV

| project | contract |
|---|---|
| 98101 | |

drawing **A303** rev. **1**

sheet 173 of 542 sheets

file 98101_S

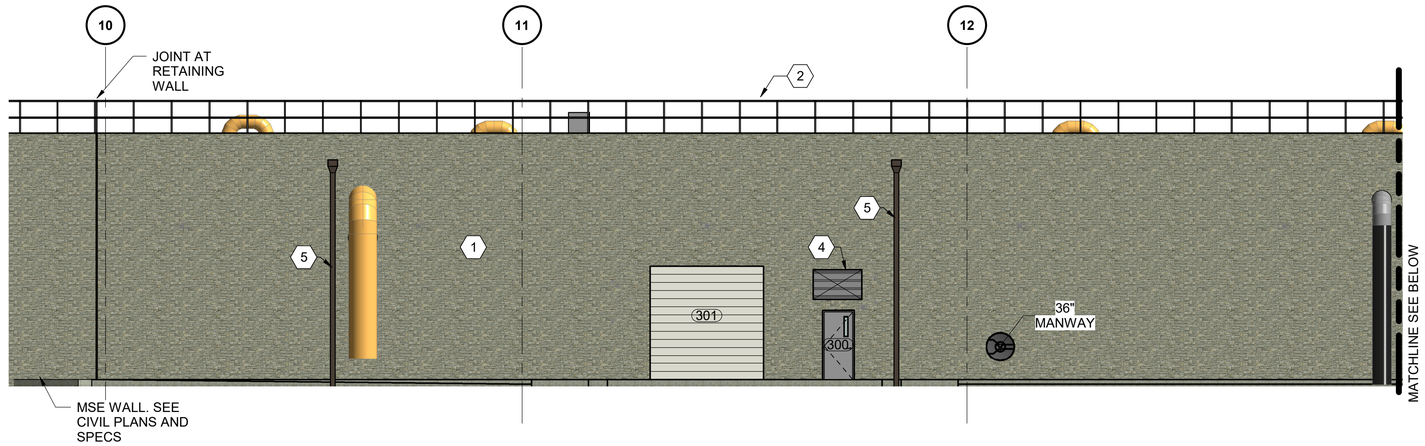
Scale For Microfilming
Millimeters
Inches

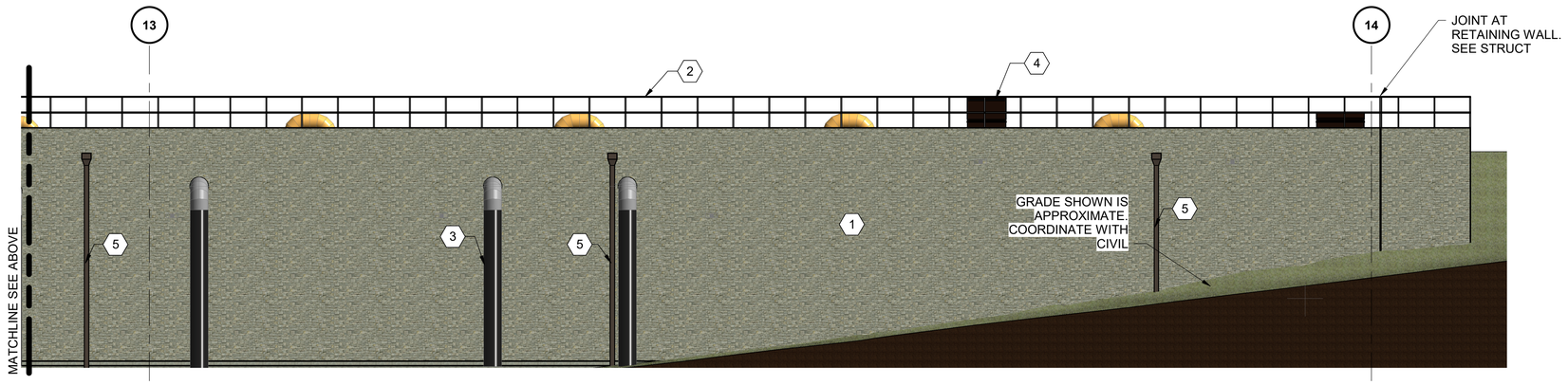
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**KEYNOTES:**

1. ASHLAR STONE CONCRETE FORM LINER.
2. ANNODIZED ALUMNINUM GUARDRAIL, BRONZE FINISH. SEE STRUCT FOR MOUNTING REQUIREMENTS.
3. OVERFLOW PIPE. SEE PROCESS DRAWINGS
4. Llouver. SEE MECH DRAWINGS. FINISH TO MATCH DOORS.
5. DARK BRONZE ANODIZED ALUMINUM SCUPPER AND DOWNSPOUT.




**CLEARWELL SOUTH ELEVATION** 1 / A212

0 4' 8' 16'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AEH | RL | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ANA | KDT | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | K. THURMAN |
| designed | checked |
| A. HUNDLEY | R. LANG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WALL DETAILS V

| project | contract |
|---|---|
| 98101 | |

drawing **A304 — 0** rev.

sheet 174 of 542 sheets

file 98101_S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## FIRE ALARM SYSTEM LEGEND

| | |
|---|---|
| FACU | FIRE ALARM CONTROL UNIT |
| NAC | NOTIFICATION CIRCUIT POWER BOOSTER, EXTENDER PANEL |
| BATT | SECONDARY POWER SUPPLY (BATTERY) |
| SS | SURGE SUPPRESSOR (TRANSIENT VOLTAGE SURGE SUPPRESSOR) |
| F | MANUAL FIRE ALARM PULL STATION |
| VS | VALVE SUPERVISORY SWITCH (PROVIDED BY DIVISION 21) |
| WF | WATER FLOW DETECTOR / SWITCH (PROVIDED BY DIVISION 21) |
| MD | MAINTENANCE/DISCONNECT SWITCH |
| FAA | FIRE ALARM ANNUNCIATOR |
| S R | SMOKE DETECTOR / SENSOR FOR DUCT<br>R = RETURN |
| S P | CEILING MOUNTED SMOKE DETECTOR<br>I = IONIZATION<br>P=PHOTOELECTRIC |
| | HORN / FIRE ALARM STROBE COMBINATION<br>$O_3$ = BY OZONE SYSTEM SUPPLIER. SHOWN FOR REFERENCE ONLY. |
| | STROBE<br>$O_3$ = BY OZONE SYSTEM SUPPLIER. SHOWN FOR REFERENCE ONLY. |
| | WALL MOUNT STROBE<br>$O_3$ = BY OZONE SYSTEM SUPPLIER. SHOWN FOR REFERENCE ONLY. |
| AOM | ADDRESSABLE OUTPUT CONTROL MODULE |
| AIM | ADDRESSABLE INPUT MONITOR MODULE |
| RTS | REMOTE TEST STATION |
| RL | NON-ADDRESSABLE OUTPUT RELAY |
| | GROUND |
| $O_3$ | GAS DETECTOR (BY OZONE SYSTEM SUPPLIER. SHOWN FOR REFERENCE ONLY.)<br>$O_3$ = OZONE<br>$O_2$ = OXYGEN |

## ABBREVIATIONS:

| | |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AHJ | AUTHORITY HAVING JURISDICTION |
| AWG | AMERICAN WIRE GAGE |
| CD | CANDELA |
| CFM | CUBIC FEET PER MINUTE |
| DACT | DIGITAL ALARM COMMUNICATOR TRANSMITTER |
| DB | DECIBEL |
| DBA | DECIBEL A-WEIGHTED |
| DDC | DIRECT DIGITAL CONTROL |
| EMCS | ENERGY MONITORING AND CONTROL SYSTEM |
| FA | FIRE ALARM |
| FDC | FIRE DEPARTMENT CONNECTION |
| FM | FM GLOBAL |
| FX | FIRE SUPPRESSION |
| HZ | HERTZ |
| IAW | IN ACCORDANCE WITH |
| IDC | INITIATING DEVICE CIRCUIT |
| NAC | NOTIFICATION APPLIANCE CIRCUIT |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| RTS | REMOTE TEST SWITCH |
| SLC | SIGNALING LINE CIRCUIT |
| TYP | TYPICAL |
| UL | UNDERWRITERS LABORATORY |
| VFD | VARIABLE FREQUENCY DRIVE |
| WP | WEATHER PROOF (NEMA 250, TYPE 3R) |

## AUDIBLE DESIGN CRITERIA:

1. PROVIDE AUDIBLE NOTIFICATION APPLIANCES AS INDICATED TO ACCOMPLISH THE FOLLOWING DESIGN CRITERIA WITH ALL DOORS CLOSED. WHERE THIS DESIGN CRITERIA IS NOT ACCOMPLISHED DURING COMMISSIONING, PROVIDE ADDITIONAL DEVICES TO MEET THE MINIMUM DESIGN CRITERIA WITHOUT EXCEEDING THE LIMITATIONS OF THE FACU OR NAC. (INCLUSIVE OF PRESCRIBED SAFETY FACTORS).
2. PROVIDE A QUANTITY OF HORNS IN EACH ROOM/AREA TO ACHIEVE THE REQUIRED SOUND POWER OUTLINED IN THE CONTRACT DOCUMENTS.
3. PROVIDE A MINIMUM SOUND POWER OF 70 DBA AND 15 DBA OVER THE AVERAGE AMBIENT SOUND LEVEL AT THE MOST REMOTE LOCATION WITHIN THE ROOM/AREA MEASURED AT 5 FT AFF. THE FOLLOWING CRITERIA WILL BE USED FOR REVIEW AND APPROVAL OF SHOP DRAWINGS.
   A. REDUCE THE SOUND POWER BY 6 DB EACH TIME THE DISTANCE BETWEEN THE APPLIANCE AND THE LISTENER IS DOUBLED. STARTING DISTANCE IS PER MANUFACTURER'S DATASHEET, TYPICALLY 10 FT.
   B. REDUCE THE SOUND POWER IN ACCORDANCE WITH THE MANUFACTURER'S DATASHEET FOR SOUND POWER DISTRIBUTION NOT PERPENDICULAR TO THE FACE OF THE APPLIANCE. REFER TO MANUFACTURER'S TYPICAL SOUND OUTPUT DISTRIBUTION DIAGRAM.
   C. IN LIEU OF THE MANUFACTURER'S PUBLISHED DB LOSS, ASSUME A MINIMUM 15 DB LOSS THROUGH A STANDARD CLOSED DOOR.

## VISIBLE DESIGN CRITERIA:

1. SPACE STROBES IN ACCORDANCE WITH NFPA 72.

## GENERAL NOTES:

1. PROVIDE AN ADDRESSABLE FIRE ALARM SYSTEM.
2. COORDINATE ALL REQUIRED SYSTEMS TO THE SATISFACTION OF THE ENGINEER AND AUTHORITY HAVING JURISDICTION. CORRECT ANY DEFICIENCIES, INCONSISTENCIES, OR POORLY COORDINATED INSTALLATIONS AT NO ADDITIONAL COST.
3. THE FIRE ALARM DRAWINGS ARE SCHEMATIC IN NATURE AND SHOW A MINIMAL QUANTITY OF DEVICES. DETERMINE THE FINAL QUANTITY AND LOCATION OF ALL DEVICES IN ACCORDANCE WITH THE SPECIFICATIONS, CONTRACT DRAWINGS, AND MANUFACTURER'S WRITTEN RECOMMENDATIONS TO BE COMPLIANT WITH ALL APPLICABLE CODES AND STANDARDS. PROVIDE ADDITIONAL DEVICES WHEN REQUIRED FOR A FULLY FUNCTIONING FIRE ALARM SYSTEM AS REQUIRED BY NFPA 72 (2016).
4. CONCEAL ALL CONDUITS IN WALLS OR ABOVE CEILINGS UNLESS OTHERWISE INDICATED. EXCEPTION: CONDUIT IS ALLOWED TO BE SURFACE MOUNTED ON WALLS AND CEILINGS IN UNFINISHED AREAS (SUCH AS MECHANICAL ROOM AND ELECTRICAL ROOM). WHERE A CONDUIT SUPPLIES A DEVICE NOT MOUNTED DIRECTLY ON THE WALL OR CEILING, ROUTE THE CONDUIT AS A SINGLE PENDENT DROP TO EACH DEVICE FROM THE CEILING SURFACE ABOVE. DO NOT TRAPEZE CONDUIT ACROSS AN OPEN SPACE.
5. ALL EXPOSED FIRE ALARM JUNCTION BOXES, COVERS AND CONDUITS IN UNFINISHED AREAS ARE TO BE PROVIDED PRE-FINISHED RED FROM THE FACTORY. PAINT EXPOSED CONDUIT AND JUNCTION BOXES IN FINISHED AREAS TO MATCH ADJACENT SURFACES.
6. PROVIDE CONDUIT IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL SPECIFICATIONS, UNLESS OTHERWISE NOTED. SUPPORT CONDUIT IN ACCORDANCE WITH THE NEC SUCH AS MAXIMUM 10 FT SUPPORT INTERVALS AND 3 FT FROM A TERMINATION. TENSION ONLY HANGERS ARE NOT PERMITTED SUCH AS BATWINGS. FLEXIBLE CONDUIT IS ONLY PERMITTED WHEN CONNECTING TO THE FOLLOWING DEVICES AND APPLIANCES: DEVICES LOCATED ON FIRE SUPPRESSION EQUIPMENT SUCH AS FLOW SWITCHES AND TAMPER SWITCHES, DEVICES AND APPLIANCES LOCATED IN REMOVABLE CEILING TILES, OR WHERE SPECIFICALLY NOTED.
7. CONSISTENTLY COLOR COORDINATE ALL CONDUCTORS THROUGH THE SYSTEM IN RELATION TO DEVICES THEY FEED SUCH AS SLC - BLACK/RED, STROBE - YELLOW/BLUE. PROVIDE ADDRESSABLE SLC CIRCUITS WITH SHIELDED CONDUCTORS, WHERE THE SHIELDING IS GROUNDED AT ONE END. PROVIDE ALL CIRCUITS WITH LABELING AT THE POINT OF TERMINATION SUCH AS SLC 1, NAC 8, IDC 4.
8. RUN CONDUCTORS FROM DEVICE TO DEVICE WITHOUT SPLICES. WIRE NUTS ARE PROHIBITED. UTILIZE TERMINAL STRIPS WHERE CONDUCTORS CANNOT BE DIRECTLY TERMINATED AT THE DEVICE SUCH AS PIGTAILS OFF A HEAT DETECTOR.
9. DO NOT USE FIRE ALARM EQUIPMENT PANELS AS RACEWAY FOR ROUTING POWER WIRING OR LOW VOLTAGE WIRING. ONLY ROUTE WIRING TERMINATING WITHIN THE PANEL INTO THE PANEL. PROVIDE 1/4 INCH SEPARATION BETWEEN POWER-LIMITED FIRE ALARM CIRCUITS AND POWER CIRCUITS.
10. MOUNTING DEVICES IN THE FACU, INCLUDING ANY SUBPANELS SUCH AS THE NAC, WHICH ARE NOT UL LISTED OR FM APPROVED AS PART OF THE UNIT IS PROHIBITED.
11. PROVIDE SURGE SUPPRESSORS TO PROTECT ALL POWER SUPPLY CIRCUITS TO THE FACU, INCLUDING ANY SUBPANELS SUCH AS THE NAC, AND ALL FIRE ALARM CIRCUITS LEAVING OR ENTERING THE BUILDING. DEVICES AND APPLIANCES MOUNTED DIRECTLY ON THE EXTERIOR OF THE BUILDING DO NOT REQUIRE SUPPRESSORS. MOUNT SURGE SUPPRESSORS IN A SEPARATE ENCLOSURE, UNLESS IT IS UL LISTED OR FM APPROVED AND INSTALLED IN THE CONTROL UNIT BY THE FACTORY.
12. INSTALL FIRE ALARM BATTERIES IN THE ENCLOSURE OF THE DEVICE/UNIT IT SUPPORTS SUCH AS FACU ENCLOSURE OR IN AN INDEPENDENT DEDICATED ENCLOSURE.
13. NONREQUIRED DETECTION IS PROVIDED IN ROOMS 210 AND 211 AT THE REQUEST OF THE CITY OF THORNTON. SELECTIVE DETECTION IS PROVIDED IN ROOMS 217, 222, AND 223 TO ADDRESS SPECIFIC HAZARDS AS REQUIRED BY CODE.
14. SEE ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR EMERGENCY ALARM SYSTEM IN GROUP H OCCUPANCIES AND EMERGENCY RESPONDER RADIO SYSTEM.
15. SUBMIT FIRE ALARM SHOP DRAWINGS TO CITY OF THORNTON FIRE MARSHALL FOR APPROVAL AS DEFERRED SUBMITTAL.
16. INSTALL RADIO AMPLIFICATION SYSTEM IN ACCORDANCE WITH SPECIFICATION SECTION 27 51 99

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed A. SCHNECKLOTH |
| designed J. GINSBURG | checked A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FIRE ALARM NOTES, LEGEND AND ABBREVIATIONS

| | |
|---|---|
| project 98101 | contract |
| drawing FA001 | rev. 0 |
| sheet 175 of 542 sheets | |
| file 98101_M | |

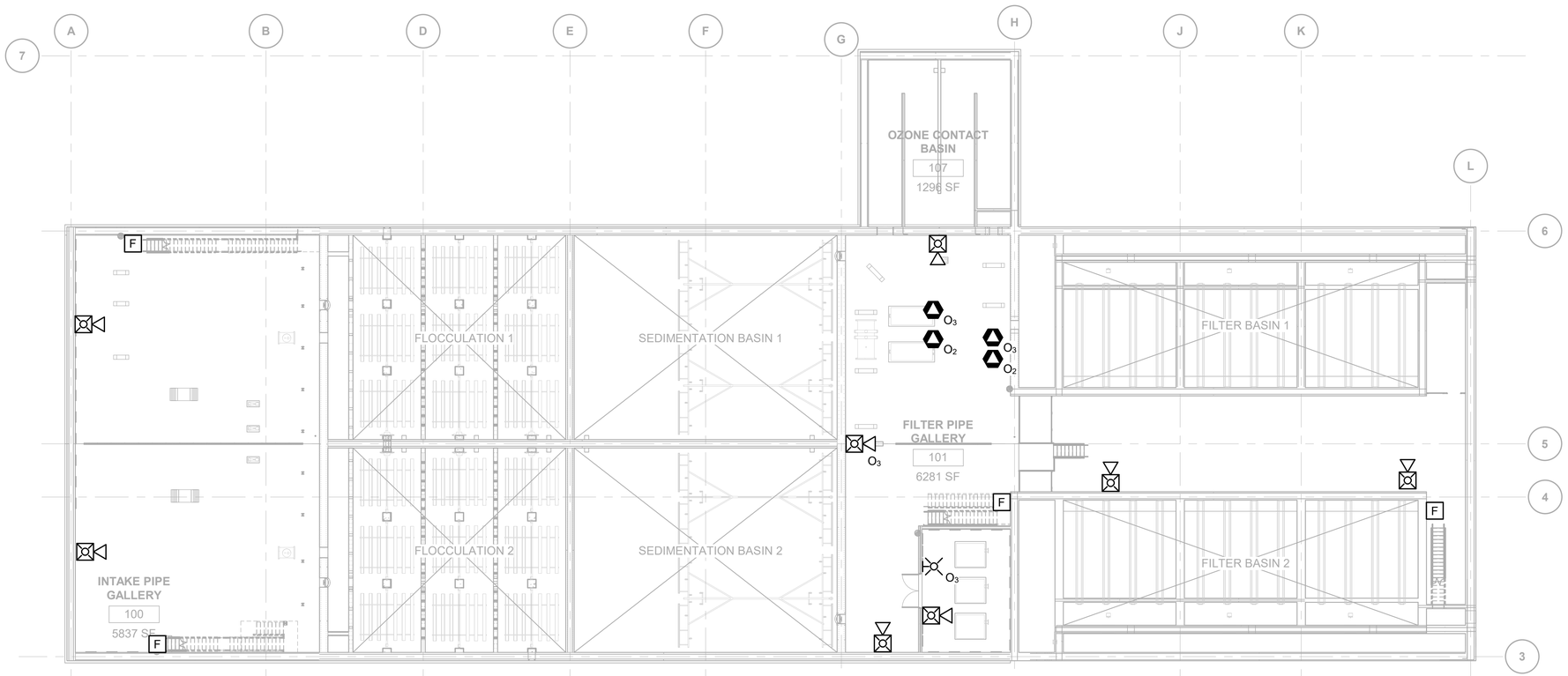
Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.

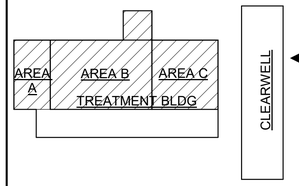
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




**FIRE OVERALL LOWER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | A. SCHNECKLOTH |
| **designed** | **checked** |
| J. GINSBURG | A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL LOWER LEVEL FIRE ALARM PLAN

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**FA201 — 0**

**sheet** 176 **of** 542 **sheets**
**file** 98101_M

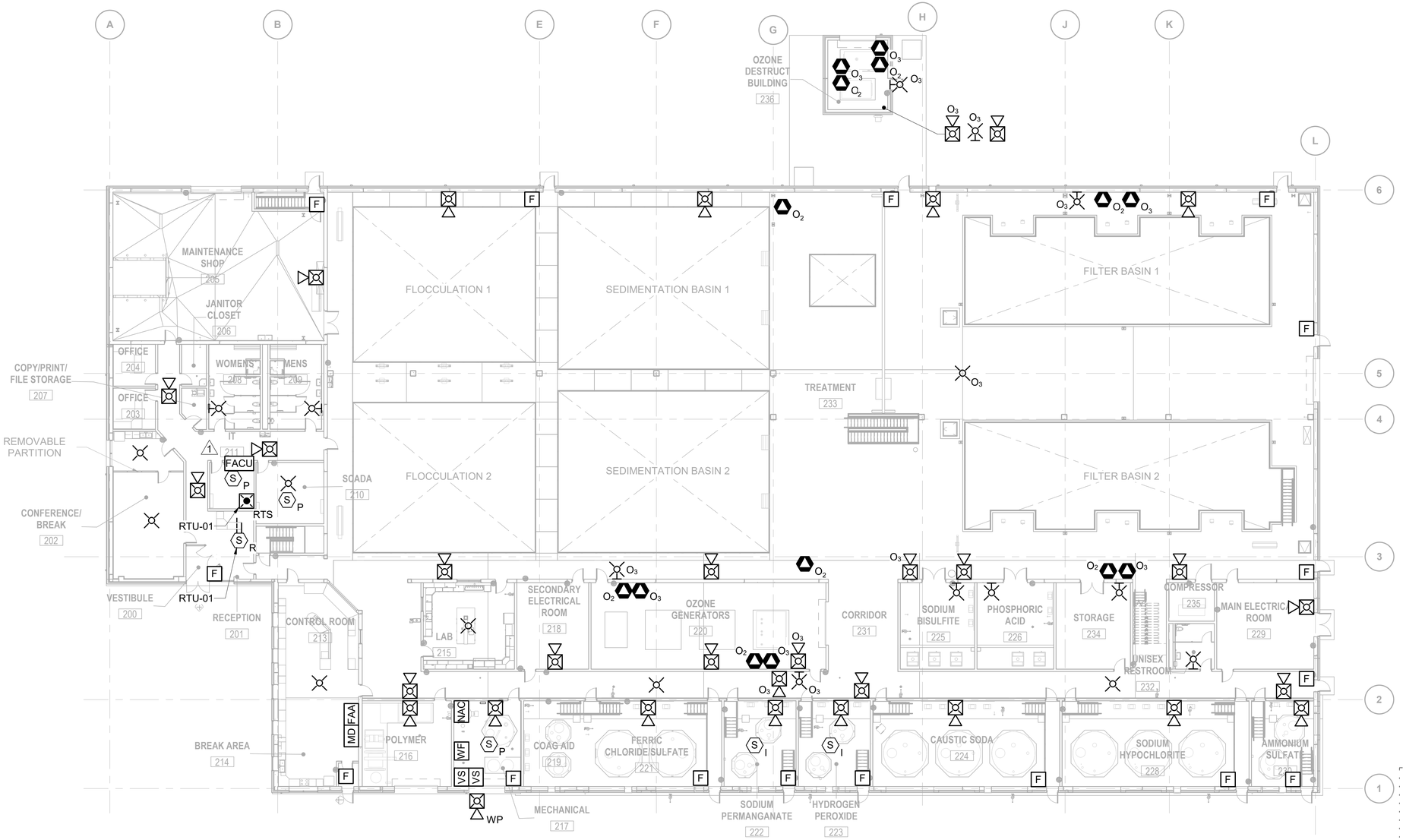
Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.

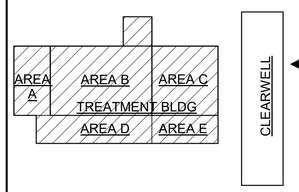
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




**FIRE OVERALL UPPER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed A. SCHNECKLOTH |
| designed J. GINSBURG | checked A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL UPPER LEVEL FIRE ALARM PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing **FA202 — 1** | rev. |
| sheet 177 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

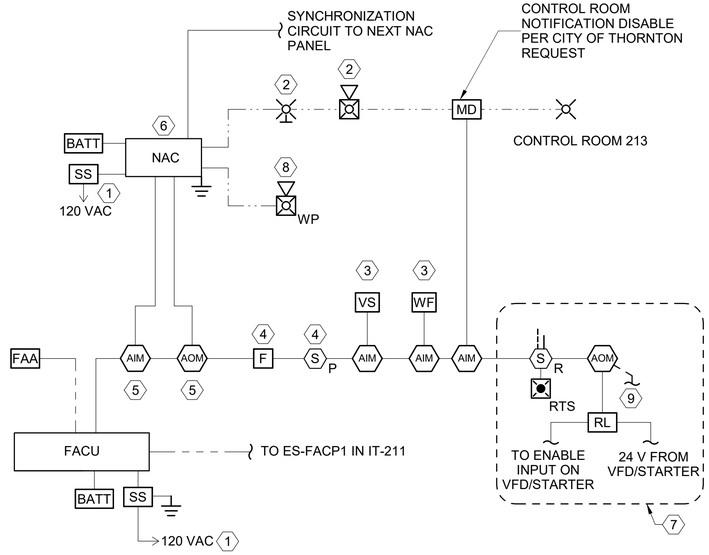
Scale For Microfilming
Millimeters
Inches

**FIRE ALARM CONTROL UNIT (FACU) FUNCTIONAL MATRIX**

| | ANNUNCIATION AT LOCAL PANEL | | | NOTIFICATION | | | | AUXILIARY FUNCTION | |
|---|---|---|---|---|---|---|---|---|---|
| **ALARM SIGNALS** | AUDIO-VISIBLE FIRE ALARM INDICATION BY DEVICE | AUDIO-VISIBLE TROUBLE INDICATION BY DEVICE | AUDIO-VISIBLE SUPERVISORY INDICATION BY DEVICE | FIRE ALARM SIGNAL TO FIRE DEPARTMENT | COMMON TROUBLE SIGNAL TO FIRE DEPARTMENT | COMMON SUPERVISORY SIGNAL TO FIRE DEPARTMENT | FIRE ALARM AUDIBLE/VISUAL NOTIFICATION | SHUT-DOWN ASSOCIATED AIR HANDLING EQUIPMENT | DISCONNECT CONTROL ROOM NOTIFICATION |
| MANUAL FIRE ALARM STATIONS | X | | | X | | | X | | |
| SMOKE DETECTOR | X | | | X | | | X | | |
| FLOW SWITCHES - WET-PIPE SYSTEM | X | | | X | | | X | | |
| **TROUBLE SIGNALS** | | | | | | | | | |
| AC POWER FAILURE | | X | | | X | | | | |
| LOW BATTERY | | X | | | X | | | | |
| OPEN CIRCUIT FAULT | | X | | | X | | | | |
| GROUND FAULT | | X | | | X | | | | |
| NOTIFICATION APPLIANCE CIRCUIT SHORT | | X | | | X | | | | |
| COMPONENT COMMON TROUBLE | | X | | | X | | | | |
| **SUPERVISORY SIGNALS** | | | | | | | | | |
| COMPONENT COMMON SUPERVISORY | | | X | | | X | | | |
| IN-DUCT SMOKE DETECTORS | | | X | | | X | | X | |
| GENERAL VALVE SUPERVISORY | | | X | | | X | | | |
| CONTROL ROOM NOTIFICATION MAINTENANCE DISCONNECT | | | X | | | X | | | X |

**CIRCUIT LEGEND:**

- SIGNALING LINE CIRCUIT (CLASS B)
- INITIATING DEVICE CIRCUITS
- AUDIBLE/VISIBLE NOTIFICATION APPLIANCE CIRCUIT (CLASS B)
- FIBER NETWORK
- 12 OR 24 VDC POWER CIRCUIT



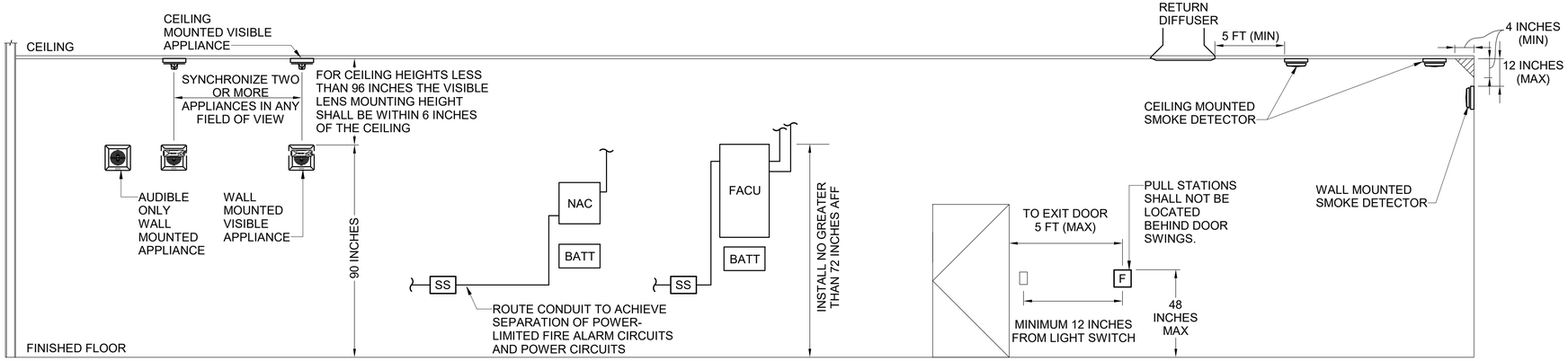

**FIRE ALARM RISER** — 2 / FA601

**NOTES:**

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.
2. THE FIRE ALARM RISER SHOWS THE INTENT OF THE FIRE ALARM INFRASTRUCTURE. NOT ALL DEVICES ARE SHOWN. SUB-CONTRACTOR SHALL PROVIDE THE QUANTITY OF DEVICES AS REQUIRED TO COMPLY WITH NFPA 72 AND CONTRACT DOCUMENTS.
3. EACH FLOW AND TAMPER SWITCH SHALL REPORT BACK TO THE FIRE ALARM CONTROL PANEL WITH A SEPARATE ADDRESS. GROUPED SWITCHES ON ONE ADDRESS ARE NOT ACCEPTABLE.

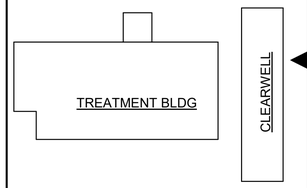
**KEYED NOTES:**

1. LOCK, LABEL "FIRE ALARM", AND PROVIDE RED INDENTIFICATION ON CIRCUIT BREAKERS SUPPLYING POWER TO FIRE ALARM EQUIPMENT. CIRCUIT BY DIVISION 16.
2. QUANTITY AND LOCATION BY DESIGN TO MEET DESIGN CRITERIA.
3. REFER TO FIRE SUPPRESSION DRAWINGS FOR QUANTITY AND / OR LOCATIONS OF DEVICE(S).
4. REFER TO FIRE ALARM PLANS FOR QUANTITY AND / OR LOCATIONS OF DEVICE(S).
5. PROVIDE ADDRESSABLE INPUT AND/OR OUTPUT MODULE(S) AS REQUIRED TO ACHIEVE THE FUNCTIONALITY INDICATED IN THE FIRE ALARM MATRIX.
6. PROVIDE ADDITIONAL BOOSTER PANELS AS REQUIRED BY DESIGN. WHERE ADDITIONAL BOOSTER PANELS ARE REQUIRED LOCATE AS INDICATED ON PLAN.
7. PROVIDE RETURN DUCT SMOKE DETECTORS FOR DIRECT SHUT DOWN FOR THE FOLLOWING UNITS: RTU-01. SHUTDOWN THROUGH THE EMCS/DDC IS NOT PERMITTED.
8. EXTERIOR WP HORN STROBE OVER FDC.
9. 24 VDC FROM FACU OR NAC PANEL.




**TYPICAL MOUNTING DETAIL** — 1 / FA601

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** A. SCHNECKLOTH |
| **designed** J. GINSBURG | **checked** A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FIRE ALARM RISER DIAGRAM AND MATRIX

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** FA601 | **rev.** 0 |
| **sheet** 178 **of** 542 **sheets** | |
| **file** 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

## FIRE SUPPRESSION LEGEND

- PRESSURE RELIEF VALVE
- OUTSIDE SCREW AND YOKE VALVE (OS&Y)
- VALVE
- DOUBLE CHECK BACKFLOW PREVENTER
- CHECK VALVE
- AUTOMATIC DRAIN VALVE
- FIRE DEPARTMENT CONNECTION
- PRESSURE GAUGE
- SIGHT GLASS
- FLOW SWITCH
- RISER LOCATION
- AUTOMATIC AIR RELEASE VALVE
- THRUST BLOCK

## FIRE SUPPRESSION SYSTEM

- WET SYSTEM

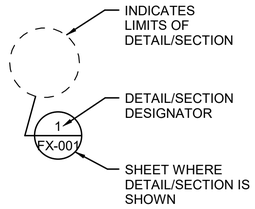
## PIPING SYMBOLS

- DRAIN PIPING
- SYSTEM PIPING

## FIRE SUPPRESSION ABBREVIATIONS

| | |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AHJ | AUTHORITY HAVING JURISDICTION |
| AS | AUTOMATIC SPRINKLER |
| FDC | FIRE DEPARTMENT CONNECTION |
| FP | FIRE PROTECTION |
| FM | FIRE MAIN |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| (S) | ELECTRICALLY SUPERVISED |
| SPR | SPRINKLER PIPE |
| SQ FT | SQUARE FOOT |

## DETAIL / ENLARGED CALLOUT SYMBOL




## FIRE SUPPRESSION GENERAL NOTES

1. PERFORM A HYDRANT FLOW TEST AND INCORPORATE THIS TEST INTO THE HYDRAULIC CALCULATIONS. HYDRANT FLOW TESTING SHALL BE IN ACCORDANCE WITH NFPA 291, AND THE RESULTS OF THE TESTING SHALL BE SUBMITTED AS INDICATED IN NFPA 291 FIGURE 4.11.2.

   HYDRAULICALLY MODELED FLOW FOR INFORMATION ONLY IS AS FOLLOWS:

   | | |
   |---|---|
   | DATE | 10/31/2017 |
   | STATIC | 96 PSI |
   | RESIDUAL | 91 PSI |
   | FLOW | 1,000 GPM |

2. PROVIDE ALL NECESSARY COMPONENTS FOR A WET PIPE SPRINKLER SYSTEM IN THE INDICATED AREAS. AT A MINIMUM PROVIDE COMPONENTS AS INDICATED ON THESE DRAWINGS. PROVIDE ADDITIONAL COMPONENTS AND MODIFICATIONS AS REQUIRED TO PROVIDE A FULLY FUNCTIONING FIRE SUPPRESSION SYSTEM AS REQUIRED BY NFPA 13 (2016).
3. COORDINATE ALL REQUIRED SYSTEMS TO THE SATISFACTION OF THE ENGINEER AND AUTHORITY HAVING JURISDICTION. CORRECT ANY DEFICIENCIES, INCONSISTENCIES, OR POORLY COORDINATED INSTALLATIONS AT NO ADDITIONAL COST.
4. FINAL DESIGN REQUIREMENTS (DEVICE QUANTITY, SIZE, AND LOCATIONS) ARE THE SOLE RESPONSIBILITY OF THE FIRE SUPPRESSION SUBCONTRACTOR. DRAWINGS INDICATE MINIMUM REQUIREMENTS; THE FIRE SUPPRESSION SUB-CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING AND COORDINATING FINAL DESIGN REQUIREMENTS WITH THESE CONSTRUCTION DOCUMENTS, SPECIFICATIONS, REFERENCE DOCUMENTS, APPLICABLE CODES, AND FACILITY USER REQUIREMENTS.
5. SUBMIT FIRE SUPPRESSION SHOP DRAWINGS TO THE CITY OF THORTON FIRE MARSHALL FOR APPROVAL AS DEFERRED SUBMITTAL. THE MINIMUM SPRINKLER DESIGN DENSITY SHALL BE APPROVED BY THE FIRE MARSHALL PRIOR TO THE COMMENCEMENT OF DESIGN.

## FIRE PROTECTION SPRINKLER SYSTEM DESIGN CRITERIA

| MARK | HAZARD CLASSIFICATION | SYSTEM TYPE | DENSITY GPM/SF | REMOTE AREA SQ FT | MAXIMUM AREA PER HEAD SQ FT | HOSE DEMAND GPM | SPRINKLER CHARACTERISTICS | | | ADDITIONAL CODE REFERENCE | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TEMP RATING | TYPE | FINISH | | |
| NO HATCH | NO SPRINKLERS REQUIRED | - | - | - | - | - | - | - | - | - | - |
| | ORDINARY HAZARD GROUP 2 | WET | 0.20 | 3000 | 130 | 250 | ORDINARY | QUICK RESPONSE UPRIGHT | BRASS | NFPA 13 -11.2.3.3 | 1 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed A. SCHNECKLOTH |
| designed J. GINSBURG | checked A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FIRE SUPPRESSION NOTES, LEGEND AND ABBREVIATIONS

| | |
|---|---|
| project 98101 | contract |
| drawing **FX001** | rev. **0** |
| sheet 179 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

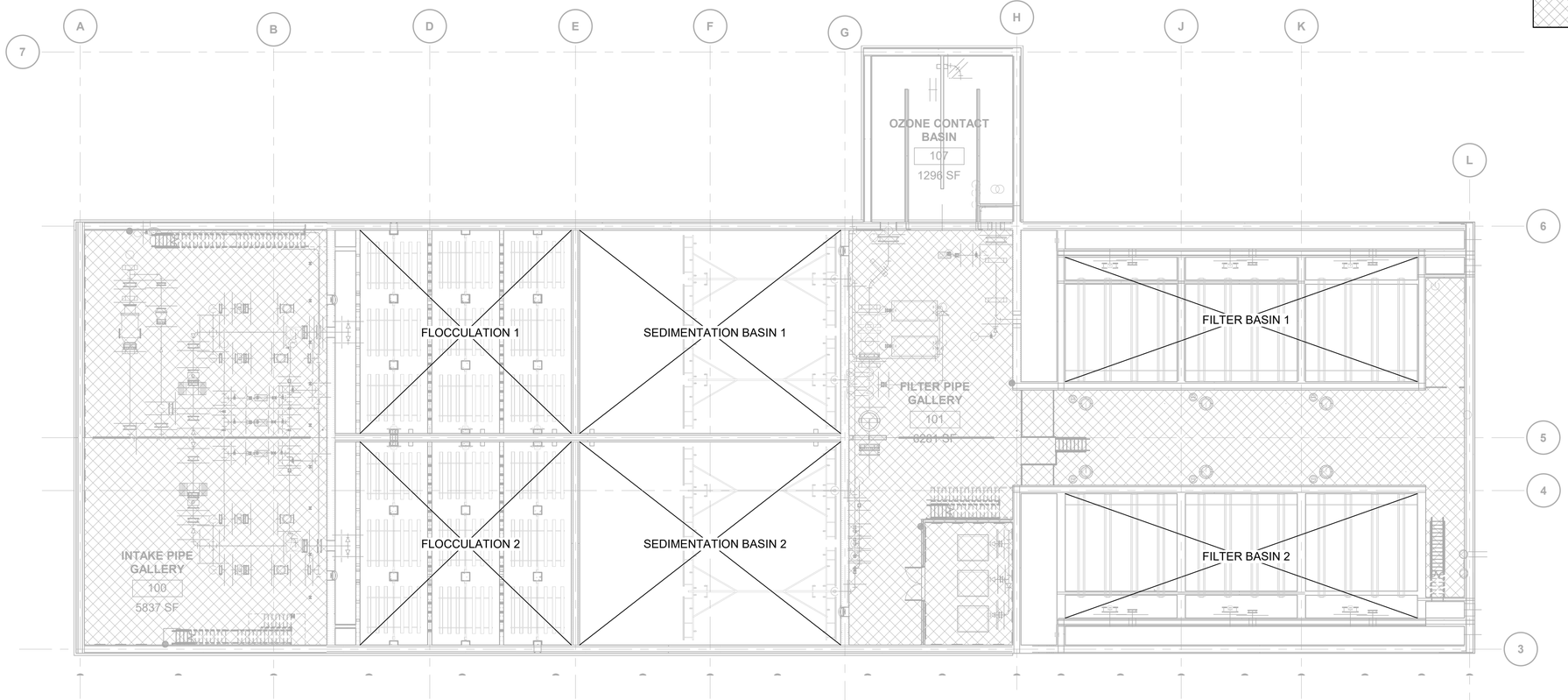
Scale For Microfilming: Millimeters / Inches

**NOTES:**

1. REFER TO FX001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.

**HAZARD SCHEDULE**

| MARK | HAZARD CLASSIFICATION |
|---|---|
| NO HATCH | NO SPRINKLERS REQUIRED |
| | ORDINARY HAZARD GROUP 2 |

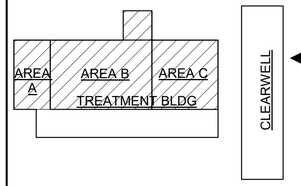



**FIRE SUPPRESSION OVERALL LOWER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | A. SCHNECKLOTH |
| **designed** | **checked** |
| J. GINSBURG | A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL LOWER LEVEL FIRE SUPPRESSION PLAN

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**FX201 — 0**

**sheet** 180 **of** 542 **sheets**
**file** 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

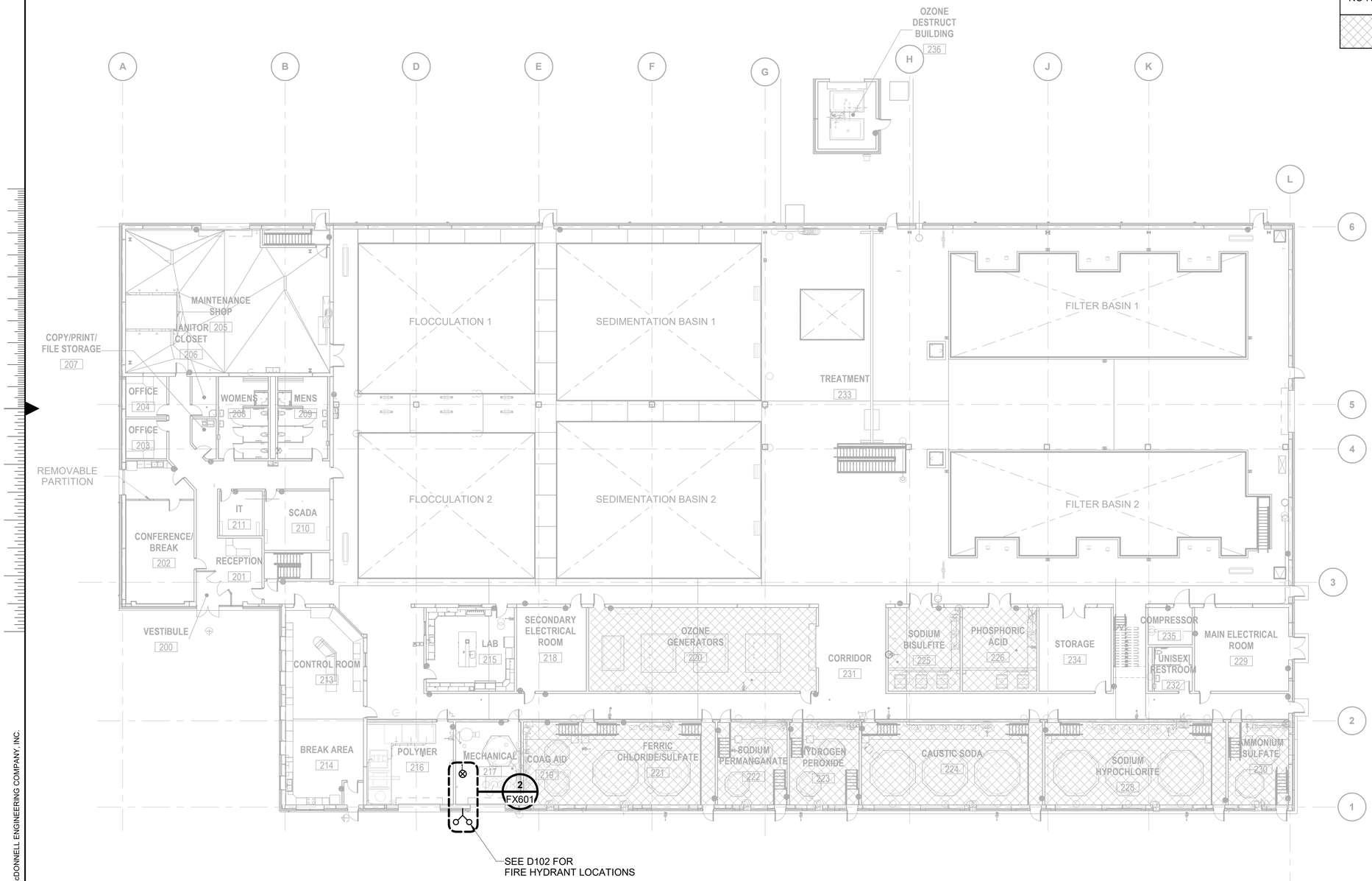
Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. REFER TO FX001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.

**HAZARD SCHEDULE**

| MARK | HAZARD CLASSIFICATION |
|---|---|
| NO HATCH | NO SPRINKLERS REQUIRED |
| | ORDINARY HAZARD GROUP 2 |

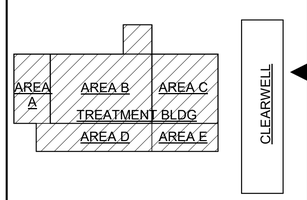



**FIRE SUPPRESSION OVERALL UPPER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | A. SCHNECKLOTH |
| **designed** | **checked** |
| J. GINSBURG | A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL UPPER LEVEL FIRE SUPPRESSION PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **FX202** rev. **0**

sheet 181 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

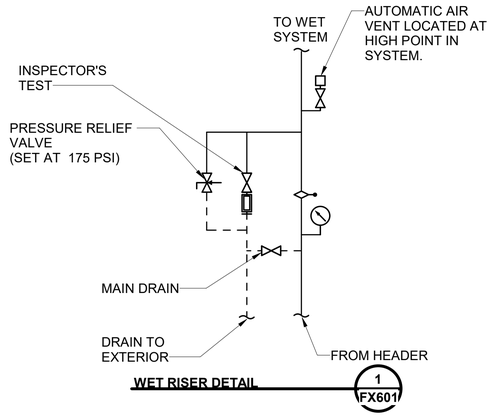
Millimeters
Scale For Microfilming
Inches

**NOTES:**

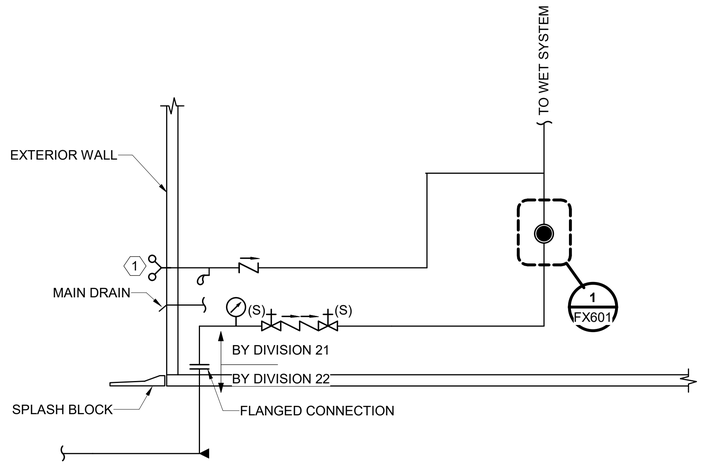
1. REFER TO FX001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.

**KEYED NOTE:** (#)

1. PROVIDE KNOX LOCKS ON FDC. COORDINATE MODEL WITH CITY OF THORTON FIRE DEPARTMENT.

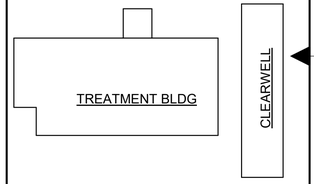



**WET RISER DETAIL** — 1 / FX601




**SPRINKLER SYSTEM RISER DIAGRAM** — 2 / FX202

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JGG | ABD | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | A. SCHNECKLOTH |
| **designed** | **checked** |
| J. GINSBURG | A. DEGROFF |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FIRE SUPPRESSION ONE LINE DIAGRAM

| project | contract |
|---|---|
| 98101 | |

**drawing** FX601 **rev.** 0

**sheet** 182 **of** 542 **sheets**

**file** 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

## PIPE LINE ACCESSORIES

- GATE VALVE
- OS&Y — OUTSIDE SCREW & YOKE VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- 2-WAY VALVE
- 3-WAY VALVE
- BALL VALVE
- BALANCING VALVE / CIRCUIT SETTER
- RELIEF, SAFETY OR THERMAL RELIEF VALVE
- M — MOTORIZED CONTROL VALVE
- HOSE GATE DRAIN VALVE
- GLOBE VALVE
- PLUG VALVE
- SRC — SPRING RETURN CLOSED BALL VALVE
- ANGLE VALVE
- SELF CONTAINED PRESSURE REDUCING (REGULATING) VALVE
- AV — AUTOMATIC AIR VENT ASSEMBLY
- MV — MANUAL AIR VENT ASSEMBLY - SEE SPECIFICATIONS FOR APPROPRIATE VALVE TYPE
- FLEX CONNECTION
- PUMP
- THERMOMETER
- BFP — BACKFLOW PREVENTION ASSEMBLY
- SUCTION DIFFUSER
- PRESSURE GUAGE
- Y-TYPE STRAINER
- REMOVABLE CAP
- REMOVABLE PLUG
- REDUCER (CONCENTRIC)
- UNION
- BLIND FLANGE
- TEST CONNECTION
- M — METER
- FM — FLOW METER
- S — STRAINER
- IF — INSULATING FLANGE
- PIPE WITH HEAT TRACE
- FLOW ARROW

## PIPE LINE DESIGNATIONS

- V — VENT
- S — STORM (ABOVE GRADE)
- S — STORM (BELOW GRADE)
- OD — STORM OVERFLOW
- DCW — DOMESTIC COLD WATER
- DHW — DOMESTIC HOT WATER
- DHWR — DOMESTIC HOT WATER RECIRCULATION
- SS — SANITARY SEWER (ABOVE GRADE)
- SS — SANITARY SEWER (BELOW GRADE)
- COND — CONDENSATE DRAIN
- CA — COMPRESSED AIR
- NG — NATURAL GAS
- CO — CLEANOUT IN RISER
- WCO — CLEANOUT IN WALL
- FCO — CLEANOUT IN FLOOR

## PLUMBING SYMBOLS LEGEND

- WC-1 — WATER CLOSET
- WC-2 — WATER CLOSET - ACCESSIBLE
- U-1 — URINAL
- U-2 — URINAL, ACCESSIBLE
- LAV-1 — LAVATORY, COUNTER MOUNTED
- LAV-2 — LAVATORY, WALL MOUNTED
- JS-1 — JANITOR SINK
- MB-1 — MOP BASIN
- SH-1 — SHOWER
- SK-1 — KITCHEN SINK
- SK-2 — SINK
- SK-3 — UNDER MOUNT SINK
- EWC-1 — DUAL ELECTRIC WATER COOLER
- EEWS-1 — EMERGENCY EYEWASH / SHOWER
- 4" FD-A — SIZE - FLOOR DRAIN
- PRESSURE/TEMPERATURE RELIEF VALVE
- HB — HOSE BIBB
- WH — WALL HYDRANT

## RISER DIAGRAM LEGEND

- CO — CLEANOUT (CO) IN RISER
- FCO — CLEANOUT (FCO) IN FLOOR
- VENT THRU ROOF (VTR)
- FLOOR OR WALL PENETRATION
- PLUMBING FIXTURE TRAP
- FLOOR DRAIN / EQUIPMENT DRAIN
- WHA-A — WATER HAMMER ARRESTOR
- WCO — WALL CLEANOUT (WCO)
- UP / DN — ISOMETRIC DIRECTION ARROW

## PIPE SYMBOLS

- PIPE ELBOW
- PIPE DOWN
- PIPE UP
- PIPE CONTINUATION

## PLUMBING ABBREVIATIONS

| | |
|---|---|
| AC | AIR COMPRESSOR |
| ADJ | ADJUSTABLE |
| AFF | ABOVE FINISH FLOOR |
| APPROX | APPROXIMATE |
| ASF | ABOVE SUMP FLLOR |
| BFP | BACKFLOW PREVENTER |
| BLDG | BUILDING |
| BOP | BOTTOM OF PIPE |
| CD | CONDENSATE DRAIN |
| CO | CLEAN OUT |
| CONC | CONCRETE |
| COND | CONDENSATE |
| CONT | CONTINUATION |
| CU FT | CUBIC FEET |
| DCW | DOMESTIC COLD WATER |
| DHW | DOMESTIC HOT WATER |
| DHWR | DOMESTIC HOT WATER RECIRCULATION |
| DN | DOWN |
| DWG(S) | DRAWING(S) |
| E | EXISTING |
| ED | EQUIPMENT DRAIN |
| EE | EMERGENCY EYEWASH |
| EEWS | EMERGENCY SHOWER/EYEWASH |
| ELECT | ELECTRICAL |
| EWH | ELECTRIC WATER HEATER |
| FD | FLOOR DRAIN |
| GAL | GALLON |
| GPM | GALLONS PER MINUTE |
| GWH | GAS FIRED WATER HEATER |
| HB | HOSE BIBB |
| HP | HORSEPOWER |
| Hz | HERTZ |
| I.E. | INVERT ELEVATION |
| I.E. | INVERT ELEVATION |
| IBC | INTERNATIONAL BUILDING CODE |
| IFGC | INTERNATIONAL FUEL GAS CODE |
| IMC | INTERNATIONAL MECHANICAL CODE |
| IN | INCHES |
| IN WC | INCHES OF WATER COLUMN |
| IPC | INTERNATIONAL PLUMBING CODE |
| IR | INFRARED HEATER |
| kW | KILOWATTS |
| LBS | POUNDS |
| M | MOTOR |
| MAU | MAKEUP AIR UNIT |
| MAX | MAXIMUM |
| MB | MOP BASIN |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MV | MIXING VALVE |
| NA | NOT APPLICABLE |
| NC | NORMALLY CLOSED |
| NG | NATURAL GAS |
| NO | NORMALLY OPEN |
| NO. | NUMBER |
| NPW | NONPOTABLE WATER |
| PD | PROCESS DRAIN |
| PH | PHASE |
| PRESS | PRESSURE |
| PRV | PRESSURE REDUCING VALVE |
| PSI | POUNDS PER SQUARE INCH |
| RH | ROOF HYRDANT |
| RM | ROOM |
| SAN | SANITARY SEWER |
| SCH | SCHEDULE |
| SH | SHOWER |
| SK | SINK |
| SP | SUMP PUMP |
| SPEC | SPECIFICATION |
| SQ FT | SQUARE FOOT |
| TEMP | TEMPERATURE |
| TOP | TOP OF PIPE |
| TW | TEMPERED WATER |
| TYP | TYPICAL |
| U | URINAL |
| UH | UNIT HEATER |
| V | VENT |
| VTR | VENT THRU ROOF |
| WC | WATER CLOSET |
| WH | WALL HYDRANT |

## GENERAL NOTES:

1. UNLESS NOTED OTHERWISE, THE CIVIL AND MECHANICAL INTERFACE POINT IS 5 FEET OUTSIDE OF THE BUILDING WALL.
2. CONTRACTOR SHALL ROUTE PIPES AS HIGH AS POSSIBLE, UNLESS OTHERWISE NOTED. ROUTE PIPES WITHIN STRUCTURE WHERE POSSIBLE. CONTRACTOR SHALL COORDINATE PIPE ELEVATIONS WITH PROCESS PIPING AND DUCTWORK. FIELD VERIFY ALL PROPOSED PIPE ROUTING. DO NOT ROUTE PIPE IN FRONT OF WINDOWS.
3. COORDINATE MECHANICAL ROOM FLOOR DRAINS WITH ACTUAL EQUIPMENT LOCATIONS AND DRAINAGE REQUIREMENTS.
4. PROVIDE STANDARD OR DEEP SEAL P-TRAP AS SPECIFIED OR SCHEDULED ON ALL PLUMBING FIXTURES WITHOUT INTEGRAL P-TRAP THAT ARE CONNECTED TO THE SANITARY SEWER SYSTEM.
5. UNLESS NOTED OTHERWISE, PROVIDED PIPE ELEVATIONS ARE ONLY INTENDED TO CONVEY DESIGN INTENT. FIELD VERIFY ALL PIPE ROUTING AND COORDINATE WITH APPLICABLE DISCIPLINES.
6. VALVES, PIPE ACCESSORIES, AND OTHER COMPONENTS REQUIRING ACCESS SHALL BE IN ACCESSIBLE LOCATIONS WHEN POSSIBLE. WHEN CONCEALED OR IN INACCESSIBLE AREAS, ACCESS PANELS/DOORS WITH PROPER IDENTIFICATION SHALL BE PROVIDED.
7. FOR FLOOR SLOPE TOWARDS DRAINS, SEE STRUCTURAL DRAWINGS.
8. INSTALL SANITARY PIPING 3" AND LARGER WITH MINIMUM 1/8" PER FOOT SLOPE DOWNWARD IN DIRECTION OF FLOW. INSTALL SANITARY PIPING LESS THAN 3" WITH A MINIMUM 1/4" PER FOOT SLOPE DOWNWARD IN DIRECTION OF FLOW. INSTALL VENT PIPING WITH 1/8" PER FOOT SLOPE DOWNWARD TOWARD FIXTURE OR STACK.
9. PROVIDE HOSE RACK AT EACH HOSE BIBB.
10. PROVIDE NATURAL GAS PRESSURE REDUCING VALVES TO ACHIEVE PRESSURE AS REQUIRED FOR EQUIPMENT. BUILDING NATURAL GAS PRESSURE IS PROVIDED AT 2 PSIG.

## CONSTRUCTION INTERFACE

- DEMOLITION
- EXISTING — EXISTING
- NEW — NEW
- NEW — DEMOLITION
- EXISTING

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS

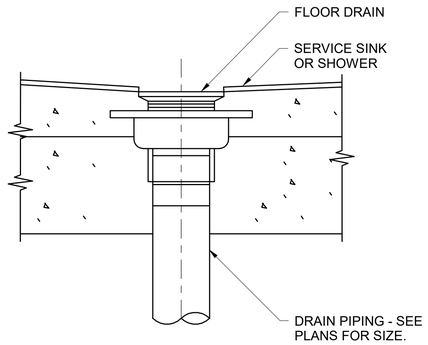
| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**P001 — 1**

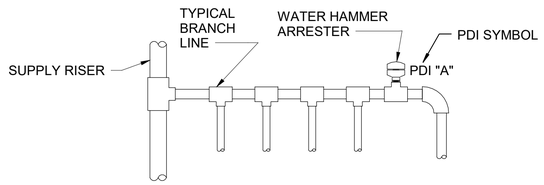
sheet 183 of 542 sheets
file 98101_M

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**FLOOR DRAIN IN SERVICE SINK OR SHOWER**
NOT TO SCALE

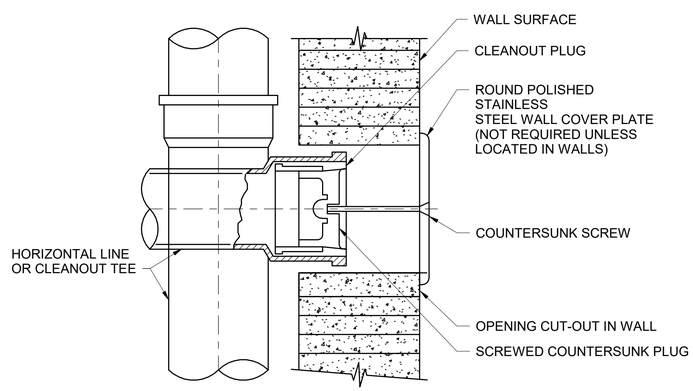



| WATER HAMMER ARRESTER SCHEDULE | | | | | | |
|---|---|---|---|---|---|---|
| PDI SYMBOL | A | B | C | D | E | F |
| FIXTURE UNIT RATING | 1-11 | 12-32 | 33-60 | 61-113 | 114-154 | 155-330 |

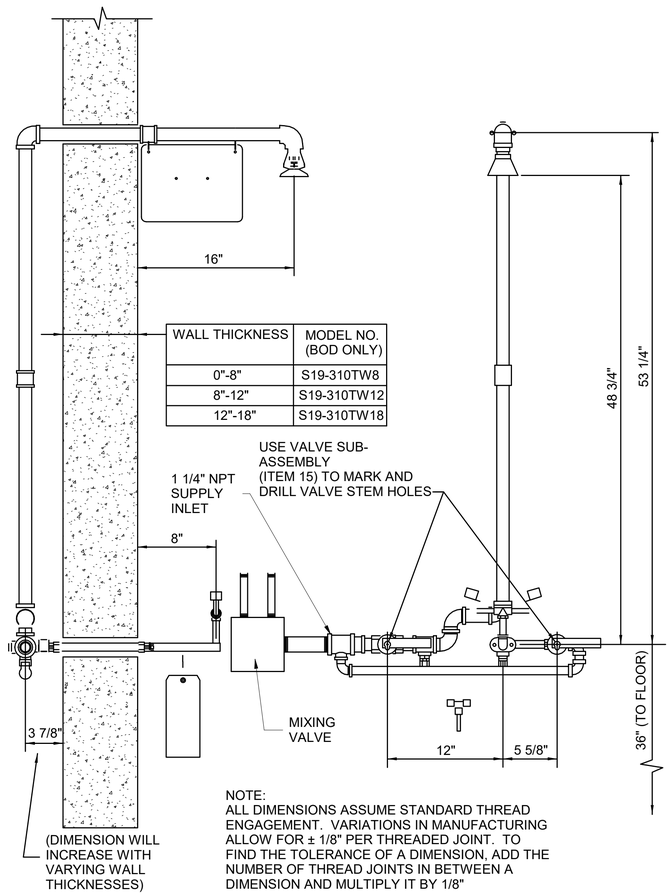
NOTES:

1. INSTALL WATER HAMMER ARRESTERS AT THE END OF BRANCH LINE BETWEEN THE LAST TWO FIXTURES SERVED.
2. ONE WATER HAMMER ARRESTER PER 10' LINE AND ANOTHER FOR BRANCHES OVER 20' IN LENGTH.
3. THE SUM OF FIXTURE UNIT RATING OF UNITS OVER 20' IN LENGTH SHALL BE EQUAL TO OR GREATER THAN THE DEMAND OF THE BRANCHES.
4. ACCESS DOORS TO BE INSTALLED FOR SERVICE.

**WATER HAMMER ARRESTOR DETAIL**
NOT TO SCALE

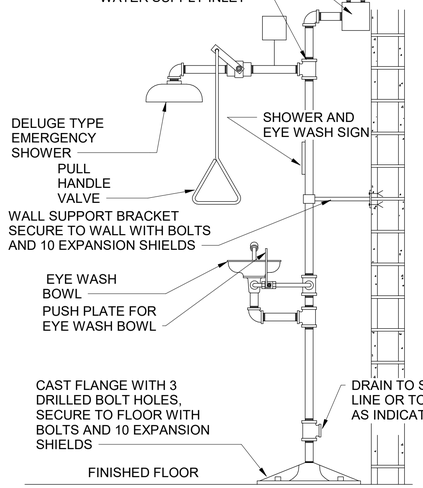



**WALL C/O CONCEALED WITHIN WALL OR END OF PIPE**
NOT TO SCALE




NOTE:
ALL DIMENSIONS ASSUME STANDARD THREAD ENGAGEMENT. VARIATIONS IN MANUFACTURING ALLOW FOR ± 1/8" PER THREADED JOINT. TO FIND THE TOLERANCE OF A DIMENSION, ADD THE NUMBER OF THREAD JOINTS IN BETWEEN A DIMENSION AND MULTIPLY IT BY 1/8"

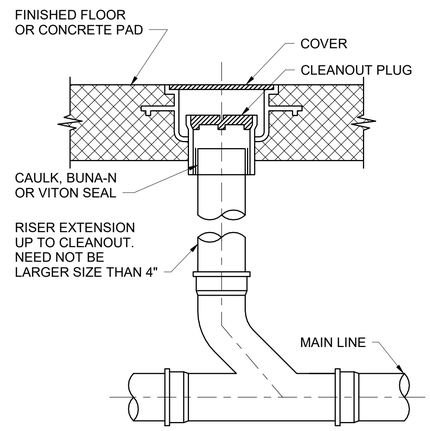
**FROST-PROOF EMERGENCY EYEWASH AND SHOWER DETAIL**
NOT TO SCALE



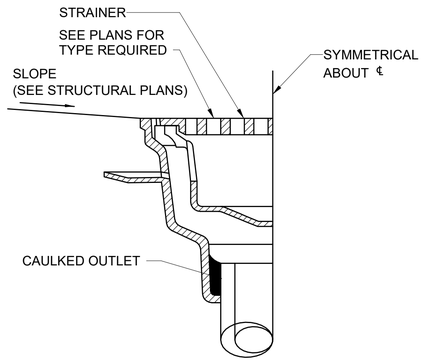

NOTES:

1. EYEWASH AND SHOWER STATIONS MUST BE INSTALLED IN WELL-LIT AREA AND IDENTIFIED WITH A HIGHLY VISIBLE SAFTEY SIGN.

**D06 - EMERGENCY EYE WASH & SHOWER**
NOT TO SCALE




**FCO FLOOR CLEANOUT**
NOT TO SCALE




**FLOOR DRAIN INSTALLED IN GROUND FLOOR**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING DETAILS I

| project | contract |
|---|---|
| 98101 | |

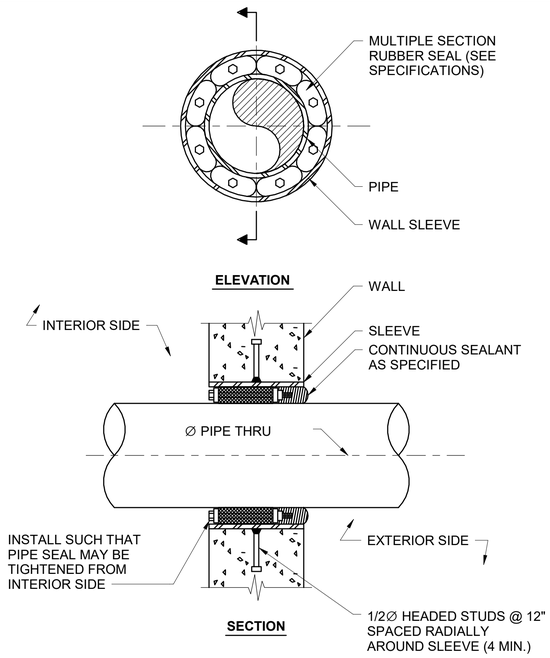
drawing **P002 — 1** rev.

sheet 184 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches



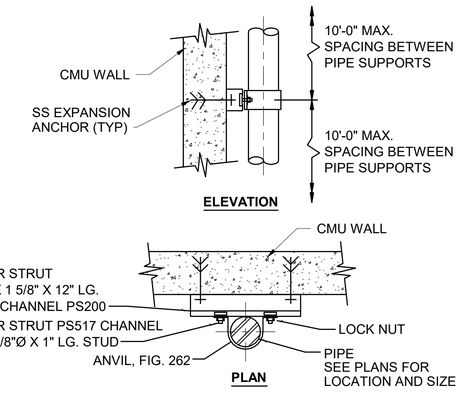

**HYDROSTATIC SEAL FOR PIPES THRU EXTERIOR WALLS**
NOT TO SCALE

**MAXIMUM HORIZONTAL PIPE HANGER AND SUPPORT SPACING**

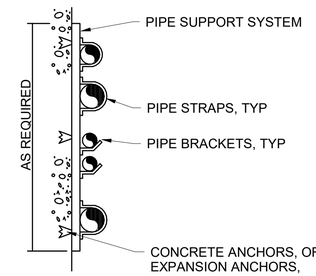
| NOMINAL PIPE OR TUBE DIA. | STANDARD WEIGHT STEEL PIPE | | COPPER TUBE | |
|---|---|---|---|---|
| | WATER SERVICE | VAPOR SERVICE | WATER SERVICE | VAPOR SERVICE |
| IN. | FT. | FT. | FT. | FT. |
| 1/4 | 7 | 8 | 5 | 5 |
| 3/8 | 7 | 8 | 5 | 6 |
| 1/2 | 7 | 8 | 5 | 6 |
| 3/4 | 7 | 9 | 5 | 7 |
| 1 | 7 | 9 | 6 | 8 |
| 1 1/4 | 7 | 9 | 7 | 9 |
| 1 1/2 | 9 | 12 | 8 | 10 |
| 2 | 10 | 13 | 8 | 11 |
| 2 1/2 | 11 | 14 | 9 | 13 |
| 3 | 12 | 15 | 10 | 14 |
| 3 1/2 | 13 | 16 | 11 | 15 |
| 4 | 14 | 17 | 12 | 16 |
| 5 | 16 | 19 | 13 | 18 |
| 6 | 17 | 21 | 14 | 20 |
| 8 | 19 | 24 | 16 | 23 |
| 10 | 20 | 26 | 18 | 25 |
| 12 | 23 | 30 | 19 | 28 |
| 14 | 25 | 32 | | |
| 16 | 27 | 35 | | |
| 18 | 28 | 37 | | |
| 20 | 30 | 39 | | |
| 24 | 32 | 42 | | |
| 30 | 33 | 44 | | |

**NOTES:**

1. FOR SPACING SUPPORTS INCORPORATING TYPE 40 SHIELDS, SEE TABLE 5, MSS SP-58.
2. DOES NOT APPLY WHERE SPAN CALCULATIONS ARE MADE OR WHERE THERE ARE CONCENTRATED LOADS BETWEEN SUPPORTS SUCH AS FLANGES, VALVES, SPECIALTIES, ETC, OR CHANGES IN DIRECTION REQUIRING ADDITIONAL SUPPORTS.
3. FIRE PROTECTION PIPING: FOLLOW REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION.
4. CAST IRON AND DUCTILE IRON PIPE: MIN. OF ONE (1) HANGER PER PIPE SECTION CLOSE TO JOINT ON THE BARREL. ALSO AT CHANGE OF DIRECTION AND BRANCH CONNECTIONS.
   CAST IRON PRESSURE PIPE: 12 FT. MAX. SPACING.
   CAST IRON SOIL PIPE: 10 FT. MAX. SPACING.
5. PLASTIC AND FIBERGLASS REINFORCED PIPE: FOLLOW PIPE MANUFACTURER'S RECOMMENDATIONS FOR SPACING AND SERVICE CONDITIONS.
6. EXTRACTED FROM MSS SP-58, 1983, WITH PERMISSION OF THE PUBLISHER, THE MANUFACTURERS STANDARDIZATION SOCIETY.
7. THIS TABLE PROVIDED FOR REFERENCE ONLY. PROVIDE HANGER AND SUPPORT SPACING IN ACCORDANCE WITH MSS SP-58 AND SPECIFICATIONS.



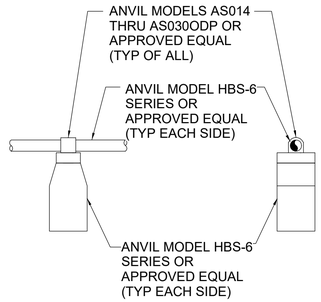

**VERTICAL PIPE SUPPORT (FOR PIPES 4" & SMALLER)**
NOT TO SCALE



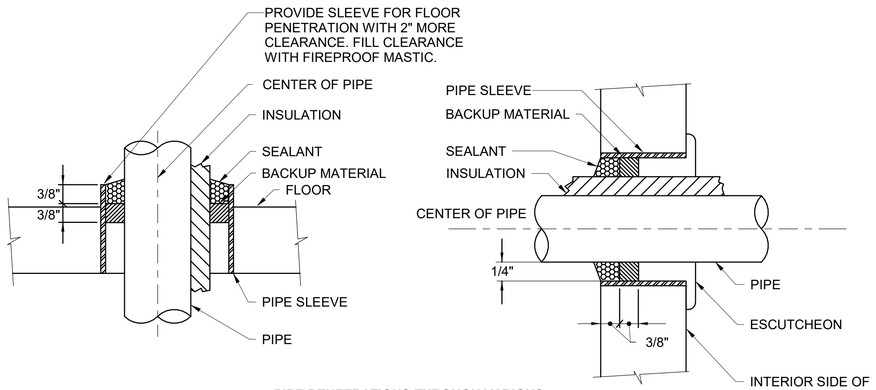

NOTES:

1. THIS PIPE SUPPORT METHOD MAY BE USED AS AN ALTERNATIVE TO OTHER SPECIFIED METHODS WHERE PIPING IS ROUTED ALONG CONCRETE OR MASONRY WALLS.

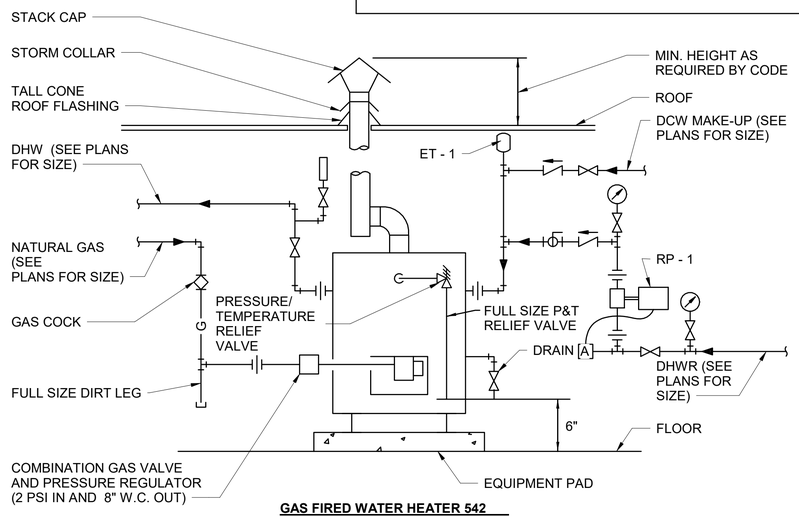
**PIPE SUPPORT - STACKED PIPE WALL SYSTEM**
NOT TO SCALE




**D14 - ROOF PIPE SUPPORT**
NOT TO SCALE




**PIPE PENETRATIONS THROUGH VARIOUS STRUCTURES**
NOT TO SCALE




**GAS FIRED WATER HEATER 542**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING DETAILS II

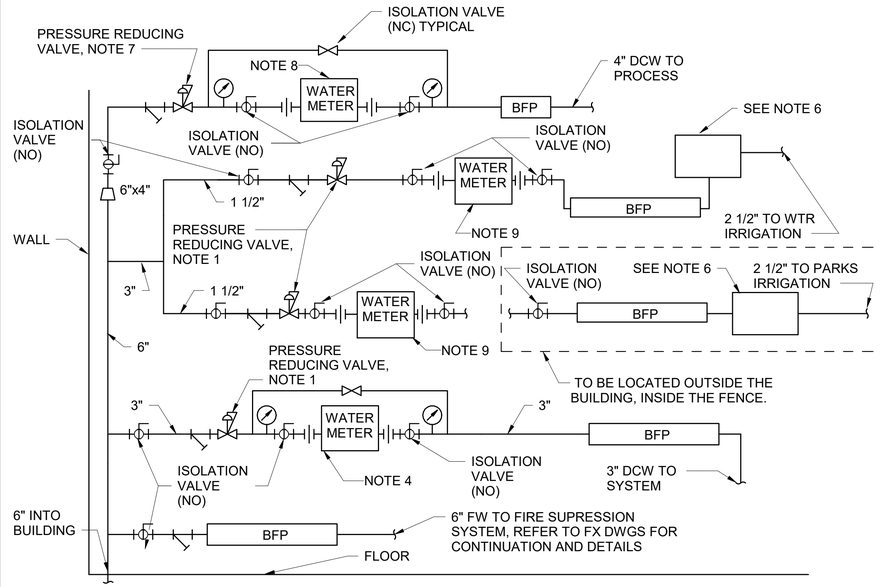
| project | contract |
|---|---|
| 98101 | |

drawing **P003 — 0** rev.

sheet 185 of 542 sheets
file 98101_M

Millimeters
Inches
Scale For Microfilming

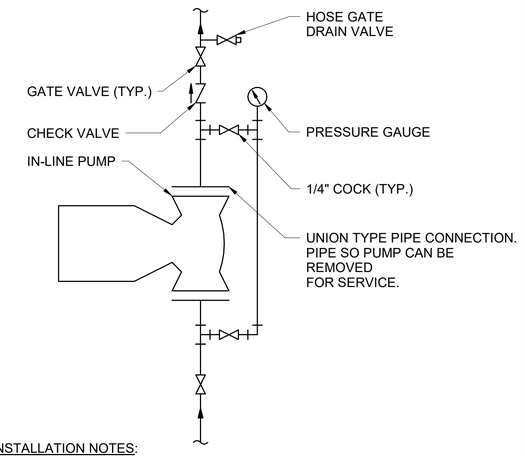
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:

1. SET PRESSURE REDUCING VALVE TO 80 PSI (ADJ.).
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE. NO UNIFLANGES PERMITTED.
3. FULL FACED NEOPRENE GASKETS SHALL BE REQUIRED ON ALL FLANGED FITTINGS.
4. CITY TO PROVIDE NEW 3" WATER METER FOR DCW BUILDING CONNECTION, CONTRACTOR TO INSTALL.
5. 6" BFP FOR FIRE SUPPRESION SHALL BE DOUBLE CHECK.
6. SEE CITY OF THORNTON STANDARD DETAIL FOR IRRIGATION CONTROLLER INSTALLATION.
7. SET PRESSURE REDUCING VALVE TO 60 PSI (ADJ).
8. CITY TO PROVIDE NEW 4" COMPOUND OR TURBINE TYPE WATER METER, CONTRACTOR TO INSTALL.
9. CITY TO PROVIDE TWO NEW 1 1/2" WATER METERS FOR IRRIGATION, CONTRACTOR TO INSTALL.

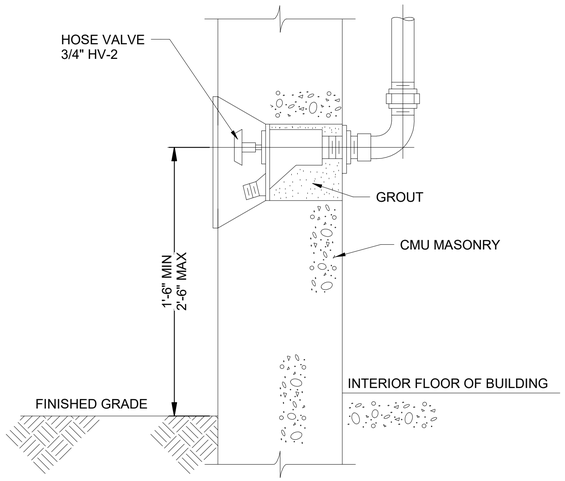
**WATER METER WITH BFP**
NOT TO SCALE



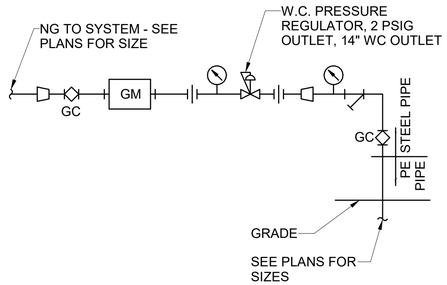

INSTALLATION NOTES:

1. INSTALL PUMP DEAD LEVEL.
2. PUMP SHALL NOT TOUCH OR REST ON ANY PART OF BUILDING STRUCTURE.
3. INSTALL PUMP SO THAT IT CAN BE REMOVED WITHOUT DISMANTLING OR FORCING ADJACENT PIPE.
4. BEFORE START-UP, LUBRICATE PUMP IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. (DO NOT RUN PUMP DRY.)

**IN-LINE PUMP**
NOT TO SCALE




**EXTERIOR WALL HOSE VALVE**
NOT TO SCALE




1

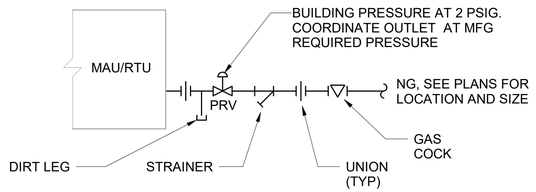
**NATURAL GAS PRESSURE REGULATOR**
NOT TO SCALE



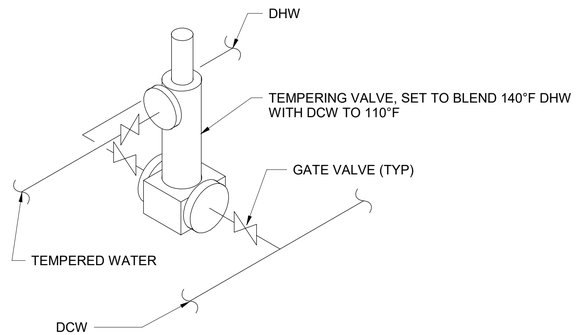

NOTE:

1. LEVEL SWITCHES SHALL BE LOCATED ON PUMP DISCHARGE PIPING AND PROVIDED BY PUMP MANUFACTURER.
2. SHUT OFF VALVES SHALL BE LOCATED 4' ABOVE TOP STAIR LANDING.
3. ACTIVATED BY WALL MOUNTED TIMER. SEE ELECTRICAL DRAWINGS FOR DETAILS.

**SUBMERSIBLE PUMP PIPING DETAIL**
NOT TO SCALE




**TYPICAL GAS TRAIN DETAIL**
NOT TO SCALE




**TEMPERING VALVE DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/10/19 | DLO | DLO | REVISED PER COR-XX |
| 2 | 4/14/20 | DLO | DLO | ISSUED PER RFI 179 |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

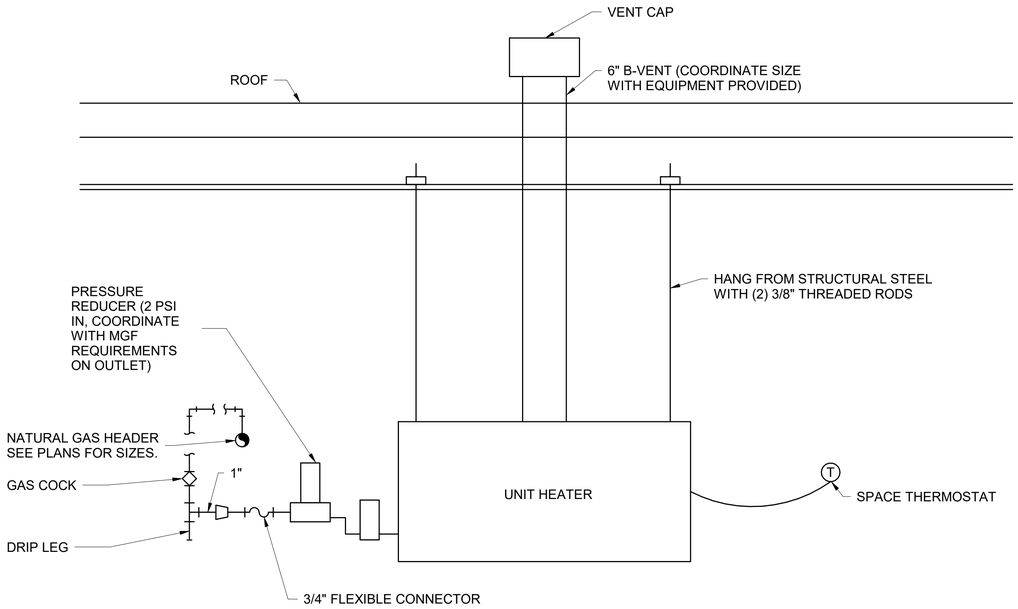
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING DETAILS III

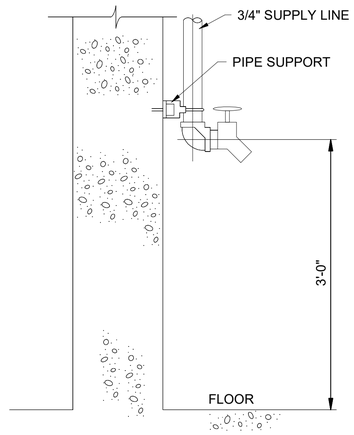
| | |
|---|---|
| project 98101 | contract |
| drawing **P004** | rev. **2** |
| sheet 186 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches



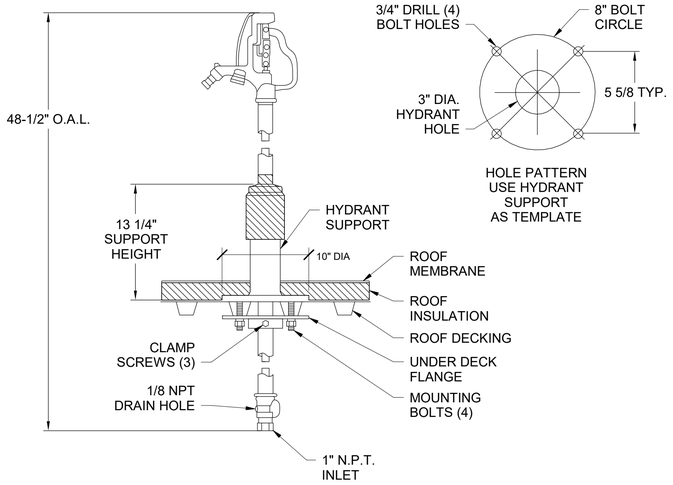

**GAS-FIRED UNIT HEATER PIPING**




NOTES:

1. ROTATE HOSE VALVE 90° OFF WALL.
2. FOR HOSE VALVE SIZE SEE PLANS.
3. CONTRACTOR SHALL PROVIDE HOSE REEL AS INDICATED ON DWG P001.

**INTERIOR HOSE BIBB (HB-1)**




**ROOF HYDRANT**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING DETAILS IV

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**P005 — 0**

**sheet** 187 **of** 542 **sheets**
**file** 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## PLUMBING FIXTURE SCHEDULE

| TAG | DESCRIPTION | FIXTURE | | | FITTING | | | TRAP | CARRIER | MOUNTING HEIGHT | CONNECTION SIZE | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BOD MFGR | BOD MODEL | TYPE | BOD MFGR | BOD MODEL | TYPE | | | | DCW | DHW | WASTE | |
| EEWS-01 | COMBINATION SHOWER / EYEWASH | BRADLEY CORP | S19-310 | COMBINATION DRENCH SHOWER AND EYEWASH | - | - | 10" IMPACT-RESISTANT BOWL, FULL FLOW STAY-OPEN BALL VALVES | 2" | N/A | N/A | 1-1/4 | 1-1/4" | N/A | PROVIDE WITH MANFUACTURER RECOMENDED MIXING VALVE |
| EEWS-02 | FREEZEPROOF COMBINATION SHOWER / EYEWASH | BRADLEY CORP | S19-310PVC | COMBINATION DRENCH SHOWER AND EYEWASH | - | - | 10" IMPACT-RESISTANT BOWL, FULL FLOW STAY-OPEN BALL VALVES, HEAVY WALL SCHEDULE 80, CORROSION RESISTANT PVC PIPING WITH 6" DIAMETER FLOOR FLANGE | N/A | N/A | N/A | 1-1/4 | 1-1/4" | N/A | PROVIDE WITH MANFUACTURER RECOMENDED MIXING VALVE |
| EWC-01 | ELECTRIC WATER COOLER | ELKAY | LZSTL8WSLK | BILEVEL ADA COOLER WITH BOTTLE FILLING STATION | - | - | LEAD-FREE BUBBLER WITH FRONT, EASY TOUCH CONTROLS | 1-1/2" | N/A | ORIFACE HT. 40" AFF & ACCESSIBLE ORIFACE HT. 34" AFF | 3/8" | N/A | 1-1/2" | |
| HB-01 | HOSE BIBB | ZURN | Z1341XL | HOSE BIBB, INTERIOR | - | - | WITH VACUUM BREAKER | N/A | N/A | 36" AFF | 3/4" | N/A | N/A | WALL MOUNTED |
| HB-02 | HOSE BIBB | WATTS | HY42 | HOSE BIBB, INTERIOR WASH DOWN | - | - | 1 1/2" HOSE CONNECTION WITH VACUUM BREAKER AND SHUTOFF VALVE | N/A | N/A | 36" AFF | 1-1/2" | N/A | N/A | WALL MOUNTED |
| HB-03 | HOSE BIBB | ZURN | Z1327-EZ | HOSE BIBB, INTERIOR, HOT & COLD | - | - | INTERGRAL VACUUM BREAKER, TEE KEY HANDLE AND HOSE | N/A | N/A | 36" AFF | 3/4" | 3/4" | N/A | WALL MOUNTED |
| LAV-01 | LAVATORY | KOHLER | K-1728 | WALL MOUNTED 19x17 VITREOUS CHINA THREE HOLE LAVATORY | ZURN | Z6915-XL | 4" CENTERSET, 0.5 GPM FAUCET, HANDS FREE OPERATION, BATTERY POWERED WITH SENSOR ACTIVATION, AND PERFORATED GRID STRAINER | 1-1/2" | WALL | RIM 34" AFF | 1/2" | 1/2" | 1-3/4" | |
| MB-01 | MOP BASIN | FLORESTONE | 95 | 24"X24" TERRAZZO MOP BASIN WITH ANGLED DROP FRONT | MOEN | 8230 | WALL-MOUNTED FAUCET, 8" CENTERS,VACUUM BREAKER, PAIL HOOK WALL BRACE, AND 3/4" MALE THREAD HOSE CONNECTION | 3" | N/A | N/A | 1/2" | 1/2" | 2" | |
| RH-01 | ROOF HYDRANT | - | - | NON-FREEZE SANITARY ROOF HYDRANT | WOODFORD | SRH-MS | BRASS W/DUAL CHECK BACKFLOW PREVENTER, HYDRANT HANDLE, AND HOSE CONNECTION | N/A | N/A | 24" AFF | 1" | N/A | N/A | ROOF MOUNTED WITH BOOT COVER AND DECK FLANGE |
| SH-01 | ACCESSIBLE SHOWER | FLORESTONE | 400 | BARRIER FREE, CENTER DRAIN TERRAZZO SHOWER BASIN | AMERICAN STD | 1662SG.221.002 | PRESSURE BALANCING MIXING VALVE WITH INTEGRAL SERVICE STOPS, ADJUSTABLE STOP SCREW, 1.5 GPM HAND SHOWER HEAD, 60" FLEXIBLE HOSE, 30" ADJUSTABLE MOUNTING BAR, FLANGE, AND ESCUTCHEON | 2" | N/A | LOW HEAD: 48" AFF & CONTROL VALVE: 40" AFF | 1/2" | 1/2" | 1-1/2" | PROVIDE MANUFACTURER RECOMMENDED DRAIN |
| SK-01 | HAND SINK | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | 1-1/2" | COUNTER | HT. SET BY COUNTER TOP | 1/2" | 1/2" | 1-1/2" | PROVIDE 1/2" CIRCUIT SOLVER MIXING VALVE OR EQUIVALENT BELOW EACH SINK |
| SK-02 | LAB HAND SINK | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | 2" | COUNTER | HT. SET BY COUNTER TOP | 1/2" | 1/2" | 1-1/2" | PROVIDE BASKET STRAINER. PROVIDE 1/2" CIRCUIT SOLVER MIXING VALVE OR EQUIVALENT BELOW EACH SINK |
| SK-03 | LAB UTILITY SINK | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | 2" | COUNTER | HT. SET BY COUNTER TOP | 1/2" | 1/2" | 1-1/2" | PROVIDE BASKET STRAINER. PROVIDE 1/2" CIRCUIT SOLVER MIXING VALVE OR EQUIVALENT BELOW EACH SINK. |
| SK-04 | LAB UTILITY SINK | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | SEE ARCH | 2" | COUNTER | HT. SET BY COUNTER TOP | 1/2" | 1/2" | 1-1/2" | PROVIDE BASKET STRAINER. PROVIDE 1/2" CIRCUIT SOLVER MIXING VALVE OR EQUIVALENT BELOW EACH SINK |
| SK-05 | UTILITY SINK | ELKAY | RMSF82362 | 16 GA 304 SS SINK 2 | MOEN | 8230 | WALL-MOUNTED FAUCET, 8" CENTERS,VACUUM BREAKER, PAIL HOOK WALL BRACE, AND 3/4" MALE THREAD HOSE CONNECTION | 2" | N/A | N/A | 1/2" | 1/2" | 1-1/2" | - |
| TD-01 | | | | TRECH DRAIN | JR SMITH | 9930 | INTERLOCKING CHANNEL DESIGN WITH BUILT-IN SLOPE OF 0.6%, 1/4" DIA PERFORATED GALV STEEL GRATE, LOAD CLASS A | 4" | | | 0 | 0 | 4" | |
| UR-01 | ACCESSIBLE URINAL | AMERICAN STANDARD | 6590.525.020 | VITREOUS CHINA, WALL MOUNTED, TOP SPUD, BACK OUTLET | SEE FIXTURE | SEE FIXTURE | SENSOR OPERATED FLUSH VALVE - BATTERY, 0.125 GPF | 2" | WALL | RIM 15" AFF | 3/4" | - | 2" | - |
| WC-01 | WATER CLOSET | AMERICAN STANDARD | 2257.660.020 | VITREOUS CHINA, ELONGATED BOWL, SIPHON JET, WALL MOUNTED, TOP SPUD, BACK DISCHARGE | SEE FIXTURE | SEE FIXTURE | SENSOR OPERATED FLUSH VALVE - BATTERY, 1.28 GPF | 4" | WALL | RIM 15" AFF | 1" | - | 4" | PROVIDE WITH SOLID PLASTIC, OPEN FRONT SEAT (LESS COVER) |
| WC-02 | ACCESSIBLE WATER CLOSET | AMERICAN STANDARD | 2257.660.020 | VITREOUS CHINA, ELONGATED BOWL, SIPHON JET, WALL MOUNTED, TOP SPUD, BACK DISCHARGE | SEE FIXTURE | SEE FIXTURE | SENSOR OPERATED FLUSH VALVE - BATTERY, 1.28 GPF | 4" | WALL | RIM 17" AFF | 1" | - | 4" | PROVIDE WITH SOLID PLASTIC, OPEN FRONT SEAT (LESS COVER) |

## DRAIN SCHEDULE

| TAG | DESCRIPTION | BASIS OF DESIGN: | | OUTLET SIZE | TYPE | STRAINER | REMARKS |
|---|---|---|---|---|---|---|---|
| | | MFGR | MODEL | | | | |
| FD-01 | FLOOR DRAIN | WATTS | FD-100-B | | | | |
| TD-01 | TRENCH DRAIN | JR SMITH | 9930 | 4" | INTERLOCKING CHANNEL DESIGN WITH BUILT-IN SLOPE OF 0.6%, 1/4" DIA PERFORATED GALV STEEL GRATE, LOAD CLASS A | 4" | |
| TD-02 | TRENCH DRAIN | JR SMITH | 9930 | 4" | INTERLOCKING CHANNEL DESIGN WITH BUILT-IN SLOPE OF 0.6%, 1/4" DIA PERFORATED GALV STEEL GRATE, LOAD CLASS A | 4" | |
| TD-03 | TRENCH DRAIN | JR SMITH | 9930 | 4" | INTERLOCKING CHANNEL DESIGN WITH BUILT-IN SLOPE OF 0.6%, 1/4" DIA PERFORATED GALV STEEL GRATE, LOAD CLASS A | 4" | |
| TD-04 | TRENCH DRAIN | JR SMITH | 9930 | 4" | INTERLOCKING CHANNEL DESIGN WITH BUILT-IN SLOPE OF 0.6%, 1/4" DIA PERFORATED GALV STEEL GRATE, LOAD CLASS A | 4" | |

## CLEANOUT SCHEDULE

| TAG | DESCRIPTION | BASIS OF DESIGN: | | TYPE | COVER | REMARKS |
|---|---|---|---|---|---|---|
| | | MFGR | MODEL | | | |
| FCO-01 | FLOOR CLEANOUT | WATTS | CO-200-R | CAST IRON FLOOR CLEANOUT W/ BRASS PLUG | GASKETED NICKEL BRONZE | |
| WCO-01 | WALL CLEANOUT | WATTS | CO-460-RD | STACK CLEANOUT W/ BRASS PLUG | STAINLESS STEEL | |

## MIXING VALVE SCHEDULE

| TAG | SYSTEM SERVED | MAX FLOW (GPM) | COLD EWT (DEG F.) | HOT EWT (DEG F.) | LWT (DEG F.) | COLD WATER CONNECTION SIZE (IN) | HOT WATER CONNECTION SIZE (IN) | TEMPERED WATER CONNECTION SIZE (IN) | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | MFGR | MODEL | |
| MV-01 | LAV. DHW | 23 GPM | EMERGENCY SHOWER / EYE WASH MIXING VALVE | 115 | 110 | 1-1/4" | 1-1/4" | 3/8" | LEONARD | 170-LF | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING SCHEDULES I

| project | contract |
|---|---|
| 98101 | |

drawing **P006 — 1** rev.

sheet 188 of 542 sheets

file 98101_M1

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

## WATER HEATER SCHEDULE

| TAG | TYPE | LOCATION | SERVICE | HEATING SOURCE | HEAT INPUT (MBH) | CAPACITY (GAL) | RECOVERY (GAL/HR AT 100 DEG F.) | HOT WATER TEMP. SETTING (DEG. F.) | VOLTS | PHASE | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | MFR | MODEL | |
| GWH-1 | NATURAL GAS, STORAGE WATER TANK | MECHANICAL ROOM | DHW | NATURAL GAS | 600 | 300 | 581 | 140 | 120 | 1 | AO SMITH | BTP-300-600 | |

NOTE: PROVIDE NATURAL GAS PRESSURE REDUCING VALVE. BUILDING NATURAL GAS IS AT 2 PSIG.

## BACKFLOW PREVENTOR SCHEDULE

| Mark | TYPE | LOCATION | SERVICE | SIZE (INCHES) | DESIGN FLOW (GPM) | SELECTED UNIT FLOW RANGE LIMIT (GPM) | PRESSURE LOSS THRU MIDDLE 1/3 OF FLOW RANGE (PSIG) | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | MANUFACTURER | MODEL NUMBER | |
| BFP-01 | REDUCED PRESSURE PRINCIPLE | MECHANICAL ROOM | DCW | 3 | 125 | 325 | 13 | WATTS | LF009 | DCW |
| BFP-02 | REDUCED PRESSURE PRINCIPLE | MECHANICAL ROOM | IRRIGATION | 1.5 | 50 | | | WATTS | LF009 | PARKS IRRIGATION |
| BFP-03 | REDUCED PRESSURE PRINCIPLE | MECHANICAL ROOM | IRRIGATION | 1.5 | 50 | | | WATTS | LF009 | PLANT IRRIGATION |
| BFP-04 | DOUBLE CHECK | MECHANICAL ROOM | PROCESS | 4 | 170 | | | KENNEDY | KS-RW | PROCESS WATER SUPPLY |

1

## PLUMBING PUMP SCHEDULE

| TAG | TYPE | LOCATION | SERVICE | BASIS OF DESIGN | | FLOW (GPM) | HEAD (FT) | CONNECTION SIZE (IN) | MOTOR - HP | ELECTRICAL | | STARTER / DISCONNECT BY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MFR | MODEL | | | | | VOLTS | PHASE | | |
| RP-01 | IN-LINE CENTRIFUGAL | MECHANICAL ROOM | DHWR | TACO | 0011 | 8 GPM | 1.0 | 1 | 0.5 | 115 | 1 | MFG | |
| SP-01 | SUMP PUMP | COAG AID 219 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-02 | SUMP PUMP | FERRIC CHLORIDE/ SULFATE 221 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-03 | SUMP PUMP | SODIUM PERMANGANATE 222 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-04 | SUMP PUMP | HYDROGEN PEROXIDE 223 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-05 | SUMP PUMP | CAUSTIC SODA 224 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-06 | SUMP PUMP | CAUSTIC SODA 224 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-07 | SUMP PUMP | SODIUM HYPOCHLORITE 228 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-08 | SUMP PUMP | SODIUM HYPOCHLORITE 228 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-09 | SUMP PUMP | AMMONIA 230 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-10 | SUMP PUMP | BACKWASH PS 300 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |
| SP-11 | SUMP PUMP | BACKWASH PS 300 | PD | ZOELLER | 460005 | 25 GPM | 15.0 | 2 | 0.5 | 115 | 1 | MFG | |

NOTE: PROVIDE FLOAT SWITCH FOR ALL ZOELLER SUMP PUMPS.

## EXPANSION TANK SCHEDULE

| TAG | TYPE | ORIENTATION | LOCATION | SYSTEM | TANK VOLUME (GAL) | MAX. TANK ACCEPTANCE VOLUME (GAL) | RELIEF VALVE SETPOINT (PSI) | DESIGN TEMP. (DEG. F.) | MAX. WORKING PRESS. (PSI) | COLD WATER FILL SIZE (IN) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ET-1 | BLADDER | VERTICAL | MECHANICAL ROOM | DOMESTIC WATER | 25 | 11 | 140 | 140 | 150 | 0.75 | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLUMBING SCHEDULES II

| | |
|---|---|
| project 98101 | contract |
| drawing P007 | rev. 1 |
| sheet 189 of 542 sheets | |
| file 98101_M | |

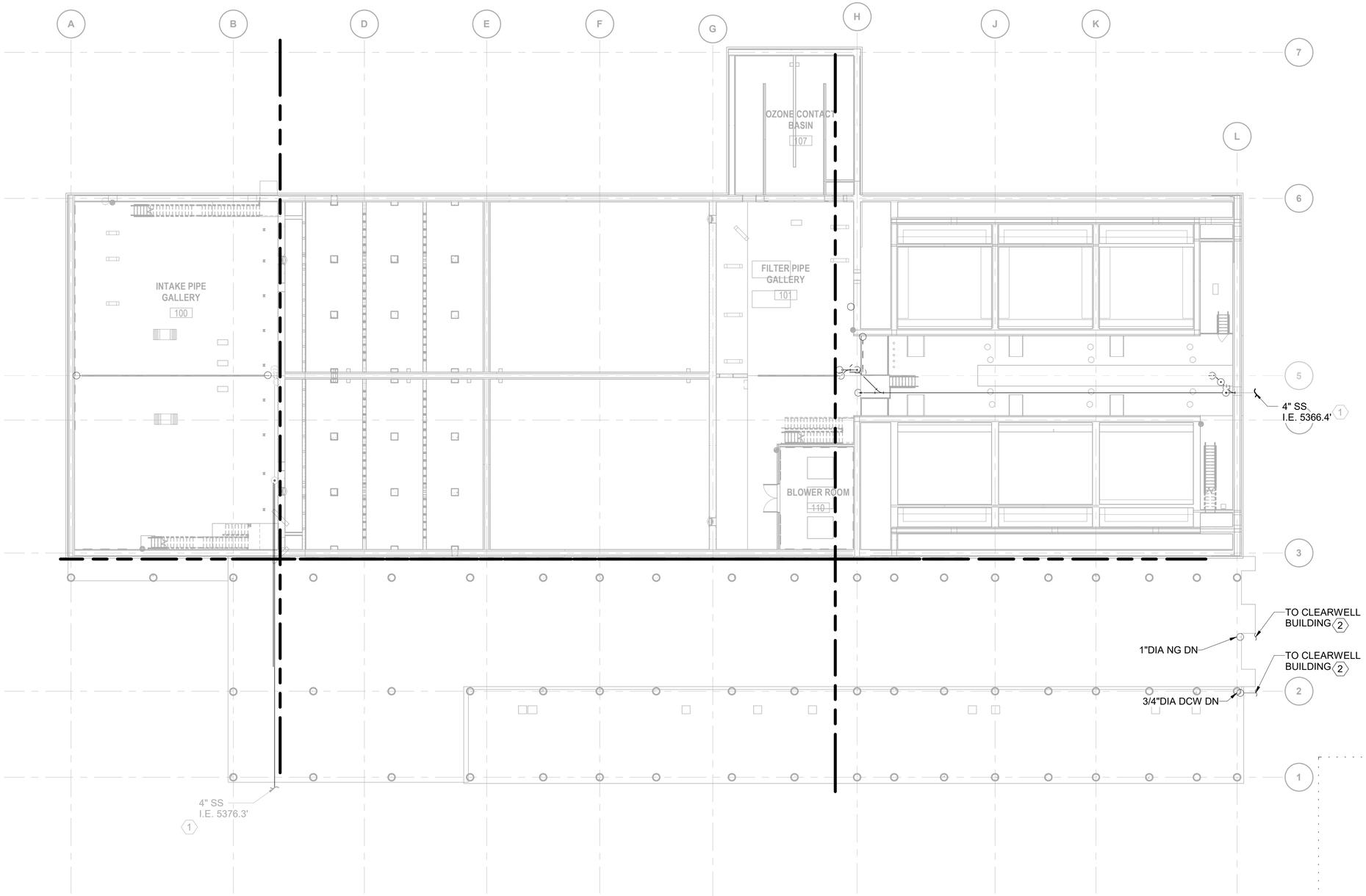
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters, Inches

**KEYED NOTES:** (#)

1. SEE CONTINUATION ON D114. CONNECT TO 6" YARD PIPING WITH ECCENTRIC CONNECTION.
2. SEE CONTINUATION ON P213.

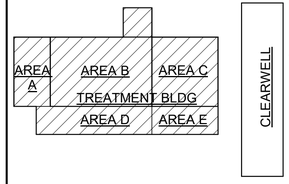
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




**OVERALL LOWER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL LOWER LEVEL PLAN

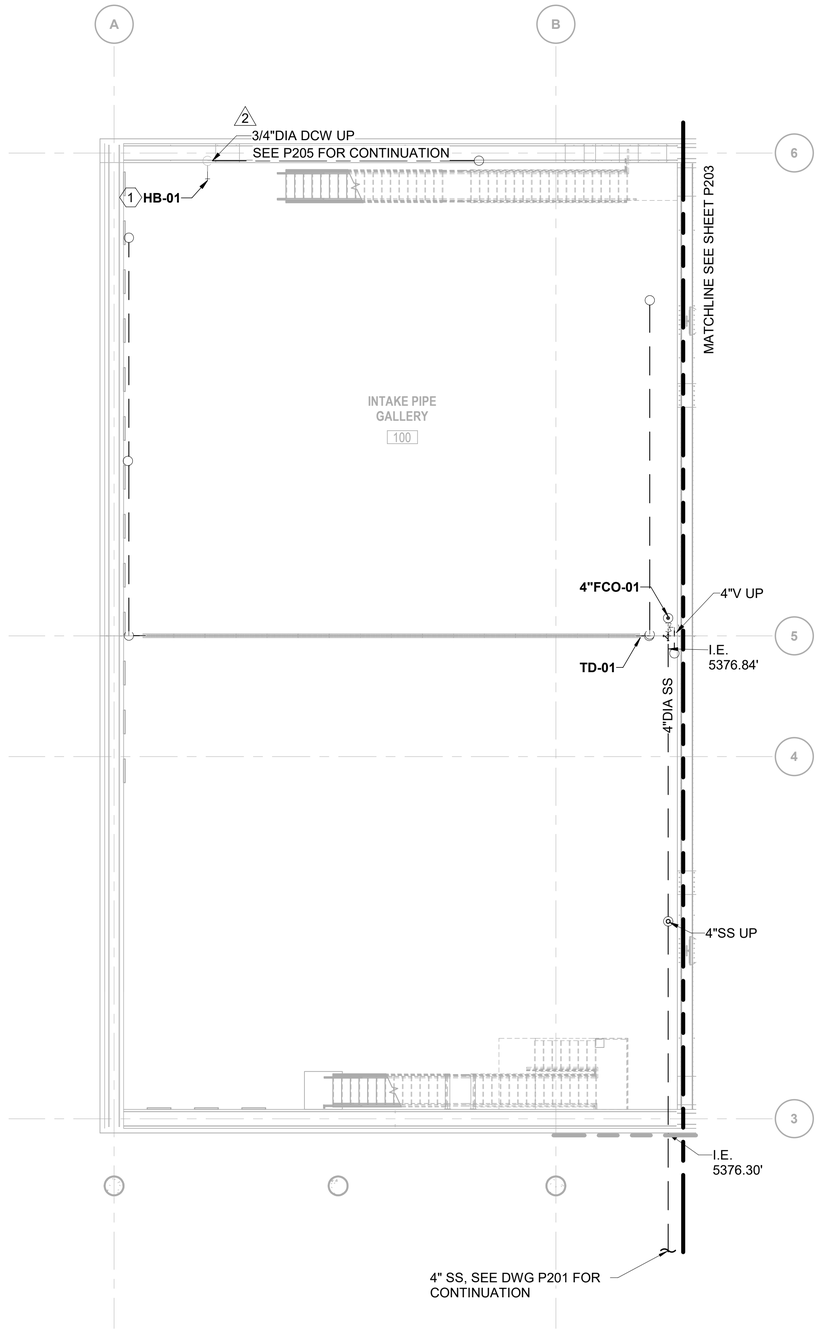
| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**P201 — 1**

sheet 190 of 542 sheets
file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA A**

0 4' 8' 16'

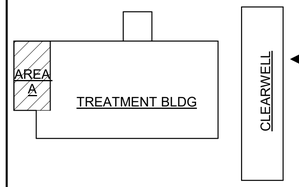
SCALE IN FEET

NORTH

**KEYED NOTES:** (#)

1. MOUNT HOSE BIBBS 4'-6" A.F.F.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** B. RICH |
| **designed** B. RICH | **checked** D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A

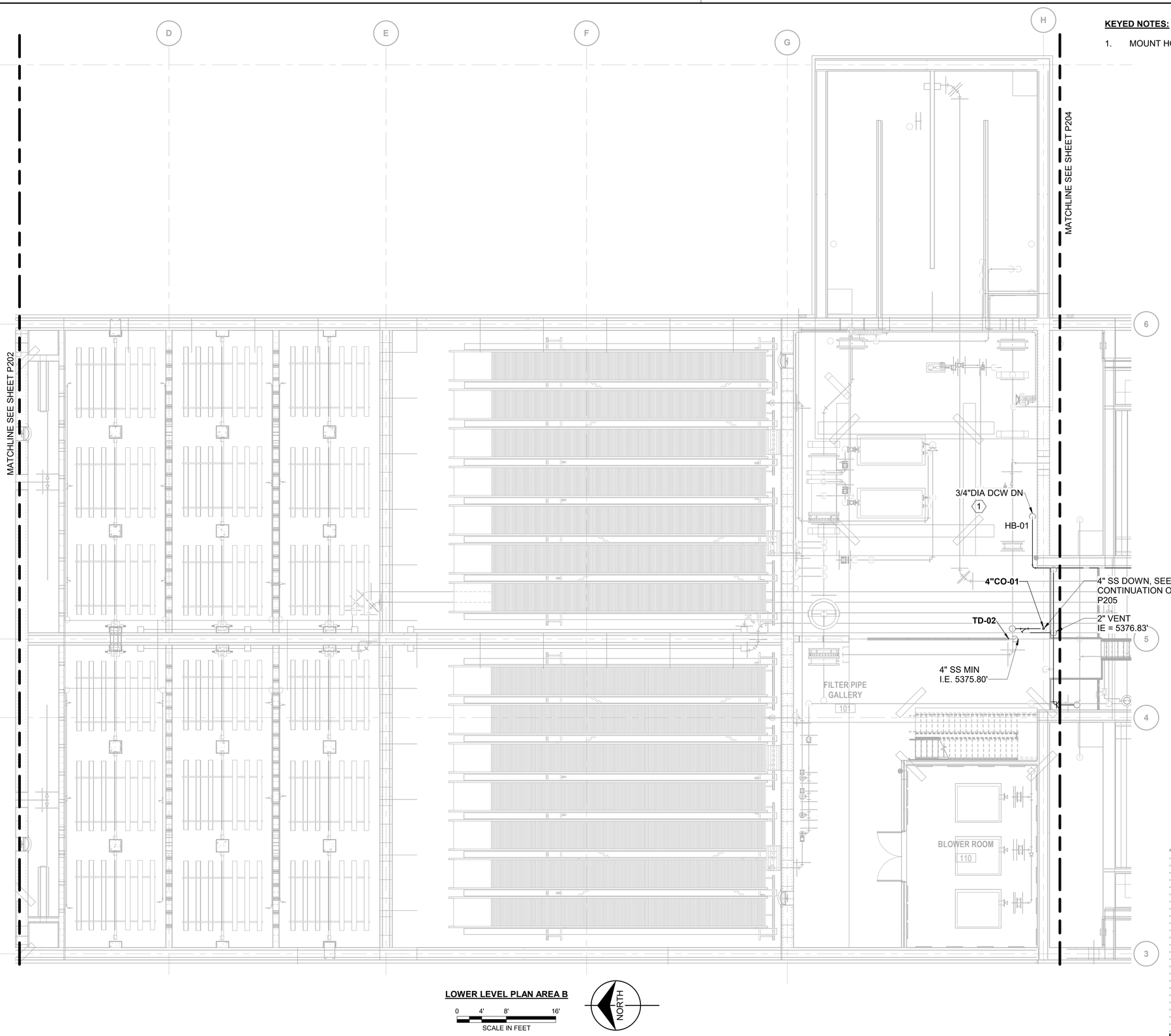
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** P202 — 2 | **rev.** |
| **sheet** 191 **of** 542 **sheets** | |
| **file** 98101_M | |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**KEYED NOTES:** (#)

1. MOUNT HOSE BIBBS 4'-6" A.F.F.



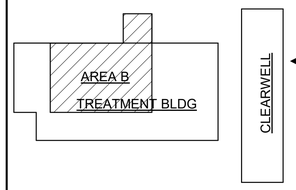

**LOWER LEVEL PLAN AREA B**

0 4' 8' 16'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** B. RICH |
| **designed** B. RICH | **checked** D. OLSEN |

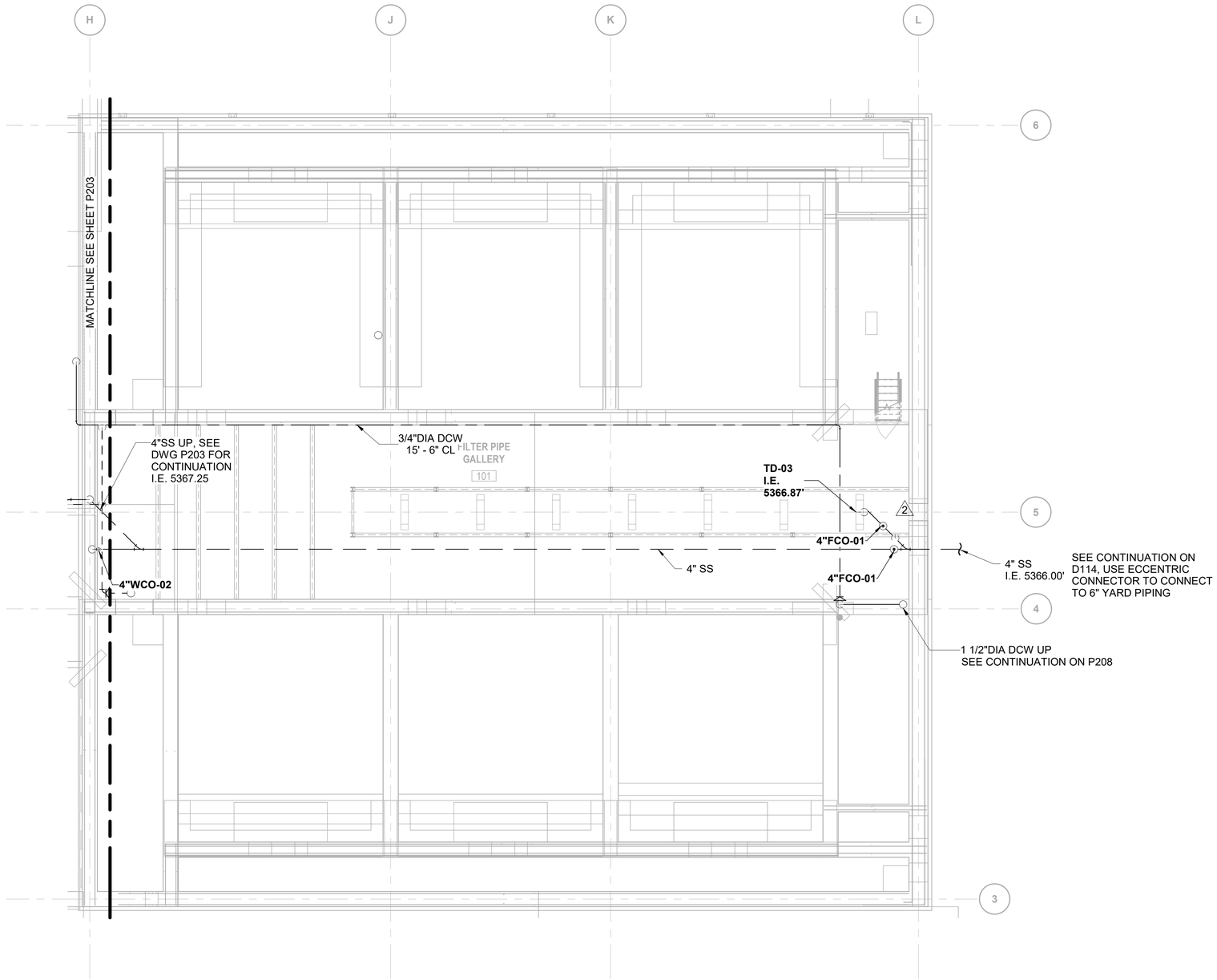
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** P203 — 1 | **rev.** |
| **sheet** 192 **of** 542 **sheets** | |
| **file** 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



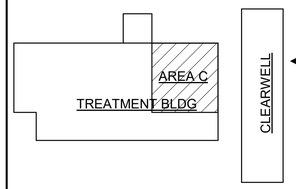

**LOWER LEVEL PLAN AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

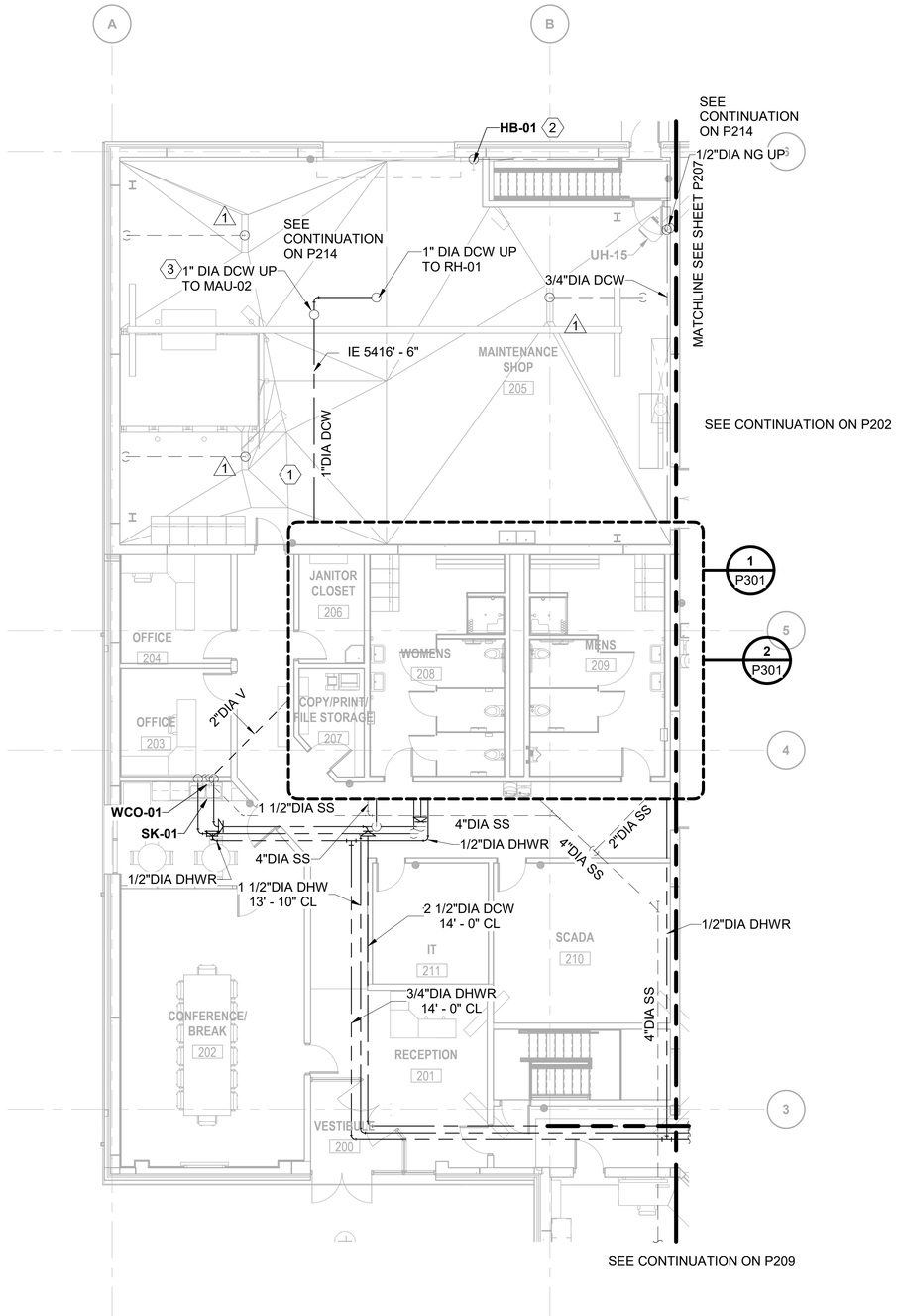
drawing **P204 — 2** rev.

sheet 193 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA A**

0 4' 8' 16'

SCALE IN FEET

NORTH

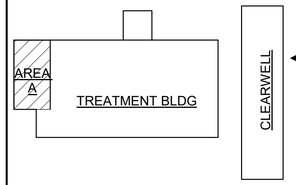
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING P001.
2. CONTRACTOR TO PROVIDE TRENCH DRAIN WITH VERTICAL OUTLET.
3. PIPES SHOWN OFFSET FOR CLARITY.

**KEYED NOTES:** (#)

1. ROUTE DOMESTIC WATER PIPE AS HIGH AS POSSIBLE OR AROUND BRIDGE CRANE. FIELD COORDINATE FINAL ROUTING TO AVOID INTERFERENCE WITH BRIDGE CRANE.
2. MOUNT HOSE BIBBS 4'-6" AFF.
3. PROVIDE 1" BALL VALVE WITH DRAIN COCK BELOW ROOF FOR FREEZE PROTECTION. COORDINATE CLEARANCES WITH BRIDGE CRANE AND LIGHTING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A

| project | contract |
|---|---|
| 98101 | |

drawing **P205 — 1** rev.

sheet 194 of 542 sheets

file 98101_M

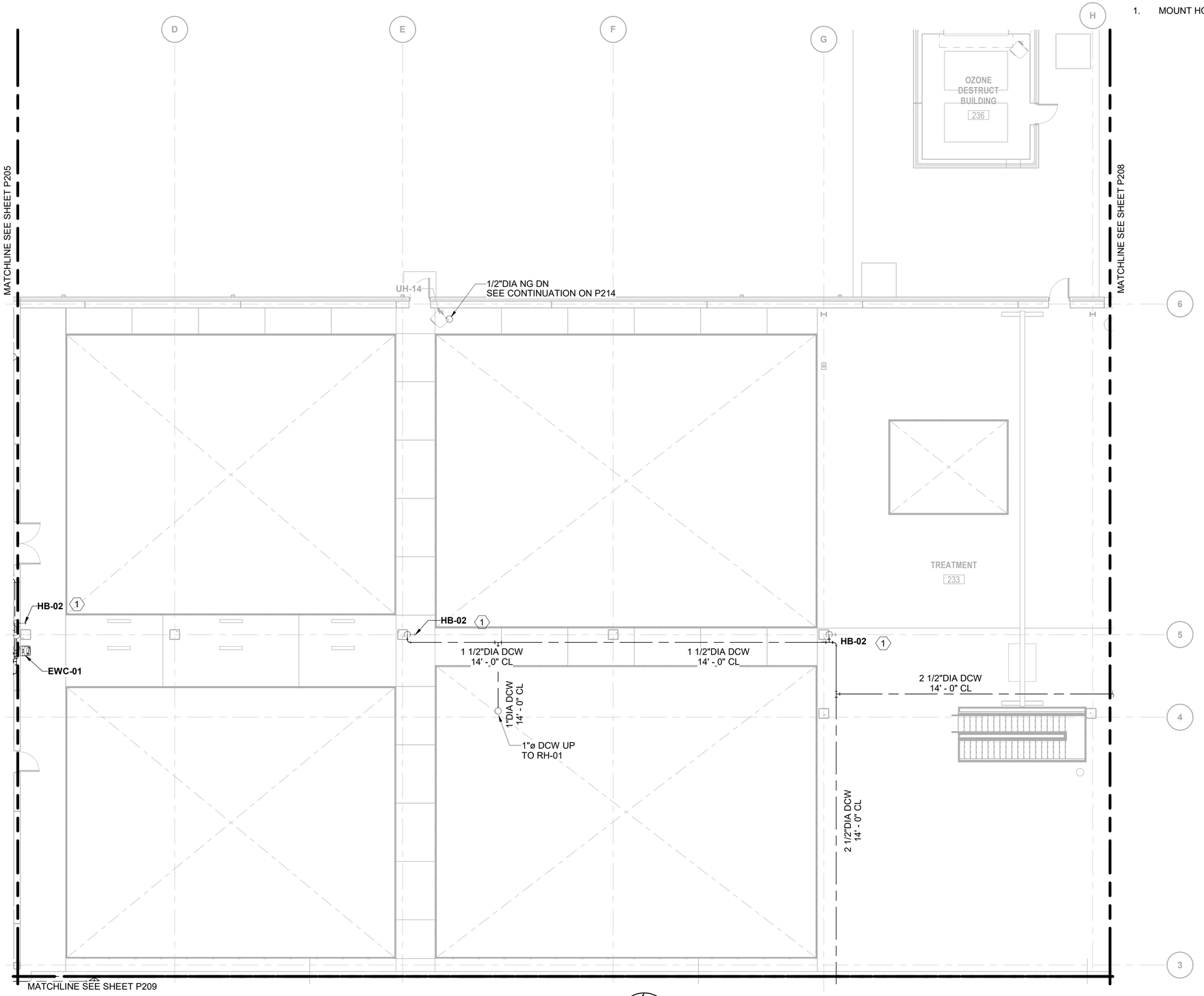
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**KEYED NOTES:** (#)

1. MOUNT HOSE BIBBS 4'-6" A.F.F.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

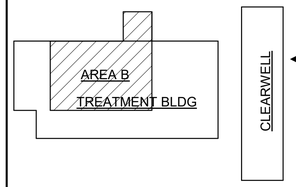



**UPPER LEVEL PLAN AREA B**

0 4' 8' 16'

SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B

| project | contract |
|---|---|
| 98101 | |

drawing **P207 — 0** rev.

sheet 195 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

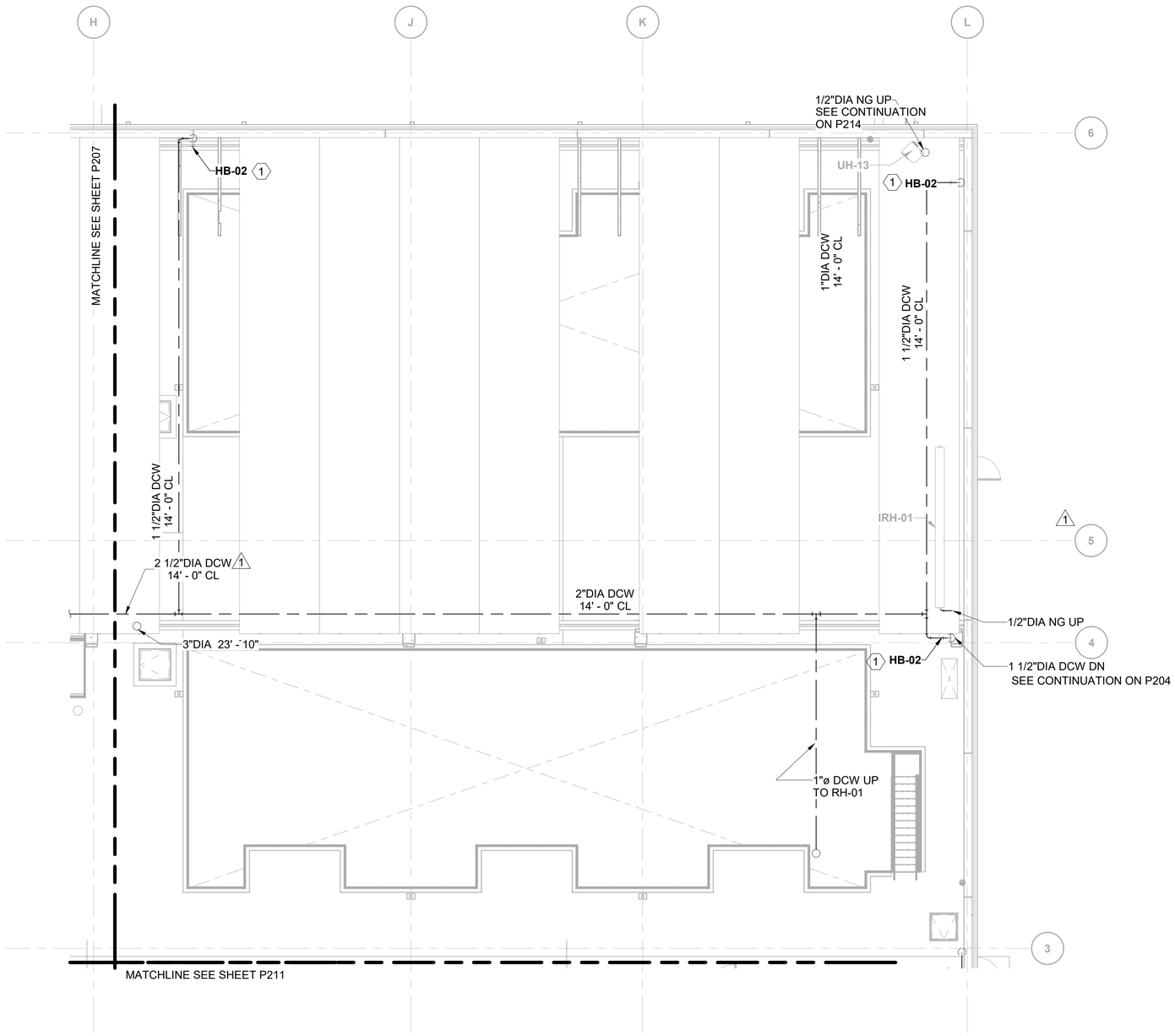
**NOTES:**

1. ROUTE VENT UP THROUGH ROOF, TERMINATE WITH CAP.

**KEYED NOTES:** (#)

1. MOUNT HOSE BIBBS 4'-6" A.F.F.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

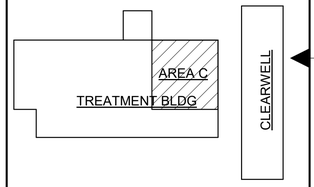



**UPPER LEVEL PLAN AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

drawing **P208 — 1** rev.

sheet 196 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

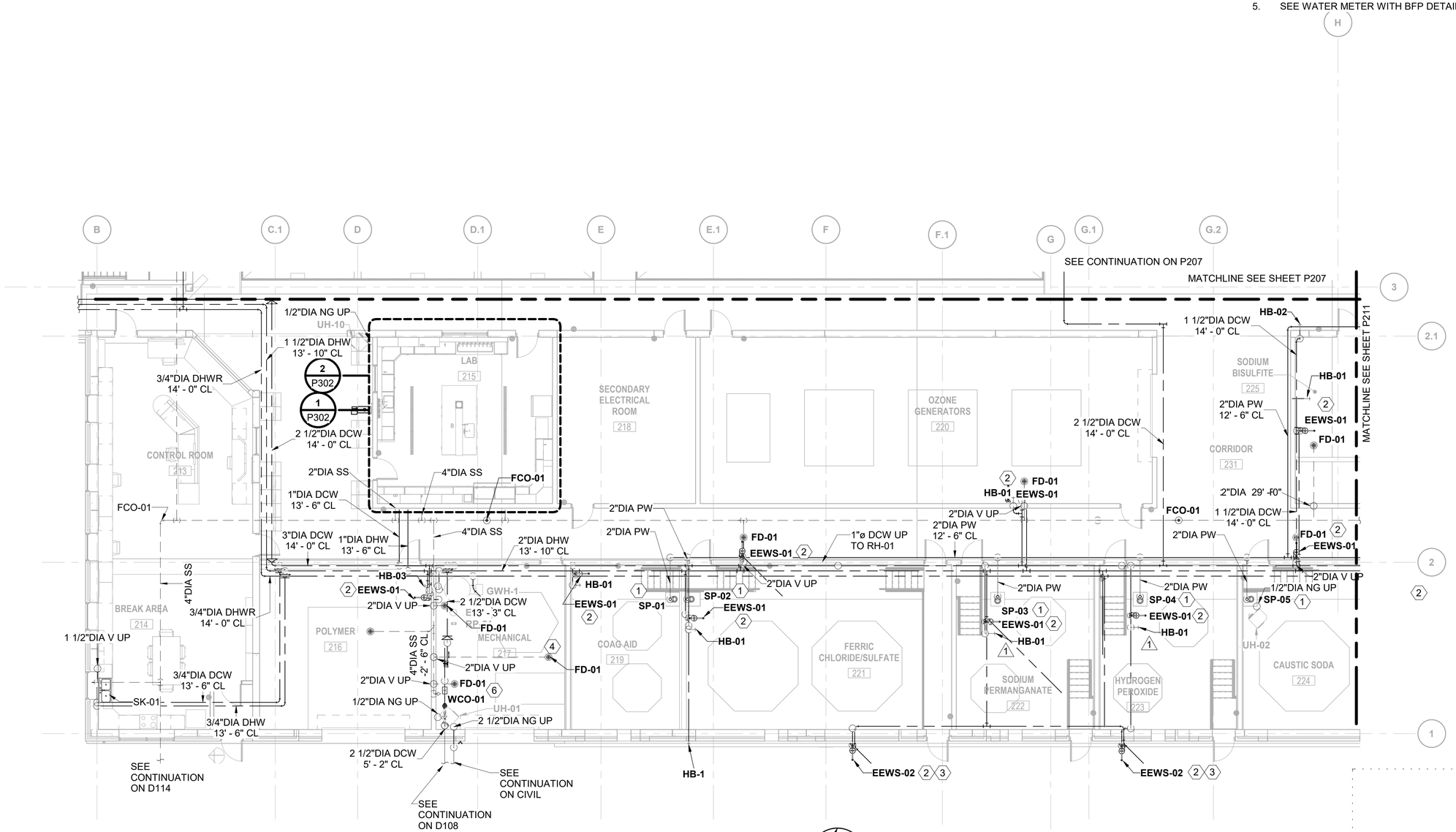
Scale For Microfilming
Millimeters
Inches

**NOTES:**

1. PIPES SHOWN OFFSET FOR CLARITY.
2. SEE FROST PROOF EMERGENCY EYEWASH/SHOWER DETAIL ON P002 FOR EXTERIOR EYEWASH/SHOWER STATIONS.
3. SEE EMERGENCY EYEWASH/SHOWER DETAIL ON P002 FOR INTERIOR EYEWASH/SHOWER.
4. MOUNT HOSE BIBBS 4'-6" AFF.

**KEYED NOTES:** (#)

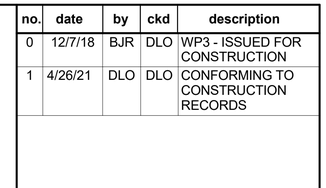
1. SEE SUMP PUMP DETAIL ON P004.
2. PROVIDE A MIXING VALVE FOR EACH EMERGENCY EYEWASH/SHOWER STATION.
3. PROVIDE AN ISOLATION VALVE ON THE INSIDE OF EACH FREEZE PROOF EXTERIOR EMERGENCY EYEWASH/SHOWER STATION. PROVIDE CONTAINER AT INTERIOR DRAIN.
4. PROVIDE 8" TO 4" HARD FUNNEL END FOR CONNECTION TO WATER SOFTNER COMPLETE WITH AIR GAP.
5. SEE WATER METER WITH BFP DETAIL ON P004.




**UPPER LEVEL PLAN AREA D**

0 4' 8' 16'
SCALE IN FEET

NORTH




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D

| project | contract |
|---|---|
| 98101 | |

drawing **P209** rev. **1**

sheet 197 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

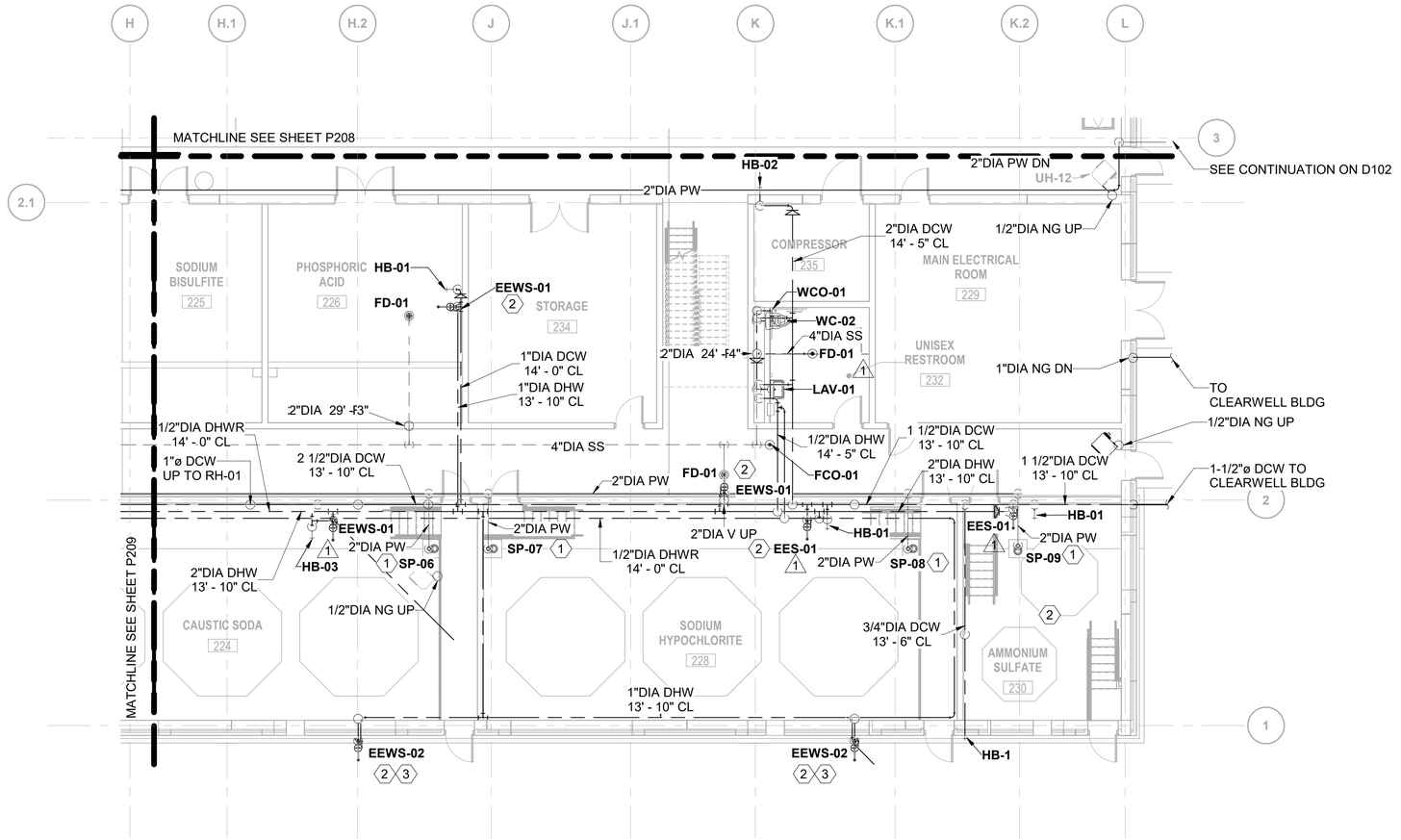
Millimeters
Scale For Microfilming
Inches

**NOTES:**

1. SEE FROST PROOF EMERGENCY EYEWASH/SHOWER DETAIL ON P001 FOR EXTERIOR EYEWASH/SHOWER STATIONS.
2. SEE EMERGENCY EYEWASH/SHOWER DETAIL ON P002 FOR INTERIOR EYEWASH/SHOWER.
3. MOUNT HOSE BIBBS 4'-6" AFF.

**KEYED NOTES:** (#)

1. SEE SUMP PUMP DETAIL ON P004.
2. PROVIDE A MIXING VALVE FOR EACH EMERGENCY EYEWASH/SHOWER STATION.
3. PROVIDE AN ISOLATION VALVE ON THE INSIDE OF EACH FREEZE PROOF EXTERIOR EMERGENCY EYEWASH/SHOWER STATION. PROVIDE A CONTAINER AT EACH DRAIN.

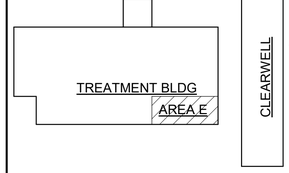



**UPPER LEVEL PLAN AREA E**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E

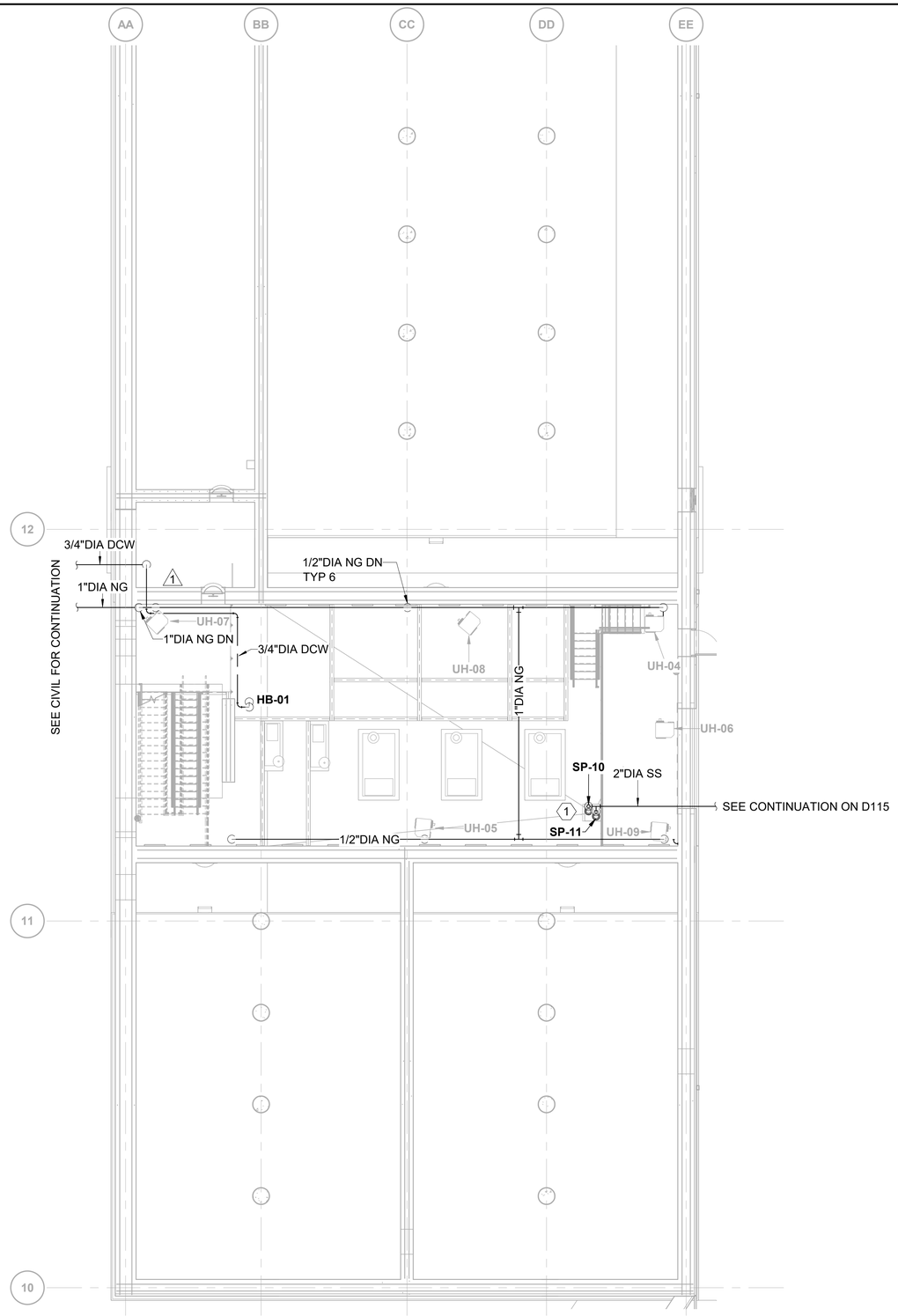
| project | contract |
|---|---|
| 98101 | |

drawing **P211 — 1** rev.

sheet 198 of 542 sheets
file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




LOWER LEVEL PLAN WEST

0 4' 8' 16'

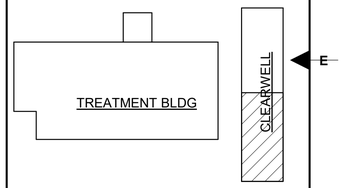
SCALE IN FEET

NORTH

KEYED NOTES: (#)

1. PROVIDE REDUNDANT SUMP PUMP. SEE SUMP PUMP DETAIL ON P004.
2. MOUNT HOSE BIBBS 4'-6" AFF.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST

| project | contract |
|---|---|
| 98101 | |

drawing **P213 — 1** rev.

sheet 199 of 542 sheets

file 98101_M

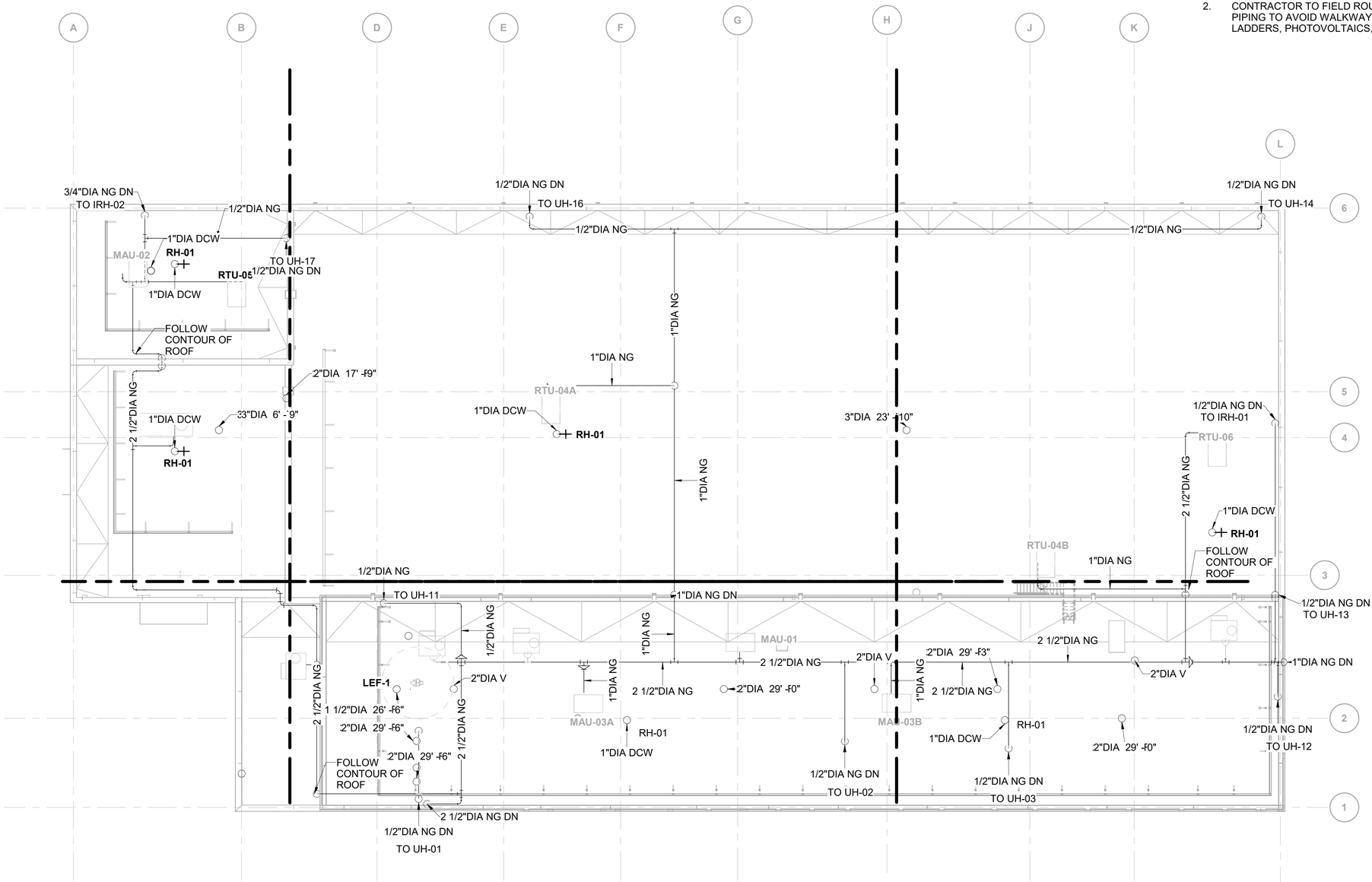
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. ROUTE NATURAL GAS LINES TO EACH MAU/RTU. CONTRACTOR TO FIELD ROUTE LINE DEPENDING ON UNIT LAYOUT/CONNECTIONS.
2. CONTRACTOR TO FIELD ROUTE ALL ROOF PIPING TO AVOID WALKWAYS, WINDOWS, LADDERS, PHOTOVOLTAICS, ETC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




**OVERALL ROOF PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL PLUMBING ROOF PLAN

| project | contract |
|---|---|
| 98101 | |

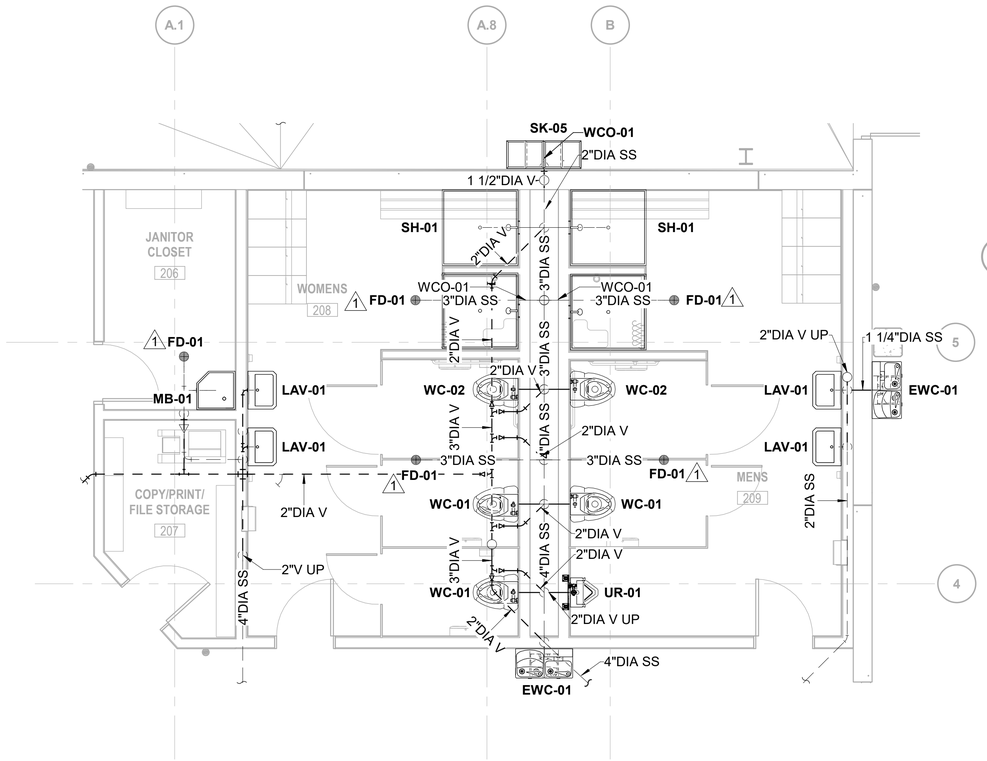
drawing **P214 — 0** rev.

sheet 200 of 542 sheets
file 98101_M

**NOTES:**

1. MOUNT HOSE BIBBS 4'-6" AFF.
2. PROVIDE WALL CLEANOUT UNDERNEATH EWC-01.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

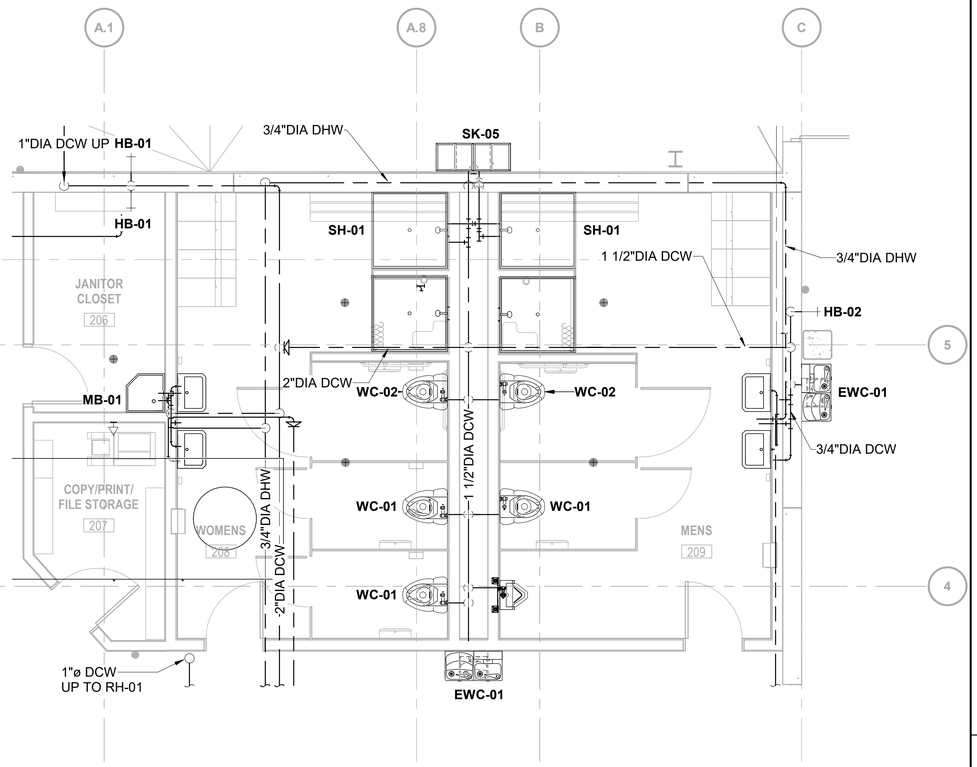



PLAN 1 / P205

**ENLARGED PLAN WASTE & VENT**

0 2' 4' 8'

SCALE IN FEET

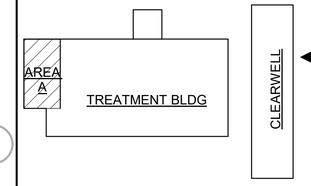



PLAN 2 / P205

**ENLARGED PLAN WATER & GAS**

0 2' 4' 8'

SCALE IN FEET




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS

| project | contract |
|---|---|
| 98101 | |

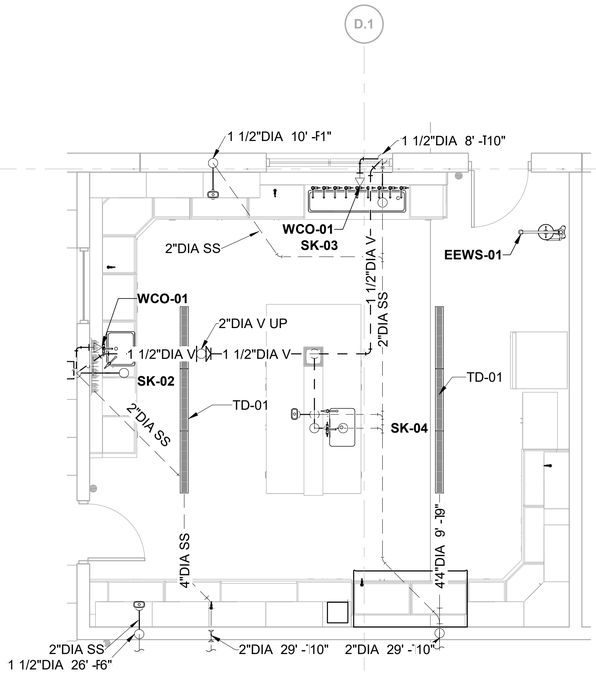
drawing **P301 — 1** rev.

sheet 201 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

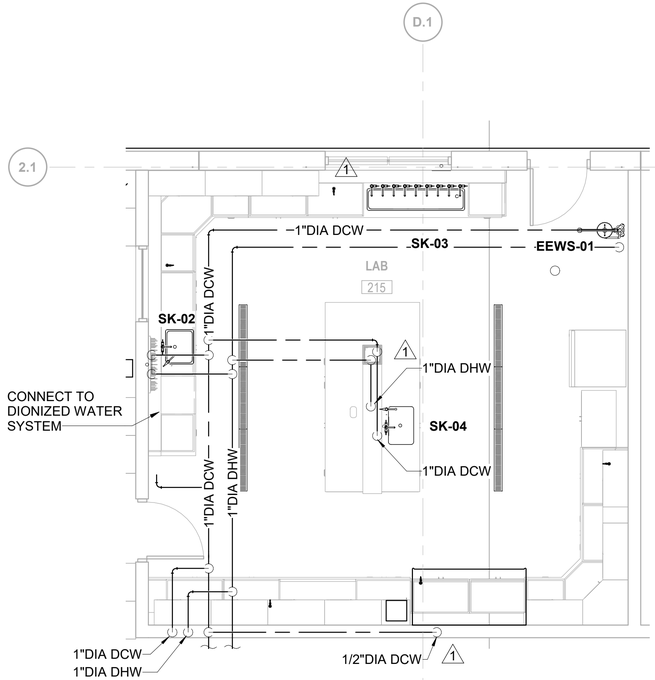
Millimeters
Scale For Microfilming
Inches




PLAN 1 / P209

**ENLARGED PLAN LAB 215**
**WASTE & VENT**

0 2' 4' 8'
SCALE IN FEET




PLAN 2 / P209

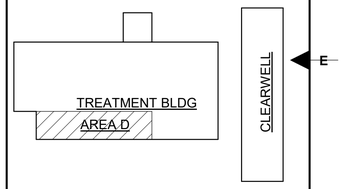
**ENLARGED PLAN LAB 215**
**WATER & GAS**

0 2' 4' 8'
SCALE IN FEET

GENERAL NOTES:

1. INSTALL VACCUM SYSTEM PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. INSTALL DEIONIZED WATER SYSTEM PER MANUFACTURER'S INSTRUCTION. PROVIDE FAUCET AT SK-02 AND SK-04.
3. SEE ARCHITECTURAL DRAWINGS FOR SINK AND FAUCET INFORMATION.
4. PROVIDE 1-1/2" P-TRAP ON FUME HOOD CUP SINK AND TIE INTO 4" SS LINE BELOW. INSTALL PER MANUFACTURER INSTRUCTIONS.
5. FIELD COORDINATE DCW LINE SIZE TO DEIONIZED WATER SYSTEM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS

| project | contract |
|---|---|
| 98101 | |

drawing **P302 — 1** rev.

sheet 202 of 542 sheets

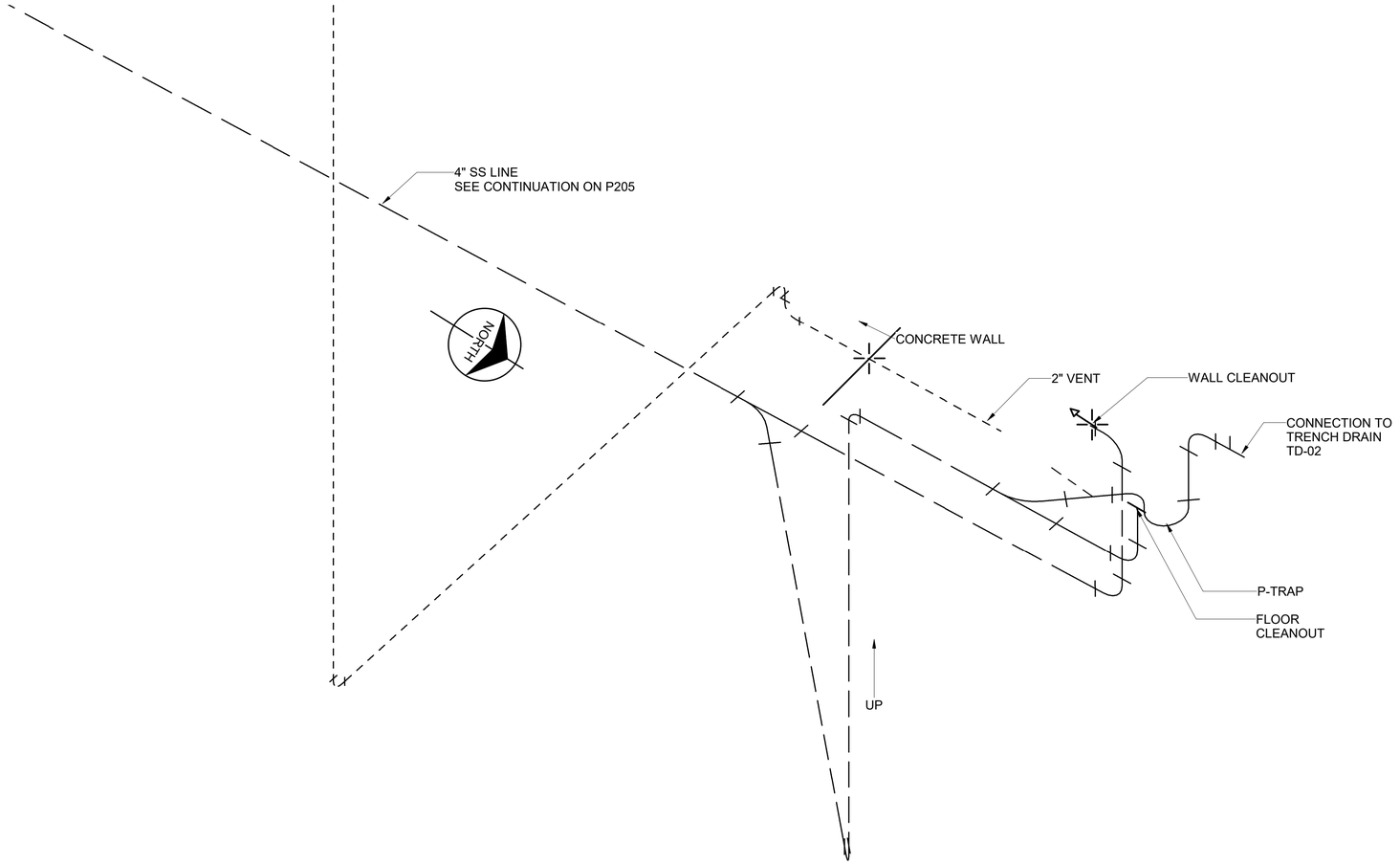
file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

GENERAL NOTES:

1. SEE P202 FOR RELATED PLAN DRAWING.




SAN AND VENT RISER DIAGRAM 1

0 1/2' 1' 2'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | BJR | KP | WP2 - ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

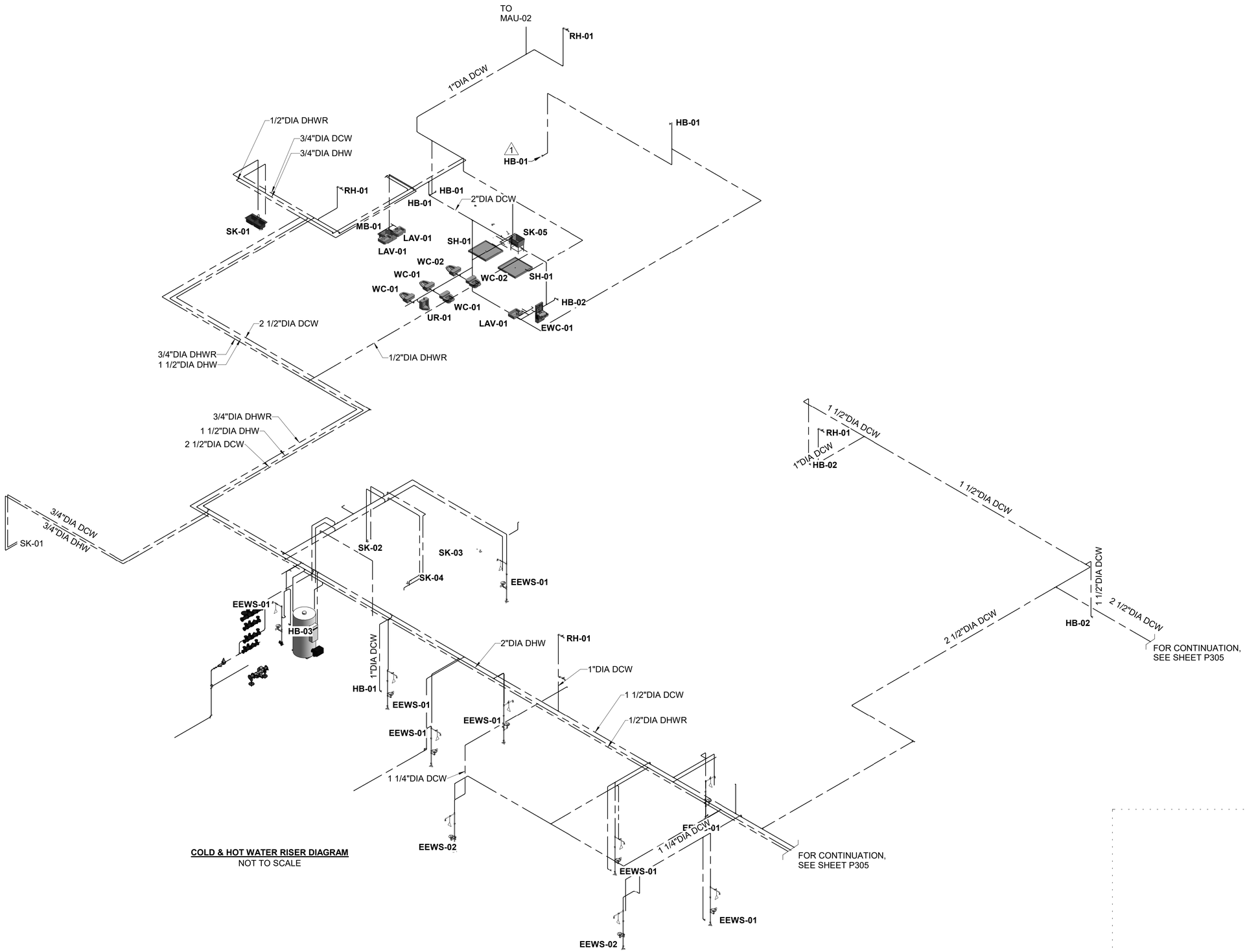
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WASTE/VENT RISER DIAGRAMS

| | |
|---|---|
| project 98101 | contract |
| drawing P303 — 1 | rev. |
| sheet 203 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**COLD & HOT WATER RISER DIAGRAM**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

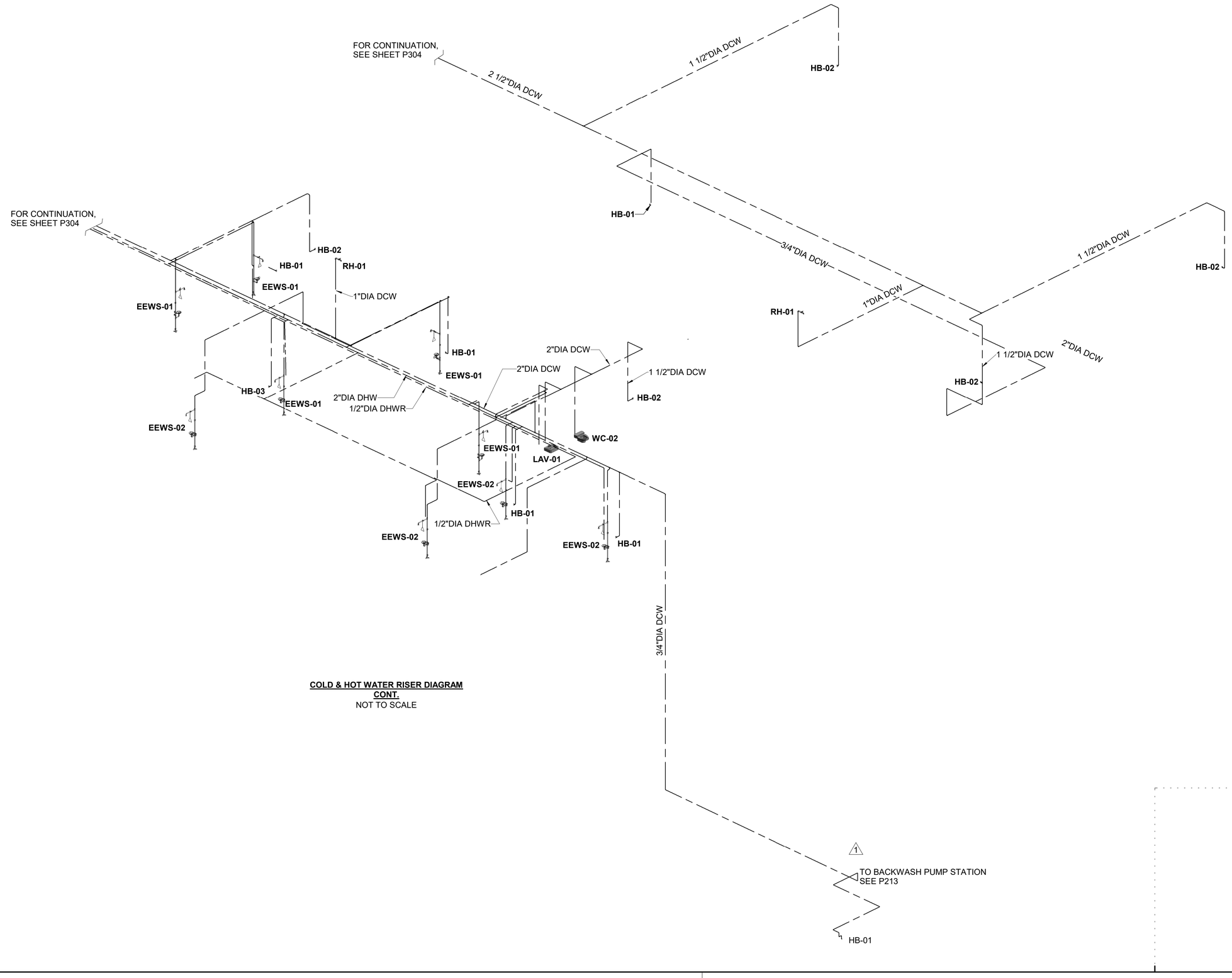
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COLD & HOT WATER RISER DIAGRAM

| | |
|---|---|
| project 98101 | contract |
| drawing **P304 — 1** | rev. |
| sheet 204 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**COLD & HOT WATER RISER DIAGRAM CONT.**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

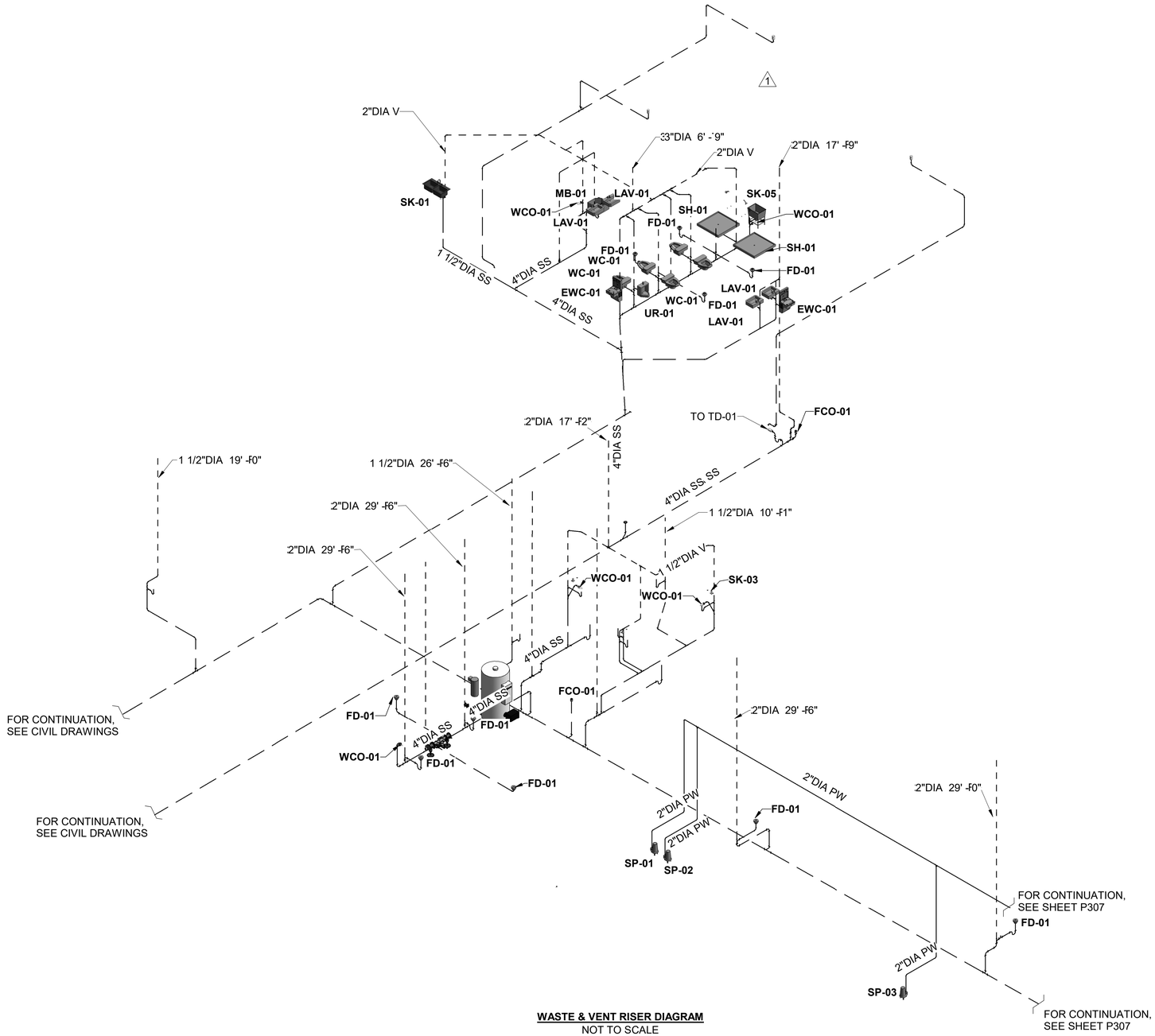
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COLD & HOT WATER RISER DIAGRAM CONT.

| | |
|---|---|
| project 98101 | contract |
| drawing **P305** | rev. **1** |
| sheet 205 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**WASTE & VENT RISER DIAGRAM**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B.RICH |
| designed B. RICH | checked D. OLSEN |

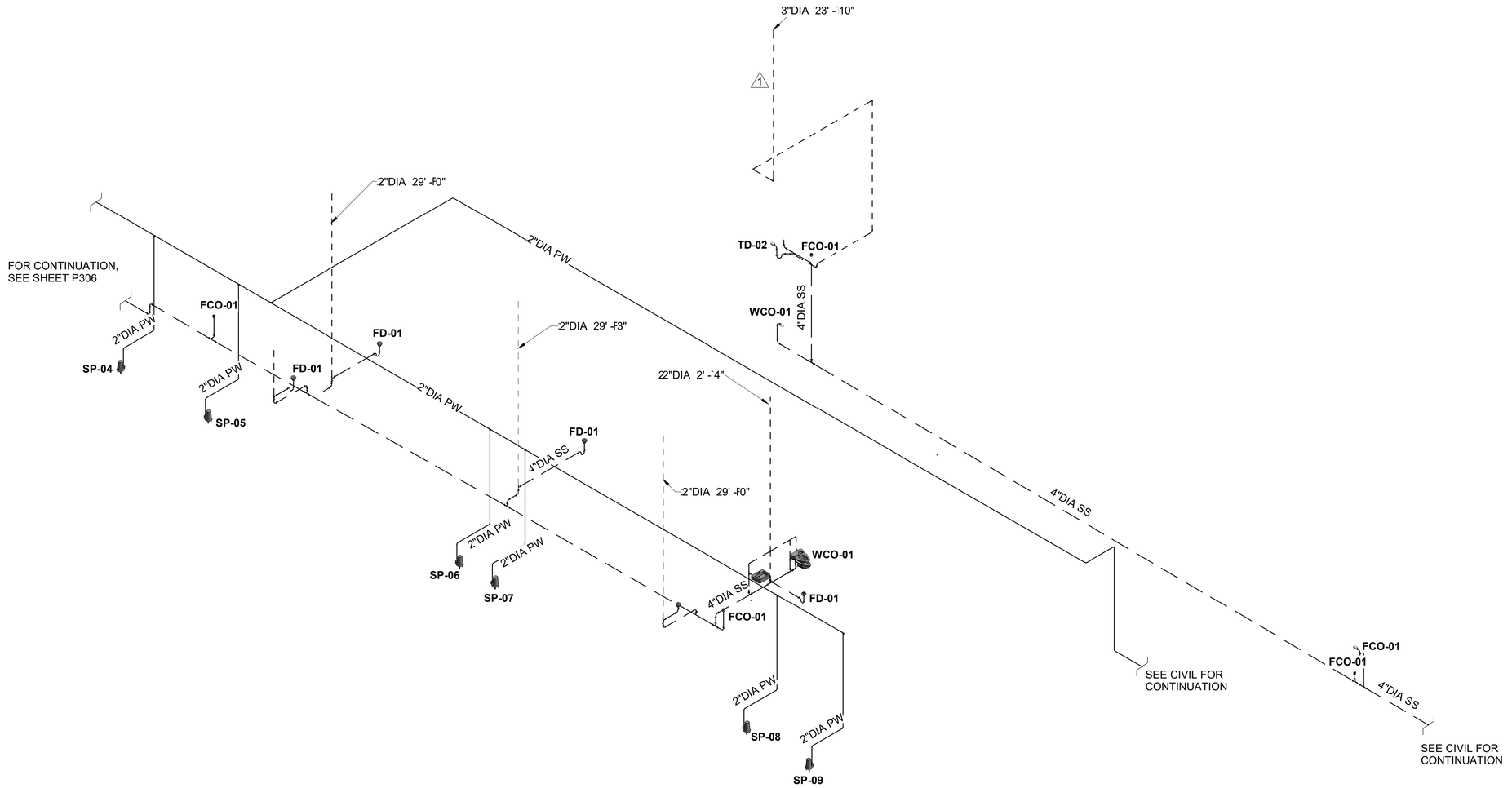
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WASTE & VENT RISER DIAGRAM

| | |
|---|---|
| project 98101 | contract |
| drawing **P306 — 1** | rev. |
| sheet 206 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**WASTE & VENT RISER DIAGRAM CONT.**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WASTE & VENT RISER DIAGRAM CONT.

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**P307 — 1**

**sheet** 207 **of** 542 **sheets**
**file** 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

## SINGLE LINE PIPING

- 18" — PIPE SIZE AND DIRECTION OF FLOW
- GENERIC VALVE
- GLOBE VALVE
- BUTTERFLY VALVE (BFV)
- CHECK VALVE (CV)
- STOP CHECK VALVE
- PLUG VALVE (PV)
- 3-WAY VALVE
- ANGLE VALVE
- RELIEF OR BACKPRESSURE VALVE
- HOSE GATE DRAIN VALVE
- PINCH VALVE
- NEEDLE VALVE
- DIAPHRAGM VALVE
- BALL VALVE (BV)
- P — SELF-CONTAINED PRESSURE REDUCING (REGULATING VALVE)
- S — SOLENOID VALVE
- BACKFLOW PREVENTER
- VB — VACUUM BREAKER
- MS — MOISTURE SEPARATOR
- T — IN-LINE TOTALIZING FLOW METER
- LOCKED OPEN
- LOCKED CLOSED
- NO — NORMALLY OPEN
- NC — NORMALLY CLOSED
- FLEXIBLE HOSE
- EXPANSION ELEMENT (JOINT)
- FLEXIBLE BALL JOINT
- BASKET TYPE STRAINER
- TEE TYPE STRAINER
- Y-TYPE STRAINER
- FLANGED COUPLING ADAPTER (FCA)
- RETAINER FLANGE
- DRAINER ASSEMBLY
- INSULATING FLANGE (I.F.)
- RESTRICTING ORIFICE
- SIGHT FLOW INDICATOR
- ELBOW TURNING DOWN
- ELBOW TURNING UP
- TYPICAL PIPE BREAK
- PIPES IN SECTION
- TEE TURNING DOWN
- TEE TURNING UP
- ABOVE / PIPES CROSSING / BELOW
- ABOVE / PIPES CROSSING WITH BREAK-OUT TO SHOW PIPES OR EQUIPMENT BELOW

- M — IN-LINE FLOW METER
- CLEANOUT (CO)
- DISCHARGE ELBOW ASSEMBLY
- STRAIGHTENING VANE
- REMOVABLE PLUG
- REMOVABLE CAP
- WELDED CAP
- BF — BLIND FLANGE
- DRIP POCKET ASSEMBLY
- STEAM TRAP ASSEMBLY
- AC — AIR COCK
- HB — HOSE BIBB
- WH — WALL HYDRANT
- PIPE ANCHOR
- PIPE GUIDE
- REDUCER
- UNION
- QUICK DISCONNECT COUPLING
- VENT THROUGH ROOF
- INJECTOR
- CENTRIFUGAL PUMP
- DIAPHRAGM METERING PUMP
- A — AIR RELEASE VALVE
- V — VACUUM VALVE
- AV — AIR AND VACUUM VALVE
- V — VACUUM TRAP
- WATER SURFACE (WS)
- PULSATION DAMPENER W/ ISOLATION BALL VALVE
- CALIBRATION COLUMN
- ROTAMETER
- STATIC MIXER
- GAUGE SEAL
- DIAPHRAM PROTECTED PRESSURE SWITCH
- PC — CHEMICAL APPLICATION POINT
- PIPE SUPPORT LOCATION
- PRESSURE REDUCING VALVE
- BLOWER
- SLIDE GATE

## DOUBLE LINE PIPING

- GATE VALVE
- BUTTERFLY VALVE
- FLANGED COUPLING ADAPTOR
- REDUCER
- FLANGED PIPING
- DOUBLE BOLTED SLEEVE COUPLING
- EXPANSION JOINT
- MECHANICAL JOINT PIPING
- HARNESSED SLEEVE COUPLING
- DIAPHRAGM CHECK VALVE
- CHECK VALVE
- BALL VALVE
- A/O — AIR/OIL CYLINDER
- PLUG VALVE
- INLINE STRAINER
- DISMANTLING JOINT
- ELBOW TURNING DOWN
- ELBOW TURNING UP
- ABOVE / PIPES CROSSING / BELOW
- TYPICAL PIPE BREAK
- ABOVE / PIPES CROSSING WITH BREAK-OUT TO SHOW PIPES OR EQUIPMENT BELOW
- PIPES IN SECTION

- AIR VAC
- GLOBE VALVE
- STRAINER
- MAG METER

## ABBREVIATIONS

| | |
|---|---|
| AAG | ABOVE AT GRADE |
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| AMS | AMMONIUM SULFATE |
| BD | BLOWDOWN |
| BFV | BUTTERFLY VALVE |
| BOC | BOTTOM OF CONCRETE |
| BV | BALL VALVE |
| BW | BACKWASH |
| BWW | BACKWASH WASTE |
| CA | COMPRESSED AIR |
| CAP | COAGULANT AID |
| CAS | CAUSTIC SODA |
| CFE | COMBINED FILTER EFFLUENT |
| CI | CAST IRON |
| CL | CENTERLINE |
| CP | COAGULANT PUMP |
| CO | CLEANOUT |
| COAG | FERRIC CHLORIDE/SULFATE |
| COT | CITY OF THORNTON |
| CV | CHECK VALVE |
| DIA | DIAMETER |
| DIP | DUCTILE IRON PIPE |
| DND | DO NOT DISTURB |
| DR | DRAIN |
| DV | DRAIN VALVE |
| DWG | DRAWING |
| EBCT | EMPTY BED CONTACT TIME |
| EGL4 | EAST GRAVEL LAKE 4 |
| EL | ELEVATION |
| FAP | FLOCCULANT AID POLYMER |
| FBS | FILTER BACKWASH SUPPLY |
| FBW | FILTER BACKWASH WASTE |
| FCA | FLANGED COUPLING ADAPTER |
| FDN | FOUNDATION DRAIN |
| FES | FERRIC SULFATE/ CHLORIDE |
| FF | FINISHED FLOOR |
| FLT | FILTRATION |
| FM | FORCE MAIN |
| FMP | FLASH MIX PUMPING |
| FP | FIRE PROTECTION |
| FRP | FIBERGLASS REINFORCED PLASTIC |
| FW | FINISHED WATER |
| GAC | GRANULAR ACTIVATED CARBON |
| GOX | GASEOUS OXYGEN |
| GPM | GALLONS PER MINUTE |
| H2O2 | HYDROGEN PEROXIDE |
| HGL | HYDRAULIC GRADE LINE |
| HP | HORSEPOWER |
| HWL | HIGH WATER LEVEL |
| ID | INNER DIAMETER |
| IE | INVERT ELEVATION |
| INV | INVERT |
| LOX | LIQUID OXYGEN |
| LT | LEFT |
| LWL | LOWER WATER LEVEL |
| MAX | MAXIMUM |
| MG | MILLION GALLONS, MILLIGRAMS |
| MGD | MILLION GALLONS PER DAY |
| MIN | MINIMUM, MINUTE |
| MOCP | MAIN OZONE CONTROL PANEL |
| NG | NATURAL GAS |
| NIC | NOT IN CONTRACT |
| NPW | NON POTABLE WATER |
| O3 | OZONE SOLUTION |
| OC | ON CENTER |
| OF | OVERFLOW |
| OSS | OZONE SYSTEM SUPPLIER |
| OVE | OVERHEAD ELECTRIC |
| OVF | OVERFLOW |
| OZD | OZONE DESTRUCT |
| OZO | OZONE SYSTEM |
| PCV | PUMP CONTROL VALVE |
| PCW | POTABLE COLD WATER |
| PD | PROCESS DRAIN |
| PE | PLAIN END |
| PFR | PIPELINE FLASH REACTOR |
| PHA | PHOSPHORIC ACID |
| PPM | PARTS PER MILLION |
| PRE | PRETREATMENT |
| PRV | PRESSURE REDUCING VALVE |
| PS | PIPE SUPPORT |
| PSI | POUNDS PER SQUARE INCH |
| PVI | POINT OF VERTICAL INFLECTION |
| PV | PLUG VALVE |
| PVC | POLYVINYL CHLORIDE |
| PW | POTABLE WATER |
| RED | REDUCER |
| RT | RIGHT |
| RW | RAW WATER LINE |
| RWS | RAW WATER SUPPLY |
| SAN | SANITARY SEWER |
| SAV | SURGE ANTICIPATION VALVE |
| SBI | SODIUM BISULFITE |
| SCH | SCHEDULE |
| SCFM | STANDARD CUBIC FOOT PER MINUTE |
| SG | SLUICE/SLIDE GATE |
| SH | SODIUM HYPOCHLORITE |
| SHP | SODIUM HYPOCHLORITE |
| SP | SODIUM PERMANGANATE |
| SPE | SODIUM PERMANGANATE |
| SQ | SQUARE |
| SST | STAINLESS STEEL |
| SS | SANITARY SEWER |
| ST | STORM DRAIN |
| STA | STATION |
| SWI | SETTLED WATER INJECTION |
| TBD | TO BE DETERMINED |
| TBR | TO BE REMOVED |
| TDH | TOTAL DESIGN HEAD |
| TEMP | TEMPORARY |
| THRU | THROUGH |
| TOC | TOP OF CONCRETE |
| TOS | TOP OF STEEL |
| TOW | TOP OF WALL |
| TTP | THORNTON TREATMENT PLANT |
| TYP | TYPICAL |
| UGE | UNDERGROUND ELECTRIC |
| UGT | UNDERGROUND TELEPHONE |
| UNO | UNLESS NOTED OTHERWISE |
| VT | VERTICAL TURBINE |
| W | WATER SUPPLY LINE |
| WL | WATERLINE |
| WS | WATER SURFACE |
| WSE | WATER SURFACE ELEVATION |

## LINETYPES

- EXISTING
- NEW CONSTRUCTION
- FUTURE CONSTRUCTION

## VALVE OPERATORS

- S — SOLENOID
- D — DIAPHRAGM
- M — MOTOR

## TAGS

- 74 — EQUIPMENT TAG
- 119 — PIPE PENETRATION
- 145 — VALVE/ METER TAG

**NOTES:**

1. THIS IS A STANDARD PROCESS LEGEND AND NOT ALL ITEMS OR EQUIPMENT AS DESIGNATED HEREON ARE USED ON THIS PROJECT.
2. THIS SHEET ONLY APPLIES TO PROCESS DRAWINGS LABELED DXXX.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date: APRIL 2021 | detailed: C. CALTAGIRONE |
| designed: J. SCHAEFER | checked: A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS LEGEND, SYMBOLS, AND ABBREVIATIONS

| | |
|---|---|
| project: 98101 | contract: |

drawing: **D001 — 1** rev.

sheet 208 of 542 sheets

file 98101_D

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

# THORNTON TREATMENT PLANT DESIGN CRITERIA

| PLANT CAPACITY | |
|---|---|
| MINIMUM PLANT FLOW (MGD) | 3 |
| MAXIMUM FLOW (MGD) | 20 |
| MINIMUM DESIGN TEMPERATURE ( °C) | 0.5 |
| | |
| **RAW WATER SUPPLY** | |
| **STANDLEY LAKE** | |
| MINIMUM FLOW (MGD) | 3 |
| MAXIMUM FLOW (MGD) | 20 |
| | |
| **EAST GRAVEL LAKES 4** | |
| MINIMUM FLOW (MGD) | 3 |
| MAXIMUM FLOW (MGD) | 15 |
| | |
| **PRETREATMENT** | |
| DESIGN CAPACITY (MGD) | 32.18 |
| | |
| **FLASH MIX** | |
| MIXER TYPE | NOZZLE |
| NOZZLE ORIFICE DIAMETER (IN) | 1.375 |
| MIXING INTENSITY G-VALUE (SEC-1) | 1200 |
| TYPE OF PUMP | END-SUCTION CENTRIFUGAL |
| NUMBER OF PUMPS | 2+1 |
| CAPACITY (EA) (GPM) | 235 |
| RATED DESIGN HEAD AT DESIGN CAPACITY (FT) | 70 |
| PUMP MOTOR (HP) | 10 |
| | |
| **FLOCCULATION** | |
| TYPE | HORIZONTAL PADDLE |
| NUMBER OF TRAINS | 2 |
| NUMBER OF STAGES | 3 |
| NUMBER OF FLOCCULATORS PER STAGE | 1 |
| TOTAL BASIN VOLUME (GAL/TRAIN) | 342,600 |
| DETENTION TIME @16.09 MGD (MIN) | 30 |
| DETENTION TIME @10.73 MGD (MIN) | 45 |
| MAX MIXING INTENSITY (G-VALUE) | |
| STAGE 1 (SEC-1) | 40-60 |
| STAGE 2 (SEC-1) | 20-40 |
| STAGE 3 (SEC-1) | 10-20 |
| | |
| **SEDIMENTATION** | |
| NUMBER OF TRAINS | 2 |
| TOTAL BASIN VOLUME (GAL/TRAIN) | 440,000 |
| DETENTION TIME @16.09 MGD (MIN) | 39 |
| DETENTION TIME @10.73 MGD (MIN) | 59 |
| EFFECTIVE PLATE LOADING RATE @ 16.09 MGD (GPM/SQ FT) | 0.30 |
| SURFACE OVERFLOW RATE @ 16.09 (GPD/SQ FT) | 9.08 |
| EFFECTIVE PLATE LOADING RATE @ 10.73 MGD (GPM/SQ FT) | 0.20 |
| SURFACE OVERFLOW RATE @ 16.09 (GPD/SQ FT) | 6.05 |
| PLATE EFFICIENCY (%) | 95 |
| NUMBER OF SOLIDS COLLECTORS, TOTAL | 4 |
| PLATE COVERAGE (% BASIN AREA) | 74.51 |
| | |
| **OZONE SYSTEM** | |
| **LOX BULK STORAGE TANKS (LEASE)** | |
| TYPE | LOX |
| NUMBER | 1 |
| CAPACITY (GAL) | 11,000 |
| PRESSURE RATING (PSI) | 250 |
| | |
| **LOX VAPORIZERS (LEASE)** | |
| TYPE | LOX |
| NUMBER | 2 |
| CAPACITY (SCFH) | 3920 |
| DESIGN AMBIENT TEMPERATURE ( °F) | -3 TO 90 |
| GOX PRESSURE AT OZONE GENERATOR INLET (PSI) | 40 |

| OZONE GENERATORS | |
|---|---|
| TYPE | TUBULAR DIELECTRIC |
| NUMBER | 2 + 0 |
| MINIMUM CAPACITY (EA) (LB/DAY) | 20 |
| MAXIMUM CAPACITY (TOTAL) (LB/DAY) | 753 |
| OZONE DESIGN CONCENTRATION (%) | 10 |
| OZONE CONCENTRATION RANGE (%) | 4-12 |
| | |
| **COOLING WATER SYSTEM PUMPS** | |
| TYPE | END-SUCTION CENTRIFUGAL |
| NUMBER | 2 + 0 |
| CAPACITY (EA) (GPM) | 60 |
| PUMP MOTOR (HP) | 5 |
| NUMBER OF HEAT EXCHANGERS | 2 |
| MAXIMUM TEMPERATURE (F) | 77 |
| COOLING WATER SUPPLY DEMAND (GPM) | 120 |
| COOLING WATER SUPPLY | PLANT SERVICE WATER |
| | |
| **INJECTION SYSTEM** | |
| TYPE | PIPELINE FLASH REACTOR |
| NUMBER | 1 |
| REQUIRED MASS TRANSFER EFFICIENCY (%) | 92 |
| MINIMUM TRANSFERRED OZONE DOSE (MG/L) | 0.75 |
| MAXIMUM TRANSFERRED OZONE DOSE (MG/L) | 4 |
| PROCESS FLOW RANGE (MGD) | 3-21.45 |
| | |
| **SIDESTREAM PUMPS** | |
| TYPE | END-SUCTION CENTRIFUGAL |
| NUMBER | 2 + 0 |
| CAPACITY (EA) (GPM) | 620 |
| PUMP MOTOR (HP) | 30 |
| SIDESTREAM SUPPLY | SETTLED WATER |
| SIDESTREAM FLOW SUPPLY (GPM) | 1200 |
| PRESSURE AT SUCTION LOCATION (FT) | 11.35 |
| PRESSURE AT DISCHARGE LOCATION (FT) | 11.35 |
| | |
| **OZONE CONTACTOR BASIN** | |
| TYPE | SERPENTINE |
| NUMBER | 1 |
| CONTACTOR BASIN VOLUME (GAL) | 124,000 |
| CONTACTOR BASIN HRT @ 21.45 MGD (MIN) | 8 |
| BAFFLE CONFIGURATION | SERPENTINE |
| WATER DEPTH (FT) | 16.08 |
| | |
| **OZONE DESTRUCTION SYSTEM** | |
| TYPE | THERMO-CATALYTIC |
| NUMBER | 1 + 1 |
| CAPACITY (EA) (SCFM) | 70 |
| BLOWER MOTOR (HP) | 3 |
| MAXIMUM DISCHARGE OZONE CONCENTRATION (PPM) | 0.07 |
| | |
| **PRE-FILTER FLASH MIX** | |
| MIXER TYPE | NOZZLE |
| NOZZLE ORIFICE DIAMETER (IN) | 1.688 |
| MIXING INTENSITY G-VALUE (SEC-1) | 750 |
| TYPE OF PUMP | END SUCTION |
| NUMBER OF PUMPS | 1 |
| CAPACITY (EA) (GPM) | 375 |
| RATED DESIGN HEAD AT DESIGN CAPACITY (FT) | 93 |
| PUMP MOTOR (HP) | 20 |

| FILTER SYSTEM | |
|---|---|
| **FILTERS** | |
| TYPE | MIXED MEDIA |
| NUMBER | 6 |
| DESIGN OPERATION FILTRATION RATE (ALL FILTERS IN SERVICE) (GPM/SQ FT) | 4.2 |
| NORMAL OPERATION FILTRATION RATE (1 FILTER OUT OF SERVICE) (GPM/SQ FT) | 5 |
| FILTER WIDTH (EA) (FT) | 23.5 |
| FILTER LENGTH (EA) (FT) | 27 |
| FILTER AREA (EA) (SQ FT) | 634.50 |
| FILTER BOX DEPTH (FT) | 16 |
| FILTER UNIT RUN VOLUME, MINIMUM (GAL/SQ FT) | 10,000 |
| HEADLOSS AVAILABLE (FT) | 10 |
| UNDERDRAIN TYPE | PLASTIC BLOCK LATERALS |
| EBCT (MIN) | 7.48 |
| | |
| **FILTER MEDIA** | |
| TYPE | GAC |
| DEPTH (IN) | 60 |
| EFFECTIVE SIZE (MM) | 1.3-1.5 |
| UNIFORMITY COEFFICIENT | <1.5 |
| TYPE | SAND |
| DEPTH (IN) | 12 |
| EFFECTIVE SIZE (MM) | 0.57-0.63 |
| UNIFORMITY COEFFICIENT | <1.4 |
| SPECIFIC GRAVITY | 2.55 TO 2.65 |
| TOTAL MEDIA DEPTH (IN) | 72 |
| TOTAL MEDIA L/D RATIO | 1,600 |
| | |
| **TROUGHS** | |
| TYPE | MEDIA RETAINING |
| | |
| **FILTER DRAIN PUMP** | |
| NUMBER | 1 |
| CAPACITY (GPM) | 356 |
| PUMP MOTOR (HP) | 2 |
| RATED DESIGN HEAD AT DESIGN CAPACITY (FT) | 10 |
| | |
| **BACKWASH PUMPS** | |
| NUMBER | 1+1 |
| CAPACITY (EA) (GPM) | 7625 |
| PUMP MOTOR (HP) | 150 |
| BACKWASH SUPPLY TANK VOLUME (GAL) | 426,700 |
| RATED DESIGN HEAD AT DESIGN CAPACITY (FT) | 64 |
| | |
| **AIR SCOUR BLOWERS** | |
| TYPE | HYBRID |
| NUMBER | 2+1 |
| AIR SCOUR RATE (SCFM/SQ FT) | 3 TO 5 |
| DISCHARGE PRESSURE (PSI) | 10.3 |
| PUMP MOTOR (HP) | 125 |
| | |
| **WASHWATER WASTE PUMPS** | |
| NUMBER | 1+1 |
| CAPACITY (EA) (GPM) | 1250 |
| PUMP MOTOR (HP) | 15 |
| SLUDGE LINE CAPACITY (MGD) | 1.8 |
| RATED DESIGN HEAD AT DESIGN CAPACITY (FT) | 27 |
| | |
| **WASHWATER WASTE BASINS** | |
| NUMBER OF BASINS | 2 |
| BASIN VOLUME (GAL, EACH) | 215,500 |
| TOTAL BASIN VOLUME (GAL) | 431,000 |
| | |
| **CLEARWELL** | |
| VOLUME (GAL) | 1,090,000 |
| REMOVAL CREDITS (VIRUS) | 2 LOG |
| REMOVAL CREDITS (GIARDIA) | 0.5 LOG |
| BAFFLING FACTOR | 0.7 |
| MINIMUM CHLORINE RESIDUAL (MG/L) | 1.5 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DESIGN CRITERIA I

| project | contract |
|---|---|
| 98101 | |

**drawing** D002 — **rev.** 0

**sheet** 209 **of** 542 sheets

**file** 98101 D_002.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

# THORNTON TREATMENT PLANT DESIGN CRITERIA

## CHEMICAL FEED SYSTEMS

| SODIUM HYPOCHLORITE | |
|---|---|
| SOLUTION CONCENTRATION (%) | 6 TO 12.5 |
| TANK STORAGE VOLUME (EA) (GAL) | 10,450 |
| NUMBER OF STORAGE TANKS | 3 |
| DAYS OF STORAGE | 15.6 |
| NUMBER OF FEED PUMPS | 6 + 0 |
| MAXIMUM DOSAGE (MG/L) | 10 |
| MAXIMUM USAGE (GAL/DAY) | 2,009 |
| TRANSFER PUMP FLOW (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 20 |

| SODIUM HYDROXIDE (CAUSTIC SODA) | |
|---|---|
| SOLUTION CONCENTRATION (%) | 32 OR 50 |
| TANK STORAGE VOLUME (EA) (GAL) | 9,600 |
| NUMBER OF STORAGE TANKS | 3 |
| DAYS OF STORAGE | 16.5 |
| NUMBER OF FEED PUMPS | 5 + 0 |
| MAXIMUM DOSAGE (MG/L) | 40 |
| MAXIMUM USAGE (GAL/DAY) | 1,741 |
| TRANSFER PUMP FLOW (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 20 |

| SODIUM BISULFITE* | |
|---|---|
| SOLUTION CONCENTRATION (%) | 38 |
| TOTE STORAGE VOLUME (EA) (GAL) | 275 |
| NUMBER OF TOTES | 3 |
| DAYS OF STORAGE | 10 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 5 |
| MAXIMUM USAGE (GAL/DAY) | 84 |

| FERRIC CHLORIDE/SULFATE | |
|---|---|
| FERRIC CHLORIDE SOLUTION CONCENTRATION (%) | 40 |
| FERRIC SULFATE SOLUTION CONCENTRATION (%) | 50 |
| TANK STORAGE VOLUME (EA) (GAL) | 14,100 |
| NUMBER OF STORAGE TANKS | 2 |
| DAYS OF STORAGE | 15 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| FERRIC CHLORIDE MAXIMUM DOSE (MG/L) | 50 |
| FERRIC SULFATE MAXIMUM DOSE (MG/L) | 60 |
| MAXIMUM USAGE (GAL/DAY) | 1,875 |
| TRANSFER PUMP FLOW RATE (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 20 |

| SODIUM PERMANGANATE | |
|---|---|
| SOLUTION CONCENTRATION (%) | 20 |
| TANK STORAGE VOLUME (EA) (GAL) | 2,700 |
| NUMBER OF STORAGE TANKS | 2 |
| DAYS OF STORAGE | 25 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 2.5 |
| MAXIMUM USAGE (GAL/DAY) | 216 |
| SL ORP CONTROL CONTACT TIME (SECONDS, 3 MGD) | 672 |
| SL ORP CONTROL CONTACT TIME (SECONDS, 20 MGD) | 100.2 |
| ELG4 ORP CONTROL CONTACT TIME (SECONDS, 3 MGD) | 415 |
| ELG4 ORP CONTROL CONTACT TIME (SECONDS, 20 MGD) | 83 |
| TRANSFER PUMP FLOW RATE (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 15 |

* CHEMICAL FEED SYSTEM CAN ACCOMMODATE TOTES OR DRUMS.

| COAGULANT AID | |
|---|---|
| SOLUTION CONCENTRATION (%) | 100 |
| TANK STORAGE VOLUME (EA) (GAL) | 2,700 |
| NUMBER OF STORAGE TANKS | 2 |
| DAYS OF STORAGE | 50.9 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 5 |
| FLOW (GAL/DAY) | 106 |
| TRANSFER PUMP FLOW (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 15 |

| HYDROGEN PEROXIDE | |
|---|---|
| SOLUTION CONCENTRATION (%) | 34 |
| TANK STORAGE VOLUME (EA) (GAL) | 3,000 |
| NUMBER OF STORAGE TANKS | 2 |
| DAYS OF STORAGE | 13.4 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 8 |
| FLOW (GAL/DAY) | 447 |
| TRANSFER PUMP FLOW (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 15 |

| PHOSPHORIC ACID* | |
|---|---|
| SOLUTION CONCENTRATION (%) | 75 |
| DRUM STORAGE VOLUME (EA) (GAL) | 55 |
| NUMBER OF STORAGE DRUMS | 2 |
| DAYS OF STORAGE | 117 |
| NUMBER OF FEED PUMPS | 1 + 1 |
| MAXIMUM DOSE (MG/L) | 0.08 |
| FLOW (GAL/DAY) | 4.3 |

| AMMONIUM SULFATE | |
|---|---|
| SOLUTION CONCENTRATION (%) | 38 |
| TANK STORAGE VOLUME (EA) (GAL) | 4,000 |
| NUMBER OF STORAGE TANKS | 2 |
| DAYS OF STORAGE | 22.3 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 1.5 |
| FLOW (GAL/DAY) | 257 |
| TRANSFER PUMP FLOW RATE (GPM) | 60 |
| TRANSFER PUMP TDH (FT) | 15 |

| FLOC-AID POLYMER | |
|---|---|
| SOLUTION CONCENTRATION (%) | 1 |
| TYPE OF POLYMER | CATIONIC |
| MIXING TANK VOLUME (EA) (GAL) | 400 |
| NUMBER OF MIXING TANKS | 1 |
| DAYS OF STORAGE | 21.2 |
| NUMBER OF FEED TANKS | 1 |
| STORAGE SACK WT (EA) (LB) | 2,000 |
| NUMBER OF STORAGE SACKS | 2 |
| NUMBER OF MAKE-UP SKIDS | 1 |
| NUMBER OF FEED PUMPS | 2 + 1 |
| MAXIMUM DOSE (MG/L) | 1.0 |
| FLOW (LBS/DAY) | 188 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
DESIGN CRITERIA II

| project | contract |
|---|---|
| 98101 | |

drawing D003 – rev. 0

sheet 210 of 542 sheets

file 98101 D_003.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

STANDLEY LAKE
NORTHERN
EGL4
SP
2
SH
FLASH MIX SUPPLY
FLASH MIX PUMPS
SLEEVE VALVE
FES
CAS
CAP
FAP
FLOCCULATION BASIN #1
SEDIMENTATION BASIN #1
FLOCCULATION BASIN #2
SEDIMENTATION BASIN #2
BROMATE MITIGATION
AMS
H2O2
O3
SBI
OZONE CONTACT CHAMBER
PHA
NUTRIENT
MAINT
PRE-FILTER FLASH MIX PUMP
OZONATED WATER
OVERFLOW
FILTER INLET CHANNEL
BW WASTE CHANNEL
FILTER # 1
FILTER # 2
FILTER # 3
FILTER # 4
FILTER # 5
FILTER # 6
AIR GAP
FILTER DRAIN PUMP
AIR SCOUR BLOWERS
OVERFLOW TO STORM SEWER
WASTE WASHWATER BASIN CELL A
WASTE WASHWATER BASIN CELL B
WASTE WASHWATER PUMPS
EXISTING DETENTION BASIN
TO WES BROWN WTP LAGOONS
BW PUMPS
POTABLE WATER CONNECTION
BACKWASH SUPPLY TANK
CHLORINE CONTACT CHAMBER
DENVER WATER INTERCONNECT
TO EXISITING CLEARWELL NO. 2 (20 MGD)

**KEYED NOTES:**.

1. FUTURE POLYMER FEED POINT.
2. SODIUM PERMANGANATE INJECTION POINT IS LOCATED IN THE YARD.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS FLOW DIAGRAM

| | |
|---|---|
| project 98101 | contract |
| drawing D004 – | rev. 0 |
| sheet 211 of 542 sheets | |
| file 98101D004.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

STANDLEY LAKE
NORTHERN
EGL4
PH/TMP
TURB
ORP
FLASH MIX SUPPLY
FLASH MIX PUMPS
SLEEVE VALVE
FLOCCULATION BASIN #1
FLOCCULATION BASIN #2
SEDIMENTATION BASIN #1
SEDIMENTATION BASIN #2
O3
OZONE CONTACT CHAMBER
PRE-FILTER FLASH MIX PUMP
OZONATED WATER
FILTER INLET CHANNEL
BW WASTE CHANNEL
FILTER # 1
FILTER # 2
FILTER # 3
FILTER # 4
FILTER # 5
FILTER # 6
AIR SCOUR BLOWERS
FILTER DRAIN PUMP
OVERFLOW
AIR GAP
OVERFLOW TO STORM SEWER
WASTE WASHWATER BASIN CELL A
WASTE WASHWATER BASIN CELL B
WASTE WASHWATER PUMPS
BW PUMPS
POTABLE WATER CONNECTION
BACKWASH SUPPLY TANK
EXISTING DETENTION BASIN
TO WES BROWN WTP LAGOONS
CHLORINE CONTACT CHAMBER
FREE CL
DENVER WATER INTERCONNECT
TO EXISITING CLEARWELL NO. 2 (20 MGD)
TOTAL CL
CHLORAMINE/TOTAL AMMONIA, MONO CHLORAMINE

LEGEND:
* GOES TO WATER QUALITY SINK IN LAB
ANALYZER

ANALYZER ABBREVIATIONS:

| | |
|---|---|
| FREE CL | FREE CHLORINE |
| O3 | OZONE RESIDUAL |
| ORP | OXIDATION-REDUCTION POTENTIAL |
| SC | STREAMING CURRENT |
| TMP | TEMPERATURE |
| TURB | TURBIDITY |
| TOTAL CL | TOTAL CHLORINE |

**KEYED NOTES:**.

1. RAW WATER SAMPLES WILL BE TAKEN IN A MANHOLE IN THE YARD.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 10/23/20 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date OCTOBER 2020 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

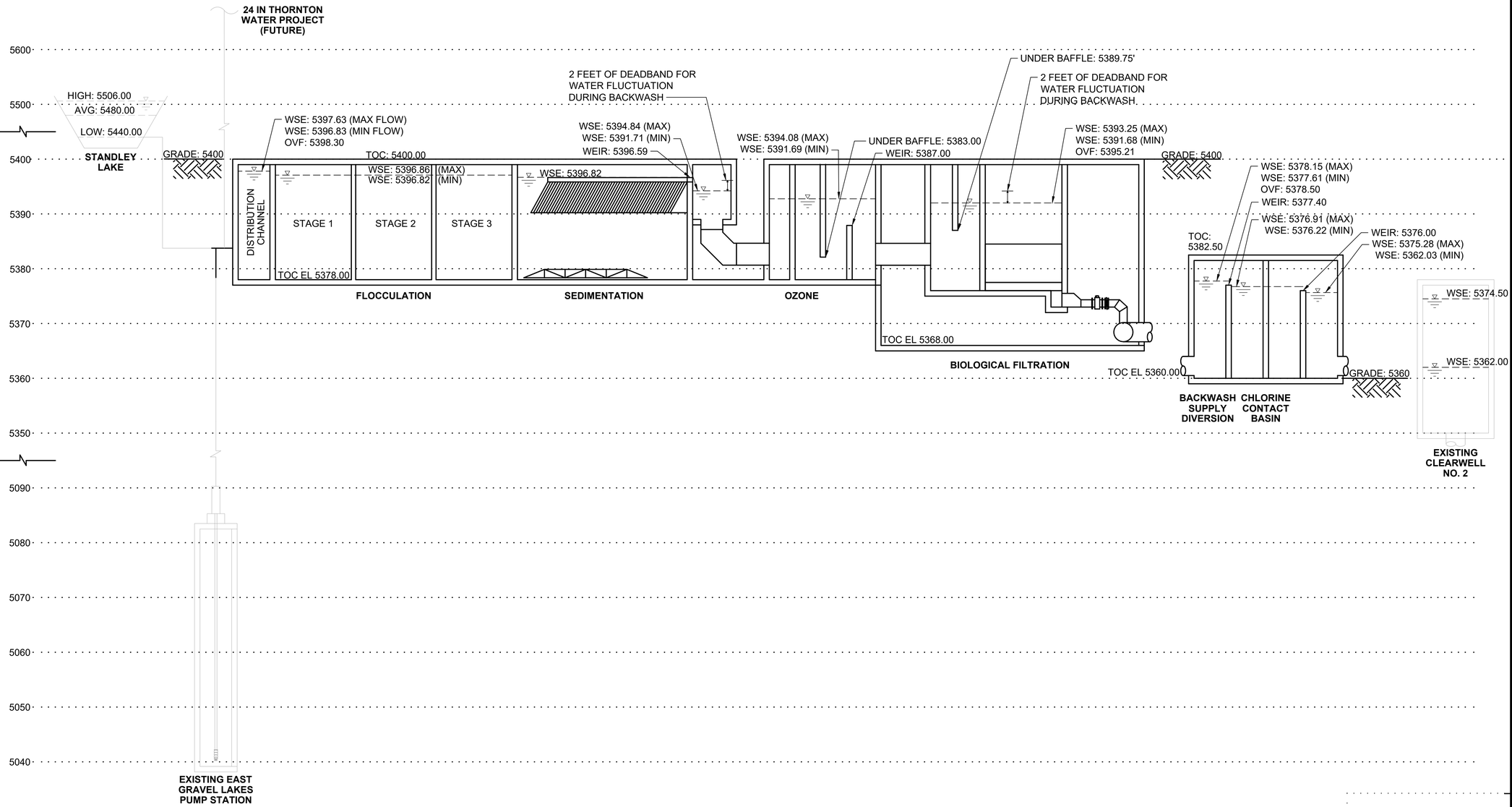
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALYZER LOCATION DIAGRAM

| | |
|---|---|
| project 98101 | contract |
| drawing **D004A** – | rev. **0** |
| sheet 212 of 542 sheets | |
| file 98101D004A.dwg | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**ASSUMPTIONS**

1. CHANNEL FLOW HEADLOSS NEGLIGIBLE.
2. ASSUMES 10 FEET OF HEADLOSS THROUGH A DIRTY FILTER.
3. ALL OVERFLOWS ARE SIZED FOR 30 MGD FLOW RATE.

## HYDRAULIC SCENARIO

| | 3 MGD (MIN) | | 20 MGD (MAX) | |
|---|---|---|---|---|
| | FLOW | # ONLINE | FLOW | # ONLINE |
| PRETREATMENT | 3.22 MGD | 1 TRAIN | 32.18 MGD | 2 TRAINS |
| OZONE | 3.22 MGD | N/A | 21.45 MGD | N/A |
| FILTRATION | 3.22 MGD | 1 FILTERS | 21.45 MGD | 5 FILTERS |
| CHLORINE CONTACT BASIN | 3 MGD | N/A | 20 MGD | N/A |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed J. SCHAEFER | checked A. BEESON |

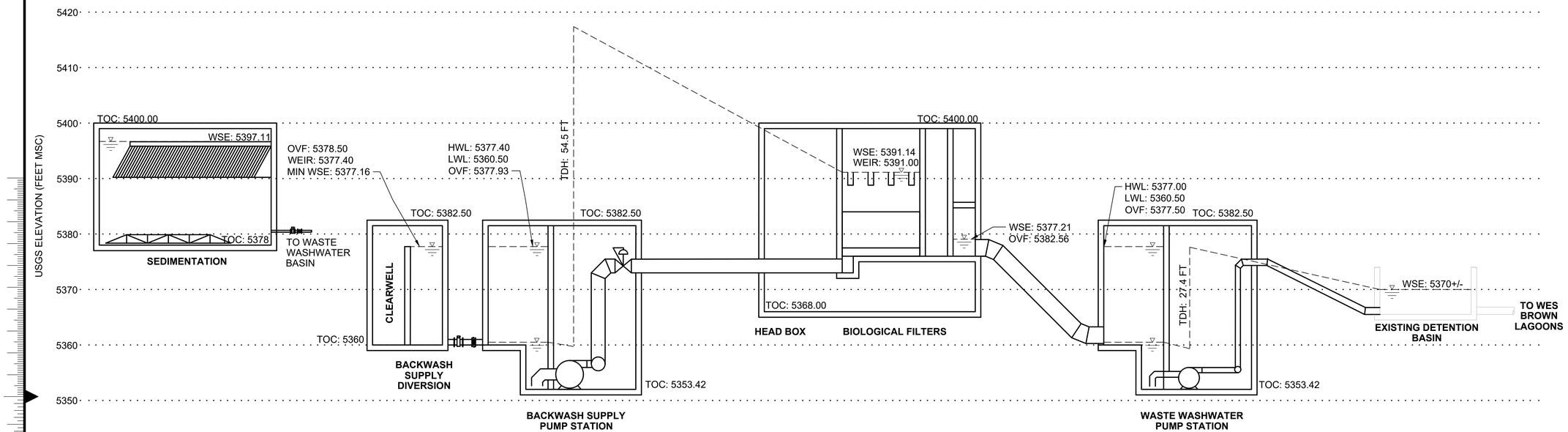
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDRAULIC PROFILE

| | |
|---|---|
| project 98101 | contract |
| drawing D005 – | rev. 0 |
| sheet 213 of 542 sheets | |
| file 98101 D_005.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_005.DWG 10/21/2020 1:50 PM HMMORTON




## HYDRAULIC SCENARIO

| | FLUIDIZING BACKWASH | SOLIDS |
|---|---|---|
| FLOW | 21.6 MGD | 0.292 MGD |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
WASTE HYDRAULIC PROFILE

| project | contract |
|---|---|
| 98101 | |

**drawing** D006 – **rev.** 0

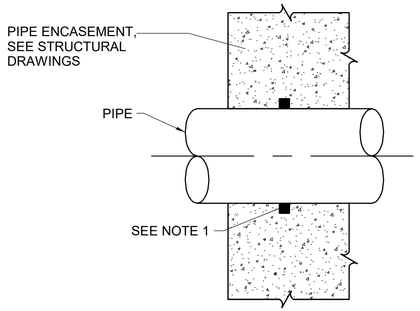
**sheet** 214 **of** 542 sheets

**file** 98101 D_006.DWG

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

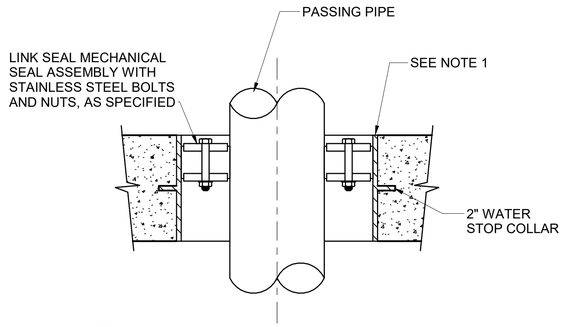
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_006.DWG 10/16/2020 4:01 PM HMMORTON




**NOTES:**

1. Rx WATERSTOP FOR DUCTILE IRON PIPE. SYNCO FLEX WATERSTOP FOR HDPE AND PVC PIPE. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. FOR STEEL PIPE, PROVIDE 2" COLLAR WELDED TO PIPE.
2. PROVIDE WATERSTOP ON PIPE AT EACH END OF ENCASEMENT.

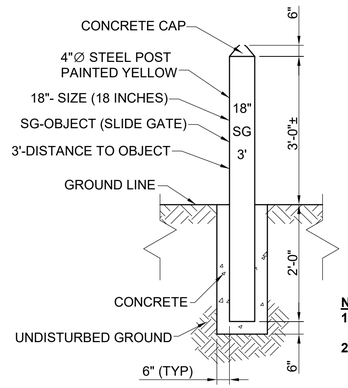
**ENCASED PIPE WATERSTOP DETAIL**
NOT TO SCALE




**NOTES:**

1. CENTURY LINE MODEL CS HDPE SLEEVE FOR PIPE SIZES LESS THAN 12". PIPING GREATER THAN OR EQUAL TO 12" SHALL UTILIZE A STAINLESS STEEL SLEEVE. ALL SLEEVES SHALL BE PER LINK SEAL MANUFACTURER'S RECOMMENDATIONS.
2. GROUT ON TOP OF LINK SEAL TO PREVENT STANDING WATER.

**FLOOR PENETRATION**
NOT TO SCALE

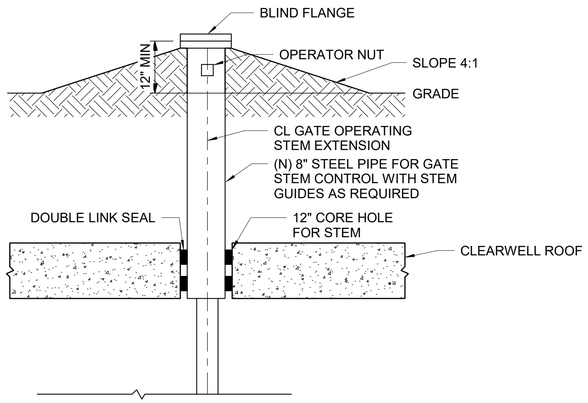



**NOTES:**

1. MARKER POST SHALL BE LOCATED AT 3' DISTANCE TO THE INDICATED OBJECT.
2. IDENTIFICATION MARKS ON POSTS SHALL BE 1" STENCILS INDICATING TYPE OF APPURTENANCE (MN, 18" SLIDE GATE, ETC.) AND THE DISTANCE IN FEET FROM POST. MARKS SHALL BE CAPITAL LETTERS FACING OBJECT.

**MARKER POST DETAIL**
NOT TO SCALE

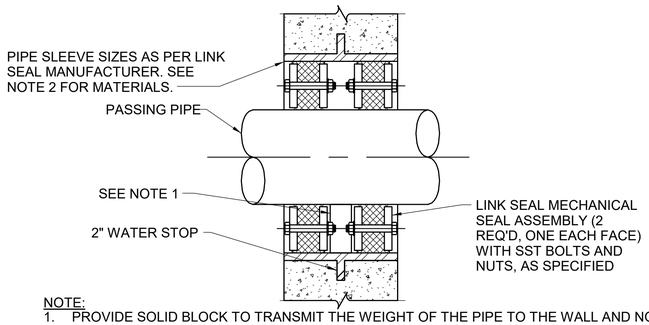
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




**NOTES:**

1. GATE OPERATION STEM EXTENSION AND PIPE SHALL BE SUPPLIED BY GATE MANUFACTURER WITH ALL REQUIRED GUIDES AND SUPPORTS.
2. PROVIDE MARKER POST, SEE DETAIL IN PROCESS DRAWINGS.

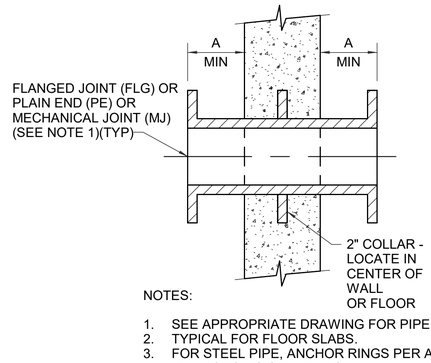
**SLIDE GATE OPERATOR EXTENSION**
NOT TO SCALE




NOTE:

1. PROVIDE SOLID BLOCK TO TRANSMIT THE WEIGHT OF THE PIPE TO THE WALL AND NOT THE LINK SEAL. THE MASONRY BLOCK SHALL BE MOUNTED UNDERNEATH THE PIPE FOR 90° CENTERED IN THE MIDDLE OF THE PIPE.
2. PIPE SLEEVE SHALL BE 3/8" 304 STAINLESS STEEL WHEN ONE OR BOTH SIDES OF THE SEAL IS IN A WATER BASIN OR BURIED BELOW GRADE. PIPE SLEEVE SHALL BE 3/8" HOT DIP GALVANIZED STEEL WHEN BOTH SIDES OF SEAL ARE NON-WATER BASINS OR WHEN ONE SIDE IS EARTH AND ONE SIDE IS NON-WATER BASIN.

**DOUBLE LINK SEAL DETAIL**
NOT TO SCALE

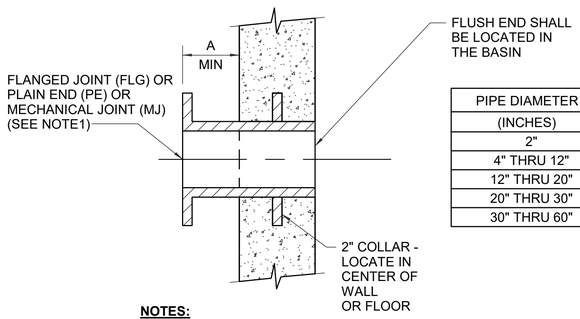



| PIPE DIAMETER (INCHES) | A (IN.) |
|---|---|
| 2" | 4 |
| 4" THRU 12" | 6 |
| 12" THRU 20" | 8 |
| 20" THRU 30" | 10 |
| 30" THRU 60" | 12 |

NOTES:

1. SEE APPROPRIATE DRAWING FOR PIPE JOINT TYPE.
2. TYPICAL FOR FLOOR SLABS.
3. FOR STEEL PIPE, ANCHOR RINGS PER AWWA M-11. REINFORCING STEEL MUST HAVE 2" MINIMUM CLEARANCE FROM WALL PIPE AND COLLAR.

**WALL PIPE DETAIL**
NOT TO SCALE

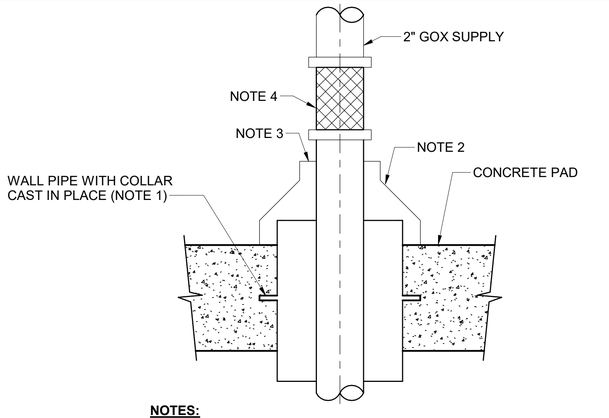



| PIPE DIAMETER (INCHES) | A (IN.) |
|---|---|
| 2" | 4 |
| 4" THRU 12" | 6 |
| 12" THRU 20" | 8 |
| 20" THRU 30" | 10 |
| 30" THRU 60" | 12 |

**NOTES:**

1. SEE APPROPRIATE DRAWING FOR PIPE JOINT TYPE.
2. TYPICAL FOR FLOOR SLABS.
3. FOR STEEL PIPE, ANCHOR RINGS PER AWWA M-11.
4. REINFORCING STEEL MUST HAVE 2" MINIMUM CLEARANCE FROM PIPE AND COLLAR.

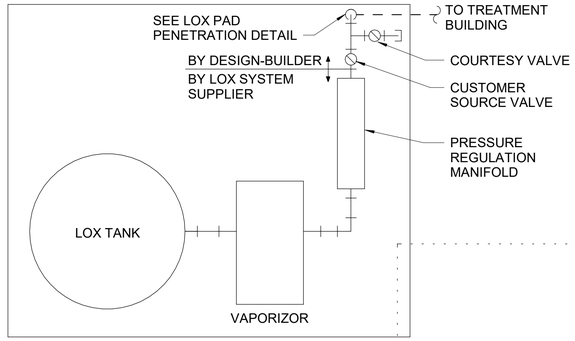
**FLUSH PIPE PENETRATION WITH COLLAR**
NOT TO SCALE




**NOTES:**

1. INSTALL 4" PE x PE WALL PIPE WITH WALL COLLAR.
2. PROVIDE AND INSTALL FERNCO-STYLE COUPLING SIZED AS REQUIRED TO FIT LOX SUPPLY LINE AND WALL PIPE.
3. SEAL TOP JOINT OF COUPLING WITH WATERTIGHT SEALANT.
4. PROVIDE AND INSTALL 2" METRAFLEX MODEL SST0200 FLEXIBLE METAL HOSE IN VERTICAL SECTION OF GOX SUPPLY LINE.

**LOX PAD PENETRATION**
NOT TO SCALE




**NOTES:**

1. NOT ALL EQUIPMENT IN LOX AREA IS SHOWN HERE FOR CLARITY. ONE-LINE PIPING REPRESENTATIVE OF ALL VAPORIZER/LOX TANK CONNECTIONS.
2. LOX SYSTEM EQUIPMENT SHALL BE PROCURRED BY OTHERS. A SEPARATE BUILDING PERMIT WILL BE OBTAINED FOR THE LOX SYSTEM EQUIPMENT BY MEANS OF A DEFERRED BUILDING DEPARTMENT SUBMITTAL.

**LOX AREA**
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS DETAILS I

| project | contract |
|---|---|
| 98101 | |

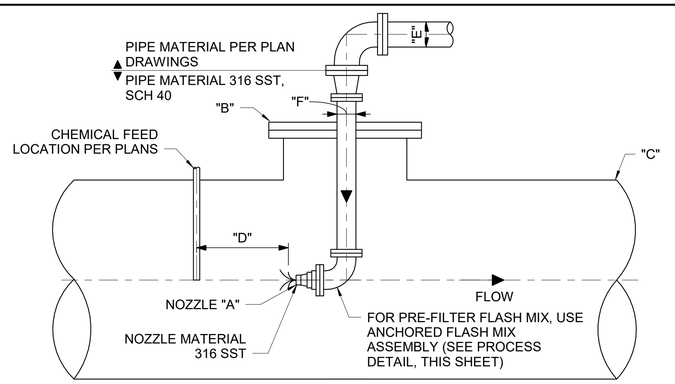
drawing **D007 — 1** rev.

sheet 215 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

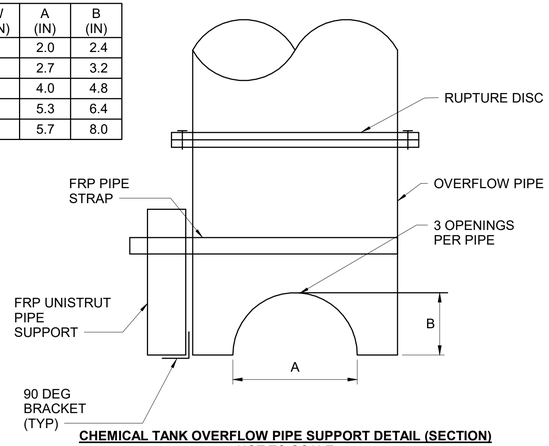



**PRETREATMENT FLASH MIX NOZZLE ASSEMBLY**
NOT TO SCALE

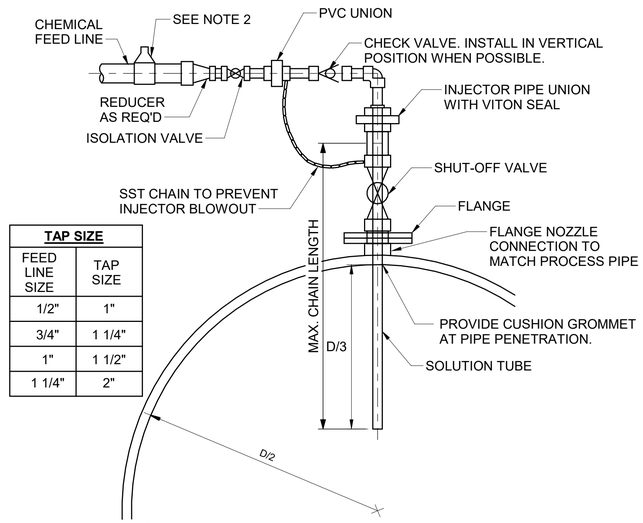
1

| | PRETREATMENT |
|---|---|
| A | SPRAYING SYSTEMS CO. FULLJET NOZZLE 3" CAPACITY 120. |
| B | 12" |
| C | 30" PRETREATMENT INLET |
| D | 45" (MIN) |
| E | 4" |
| F | 3" |

| OVERFLOW PIPE DIA (IN) | A (IN) | B (IN) |
|---|---|---|
| 3 | 2.0 | 2.4 |
| 4 | 2.7 | 3.2 |
| 6 | 4.0 | 4.8 |
| 8 | 5.3 | 6.4 |
| 10 | 5.7 | 8.0 |




**CHEMICAL TANK OVERFLOW PIPE SUPPORT DETAIL (SECTION)**
NOT TO SCALE



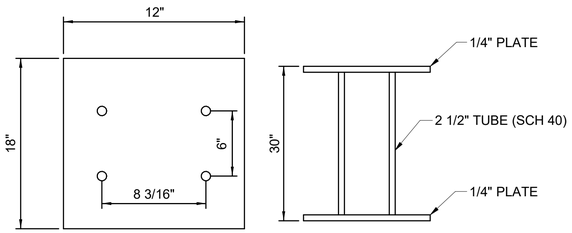

| TAP SIZE | |
|---|---|
| FEED LINE SIZE | TAP SIZE |
| 1/2" | 1" |
| 3/4" | 1 1/4" |
| 1" | 1 1/2" |
| 1 1/4" | 2" |

**NOTES:**

1

1. DIFFUSERS TO BE SIZED AS REQUIRED FOR PROPER OPERATION BY CHEMICAL SYSTEM SUPPLIER.
2. GRIFFCO G-SERIES BACKPRESSURE VALVE, OR APPROVED EQUAL W/UNIONS.
3. DIFFUSER MATERIALS SHALL BE HASTELLOY C FOR FERRIC SULFATE, FERRIC CHLORIDE, PHOSPHORIC ACID, AND SODIUM HYPOCHLORITE AND STAINLESS STEEL FOR ALL OTHER CHEMICALS.
4. PROVIDE REDUNDANT DIFFUSER FOR CAUSTIC AND AMMONIA INJECTION LOCATIONS.

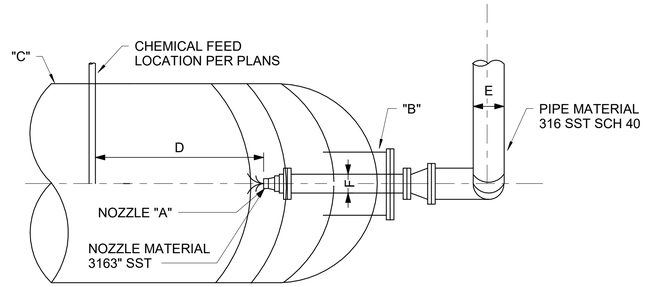
**CHEMICAL QUILL INJECTION DIFFUSER DETAIL**




**NOTE:**

1. ALL STEEL SHALL BE COATED WITH 10 MIL MDFT TNEMEC #66 EPOXY.
2. MATERIAL OF PUMP STAND TO MATCH CHEMICAL PANEL MATERIAL.

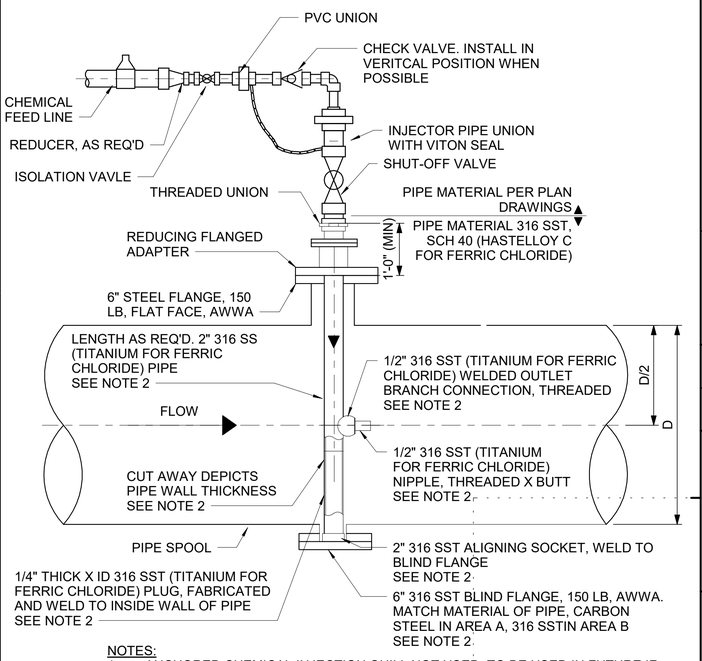
1 **CHEMICAL PUMP STAND**
NOT TO SCALE




**PRE-FILTER FLASH MIX NOZZLE ASSEMBLY**
NOT TO SCALE

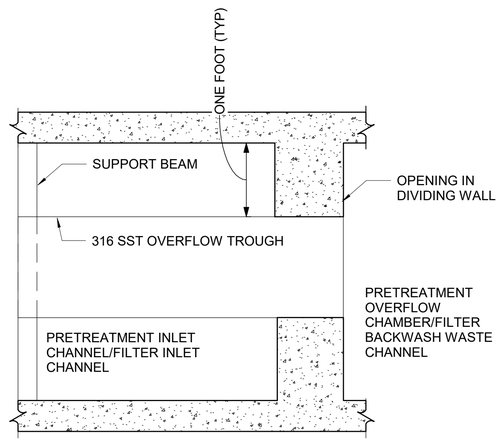
1

| | PRE-FILTER |
|---|---|
| A | SPRAYING SYSTEMS CO. FULLJET NOZZLE 4" CAPACITY 160. |
| B | 10" |
| C | 48" OZONATED WATER |
| D | 72" (MIN) |
| E | 6" |
| F | 4" |

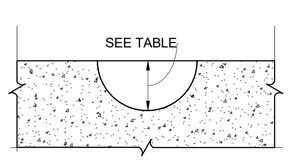



NOTES:
1. ANCHORED CHEMICAL INJECTION QUILL NOT USED. TO BE USED IN FUTURE IF NEEDED
2. TYPICAL QUILL WAS INSTALLED, SEE DETAIL ABOVE. THIS DETAIL DEMONSTRATES HOW AN ANCHORED QUILL CAN BE USED IN THE FUTURE.

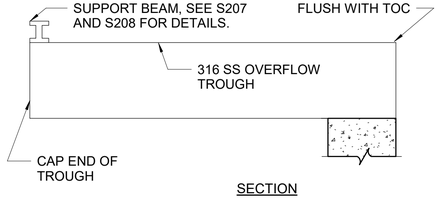
1 **ANCHORED CHEMICAL INJECTION QUILL**
NOT TO SCALE




PLAN




1 SECTION




SECTION

**TROUGH DIMENSIONS**

| | TROUGH LENGTH | TROUGH WIDTH | TROUGH DEPTH | TOP OF TROUGH ELEVATION |
|---|---|---|---|---|
| PRE-TREATMENT OVERFLOW TROUGH | 8'-0" | 3'-0" | 1'-6" | 5398.30 |
| FILTER INFLUENT OVERFLOW TROUGH | 7'-8" | 2'-6" | 1'-3" | 5395.21 |

1 **OVERFLOW TROUGH DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS DETAILS II

| project | contract |
|---|---|
| 98101 | |

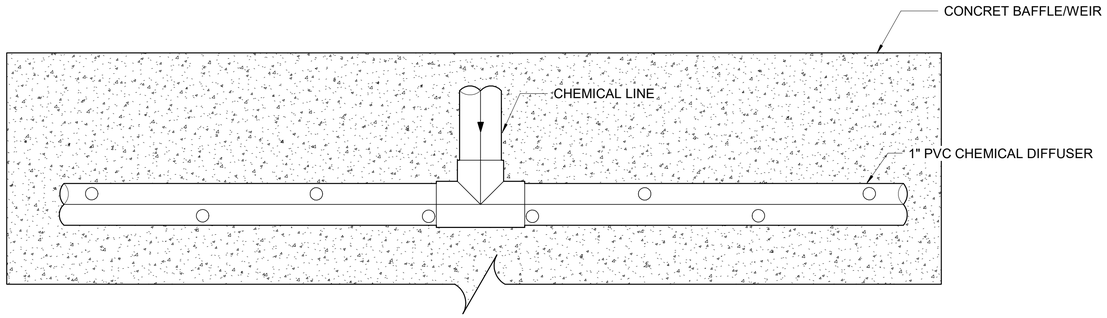
drawing **D008 — 1** rev.

sheet 216 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

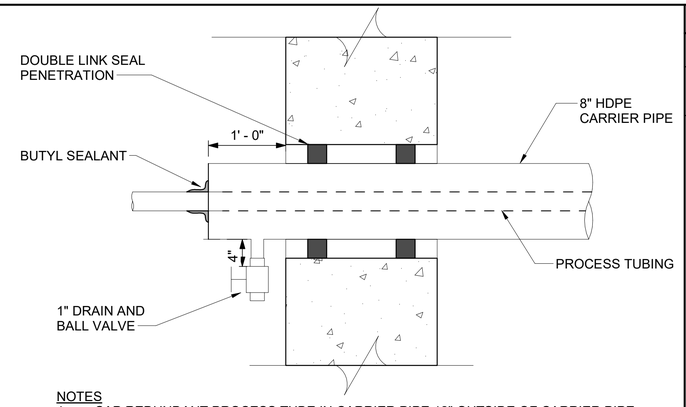
Millimeters
Scale For Microfilming
Inches




**NOTES:**
1. HOLES SHALL BE 1/4" IN DIAMETER AND SPACED 6" APART.
2. SUPPORT DIFFUSER WITH PS-5 SUPPORTS, SPACED A MAXIMUM OF 5' APART. SEE STRUCTURAL DETAILS.
3. PIPE MATERIAL AND SUPPORTS SHALL BE 316 STAINLESS STEEL FOR ALL DIFFUSERS IN THE OZONE CONTACT BASIN.

**CHEMICAL DIFFUSER**

NOT TO SCALE

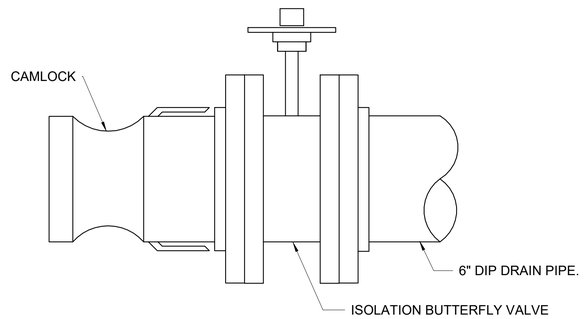



NOTES
1. CAP REDUNDANT PROCESS TUBE IN CARRIER PIPE 12" OUTSIDE OF CARRIER PIPE.
2. WRAP PROCESS TUBE WITH BUTYL TAPE AT PENETRATION. TRANSITION TO PIPE MATERIAL REQUIRED FOR CHEMICAL ON INTERIOR OF BUILDING.
3. ONLY ONE PIPE IS SHOWN FOR CLARITY. ALL PIPES SHALL BE LOCATED IN ONE CARRIER PIPE AS INDICATED IN THE DRAWINGS.

**CARRIER PIPE TERMINATION DETAIL**

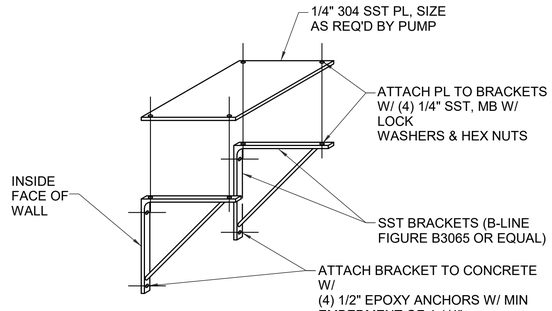
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

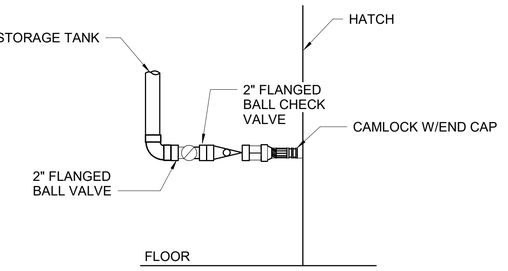



**CAMLOCK DETAIL**

NOT TO SCALE

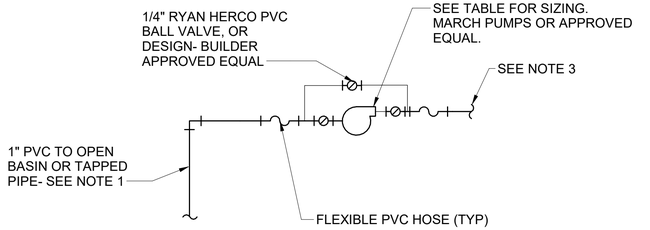



**WATER QUALITY SAMPLE PUMP SUPPORT**
NOT TO SCALE




**NOTES:**
1. SEE ARCHITECTURAL DETAILS FOR FILL STATION HATCH/EXTERIOR AND PIPE SUPPORT DETAILS.

**CHEMICAL STORAGE TANK FILL STATION**
NOT TO SCALE

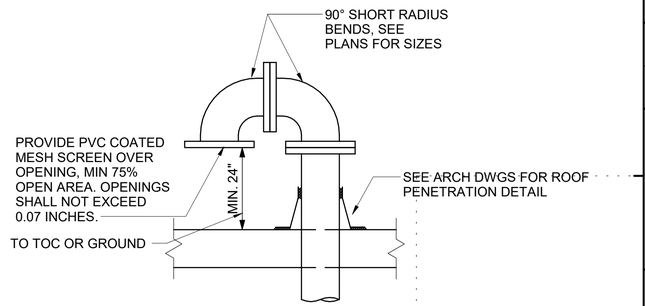



| 1 SAMPLE PUMP TAG(S) | FLOW (GPM) | TDH (FT) | MARCH PUMP SERIES |
|---|---|---|---|
| RWS-SMP-11001 | 5 | 30 | AC-5C |
| RWS-SMP-11002 | | | |
| RWS-SMP-11003 | | | |
| PRE-SMP-26100 | | | |
| PRE-SMP-26200 | | | |
| OZO-SMP-36001 | 5 | 20 | AC-5C* |
| OZO-SMP-36002 | | | |
| OZO-SMP-36003 | | | |
| OZO-SMP-36004 | | | |
| FLT-SMP-43000 | 5 | 37 | SERIES 5.5 |
| CCC-SMP-62001 | 5 | 60 | SERIES 5.5 |
| CCC-SMP-62002 | | | |
| FWT-SMP-62010 | | | |
| FWT-SMP-62011 | | | |

*PUMPS SHALL USE MATERIALS COMPATIBLE WITH OZONE.

**NOTES**
1. PROVIDE 3/4" STAINLESS STEEL BALL VALVE FOR TAPPED PIPE SAMPLE LOCATIONS.
2. ROUTE DISCHARGE TO LOCATIONS INDICATED ON THE DRAWINGS, INCLUDING ONE (1) MANUAL SAMPLE TAP. PROVIDE ISOLATION BALL VALVE TO EACH LOCATION.
3. SEE WATER QUALITY SAMPLE PUMP SUPPORT DETAIL FOR MOUNTING DETAILS.

**WATER QUALITY SAMPLE PUMP DETAIL**
NOT TO SCALE




**NOTES**
1. RAISE BENDS AS REQ'D.

**VENT DETAIL**
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS DETAILS III

| project | contract |
|---|---|
| 98101 | |

drawing **D009 — 1** rev.

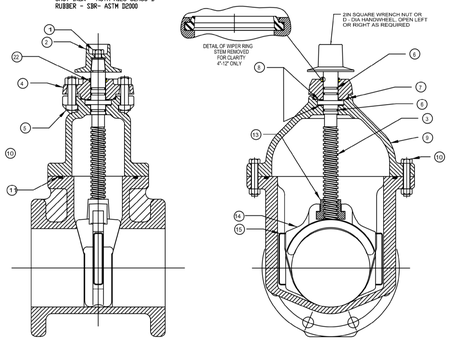
sheet 217 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Inches
Scale For Microfilming

NOTES:
1. RUBBER ENCAPSULATED CAST IRON DISC
   CAST IRON – ASTM A126 CLASS B
   RUBBER – SBR– ASTM D2000




| ITEM | DESCRIPTION | REQ'D | MATERIAL | ASTM | |
|---|---|---|---|---|---|
| 1 | CAP SCREW | 1 | 304 STAINLESS STEEL | A193 | GRADE B8 |
| 2 | WRENCH NUT | 1 | CAST IRON | A126 | CLASS B |
| 3 | STEM | 1 | BRONZE | B138 | ALLOY C67600 |
| 4 | STUFFING BOX | 1 | CAST IRON | A126 | CLASS B |
| 5 | STUFFING BOX BOLTS<br>STUFFING BOX NUTS | 2 | 304 STAINLESS STEEL<br>304 STAINLESS STEEL | A193<br>F594 | GRADE B8<br>GROUP 1 |
| 6 | O-RING | 3 | RUBBER | D2000 | NITRILE |
| 7 | O-RING | 1 | RUBBER | D2000 | NITRILE |
| 8 | ANTI-FRICTION WASHER | 2 | CELCON | | |
| 9 | BONNET | 1 | CAST IRON | A126 | CLASS B |
| 10 | BONNET BOLTS<br>BONNET NUTS | "2" | 304 STAINLESS STEEL<br>304 STAINLESS STEEL | A193<br>F594 | GRADE B8<br>GROUP 1 |
| 11 | BONNET GASKET (O-RING) | 1 | RUBBER | D2000 | NITRILE |
| 13 | DISC NUT | 1 | BRONZE | B62 | ALLOY C83600 |
| 14 | DISC | 1 | SEE NOTE 1 | | |
| 15 | GUIDE CAP | 2 | CELCON | | |
| 16 | BODY - FLANGE ENDS | 1 | CAST IRON | | CLASS B |
| 17 | HANDWHEEL | 1 | CAST IRON | A126 | CLASS B |
| 18 | BODY - MJ ENDS | 1 | CAST IRON | A126 | CLASS B |
| 19 | BODY - SLIP-ON ENDS | 1 | CAST IRON | A126 | CLASS B |
| 20 | BODY - FLANGE x MJ END | 1 | CAST IRON | A126 | CLASS B |
| 21 | BODY - FLANGE x SLIP-ON END | 1 | CAST IRON | A126 | CLASS B |
| 22 | WIPER RING | 1 | RUBBER | | |

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

GATE VALVE DETAIL

ISSUED: APRIL 2010
REVISED:
DRAWING NO. 200–6A

GATE VALVES

VALVES SHALL BE MANUFACTURED AND TESTED IN ACCORDANCE WITH AWWA STANDARD C-500, "METAL-SEATED GATE VALVES FOR WATER", OR AWWA C-509 "RESILIENT-SEATED GATE VALVES, 3 THROUGH 12 NPS, FOR WATER AND SEWAGE SYSTEMS" WITH THE FOLLOWING ADDITIONAL REQUIREMENTS OR EXCEPTIONS:

VALVES MEETING AWWA STANDARD C-500 SHALL BE OF A MODIFIED WEDGE DISC CONSTRUCTION, COATED BOTH INSIDE AND OUT WITH A TOUGH, DURABLE EPOXY TO PREVENT CORROSION; CAST IRON BODY, FULLY BRONZE MOUNTED WITH NON-RISING STEMS.

VALVES SHALL BE SUITABLE FOR FREQUENT OPERATION, AS WELL AS SERVICE INVOLVING LONG PERIODS OF INACTIVITY. THE OPERATING PRESSURE FOR VALVE SIX (6) INCHES THROUGH TWELVE (12) INCHES SHALL BE 200 PSI.

VALVE STEMS SHALL BE MADE OF BRONZE AND THREADED SO THAT VALVES SHALL OPEN BY TURNING TO THE LEFT (COUNTERCLOCKWISE). EACH VALVE SHALL BE FURNISHED WITH A TWO (2) INCH SQUARE OPERATING NUT. THE OPERATING NUT SHALL HAVE AN ARROW SHOWING THE DIRECTION OF OPENING AND THE WORD "OPEN" CAST ON THE NUT. THE STEM SEAL SHALL CONSIST OF TWO (2) O-RINGS; ONE OR BOTH POSITIONED ABOVE THE THRUST COLLAR WITH THE VALVE UNDER PRESSURE IN THE FULL OPEN POSITION.

BOLTS AND HEX NUTS USED ON THE BONNET OF THE VALVE SHALL BE THE MANUFACTURER'S STANDARD FABRICATED FROM A LOW ALLOY STEEL FOR CORROSION RESISTANCE.

FLANGES SHALL BE SIZED AND DRILLED IN ACCORDANCE WITH ANSI B-16.1 CLASS 125 SPECIFICATIONS. FLANGES SHALL BE MACHINED IN A FLAT FACE OR MACHINED TO A FLAT SURFACE WITH A SERRATED FINISH IN ACCORDANCE WITH AWWA STANDARD C-207 "STEEL PIPE FLANGES."

THE COMPONENTS OF THE MECHANICAL JOINT SHALL CONFORM TO ANSI A-21.11 (AWWA STANDARD C-111). THE TEE-HEAD BOLTS AND HEXAGON NUTS SHALL BE FABRICATED FROM A HIGH STRENGTH, STAINLESS STEEL, OR AN APPROVED EQUAL.

AFTER APPROVED FACTORY ASSEMBLY, EACH VALVE SHALL BE GIVEN THE OPERATION AND HYDROSTATIC TESTS IN ACCORDANCE WITH THE REFERENCED SPECIFICATIONS.

WEDGE DISC VALVES SHALL BE LIMITED TO THE FOLLOWING MANUFACTURERS OR APPROVED EQUIVALENT: WATEROUS SERIES-500, MUELLER-A-2350, KENSEAL, CLOW R/N: RESILIENT-SEATED GATE VALVES SHALL BE LIMITED TO THE AMERICAN-KO "CRS" GATE VALVE OR THE U.S. PIPE "METROSEAL" GATE VALVE.

THE MANUFACTURER SHALL FURNISH A CERTIFIED STATEMENT THAT THE INSPECTION AND SPECIFIED TESTS HAVE BEEN MADE AND THE RESULTS THEREOF COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE STANDARD(S) HEREIN SPECIFIED. A COPY OF THE CERTIFICATION SHALL BE SENT TO THE DEVELOPMENT ENGINEERING MANAGER UPON REQUEST.

CORROSION PROTECTION SHALL BE COVERED IN SUBSECTION 204.2 OF THESE STANDARDS AND SPECIFICATIONS.

VALVES SHALL BE HANDLED IN SUCH A MANNER AS TO PREVENT ANY INJURY OR DAMAGE AND SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION. VALVES SHALL BE SET IN SUCH A MANNER THAT THE VALVE STEMS ARE PLUMB. VALVES SHALL BE LOCATED AT POINTS AS SPECIFIED IN SUBSECTION 203.8 OF THESE STANDARDS AND SPECIFICATIONS.

VALVE BOXES

VALVE BOX PARTS SHALL BE MANUFACTURED BY TYLER, SERIES 6860 OR AN APPROVED EQUIVALENT MANUFACTURER AND MADE OF GRAY CAST IRON, BUFFALO TYPE WITH NO. 160 OVAL BASE. A FIVE AND ONE-QUARTER (5 ¼) INCH SCREW-TYPE SHAFT SHALL BE ADJUSTABLE FROM 45 INCHES TO 66 INCHES. VALVE BOX LIDS SHALL BE MARKED WITH THE WORD "WATER" AND SHALL HAVE A LIP OR FLANGE EXTENDING INTO THE VALVE BOX SHAFT. NO SLIP-TYPE BOXES SHALL BE ALLOWED. THE VALVE BOX SHALL BE OF A DESIGN WHICH SHALL NOT TRANSMIT SHOCK OR STRESS TO THE VALVE AND SHALL BE CENTERED AND PLUMB OVER THE OPERATING NUT OF THE VALVE WITH THE BOX COVER FLUSH WITH THE SURFACE OF THE PAVEMENT. IN NON-PAVED AREAS, A 24 INCH SQUARE CONCRETE COLLAR IS REQUIRED AROUND VALVE BOX COVER AS PER THE STANDARD DETAIL IN SECTION 200 OF THESE STANDARDS AND SPECIFICATIONS. IN UNIMPROVED ROADWAYS THE VALVE BOX COVER SHALL BE SET SIX (6) INCHES BELOW FINAL GRADE WITH A MARKER POST INDICATING THE LOCATION AS PER THE STANDARD DETAIL DRAWING.

THE MANUFACTURER SHALL FURNISH A CERTIFIED STATEMENT THAT THE INSPECTION AND SPECIFIED TESTS HAVE BEEN MADE AND THE RESULTS THEREOF COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE STANDARD(S) HEREIN SPECIFIED. A COPY OF THE CERTIFICATION SHALL BE SENT TO THE DEVELOPMENT ENGINEERING MANAGER UPON REQUEST.

FOR VALVE BOXES ALONG FIRE SPRINKLER LINES THE LID SHALL BE LABELED "FIRE".

CORROSION PROTECTION SHALL BE COVERED IN SUBSECTION 204.2 OF THESE STANDARDS AND SPECIFICATIONS.

FINAL ELEVATION OF VALVE BOXES SHALL BE LEFT TO THE DISCRETION OF THE DEVELOPMENT ENGINEERING MANAGER.

VALVE BOXES SHALL BE INSTALLED PLUMB.

VALVE BOXES WHICH HAVE SHIFTED DURING BACKFILL OPERATIONS AND ARE NO LONGER PLUMB, SHALL BE RE-EXCAVATED AND RE-ALIGNED TO THE SATISFACTION OF THE DEVELOPMENT ENGINEERING MANAGER.

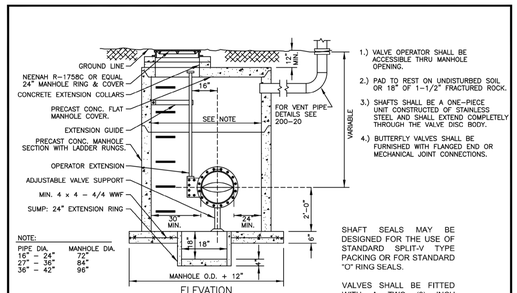
FOR GREENBELT AREA APPLICATION, REFER TO DETAIL 200-7

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

GATE VALVE AND VALVE BOX NOTES

ISSUED: APRIL 2010
REVISED:
DRAWING NO. 200–6B




NOTE:

| PIPE DIA. | MANHOLE DIA. |
|---|---|
| 16" – 24" | 72" |
| 27" – 36" | 84" |
| 36" – 42" | 96" |

1.) VALVE OPERATOR SHALL BE ACCESSIBLE THRU MANHOLE OPENING.

2.) PAD TO REST ON UNDISTURBED SOIL OR 18" OF 1–1/2" FRACTURED ROCK.

3.) SHAFTS SHALL BE A ONE–PIECE UNIT CONSTRUCTED OF STAINLESS STEEL AND SHALL EXTEND COMPLETELY THROUGH THE VALVE DISC BODY.

4.) BUTTERFLY VALVES SHALL BE FURNISHED WITH FLANGED END OR MECHANICAL JOINT CONNECTIONS.

SHAFT SEALS MAY BE DESIGNED FOR THE USE OF STANDARD SPLIT-V TYPE PACKING OR FOR STANDARD "O" RING SEALS.

VALVES SHALL BE FITTED WITH A TWO (2) INCH SQUARE OPERATING NUT AND SHALL OPEN TO THE LEFT (COUNTERCLOCKWISE).

NOTE: BUTTERFLY VALVES SHALL BE CLASS 150–B AND CONFORM TO AWWA SPECIFICATION C–504

THE MANUFACTURER SHALL FURNISH A CERTIFIED STATEMENT THAT THE INSPECTION AND SPECIFIED TESTS HAVE BEEN MADE AND THE RESULTS THEREOF COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE STANDARD(S). A COPY OF THE CERTIFICATION SHALL BE SENT TO THE DEVELOPMENT ENGINEERING MANAGER UPON REQUEST.

N.T.S.

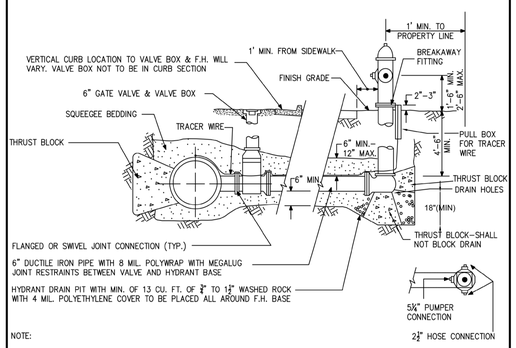
CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

16" TO 42" VALVE AND VAULT DETAIL

ISSUED: JANUARY 2005
REVISED: APRIL 2010
DRAWING NO. 200–8

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 03/19/21 | LG | KH | CONFORMING TO CONSTRUCTION RECORDS |

## FIRE HYDRANT ASSEMBLY




NOTE:

FIRE HYDRANTS SHALL BE LIMITED TO THE FOLLOWING MANUFACTURERS ONLY:
1) MUELLER COMPANY 5–1/4 SUPER CENTURION
2) WATEROUS COMPANY (1) MODEL WB–250–PACER
SHOE AND BARREL SHALL BE CONNECTED WITH HIGH STRENGTH STAINLESS BOLTS AND NUTS
HYDRANT SHALL HAVE A FIVE (5') FOOT CLEAR ZONE ON EACH SIDE OF HYDRANT (TEN (10') FOOT EASEMENT AROUND).
MINIMUM DISTANCE FROM DRIVEWAYS SHALL BE SIX (6) FEET.
HYDRANTS SHALL CONFORM TO AND BE TESTED IN ACCORDANCE WITH AWWA SPECIFICATION C–502.
HYDRANTS SHALL BE MADE OF CAST IRON WITH FULL BRONZE MOUNTINGS.
INLET SHALL FIT SIX (6) INCH PIPE WITH BARREL LENGTH SUFFICIENT FOR A FIVE (5) FOOT TRENCH.
ONLY TWO (2) HEIGHT EXTENSIONS MAY BE USED PER HYDRANT.
HYDRANT BASES SHOULD NOT BE ANY DEEPER THAN SIX (6) FEET FROM THE TOP OF FINISHED GRADE.
MAIN VALVE OPENING IN THE HYDRANT SHALL BE NO LESS THAN FIVE (5) INCHES IN DIAMETER.
THREADS ON NOZZLES SHALL BE NATIONAL STANDARD.
OPERATING NUT & NOZZLE COVERS SHALL BE NATIONAL STANDARD PENTAGON MEASURING ONE AND ONE–HALF (1½) INCHES FROM POINT TO OPPOSITE FLAT AND SHALL OPEN CLOCKWISE.
HYDRANTS SHALL BE PLUMBED VERTICALLY WITH PUMPER NOZZLE FACING STREET.
NO WATER SERVICE MAIN TAPS SHALL BE MADE TO A DISTRIBUTION MAIN WITHIN FIVE (5) FEET OF A FIRE HYDRANT BRANCH MAIN.
NO HORIZONTAL BENDS OR OFFSETS SHALL BE USED IN INSTALLING FIRE HYDRANT BRANCH MAINS.

EACH HYDRANT SHALL BE PAINTED WITH OSHA ENAMEL, SAFETY YELLOW, OR AN APPROVED EQUIVALENT.
FIRE HYDRANT ASSEMBLIES SHALL BE MEGALUGGED IN ACCORDANCE WITH SUBSECTION 204.1 (N)

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

FIRE HYDRANT ASSEMBLY DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 200–10

THRUST BLOCKS SHALL BE CONSTRUCTED AT BENDS AND FITTINGS WHICH RESULT IN UNBALANCED LINE THRUST. CARE SHALL BE TAKEN NOT TO BLOCK OUTLETS OR TO COVER BOLTS, NUTS, CLAMPS OR OTHER FITTINGS OR TO MAKE THEM INACCESSIBLE.

A BOND BREAKER SHALL BE PLACED BETWEEN THE FITTING AND THE THRUST BLOCK TO AID IN EASE OF FUTURE REMOVAL.

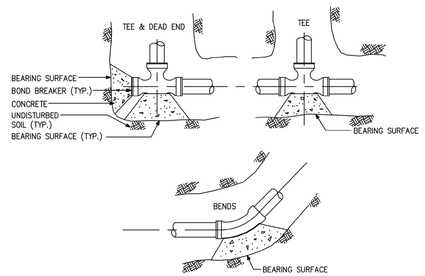
THE VERTICAL SIDES OF THE CONCRETE THRUST BLOCKS SHALL BE FORMED TO ALLOW FOR SYMMETRICAL THRUST.

WHEN IT IS IMPOSSIBLE THROUGH OVER EXCAVATION OR OTHER CAUSES TO POUR A THRUST BLOCK AGAINST UNDISTURBED EARTH, HARNESS RODS SHALL BE REQUIRED TO ANCHOR THE FITTINGS TO THE MAIN UPON APPROVAL OF THE DEVELOPMENT ENGINEERING MANAGER.

BACKFILL MAY BE PLACED OVER THE THRUST BLOCK ONCE THE SURFACE HAS SET SUFFICIENTLY TO RESIST THE WEIGHT OF THE BACKFILL.

NO DRY KICKERS SHALL BE ALLOWED.

NO HAND MIXED CONCRETE SHALL BE ALLOWED.




PLAN VIEW

NOTES:
1. THRUST BLOCKS MUST BE CAST IN PLACE CONCRETE.
2. NO TAMPING OR COMPACTING SHALL BE ALLOWED ABOVE THRUST BLOCK FOR A MINIMUM OF TWENTY–FOUR (24) HOURS AFTER PLACEMENT.
3. CONCRETE MUST SET A MINIMUM OF FORTY–EIGHT (48) HOURS PRIOR TO THE PERFORMANCE OF A HYDROSTATIC TEST.
4. BEARING SURFACE BASED ON BEARING STRENGTH OF 3000 P.S.F. AND MAIN PRESSURE OF 200 P.S.I.. FOR MAINS GREATER THAN 16" OR VERICAL THRUSTS, SHOW AREA REQUIREMENT ON STANDARD DETAILS.
5. BOND BREAKER TO BE MINIMUM OF 8 MIL. POLYETHYLENE PLASTIC.

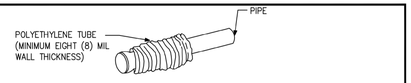
N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

THRUST BLOCK DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 200–11

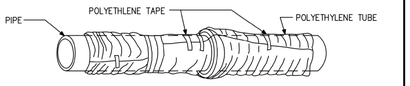
FOR D.I.P.:




STEP 1




STEP 2




STEP 3

NOTE: POLYETHYLENE ENCASEMENT MATERIAL SHALL BE MANUFACTURED IN ACCORDANCE WITH CURRENT ASTM STANDARD. THE RAW MATERIAL USED TO MANUFACTURE POLYETHYLENE FILM SHALL BE TYPE I, CLASS A, GRADE E–1 IN ACCORDANCE WITH CURRENT ASTM STANDARD.

STEP 1 – PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO TRENCH.

STEP 2 – PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC TUBE IN PLACE.

STEP 3 – OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPED IN PLACE.

FOR STEEL:

BITUMINOUS MATERIAL IS TO BE USED FOR CORROSION PROTECTION ON ALL STEEL PIPES.

SOIL RESISTIVITY TESTS:

SOIL RESISTIVITY TESTS AND/OR ANY OTHER SOIL TESTS ARE REQUIRED WITH THE UTILIZATION OF METAL PIPING OR AT THE SOLE DISCRETION OF THE DEVELOPMENT ENGINEERING MANAGER, OTHER MEANS OF CORROSION PROTECTION MUST BE SPECIFICALLY APPROVED BY THE DEVELOPMENT ENGINEERING MANAGER. THE RESPONSIBLE PARTY SHALL INCUR THE COSTS OF ALL SOIL TESTING AS REQUIRED.

N.T.S.

CITY OF THORNTON, COLORADO
STANDARDS & SPECIFICATIONS

CORROSION PROTECTION DETAIL

ISSUED: APRIL 1992
REVISED: APRIL 2010
DRAWING NO. 200–15

BURNS McDONNELL

| date | detailed |
|---|---|
| MARCH 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
YARD PIPING DETAILS I

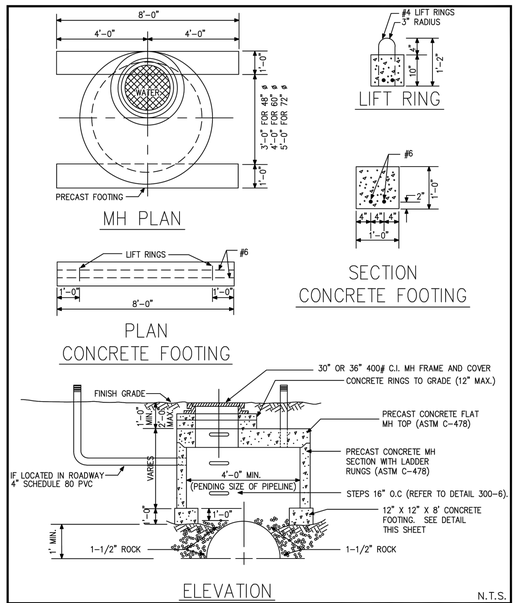
| project | contract |
|---|---|
| 98101 | |

drawing D010 – rev. 1

sheet 218 of 542 sheets

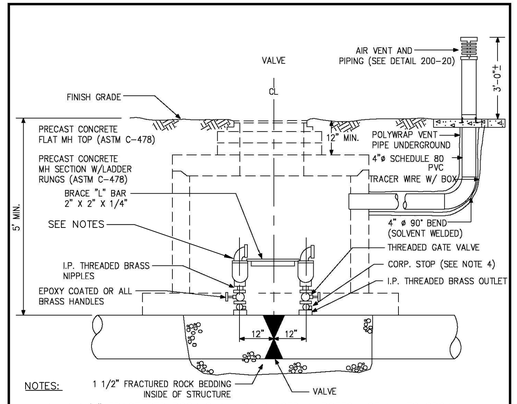
file 98101 D_011.DWG

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>AIR RELIEF VALVE ASSEMBLY<br>MANHOLE DETAIL | ISSUED:<br>APRIL 1992<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>200-13A |

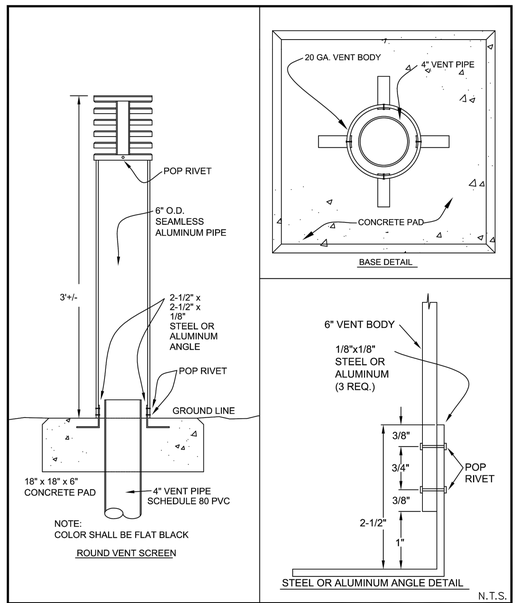



NOTES:

1. 1 1/2" FRACTURED ROCK SHALL BE PLACED IN BOTTOM OF MH TO CROWN OF PIPE ONLY.
2. PIPE AND FITTINGS SHALL BE BRASS.
3. PIPELINES 24" IN DIAMETER AND LARGER SHALL HAVE MH DIAMETERS OF 60" MINIMUM. MH DIAMETER SHALL BE DETERMINED BY ENGINEER.
4. WITH I.P. THREADED OUTLET, CORP. STOP SHALL BE I.P. THREADED BOTH ENDS (MUELLER H-10012 OR APPROVED EQUAL). FOR DIRECT TAP ON PIPE, CORP. STOP SHALL BE MUELLER (CC)THREADED ONE END, I.P. THREADED OTHER (H-10003 OR OTHER APPROVED BY THE DEVELOPMENT ENGINEERING MANAGER).
5. ARI D040 OR APPROVED EQUAL FOR POTABLE WATER USE. ARI D025 OR APPROVED EQUAL FOR SEWER USE. ARI D021 OR APPROVED EQUAL FOR RAW WATER USE. IN INSTANCES WHERE NO ISOLATION VALVE IS CALLED OUT PROVIDE AS SINGLE ARV.

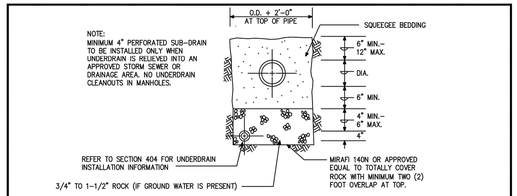
N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>AIR RELIEF VALVE ASSEMBLY<br>DETAIL | ISSUED:<br>APRIL 1992<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>200-13B |

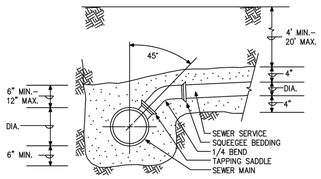



N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>TYPICAL AIR VENT DETAIL | ISSUED:<br>JANUARY 2005<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>200-20 |

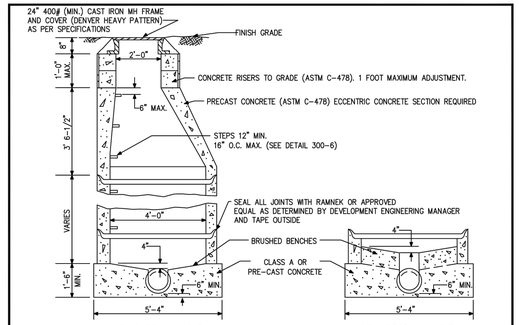



SERVICE STUB-INS SHALL BE EXTENDED AT LEAST TO PROPERTY LINE AND SHALL BE PLUGGED WITH A WATERTIGHT COMPRESSION STOP. ADJACENT TO THE END OF THE STUB IN, A FOUR (4) FOOT LENGTH OF TWO (2)INCH BY FOUR (4) INCH WOOD MARKER (OR A FOUR (4) FOOT LENGTH STEEL FENCE POST) SHALL BE PLACED IN A VERTICAL POSITION PRIOR TO BACKFILLING. THE RESPONSIBLE PARTY SHALL PLACE A CHISELED "X" IN THE CURB HEAD AT THE LOCATION WHERE THE SERVICE CROSSES UNDERNEATH THE CURB. THIS MARKER SHALL REMAIN IN PLACE UNTIL SERVICE LOCATIONS ARE CHISELED ON THE CUR. IF THE MARKER IS NOT PRESENT AT THE TIME OF CHISELING, THE RESPONSIBLE PARTY SHALL BEAR THE EXPENSE OF REAFFIRMING THE LOCATION OF THE SERVICE STUB-OUT BY RE-EXCAVATION. THE RESPONSIBLE PARTY SHALL TAKE MEASUREMENTS OF DISTANCES FROM MANHOLES TO SERVICE TAPS AND GIVE THIS INFORMATION TO THE CITY. SERVICE LOCATIONS FOR SANITARY SEWER SHALL ALSO BE MARKED WITH AN "X" ON THE CURB. MARKINGS SHALL BE NEATLY CHISELED OR SAW-CUT, NOT PAINTED, BY THE RESPONSIBLE PARTY.



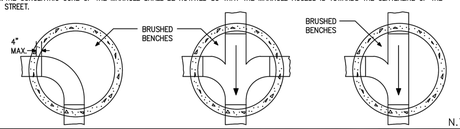

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>SEWER MAIN BEDDING,<br>UNDERDRAIN AND SERVICE<br>CONNECTION DETAIL | ISSUED:<br>APRIL 1992<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>300-2 |



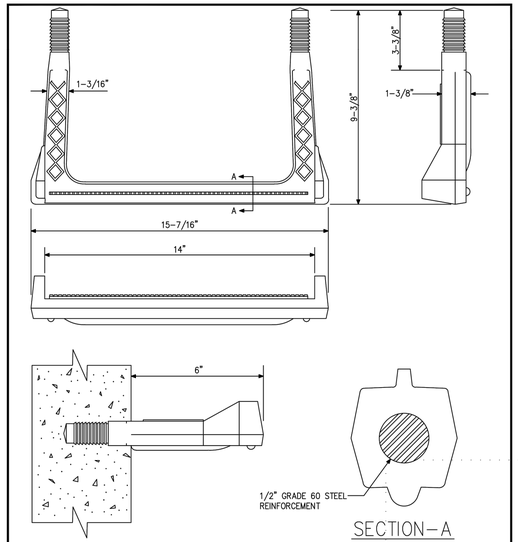

NOTES:

1. TOP ELEVATION OF THE MANHOLE SHALL BE ADJUSTED TO EXACTLY MATCH FINAL STREET GRADE PRIOR TO THE INITIATION OF THE ONE (1) YEAR WARRANTY PERIOD.
2. IF MANHOLES ARE LOCATED IN OPEN FIELDS, THEY SHALL BE LEFT SIX (6) INCHES TO EIGHT (8) INCHES ABOVE GRADE WHERE PRACTICAL.
3. FLAT TOP SECTIONS MAY BE USED ON SHALLOW LINES WHERE CONE SECTIONS ARE IMPRACTICAL TO USE AS SPECIFIED BY THE DEVELOPMENT ENGINEERING MANAGER.
4. SEMI-DROP MANHOLES SHALL BE USED FOR DROPS OF 2'-0" OR LESS.
5. MANHOLE RINGS SHALL BE 30 INCH DIAMETER, WITH 24 INCH INSERT AND COVER, FOR 60 INCH AND 72 INCH DIAMETER MANHOLE BARRELS.
6. MANHOLE INVERTS SHALL BE FORMED AS INDICATED BELOW TO ENSURE SMOOTH FLOW THROUGH MANHOLE.
7. WHERE MORE THAN ONE SEWER ENTERS A MANHOLE, THE SMALLER OF THE LINES SHALL INSTALLED AT THE CROWN ELEVATION OF THE LARGER SEWER.
8. WATERPROOFING IS REQUIRED WHERE GROUNDWATER IS PRESENT AS REQUIRED BY THE DEVELOPMENT ENGINEERING MANAGER.
9. A LOCKING RING AND COVER SHALL BE INSTALLED ON MANHOLES LOCATED OUTSIDE OF ROADWAYS. THE LOCKING LIDS SHALL HAVE MCGARD INTIMIDATOR MANLOCKS MODEL NUMBER 117011 (2 PER MANHOLE).
10. THE CONCENTRIC CONE OF THE MANHOLE SHALL BE ROTATED SO THAT THE MANHOLE ACCESS IS TOWARDS THE CENTERLINE OF THE STREET.




N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>STANDARD AND SEMI-DROP<br>MANHOLE DETAIL | ISSUED:<br>APRIL 1992<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>300-3 |




NOTE:
STEPS SHALL BE PLASTIC COATED STEEL STEPS MANUFACTURED BY M.A. INDUSTRIES INC., PS2-PF, OR APPROVED EQUIVALENT, AS DETERMINED BY THE DEVELOPMENT ENGINEERING MANAGER, SPACED 12 TO 16 INCHES ON CENTER, ALIGNED AWAY FROM THE INVERT OVER LARGEST BENCH.

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO<br>STANDARDS & SPECIFICATIONS<br>PLASTIC MANHOLE STEP DETAIL | ISSUED:<br>APRIL 1992<br>REVISED:<br>APRIL 2010<br>DRAWING NO.<br>300-6 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date<br>APRIL 2021 | detailed<br>M. SANDOVAL |
| designed<br>M. LEHRBURGER | checked<br>K. HENSKE |

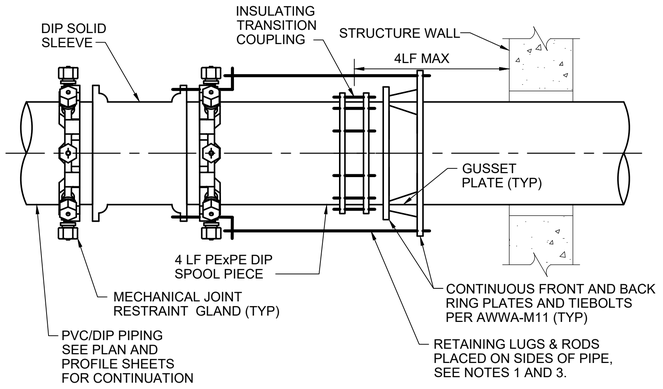
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING DETAILS II

| | |
|---|---|
| project<br>98101 | contract |
| drawing<br>**D011 – 0** | rev. |
| sheet 219 of 542 sheets | |
| file 98101 D_011.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_011.DWG 10/21/2020 4:12 PM HMMORTON

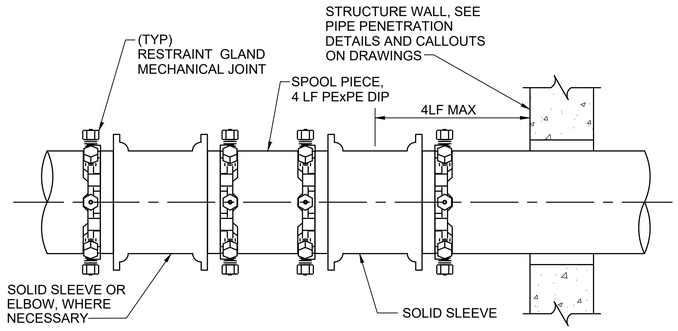



NOTES:

1. LUG TYPE, TIE BOLT DIAMETER, AND NUMBER OF RETAINING RODS VARIES BY PIPE DIAMETER AND DESIGN PRESSURE. CONFORM TO AWWA-M11.
2. ALL NUTS, BOLTS AND RESTRAINT ROD SHALL BE STAINLESS STEEL.
3. INSULATE RETAINING RODS WITH MINLON SLEEVES AT ALL NUTS.

**DOUBLE SLEEVE STRUCTURE CONNECTION DETAIL (STEEL TO PVC OR DIP PIPE)** — 1

NOT TO SCALE

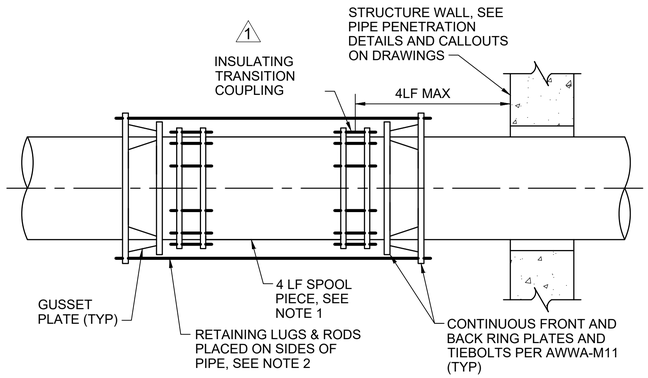



NOTES:

1. ALL NUTS, BOLTS AND RESTRAINT ROD SHALL BE STAINLESS STEEL.

**DOUBLE SLEEVE STRUCTURE CONNECTION DETAIL (DIP OR PVC TO DIP OR PVC PIPE)** — 2

NOT TO SCALE

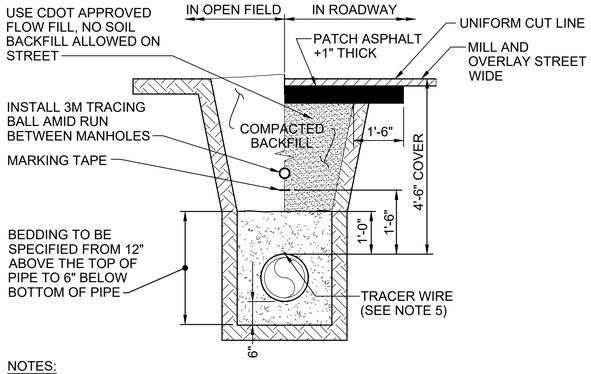



NOTES:

1. SPOOL PIECE MATERIAL SHALL MATCH PIPE MATERIAL OPPOSITE OF STRUCTURE.
2. LUG TYPE, TIE BOLT DIAMETER, AND NUMBER OF RETAINING RODS VARIES BY PIPE DIAMETER AND DESIGN PRESSURE. CONFORM TO AWWA-M11.
3. ALL NUTS, BOLTS AND RESTRAINT ROD SHALL BE STAINLESS STEEL.
4. INSULATE RETAINING RODS WITH MINLON SLEEVES AT ALL NUTS.

**DOUBLE SLEEVE STRUCTURE CONNECTION DETAIL (STEEL TO STEEL PIPE)** — 3

NOT TO SCALE

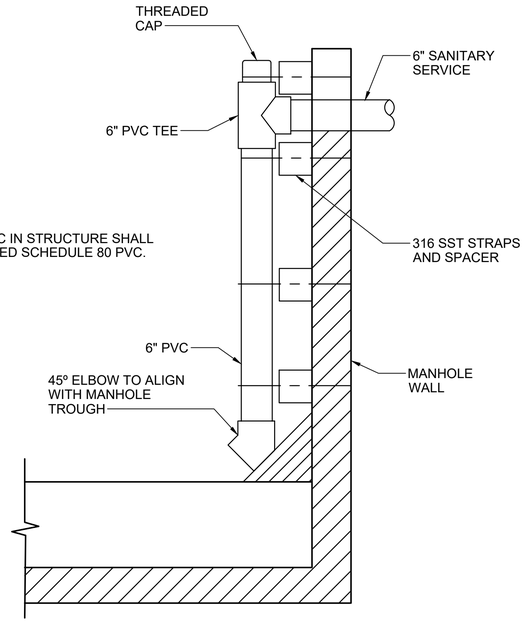



NOTES:

1. TRENCH TO BE BRACED OR SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND THE PROTECTION OF OTHER UTILITIES IN ACCORDANCE WITH ALL OSHA REGULATIONS.
2. MINIMUM COVER TO BE BELOW OFFICIAL STREET GRADE OR FINISHED GRADE.
3. BEDDING MATERIALS SHALL BE AS SPECIFIED.
4. TOP OF PATCHING SURFACE SHALL MATCH ELEVATION OF EXISTING PAVEMENT SURFACE.
5. ALL WATER PIPE SHALL HAVE A TRACER WIRE. INSTALL 12 GAUGE TYPE UF SINGLE STRAND COPPER TRACER WIRE TO PIPE WITH 2" WIDE PVC TAPE. SPLICING OF TRACER WIRE SHALL BE PER MANUFACTURER'S RECOMMENDATION. THE TRACER WIRE SHALL RUN TO A TEST STATION LOCATED NEXT TO THE FIRE HYDRANT OR STRUCTURAL PENETRATION.

**TYPICAL TRENCH SECTION** — 4

NOT TO SCALE

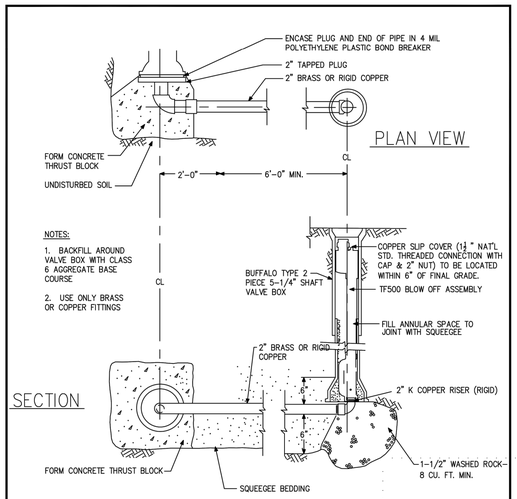



NOTES:

1. ALL PVC IN STRUCTURE SHALL BE GLUED SCHEDULE 80 PVC.

**INTERNAL DROP MANHOLE** — 5

NOT TO SCALE




VALVES SHALL BE HANDLED IN SUCH A MANNER AS TO PREVENT ANY INJURY OR DAMAGE AND SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION. VALVES SHALL BE SET IN SUCH A MANNER THAT THE VALVE STEMS ARE PLUMB. VALVE BOXES SHALL BE INSTALLED PLUMB. FINAL ELEVATION OF THE VALVE BOXES SHALL BE LEFT TO THE DISCRETION OF THE DEVELOPMENT ENGINEERING MANAGER.

NOTE: FOR LINES 12" AND LARGER, A HYDRANT SHALL BE USED FOR THE BLOWOFF

N.T.S.

| | | |
|---|---|---|
| | CITY OF THORNTON, COLORADO STANDARDS & SPECIFICATIONS<br>2" BLOWOFF DETAIL<br>(FOR MAINS LESS THAN 12" DIA.) | ISSUED: APRIL 1992<br>REVISED: APRIL 2010<br>DRAWING NO. 200-9 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed M. SANDOVAL |
| designed M. LEHRBURGER | checked K. HENSKE |

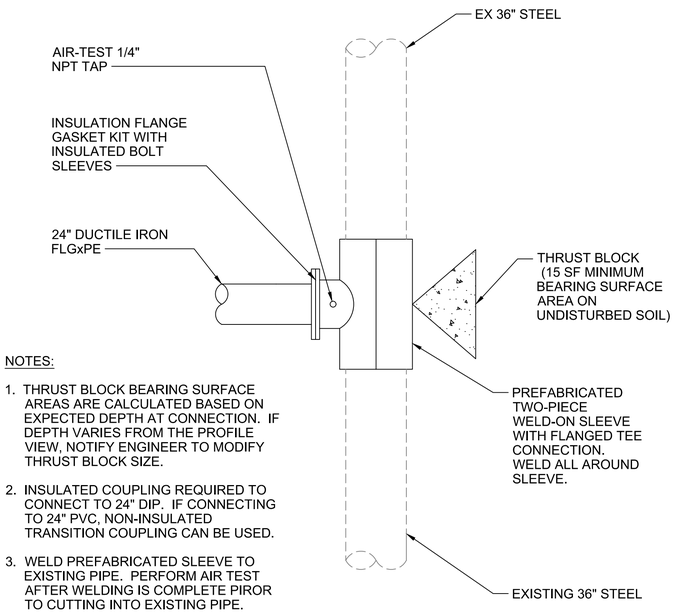
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING DETAILS III

| | |
|---|---|
| project 98101 | contract |
| drawing D012 – | rev. 1 |
| sheet 220 of 542 sheets | |
| file 98101 D_015.DWG | |

Scale For Microfilming: Millimeters / Inches

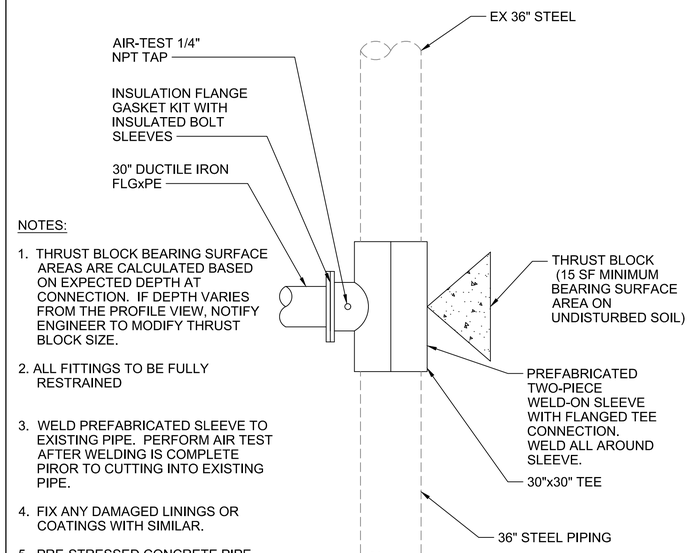
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:

1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.
2. INSULATED COUPLING REQUIRED TO CONNECT TO 24" DIP. IF CONNECTING TO 24" PVC, NON-INSULATED TRANSITION COUPLING CAN BE USED.
3. WELD PREFABRICATED SLEEVE TO EXISTING PIPE. PERFORM AIR TEST AFTER WELDING IS COMPLETE PIROR TO CUTTING INTO EXISTING PIPE.
4. FIX ANY DAMAGED LININGS OR COATINGS WITH SIMILAR.

**STA 106+46.24**
**EGL RAW WATER**
**CONNECTION DETAIL (STEEL)** — 101 / D104
NOT TO SCALE

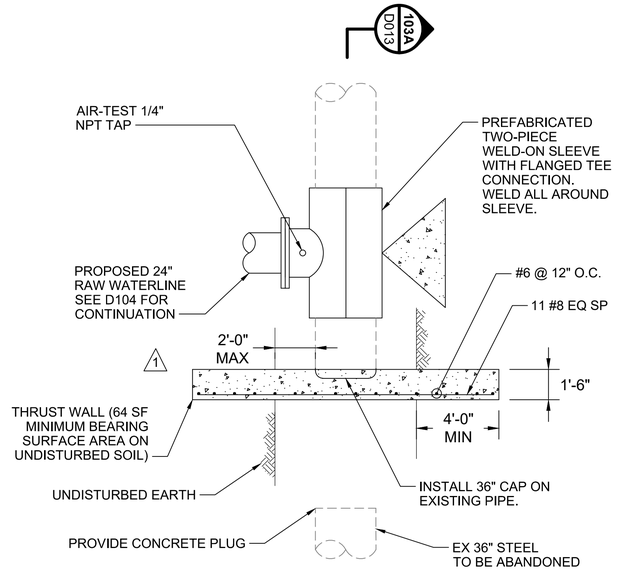



NOTES:

1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.
2. ALL FITTINGS TO BE FULLY RESTRAINED
3. WELD PREFABRICATED SLEEVE TO EXISTING PIPE. PERFORM AIR TEST AFTER WELDING IS COMPLETE PIROR TO CUTTING INTO EXISTING PIPE.
4. FIX ANY DAMAGED LININGS OR COATINGS WITH SIMILAR.
5. PRE-STRESSED CONCRETE PIPE (PCP) IS PRESENT NORTH AND SOUTH OF THE TIE-IN LOCATION. AVOID CONTACTING OR DAMAGING PCP SECTIONS.

NORTH

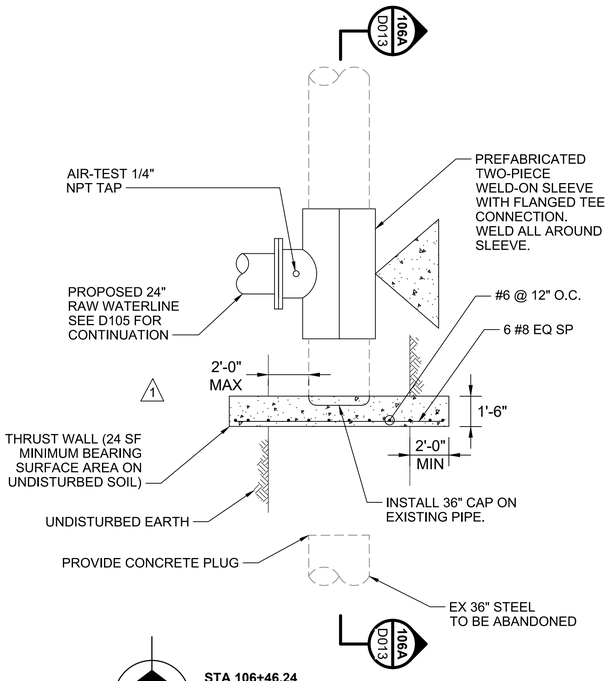
**STA 106+02.77**
**STANDLEY LAKE RAW WATER**
**CONNECTION DETAIL (STEEL)** — 102 / D104
NOT TO SCALE




NORTH

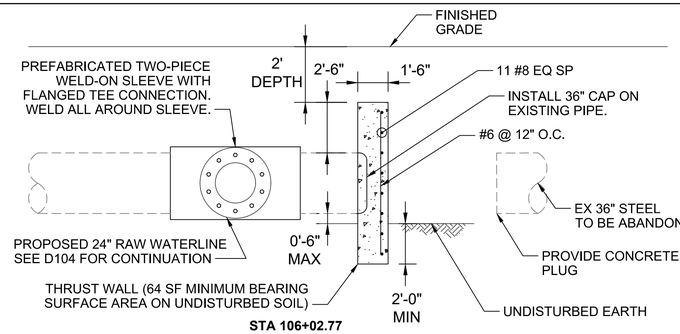
**STA 106+02.77**
**STANDLEY LAKE RAW WATER**
**MODIFICATION DETAIL (FINAL)** — 103 / D104
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | KL | JZ | THRUST BLK REV |




NORTH

**STA 106+46.24**
**EGL4 RAW WATER**
**MODIFICATION DETAIL (FINAL)** — 106 / D105
NOT TO SCALE

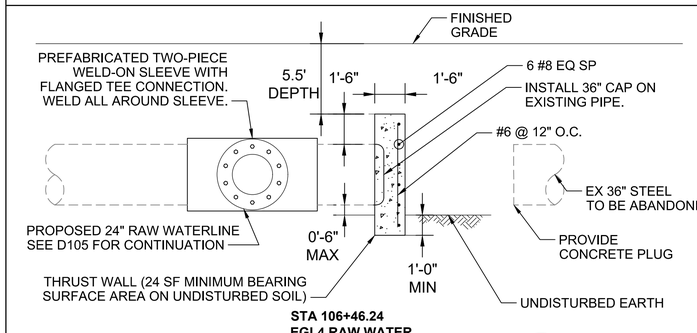



1

**STA 106+02.77**
**STANDLEY LAKE RAW WATER**
**MODIFICATION DETAIL ELEVATION** — 103A / D013
NOT TO SCALE

NOTES:

1. THRUST WALL BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST WALL SIZE.
2. PROTECT BOLTS FROM CONCRETE ENCASEMENT, USE POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN CAP, BOLTS, AND PIPE.
3. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE AND HAVE MINIMUM f'c OF 3,000 PSI.
4. ALL REINFORCEMENT SHALL BE ASTM A615, GRADE 60.
5. CONTRACTOR SHALL ENSURE PIPE REMAINS ELECTRICALLY ISOLATED FROM REINFORCEMENT OR OTHER METALLIC ITEMS USED TO FACILITATE CONSTRUCTION. MAINTAIN A MINIMUM 3" CLEARANCE BETWEEN PIPE AND ANY METALLIC ITEM.
6. THRUST WALL SHALL BE PLACED AGAINST UNDISTURBED NATIVE MATERIAL WHERE NOTED IN THE DETAIL. IF NATIVE MATERIAL IS DISTURBED BEYOND LIMITS SHOWN DURING STEEL PIPE REMOVAL, CONTROLLED LOW STRENGTH MATERIAL (CLSM 100 PSI MIN.) SHALL BE USED AS BACKFILL.




1

**STA 106+46.24**
**EGL4 RAW WATER**
**MODIFICATION DETAIL ELEVATION** — 106A / D013
NOT TO SCALE

NOTES:

1. THRUST WALL BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST WALL SIZE.
2. PROTECT BOLTS FROM CONCRETE ENCASEMENT, USE POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN CAP, BOLTS, AND PIPE.
3. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE AND HAVE MINIMUM f'c OF 3,000 PSI.
4. ALL REINFORCEMENT SHALL BE ASTM A615, GRADE 60.
5. CONTRACTOR SHALL ENSURE PIPE REMAINS ELECTRICALLY ISOLATED FROM REINFORCEMENT OR OTHER METALLIC ITEMS USED TO FACILITATE CONSTRUCTION. MAINTAIN A MINIMUM 3" CLEARANCE BETWEEN PIPE AND ANY METALLIC ITEM.
6. THRUST WALL SHALL BE PLACED AGAINST UNDISTURBED NATIVE MATERIAL WHERE NOTED IN THE DETAIL. IF NATIVE MATERIAL IS DISTURBED BEYOND LIMITS SHOWN DURING STEEL PIPE REMOVAL, CONTROLLED LOW STRENGTH MATERIAL (CLSM 100 PSI MIN.) SHALL BE USED AS BACKFILL.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING DETAILS IV

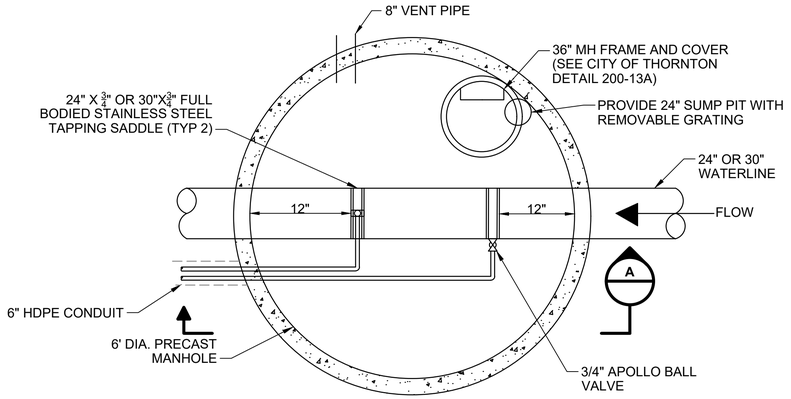
| project | contract |
|---|---|
| 98101 | |

drawing **D013** — rev. **1**

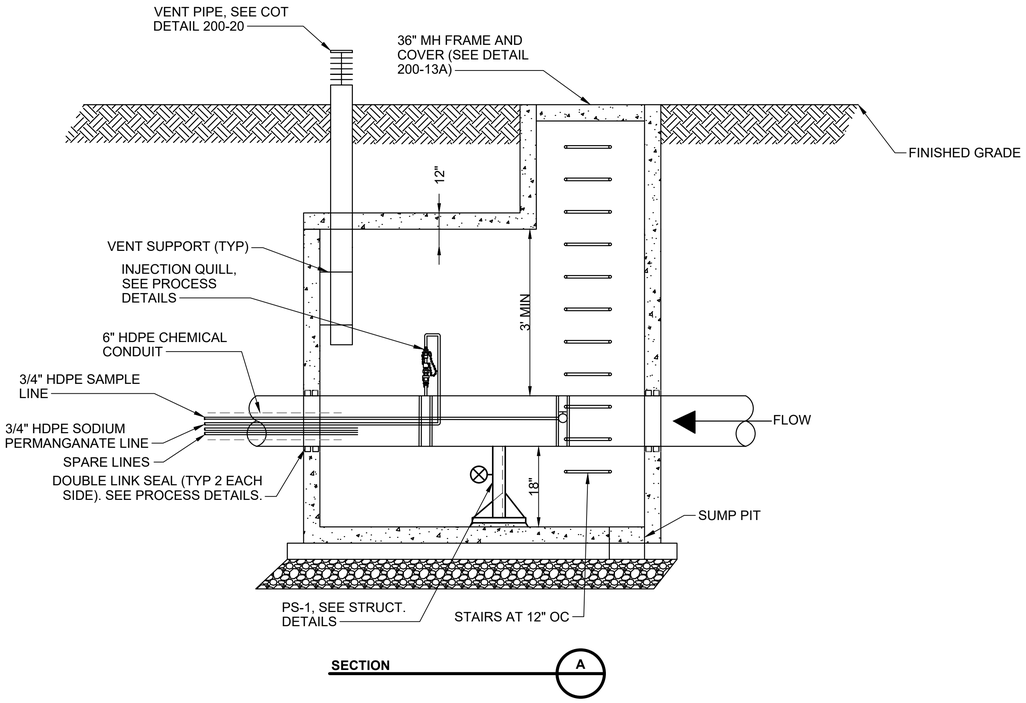
sheet 212 of 542 sheets

file 98101 D_015.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



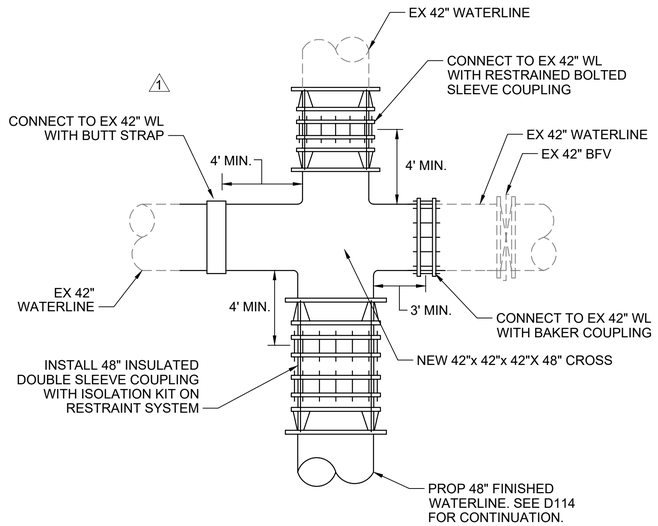

**PLAN**




**SECTION** A

**SODIUM PERMANGANATE INJECTION/ SAMPLE VAULT DETAIL** 6 D104 D105

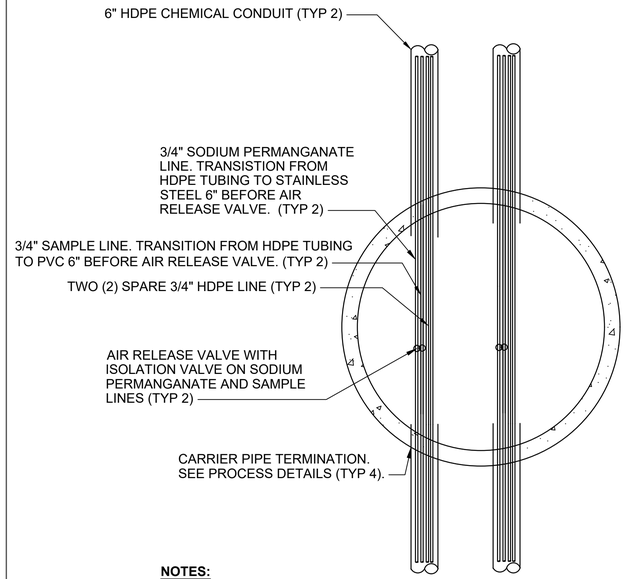
NOT TO SCALE




NORTH

**STA 107+32.79 FINISHED WATERLINE CONNECTION DETAIL** 201 D114

NOT TO SCALE




**NOTES:**

1. 48" MANHOLE WITH BOTTOM. SEE SPECS AND CITY OF THORNTON DETAILS FOR VENT, STAIRS, MANHOLE COVER, SUMP, AND DAMPPROOFING REQUIREMENTS.
2. FIELD ROUTE CHEMICAL AND SAMPLE LINES. DETAIL IS FOR GENERAL ARRANGEMENT PURPOSES ONLY.
3. PULL-BOX ONLY MANHOLES DO NOT REQUIRE AIR RELEASE VALVES.

**SODIUM PERMANGANATE AIR/VAC AND/OR PULL BOX MANHOLE** 7 D107

NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed M. SANDOVAL |
| designed M. LEHRBURGER | checked K. HENSKE |

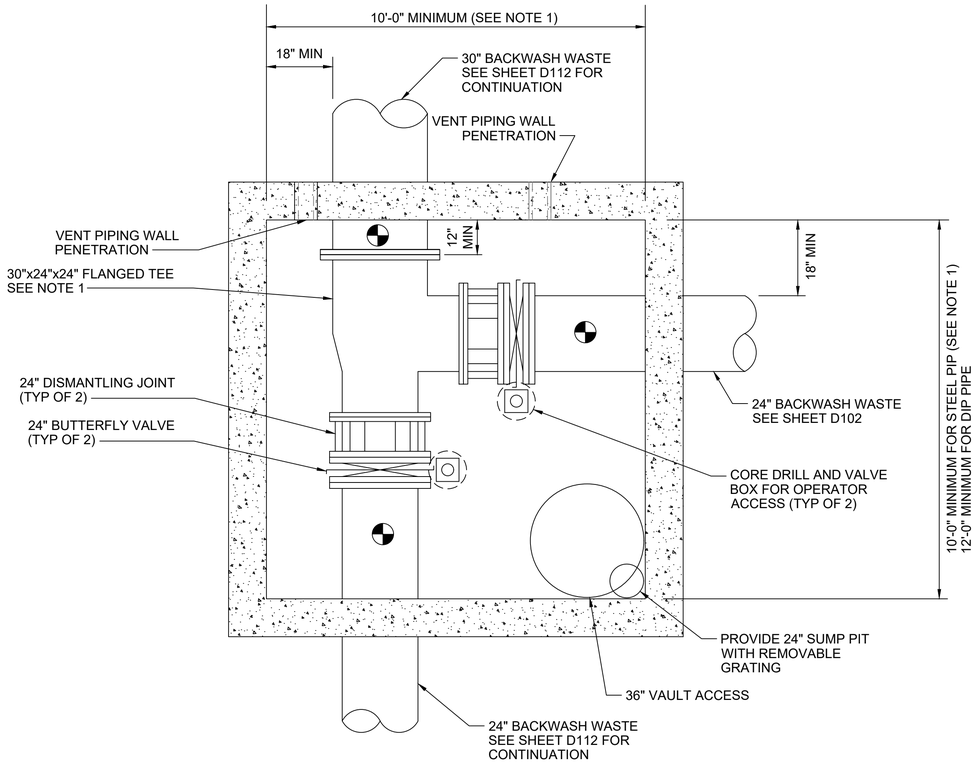
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING DETAILS V

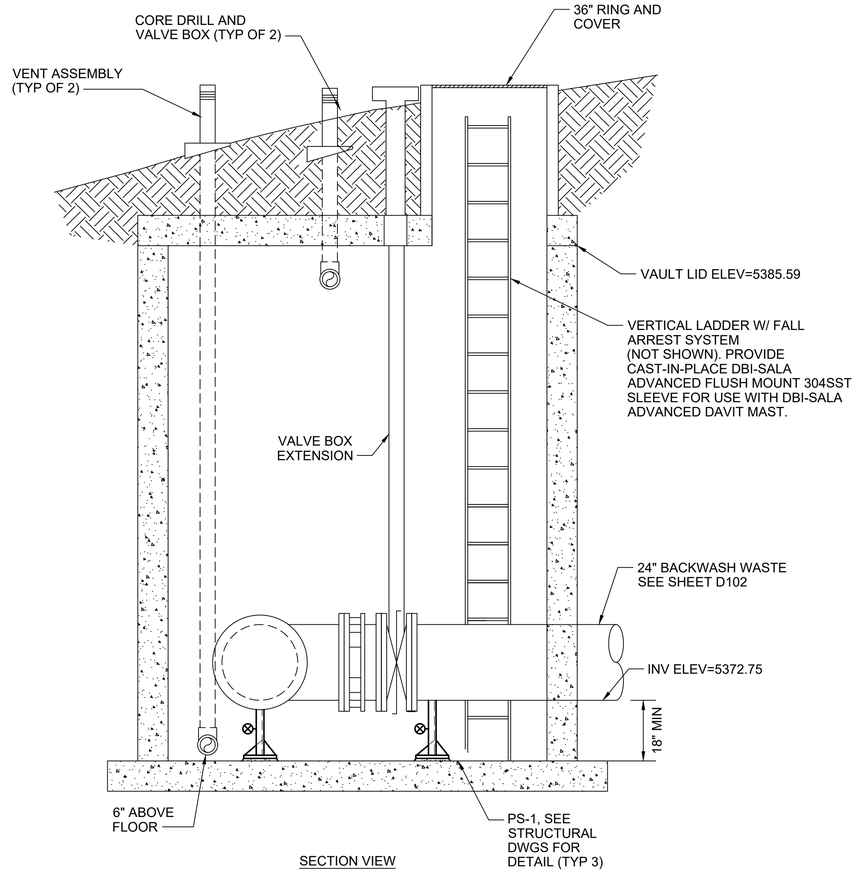
| | |
|---|---|
| project 98101 | contract |
| drawing D014 – | rev. 1 |
| sheet 222 of 542 sheets | |
| file 98101 D_015.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_015.DWG 10/21/2020 6:31 PM HMMORTON




PLAN VIEW




SECTION VIEW

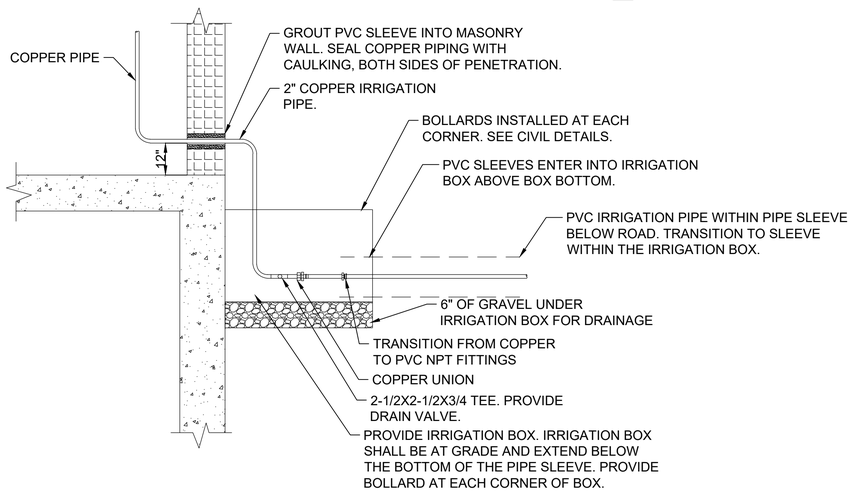
NOTES:
1. TEE, VALVE, AND PIPING CONFIGURATION IS SHOWN ASSUMING STEEL PIPING. VAULT STRUCTURE WILL REQUIRE UPSIZING IF DIP IS USED DUE TO NEED FOR 30"x24" REDUCER TO THE SOUTH.
2. ALL PIPING AND APPURTENANCES TO BE FULLY RESTRAINED.
3. PRE-CAST VAULT STRUCTURE TO BE DESIGNED AND STAMPED BY A PROFESSIONAL ENGINEER IN THE STATE OF COLORADO.
4. VAULT SHALL HAVE A MINIMUM THICKNESS OF 6" OR AS REQUIRED TO WITHSTAND A MOMENT OF 90,000 AND VERTICAL LOAD OF 5,000 LBS FROM DAVIT ARM INSERT, IN ADDITION TO REQUIRED EARTH PRESSURE LOADS.

NORTH

**STA 100+49.14**
**BACKWASH WASTE**
**VALVE VAULT DETAIL**
NOT TO SCALE

301 / D112

2




IRRIGATION PIPE TRANSITION
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 1 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING DETAILS VI

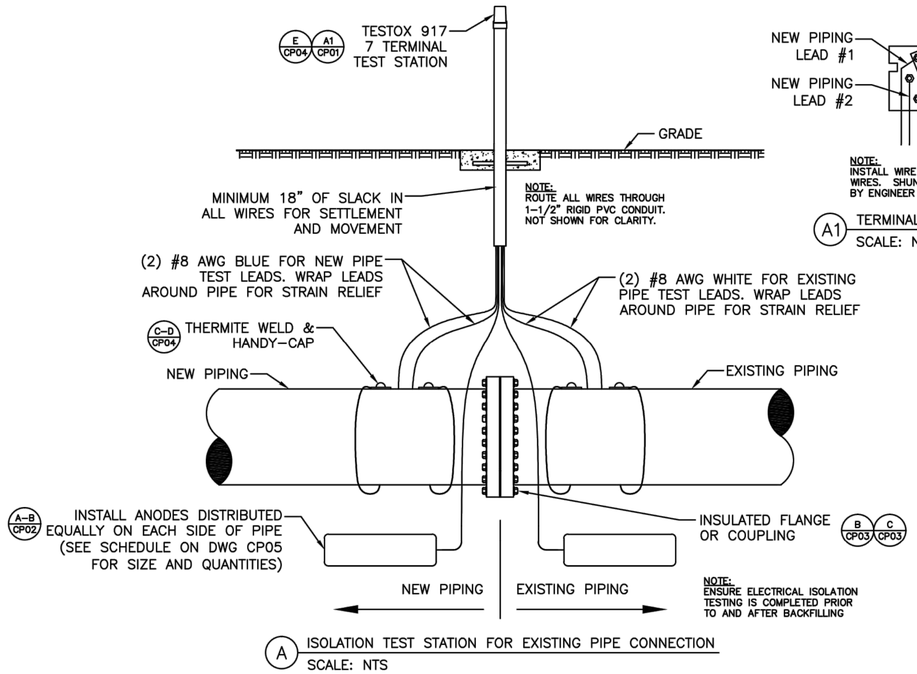
| project | contract |
|---|---|
| 98101 | |

drawing **D015** — rev. **0**

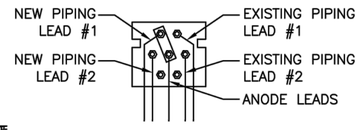
sheet 223 of 542 sheets

file 98101 D_015.DWG

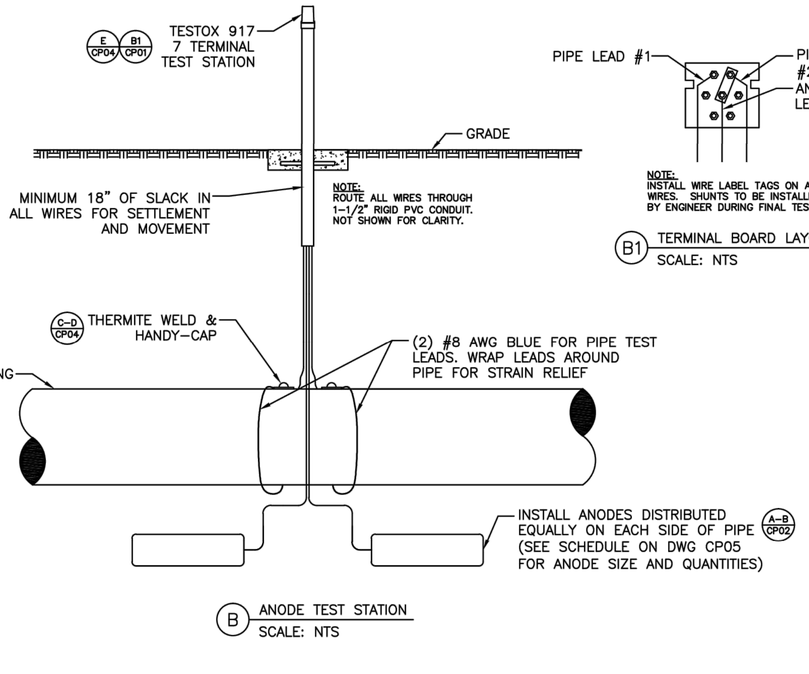
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




A ISOLATION TEST STATION FOR EXISTING PIPE CONNECTION
SCALE: NTS




A1 TERMINAL BOARD LAYOUT
SCALE: NTS




B ANODE TEST STATION
SCALE: NTS




B1 TERMINAL BOARD LAYOUT
SCALE: NTS

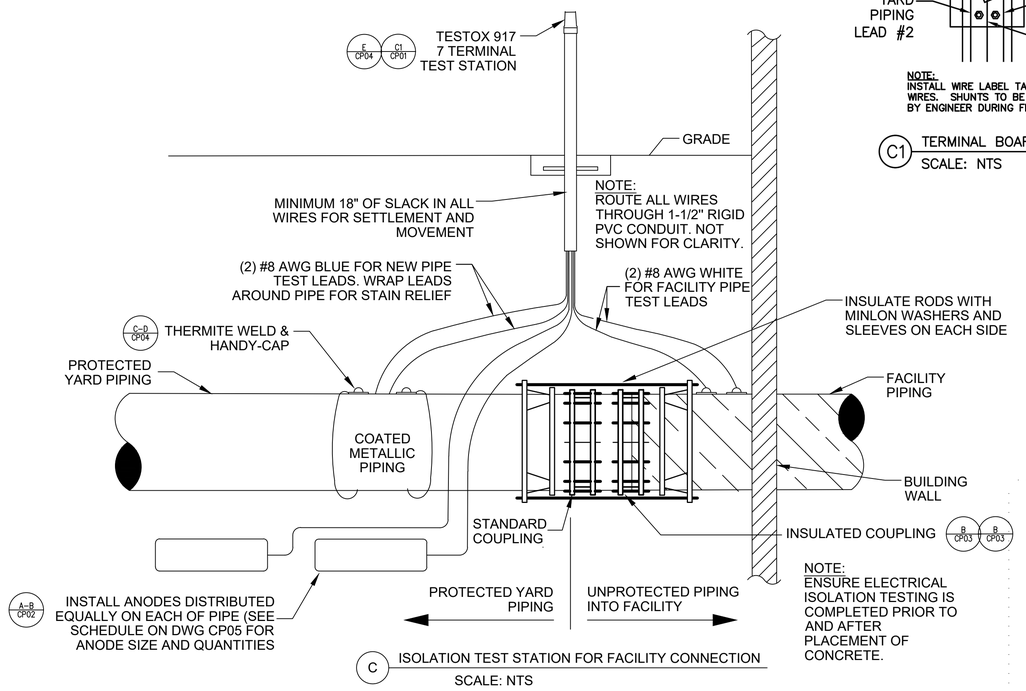
**GENERAL NOTES:**

1. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN THE PLANS FOR THIS PROJECT AND ACTUAL FIELD CONDITIONS WHICH MAY INTERFERE WITH THIS PROJECT.
2. ALL WORK SHALL BE NEW UNLESS OTHERWISE INDICATED.
3. NO BELOW GRADE SPLICING OF CATHODIC PROTECTION WIRES IS ALLOWED WITHOUT PRIOR APPROVAL FROM THE ENGINEER. CONTRACTOR SHALL ENSURE ALL WIRES ARE OF SUFFICIENT LENGTH FOR EACH INTENDED APPLICATION.
4. PIPELINE CONTRACTOR SHALL INSTALL TEST STATIONS IN PROTECTED AND ACCESSIBLE LOCATIONS (I.E. NEAR FENCES/BUILDINGS, OUTSIDE OF ROADWAYS, ETC.)
5. CONTRACTOR MUST ENSURE ALL BURIED METALLIC PIPELINES ARE ELECTRICALLY ISOLATED FROM ALL OTHER METALLIC COMPONENTS INCLUDING BUT NOT LIMITED TO: ELECTRICAL GROUNDS, FOREIGN PIPELINES, TANKS, CONCRETE REBAR, PIPE SUPPORTS, AND OTHER METALLIC STRUCTURES.
6. ANODE LEADS SHALL BE ROUTED THROUGH A TEST STATION EXCEPT IN INSTANCES WHERE THEY ARE DIRECTLY BONDED TO METALLIC FITTINGS AS SHOWN ON THE DETAIL DRAWINGS.
7. DURING BACKFILL, INSTALL CATHODIC PROTECTION WARNING TAPE 12–18 INCHES ABOVE ANY CATHODIC PROTECTION WIRES OR DEVICES.
8. TYPICAL WIRE INSULATION COLORS:

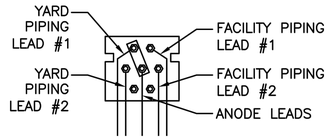
   BLUE = NEWLY PROTECTED PIPE
   WHITE = FACILITY OR EXISTING PIPING
   RED = FOREIGN PIPING
   BLACK = JOINT BOND/ANODE

9. SEE PROJECT SPECIFICATIONS FOR FURTHER INFORMATION.

NOTES:
1. ANY TIME THAT "PIPELINE CONTRACTOR" IS USED IN A CITY OF THORNTON STANDARD DETAIL, DESIGN BUILDER SHALL BE SUBSTITUTED.




C ISOLATION TEST STATION FOR FACILITY CONNECTION
SCALE: NTS




C1 TERMINAL BOARD LAYOUT
SCALE: NTS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CORROSION PROTECTION I

| project | contract |
|---|---|
| 98101 | |

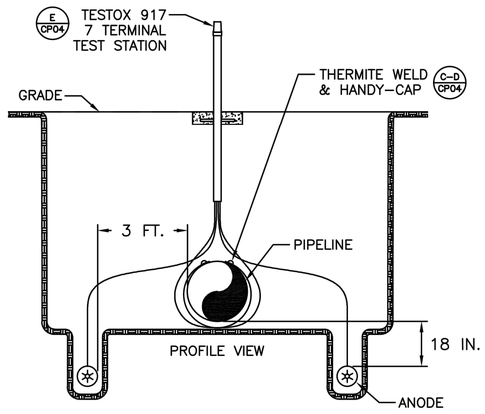
drawing **D016 – 0** rev.

sheet 224 of 542 sheets

file 98101 D_018.DWG

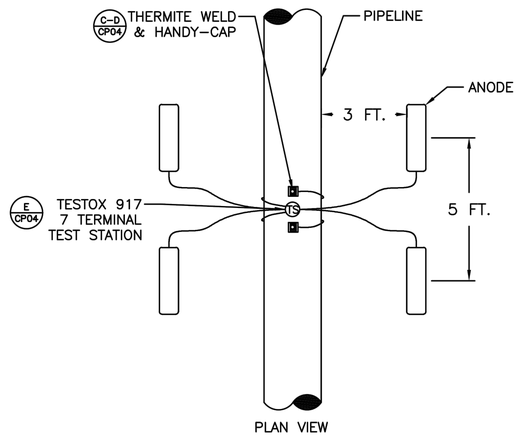
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_018.DWG 10/16/2020 5:16 PM JHDAVIS

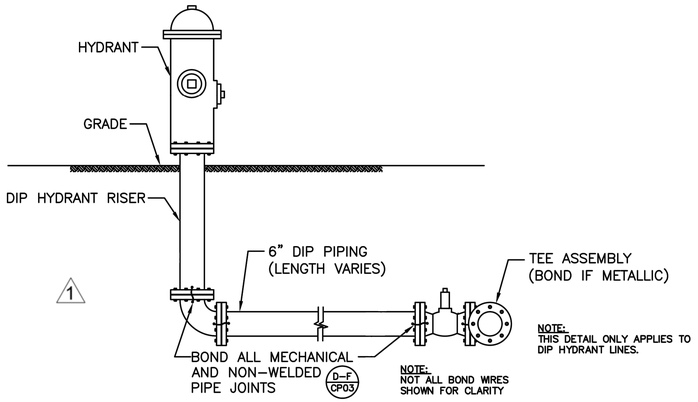



A ANODE PLACEMENT DETAIL
SCALE: NTS

NOTE:
INSTALL ANODES A MINIMUM OF 3 FEET OR ONE (1) PIPE DIAMETER (WHICHEVER IS GREATER) FROM THE PIPELINES AND ANY OTHER UNDERGROUND METALLIC STRUCTURES AND A MINIMUM OF 5 FEET FROM NEIGHBORING ANODES.




B ANODE PLACEMENT DETAIL
SCALE: NTS




C TYPICAL HYDRANT TAP AND VALVE
SCALE: NTS

GENERAL NOTES:

1. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN THE PLANS FOR THIS PROJECT AND ACTUAL FIELD CONDITIONS WHICH MAY INTERFERE WITH THIS PROJECT.
2. ALL WORK SHALL BE NEW UNLESS OTHERWISE INDICATED.
3. NO BELOW GRADE SPLICING OF CATHODIC PROTECTION WIRES IS ALLOWED WITHOUT PRIOR APPROVAL FROM THE ENGINEER. CONTRACTOR SHALL ENSURE ALL WIRES ARE OF SUFFICIENT LENGTH FOR EACH INTENDED APPLICATION.
4. REMOVE ANODES FROM PLASTIC OR OTHER SHIPPING BAG AND POSITION ACCORDING TO DETAIL DRAWINGS. DO NOT REMOVE CLOTH SACK.
5. BACKFILL WITH NATIVE SOIL A MINIMUM OF 12 INCHES AROUND ANY ANODES THEN FLOOD EACH WITH A MINIMUM OF 5 GALLONS OF FRESH WATER. AFTER WATER ABSORPTION, CONTINUE BACKFILLING AS PER SPECIFICATIONS.
6. ALL METALLIC FITTINGS MUST BE PROPERLY PROTECTED FROM CORROSION THROUGH THE INSTALLATION OF CATHODIC PROTECTION. SEE CATHODIC PROTECTION DETAIL DRAWINGS FOR MORE INFORMATION.
7. ANODE LEADS SHALL BE ROUTED THROUGH A TEST STATION EXCEPT IN INSTANCES WHERE THEY ARE DIRECTLY BONDED TO METALLIC FITTINGS AS SHOWN ON THE DETAIL DRAWINGS.
8. DURING BACKFILL, INSTALL CATHODIC PROTECTION WARNING TAPE 12–18 INCHES ABOVE ANY CATHODIC PROTECTION WIRES OR DEVICES.
9. TYPICAL WIRE INSULATION COLORS:

   BLUE = NEWLY PROTECTED PIPE
   WHITE = FACILITY OR EXISTING PIPING
   RED = FOREIGN PIPING
   BLACK = JOINT BOND/ANODE

10. SEE PROJECT SPECIFICATIONS FOR FURTHER INFORMATION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
CORROSION PROTECTION II

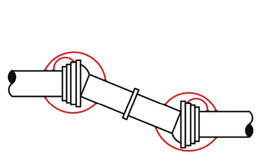
| project | contract |
|---|---|
| 98101 | |

drawing D017 – rev. 1

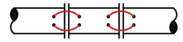
sheet 225 of 542 sheets

file 98101 D_018.DWG

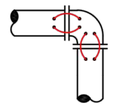
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



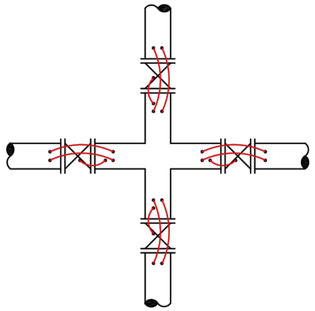
FLEXIBLE JOINT



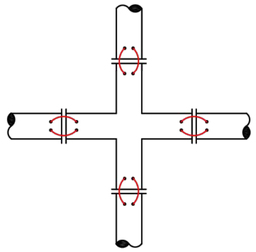
ADAPTER



BEND



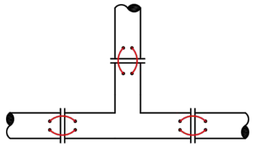
VALVE CROSSING



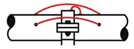
CROSS



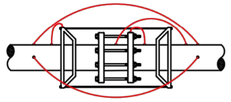
VALVE



TEE



VICTAULIC COUPLING



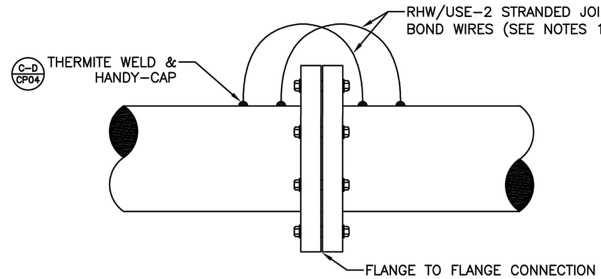
FLEX COUPLING WITH RESTRAINER

A JOINT BONDING DETAILS
SCALE: NTS

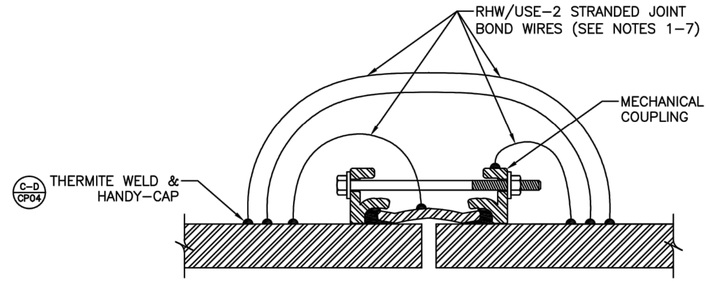
NOTES:

1. TYPICAL FOR MECHANICAL OR NON–WELDED JOINTS.
2. CLEAN PIPE PRIOR TO WELDING.
3. RHW/USE–2 INSULATED WIRE STRANDED COPPER BOND WIRES SHALL BE SIZED ACCORDING TO THE FOLLOWING TABLE UNLESS OTHERWISE NOTED.
4. UTILIZE COPPER BONDING SLEEVES FOR ALL JOINT BONDS OF #8 AWG OR SMALLER.
5. ENSURE ALL BLOW–OFF AND HYDRANT PIPING ARE BONDED AND ELECTRICALLY CONTINUOUS WITH ADJACENT WATER MAIN (IF METALLIC).
6. ALL FOLLOWER RINGS (I.E. MEC–A–LUGS) SHALL HAVE A SINGLE #8 AWG JOINT BOND WIRE ATTACHED WHERE POSSIBLE.
7. TEST AND DOCUMENT ALL JOINT BONDS BEFORE AND AFTER BACKFILL IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

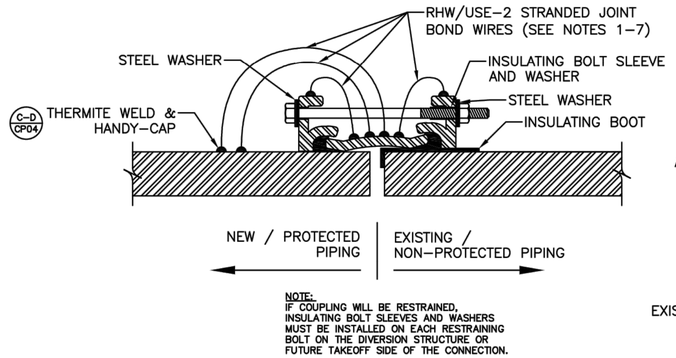
| NOMINAL PIPE ø | WIRE SIZE | # OF WIRES |
|---|---|---|
| 12" OR LESS | #8 | 2 |
| 13"–36" | #4 | 2 |
| >36" | #2 | 3 |




D FLANGE TO FLANGE BONDING DETAIL (NON–INSULATING)
SCALE: NTS

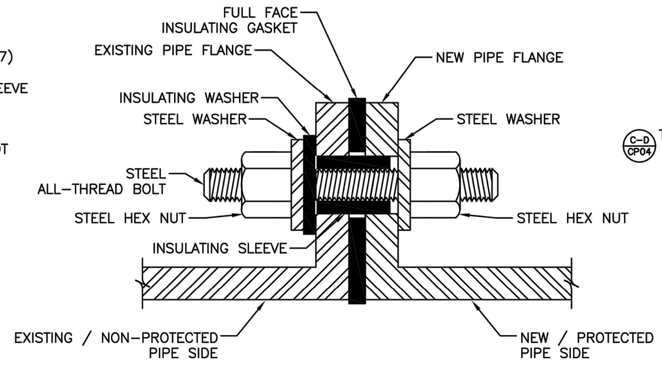



E MECHANICAL COUPLING BONDING DETAIL (NON–INSULATING)
SCALE: NTS

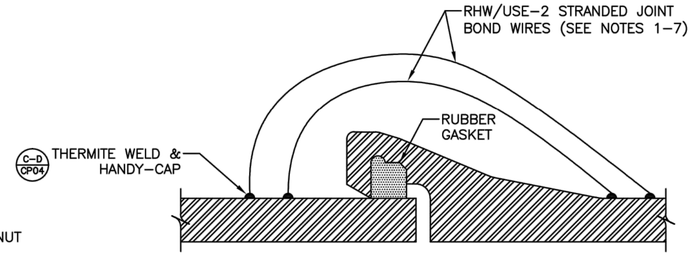



NOTE:
IF COUPLING WILL BE RESTRAINED, INSULATING BOLT SLEEVES AND WASHERS MUST BE INSTALLED ON EACH RESTRAINING BOLT ON THE DIVERSION STRUCTURE OR FUTURE TAKEOFF SIDE OF THE CONNECTION.

B INSULATED COUPLING BONDING DETAIL
SCALE: NTS




C INSULATED FLANGE DETAIL
(SINGLE WASHER SET FOR BURIED APPLICATIONS)
SCALE: NTS




F BELL AND SPIGOT BONDING DETAIL
SCALE: NTS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CORROSION PROTECTION III

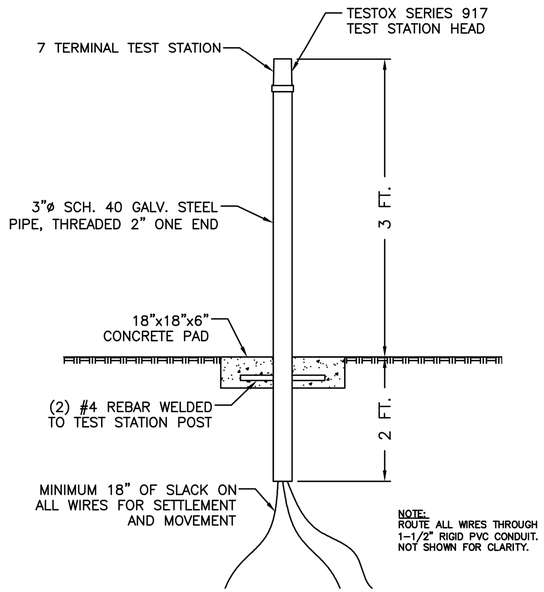
| project | contract |
|---|---|
| 98101 | |

drawing **D018** – rev. **0**

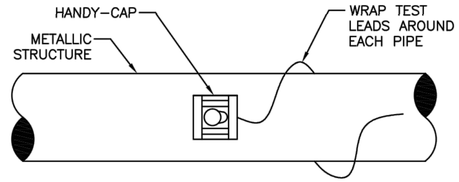
sheet 226 of 542 sheets

file 98101 D_018.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




(E) POST MOUNT TEST STATION DETAIL
SCALE: NTS



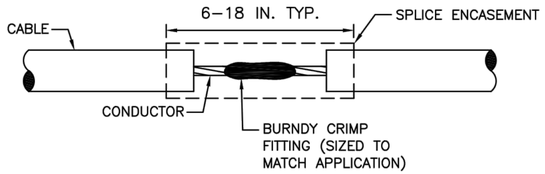

HANDY-CAP APPLICATION PROCEDURES

1. CLEAN ALL MUD, DIRT, GREASE, OIL, AND OTHER CONTAINMENTS FROM THE METAL SURFACE AND ANY PART OF THE MILL APPLIED COATING WHICH IS TO BE COVERED.
2. APPLY A COAT OF ROYSTON 747 PRIMER (if required) AND ALLOW TO DRY TO A NON-GLOSSY APPEARANCE, WHICH WILL TAKE APPROXIMATELY 5 MINUTES DEPENDING ON HUMIDITY AND TEMPERATURE.
3. REMOVE THE RELEASE PAPER FROM THE BOTTOM OF THE ROYSTON HANDY CAP. BEND THE PLASTIC SHEET INWARD AT THE SERRATIONS WHEN APPLYING TO A SMALL DIAMETER PIPE. POSITION AND PLACE THE HANDY CAP ON THE WELDED AREA WITH THE TUNNEL OVER THE LEAD WIRE.
4. PUSH THE DOME OF THE CAP FIRMLY IN THE WELD AREA. NOW LIFT THE WIRE AWAY FROM THE PIPE AND SQUEEZE THE BLACK RUBBER COMPOUND COMPLETELY AROUND AND UNDERNEATH THE WIRE. THEN PUSH THE LEAD WIRE BACK DOWN ON THE PIPE AND PRESS THE ELASSTOMERIC COMPOUND INTO FIRM CONTACT WITH THE PIPE OVER THE ENTIRE AREA.

NO FURTHER PROTECTION IS NECESSARY IF THE ROYSTON HANDY CAP COVERS THE ENTIRE EXPOSED METAL AREA. UNCOVERED AREAS SHOULD BE PROTECTED BY APPLYING TAPE OR MASTIC SUCH AS TRENTON PIPELINE TAPE CP OR ROYSTON ROSKOTE MASTIC.

WHEN COATING OR WRAPPING THE ROYSTON HANDY CAP, REMOVE THE NARROW STRIPS OF PLASTIC RELEASE FILM ON THE TOP OF THE CAP. THIS WILL ASSURE MAXIMUM PROTECTION BY EFFECTING A POSITIVE WATERPROOF SEAL.

(D) HANDY-CAP APPLICATION
SCALE: NTS

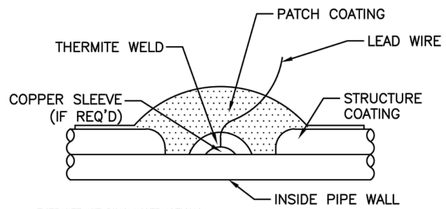



NOTE:
ALL SPLICES MUST BE APPROVED BY COMPANY REPRESENTATIVE PRIOR TO USE. PROVIDE WIRING OF SUFFICIENT LENGTH SO THAT SPLICES ARE NOT REQUIRED.

TYPICAL PROCEDURE TO SPLICE ANODE OR CABLE:

1. CUT BACK INSULATION FROM END OF ANODES OR CABLES APPROX. 1 INCH. BE SURE ALL CABLE ENDS AND CONNECTIONS ARE CLEAN OF DIRT AND FOREIGN MATTER AND THAT ALL CONNECTIONS ARE BARE METAL.
2. PUT CABLES IN APPROPRIATE SIZED CRIMP FITTING AND CRIMP.
3. APPLY ELECTRICAL PUTTY TO FILL IN ANY VOIDS AND IRREGULAR SHAPES.
4. APPLY ELECTRICAL RUBBER TAPE AROUND THE PUTTY AND CABLE WHERE INSULATION WAS REMOVED.
5. APPLY ELECTRICAL TAPE ALONG THE ENTIRE SPLICE AND A MINIMUM OF 2 INCHES ON EACH ANODE OR CABLE END.
6. APPLY ELECTRICAL COATING ALONG THE ENTIRE SPLICE.
7. EPOXY SPLICE KIT MAY BE USED IN LIEU OF RUBBER AND PLASTIC TAPE.

(B) WIRE SPLICING PROCEDURE
SCALE: NTS




THERMITE WELDING INSTRUCTIONS

1. REMOVE APPROXIMATELY 4" DIAMETER CIRCLE OF PIPELINE COATING AT STRUCTURE CONNECTION LOCATION.
2. CLEAN AREA APPROXIMATELY 2" DIAMETER TO BRIGHT METAL.
3. REMOVE 2" OF INSULATION FROM END OF WIRE.
4. WELD CONDUCTOR TO PIPE. USE APPROPRIATE GRAPHITE MOLD AND CARTRIDGE CHARGE SIZE.
5. TEST THE THERMITE WELD CONNECTION BY STRIKING THE COMMON SEVERAL BLOWS ON THE SIDE USING A ONE POUND HAMMER. TOP OF WELD MAY BE HAMMERED FLAT IF REQUIRED.
6. APPLY HANDY-CAP. SEE DETAIL D ON CP04.

(C) THERMITE WELD DETAIL
SCALE: NTS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
CORROSION PROTECTION IV

| project | contract |
|---|---|
| 98101 | |

drawing D019 – rev. 0

sheet 227 of 542 sheets

file 98101 D_019.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

# THORNTON WTP- CATHODIC PROTECTION SCHEDULE (STEEL OR DUCTILE OPTION)

| PIPELINE | STATION | TEST STATION NO. | DRAWING NUMBER | DRAWING DETAIL | INSULATED FLANGE OR COUPLING REQ'D AT THIS LOCATION? | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|
| LINE A- 30" STANDLEY LAKE RAW WATER | 100+00 | A-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE A- 30" STANDLEY LAKE RAW WATER | 103+00 | A-2 | CP01 | B | NO | MIDPOINT OF PIPELINE | (4) 48LB ANODES |
| LINE A- 30" STANDLEY LAKE RAW WATER | 106+02 | A-3 | CP01 | A | YES | INSULATED FLANGE @ EXISTING PIPE CONNECTION | (2) 48LB ANODES |
| LINE B- 24" EGL4 RAW WATER | 100+00 | B-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE B- 24" EGL4 RAW WATER | 103+26 | B-2 | CP01 | B | NO | MIDPOINT OF PIPELINE | (2) 48LB ANODES |
| LINE B- 24" EGL4 RAW WATER | 106+46 | B-3 | CP01 | A | YES | INSULATED FLANGE @ EXISTING PIPE CONNECTION | (2) 48LB ANODES |
| LINE C- FUTURE 30" NORTHERN SUPPLY | 100+00 | C-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE C- FUTURE 30" NORTHERN SUPPLY | 102+73 | C-2 | CP01 | B | NO | PLUG AT END OF LINE | (2) 48LB ANODES |
| LINE D- 36" OVERFLOW | 100+00 | D-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE D- 36" OVERFLOW | 100+72 | D-2 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE D- 36" OVERFLOW | 101+55 | D-3 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (4) 48LB ANODES |
| LINE D- 36" OVERFLOW | 105+63 | D-4 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (4) 48LB ANODES |
| LINE E- 30" BACKWASH WASTE | 100+00 | E-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE E- 30" BACKWASH WASTE | 100+49 | E-2 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE E- 30" BACKWASH WASTE | 102+04 | E-3 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE E- 30" BACKWASH WASTE | 103+10 | E-4 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE F- 48" COMBINED FILTER EFFLUENT | 0+00 | G-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE F- 48" COMBINED FILTER EFFLUENT | 1+00 | G-2 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE G- 30" BACKWASH SUPPLY | 0+00 | F-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE G- 30" BACKWASH SUPPLY | 1+00 | F-2 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE H- 48" FINISHED WATER LINE | 100+00 | H-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (4) 48LB ANODES |
| LINE H- 48" FINISHED WATER LINE | 103+70 | H-2 | CP01 | B | NO | MIDPOINT OF PIPELINE | (6) 48LB ANODES |
| LINE H- 48" FINISHED WATER LINE | 107+40 | H-3 | CP01 | A | YES | INSULATED FLANGE @ EXISTING PIPE CONNECTION | (4) 48LB ANODES |
| LINE I- 6" FIRE/DOMESTIC SERVICE LINE | 106+34 | I-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE J- 10" PRESSURE SOLIDS LINE | 100+00 | J-1 | CP01 | C | YES | INSULATED COUPLING @ FACILITY CONNECTION | (2) 48LB ANODES |
| LINE J- 10" PRESSURE SOLIDS LINE | 103+23 | J-2 | CP01 | B | NO | MIDPOINT OF PIPELINE | (2) 48LB ANODES |
| LINE J- 10" PRESSURE SOLIDS LINE | 106+45 | J-3 | CP01 | B | NO | END OF PIPELINE INTO DETENTION BASIN | (2) 48LB ANODES |
| **PLACE TEST STATIONS IN PROTECTED AND ACCESSIBLE LOCATIONS (I.E. NEXT TO FENCES/BUILDINGS, OUTSIDE OF ROADWAYS, ETC.) | | | | | | | |

NOTES:
1. FOR THE STEEL OPTION, ALL METALLIC PIPING WILL BE POLYURETHANE COATED.
2. FOR THE DUCTILE OPTION, ALL METALLIC PIPING WILL BE COATED WITH STANDARD BITUMINOUS COATING.
3. ALL METALLIC FITTINGS FOR THE STEEL, DUCTILE, AND PVC OPTIONS SHALL BE LINED AND COATED WITH POLYURETHANE OR FUSION BONDED EPOXY (FBE) PER AWWA C116.
4. ALL MECHANICAL OR NON-WELDED PIPING CONNECTIONS FOR BOTH STEEL AND DUCTILE OPTIONS MUST CONTAIN JOINT BONDING AS PER THE DETAIL DRAWINGS AND PROJECT SPECIFICATIONS.
5. ALL METALLIC VALVES, ELBOWS, SLEEVES, TEES, AND OTHER FITTINGS INSTALLED ON PVC PIPELINES SHALL CONTAIN A SINGLE 17-LB DIRECT BONDED MAGNESIUM ANODE PER THE DETAIL DRAWINGS AND PROJECT SPECIFICATIONS.
6. ALL HYDRANT ASSEMBLIES TO CONTAIN JOINT BONDING AND INSTALLATION OF TWO (2) 17-LB DIRECT BONDED MAGNESIUM ANODES PER THE DETAIL DRAWINGS AND SPECIFICATIONS.
7. ASSUME ALL INSULATING FLANGES AND/OR COUPLINGS WILL BE DIRECT BURIED. IF ISOLATION DEVICES WILL BE ABOVE GRADE, VAULTED, OR INSIDE OF A BUILDING, MODIFICATION OF THIS SCHEDULE IS REQUIRED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CORROSION PROTECTION V

| project | contract |
|---|---|
| 98101 | |

**drawing** D020 – **rev.** 0

**sheet** 228 **of** 542 sheets

**file** 98101 D_018.DWG

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

EQUIPMENT SCHEDULE XX

| MARK | DESCRIPTION | TAG | SPECFICATION SECTION | NOTES | LOCATION | SHEET |
|---|---|---|---|---|---|---|
| 1 | FLASH MIX PUMP | FMP-P-20201 | 33 12 20 | | LOWER LEVEL A | D203 |
| 2 | FLASH MIX PUMP | FMP-P-20202 | 33 12 20 | | LOWER LEVEL A | D203 |
| 3 | FLASH MIX PUMP | FMP-P-20203 | 33 12 20 | | LOWER LEVEL A | D203 |
| 4 | PRETREATMENT TRAIN 1 OVERFLOW TROUGH | PRE-OVF-21112 | D008 | SEE PROCESS DETAILS | LOWER LEVEL B | D204 |
| 5 | PRETREATMENT TRAIN 2 OVERFLOW TROUGH | PRE-OVF-21212 | D008 | SEE PROCESS DETAILS | LOWER LEVEL B | D204 |
| 6 | FLOCCULATION DRIVE | PRE-FLC-21111 | 46 41 33 | | UPPER LEVEL B | D206 |
| 7 | FLOCCULATION DRIVE | PRE-FLC-21121 | 46 41 33 | | UPPER LEVEL B | D206 |
| 8 | FLOCCULATION DRIVE | PRE-FLC-21131 | 46 41 33 | | UPPER LEVEL B | D206 |
| 9 | SOLIDS REMOVAL EQUIPMENT | PRE-SCL-22101 | 46 40 13 | | LOWER LEVEL B | D204 |
| 10 | SOLIDS REMOVAL EQUIPMENT | PRE-SCL-22102 | 46 40 13 | | LOWER LEVEL B | D204 |
| 11 | INCLINED PLATE SETTLER | PRE-SED-22103 | 46 43 76 | | UPPER LEVEL B | D206 |
| 12 | SOLIDS REMOVAL DRIVE | PRE-SED-22104 | 46 40 13 | | UPPER LEVEL B | D206 |
| 13 | SOLIDS REMOVAL DRIVE | PRE-SED-22105 | 46 40 13 | | UPPER LEVEL B | D206 |
| 14 | FLOCCULATION DRIVE | PRE-FLC-21211 | 46 41 33 | | UPPER LEVEL B | D206 |
| 15 | FLOCCULATION DRIVE | PRE-FLC-21221 | 46 41 33 | | UPPER LEVEL B | D206 |
| 16 | FLOCCULATION DRIVE | PRE-FLC-21231 | 46 41 33 | | UPPER LEVEL B | D206 |
| 17 | SOLIDS REMOVAL EQUIPMENT | PRE-SCL-22201 | 46 40 13 | | LOWER LEVEL B | D204 |
| 18 | SOLIDS REMOVAL EQUIPMENT | PRE-SCL-22202 | 46 40 13 | | LOWER LEVEL B | D204 |
| 19 | INCLINED PLATE SETTLER | PRE-SED-22203 | 46 43 76 | | UPPER LEVEL B | D206 |
| 20 | SOLIDS REMOVAL DRIVE | PRE-SED-22204 | 46 40 13 | | UPPER LEVEL B | D206 |
| 21 | SOLIDS REMOVAL DRIVE | PRE-SED-22205 | 46 40 13 | | UPPER LEVEL B | D206 |
| 22 | OZONE INJECTOR | SWI-SKD-30101 | 46 31 57 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | LOWER LEVEL B | D215 |
| 23 | OZONE INJECTOR | SWI-SKD-30102 | 46 31 57 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | LOWER LEVEL B | D215 |
| 24 | PIPELINE FLASH REACTOR | OZO-PFR-30160 | 46 31 57 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | LOWER LEVEL B | D215 |
| 25 | PRE-FILTER FLASH MIX PUMP | OZO-P-36501 | 33 12 20 | | LOWER LEVEL B | D204 |
| 26 | FILTERS 1-3 ISOLATION SLIDE GATE | FLT-SG-40101 | 33 12 18 | INSTALLED AS PART OF WP2 | LOWER LEVEL C | D205 |
| 27 | FILTERS 4-6 ISOLATION SLIDE GATE | FLT-SG-40102 | 33 12 18 | INSTALLED AS PART OF WP2 | LOWER LEVEL C | D205 |
| 28 | FILTER 1 UNDERDRAINS | FLT-UD-41101 | 46 61 24 | | LOWER LEVEL C | D205 |
| 29 | FILTER 1 TROUGHS | FLT-TR-41101 | 46 61 24 | | UPPER LEVEL C | D207 |
| 30 | FILTER 2 UNDERDRAINS | FLT-UD-41201 | 46 61 24 | | LOWER LEVEL C | D205 |
| 31 | FILTER 2 TROUGHS | FLT-TR-41201 | 46 61 24 | | UPPER LEVEL C | D207 |
| 32 | FILTER 3 UNDERDRAINS | FLT-UD-41301 | 46 61 24 | | LOWER LEVEL C | D205 |
| 33 | FILTER 3 TROUGHS | FLT-TR-41301 | 46 61 24 | | UPPER LEVEL C | D207 |
| 34 | FILTER 4 UNDERDRAINS | FLT-UD-41401 | 46 61 24 | | LOWER LEVEL C | D205 |
| 35 | FILTER 4 TROUGHS | FLT-TR-41401 | 46 61 24 | | UPPER LEVEL C | D207 |
| 36 | FILTER 5 UNDERDRAINS | FLT-UD-41501 | 46 61 24 | | LOWER LEVEL C | D205 |
| 37 | FILTER 5 TROUGHS | FLT-TR-41501 | 46 61 24 | | UPPER LEVEL C | D207 |
| 38 | FILTER 6 UNDERDRAINS | FLT-UD-41601 | 46 61 24 | | LOWER LEVEL C | D205 |
| 39 | FILTER 6 TROUGHS | FLT-TR-41601 | 46 61 24 | | UPPER LEVEL C | D207 |
| 40 | FILTERS 1-3 OVERFLOW TROUGH | FLT-OVF-40101 | D008 | SEE PROCESS DETAILS | LOWER LEVEL C | D205 |
| 41 | FILTERS 4-6 OVERFLOW TROUGH | FLT-OVF-40102 | D008 | SEE PROCESS DETAILS | LOWER LEVEL C | D205 |
| 42 | 4'x4' SLIDE GATE | CCC-SG-61001 | 33 12 18 | INSTALLED AS PART OF WP2 | CLEARWELL EAST | |
| 43 | BLOWER | FLT-BLW-44001 | 43 11 33 | | LOWER LEVEL B | D219 |
| 44 | BLOWER | FLT-BLW-44002 | 43 11 33 | | LOWER LEVEL B | D219 |
| 45 | BLOWER | FLT-BLW-44003 | 43 11 33 | | LOWER LEVEL B | D219 |
| 46 | DRAIN PUMP | FLT-DP-46001 | 33 12 20 | | LOWER LEVEL C | D215 |
| 47 | BACKWASH PUMP | FBS-P-54001 | 33 12 20 | | CLEARWELL WEST | D217 |
| 48 | BACKWASH PUMP | FBS-P-54002 | 33 12 20 | | CLEARWELL WEST | D217 |
| 49 | BACKWASH PUMP | FBS-P-54003 | 33 12 20 | | CLEARWELL WEST | D217 |
| 50 | WASTE WASHWATER PUMP | FBW-P-55001 | 33 12 20 | | CLEARWELL WEST | D217 |
| 51 | WASTE WASHWATER PUMP | FBW-P-55002 | 33 12 20 | | CLEARWELL WEST | D217 |
| 52 | POLYMER MIX TANK | FAP-TNK-75040 | 46 33 33 | | UPPER LEVEL D | D220 |
| 53 | TOWER AND FEEDER | FAP-TNK-75020 | 46 33 33 | | UPPER LEVEL D | D220 |
| 54 | FLOC AID POLYMER METERING PUMP | FAP-P-75001 | 46 33 33 | | UPPER LEVEL D | D220 |
| 55 | FLOC AID POLYMER METERING PUMP | FAP-P-75002 | 46 33 33 | | UPPER LEVEL D | D220 |
| 56 | FLOC AID POLYMER METERING PUMP | FAP-P-75003 | 46 33 33 | | UPPER LEVEL D | D220 |
| 57 | COAGULANT AID TANK | CAP-TNK-74011 | 43 41 45 | | UPPER LEVEL D | D220 |
| 58 | COAGULANT AID TANK | CAP-TNK-74012 | 43 41 45 | | UPPER LEVEL D | D220 |
| 59 | CHEMICAL FEED PUMP | CAP-P-74001 | 46 33 00 | | UPPER LEVEL D | D220 |
| 60 | CHEMICAL FEED PUMP | CAP-P-74002 | 46 33 00 | | UPPER LEVEL D | D220 |
| 61 | CHEMICAL FEED PUMP | CAP-P-74003 | 46 33 00 | | UPPER LEVEL D | D220 |
| 62 | CHEMICAL TRANSFER PUMP | CAP-TP-74010 | 46 33 00 | | UPPER LEVEL D | D220 |
| 63 | FERRIC SULFATE/CHLORIDE TANK | FES-TNK-72011 | 43 41 45 | | UPPER LEVEL D | D220 |
| 64 | CHEMICAL FEED PUMP | FES-P-72001 | 46 33 00 | | UPPER LEVEL D | D220 |
| 65 | CHEMICAL FEED PUMP | FES-P-72002 | 46 33 00 | | UPPER LEVEL D | D220 |
| 66 | CHEMICAL FEED PUMP | FES-P-72003 | 46 33 00 | | UPPER LEVEL D | D220 |
| 67 | CHEMICAL TRANSFER PUMP | FES-TP-72010 | 46 33 00 | | UPPER LEVEL D | D220 |
| 68 | SODIUM PERMANGANATE TANK | SPE-TNK-76011 | 43 32 78 | | UPPER LEVEL D | D220 |
| 69 | SODIUM PERMANGANATE TANK | SPE-TNK-76012 | 43 32 78 | | UPPER LEVEL D | D220 |
| 70 | CHEMICAL FEED PUMP | SPE-P-76001 | 46 33 00 | | UPPER LEVEL D | D220 |
| 71 | CHEMICAL FEED PUMP | SPE-P-76002 | 46 33 00 | | UPPER LEVEL D | D220 |
| 72 | CHEMICAL FEED PUMP | SPE-P-76003 | 46 33 00 | | UPPER LEVEL D | D220 |
| 73 | MIX/AGE TANK | FAP-TNK-75120 | 46 33 00 | | | |
| 74 | CHEMICAL TRANSFER PUMP | SPE-TP-76010 | 46 33 00 | | UPPER LEVEL D | D220 |
| 75 | HYDROGEN PEROXIDE TANK | HYP-TNK-78011 | 43 32 78 | | UPPER LEVEL D | D220 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
EQUIPMENT SCHEDULE I

| | |
|---|---|
| project 98101 | contract |
| drawing D021 — 0 | rev. |
| sheet 229 of 542 sheets | |
| file 98101_D | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| EQUIPMENT SCHEDULE II XX | | | | | | |
|---|---|---|---|---|---|---|
| MARK | DESCRIPTION | TAG | SPECFICATION SECTION | NOTES | LOCATION | SHEET |
| 76 | HYDROGEN PEROXIDE TANK | HYP-TNK-78012 | 43 32 78 | | UPPER LEVEL D | D220 |
| 77 | CHEMICAL FEED PUMP | HYP-P-78001 | 46 33 00 | | UPPER LEVEL D | D220 |
| 78 | CHEMICAL FEED PUMP | HYP-P-78002 | 46 33 00 | | UPPER LEVEL D | D220 |
| 79 | CHEMICAL FEED PUMP | HYP-P-78003 | 46 33 00 | | UPPER LEVEL D | D220 |
| 81 | MOCP | OZO-MOCP-39501 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL D | D216 |
| 82 | NITROGEN BOOST | OZO-SKD-31001 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL D | D216 |
| 83 | OZONE GENERATOR | OZO-GEN-34001 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL D | D216 |
| 84 | OZONE GENERATOR | OZO-GEN-34002 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL D | D216 |
| 85 | GOX MANIFOLD | GOX-SKD-33501 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL D | D216 |
| 86 | CAUSTIC SODA TANK | CAS-TNK-71011 | 43 41 13 | | UPPER LEVEL D/E | D218 |
| 87 | CAUSTIC SODA TANK | CAS-TNK-71012 | 43 41 13 | | UPPER LEVEL D/E | D218 |
| 88 | CAUSTIC SODA TANK | CAS-TNK-71013 | 43 41 13 | | UPPER LEVEL D/E | D218 |
| 89 | CHEMICAL FEED PUMP | CAS-P-71001 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 90 | CHEMICAL FEED PUMP | CAS-P-71002 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 91 | CHEMICAL FEED PUMP | CAS-P-71003 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 92 | CHEMICAL FEED PUMP | CAS-P-71004 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 93 | CHEMICAL FEED PUMP | CAS-P-71005 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 94 | CHEMICAL TRANSFER PUMP | CAS-TP-71010 | 46 33 00 | | UPPER LEVEL D/E | D218 |
| 95 | SODIUM HYPOCHLORITE TANK | SHP-TNK-73011 | 43 41 45 | | UPPER LEVEL E | D221 |
| 96 | SODIUM HYPOCHLORITE TANK | SHP-TNK-73012 | 43 41 45 | | UPPER LEVEL E | D221 |
| 97 | SODIUM HYPOCHLORITE TANK | SHP-TNK-73013 | 43 41 45 | | UPPER LEVEL E | D221 |
| 98 | CHEMICAL FEED PUMP | SHP-P-73001 | 46 33 00 | | UPPER LEVEL E | D221 |
| 99 | CHEMICAL FEED PUMP | SHP-P-73002 | 46 33 00 | | UPPER LEVEL E | D221 |
| 100 | CHEMICAL FEED PUMP | SHP-P-73003 | 46 33 00 | | UPPER LEVEL E | D221 |
| 101 | CHEMICAL FEED PUMP | SHP-P-73004 | 46 33 00 | | UPPER LEVEL E | D221 |
| 102 | CHEMICAL FEED PUMP | SHP-P-73005 | 46 33 00 | | UPPER LEVEL E | D221 |
| 103 | CHEMICAL FEED PUMP | SHP-P-73006 | 46 33 00 | | UPPER LEVEL E | D221 |
| 104 | CHEMICAL TRANSFER PUMP | SHP-TP-73010 | 46 33 00 | | UPPER LEVEL E | D221 |
| 105 | AMMONIUM SULFATE TANK | AMS-TNK-77011 | 43 41 45 | | UPPER LEVEL E | D221 |
| 106 | AMMONIUM SULFATE TANK | AMS-TNK-77012 | 43 41 45 | | UPPER LEVEL E | D221 |
| 107 | CHEMICAL FEED PUMP | AMS-P-77001 | 46 33 00 | | UPPER LEVEL E | D221 |
| 108 | CHEMICAL FEED PUMP | AMS-P-77002 | 46 33 00 | | UPPER LEVEL E | D221 |
| 109 | CHEMICAL FEED PUMP | AMS-P-77003 | 46 33 00 | | UPPER LEVEL E | D221 |
| 110 | CHEMICAL TRANSFER PUMP | AMS-TP-77010 | 46 33 00 | | UPPER LEVEL E | D221 |
| 111 | CHEMICAL FEED PUMP | PHA-P-79501 | 46 33 00 | | UPPER LEVEL E | D221 |
| 112 | CHEMICAL FEED PUMP | PHA-P-79502 | 46 33 00 | | UPPER LEVEL E | D221 |
| 113 | PHOSPHORIC ACID SCALE | PHA-TNK-79511 | 46 33 00 | TOTE PURCHASED BY COT WITH CHEMICAL | UPPER LEVEL E | D221 |
| 114 | PHOSPHORIC ACID SCALE | PHA-TNK-79512 | 46 33 00 | TOTE PURCHASED BY COT WITH CHEMICAL | UPPER LEVEL E | D221 |
| 115 | CHEMICAL FEED PUMP | SBI-P-79001 | 46 33 00 | | UPPER LEVEL E | D221 |
| 116 | CHEMICAL FEED PUMP | SBI-P-79002 | 46 33 00 | | UPPER LEVEL E | D221 |
| 117 | CHEMICAL FEED PUMP | SBI-P-79003 | 46 33 00 | | UPPER LEVEL E | D221 |
| 118 | SODIUM BISULFITE SCALE | SBI-TNK-79011 | 46 33 00 | TOTE PURCHASED BY COT WITH CHEMICAL | UPPER LEVEL E | D221 |
| 119 | SODIUM BISULFITE SCALE | SBI-TNK-79012 | 46 33 00 | TOTE PURCHASED BY COT WITH CHEMICAL | UPPER LEVEL E | D221 |
| 120 | SODIUM BISULFITE SCALE | SBI-TNK-79013 | 46 33 00 | TOTE PURCHASED BY COT WITH CHEMICAL | UPPER LEVEL E | D221 |
| 121 | CHEMICAL FILL STATION | CAP-FS-74001 | 46 33 00 | SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL D | D220 |
| 122 | CHEMICAL FILL STATION | FES-FS-72001 | 46 33 00 | SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL D | D220 |
| 123 | CHEMICAL FILL STATION | SPE-FS-76001 | 46 33 00 | SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL D | D220 |
| 124 | CHEMICAL FILL STATION | HYP-FS-78001 | 46 33 00 | SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL D | D220 |
| 125 | CHEMICAL FILL STATION | CAS-FS-71001 | 46 33 00 | PIPING ON FILL STATION TO BE INSULATED; SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL E | D218 |
| 126 | CHEMICAL FILL STATION | SHP-FS-73001 | 46 33 00 | SEE ARCHITECTURAL DETAILS AND D009 | UPPER LEVEL E | D221 |
| 127 | CHEMICAL FILL STATION | AMS-FS-77001 | 46 33 00 | SEE ARCHITECHURAL DETAILS AND D009 | UPPER LEVEL E | D221 |
| 128 | WATER SOFTENING SYSTEM | CHE-WS-67001 | 46 33 00 | | UPPER LEVEL D | D220 |
| 129 | OZONE DESTRUCT SKID | OZO-SKD-35001 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL B | D219 |
| 130 | OZONE DESTRUCT SKID | OZO-SKD-35002 | 46 31 53 | SUPPLIED WITH OZONE PROCUREMENT PACKAGE | UPPER LEVEL B | D219 |
| 131 | LOX TANK AND VAPORIZER | OZO-LOX-33001 | N/A | RENTED BY COT, SUPPLIED BY OTHERS. | EXTERIOR | |
| 132 | AIR COMPRESSOR | CHE-AC-68001 | D209 | | UPPER LEVEL E | D209 |
| 133 | POLYMER CARBON FILTER | FAP-FLT-75104 | 46 33 33 | PROVIDED BY POLYMER SYSTEM SUPPLIER | UPPER LEVEL D | D220 |
| 134 | POLYMER WATER HEATER | FAP-HTR-75103 | 46 33 33 | PROVIDED BY POLYMER SYSTEM SUPPLIER | UPPER LEVEL D | D220 |
| 135 | HYDROGEN PEROXIDE FILTERED VENT | HYP-VNT-78011 | 43 32 78 | PROVIDED BY SST TANK MANUFACTURER | | |
| 136 | HYDROGEN PEROXIDE FILTERED VENT | HYP-VNT-78012 | 43 32 78 | PROVIDED BY SST TANK MANUFACTURER | | |
| 137 | POLYMER MAKE-UP SKID | FAP-SKD-75110 | | | | |
| 138 | BRINE TANK | BRI-TNK-67002 | 43 41 45 | | UPPER LEVEL D | D220 |

| 1 EQUIPMENT SCHEDULE - MAG METER* XX | | | | | |
|---|---|---|---|---|---|
| NO. | DESCRIPTION | EQUIPMENT TAG | METER SIZE | LOCATION | SHEET |
| 301 | FLOW METER | RWS-MM-11001 | 24" | LOWER LEVEL AREA A | D203 |
| 302 | FLOW METER | RWS-MM-11006 | 20" | LOWER LEVEL AREA A | D203 |
| 303 | FLOW METER | RWS-MM-11003 | 24" | LOWER LEVEL AREA A | D203 |
| 304 | FLOW METER | RWS-MM-11007 | 20" | LOWER LEVEL AREA A | D203 |
| 305 | FLOW METER | FMP-MM-20201 | 4" | LOWER LEVEL AREA A | D203 |
| 306 | FLOW METER | FMP-MM-20202 | 4" | LOWER LEVEL AREA A | D203 |
| 307 | FLOW METER | SLD-MM-24101 | 4" | LOWER LEVEL AREA B | D226 |
| 308 | FLOW METER | FLT-MM-41101 | 20" | LOWER LEVEL AREA C | D214 |
| 309 | FLOW METER | FLT-MM-41201 | 20" | LOWER LEVEL AREA C | D214 |
| 310 | FLOW METER | FLT-MM-41301 | 20" | LOWER LEVEL AREA C | D214 |
| 311 | FLOW METER | FLT-MM-41401 | 20" | LOWER LEVEL AREA C | D214 |
| 312 | FLOW METER | FLT-MM-41501 | 20" | LOWER LEVEL AREA C | D214 |
| 313 | FLOW METER | FLT-MM-41601 | 20" | LOWER LEVEL AREA C | D214 |
| 314 | FLOW METER | FBS-MM-54001 | 10" | CLEARWELL WEST | D229 |
| 315 | FLOW METER | FBS-MM-54002 | 24" | CLEARWELL WEST | D217 |
| 316 | FLOW METER | RWS-MM-11026 | 20" | LOWER LEVEL AREA A | D203 |
| 317 | FLOW METER | RWS-MM-11030 | 20" | LOWER LEVEL AREA A | D203 |
| 318 | FLOW METER | PSW-FIT-66001 | 4" | UPPER LEVEL AREA D | |

* ALL FLOW METERS SHALL BE PLACED AT LEAST 5 PIPE DIAMETERS DOWNSTREAM AND 2 PIPE DIAMETERS UPSTREAM OF ELBOWS OR VALVES IN THE LINE FROM THE CENTER OF THE FLOWMETER.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
EQUIPMENT SCHEDULE II

| | |
|---|---|
| project 98101 | contract |
| drawing D022 | rev. 1 |
| sheet 230 of 542 sheets | |
| file 98101_D | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## VALVE SCHEDULE I (XX) (1)

| NO. | TAG | SIZE | TYPE | PRESSURE CLASS | END CONNECTION | WORKING PRESSURE (PSI) | PIPE SYSTEM | ACTUATOR | LINE ORIENTATION | SHAFT ORIENTATION | SERVICE | LOCATION | SHEET | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | RWS-V-11009 | 30" | BUTTERFLY | 150 | FLG X FLG | 55 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 2 | RWS-V-11001 | 30" | SLEEVE | 150 | FLG X FLG | 55 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 3 | RWS-V-11010 | 30" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 4 | RWS-V-11011 | 20" | BUTTERFLY | 150 | FLG X FLG | 55 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 5 | RWS-V-11002 | 20" | BALL | 150 | FLG X FLG | 55 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 6 | RWS-V-11012 | 30" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 7 | RWS-V-11017 | 24" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 8 | RWS-V-11005 | 24" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 9 | RWS-V-11008 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 10 | RWS-V-11018 | 20" | CHECK | 150 | FLG X FLG | 15 | RAW WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 11 | RWS-V-11019 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D223 | PROVIDE CHAIN OPERATOR EXTENSION |
| 12 | RWS-V-11016 | 30" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D223 | |
| 13 | RWS-V-11013 | 24" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 14 | RWS-V-11003 | 24" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 15 | RWS-V-11007 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 16 | RWS-V-11014 | 20" | CHECK | 150 | FLG X FLG | 15 | RAW WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 17 | RWS-V-11015 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D223 | PROVIDE CHAIN OPERATOR EXTENSION |
| 18 | RWS-V-11020 | 30" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D223 | |
| 19 | RWS-V-11021 | 4" | BUTTERFLY | 150 | FLG X FLG | 55 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | PROVIDE CHAIN OPERATOR EXTENSION |
| 20 | RWS-V-11004 | 4" | BUTTERFLY | 150 | FLG X FLG | 55 | FLASH MIX | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 21 | RWS-V-11006 | 4" | BUTTERFLY | 150 | FLG X FLG | 55 | FLASH MIX | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 22 | FMP-V-20201 | 4" | BUTTERFLY | 150 | FLG X FLG | 15 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 23 | FMP-V-20202 | 4" | BUTTERFLY | 150 | FLG X FLG | 15 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 24 | FMP-V-20203 | 4" | BUTTERFLY | 150 | FLG X FLG | 15 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 25 | FMP-V-20204 | 4" | CHECK | 150 | FLG X FLG | 80 | FLASH MIX | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 26 | FMP-V-20205 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 27 | FMP-V-20206 | 4" | BUTTERFLY | 150 | FLG X FLG | 15 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 28 | FMP-V-20207 | 4" | CHECK | 150 | FLG X FLG | 80 | FLASH MIX | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 29 | FMP-V-20208 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 30 | FMP-V-20209 | 4" | BUTTERFLY | 150 | FLG X FLG | 15 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 31 | FMP-V-20210 | 4" | CHECK | 150 | FLG X FLG | 80 | FLASH MIX | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 32 | FMP-V-20211 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 33 | FMP-V-20212 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 34 | FMP-V-20213 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 35 | FMP-V-20214 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 36 | FMP-V-20215 | 4" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 37 | STW-V-25101 | 48" | BUTTERFLY | 150 | LUG X LUG | 10 | OZONATED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | PROVIDE CHAIN OPERATOR EXTENSION, SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 38 | STW-V-25102 | 48" | BUTTERFLY | 150 | FLG X FLG | 10 | SETTLED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | PROVIDE CHAIN OPERATOR EXTENSION |
| 39 | STW-V-25103 | 30" | BUTTERFLY | 150 | FLG X FLG | 10 | SETTLED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | PROVIDE CHAIN OPERATOR EXTENSION |
| 40 | STW-V-25104 | 48" | BUTTERFLY | 150 | LUG X LUG | 10 | OZONATED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | PROVIDE CHAIN OPERATOR EXTENSION, SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 41 | FLT-V-41101 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER INFLUENT | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 42 | FLT-V-41102 | 20" | BUTTERFLY | 150 | FLG X FLG | 30 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 43 | FLT-V-41103 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 44 | FLT-V-41107 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 45 | FLT-V-41105 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 46 | FLT-V-41106 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 47 | FLT-V-41104 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 48 | FLT-V-41201 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER INFLUENT | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 49 | FLT-V-41202 | 20" | BUTTERFLY | 150 | FLG X FLG | 30 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 50 | FLT-V-41203 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 51 | FLT-V-41207 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 52 | FLT-V-41205 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 53 | FLT-V-41206 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 54 | FLT-V-41204 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 55 | FLT-V-41301 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER INFLUENT | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 56 | FLT-V-41302 | 20" | BUTTERFLY | 150 | FLG X FLG | 30 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 57 | FLT-V-41303 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 58 | FLT-V-41307 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 59 | FLT-V-41305 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 60 | FLT-V-41306 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 61 | FLT-V-41304 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 62 | FLT-V-41401 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER INFLUENT | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 63 | FLT-V-41402 | 20" | BUTTERFLY | 150 | FLG X FLG | 30 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 64 | FLT-V-41403 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 65 | FLT-V-41407 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 66 | FLT-V-41405 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 67 | FLT-V-41406 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 68 | FLT-V-41404 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
VALVE SCHEDULE I

| project | contract |
|---|---|
| 98101 | |

drawing **D023 — 1** rev.

sheet 231 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## VALVE SCHEDULE II (XX)

| NO. | TAG | SIZE | TYPE | PRESSURE CLASS | END CONNECTION | WORKING PRESSURE (PSI) | PIPE SYSTEM | ACTUATOR | LINE ORIENTATION | SHAFT ORIENTATION | SERVICE | LOCATION | SHEET | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | FLT-V-41501 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER INFLUENT | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 70 | FLT-V-41502 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 71 | FLT-V-41503 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 72 | FLT-V-41507 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 73 | FLT-V-41505 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 74 | FLT-V-41506 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 75 | FLT-V-41504 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 76 | FLT-V-41601 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 77 | FLT-V-41602 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | MODULATING | LOWER LEVEL AREA C | D214 | ELECTRIC MOTOR ACTUATOR SHALL BE HIGH TORQUE. SEE SPECIFICATION 33 12 16. |
| 78 | FLT-V-41603 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 79 | FLT-V-41607 | 14" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 80 | FLT-V-41605 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 81 | FLT-V-41606 | 36" | BUTTERFLY | 150 | FLG X FLG | 10 | BACKWASH WASTE | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D205 | STEM EXTENSION AND SUPPORT TO UPPER LEVEL. ACTUATOR ON UPPER LEVEL. |
| 82 | FLT-V-41604 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 83 | FLT-V-46001 | 20" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D215 | |
| 84 | FLT-V-46002 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D215 | |
| 85 | FLT-V-46004 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | FILTER TO WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA C | D215 | |
| 86 | SLD-V-22102 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 87 | SLD-V-22103 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 88 | SLD-V-22202 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | ELECTRIC MOTOR | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 89 | SLD-V-22203 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | ELECTRIC MOTOR | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 90 | OZO-V-30110 | 6" | PLUG | 150 | FLG X FLG | 10 | DRAIN | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D214 | |
| 91 | PRE-V-21101 | 6" | PLUG | 150 | FLG X FLG | 10 | DRAIN | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D214 | ORIENT HANDWHEEL SO IT FACES SOUTH AND IS ACCESSIBLE FROM PLATFORM IN FILTER PIPE GALLERY. |
| 92 | PRE-V-21201 | 6" | PLUG | 150 | FLG X FLG | 10 | DRAIN | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D214 | ORIENT HANDWHEEL SO IT FACES SOUTH AND IS ACCESSIBLE FROM PLATFORM IN FILTER PIPE GALLERY. |
| 93 | PRE-V-22101 | 6" | PLUG | 150 | FLG X FLG | 10 | DRAIN | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D214 | ORIENT HANDWHEEL SO IT FACES SOUTH AND IS ACCESSIBLE FROM PLATFORM IN FILTER PIPE GALLERY. |
| 94 | PRE-V-22201 | 6" | PLUG | 150 | FLG X FLG | 10 | DRAIN | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D214 | ORIENT HANDWHEEL SO IT FACES SOUTH AND IS ACCESSIBLE FROM PLATFORM IN FILTER PIPE GALLERY. |
| 95 | FLT-V-44004 | 12" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D219 | PROVIDED BY BLOWER MANUFACTURER |
| 96 | FBW-V-55010 | 10" | PLUG | 150 | FLG X FLG | 10 | WASTE WASHWATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 97 | FLT-V-44002 | 12" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D219 | PROVIDED BY BLOWER MANUFACTURER |
| 99 | FLT-V-44006 | 12" | BUTTERFLY | 150 | FLG X FLG | 10 | AIR SCOUR | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D219 | PROVIDED BY BLOWER MANUFACTURER |
| 101 | FBS-V-54001 | 10" | BUTTERFLY | 150 | FLG X FLG | 50 | FILTERED WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D229 | |
| 102 | FBS-V-54002 | 10" | BUTTERFLY | 150 | FLG X FLG | 50 | FILTERED WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | CLEARWELL WEST | D229 | |
| 103 | FBS-V-54003 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 104 | FBS-V-54004 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 105 | FBS-V-54005 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 106 | FBS-V-54006 | 20" | CHECK | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D217 | |
| 107 | FBS-V-54007 | 20" | CHECK | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D217 | |
| 108 | FBS-V-54008 | 20" | CHECK | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D217 | |
| 109 | FBS-V-54009 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 110 | FBS-V-54010 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 111 | FBS-V-54011 | 20" | BUTTERFLY | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 112 | FBS-V-54012 | 24" | PRV | 150 | FLG X FLG | 50 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 113 | FBW-V-55001 | 8" | PLUG | 150 | FLG X FLG | 10 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 114 | FBW-V-55002 | 8" | PLUG | 150 | FLG X FLG | 10 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 115 | FBW-V-55003 | 8" | PLUG | 150 | FLG X FLG | 10 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 116 | FBW-V-55004 | 10" | CHECK | 150 | FLG X FLG | 20 | BACKWASH WASTE | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D217 | |
| 117 | FBW-V-55005 | 10" | PLUG | 150 | FLG X FLG | 20 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 118 | FBW-V-55006 | 10" | CHECK | 150 | FLG X FLG | 20 | BACKWASH WASTE | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D217 | |
| 119 | FBW-V-55007 | 10" | PLUG | 150 | FLG X FLG | 20 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 120 | FBW-V-55008 | 8" | PLUG | 150 | FLG X FLG | 10 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 121 | FBW-V-55009 | 8" | PLUG | 150 | FLG X FLG | 10 | BACKWASH WASTE | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 122 | RWS-V-11028 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 55 | RAW WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 123 | RWS-V-11029 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | RAW WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 124 | FMP-V-20216 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 80 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 125 | FMP-V-20217 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 80 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 126 | FMP-V-20218 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 80 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 127 | STW-V-25105 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | SETTLED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA B | D226 | ROUTE VENT TO FILTER INLET CHANNEL, SHALL HAVE PTFE GASKETS AND SST BODY. PROVIDE ISOLATION KIT. |
| 128 | OZO-V-36504 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 80 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA B | D204 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 129 | OZO-V-36501 | 6" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 130 | OZO-V-36502 | 6" | CHECK | 150 | FLG X FLG | 80 | FLASH MIX | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA B | D204 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 131 | OZO-V-36503 | 6" | BUTTERFLY | 150 | FLG X FLG | 80 | FLASH MIX | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 132 | FLT-V-41109 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 133 | FLT-V-41108 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 134 | FLT-V-41209 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 135 | FLT-V-41208 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
VALVE SCHEDULE II

| | |
|---|---|
| project 98101 | contract |
| drawing D024 | rev. 0 |
| sheet 232 of 542 sheets | |
| file 98101_D | |

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## VALVE SCHEDULE III (XX) /1

| NO. | TAG | SIZE | TYPE | PRESSURE CLASS | END CONNECTION | WORKING PRESSURE (PSI) | PIPE SYSTEM | ACTUATOR | LINE ORIENTATION | SHAFT ORIENTATION | SERVICE | LOCATION | SHEET | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 136 | FLT-V-41309 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 137 | FLT-V-41308 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 138 | FLT-V-41609 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 139 | FLT-V-41608 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 140 | FLT-V-41508 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 141 | FLT-V-41509 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 142 | FLT-V-41408 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTERED WATER | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 143 | FLT-V-41409 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D214 | |
| 144 | FLT-V-46005 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 10 | FILTER TO WASTE | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D215 | WASTEWATER STYLE |
| 145 | FBS-V-54013 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D217 | |
| 146 | FBS-V-54014 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D217 | |
| 147 | FBS-V-54015 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D217 | |
| 148 | FBW-V-55011 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 20 | BACKWASH WASTE | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D217 | WASTEWATER STYLE |
| 149 | FBW-V-55014 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 20 | BACKWASH WASTE | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D217 | WASTEWATER STYLE |
| 150 | FBS-V-54016 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D205 | |
| 151 | FLT-V-46003 | 6" | CHECK | 150 | FLG X FLG | 10 | FILTER TO WASTE | N/A | HORIZONTAL | VERTICAL | N/A | LOWER LEVEL AREA C | D215 | |
| 152 | FBS-V-54021 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D205 | |
| 153 | OZO-V-32001 | 8" | BUTTERFLY | 150 | FLG X FLG | 15 | SETTLED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D215 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 154 | CCC-V-61001 | 10" | BUTTERFLY | 150 | FLG X FLG | 15 | DRAIN | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | CLEARWELL WEST | D229 | |
| 155 | CCC-V-61002 | 10" | CHECK | 150 | FLG X FLG | 15 | DRAIN | N/A | HORIZONTAL | N/A | N/A | CLEARWELL WEST | D229 | |
| 156 | FBS-V-54022 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 30 | BACKWASH SUPPLY | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA C | D205 | |
| 157 | FBS-V-54017 | 30" | BUTTERFLY | 150 | FLG X FLG | 30 | BACKWASH SUPPLY | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 158 | CCC-V-61003 | 14" | BUTTERFLY | 150 | FLG X FLG | 30 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | PROVIDE CHAIN OPERATOR EXTENSION |
| 159 | CCC-V-61004 | 14" | CHECK | 150 | FLG X FLG | 30 | DRAIN | N/A | HORIZONTAL | N/A | N/A | CLEARWELL WEST | D217 | |
| 160 | CCC-V-61005 | 14" | PRESSURE SUSTAINING | 150 | FLG X FLG | 30 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 161 | FBW-V-55501 | 36" | CHECK | 150 | FLG | 20 | OVERFLOW | N/A | HORIZONTAL | N/A | N/A | CLEARWELL WEST | D217 | DUCKBILL STYLE CHECK VALVE |
| 162 | OZO-V-32004 | 6" | CHECK | 150 | FLG X FLG | 100 | OZONATED WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA B | D215 | SHALL HAVE PTFE SEAT & GASKETS & AND SST BODY. PROVIDE ISOLATION KIT. |
| 163 | CCC-V-61006 | 14" | CHECK | 150 | FLG | 30 | DRAIN | N/A | VERTICAL | N/A | N/A | CLEARWELL WEST | D230 | DUCKBILL STYLE CHECK VALVE |
| 164 | SLD-V-22105 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 165 | SLD-V-22106 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 166 | SLD-V-22204 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 167 | SLD-V-22205 | 4" | PLUG | 150 | FLG X FLG | 10 | SOLIDS | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D226 | |
| 168 | FLT-V-40101 | 2" | BALL VALVE | 150 | NTP | 10 | FILTER INFLUENT DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA C | D214 | |
| 169 | OZO-V-32002 | 6" | BUTTERFLY | 150 | FLG X FLG | 100 | OZONATED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D215 | PROVIDE CHAIN OPERATOR EXTENSION, SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 170 | OZO-V-32003 | 6" | BUTTERFLY | 150 | FLG X FLG | 100 | OZONATED WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA B | D215 | PROVIDE CHAIN OPERATOR EXTENSION, SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 171 | OZO-V-35001 | 6" | PVRV | N/A | FLG X FLG | 30 | OZONE DESTRUCT | N/A | VERTICAL | N/A | N/A | UPPER LEVEL AREA B | D232 | PROVIDED BY OSS |
| 172 | OZO-V-35002 | 6" | PVRV | N/A | FLG X FLG | 30 | OZONE DESTRUCT | N/A | VERTICAL | N/A | N/A | UPPER LEVEL AREA B | D232 | PROVIDED BY OSS |
| 173 | OZO-V-35003 | 4" | BUTTERFLY | 150 | FLG X FLG | 10 | OZONE DESTRUCT | MANUAL | VERTICAL | VERTICAL | OPEN/CLOSE | UPPER LEVEL AREA B | D219 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. |
| 174 | FBS-V-54019 | 6" | BACKFLOW PREVENTOR | 150 | FLG X FLG | 100 | BACKWASH SUPPLY | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D230 | WATTS MODEL LF009 BACKFLOW PREVENTER. SEE SPECIFICATION 22 11 19. |
| 175 | OZO-V-32005 | 6" | CHECK | 150 | FLG X FLG | 100 | OZONATED WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA B | D215 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 176 | SLD-V-22206 | 6" | CHECK | 150 | FLG | 10 | SOLIDS | N/A | HORIZONTAL | N/A | N/A | CLEARWELL WEST | D217 | DUCKBILL STYLE CHECK VALVE |
| 177 | CCC-V-61007 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D229 | |
| 178 | CCC-V-61008 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D229 | |
| 179 | FBW-V-55012 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 180 | FMP-V-20219 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 70 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 181 | FMP-V-20220 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 70 | FLASH MIX | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA A | D203 | |
| 182 | FBS-V-54018 | 6" | PRV | 150 | FLG X FLG | 100 | BACKWASH SUPPLY | N/A | HORIZONTAL | HORIZONTAL | N/A | CLEARWELL WEST | D230 | |
| 183 | CCC-V-61009 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 184 | FBW-V-55013 | 6" | BUTTERFLY | 150 | FLG X FLG | 10 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 185 | OZO-V-35004 | 8" | BUTTERFLY | 150 | FLG X FLG | 10 | OZONE DESTRUCT | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | UPPER LEVEL AREA B | D232 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 186 | OZO-V-35005 | 8" | BUTTERFLY | 150 | FLG X FLG | 10 | OZONE DESTRUCT | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | UPPER LEVEL AREA B | D232 | SHALL HAVE PTFE SEAT & GASKETS & SST BODY. PROVIDE ISOLATION KIT. |
| 187 | RWS-V-11027 | 24" | BUTTERFLY | 150 | FLG X FLG | 10 | RAW WATER | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | |
| 188 | RWS-V-11022 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA A | D203 | PROVIDE CHAIN OPERATOR EXTENSION |
| 189 | RWS-V-11023 | 20" | CHECK | 150 | FLG X FLG | 15 | RAW WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 190 | RWS-V-11026 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 191 | RWS-V-11024 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | MANUAL | HORIZONTAL | HORIZONTAL | OPEN/CLOSE | INTAKE PIPE GALLERY | D203 | PROVIDE CHAIN OPERATOR EXTENSION |
| 192 | RWS-V-11025 | 20" | CHECK | 150 | FLG X FLG | 15 | RAW WATER | N/A | HORIZONTAL | HORIZONTAL | N/A | LOWER LEVEL AREA A | D203 | |
| 193 | RWS-V-11030 | 20" | BUTTERFLY | 150 | FLG X FLG | 15 | RAW WATER | ELECTRIC MOTOR | HORIZONTAL | HORIZONTAL | MODULATING | LOWER LEVEL AREA A | D203 | |
| 194 | SLD-V-22107 | 6" | PLUG | 150 | FLG X FLG | 40 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 195 | SLD-V-22104 | 6" | PLUG | 150 | FLG X FLG | 40 | DRAIN | MANUAL | HORIZONTAL | VERTICAL | OPEN/CLOSE | CLEARWELL WEST | D217 | |
| 197 | STW-V-25013 | 48" | BUTTERFLY | 150 | FLG X FLG | 10 | SETTLED WATER | MANUAL | VERTICAL | HORIZONTAL | OPEN/CLOSE | LOWER LEVEL AREA B | D204 | |
| 199 | OZO-V-32006 | 2" | COMBO AIR/VAC VALVE | N/A | NPT | 70 | OZONE SIDESTREAM | N/A | VERTICAL | N/A | N/A | LOWER LEVEL AREA B | D215 | |
| 200 | SLD-V-22207 | 6" | CHECK | 150 | FLG | 10 | SOLIDS | N/A | HORIZONTAL | N/A | OPEN/CLOSE | CLEARWELL WEST | D217 | DUCKBILL STYLE CHECK VALVE |
| 201 | FBS-V-54020 | 10" | CHECK | 150 | FLG X FLG | 15 | FILTERED WATER | N/A | HORIZONTAL | N/A | N/A | CLEARWELL WEST | D229 | |

NOTES:
1. PROVIDE THREAD LUBE FOR INSTALLATION OF ALL THREADED VALVES.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
VALVE SCHEDULE III

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**D025 — 1**

sheet 233 of 542 sheets
file 98101_D

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| PENETRATION SCHEDULE (XX) | | | | | | |
|---|---|---|---|---|---|---|
| MARK | PIPE SIZE | PENETRATION TYPE | PIPE LOCATION | SHEET NUMBER | DESCRIPTION | WORK PACKAGE |
| 1 | 4"ø | DOUBLE LINK SEAL | LOWER LEVEL B | D204 | SOLIDS | WP2 |
| 2 | 4"ø | DOUBLE LINK SEAL | LOWER LEVEL B | D204 | SOLIDS | WP2 |
| 3 | 4"ø | DOUBLE LINK SEAL | LOWER LEVEL B | D204 | SOLIDS | WP2 |
| 4 | 4"ø | DOUBLE LINK SEAL | LOWER LEVEL B | D204 | SOLIDS | WP2 |
| 146 | 4"ø | ROOF PENETRATION | UPPER LEVEL B | D219 | OZONE DESTRUCT | WP3 |
| 5 | 4"ø | ROOF PENETRATION | UPPER LEVEL B | D224 | OZONE DESTRUCT | WP3 |
| 6 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | DRAIN | WP2 |
| 7 | 6"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D205 | COMBINED SOLIDS AND DRAIN | WP2 |
| 8 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | POTABLE WATER | WP2 |
| 9 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | COMBINED SOLIDS AND DRAIN | WP2 |
| 10 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | BW SUPPLY DIVERSION DRAIN | WP2 |
| 11 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | FILTERED WATER | WP2 |
| 12 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | DRAIN | WP2 |
| 14 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | SOLIDS AND DRAIN | WP2 |
| 15 | 6"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | SOLIDS AND DRAIN | WP2 |
| 16 | 8"ø | DOUBLE LINK SEAL OR WALL PIPE | CLEARWELL WEST | D217 | WASTE | WP2 |
| 17 | 8"ø | DOUBLE LINK SEAL OR WALL PIPE | CLEARWELL WEST | D217 | WASTE | WP2 |
| 30 | 8"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D215 | CARRIER PIPE | WP2 |
| 31 | 8"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | CARRIER PIPE | WP2 |
| 32 | 8"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D205 | CARRIER PIPE | WP2 |
| 121 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 124 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 127 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 129 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 130 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 132 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 126 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 134 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 24 | 8"ø | WALL PIPE | UPPER LEVEL B | D224 | OZONE DESTRUCT | WP3 |
| 122 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 120 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 123 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 125 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 131 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 133 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 33 | 8"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | CARRIER PIPE | WP2 |
| 128 | 8"ø | ROOF PENETRATION | UPPER LEVEL E | D231 | CHEMICAL VENT | WP3 |
| 118 | 8"ø | WALL PIPE | LOWER LEVEL B | D232 | RISER PIPE | WP3 |
| 117 | 8"ø | WALL PIPE | LOWER LEVEL B | D232 | RISER PIPE | WP3 |
| 135 | 8"ø | WALL PIPE | LOWER LEVEL B | D206 | RISER PIPE | WP3 |
| 136 | 8"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D205 | CARRIER PIPE | WP2 |
| 137 | 8"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | CARRIER PIPE | WP2 |
| 119 | 8"ø | ROOF PENETRATION | UPPER LEVEL D | D231 | CHEMICAL VENT | WP3 |
| 26 | 10"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | BACKWASH SUPPLY DIVERSION | WP2 |
| 27 | 10"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | BACKWASH SUPPLY DIVERSION | WP2 |
| 28 | 10"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | CLEARWELL DRAIN | WP2 |
| 29 | 10"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D217 | FILTERED WATER | WP2 |
| 34 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 35 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 36 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 37 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 38 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 39 | 14"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D214 | AIR SCOUR | WP2 |
| 40 | 14"ø | FLOOR PENETRATION | UPPER LEVEL B | D206 | AIR SCOUR | WP3 |
| 41 | 14"ø | FLOOR PENETRATION | UPPER LEVEL B | D206 | AIR SCOUR | WP3 |
| 42 | 14"ø | VERTICAL WALL PIPE PENETRATION | CLEARWELL WEST | D230 | CLEARWELL DRAIN | WP2 |
| 44 | 14"ø | VERTICAL WALL PIPE PENETRATION | CLEARWELL WEST | D230 | WASHWATER BASIN | WP2 |
| 45 | 18"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D211 | FRP VENT | WP2 |
| 46 | 18"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D211 | FRP VENT | WP2 |
| 47 | 18"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D211 | FRP VENT | WP2 |
| 48 | 18"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D211 | FRP VENT | WP2 |
| 49 | 20"ø | DOUBLE LINK SEAL | LOWER LEVEL C | D215 | FILTER TO WASTE | WP2 |
| 50 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | FILTER INFLUENT | WP2 |
| 51 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | FILTER INFLUENT | WP2 |
| 52 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | FILTER INFLUENT | WP2 |
| 53 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | FILTER INFLUENT | WP2 |
| 54 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | FILTER INFLUENT | WP2 |
| 55 | 20"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH PUMP SUCTION | WP2 |
| 56 | 20"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D217 | BACKWASH PUMP SUCTION | WP2 |
| 57 | 20"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D217 | BACKWASH PUMP SUCTION | WP2 |
| 58 | 20"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D217 | FILTERED WATER | WP2 |
| 59 | 20"ø | DOUBLE LINK SEAL | UPPER LEVEL C | D232 | SST VENT | WP3 |
| 60 | 20"ø | MASONRY WALL PENETRATION | UPPER LEVEL C | D232 | SST VENT | WP3 |
| 61 | 20"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D211 | FRP VENT | WP2 |
| 62 | 20"ø | DOUBLE LINK SEAL | UPPER LEVEL C | D227 | SST VENT | WP3 |
| 64 | 20"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D211 | FRP VENT | WP2 |

| PENETRATION SCHEDULE (XX) | | | | | | |
|---|---|---|---|---|---|---|
| MARK | PIPE SIZE | PENETRATION TYPE | PIPE LOCATION | SHEET NUMBER | DESCRIPTION | WORK PACKAGE |
| 65 | 20"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D211 | FRP VENT | WP2 |
| 66 | 20"ø | VERTICAL FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D211 | FRP VENT | WP2 |
| 67 | 20"ø | ROOF PENETRATION | UPPER LEVEL B | D227 | SST VENT | WP2 |
| 63 | 20"ø | DOUBLE LINK SEAL | UPPER LEVEL C | D227 | SST VENT | WP3 |
| 68 | 24"ø | DOUBLE LINK SEAL | LOWER LEVEL A | D203 | ELG4 INLET | WP2 |
| 69 | 24"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D212 | BACKWASH WASTE | WP2 |
| 70 | 24"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D212 | BACKWASH WASTE | WP2 |
| 71 | 24"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D217 | BACKWASH SUPPLY | WP2 |
| 72 | 24"ø | FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D213 | DENVER WATER CONNECTION | WP2 |
| 73 | 24"ø | DOUBLE LINK SEAL | CLEARWELL EAST | D213 | OVERFLOW | WP2 |
| 75 | 24"ø | DOUBLE LINK SEAL | CLEARWELL WEST | D212 | BACKWASH SUPPLY OVERFLOW | WP2 |
| 76 | 24"ø | DOUBLE LINK SEAL | CLEARWELL EAST | D213 | OVERFLOW | WP2 |
| 77 | 24"ø | DOUBLE LINK SEAL | CLEARWELL EAST | D213 | OVERFLOW | WP2 |
| 78 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 79 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 80 | 30"ø | WALL PIPE PENETRATION | LOWER LEVEL A | D203 | PRETREATMENT TRAIN 2 INLET | WP2 |
| 81 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D215 | BACKWASH WASTE | WP2 |
| 82 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 83 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 84 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 85 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 86 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 87 | 30"ø | WALL PIPE PENETRATION | LOWER LEVEL A | D203 | NORTHERN WATER INLET | WP2 |
| 88 | 30"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D204 | OZONE BYPASS | WP2 |
| 89 | 30"ø | WALL PIPE PENETRATION | LOWER LEVEL C | D205 | BACKWASH SUPPLY | WP2 |
| 90 | 30"ø | WALL PIPE PENETRATION | LOWER LEVEL A | D203 | STANDLEY LAKE INLET | WP2 |
| 91 | 30"ø | WALL PIPE PENETRATION | LOWER LEVEL A | D203 | PRETREATMENT TRAIN 1 INLET | WP2 |
| 92 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 93 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 94 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 95 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 96 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 97 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | BACKWASH WASTE | WP2 |
| 98 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL A | D203 | OVERFLOW | WP2 |
| 99 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL A | D203 | OVERFLOW | WP2 |
| 100 | 36"ø | WALL PIPE PENETRATION | LOWER LEVEL A | D203 | OVERFLOW | WP2 |
| 101 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D215 | OVERFLOW | WP2 |
| 102 | 36"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D205 | OVERFLOW | WP2 |
| 103 | 36"ø | FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D212 | OVERFLOW | WP2 |
| 74 | 36"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D212 | OVERFLOW | WP2 |
| 104 | 36"ø | WALL PIPE PENETRATION | CLEARWELL WEST | D217 | BACKWASH OVERFLOW | WP2 |
| 105 | 42"ø | WALL PIPE PENETRATION | LOWER LEVEL C | D214 | FILTER EFFLUENT | WP2 |
| 106 | 48"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D225 | SETTLED WATER | WP3 |
| 107 | 48"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D204 | SETTLED WATER | WP3 |
| 108 | 48"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D204 | OZONATED WTER | WP2 |
| 109 | 48"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D204 | OZONATED WATER | WP2 |
| 110 | 48"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL B | D204 | OZONATED WATER | WP2 |
| 111 | 48"ø | FLUSH PENETRATION W/COLLAR | CLEARWELL WEST | D212 | FINISHED WATER | WP2 |
| 113 | 48"ø | FLUSH PENETRATION W/COLLAR | CLEARWELL EAST | D213 | FINISHED WATER | WP2 |
| 112 | 48"ø | WALL PIPE PENETRATION | LOWER LEVEL B | D204 | SETTLED WATER | WP2 |
| 13 | 60"ø | WALL PIPE PENETRATION | LOWER LEVEL C | D214 | FILTER INFLUENT | WP2 |
| 114 | 60"ø | WALL PIPE PENETRATION | LOWER LEVEL C | D214 | OZONATED WATER | WP2 |
| 115 | 60"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D227 | OZONATED WATER | WP3 |
| 116 | 60"ø | FLUSH PENETRATION W/COLLAR | LOWER LEVEL C | D227 | OZONATED WATER | WP3 |

**NOTES:**
1. SEE ARCHITECTURAL DRAWINGS FOR ROOF PENETRATION DETAILS. SEE PROCESS DRAWINGS FOR ALL OTHER DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

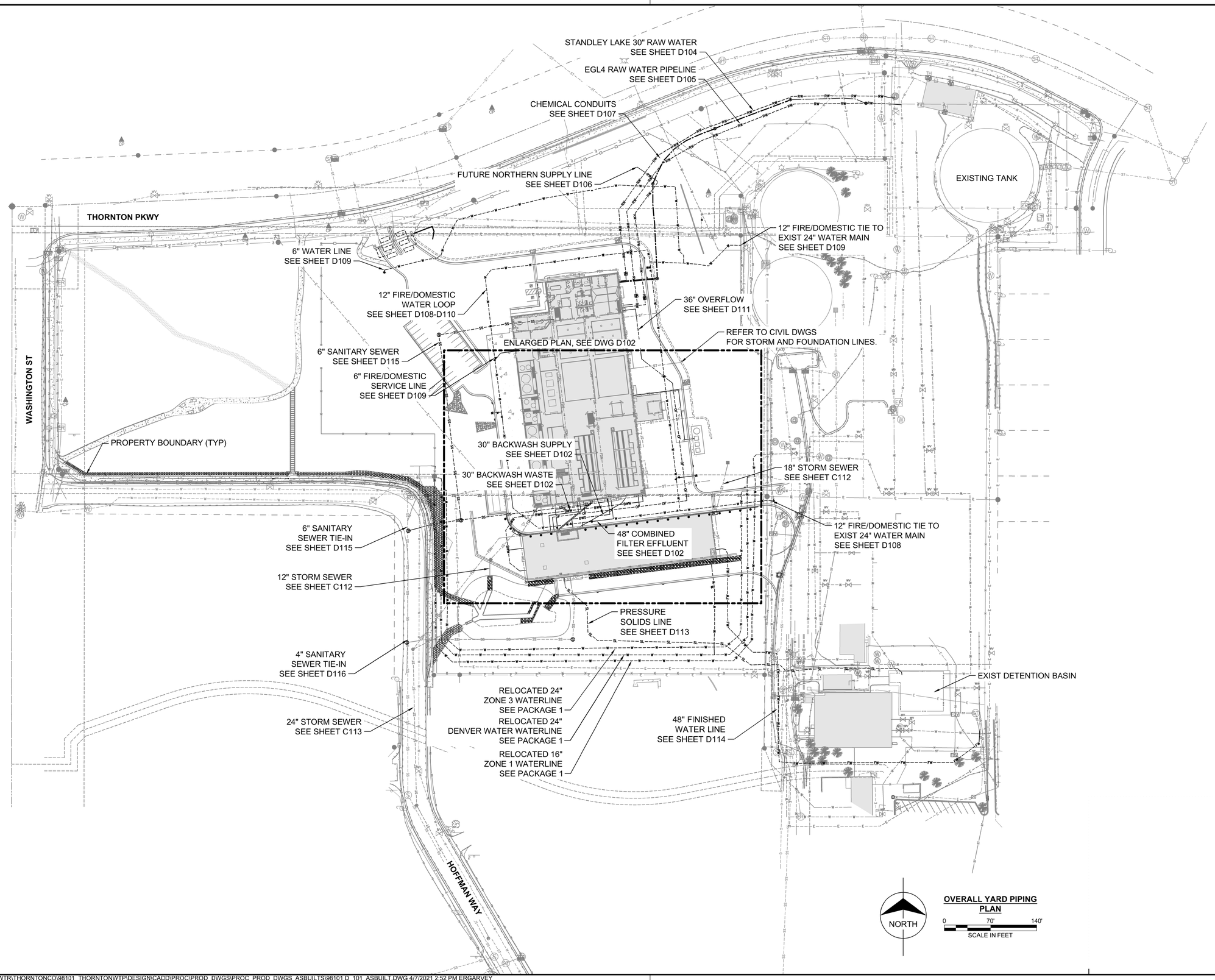
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PIPE PENETRATION SCHEDULE

| | |
|---|---|
| project 98101 | contract |
| drawing D026 | rev. 0 |
| sheet 234 of 542 sheets | |
| file 98101_D | |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**OVERALL YARD PIPING PLAN**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 04/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL YARD PIPING PLAN

| project | contract |
|---|---|
| 98101 | |

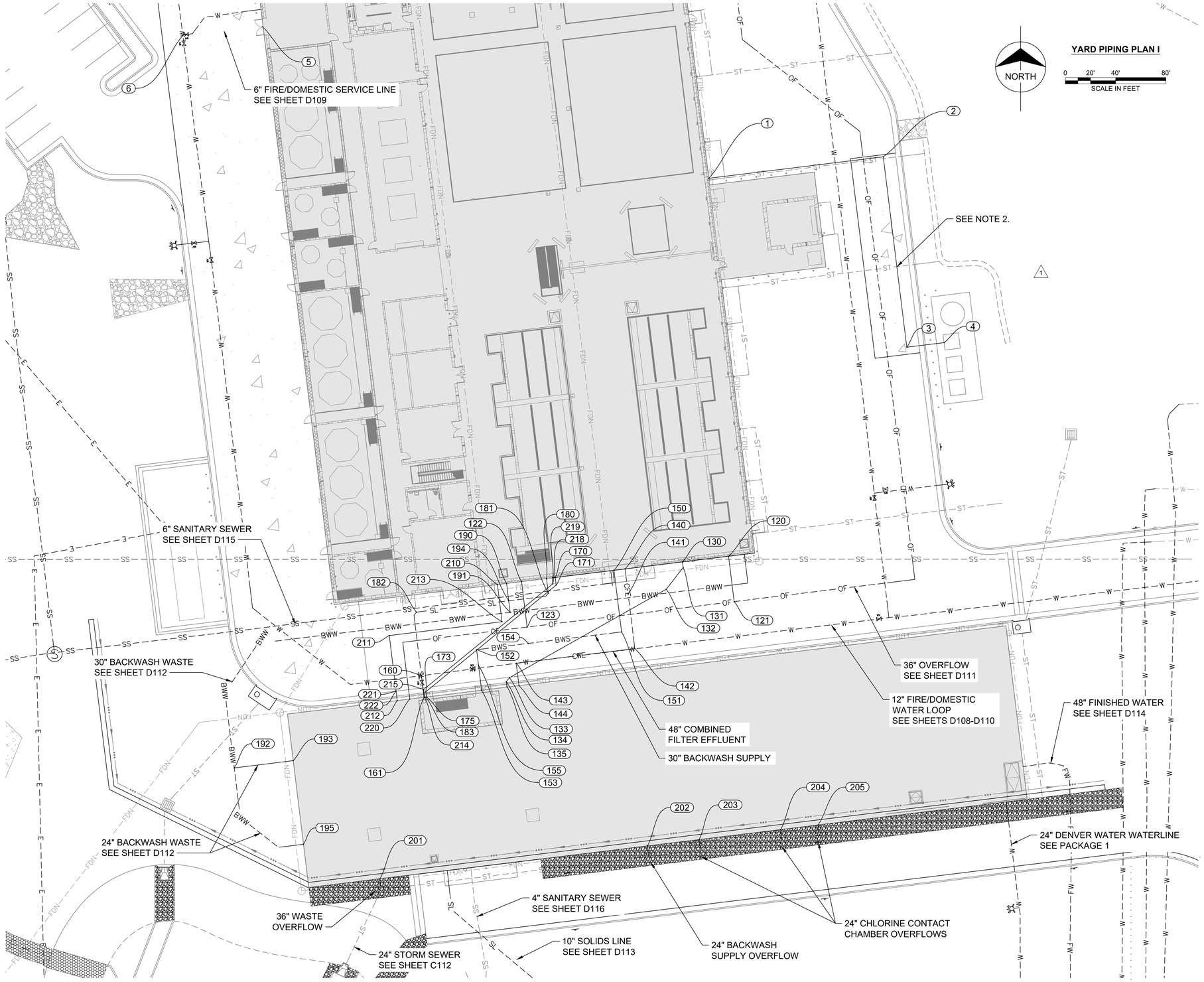
**drawing** D101 – **rev.** 0

**sheet** 235 **of** 542 sheets

**file** 98101 D_101_ASBUILT.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.
2. GASEOUS OXYGEN PIPING SHALL BE INSTALLED MINIMUM 30" BELOW FINISHED GRADE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/25/19 | ML | KH | REVISED PER BUILDING DEPARTMENT REVIEW |
| | 04/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING PLAN I

| project | contract |
|---|---|
| 98101 | |

drawing **D102** rev. **1**

sheet 236 of 542 sheets

file 98101 D_102_ASBUILT.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 1 | 742573.68 | 148234.84 | 5385.23 | 2" GOX WALL PENETRATION |
| 2 | 742582.20 | 148304.28 | 5395.00 | 2" GOX 90° BEND |
| 3 | 742506.46 | 148313.67 | 5395.00 | 2" GOX 90° BEND |
| 4 | 742508.29 | 148328.56 | 5395.00 | 2" GOX TANK CONNECTION |
| 5 | 742633.90 | 148057.25 | 5392.44 | 6" WALL PENETRATION (FIRE/DOMESTIC SERVICE) |
| 6 | 742630.38 | 148025.43 | 5392.44 | CONNECT TO 12"x6" TEE. SEE SHEET D108. |
| 120 | 742423.31 | 148242.73 | 5379.00 | 36" WALL PENETRATION (BACKWASH WASTE CHANNEL OVERFLOW) |
| 121 | 742405.23 | 148244.95 | 5378.75 | CONNECT TO 36"x36" TEE. SEE SHEET D110 AND NOTE 3. (BACKWASH WASTE CHANNEL OVERFLOW) |
| 122 | 742413.19 | 148160.33 | 5379.00 | 36" WALL PENETRATION (BACKWASH WASTE CHANNEL OVERFLOW) |
| 123 | 742395.12 | 148162.55 | 5378.50 | CONNECT TO 36"x36" TEE. SEE SHEET D110 AND NOTE 3. (BACKWASH WASTE CHANNEL OVERFLOW) |
| 130 | 742421.05 | 148224.38 | 5377.66 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 131 | 742418.81 | 148224.64 | 5377.66 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 132 | 742410.14 | 148217.90 | 5377.66 | 8" 22.5° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 133 | 742374.95 | 148155.50 | 5377.66 | 8" 22.5° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 134 | 742373.38 | 148154.27 | 5377.66 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 135 | 742371.49 | 148154.50 | 5371.66 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 140 | 742418.25 | 148201.53 | 5368.91 | 42" WALL PENETRATION (COMBINED FILTER EFFLUENT) |
| 141 | 742408.32 | 148202.74 | 5368.91 | 42"x48" ECCENTRIC REDUCER. MATCH INVERTS. (COMBINED FILTER EFFLUENT) |
| 142 | 742386.52 | 148205.42 | 5367.00 | 48" 90° BEND (COMBINED FILTER EFFLUENT) |
| 143 | 742380.73 | 148158.21 | 5363.00 | 48" 90° BEND (COMBINED FILTER EFFLUENT) |
| 144 | 742371.79 | 148159.31 | 5362.50 | 48" WALL PENETRATION (COMBINED FILTER EFFLUENT) |
| 150 | 742417.71 | 148197.12 | 5386.44 | 30" WALL PENETRATION (BACKWASH SUPPLY) |
| 151 | 742393.18 | 148200.13 | 5386.20 | 30" 90° BEND (BACKWASH SUPPLY) |
| 152 | 742386.10 | 148142.44 | 5365.00 | 30" 90° BEND (BACKWASH SUPPLY) |
| 153 | 742369.96 | 148144.42 | 5364.98 | 24" WALL PENETRATION (BACKWASH SUPPLY) |
| 154 | 742388.63 | 148163.11 | 5385.83 | 30" 45° BEND DOWN (BACKWASH SUPPLY) |
| 155 | 742379.89 | 148143.20 | 5365.00 | 24"x30" CONCENTRIC REDUCER (BACKWASH SUPPLY) |
| 160 | 742375.83 | 148120.46 | 5392.64 | CONNECT TO 12"x6" TEE. SEE SHEET D107. |
| 161 | 742367.11 | 148121.53 | 5392.64 | 6" WALL PENETRATION (POTABLE SERVICE) |
| 170 | 742414.77 | 148173.73 | 5377.50 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 171 | 742411.79 | 148174.10 | 5377.50 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 173 | 742369.41 | 148122.25 | 5377.50 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 175 | 742367.27 | 148122.52 | 5377.50 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 180 | 742414.41 | 148170.25 | 5369.02 | 6" WALL PENETRATION (GRAVITY SOLIDS LINE) |
| 181 | 742407.51 | 148171.10 | 5369.00 | 6" 45° BEND (GRAVITY SOLIDS LINE) |
| 182 | 742401.05 | 148118.48 | 5368.50 | 6" 45° BEND (GRAVITY SOLIDS LINE) |
| 183 | 742367.23 | 148122.19 | 5368.00 | 6" WALL PENETRATION (GRAVITY SOLIDS LINE) |
| 190 | 742412.46 | 148154.37 | 5376.00 | 30" WALL PENETRATION (BACKWASH WASTE) |
| 191 | 742400.98 | 148155.78 | 5374.00 | CONNECT TO 30"x30" TEE. SEE SHEET D111. |
| 192 | 742339.06 | 148045.97 | 5361.59 | CONNECT TO 30"x24" TEE. SEE SHEET D111. |

## CONTROL POINT TABLE

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| 193 | 742341.94 | 148069.44 | 5361.49 | 24" WALL PENETRATION (BACKWASH WASTE) |
| 194 | 742405.78 | 148155.19 | 5376.00 | 30" 22.5° BEND DOWN (BACKWASH WASTE) |
| 195 | 742308.70 | 148073.53 | 5362.70 | 24" WALL PENETRATION (BACKWASH WASTE) |
| 201 | 742294.95 | 148103.93 | 5373.49 | 36" WALL PENETRATION (WASTE OVERFLOW). SEE NOTE 5. |
| 202 | 742308.03 | 148210.42 | 5378.00 | 24" WALL PENETRATION (BACKWASH SUPPLY OVERFLOW). SEE NOTE 5. |
| 203 | 742310.56 | 148231.01 | 5378.50 | 24" WALL PENETRATION (CHLORINE CONTACT CHAMBER OVERFLOW). SEE NOTE 5. |
| 204 | 742314.54 | 148263.44 | 5378.50 | 24" WALL PENETRATION (CHLORINE CONTACT CHAMBER OVERFLOW). SEE NOTE 5. |
| 205 | 742316.37 | 148278.34 | 5378.50 | 24" WALL PENETRATION (CHLORINE CONTACT CHAMBER OVERFLOW). SEE NOTE 5. |
| 210 | 742412.01 | 148150.73 | 5396.00 | 2" WALL PENETRATION (SUMP PUMP DISCHARGE) |
| 211 | 742391.73 | 148107.67 | 5396.00 | 2" 90° BEND (SUMP PUMP DISCHARGE) |
| 212 | 742365.84 | 148110.85 | 5396.00 | 2" WALL PENETRATION (SUMP PUMP DISCHARGE) |
| 213 | 742397.24 | 148152.54 | 5396.00 | 2" 90° BEND (SUMP PUMP DISCHARGE) |
| 214 | 742367.18 | 148121.77 | 5377.50 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 215 | 742370.31 | 148121.39 | 5377.50 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 218 | 742412.32 | 148172.78 | 5377.50 | 8" 45° BEND (CHEM & SAMPLE LINE CONDUIT) |
| 219 | 742414.77 | 148172.72 | 5377.50 | 8" WALL PENETRATION (CHEM & SAMPLE LINE CONDUIT) |
| 220 | 742366.45 | 148115.81 | 5377.40 | 36" WALL PENETRATION (OVERFLOW) |
| 221 | 742369.60 | 148110.39 | 5396.00 | 2" 90° BEND ( SUMP PUMP DISCHARGE) |
| 222 | 742369.60 | 148110.39 | 5376.00 | 2" 90° BEND ( SUMP PUMP DISCHARGE) |

NOTES:

1. ALL ELEVATIONS ARE TO PROPOSED INVERT UNLESS OTHERWISE INDICATED.
2. SEE SHEET D012 FOR DOUBLE SLEEVE STRUCTURE CONNECTION DETAILS AT ALL PROPOSED CONNECTIONS TO INTERNAL PIPING.
3. INSTALL IN-LINE RUBBER CHECK VALVE BETWEEN TEE AND BUILDING PENETRATION (PROCO STYLE 790 OR EQUAL).
4. RESTRAINED JOINTS:
   - A. THE FOLLOWING LINES SHALL HAVE FULLY RESTRAINED JOINTS:
     - i. BACKWASH SUPPLY
     - ii. COMBINED FILTER EFFLUENT
     - iii. CHEM AND SAMPLE LINE CONDUITS
     - iv. BACKWASH WASTE CHANNEL OVERFLOWS
     - v. BACKWASH WASTE (BETWEEN POINTS 190 AND 191)
     - vi. FIRE/DOMESTIC SERVICE (BETWEEN POINTS 5 AND 6)
     - vii. POTABLE SERVICE TO CLEARWELL (BETWEEN POINTS 160 AND 161)
   - B. SEE PLAN AND PROFILE SHEETS (D104-D115) FOR ADDITIONAL RESTRAINED JOINT REQUIREMENTS.
5. SEE SHEET C011 FOR EXTERNAL OVERFLOW PIPING AND MANHOLE DETAILS.
6. ALL ELBOWS ON THE CHEMICAL CARRIER PIPE LINE SHALL BE LONG RADIUS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** M. SANDOVAL |
| **designed** M. LEHRBURGER | **checked** K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
YARD PIPING CONTROL POINT TABLE

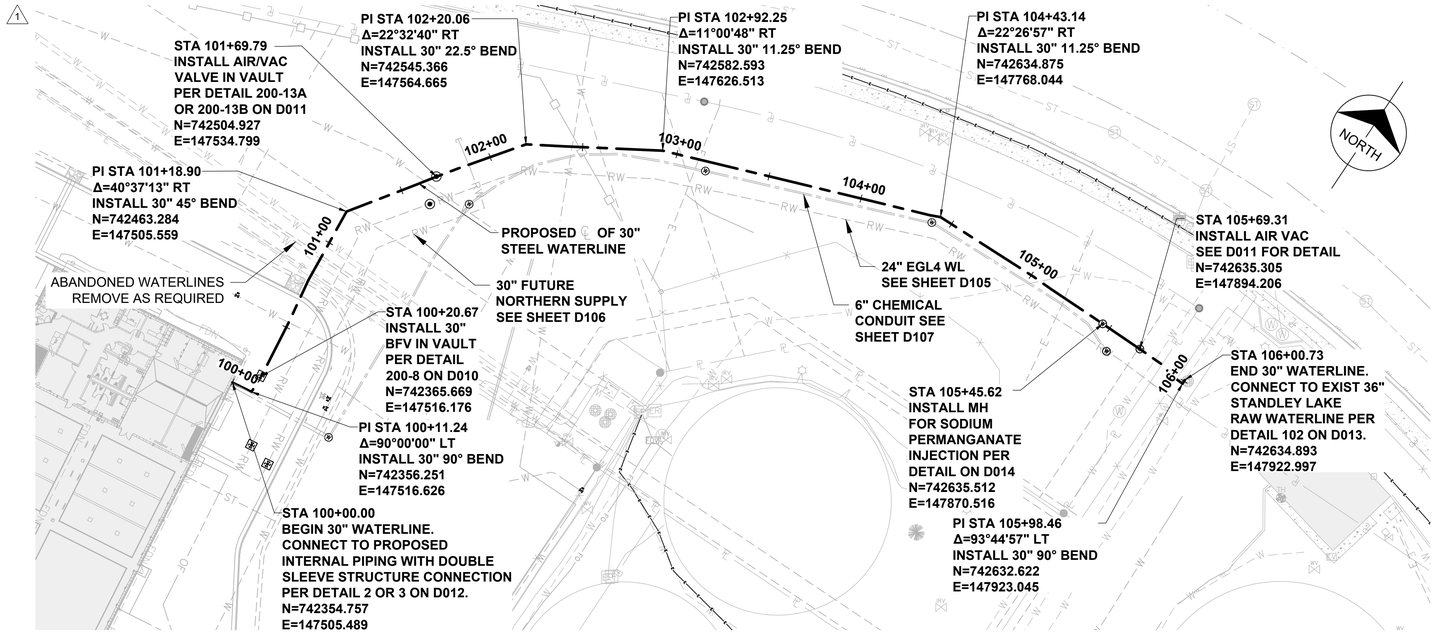
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** D103 | **rev.** – 0 |
| **sheet** 237 **of** 542 sheets | |
| **file** 98101 D_102_ASBUILT.DWG | |

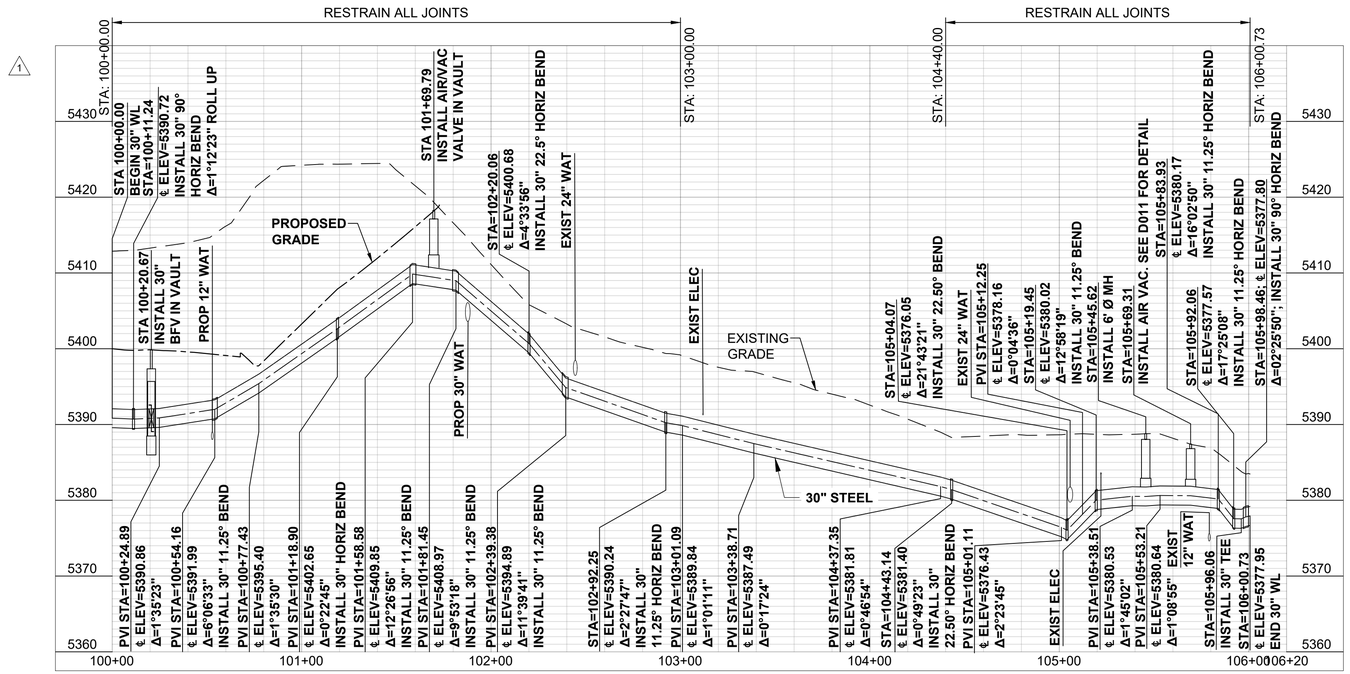
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PROC_PROD_DWGS_ASBUILTS\98101 D_102_ASBUILT.DWG 10/21/2020 4:36 PM ERGARVEY

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.
2. LIDS ON MANHOLES OUTSIDE PROPERTY FENCE SHALL BE SECURE.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
STANDLEY LAKE 30" RAW WATERLINE

| project | contract |
|---|---|
| 98101 | |

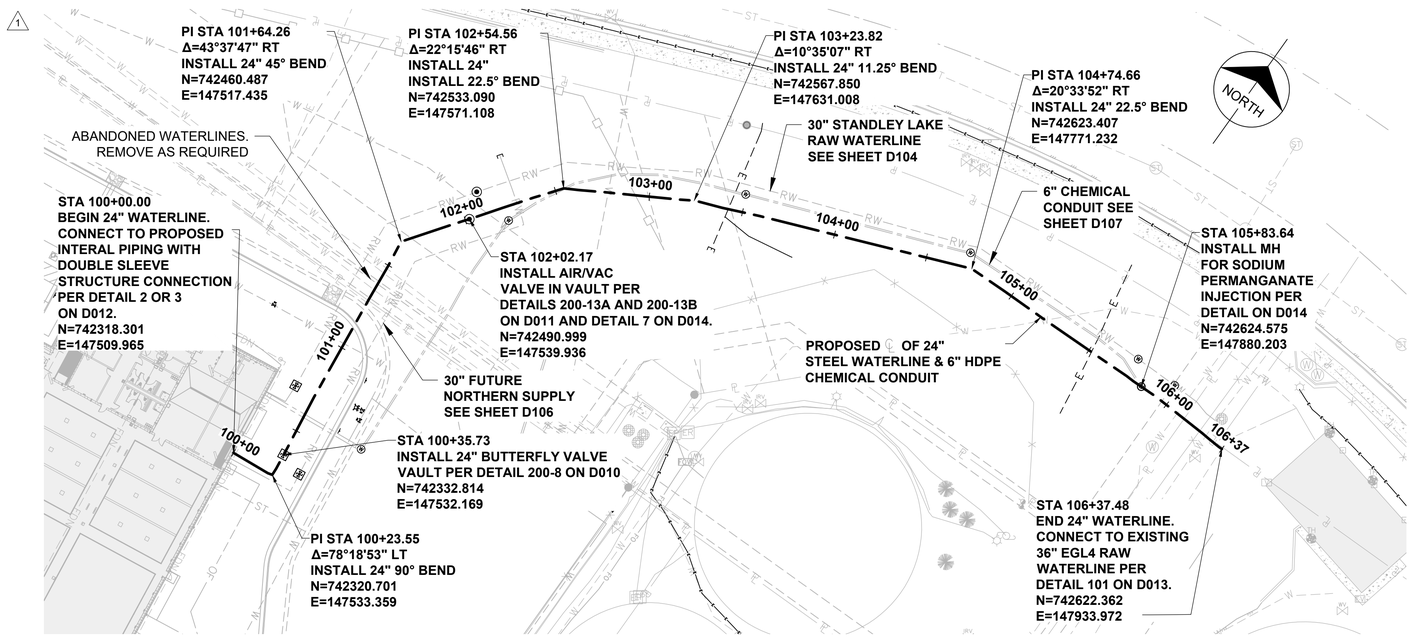
drawing **D104** – rev. **1**

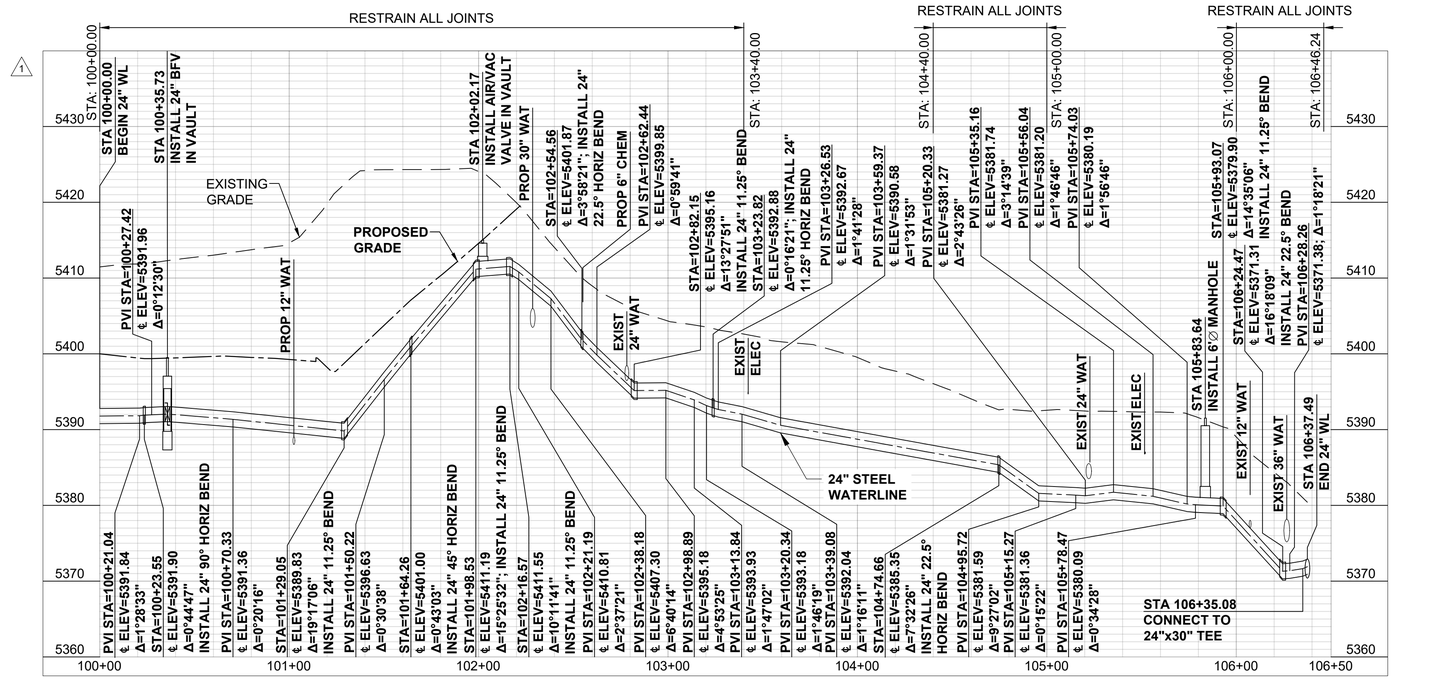
sheet 238 of 542 sheets

file 98101 D_104.DWG

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_104.DWG 3/10/2021 9:58 AM ERGARVEY




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.
2. LIDS ON MANHOLES OUTSIDE PROPERTY FENCE SHALL BE SECURE.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M.LEHRBURGER | K. HENSKE |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
EGL4 24" RAW WATERLINE

| project | contract |
|---|---|
| 98101 | |

drawing D105 – rev. 1

sheet 239 of 542 sheets

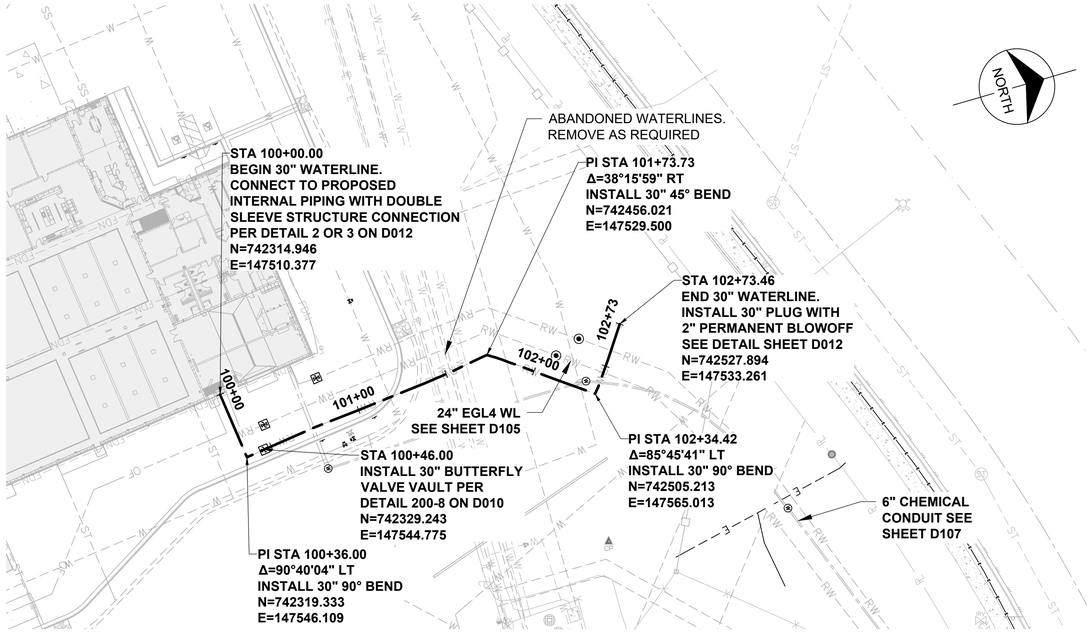
file 98101 D_105.DWG

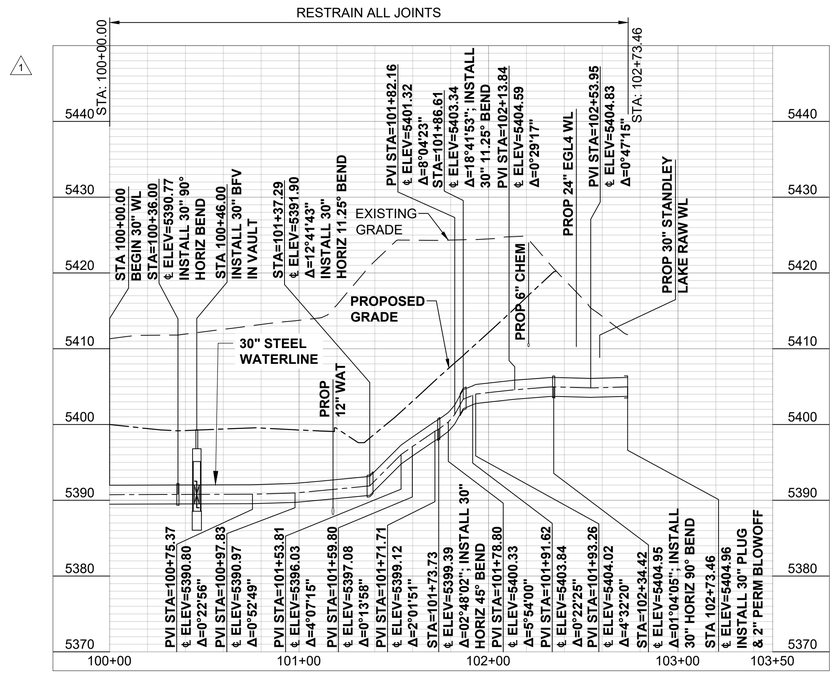
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_105.DWG 11/16/2020 1:55 PM ERGARVEY

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_106.DWG 11/16/2020 2:30 PM ERGARVEY

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FUTURE NORTHERN SUPPLY 30" WATERLINE

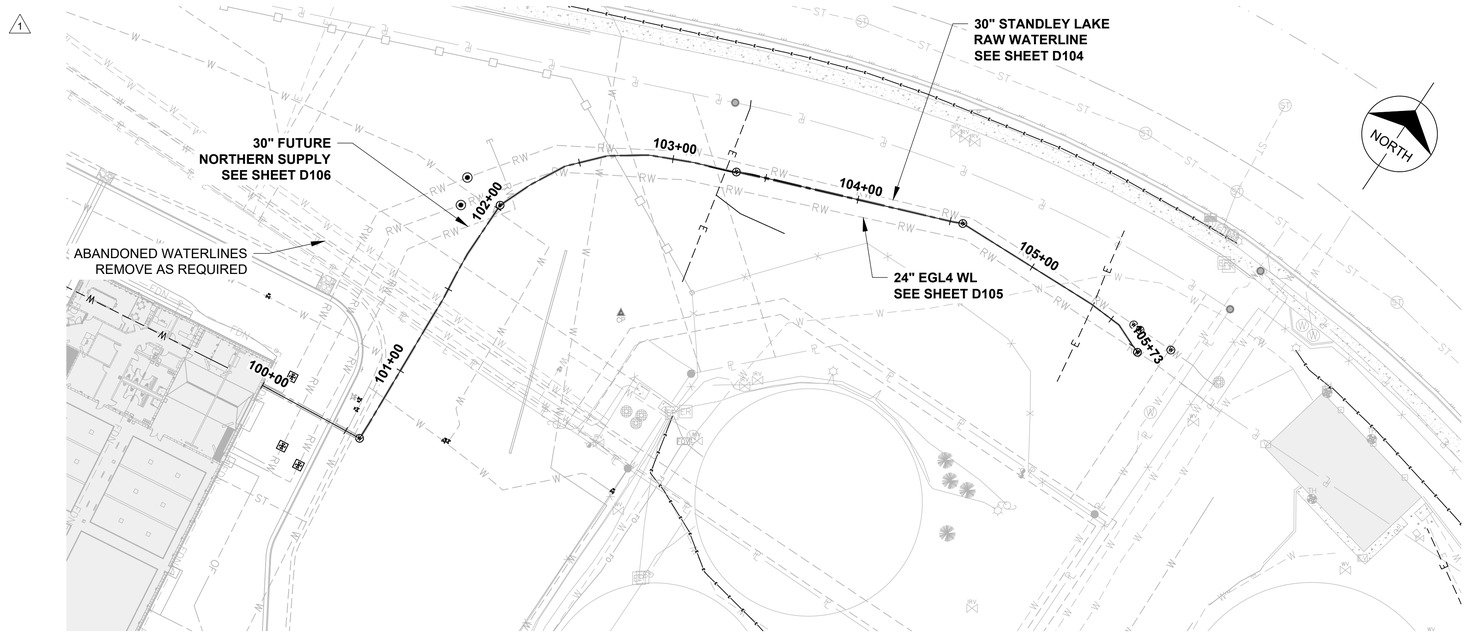
| project | contract |
|---|---|
| 98101 | |

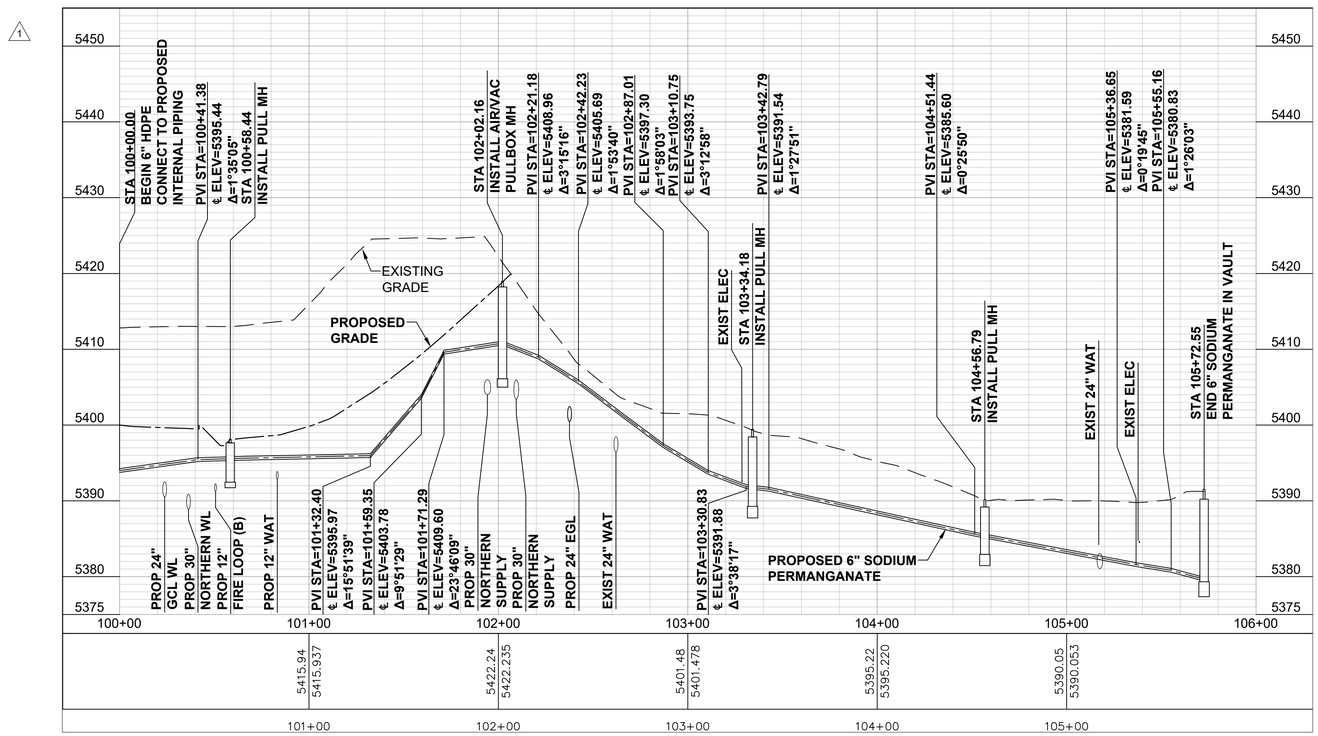
**drawing** D106 — **rev.** 1

**sheet** 240 **of** 542 sheets

**file** 98101 D_106.DWG

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |




**NOTES:**

1. **LIDS ON MANHOLES OUTSIDE PROPERTY FENCE SHALL BE SECURE.**
2. **MAINTAIN MINIMUM 1' VERTICAL SEPARATION BETWEEN LINES.**

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
6" RAW WATER CHEMICAL CONDUITS

| project | contract |
|---|---|
| 98101 | |

drawing **D107** – rev. **1**

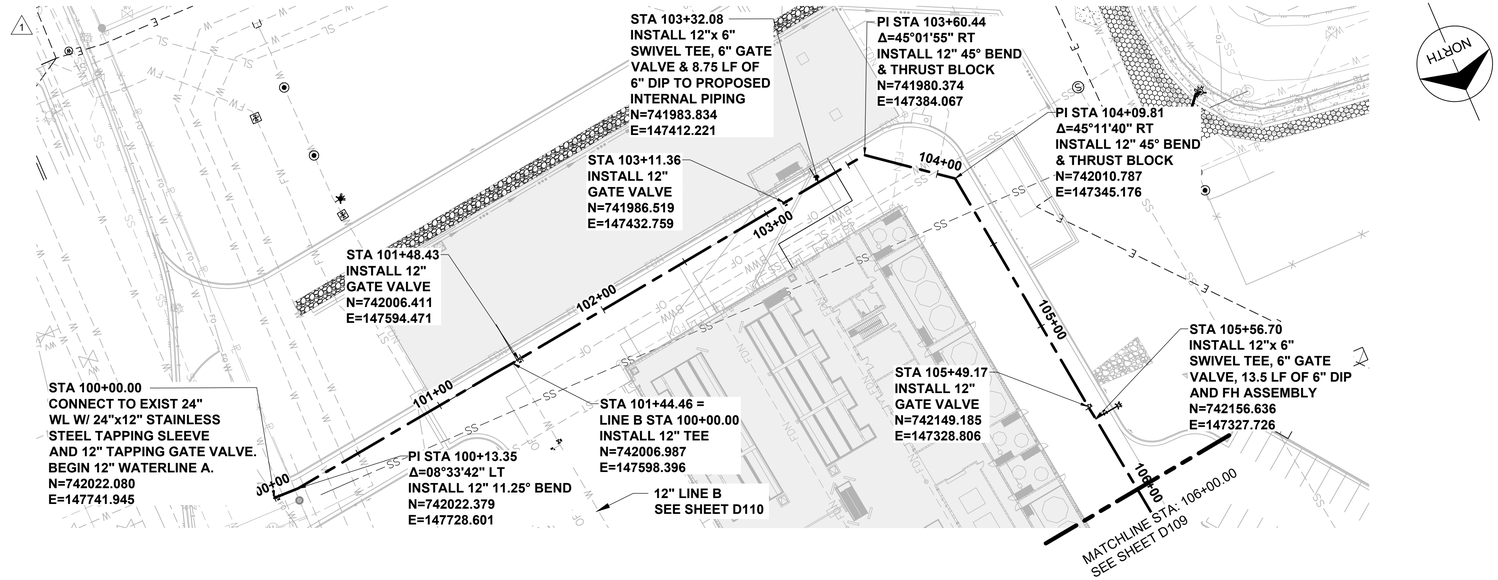
sheet 241 of 542 sheets

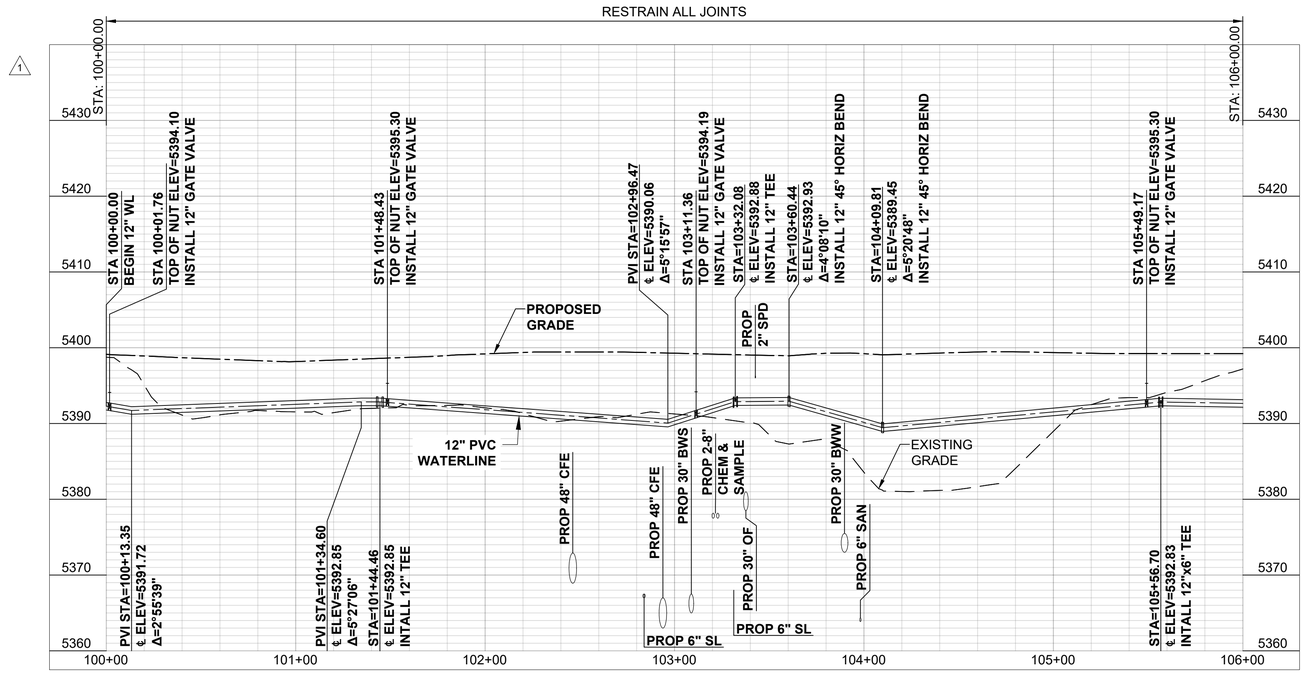
file 98101 D_107.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_107.DWG 11/16/2020 2:50 PM KWEISS




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
12" FIRE & DOMESTIC LOOP
LINE A I

| project | contract |
|---|---|
| 98101 | |

drawing **D108** – rev. **1**

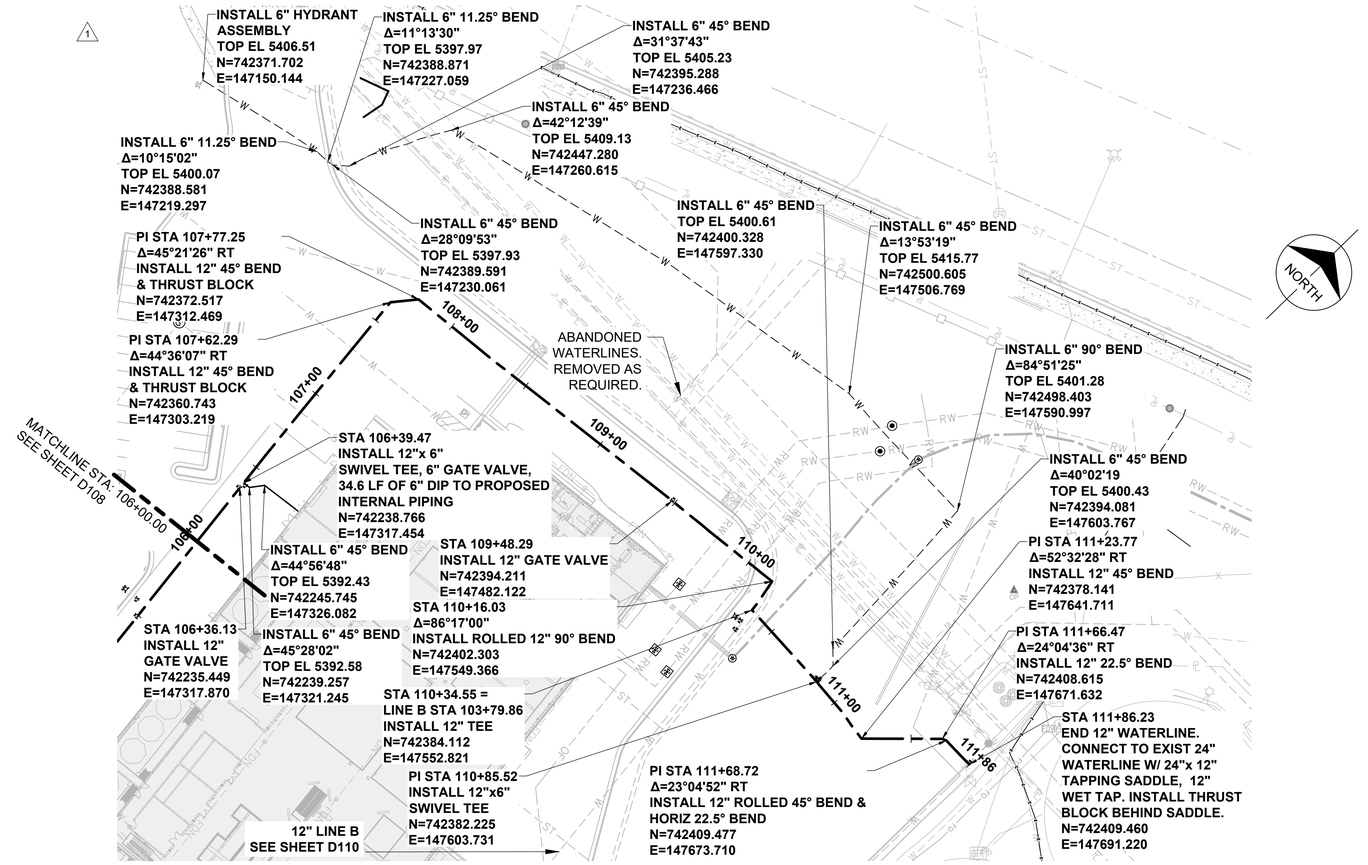
sheet 242 of 542 sheets

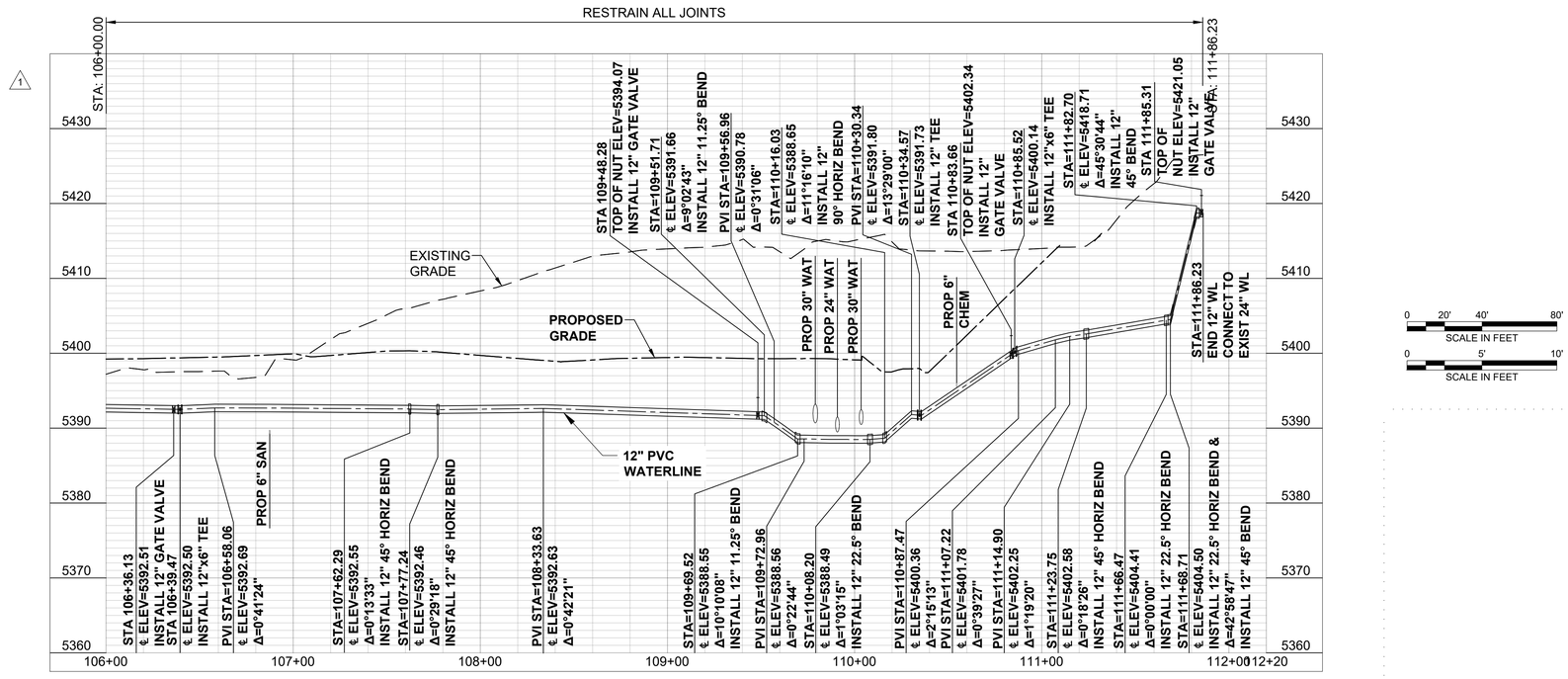
file 98101 D_108.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_108.DWG 11/16/2020 3:01 PM KWEISS




0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed M. SANDOVAL |
| designed M. LEHRBURGER | checked K. HENSKE |

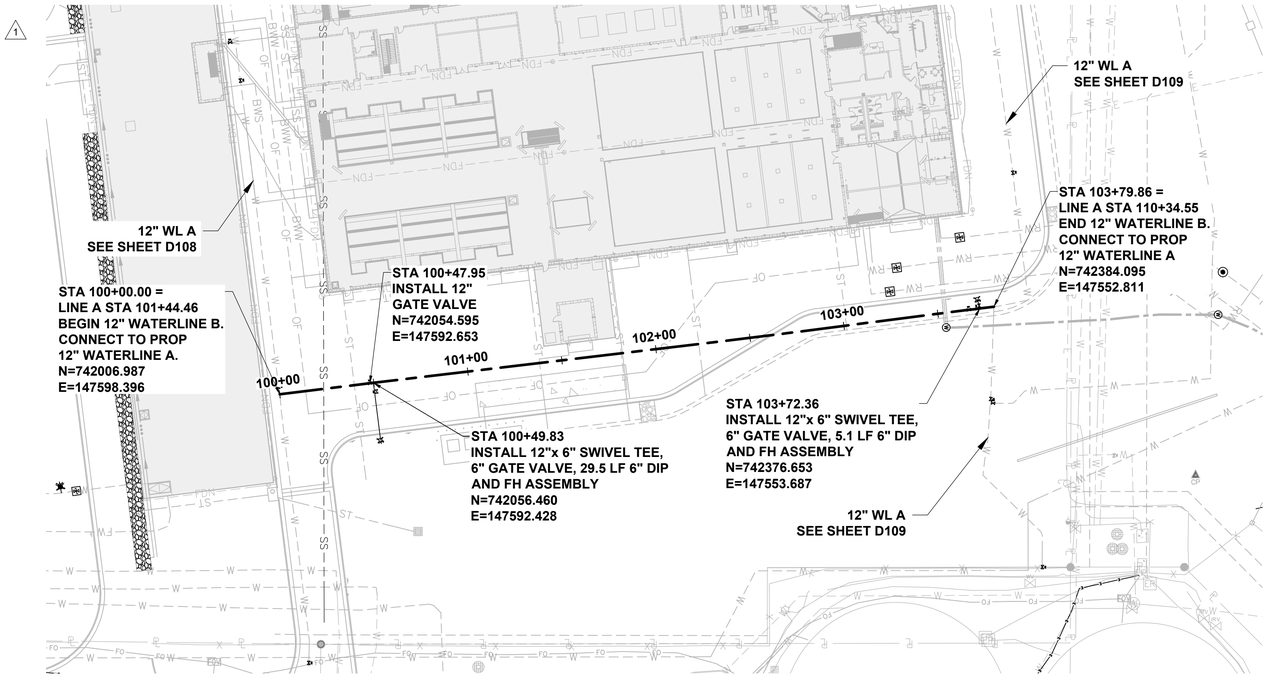
City of Thornton

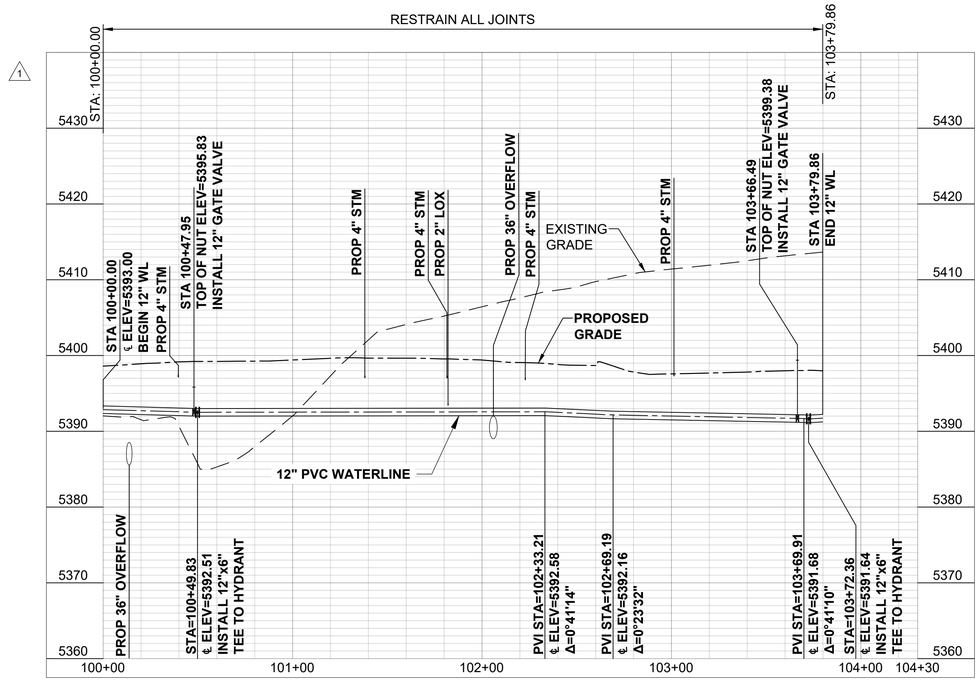
CITY OF THORNTON
TTP - PACKAGE 3
12" FIRE & DOMESTIC LOOP
LINE A II & 6" WL

| | |
|---|---|
| project 98101 | contract |
| drawing D109 | rev. 1 |
| sheet 243 of 542 sheets | |
| file 98101 D_109.DWG | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_109.DWG 11/17/2020 7:41 AM ERGARVEY




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
12" FIRE & DOMESTIC LOOP
LINE B

| project | contract |
|---|---|
| 98101 | |

drawing **D110** – rev. **1**

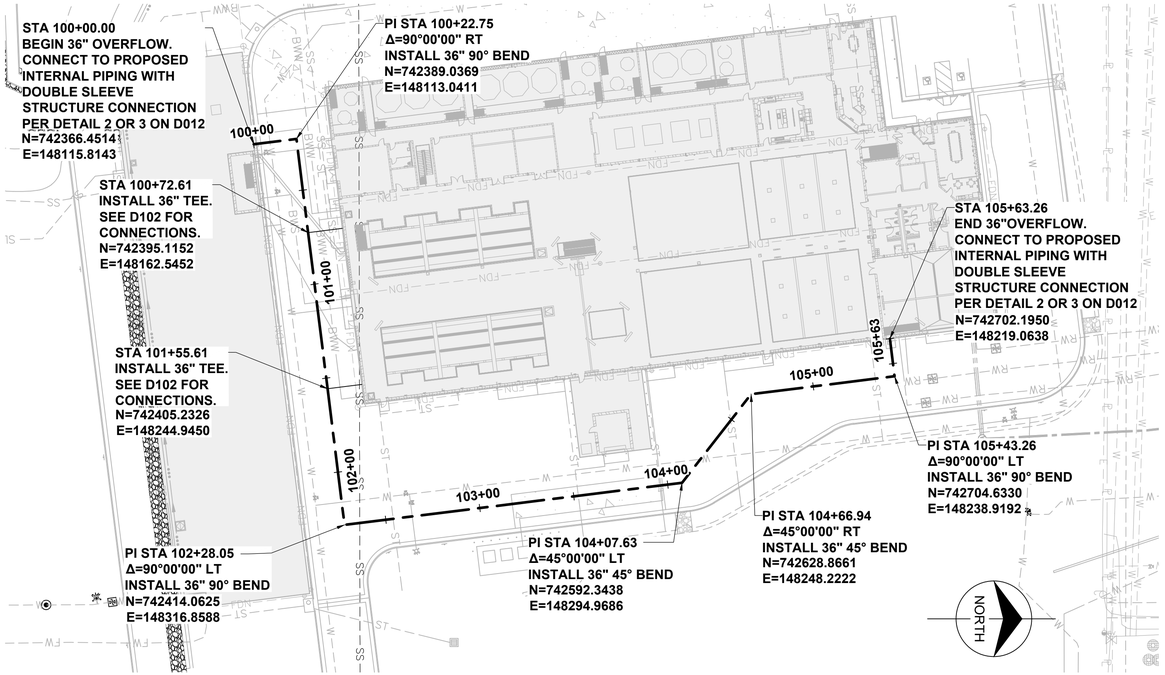
sheet 244 of 542 sheets

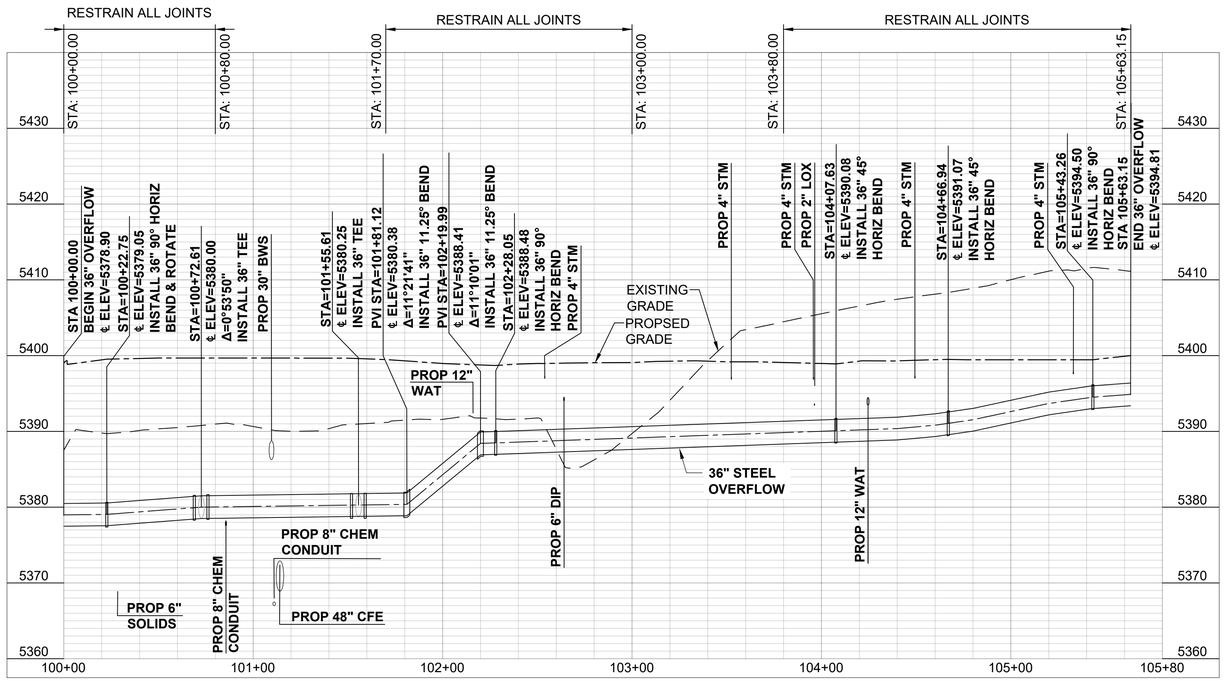
file 98101 D_110.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_110.DWG 11/17/2020 7:53 AM ERGARVEY




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
36" OVERFLOW PLAN & PROFILE

| project | contract |
|---|---|
| 98101 | |

drawing **D111** rev. **1**

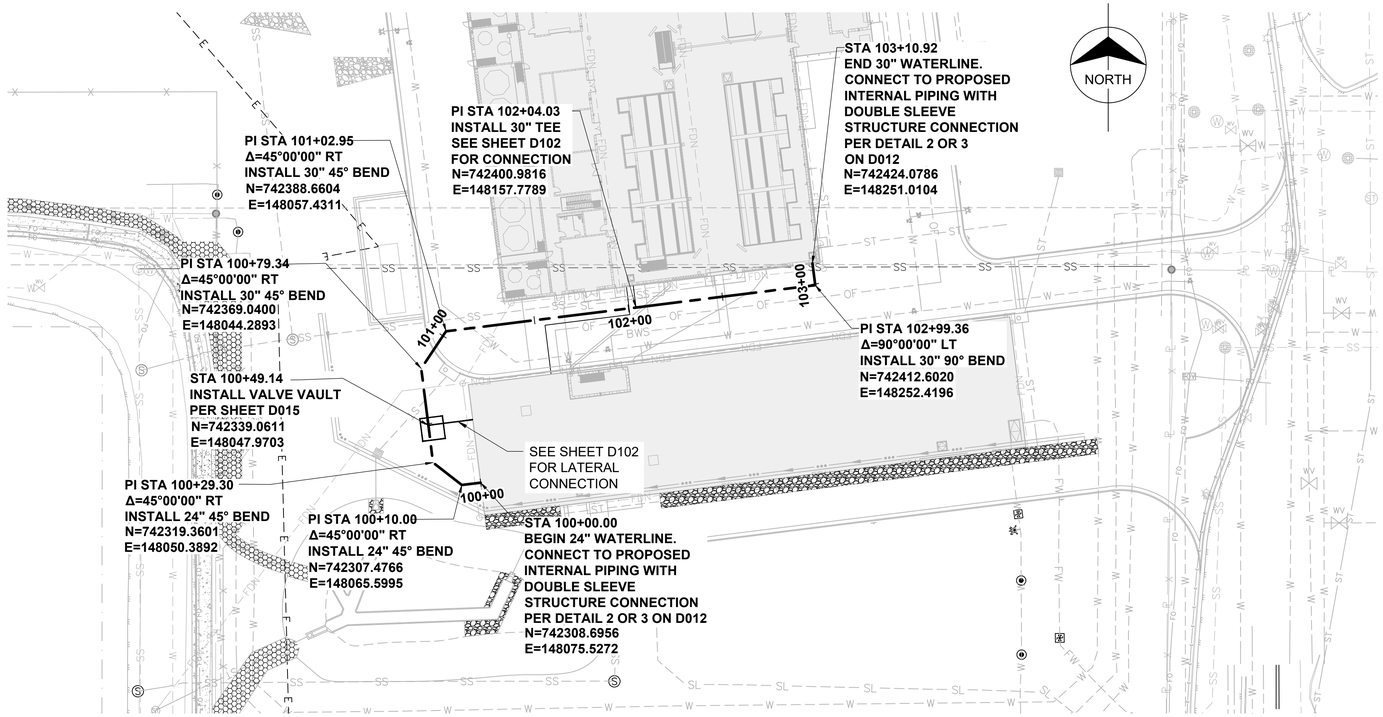
sheet 245 of 542 sheets

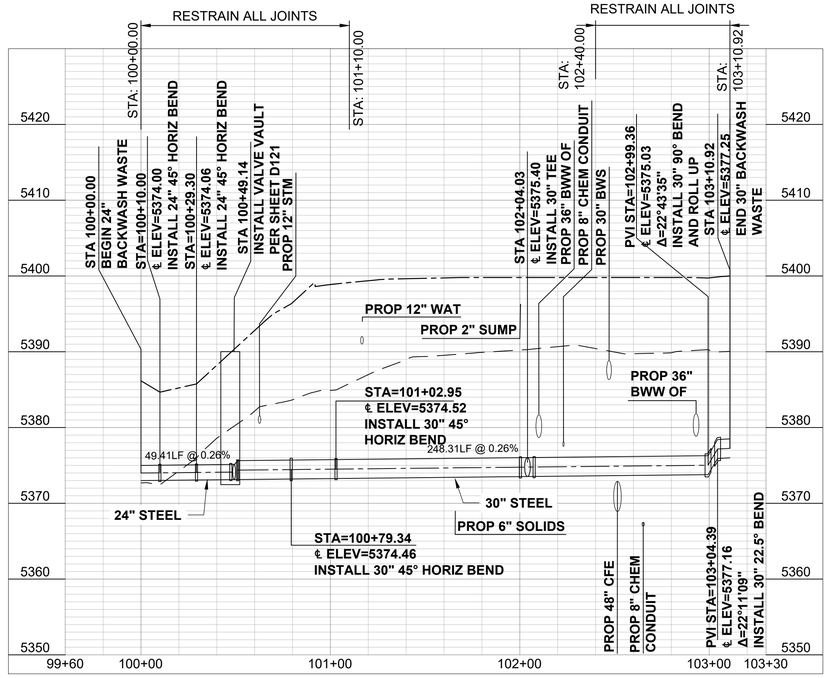
file 98101 D_111.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_111.DWG 11/17/2020 8:24 AM KWEISS




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
30" BACKWASH WASTE PLAN & PROFILE

| project | contract |
|---|---|
| 98101 | |

drawing **D112** – rev. **1**

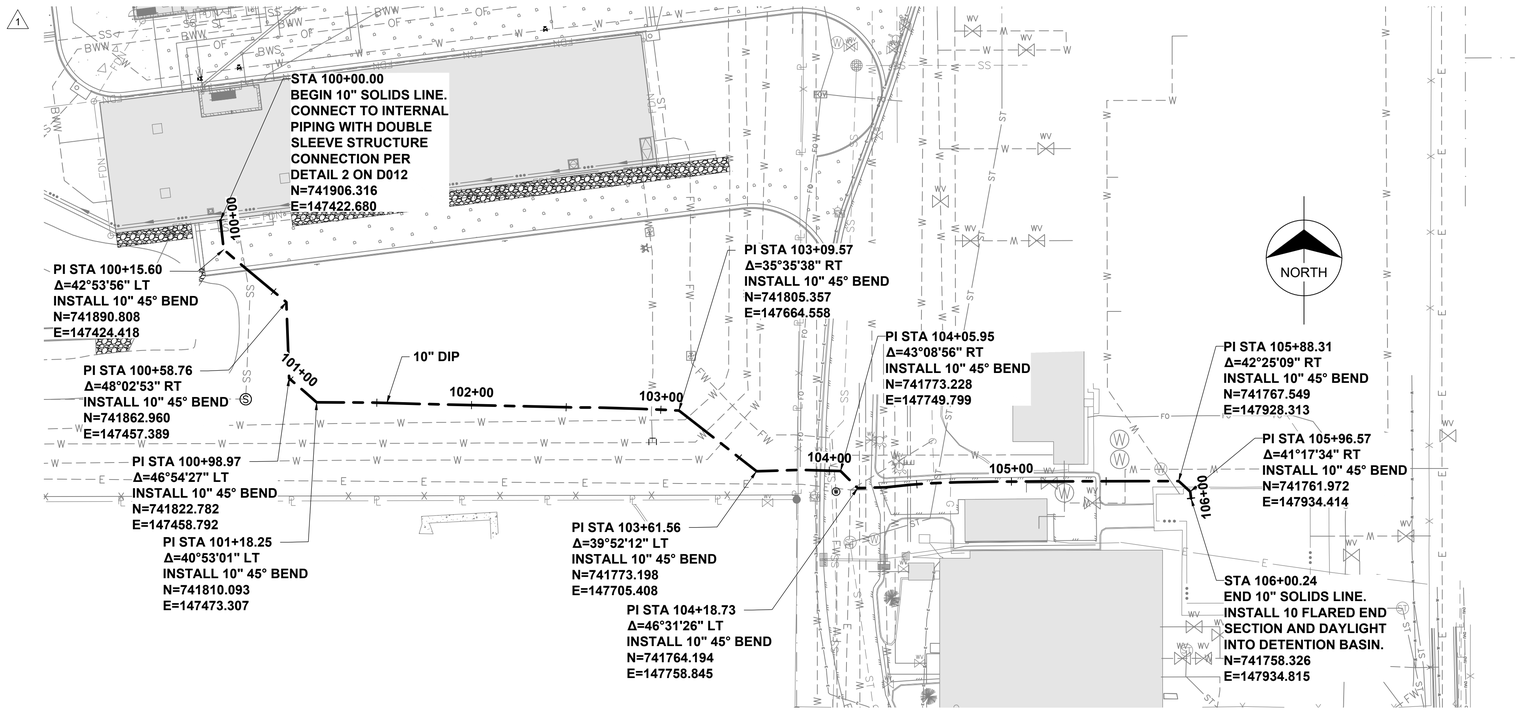
sheet 246 of 542 sheets

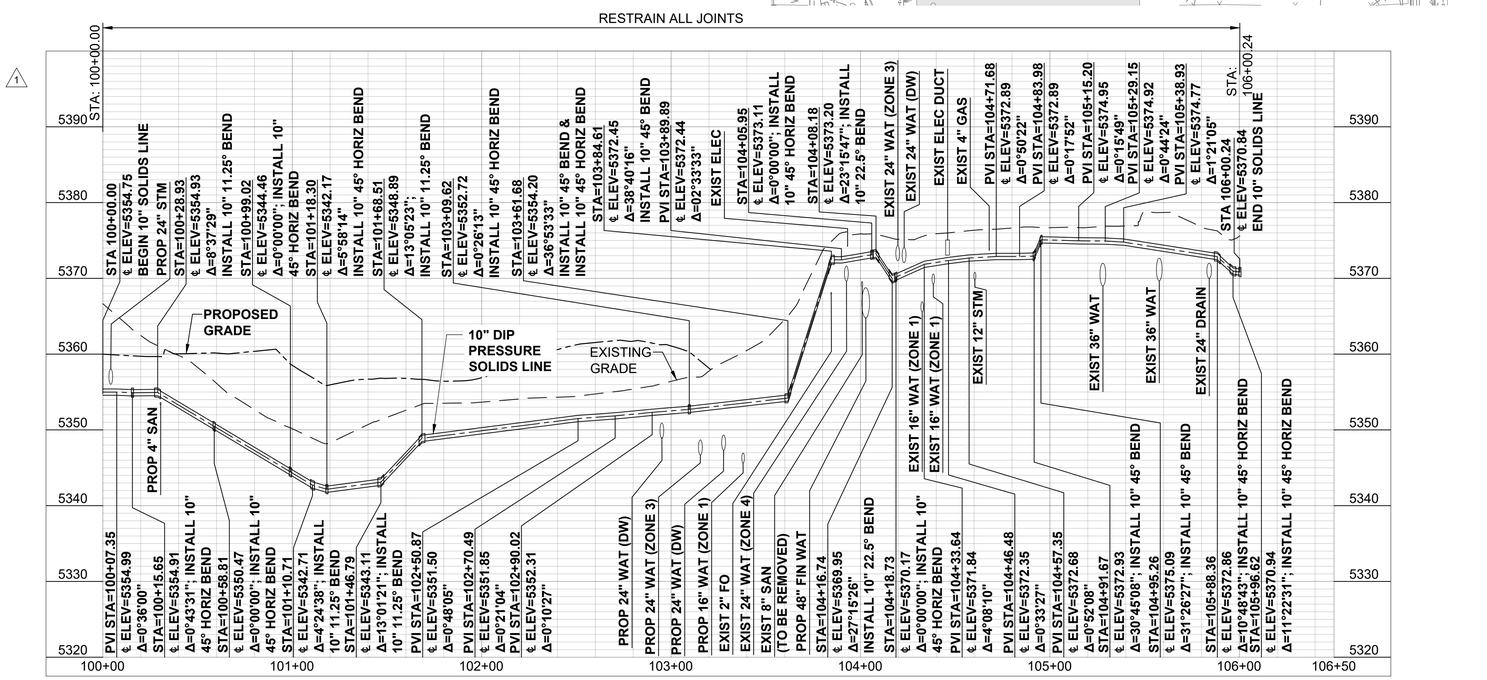
file 98101 D_112.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_112.DWG 11/17/2020 8:55 AM KWEISS




NOTES:

1. ALL DISTURBED SURFACES SHALL BE RESTORED TO EXISTING OR BETTER CONDITIONS.
2. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
10" PRESSURE SOLIDS LINE PLAN & PROFILE

| project | contract |
|---|---|
| 98101 | |

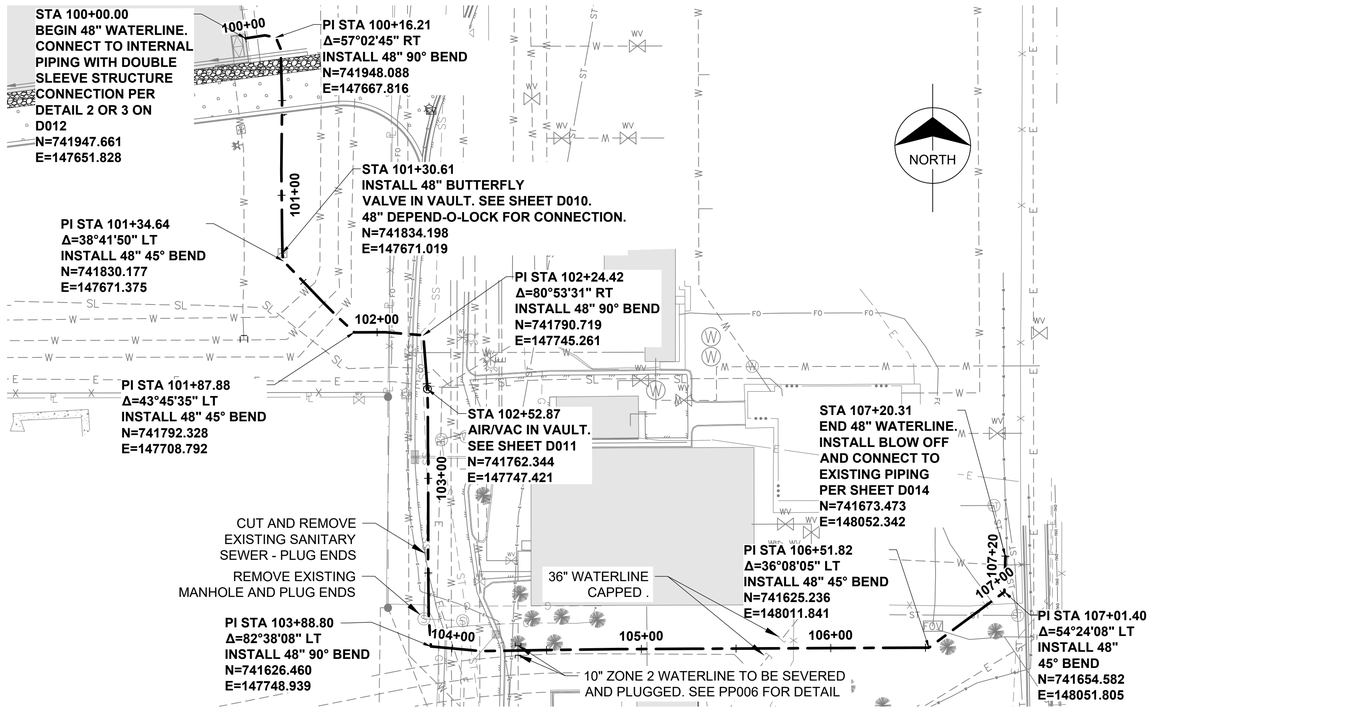
drawing **D113** – rev. **1**

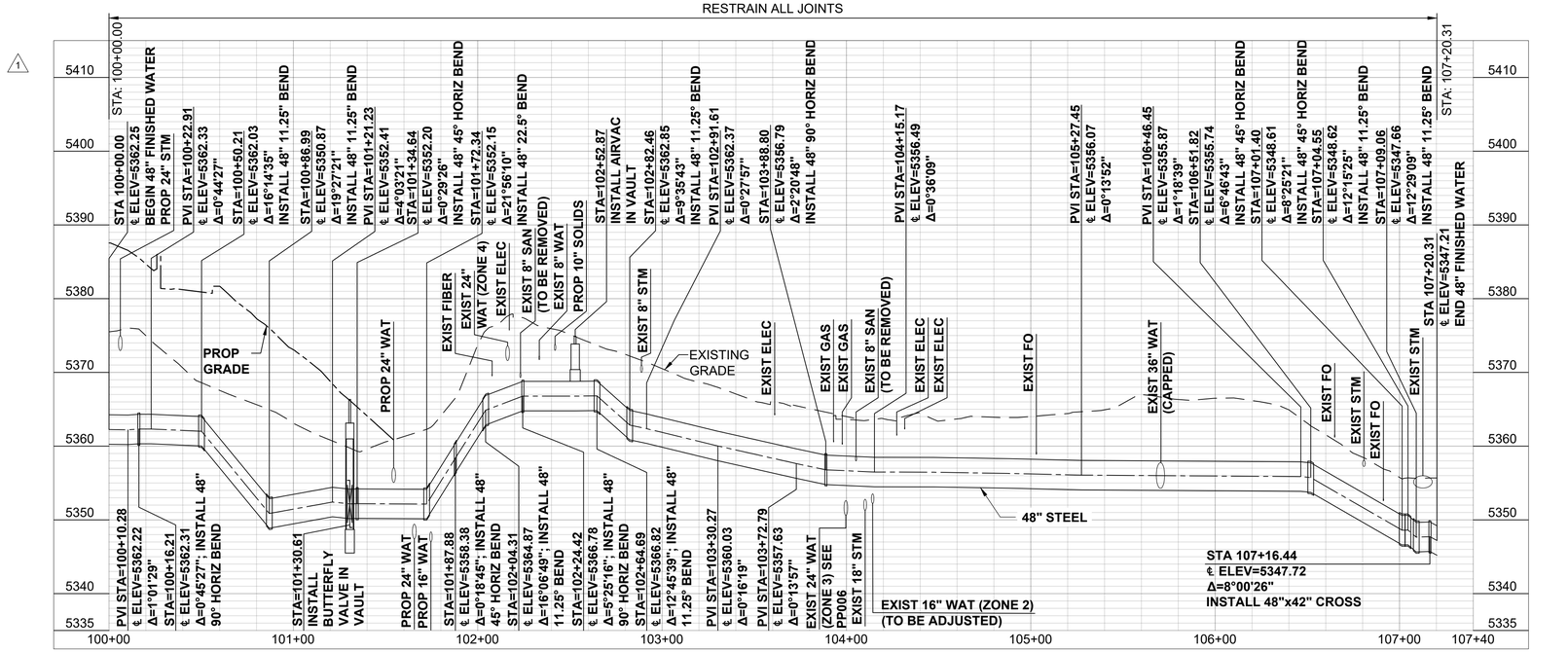
sheet 247 of 542 sheets

file 98101 D_113.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
48" FINISHED WATERLINE PLAN & PROFILE

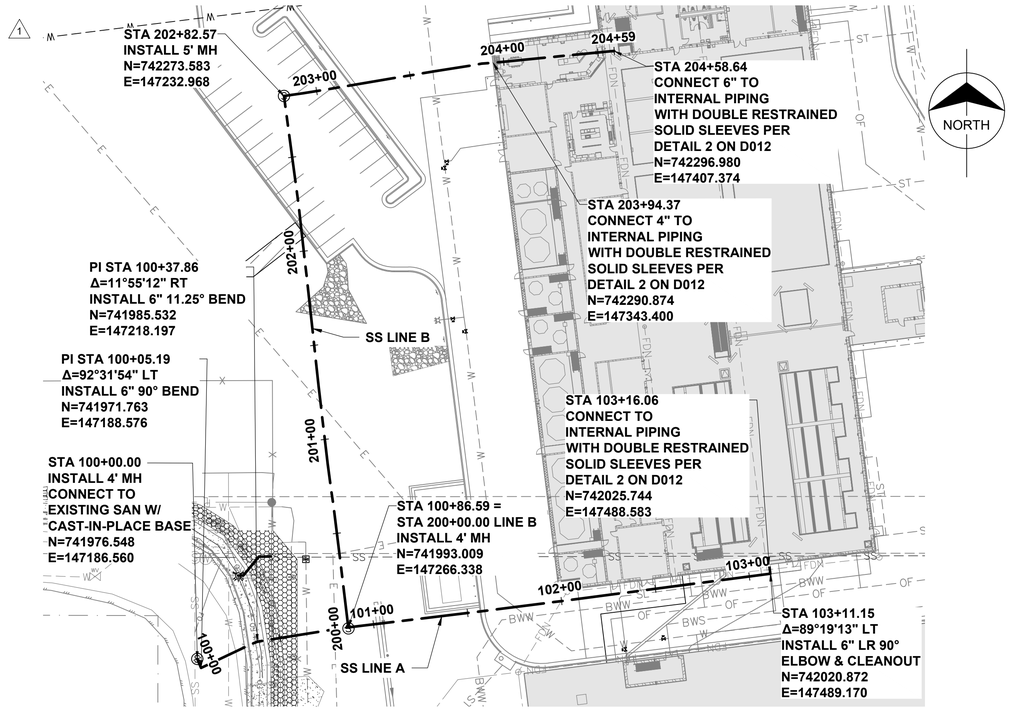
| project | contract |
|---|---|
| 98101 | |

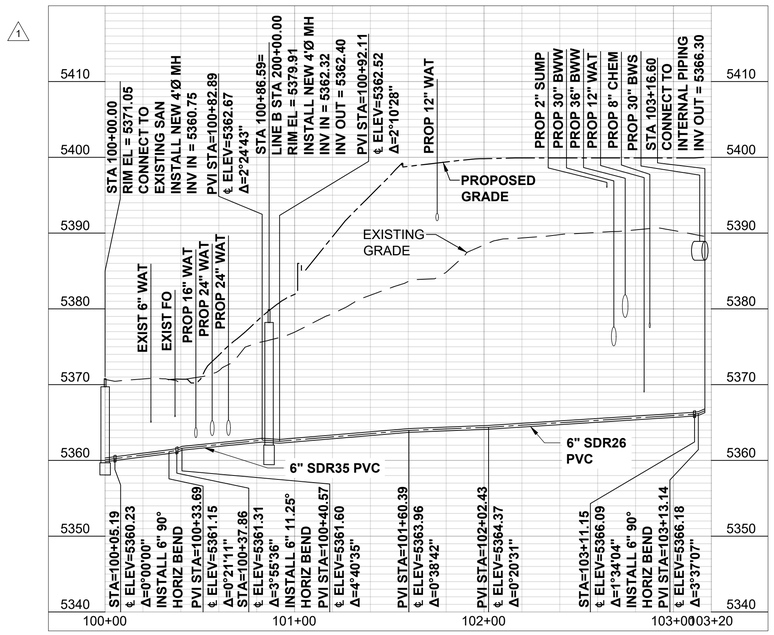
drawing **D114** – rev. **1**

sheet 248 of 542 sheets

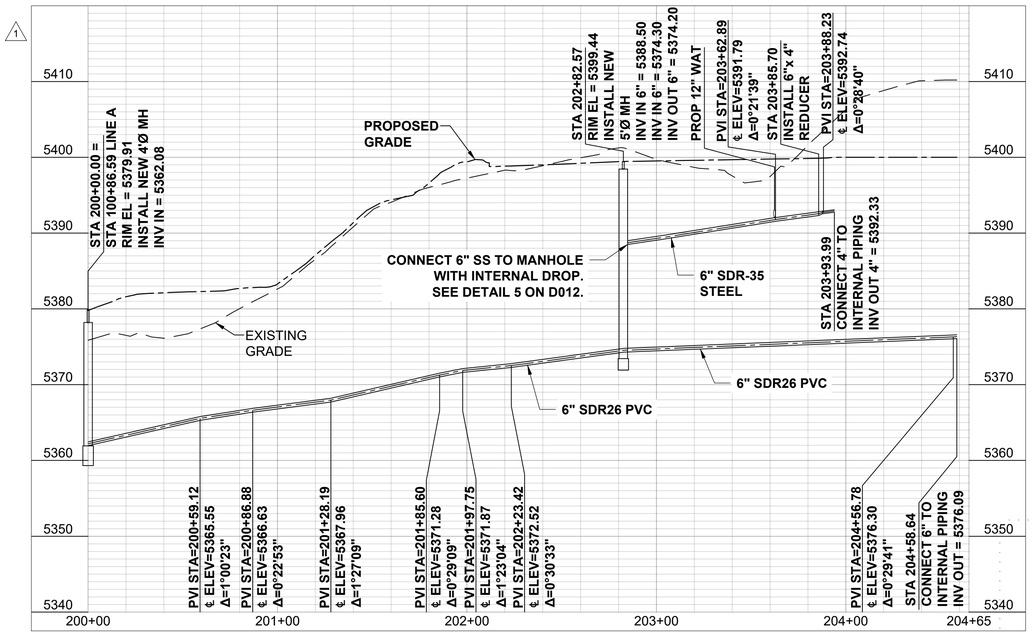
file 98101 D_114.DWG

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




## SS LINE A




## SS LINE B

**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/20 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
6" SANITARY PLAN & PROFILE
SS LINES A & B

| project | contract |
|---|---|
| 98101 | |

drawing **D115** – rev. **1**

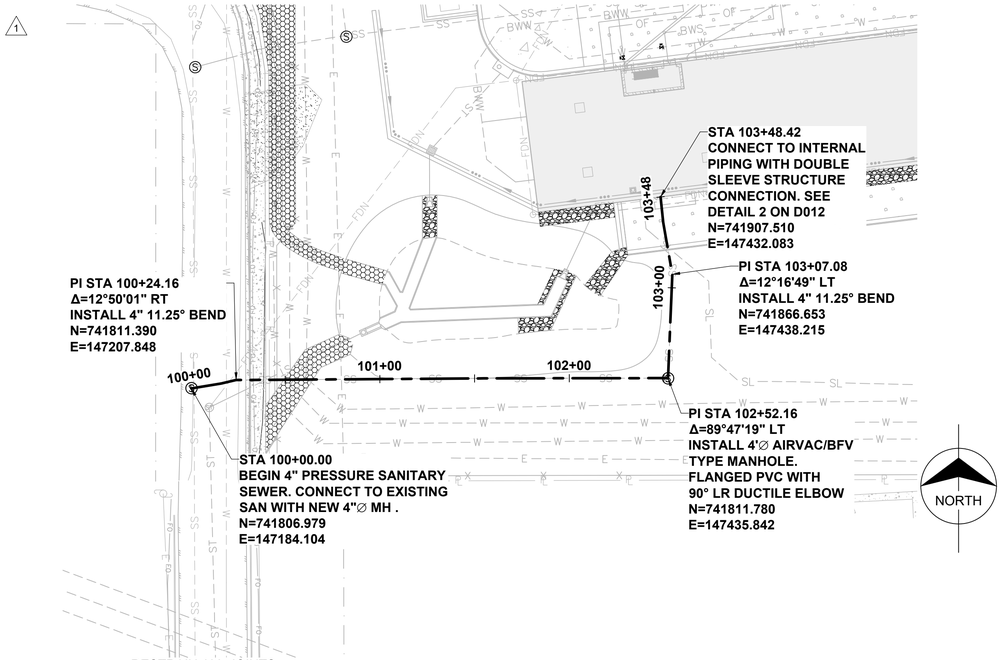
sheet 249 of 542 sheets

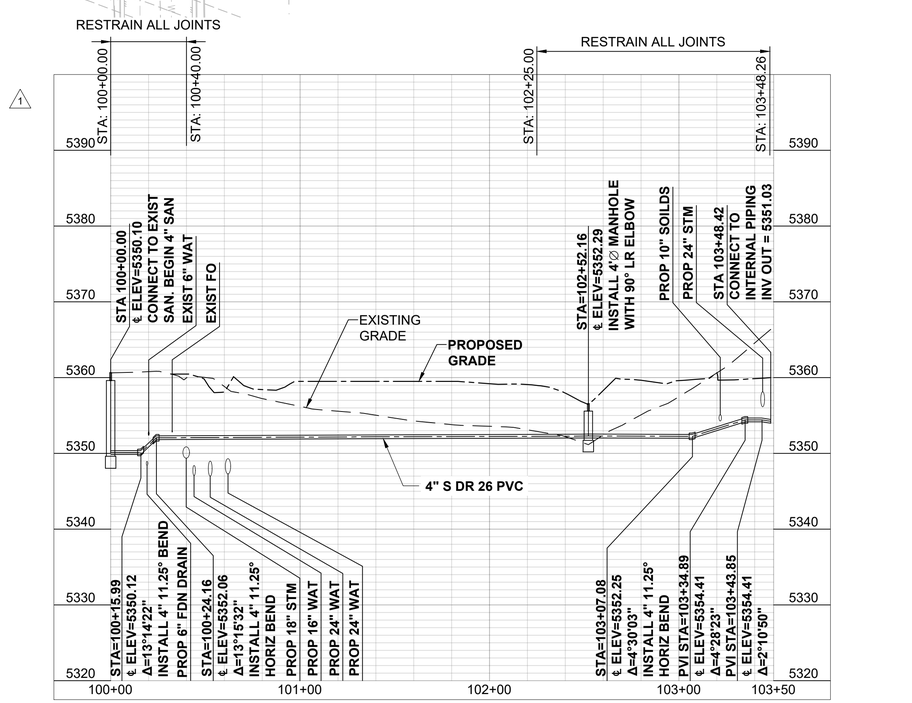
file 98101 D_115.DWG

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | ML | KH | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | ML | KH | CONFORMING TO CONSTRUCTION RECORDS |




## SS LINE C

**NOTES:**

1. IN ALL INSTANCES WHERE A SOLIDS LINE CROSSES A FINISHED WATER LINE, WITH LESS THAN 18" OF VERTICAL SEPARATION, BACKFILL WITH CLSM 10' ON EITHER SIDE OF THE CROSSING.

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| M. LEHRBURGER | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
4" PRESSURE SANITARY PLAN & PROFILE
SS LINE C

| project | contract |
|---|---|
| 98101 | |

**drawing** D116 – **rev.** 1

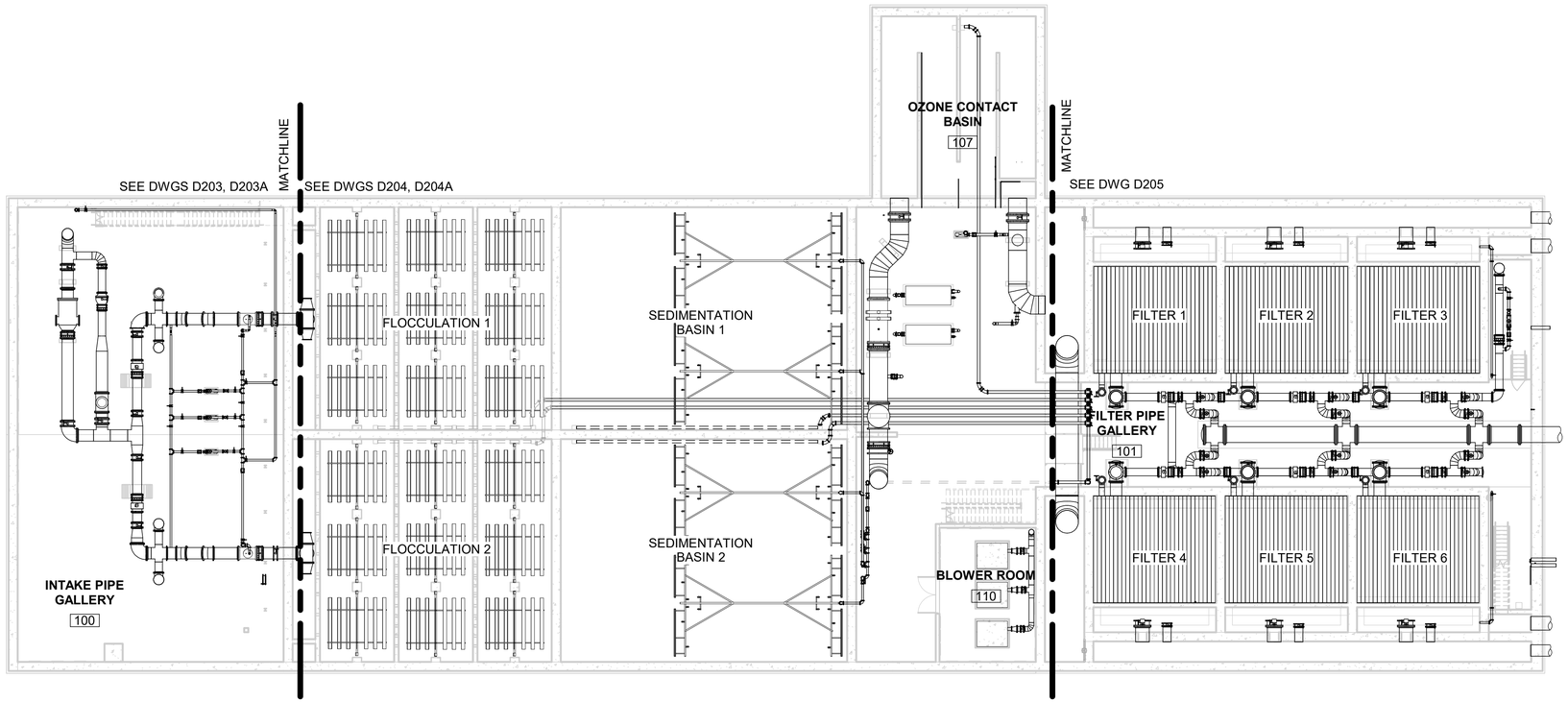
**sheet** 250 **of** 542 sheets

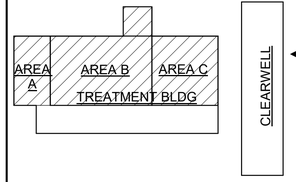
**file** 98101 D_116.DWG

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\PLAN & PROFILES\98101 D_116.DWG 3/10/2021 9:17 PM ERGARVEY

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




LOWER LEVEL OVERALL TREATMENT

0 8' 16' 32'
SCALE IN FEET

NORTH

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

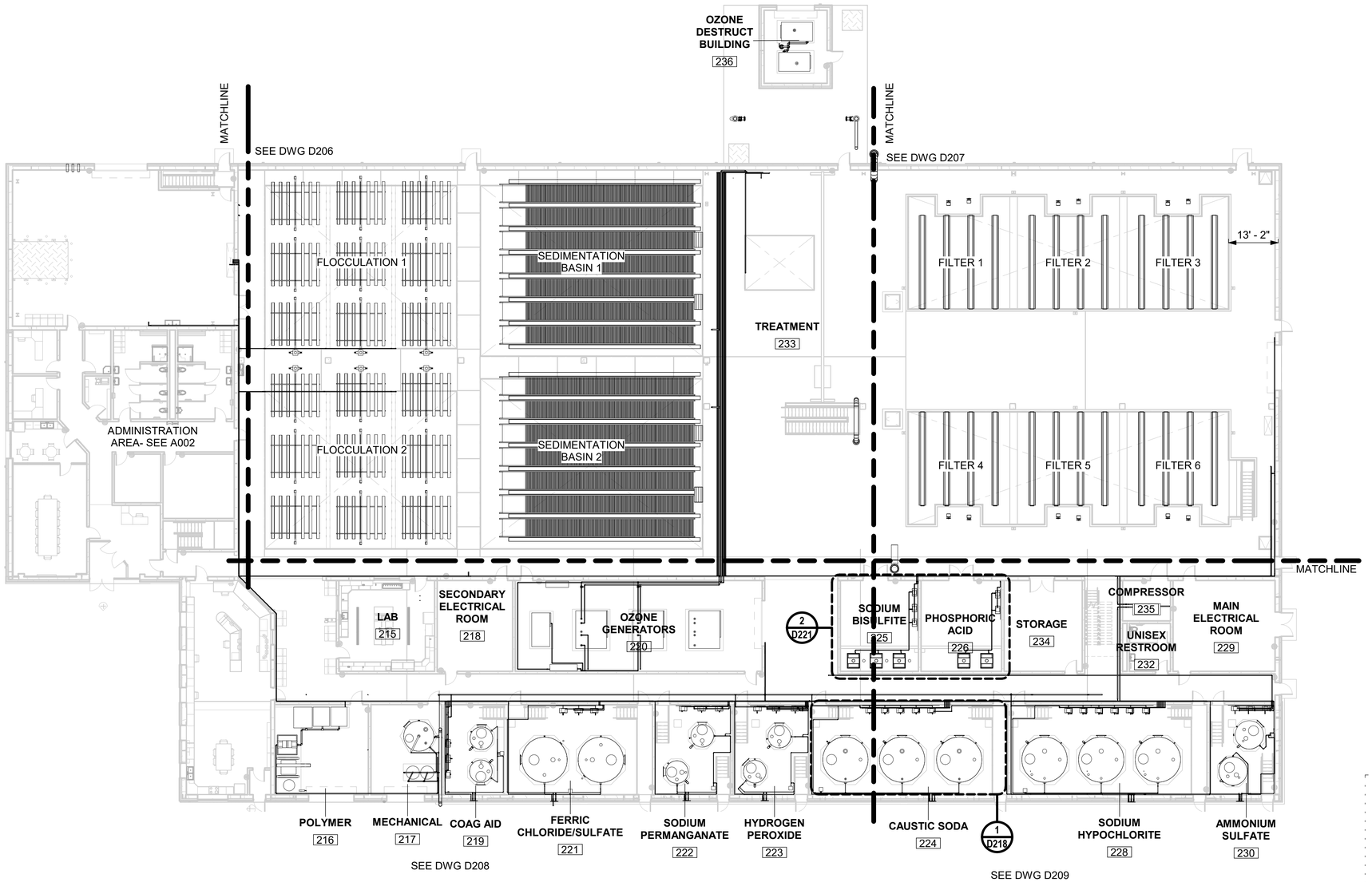
**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL OVERALL PLAN

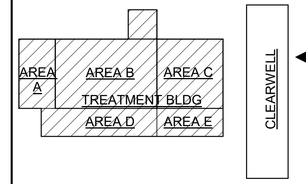
| | |
|---|---|
| project 98101 | contract |
| drawing D201 | rev. 0 |
| sheet 251 of 542 sheets | |
| file 98101_D | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




UPPER LEVEL OVERALL TREATMENT

0 8' 16' 32'

SCALE IN FEET

NORTH

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
UPPER LEVEL OVERALL PLAN

| project | contract |
|---|---|
| 98101 | |

drawing D202 — 0 rev.

sheet 252 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

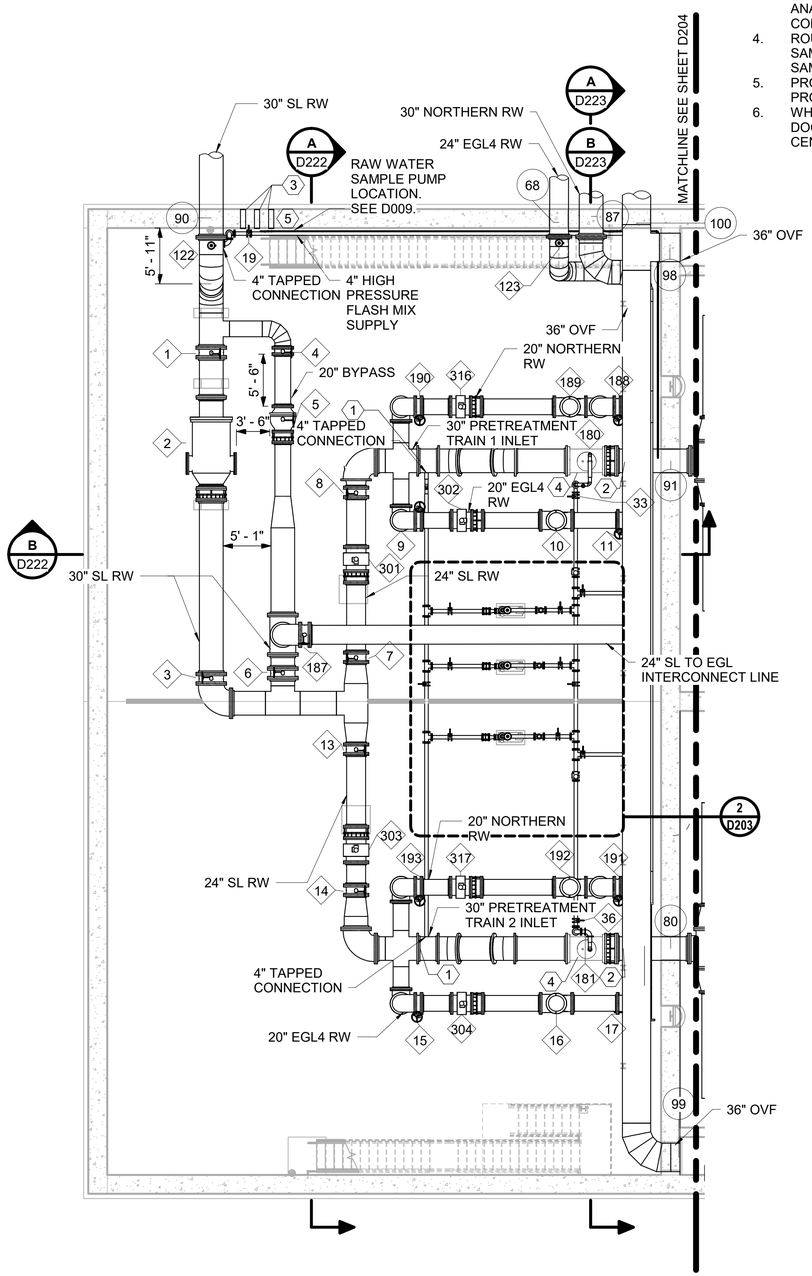
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:

1. SEE YARD PIPING PLAN D101 FOR PIPE CONTINUATION.
2. ANCHORED CHEMICAL INJECTION QUILL SHALL BE USED FOR ALL CHEMICAL INJECTION LOCATIONS PRIOR TO FLASH MIX SYSTEMS. ALL OTHER CHEMICAL INJECTION POINTS SHALL BE THE CHEMICAL QUILL INJECTION DIFFUSER DETAIL. SEE PROCESS DETAILS SHEET D008.
3. COMBINE ANALYZER DRAIN LINES TO A COMBINED DRAIN LINE FOR ANALYZERS THAT ARE LOCATED NEAR ONE ANOTHER. ROUTE COMBINED DRAIN LINES TO TRENCH DRAIN.
4. ROUTE SAMPLE LINES TO ANALYZERS AND SAMPLE PUMP. ROUTE SAMPLE PUMP DISCHARGE TO SAMPLE SINK IN LAB. SEE D008 FOR SAMPLE PUMP DETAIL.
5. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
6. WHEN POSSIBLE, AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.

KEYED NOTES:

1. SAMPLE TAP LOCATION FOR BLENDED RAW WATER PH/TEMP ANALYZER.
2. SAMPLE TAP LOCATION FOR PRETREATMENT INLET PH/TEMP AND STREAMING CURRENT ANALYZER.
3. 6" HDPE CARRIER PIPE, IE: 5382.33'. LINES ROUTED IN CARRIER PIPE INCLUDE ONE (1) 3/4" SAMPLE LINE AND ONE (1) 3/4" SODIUM PERMANGANATE LINE. ROUTE SAMPLE LINES TO RAW WATER ANALYZERS AND SAMPLE PUMPS. DRAIN LINES FROM ANALYZERS TO BE COMBINED IN COMMON DRAIN LINE AND ROUTED TO TRENCH DRAIN. INCLUDE ONE SPARE LINE FOR SAMPLE AND CHEMICAL LINES (TYP 2). SEE PROCESS DETAILS D009 FOR CARRIER PIPE PENETRATION DETAIL.
4. FLASH MIX ASSEMBLY. SEE D008 FOR DETAIL.
5. CHEMICAL LINES ENTERING THE LOWER LEVEL FROM ABOVE: TWO (2) 3/4" COAGULATION AID LINES, TWO (2) 3/4" FERRIC CHLORIDE/SULFATE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" SODIUM HYPOCHLORITE LINES, AND TWO (2) 3/4" SODIUM PERMANGANATE LINES.

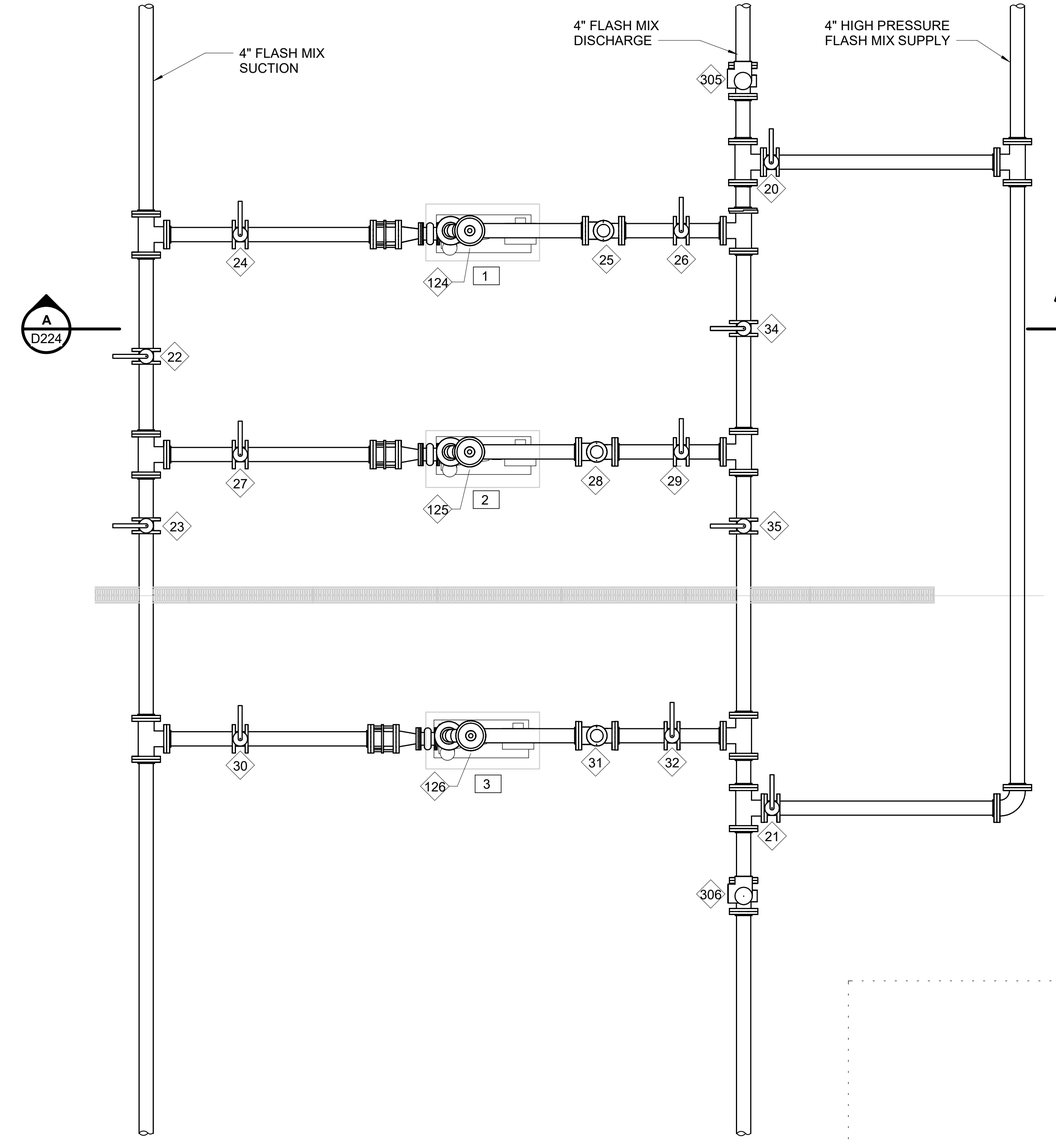



LOWER LEVEL AREA A

0 4' 8' 16'

SCALE IN FEET

NORTH



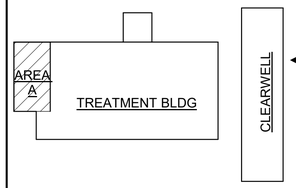

ENLARGED PLAN 2 D203

0 1' 2' 4'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
LOWER LEVEL PLAN AREA A

| | |
|---|---|
| project 98101 | contract |
| drawing D203 | rev. 0 |
| sheet 253 of 542 sheets | |
| file 98101_D | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

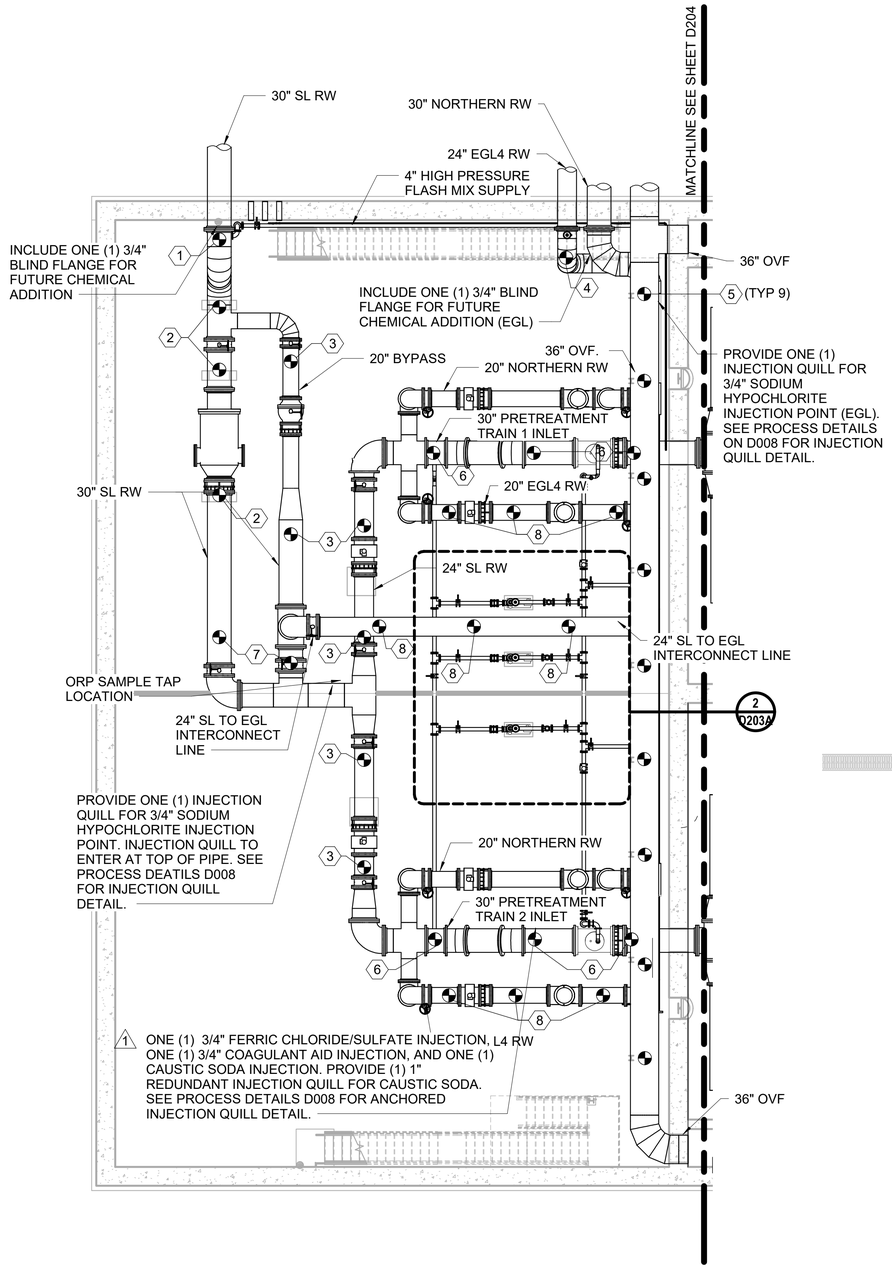
Scale For Microfilming
Millimeters
Inches

NOTES:

1. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.

KEYED NOTES:

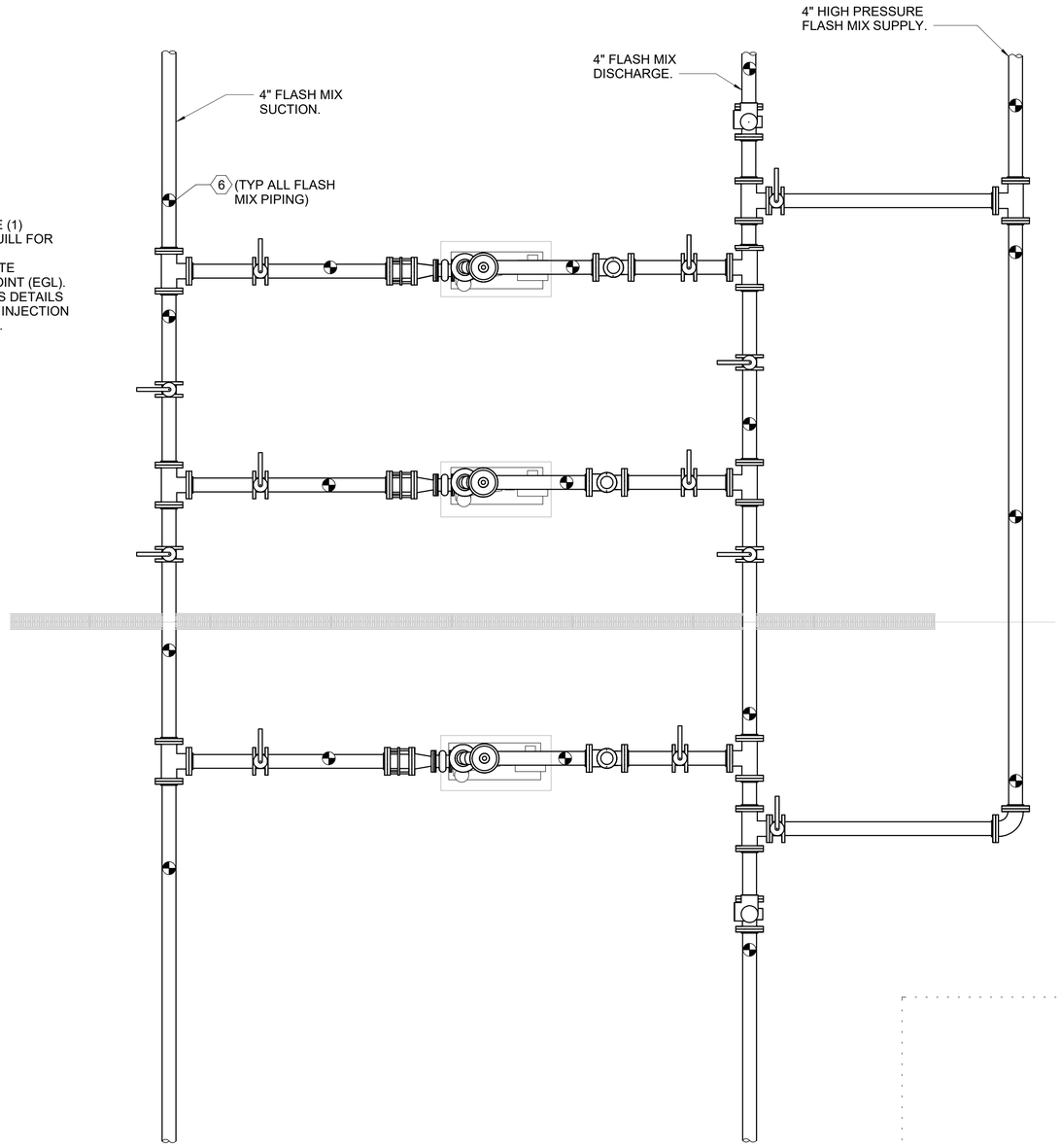
1. PS-7, SEE STRUC DWGS FOR DETAIL.
2. PS-4, SEE STRUC DWGS FOR DETAIL.
3. PS-2, SEE STRUC DWGS FOR DETAIL.
4. PS-9, SEE STRUC DWGS FOR DETAIL.
5. PS-100, SEE STRUC DWGS FOR DETAIL.
6. PS-1, SEE STRUC DWGS FOR DETAIL.
7. PS-102, SEE STRUC DWGS FOR DETAIL.
8. PS-10, SEE STRUC DWGS FOR DETAIL.




LOWER LEVEL AREA A PIPE SUPPORT

0 4' 8' 16'
SCALE IN FEET

NORTH

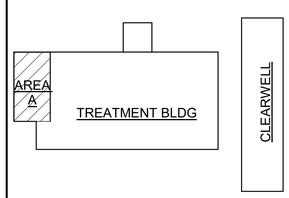



ENLARGED PLAN 2 DD203A

0 1' 2' 4'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL AREA A PIPE SUPPORTS, SAMPLE TAPS, AND CHEMICAL INJECTION

| project | contract |
|---|---|
| 98101 | |

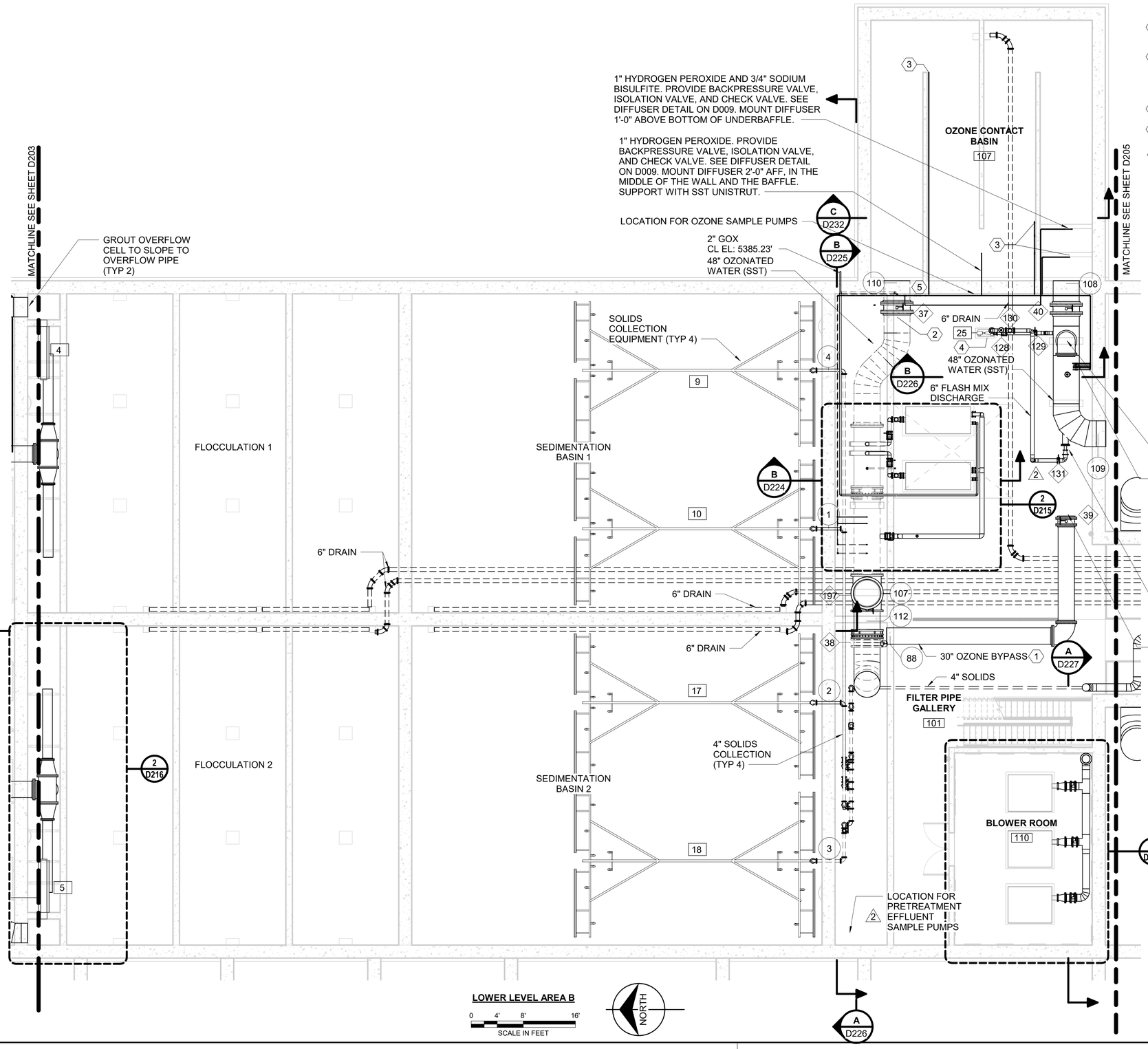
drawing **D203A — 1** rev.

sheet 254 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



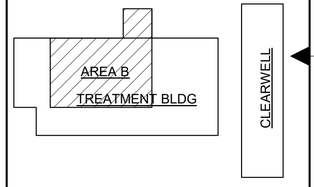

KEYED NOTES:

1. OZONE BYPASS CONNECTION TO SETTLED WATER TROUGH, SEE SECTION VIEW.
2. SAMPLE TAP LOCATION FOR FIRST OZONE SAMPLE PUMP.
3. 1" SAMPLE LINE. PIPE OPENING SHALL BE LOCATED 10'-0" AFF. SAMPLE COLLECTION INLET SHALL CONSIST OF THREE PIPE OPENINGS.
4. FLASH MIX PUMP.
5. CHEMICAL LINES ENTERING THE OZONE INJECTION AREA FROM UPPER LEVEL
2. INCLUDE: THREE (3) 1" HYDROGEN PEROXIDE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" AMMONIUM SULFATE LINES, TWO (2) 1" SODIUM HYPOCHLORITE LINES, ONE (1) 3/4" PHOSPHORIC ACID LINE, ONE (1) 3/4" SODIUM BISULFITE LINE. CHEMICAL LINES SHOWN OFFSET FROM OZONE COOLING WATER LINE FOR CLARITY. OZONE LINES TO BE ROUTED INCLUDE: ONE (1) 3" COOLING WATER RETURN, ONE (1) 2" GOX SUPPLY, AND ONE (1) 3" OZONE GAS. COORDINATE PIPE ROUTING WITH BRIDGECRANE. SUPPORT WITH PS-105, 5' MINIMUM SPACING, SEE STRUCTURAL DRAWINGS FOR DETAIL. MOUNT CHEMICAL LINES MAXIMUM 8'-0" AFF. MOUNT OZONE LINES 9'-0" AFF.

NOTES:

1. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
2. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B

| project | contract |
|---|---|
| 98101 | |

drawing **D204 — 2** rev.

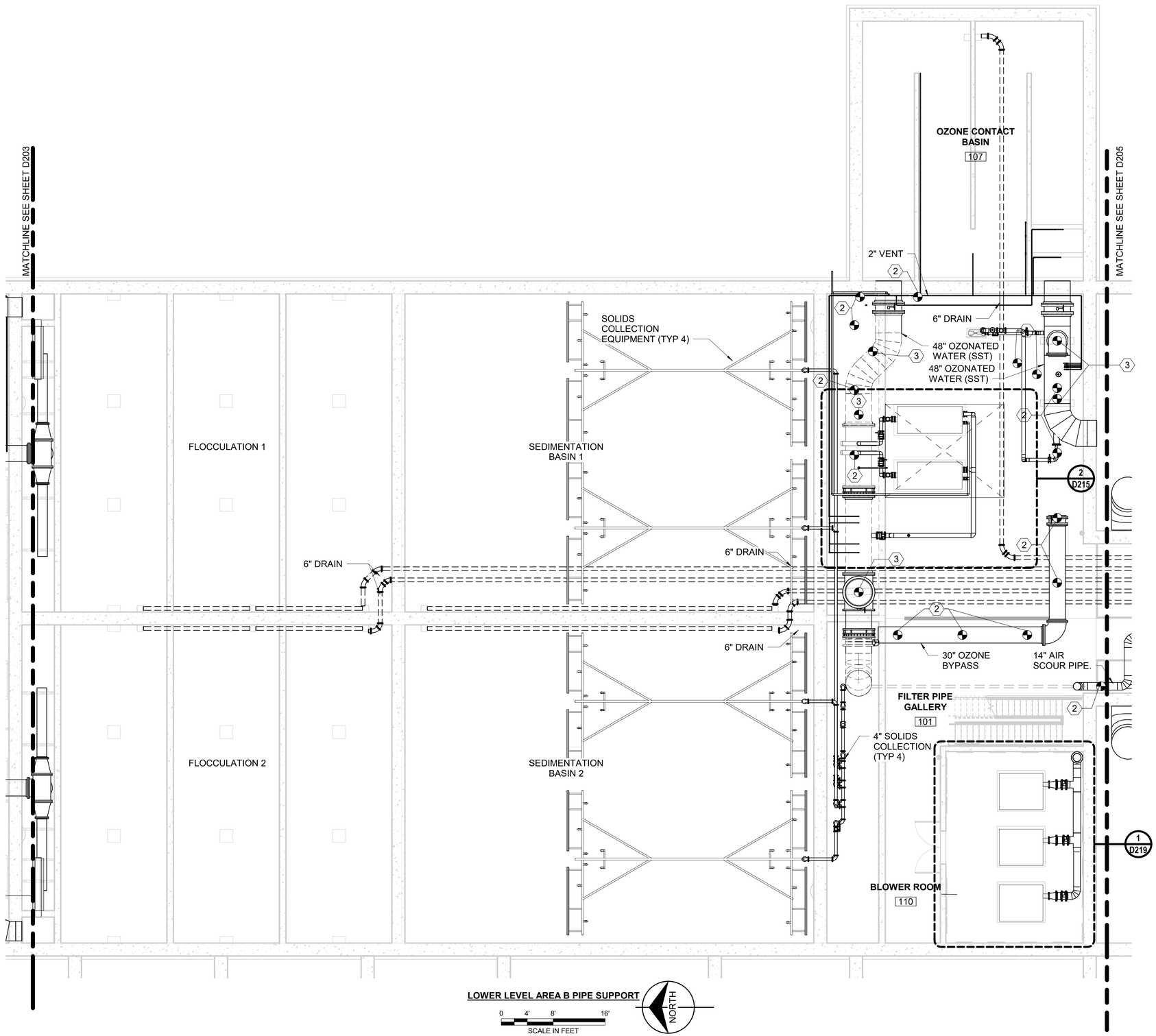
sheet 255 of 542 sheets
file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES:

1. PS-1, SEE STRUC DWGS FOR DETAIL.
2. PS-7, SEE STRUC DWGS FOR DETAIL.
3. PS-4, SEE STRUC DWGS FOR DETAIL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

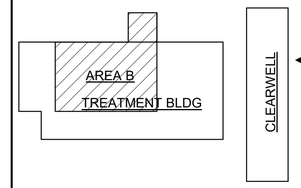



LOWER LEVEL AREA B PIPE SUPPORT

0 4' 8' 16'

SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL AREA B PIPE SUPPORTS

| project | contract |
|---|---|
| 98101 | |

drawing **D204A** rev. **0**

sheet 256 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

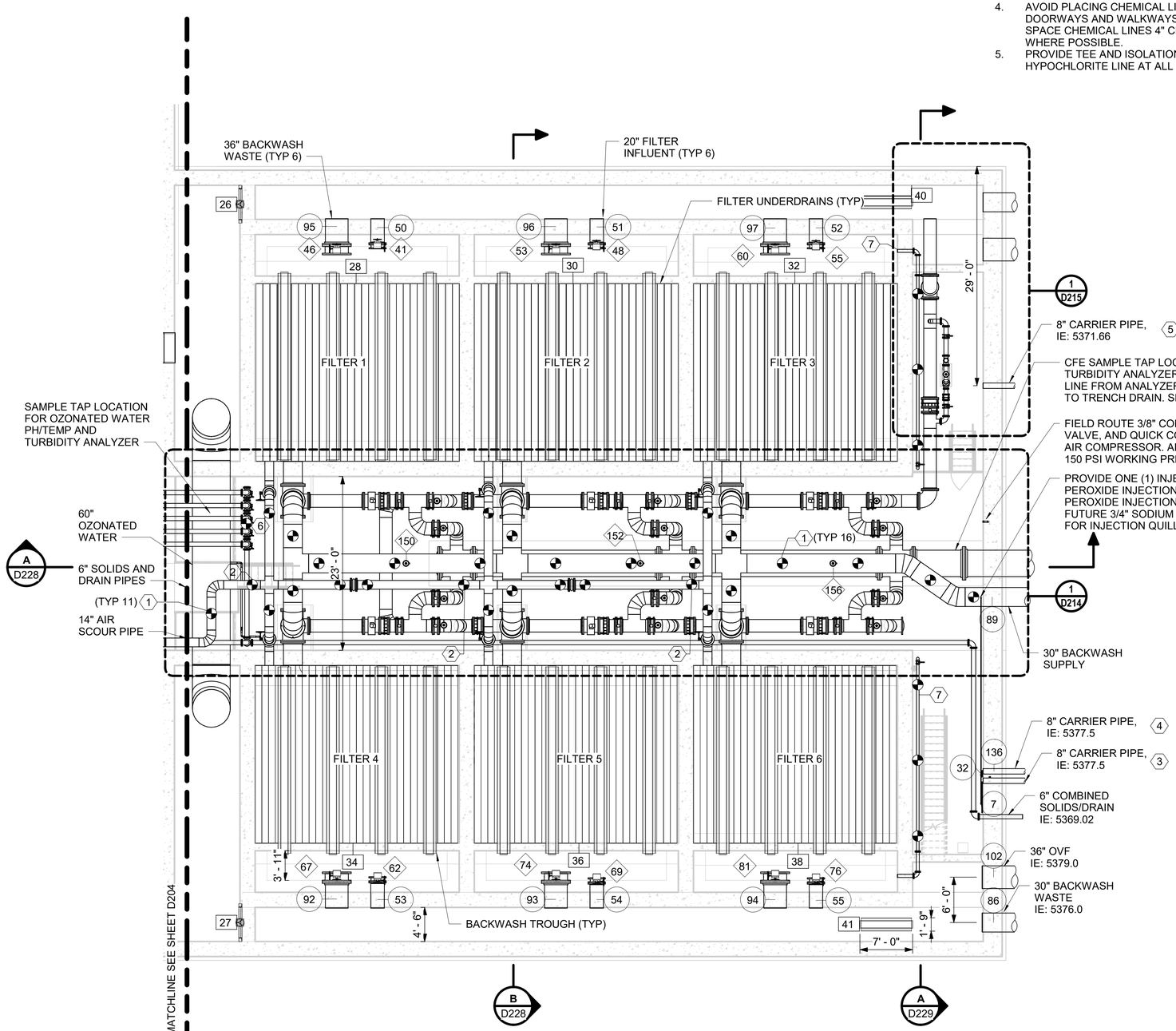
Scale For Microfilming
Millimeters
Inches

NOTES:

1. SEE YARD PIPING PLAN D101 FOR PIPE CONTINUATION.
2. ALL CHEMICAL INJECTION LOCATIONS TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS D008.
3. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS, WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.

KEYED NOTES:

1. PS-7, SEE STRUC DWGS FOR DETAIL.
2. PS-7B, SEE STRUC DWGS FOR DETAIL.
3. CHEMICAL LINES ROUTED IN 8" CARRIER PIPE TO BACKWASH PUMP STATION INCLUDE: ONE (1) 1" CAUSTIC SODA AND TWO (2) 1" SODIUM HYPOCHLORITE LINES. INCLUDE ONE SPARE LINE FOR EACH LINE. ALL ELBOWS SHALL BE LONG RADIUS. SEE CARRIER PIPE DETAIL ON D009.
4. CHEMICAL LINES ROUTE IN 8" CARRIER PIPE TO BACKWASH PUMP STATION INCLUDE: ONE (1) 1" AMMONIUM SULFATE AND ONE (1) 3/4" SODIUM BISULFITE. SAMPLE LINES ROUTED IN 8" CARRIER PIPE FROM BACKWASH PUMP STATION INCLUDE ONE (1) 1" FINISHED WATER SAMPLE LINE. ROUTE SAMPLE LINE TO SAMPLE SINK IN LAB. INCLUDE ONE SPARE LINE FOR EACH LINE. ALL ELBOWS SHALL BE LONG RADIUS. SEE CARRIER PIPE DETAIL ON D009.
5. SAMPLE LINES ROUTED IN 8" CARRIER PIPE INCLUDE TWO (2) 1" SAMPLE LINES. ROUTE SAMPLE LINES TO FREE CHLORINE ANALYZERS. DRAIN LINES FROM ANALYZERS TO BE COMBINED IN COMMON DRAIN LINE AND ROUTED TO TRENCH DRAIN. INCLUDE ONE SPARE LINE FOR EACH LINE. SEE CARRIER PIPE DETAIL ON D009.
6. PS-1A, SEE STRUCT DWGS FOR DETAIL.
7. 4" FILTER AIR GAP DRAIN. USE DIP PIPE WITH SST BOLTS UNTIL OUTSIDE OVF CHAMBER. FLANGED TRANSITION TO PVC OUTSIDE OVF CHAMBER. PVC PIPE TO HAVE ISOLATION VALVE. ALL PENETRATIONS TO BE DOUBLE LINK SEAL. IE: 5376.00 SUPPORT PS-5 EVERY 10 FEET (TYP 2).



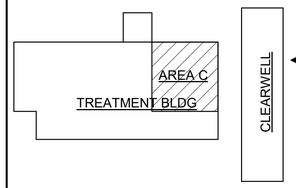

**LOWER LEVEL AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

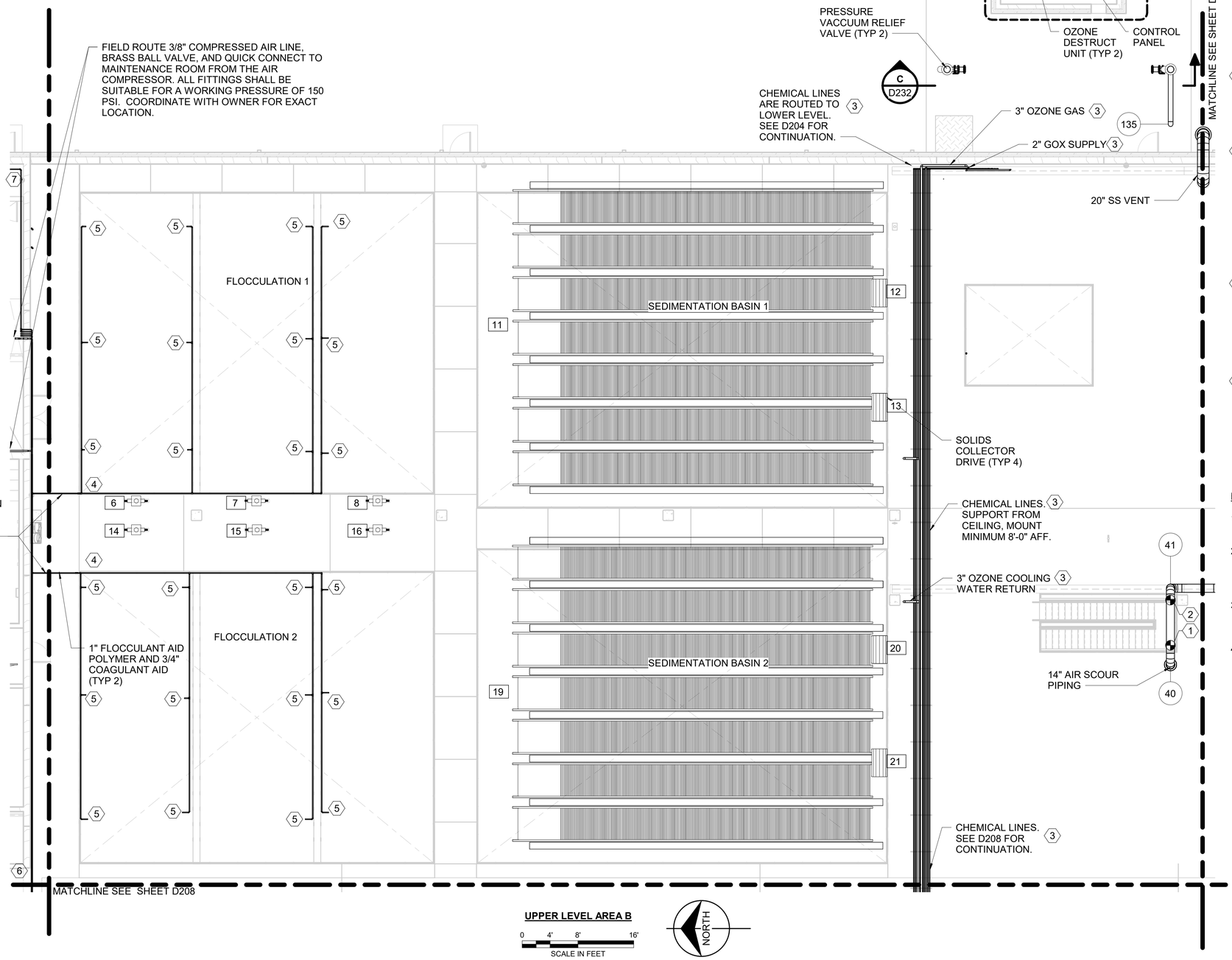
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C

| | |
|---|---|
| project 98101 | contract |
| drawing D205 — 2 | rev. |
| sheet 257 of 542 sheets | |
| file 98101_D | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




KEYED NOTES

1. PS-13, SEE STRUC DWGS FOR DETAIL.
2. PS-8, SEE STRUC DWGS FOR DETAIL.
3. CHEMICAL LINES TO BE ROUTED TO OZONE INJECTION AREA ON LOWER LEVEL INCLUDE: THREE (3) 1" HYDROGEN PEROXIDE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" AMMONIUM SULFATE LINES, TWO (2) 1" SODIUM HYPOCHLORITE LINES, ONE (1) 3/4" PHOSPHORIC ACID LINE, ONE (1) 3/4" SODIUM BISULFITE LINE. CHEMICAL LINES SHOWN OFFSET FROM OZONE COOLING WATER LINE FOR CLARITY. OZONE LINES TO BE ROUTED INCLUDE: ONE (1) 3" COOLING WATER RETURN, ONE (1) 2" GOX SUPPLY, AND ONE (1) 3" OZONE GAS. COORDINATE PIPE ROUTING WITH BRIDGECRANE. SUPPORT WITH PS-105, 5' MINIMUM SPACING, SEE STRUCTURAL DRAWINGS FOR DETAIL. MOUNT CHEMICAL LINES MAXIMUM 8'-0" AFF. MOUNT OZONE LINES 9'-0" AFF.
4. SUPPORT FLOCCULANT AID POLYMER AND COAGULANT AID LINES ON BASIN RAILINGS USING PS-106. MAXIMUM 5' SPACING. SUPPORT AS NEEDED FROM CEILING USING PS-7 TO MAINTAIN MAXIMUM 5' SUPPORT SEPARATION. SEE STRUCTURAL DRAWINGS FOR DETAILS.
5. FLOCCULANT AID POLYMER AND COAGULANT AID TO BE DOSED USING PLAIN END PIPE. ROUTE CHEMICAL LINES SUCH THAT THE DOSAGE LOCATION IS MIXED BY FLOC MIXERS ROTATING IN THE UPWARD DIRECTION. CHEMICAL INJECTION SHALL BE 14'-0" AFF. PROVIDE BACKPRESSURE VALVE, ISOLATOIN VALVE, AND CHECK VALVE ON THE CHEMICAL LINE HEADER. INSTALL ISOLATION VALVES ON CHEMICAL LINES TO EACH FLOCCULATION STAGE.
6. CHEMICAL LINES ROUTED INTO THE FLOCCULATION AREA INCLUDE: TWO (2) 1" FLOCCULATION AID POLYMER LINES, FOUR (4) 3/4" COAGULATION AID LINES, TWO (2) 3/4" FERRIC CHLORIDE/SULFATE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" SODIUM HYPOCHLORITE LINES, AND TWO (2) 3/4" SODIUM PERMANGANATE LINES.
7. CHEMICAL LINES ROUTED TO RAW WATER LINES AND FLASH MIX AREA INCLUDE: TWO (2) 3/4" COAGULATION AID LINES, TWO (2) 3/4" FERRIC CHLORIDE/SULFATE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" SODIUM HYPOCHLORITE LINES, AND TWO (2) 3/4" SODIUM PERMANGANATE LINES.

NOTES:

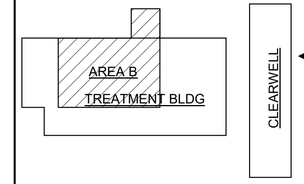
1. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
2. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL SEAL COMPLETELY AND ALLOW NO GAS TO ESCAPE.
3. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
4. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.

**UPPER LEVEL AREA B**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

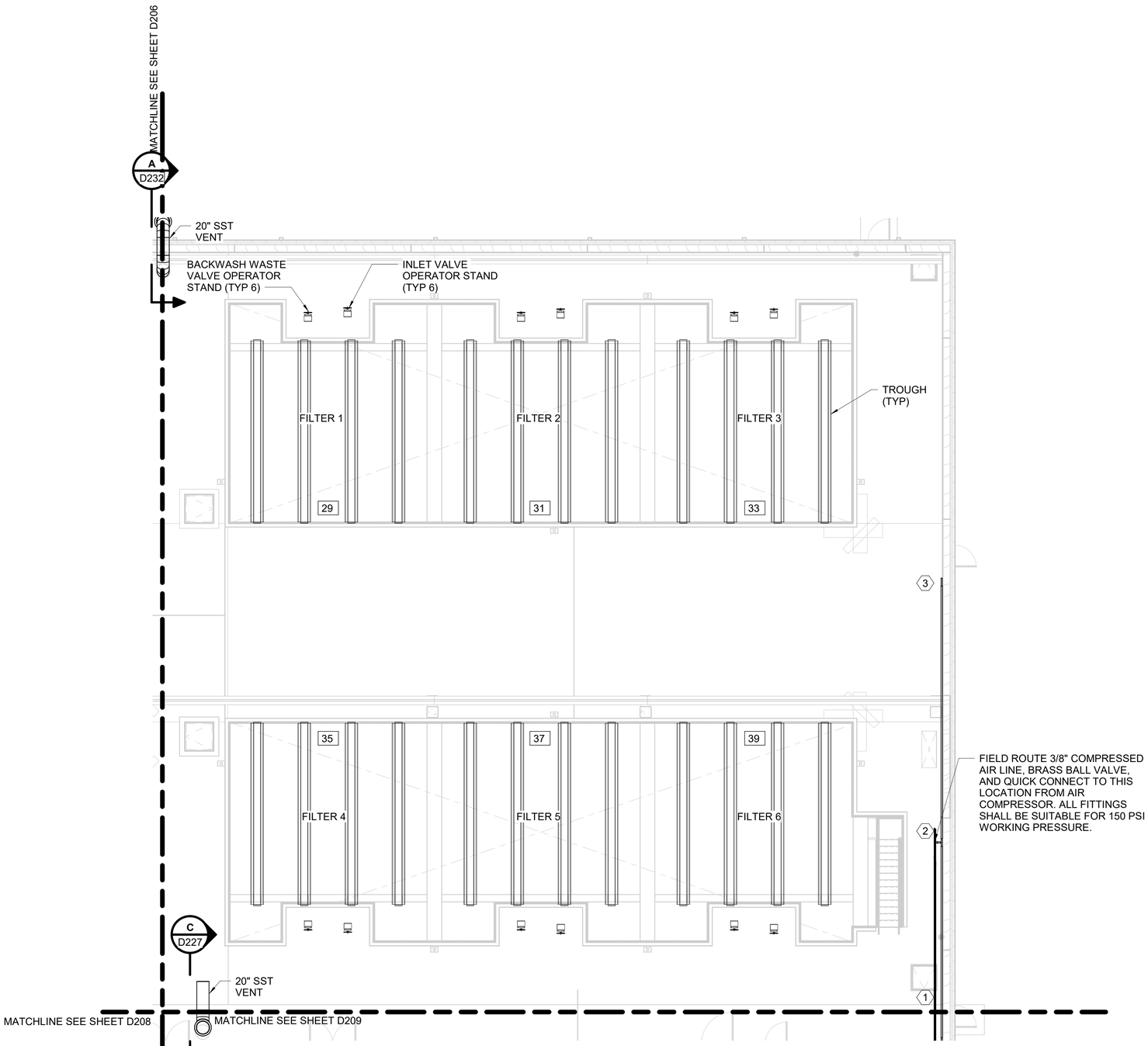
| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B

| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |
| **D206** | **0** |
| sheet 258 of 542 sheets | |
| file 98101_D | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



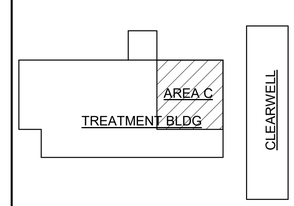

NOTES:

1. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
2. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.
1 3. INSTALL FLOOR STANDS ON CONCRETE CURBS OF MINIMUM 4" HEIGHT. COORDINATE LENGTH OF VALVE SHAFT WITH CURB HEIGHT.

KEYED NOTES:

1. CHEMICAL LINES ROUTED THROUGH THE FILTER AREA: ONE (1) AMMONIUM SULFATE LINE, ONE (1) 3/4" SODIUM BISULFITE LINE, TWO (2) 1" SODIUM HYPOCHLORITE LINES,ONE (1) 1" CAUSTIC SODA LINE, AND ONE (1) 1" HYDROGEN PEROXIDE LINE.
2. CHEMICAL LINES ROUTED TO CARRIER PIPES ON LOWER LEVEL: ONE (1) AMMONIUM SULFATE LINE, ONE (1) 3/4" SODIUM BISULFITE LINE, TWO (2) 1" SODIUM HYPOCHLORITE LINES,AND ONE (1) 1" CAUSTIC SODA LINE.
3. CHEMICAL LINES ROUTED TO PIPE GALLERY: ONE (1) 1" HYDROGEN PEROXIDE LINE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL AREA C**

0 4' 8' 16'
SCALE IN FEET

NORTH

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C

| | |
|---|---|
| project 98101 | contract |
| drawing **D207 — 1** | rev. |
| sheet 259 of 542 sheets | |
| file 98101_D | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

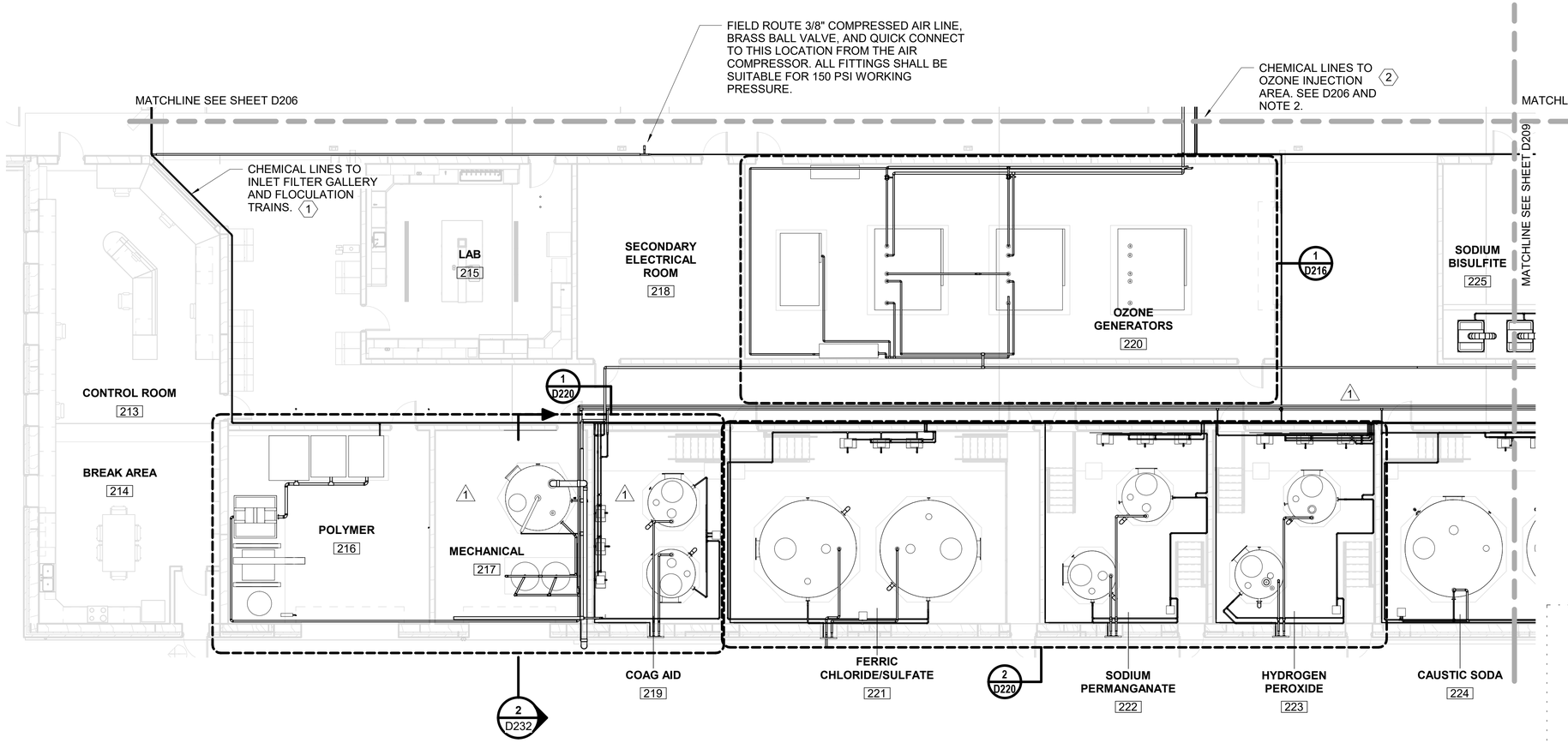
KEYED NOTES

1. CHEMICAL LINES ROUTED TO INTAKE GALLERY INCLUDE: TWO (2) 1" CAUSTIC SODA, TWO (2) 3/4" SODIUM PERMANGANATE, TWO (2) 3/4" SODIUM HYPOCHLORITE, TWO (2) 3/4" FERRIC CHLORIDE/FERRIC SULFATE LINES, TWO (2) 3/4" COAGULANT AID LINES. CHEMICAL LINES ROUTED TO FLOCCULATION BASINS INCLUDE TWO (2) 1" FLOCCULANT AID POLYMER LINES AND TWO (2) 1" COAGULANT AID LINES.
2. CHEMICAL LINES TO BE ROUTED THROUGH UPPER OZONE INJECTION AREA TO OZONE INJECTION AREA ON LOWER LEVEL INCLUDE: THREE (3) 1" HYDROGEN PEROXIDE LINES, TWO (2) 1" CAUSTIC SODA LINES, TWO (2) 3/4" AMMONIUM SULFATE LINES, TWO (2) 1" SODIUM HYPOCHLORITE LINES, ONE (1) 3/4" PHOSPHORIC ACID LINE, ONE (1) 3/4" SODIUM BISULFITE LINE. CHEMICAL LINES SHOWN OFFSET FROM OZONE COOLING WATER LINE FOR CLARITY. OZONE LINES TO BE ROUTED INCLUDE: ONE (1) 3" COOLING WATER RETURN, ONE (1) 2" GOX SUPPLY, AND ONE (1) 3" OZONE GAS. COORDINATE PIPE ROUTING WITH BRIDGECRANE. SUPPORT WITH PS-105, 5' MINIMUM SPACING, SEE STRUCTURAL DRAWINGS FOR DETAIL. MOUNT CHEMICAL LINES MAXIMUM 8'-0" AFF. MOUNT OZONE LINES 9'-0" AFF.

NOTES:

1. UNLESS OTHERWISE NOTED, SUPPORT CHEMICAL LINES ON WALL USING PS-106, MAXIMUM 5' SPACING. SEE STRUCTURLA DRAWINGS FOR DETAIL. MOUNT MINIMUM 8'-0" AFF.
2. LINES SPANNING HALLWAY TO BE SUPPORTED USING P-106, MAXIMUM 5' SPACING. SEE STRUCTURAL DRAWINGS FOR DETAIL.
3. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL SEAL COMPLETELY AND ALLOW NO GAS TO ESCAPE.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. WHEN POSSIBLE, AVOID ROUTING PIPE IN FRONT OF THE KNOCKOUT WALLS.
6. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
7. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

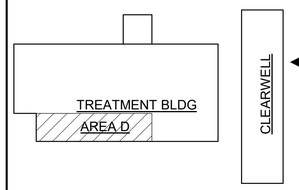



UPPER LEVEL AREA D

0 4' 8' 16'

SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
UPPER LEVEL PLAN AREA D

| | |
|---|---|
| project 98101 | contract |
| drawing D208 | rev. 1 |
| sheet 260 of 542 sheets | |
| file 98101_D | |

Millimeters
Scale For Microfilming
Inches

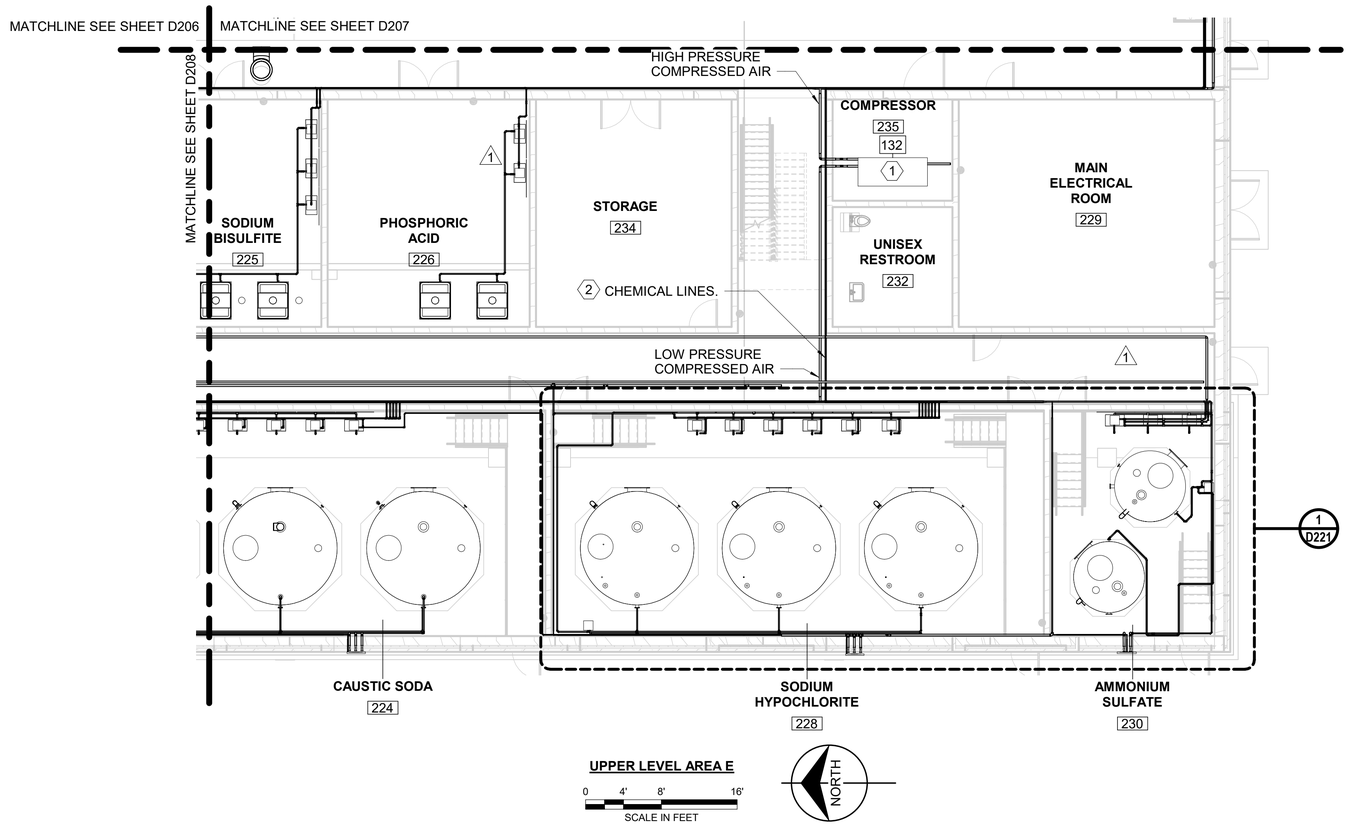
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES:

1. AIR COMPRESSOR SHALL BE INGERSOLL RAND MODEL 2-2545E10V, OR DESIGN-BUILDER APPROVED EQUAL, WITH A DRYER, FILTER, AND POLYSEP ON THE DRAIN LINE. PROVIDE ONE REGULATOR FOR THE HOUSE AIR CONNECTIONS, WITH A SET POINT OF 95 PSI AND ONE REGULATOR FOR THE CHEMICAL FILL CONNECTIONS WITH A SET POINT OF 20 PSI.
2. CHEMICAL LINES ROUTED TO BACKWASH PUMP STATION INCLUDE: ONE (1) 1" CAUSTIC SODA LINE, ONE (1) 1" AMMONIUM SULFATE LINE, TWO (2) 1" SODIUM HYPOCHLORITE LINES, AND ONE (1) 3/4" SODIUM BISULFITE LINE. CHEMICAL LINES ROUTED TO FILTER GALLERY AREA INCLUDE ONE (1) 1" HYDROGEN PEROXIDE LINE. MOUNT MINIMUM 8'-0" AFF. LINES SPANNING HALLWAY TO BE SUPPORTED USING P-106, MAXIMUM 5' SPACING. SEE STRUCTURAL DRAWINGS FOR DETAIL.

NOTES:

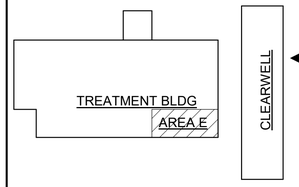
1. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
2. WHEN POSSIBLE, AVOID ROUTING PIPE IN FRONT OF KNOCKOUT WALLS.
3. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
4. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.




UPPER LEVEL AREA E

0 4' 8' 16'

SCALE IN FEET




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
UPPER LEVEL PLAN AREA E

| project | contract |
|---|---|
| 98101 | |

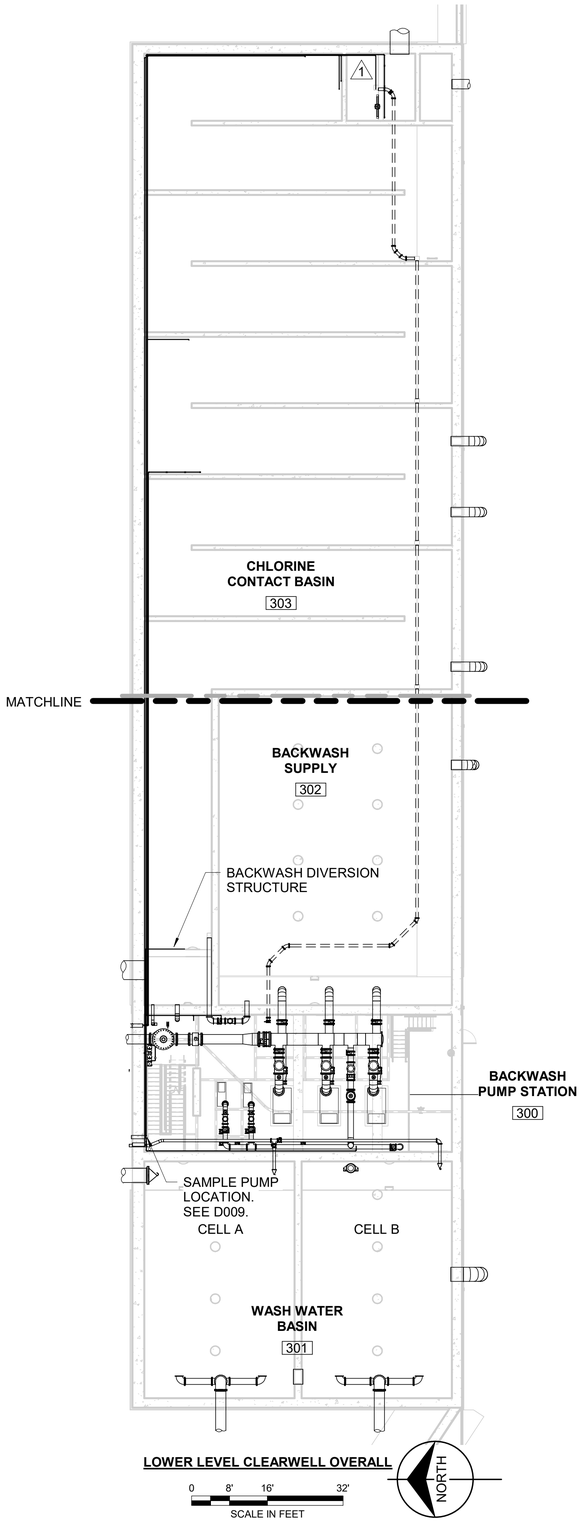
drawing D209 — 1 rev.

sheet 261 of 542 sheets

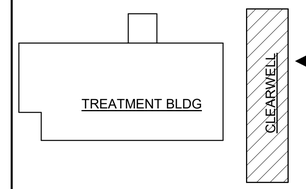
file 98101_D

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL OVERALL PLAN

| project | contract |
|---|---|
| 98101 | |

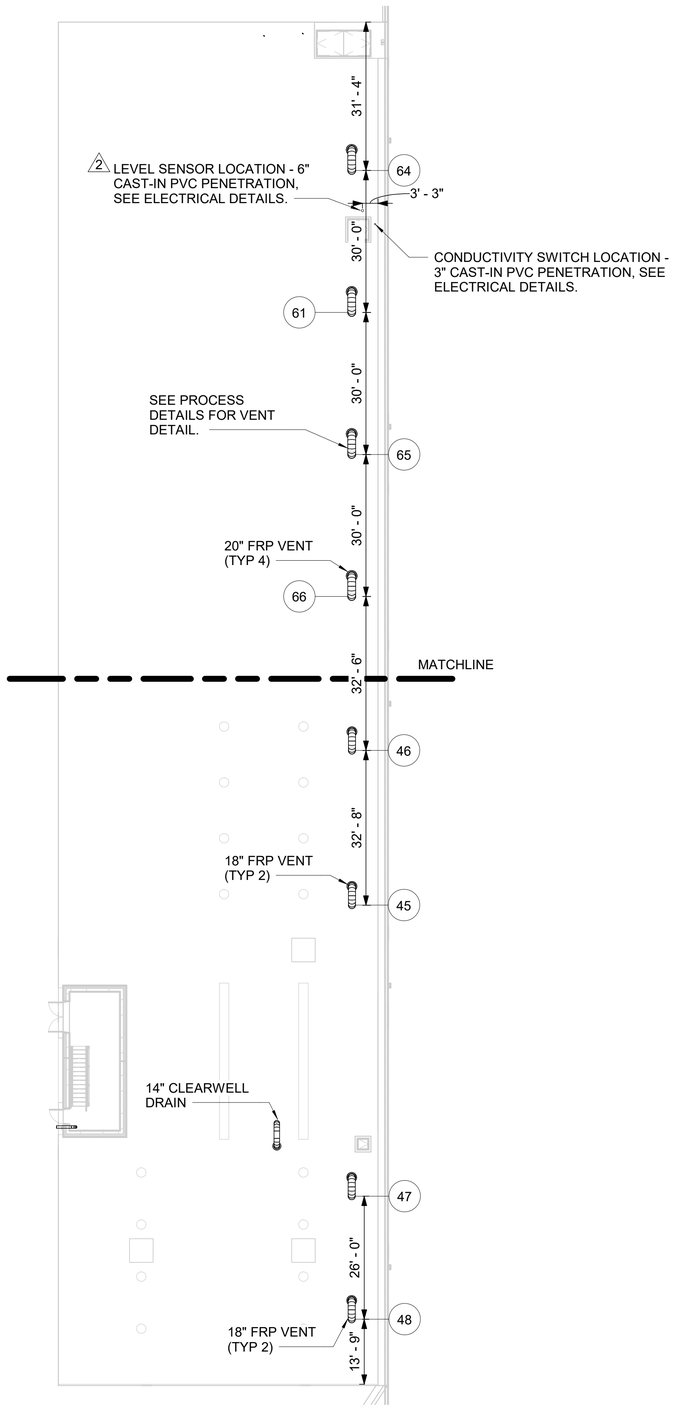
drawing **D210 — 1** rev.

sheet 262 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL OVERALL CLEARWELL**

0 8' 16' 32'

SCALE IN FEET

NORTH

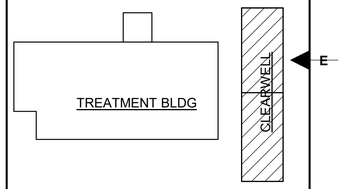
Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26//21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

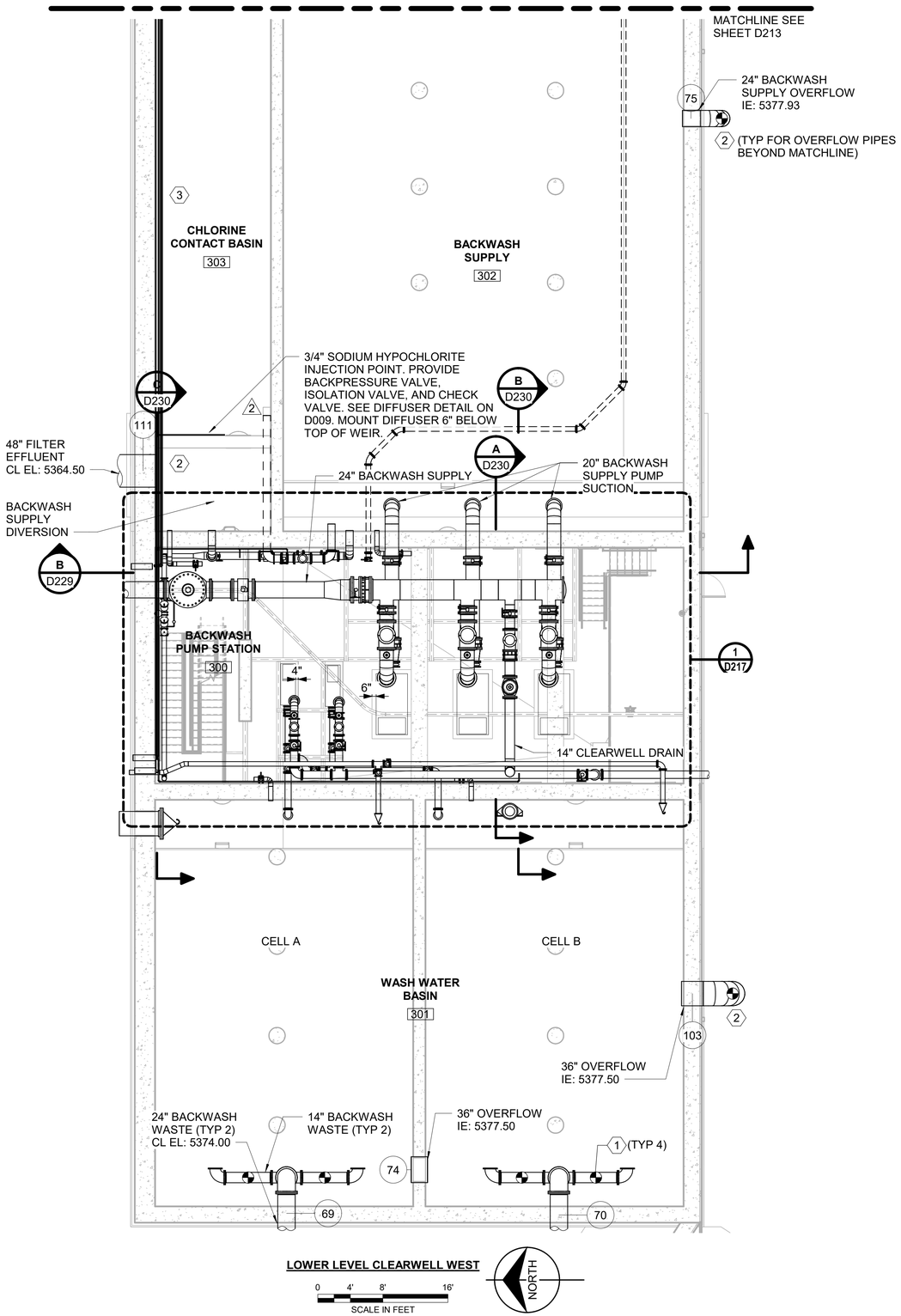
**CITY OF THORNTON**
**TTP - PACKAGE 3**
CLEARWELL ROOF PLAN

| project | contract |
|---|---|
| 98101 | |

**drawing** D211 — 2 **rev.**

**sheet** 263 **of** 542 **sheets**

**file** 98101_D



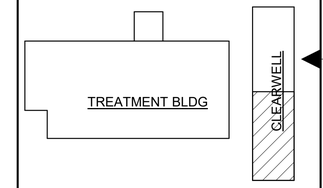

**KEYED NOTES:**

1. PS-1, SEE STRUC DWGS FOR DETAILS.
2. PS-9, SEE STRUC DWGS FOR DETAILS. SEE CIVIL DETAILS FOR OVF MANHOLE.
3. CHEMICAL LINES ROUTED TO CLEARWELL EAST INCLUDE: ONE (1) 3/4" SODIUM HYPOCHLORITE LINE, ONE (1) 1" AMMONIUM SULFATE LINE, ONE (1) 1" CAUSTIC SODA LINE, AND THREE (3) 1" SAMPLE LINES.

NOTES:

1. PROVIDE FLANGES AND DISMMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
2. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
3. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
4. UNLESS OTHERWISE NOTED, SUPPORT CHEMICAL LINES ON WALL USING PS-106, MAXIMUM 5' SPACING. SEE STRUCTURAL DRAWINGS FOR DETAIL. MOUNT MINIMUM 8'-0" AFF. SUPPORTS SHALL BE FRP.
5. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | JS | AB | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 2 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST

| project | contract |
|---|---|
| 98101 | |

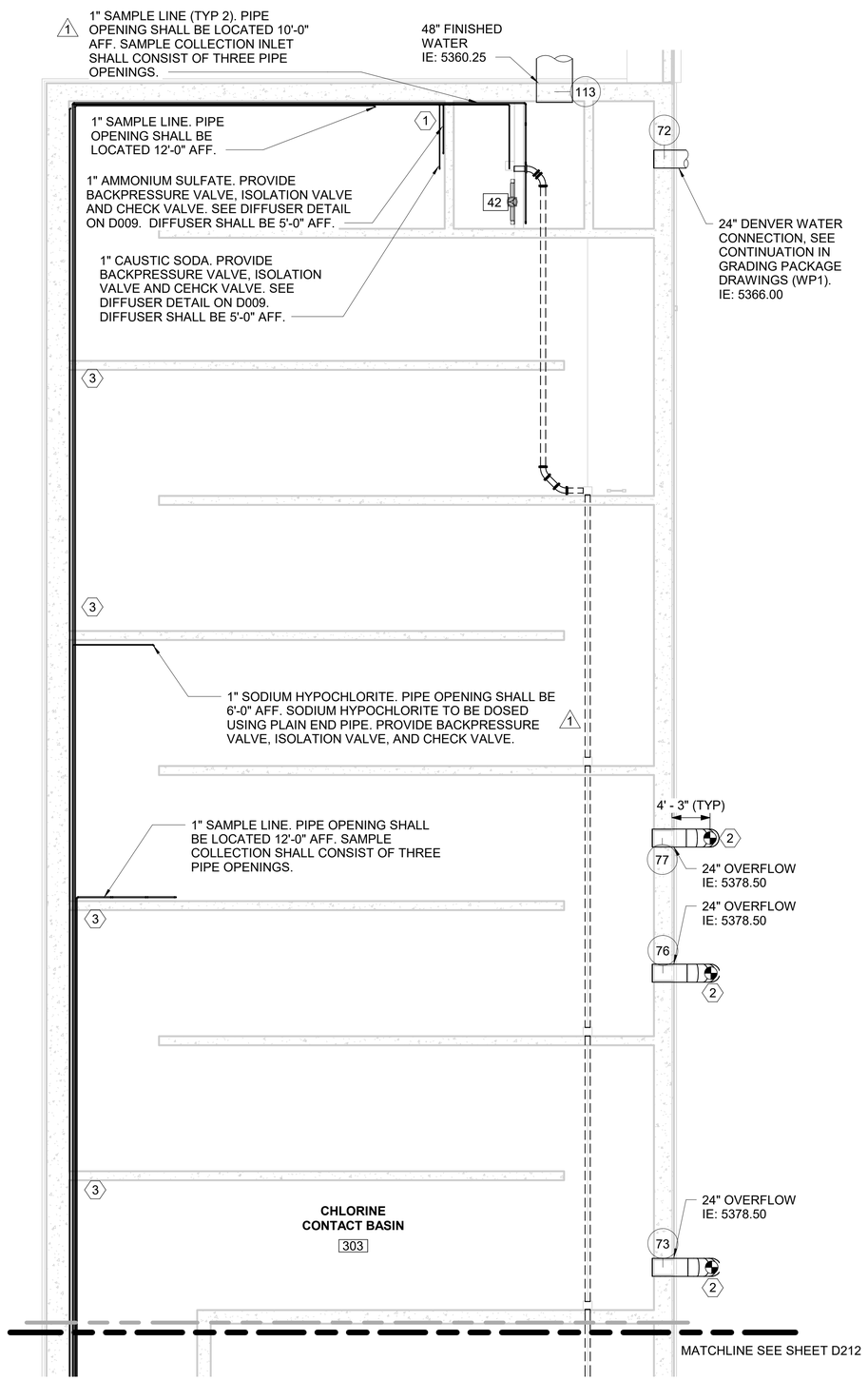
drawing **D212 — 2** rev.

sheet 264 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches




LOWER LEVEL CLEARWELL EAST

0 4' 8' 16'

SCALE IN FEET

NORTH

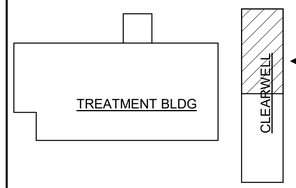
NOTES:

1. SEE YARD PIPING PLAN FOR PIPE CONTINUATION.
2. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
3. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
4. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
5. UNLESS OTHERWISE NOTED, SUPPORT CHEMICAL LINES ON WALL USING PS-106, MAXIMUM 5' SPACING. SEE STRUCTURAL DRAWINGS FOR DETAIL. MOUNT MINIMUM 8'-0" AFF. SUPPORTS SHALL BE FRP.

KEYED NOTES

1. ROUTE AMMONIUM SULFATE AND CAUSTIC SODA LINES TO THE UNDERBAFFLE. PROVIDE CHEMICAL DIFFUSER. SEE PROCESS DETAILS.
2. PS-9, SEE STRUC DWGS FOR DETAILS. SEE CIVIL DETAILS FOR OVF MANHOLE.
3. CORE HOLES IN BAFFLE WALL FOR CHEMICAL LINES. GROUT HOLE CLOSED ONCE CHEMICAL LINES HAVE BEEN ROUTED THROUGH.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL EAST

| project | contract |
|---|---|
| 98101 | |

drawing **D213 — 1** rev.

sheet 265 of 542 sheets

file 98101_D

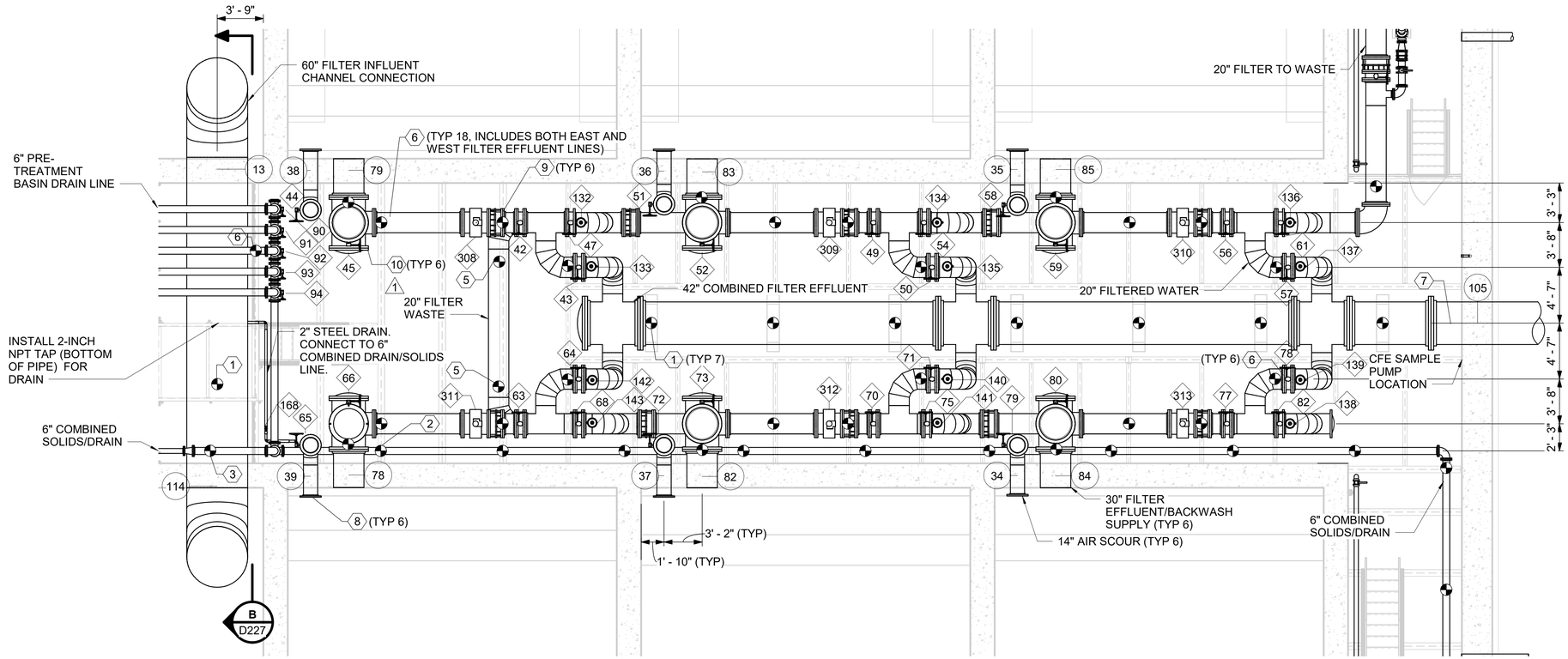
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES
1. VIEW SHOWN ON THIS PAGE IS CUT AT DIFFERENT ELEVATION THAN D205 FOR CLARITY IN SHOWING LOWER LEVEL PIPES IN THIS AREA.
2. COMBINE DRAIN LINES FROM TURBIDIMETERS INTO A COMMON DRAIN LINE AND ROUTE TO TRENCH DRAIN.
3. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
4. COMBINE ANALYZER DRAIN LINES TO A COMBINED DRAIN LINE FOR ANALYZERS THAT ARE LOCATED NEAR ONE ANOTHER. ROUTE COMBINED DRAIN LINES TO TRENCH DRAIN.

KEYED NOTES
1. PS-4, SEE STRUC DWGS FOR DETAIL.
2. PS-2, EVERY 10 FEET SUPPORTING COMBINED SOLIDS/DRAIN LINE. SEE STRUC DWGS FOR DETAIL. (TYP 11)
3. PS-101, SEE STRUC DWGS FOR DETAIL.
4. PS-7A, SEE STRUC DWGS FOR DETAIL.
5. PS-1, EVERY 10 FEET SUPPORTING FILTER TO WASTE LINE. SEE STRUC DWGS FOR DETAIL. (TYP 18)
6. PS1-A, SEE STRUC DWGS FOR DETAIL.
7. SAMPLE TAP LOCATION FOR CFE PH/TEMP AND TURBIDITY ANALYZERS. ROUTE TO ANALYZERS AND SAMPLE PUMP. ROUTE SAMPLE LINES TO ANALYZERS AND SAMPLE PUMP. ROUTE SAMPLE PUMP DISCHARGE TO SAMPLE SINK IN LAB. SEE D008 FOR SAMPLE PUMP DETAIL.
8. COORDINATE 14" AIR SCOUR CONNECTION WITH UNDERDRAIN SUPPLIER.
9. SAMPLE TAP LOCATION ON FILTER EFFLUENT LINE FOR INDIVIDUAL FILTER EFFLUENT TURBIDITY ANALYZER.
10. FRP BLIND FLANGE.

△1




△1 ENLARGED PLAN — 1 D205

0 2' 4' 8'
SCALE IN FEET

NORTH




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ENLARGED PLANS I

| project | contract |
|---|---|
| 98101 | |

drawing D214 — 1 rev. 1

sheet 266 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

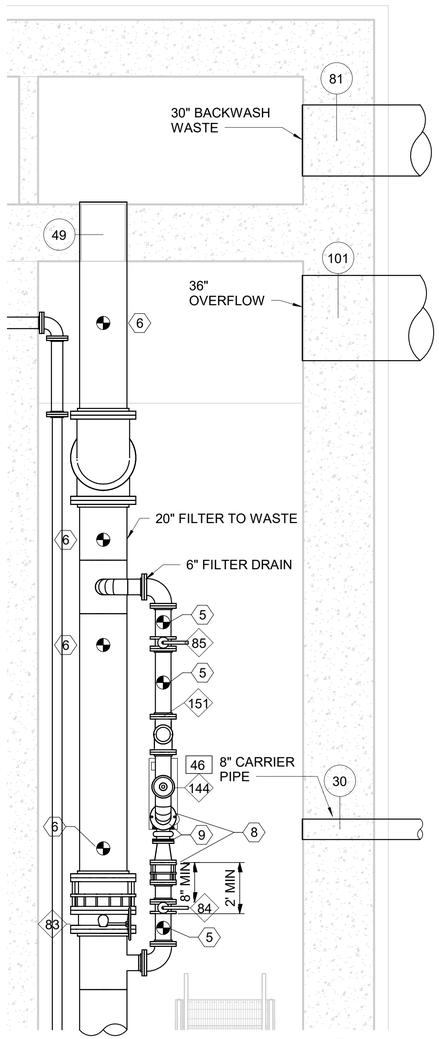
Scale For Microfilming
Millimeters
Inches

NOTES:

1. ALL CHEMICAL INJECTION LOCATIONS TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS.
2. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
3. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL BR OZONE-COMPATIBLE, SEAL COMPLETELY AND ALLOW NO GAS TO ESCAPE.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
6. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.

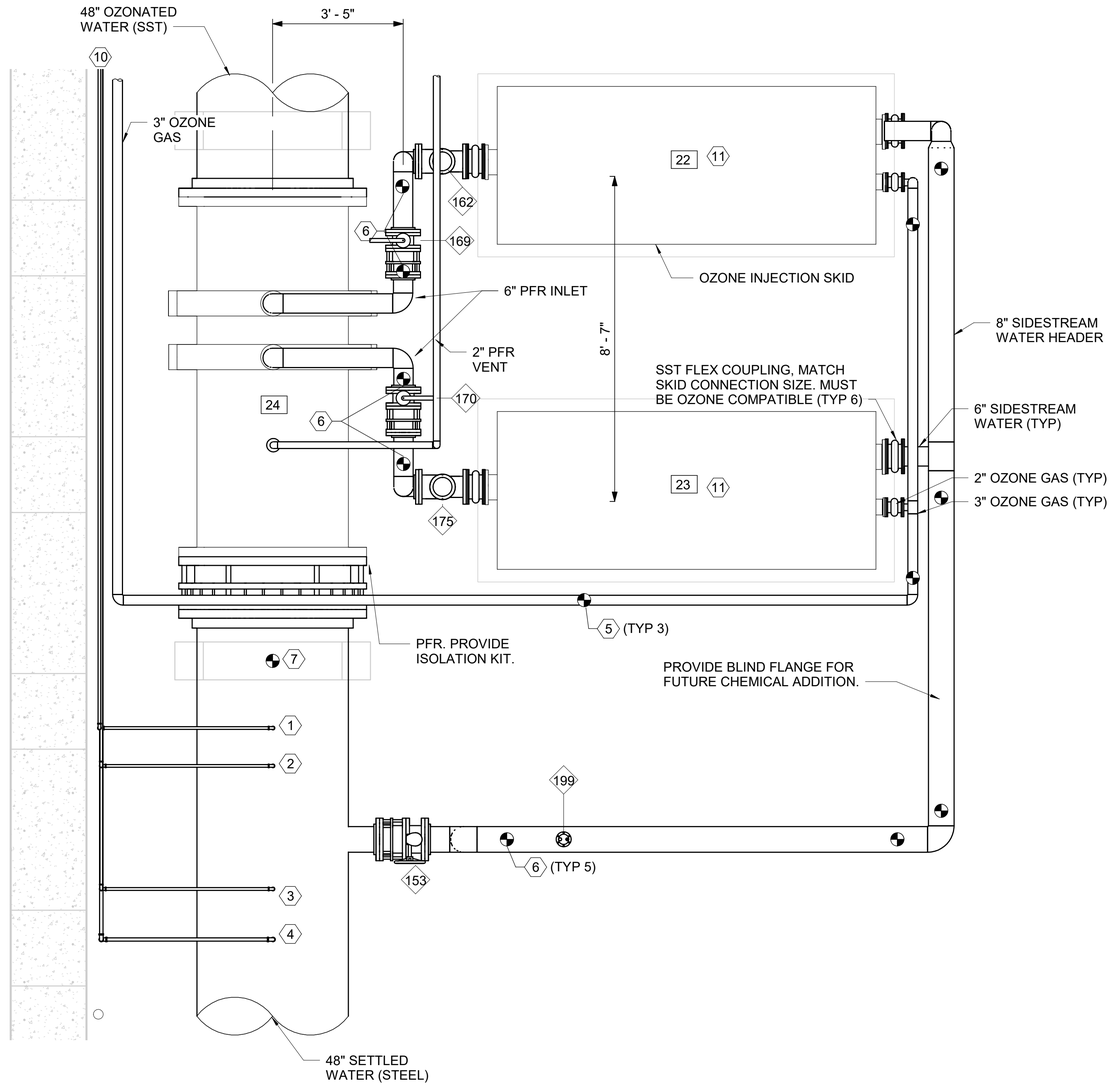
KEYED NOTES:

1. ONE (1) 1" HYDROGEN PEROXIDE INJECTION POINT. CHEMICAL INJECTION LOCATION TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS D008.
2. ONE (1) 1" CAUSTIC SODA INJECTION POINT. PROVIDE ONE (1) REDUNDANT DIFFUSER. CHEMICAL INJECTION LOCATION TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS D008.
3. ONE (1) 1" SODIUM HYPOCHLORITE INJECTION POINT. CHEMICAL INJECTION LOCATION TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS D008.
4. ONE (1) 3/4" AMMONIUM SULFATE INJECTION POINT. PROVIDE ONE (1) REDUNDANT DIFFUSER . CHEMICAL INJECTION LOCATION TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS D008.
5. PS-2, SEE STRUC DWGS FOR DETAIL.
6. PS-1, SEE STRUC DWGS FOR DETAIL.
7. PS-4, SEE STRUC DWGS FOR DETAIL.
8. 6" DISMANTLING JOINT.
9. EXPANSION JOINT. COORDINATE SIZE WITH PUMP MANUFACTURER.
10. CHEMICAL LINES ROUTE TO SETTLED WATER INJECTION POINT: ONE (1) 1" HYDROGEN PEROXIDE LINE, ONE (1) 1" CAUSTIC SODA LINE, ONE (1) 3/4" AMMONIUM SULFATE LINE, AND ONE (1) 3/4" SODIUM HYPOCHLORITE LINE.
11. ROUTE SST VENT LINES FROM PRVS ON SKIDS TO UPPER LEVEL AND TO THE OUTSIDE OF THE BUILDING, ENDING MIN 8' AFF. VENT SIZE TO MATCH PRV VENT SIZE.



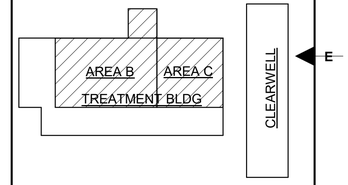

ENLARGED PLAN 1 D205

SCALE IN FEET: 0, 2', 4', 6'




ENLARGED PLAN 2 D204 D204A

SCALE IN FEET: 0, 1', 2', 4'




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ENLARGED PLANS II

| | |
|---|---|
| project 98101 | contract |
| drawing D215 | rev. 0 |
| sheet 267 of 542 sheets | |
| file 98101_D | |

Scale For Microfilming: Millimeters / Inches

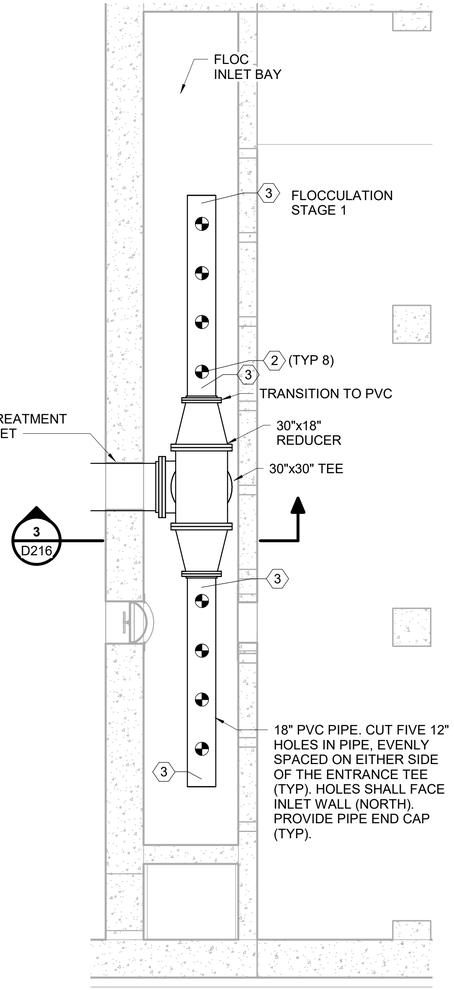
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES

1. LOCATION FOR FUTURE OZONE GENERATOR. NIC.
2. W8X10 ALUMINUM SUPPORTS, SEE STRUC DWGS.
3. DRILL 1" DRAIN HOLE.
4. ROUTE SST VENT LINES FROM PRVS ON SKIDS TO ROOF, ENDING MIN 8' AFF. VENT SIZE TO MATCH PRV VENT SIZE.

NOTES:

1. COORDINATE FINAL PIPE CONNECTIONS WITH OZONE EQUIPMENT MANUFACTURER.
2. COORDINATE VALVES IN OZONE ROOM WITH OZONE EQUIPMENT MANUFACTURER P&IDS.
3. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
4. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL SEAL COMPLETELY AND ALLOW NO GAS TO ESCAPE. ALL EXPANSION JOINT MATERIALS SHALL BE COMPATIBLE WITH OZONE.
5. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
6. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
7. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.

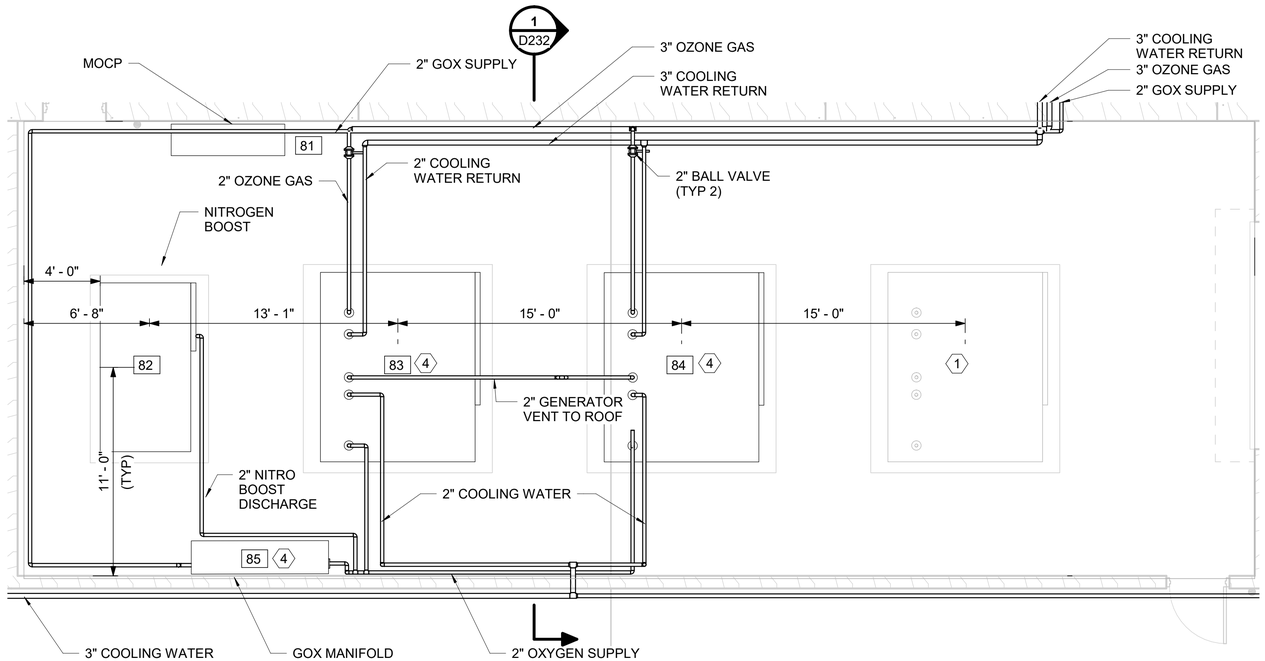



ENLARGED PLAN 2 D204

0 2' 4' 8'

SCALE IN FEET

NORTH

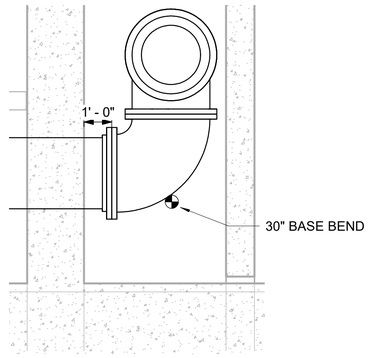



ENLARGED PLAN 1 D208

0 2' 4' 8'

SCALE IN FEET

NORTH

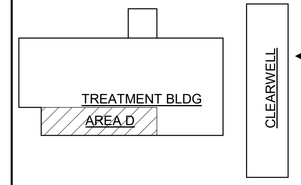



SECTION 3 D216

0 2' 4' 6'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ENLARGED PLANS III

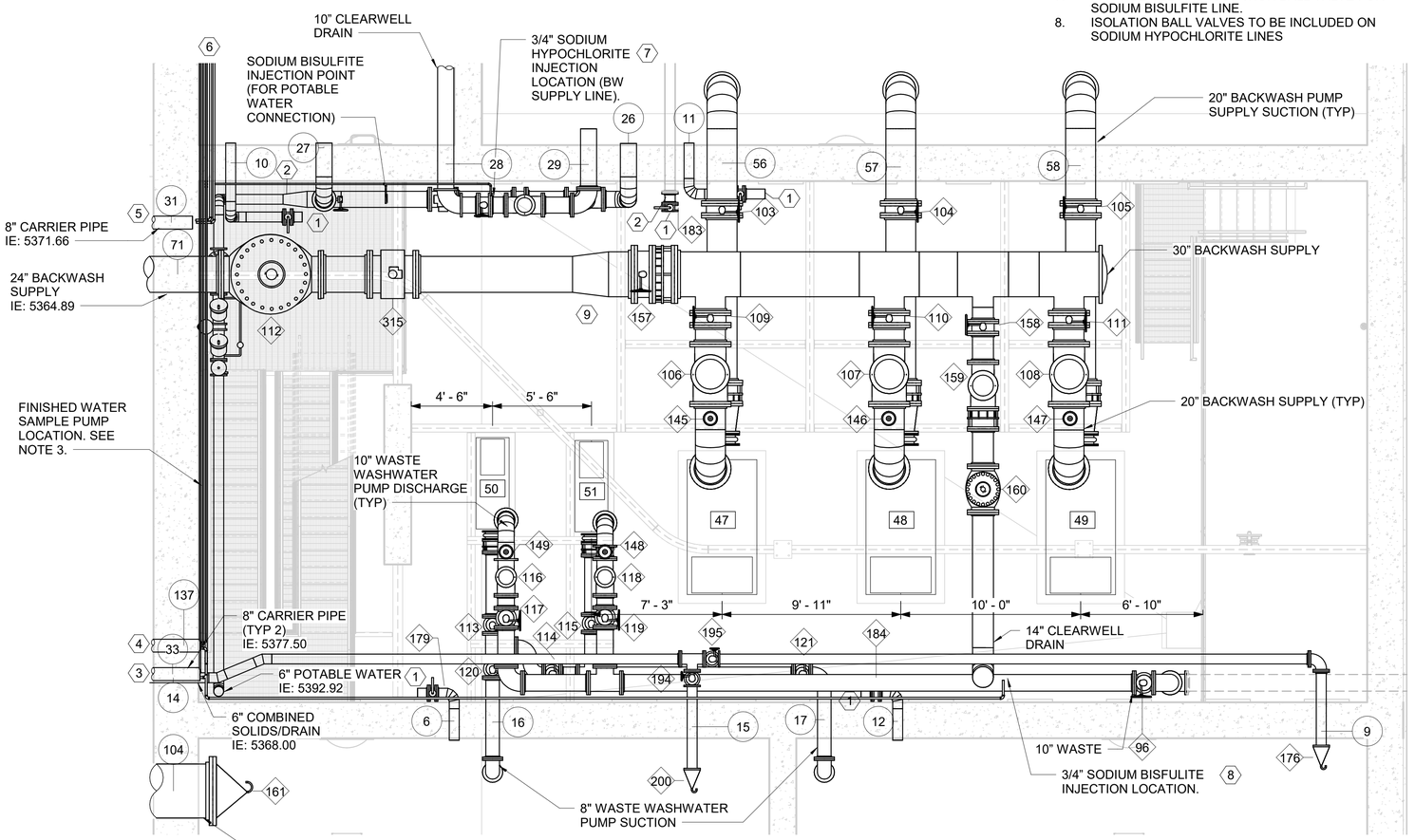
| | |
|---|---|
| project 98101 | contract |
| drawing D216 | rev. 0 |
| sheet 268 of 542 sheets | |
| file 98101_D | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

NOTES:

1. SEE YARD PIPING PLAN FOR PIPE CONTINUATION.
2. ALL CHEMICAL INJECTION LOCATIONS IN THIS AREA TO BE QUILL INJECTION STYLE. SEE PROCESS DETAILS.
3. SAMPLE LINE SHALL SUPPLY FINISHED WATER TO ANALYZERS AND SAMPLE PUMP. LOCATE FINISHED WATER SAMPLE PUMP ON NORTH WALL OF BACKWASH PUMP STATION, DOWNSTREAM OF ANALYZERS. COMBINE DRAIN LINES FROM ANALYZERS INTO A COMBINED DRAIN AND ROUTE TOWARD SUMP. SAMPLE PUMP DISCHARGE LINE SHALL BE ROUTED TO SAMPLE SINK IN LAB.
4. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
5. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS, WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
6. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
7. PROVIDE TEE AND ISOLATION BALL VALVE FOR SODIUM BISULFITE LINE.
8. ISOLATION BALL VALVES TO BE INCLUDED ON SODIUM HYPOCHLORITE LINES




ENLARGED PLAN 1 D212

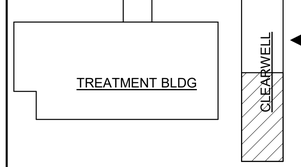
0 2' 4' 8'
SCALE IN FEET

NORTH

KEYED NOTES:

1. 6" DRAIN WITH 6" CAMLOCK CONNECTION. SEE PROCESS DETAILS.
2. IN-LINE CHECK VALVE. SEE SPECIFICATION 33 12 16.
3. CHEMICAL LINES ROUTED IN 8" CARRIER PIPE FROM FILTER GALLERY INCLUDE: ONE (1) 1" CAUSTIC SODA AND TWO (2) 1" SODIUM HYPOCHLORITE LINES. INCLUDE ONE SPARE LINE PER LINE. SEE D009 FOR CARRIER PIPE TERMINATION DETAIL.
4. CHEMICAL LINES ROUTE IN 8" CARRIER PIPE INCLUDE: ONE (1) 1" AMMONIUM SULFATE AND ONE (1) 3/4" SODIUM BISULFITE. INCLUDE ONE (1) 1" FINISHED WATER SAMPLE LINE. INCLUDE ONE SPARE LINE PER LINE. SEE D009 FOR CARRIER PIPE TERMINATION DETAIL.
5. SAMPLE LINES ROUTED IN 8" CARRIER PIPE INCLUDE TWO (2) 1" SAMPLE LINES. PROVIDE SPARE LINE FOR EACH SAMPLE LINE. SEE D009 FOR CARRIER PIPE TERMINATION DETAIL.
6. CHEMICAL LINES ROUTED TO CLEARWELL INCLUDE TWO (2) 1" SODIUM HYPOCHLORITE LINES, ONE (1) 3/4" AMMONIUM SULFATE LINE, AND ONE (1) 1" CAUSTIC SODA LINE. SAMPLES LINES ROUTED FROM THE CLEARWELL INCLUDE THREE (3) 1" SAMPLE LINES.
7. CHEMICAL LINE TEES OFF OF THE INTERMEDIATE CLEARWELL DOSAGE LINE. PROVIDE TEE AND ISOLATION BALL VALVE.
8. CHEMICAL LINE TEES OFF OF THE POTABLE WATER DOSAGE LINE. PROVIDE TEE AND ISOLATION BALL VALVE.
9. 30" X 24" REDUCER.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ENLARGED PLANS IV

| project | contract |
|---|---|
| 98101 | |

drawing D217 — 1 rev.

sheet 269 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

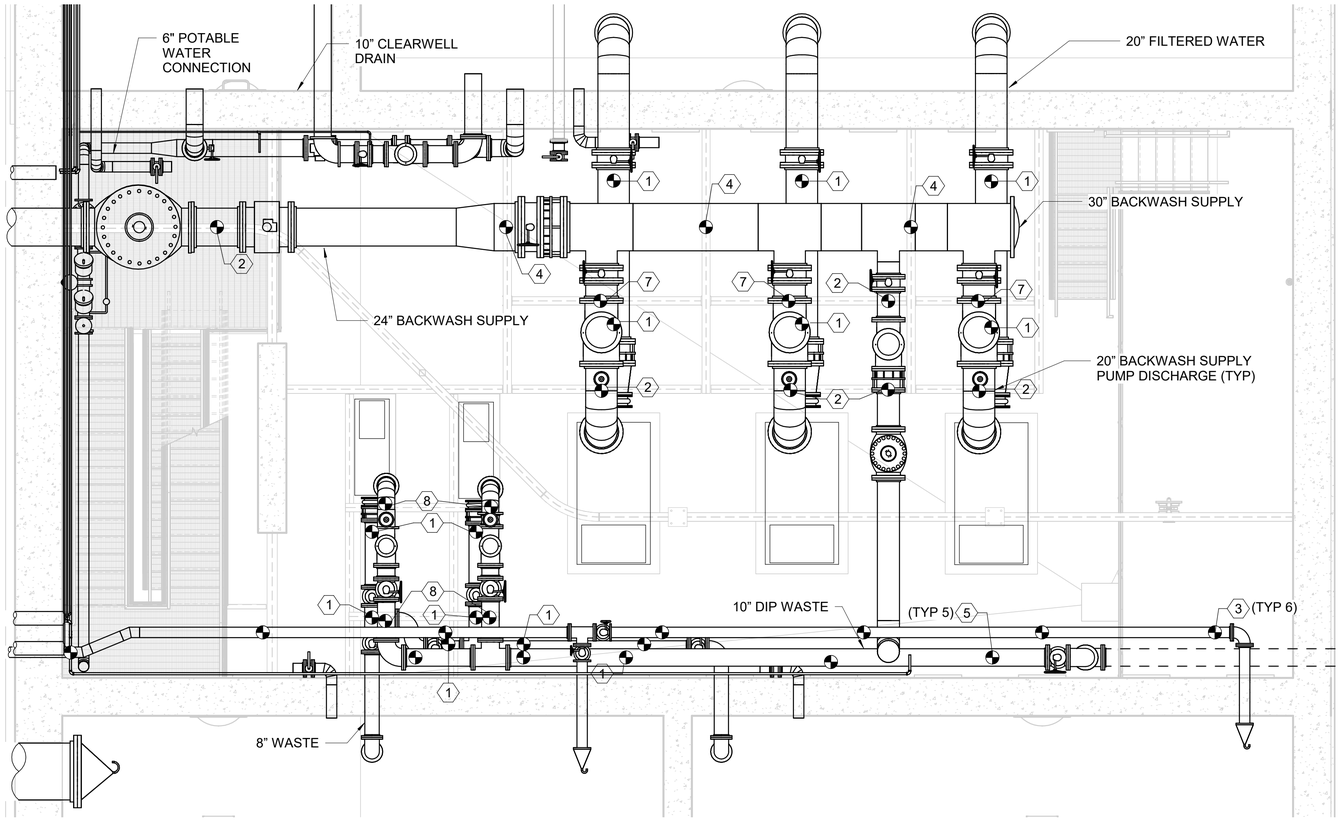
Scale For Microfilming
Millimeters
Inches

NOTES:

1. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
2. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.

KEYED NOTES:

1. PS-1, SEE STRUC DWGS FOR DETAILS.
2. PS-1A, SEE STRUC DWGS FOR DETAILS.
3. PS-8, SEE STRUC DWGS FOR DETAILS.
4. PS-16, SEE STRUC DWGS FOR DETAILS.
5. PS-16, SEE STRUC DWGS FOR DETAILS.
6. PS-7A, SEE STRUC DWGS FOR DETAILS.
7. PS-3A, SEE STRUC DWGS FOR DETAILS.

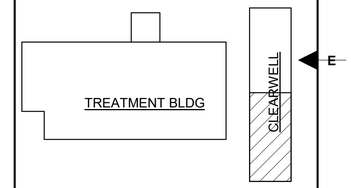



ENLARGED PLAN 1/D212

0 2' 4' 8'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS V

| project | contract |
|---|---|
| 98101 | |

drawing **D217A** rev. **0**

sheet 270 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

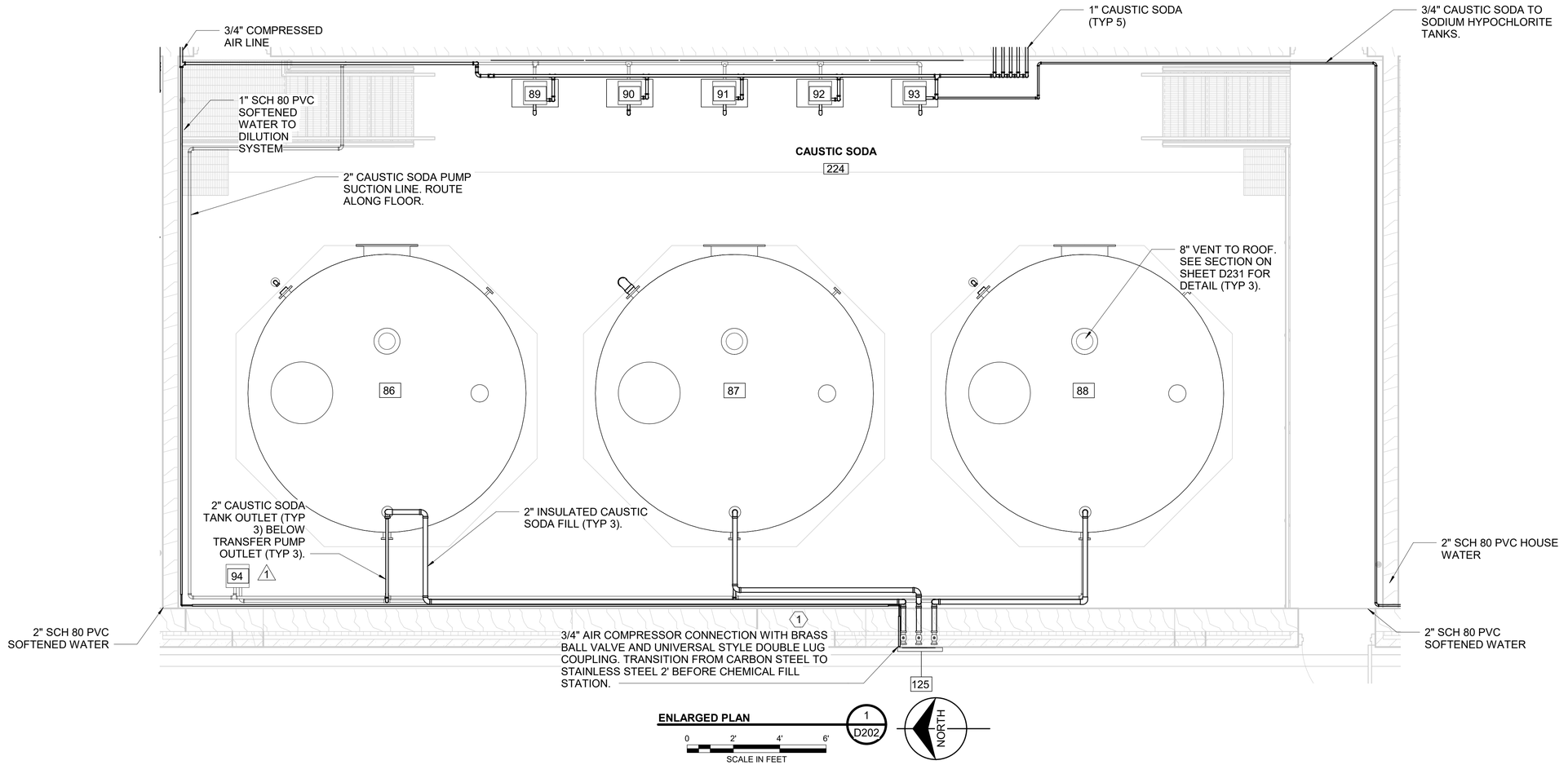
Scale For Microfilming
Millimeters
Inches

NOTES:

1. VALVES AND APPURTENANCES NOT SHOWN FOR CLARITY. REFER TO PIDS FOR DETAIL.
2. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
3. FIELD VERIFY ROUTING OF ALL LINES.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. SEE A301 FOR CHEMICAL FILL STATION DETAILS.
6. WHEN POSSIBLE, AVOID ROUTING PIPE IN FRONT OF THE KNOCKOUT WALLS.
7. REFER TO TANK DATA SHEETS IN SPECIFICATIONS FOR NOZZLE SCHEDULE.

KEYED NOTES

1 CHEMICAL TANKS MAY BE REMOVED FROM STORAGE ROOM BY REMOVING THE KNOCKOUT WALL ON THE WEST WALL OF THE BUILDING.

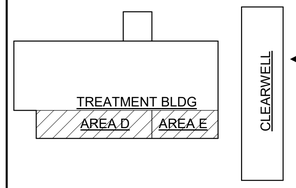



ENLARGED PLAN — 1 / D202

0 2' 4' 6'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS VI

| project | contract |
|---|---|
| 98101 | |

drawing **D218 — 1** rev.

sheet 271 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

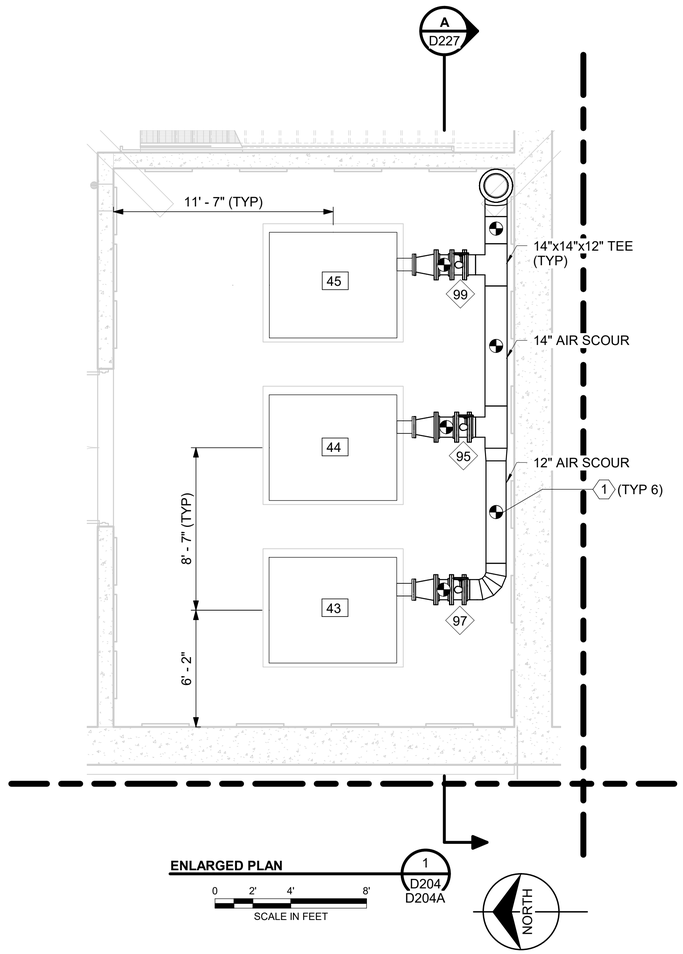
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:

1. PROVIDE FLANGES AND DISMANTLING JOINTS AS NECESSARY FOR PROPER ASSEMBLY AND INSTALLATION OF PIPES.
2. FIBERGLASS INSULATION SHALL BE USED ON OZONE OFF-GAS PIPING.
3. VENT LINES COMBINE TO ONE COMMON HEADER

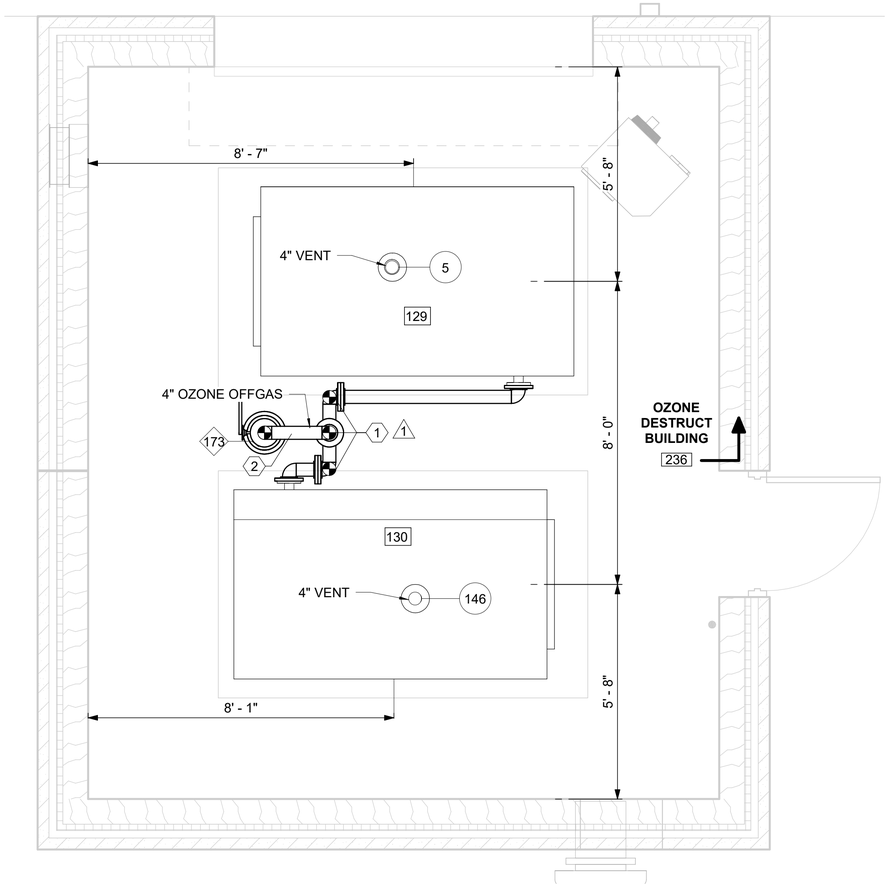
KEYED NOTES

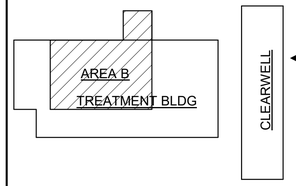
1. PS-1, SEE STRUC DWGS FOR DETAIL.
2. PS-13, SEE STRUC DWGS FOR DETAIL.










| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS VII

| project | contract |
|---|---|
| 98101 | |

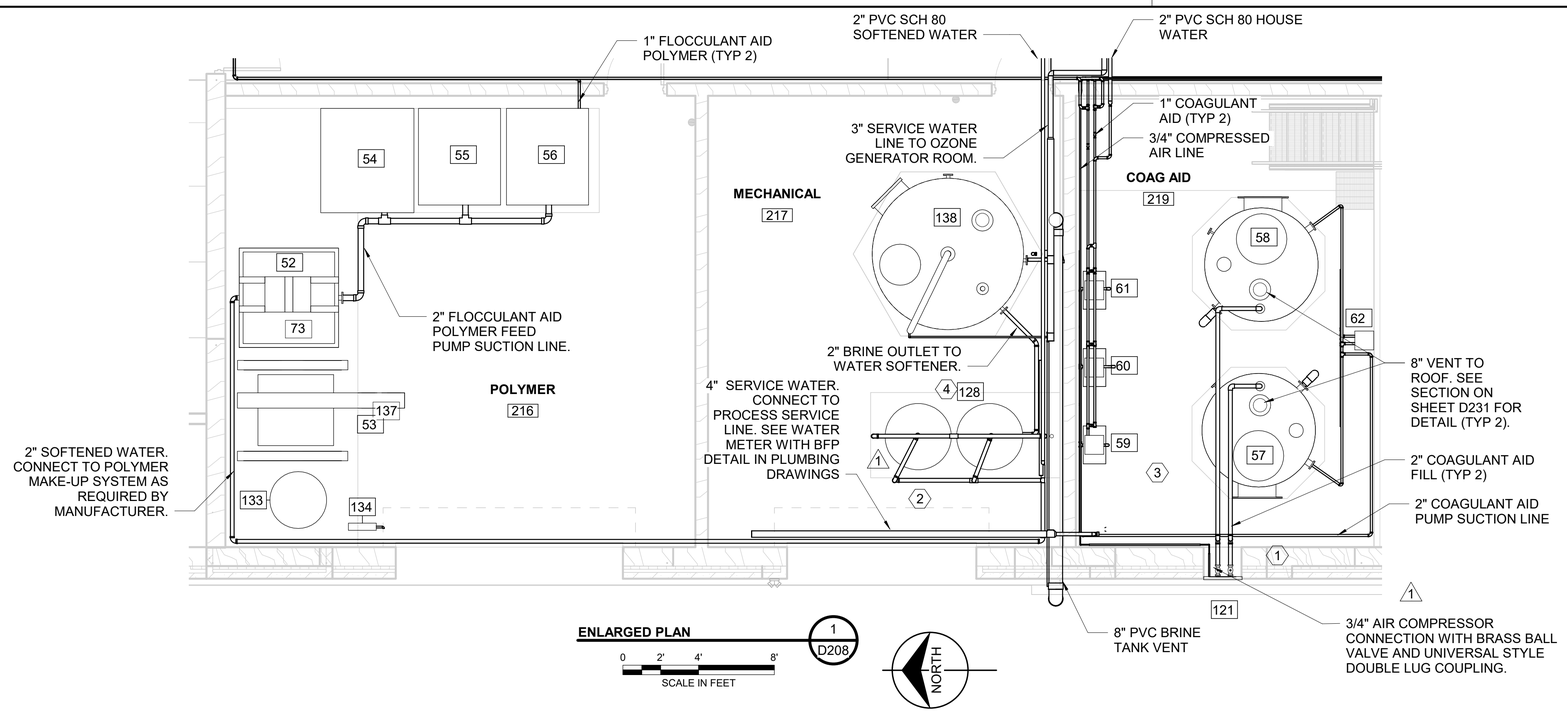
drawing **D219 — 1** rev.

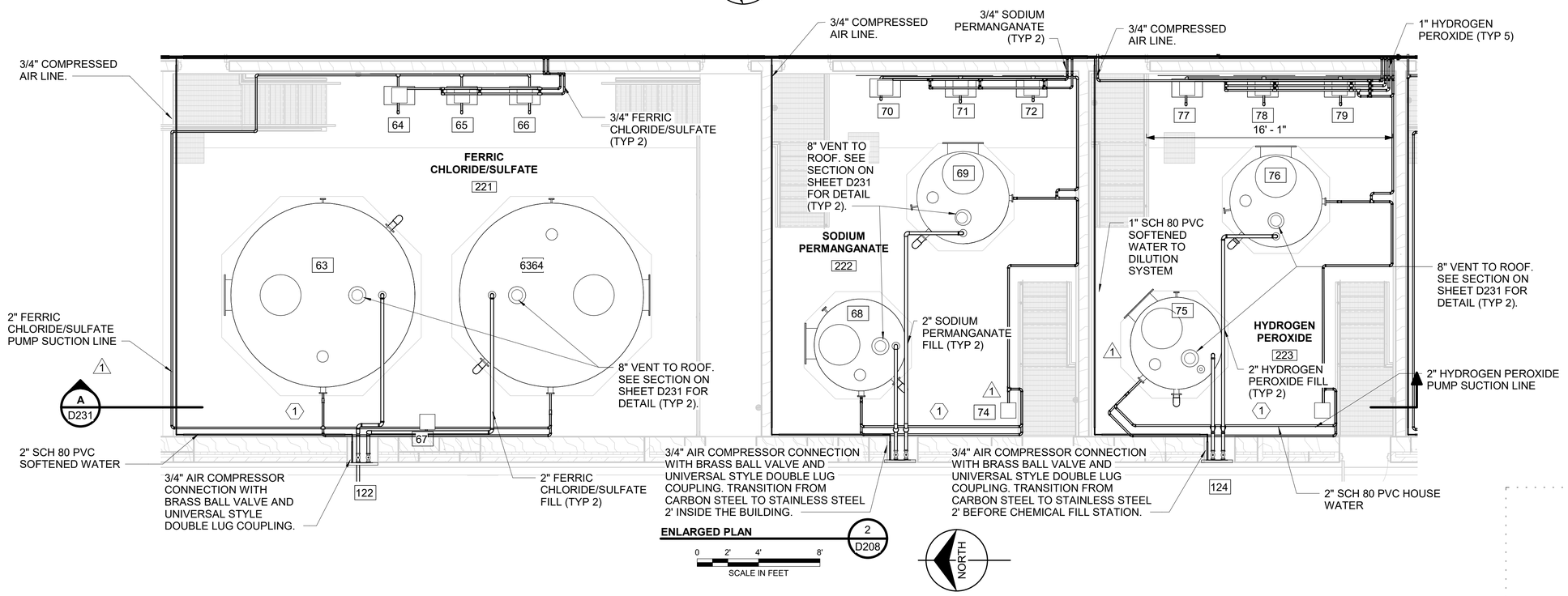
sheet 272 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




KEYED NOTES

1. CHEMICAL TANKS MAY BE REMOVED FROM STORAGE ROOM BY REMOVING THE KNOCKOUT WALL ON THE WEST WALL OF THE BUILDING.
2. ROUTE DRAIN LINE TO FLOOR DRAIN.
3. ROUTE DRAIN LINE TO SUMP.
4. ROUTE 2" WATER SOFTENING SYSTEM DRAIN LINE TO FLOOR DRAIN.

NOTES:

1. VALVES AND APPURTENANCES NOT SHOWN FOR CLARITY. REFER TO PIDS FOR DETAIL.
2. PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL PIPES AS CLOSE TO WALL AS POSSIBLE.
3. FIELD VERIFY ROUTING OF ALL LINES.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. SEE A301 FOR CHEMICAL FILL STATION DETAILS.
6. WHEN POSSIBLE, AVOID ROUTING PIPE IN FRONT OF THE KNOCKOUT WALLS.
7. REFER TO TANK DATA SHEETS IN SPECIFICATIONS FOR NOZZLE SCHEDULE.
8. PROVIDE ISOLATION BALL VALVE ON ALL HOUSE WATER AND SOFTENED WATER CONNECTIONS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS VIII

| project | contract |
|---|---|
| 98101 | |

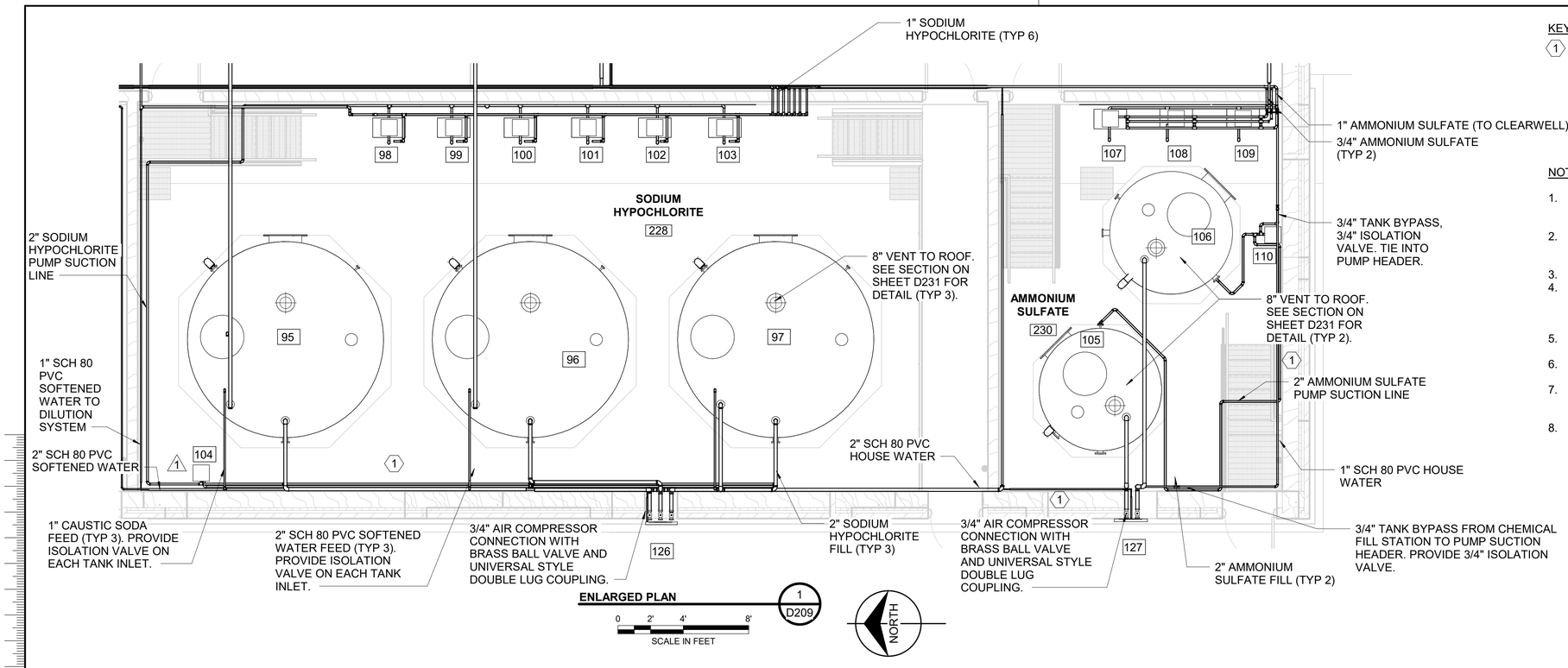
drawing **D220 — 1** rev.

sheet 273 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

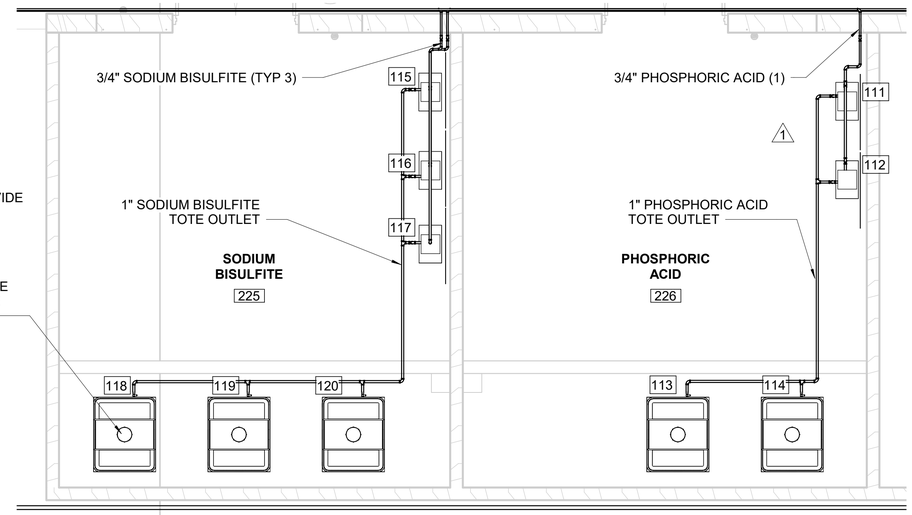



ENLARGED PLAN 1 D209

0 2' 4' 8'

SCALE IN FEET

NORTH




ENLARGED PLAN 2 D202

0 2' 4' 8'

SCALE IN FEET

NORTH

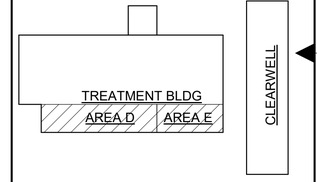
KEYED NOTES

1 CHEMICAL TANKS MAY BE REMOVED FROM STORAGE ROOM BY REMOVING THE KNOCKOUT WALL ON THE WEST WALL OF THE BUILDING.

NOTES:

1. VALVES AND APPURTENANCES NOT SHOWN FOR CLARITY. REFER TO PIDS FOR DETAIL.
2. PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL PIPES AS CLOSE TO WALL AS POSSIBLE.
3. FIELD VERIFY ROUTING OF ALL LINES.
4. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
5. SEE A301 FOR CHEMICAL FILL STATION DETAILS.
6. WHEN POSSIBLE, AVOID ROUTING PIPE IN FRONT OF THE KNOCKOUT WALLS.
7. PROVIDE TEE AND ISOLATION VALVE ON SODIUM HYPOCHLORITE LINE AT ALL HIGH POINTS.
8. REFER TO TANK DATA SHEETS IN SPECIFICATIONS FOR NOZZLE SCHEDULE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED PLANS IX

| project | contract |
|---|---|
| 98101 | |

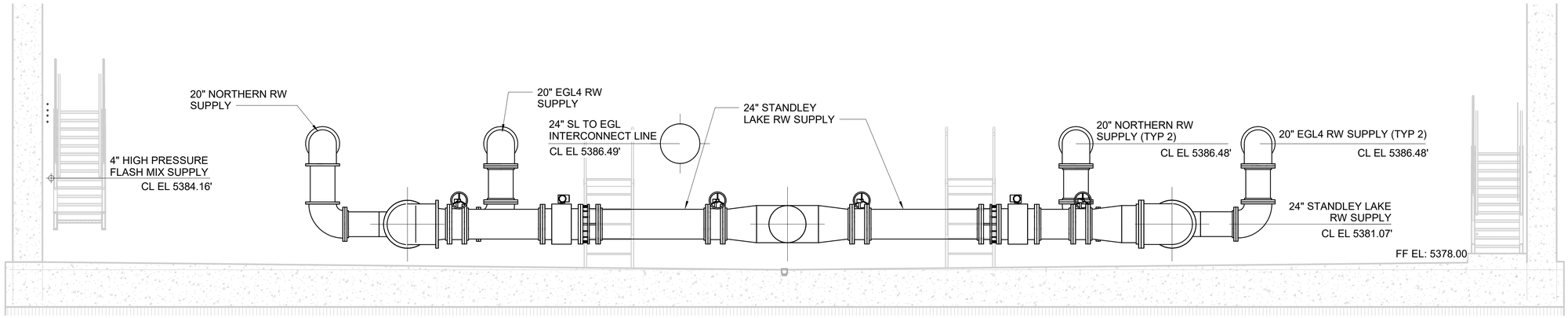
drawing **D221 — 1** rev.

sheet 274 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

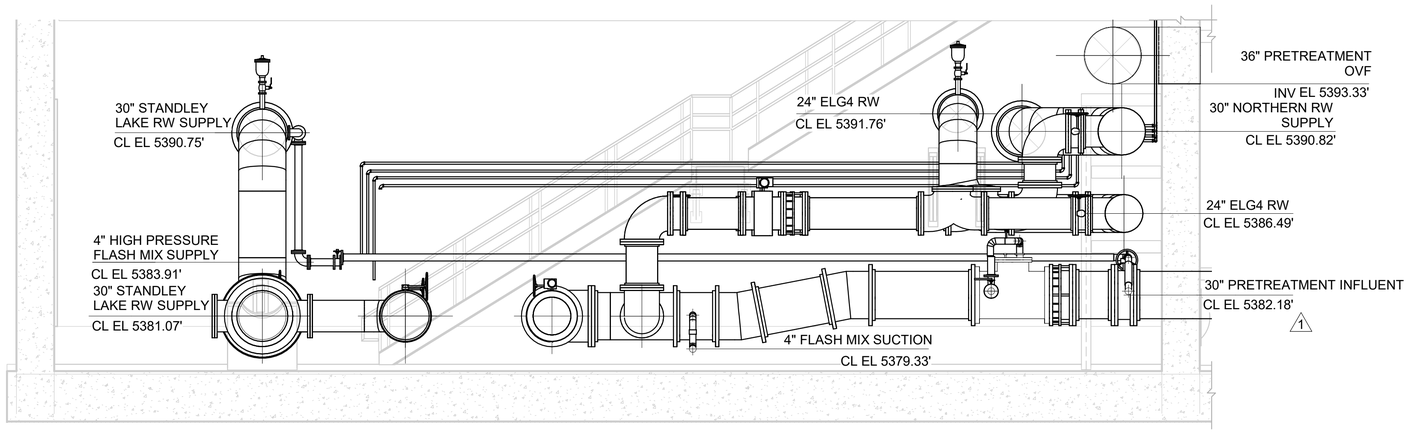
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECTION** A D203

0 2' 4' 8'

SCALE IN FEET

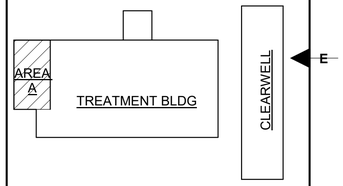



**SECTION** B D203

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** C. CALTAGIRONE |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS I

| | |
|---|---|
| **project** 98101 | **contract** |

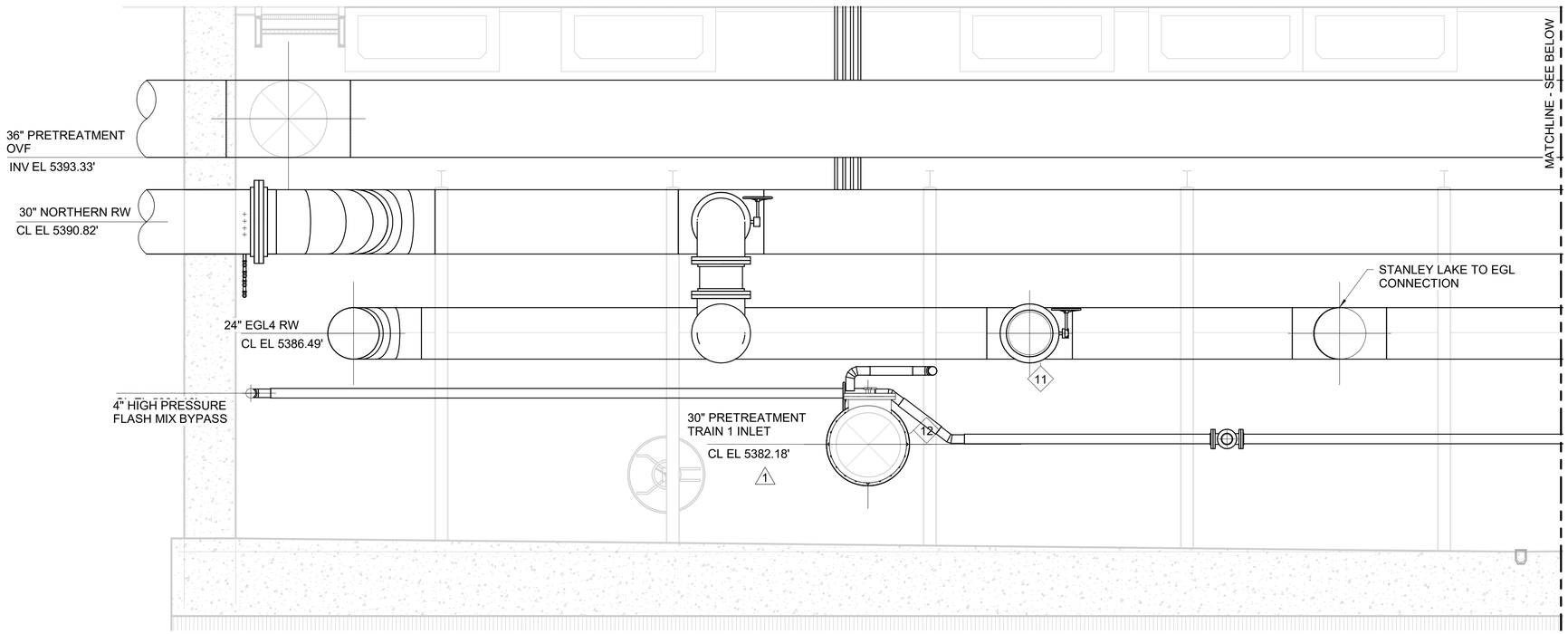
**drawing** **D222 — 1** **rev.**

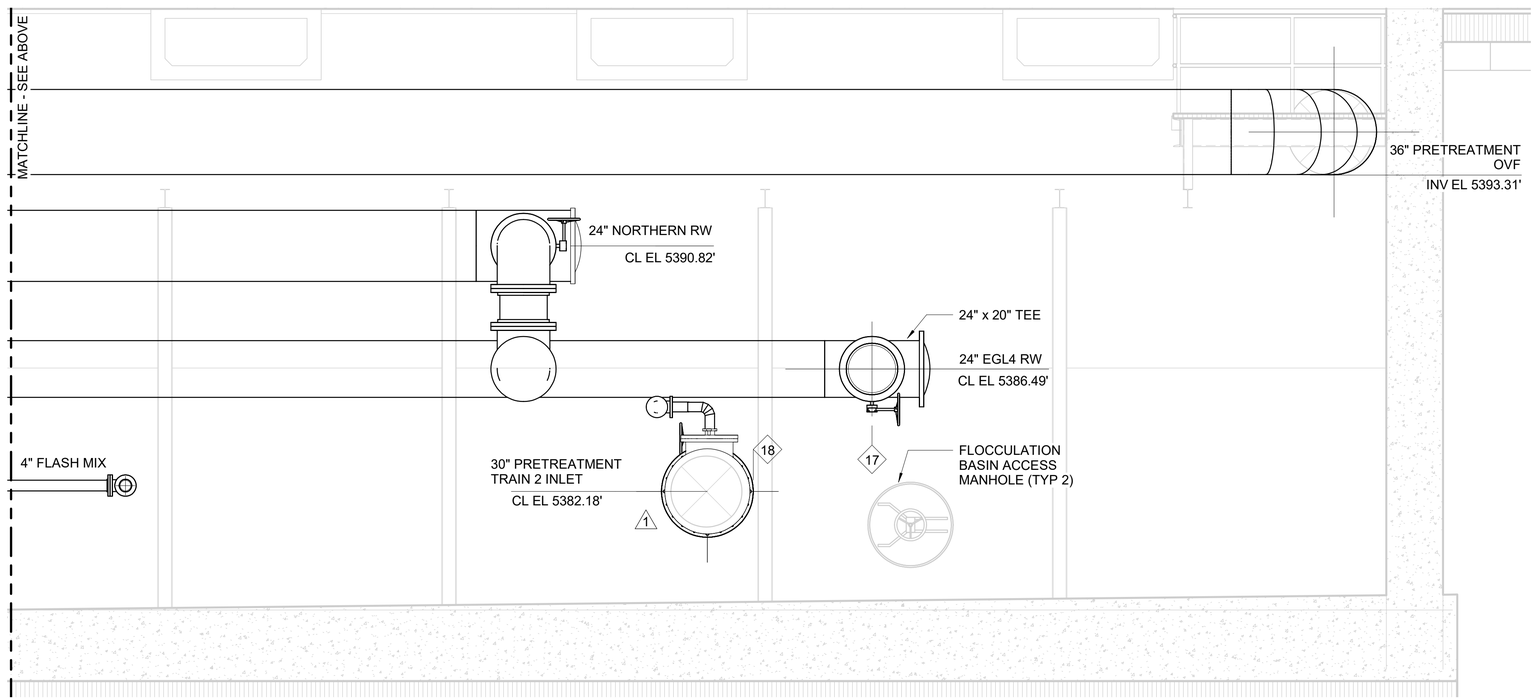
**sheet** 275 **of** 542 **sheets**

**file** 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

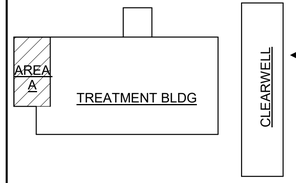



SECTION A / D203

0 2' 4' 6'

SCALE IN FEET




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS II

| project | contract |
|---|---|
| 98101 | |

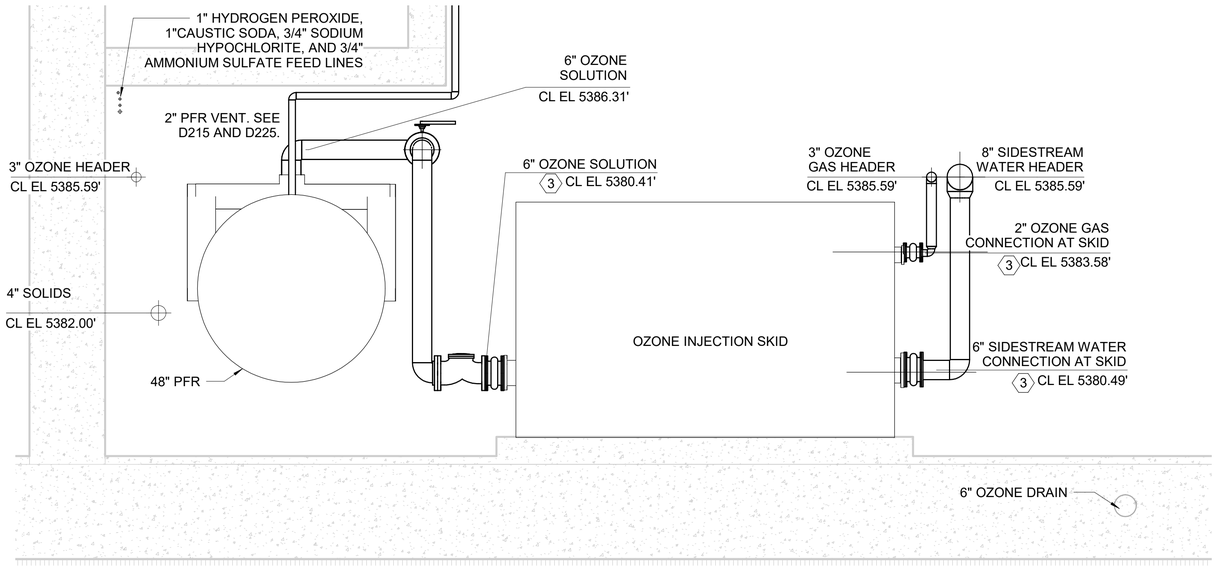
drawing **D223 — 1** rev.

sheet 276 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

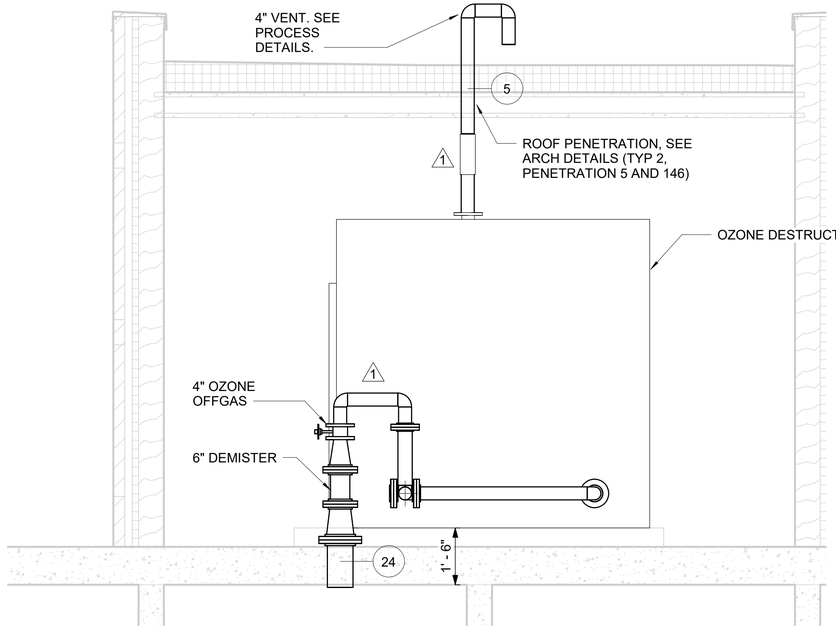
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECTION** B D204

0 1' 2' 4'

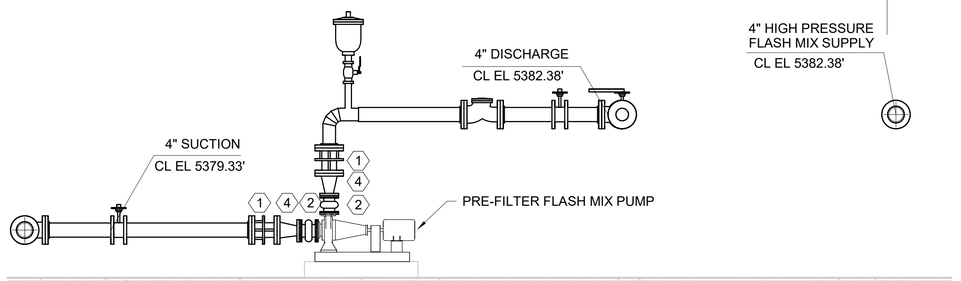
SCALE IN FEET




**SECTION** C D206

0 1' 2' 4'

SCALE IN FEET




**SECTION** A D203

0 1' 2' 4'

SCALE IN FEET

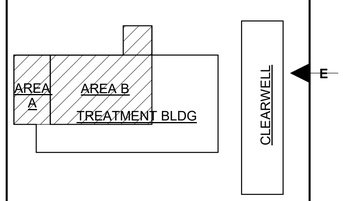
KEYED NOTES:

1. 4" DISMANTLING JOINT. (TYP ALL PRETREATMENT FLASH MIX PUMPS)
2. EXPANSION JOINT, MATCH PUMP CONNECTION SIZE. (TYP ALL PRETREATMENT FLASH MIX PUMPS)
3. VERIFY OZONE INJECTION SKID CONNECTION ELEVATIONS WITH OSS.
4. REDUCER. COORDINATE WITH PUMP MANUFACTURER FOR SIZING.

NOTES:

1. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL SEAL COMPLETELY AND ALLOW NO GAS TO ESCAPE. ALL EXPANSION JOINT MATERIALS SHALL BE OZONE COMPATIBLE.
2. FIBERGLASS INSULATION SHALL BE USED ON OZONE OFF-GAS PIPING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS III

| project | contract |
|---|---|
| 98101 | |

drawing **D224 — 1** rev.

sheet 277 of 542 sheets

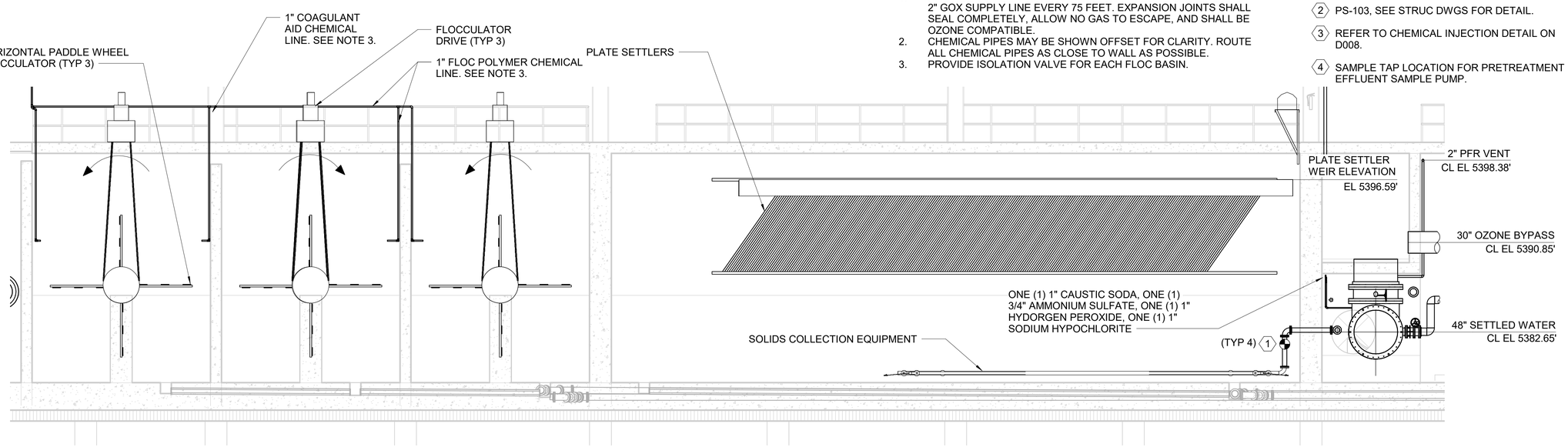
file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

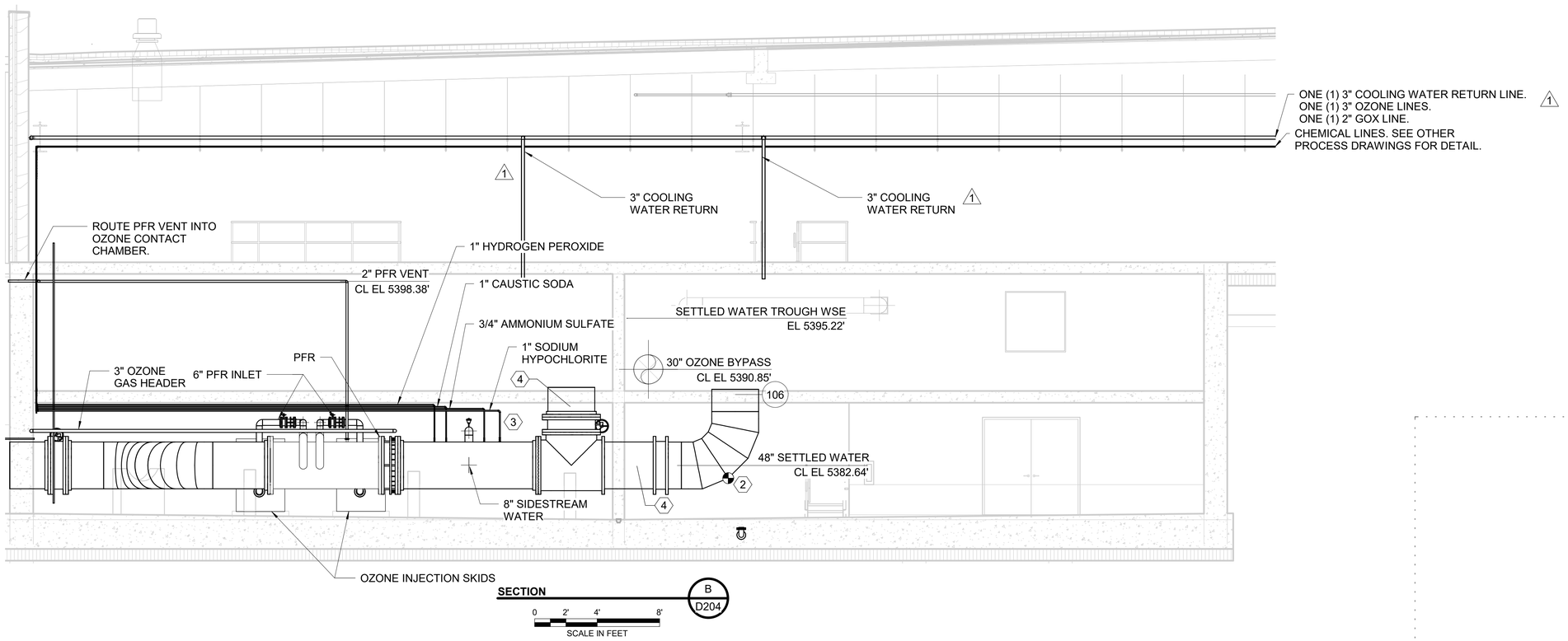
NOTES:
1. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOINTS SHALL SEAL COMPLETELY, ALLOW NO GAS TO ESCAPE, AND SHALL BE OZONE COMPATIBLE.
2. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.
3. PROVIDE ISOLATION VALVE FOR EACH FLOC BASIN.

KEYED NOTES
1. PS-6, SEE STRUC DWGS FOR DETAIL.
2. PS-103, SEE STRUC DWGS FOR DETAIL.
3. REFER TO CHEMICAL INJECTION DETAIL ON D008.
4. SAMPLE TAP LOCATION FOR PRETREATMENT EFFLUENT SAMPLE PUMP.




SECTION A D204

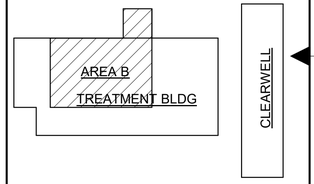
0 2' 4' 8'
SCALE IN FEET




SECTION B D204

0 2' 4' 8'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
SECTIONS IV

| project | contract |
|---|---|
| 98101 | |

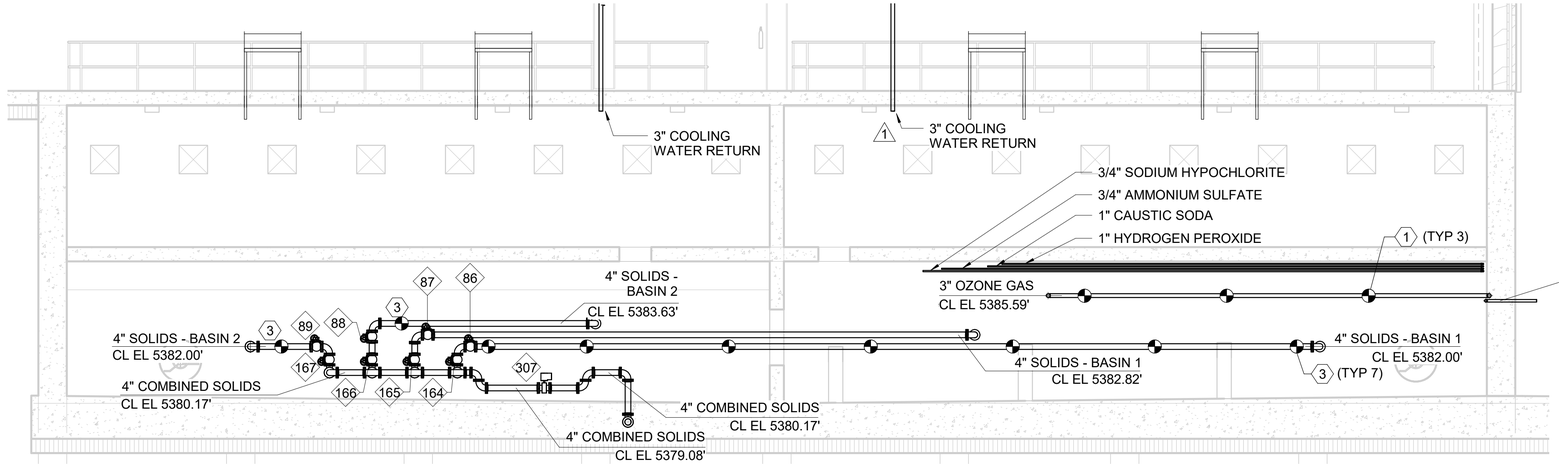
drawing D225 — 1 rev.

sheet 278 of 542 sheets

file 98101_D

Millimeters
Inches
Scale For Microfilming

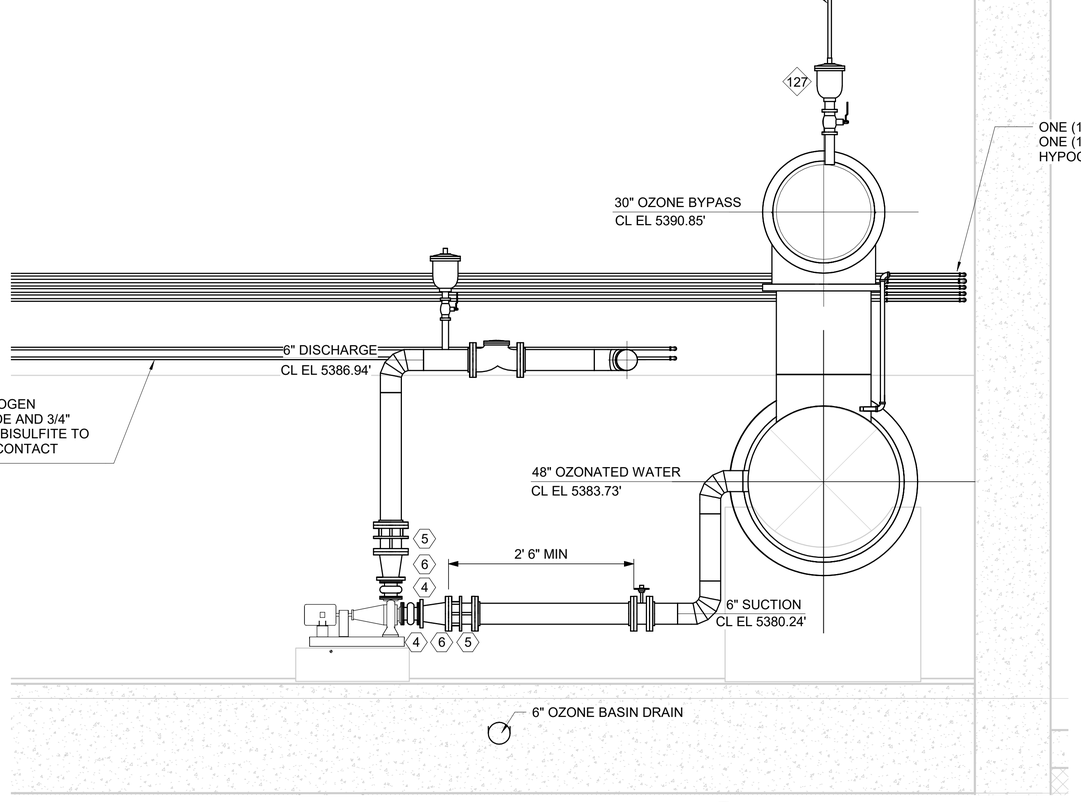
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECTION** A D204

0 2' 4' 8'

SCALE IN FEET




**SECTION** B D204

0 1' 2' 4'

SCALE IN FEET

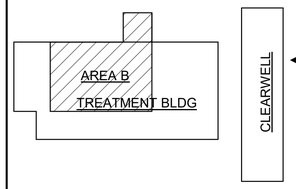
KEYED NOTES:

1. PS-5, SEE STRUC DWGS FOR DETAILS.
2. PS-7, SEE STRUC DWGS FOR DETAILS.
3. PS-101, SEE STRUC DWGS FOR DETAILS.
4. EXPANSION JOINT. COORDINATE WITH PUMP MANUFACTURER FOR SIZING.
5. 6" DISMANTLING JOINT.
6. REDUCER. COORDINATE WITH PUMP MANUFACTURER FOR SIZING.

NOTES:

1. PROVIDE SST EXPANSION JOINTS ON 3" OZONE GAS LINE AND 2" GOX SUPPLY LINE EVERY 75 FEET. EXPANSION JOITNS SHALL SEAL COMPLETELY, ALLOW NO GAS TO ESCAPE, AND SHALL BE OZONE COMPATIBLE.
2. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
3. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

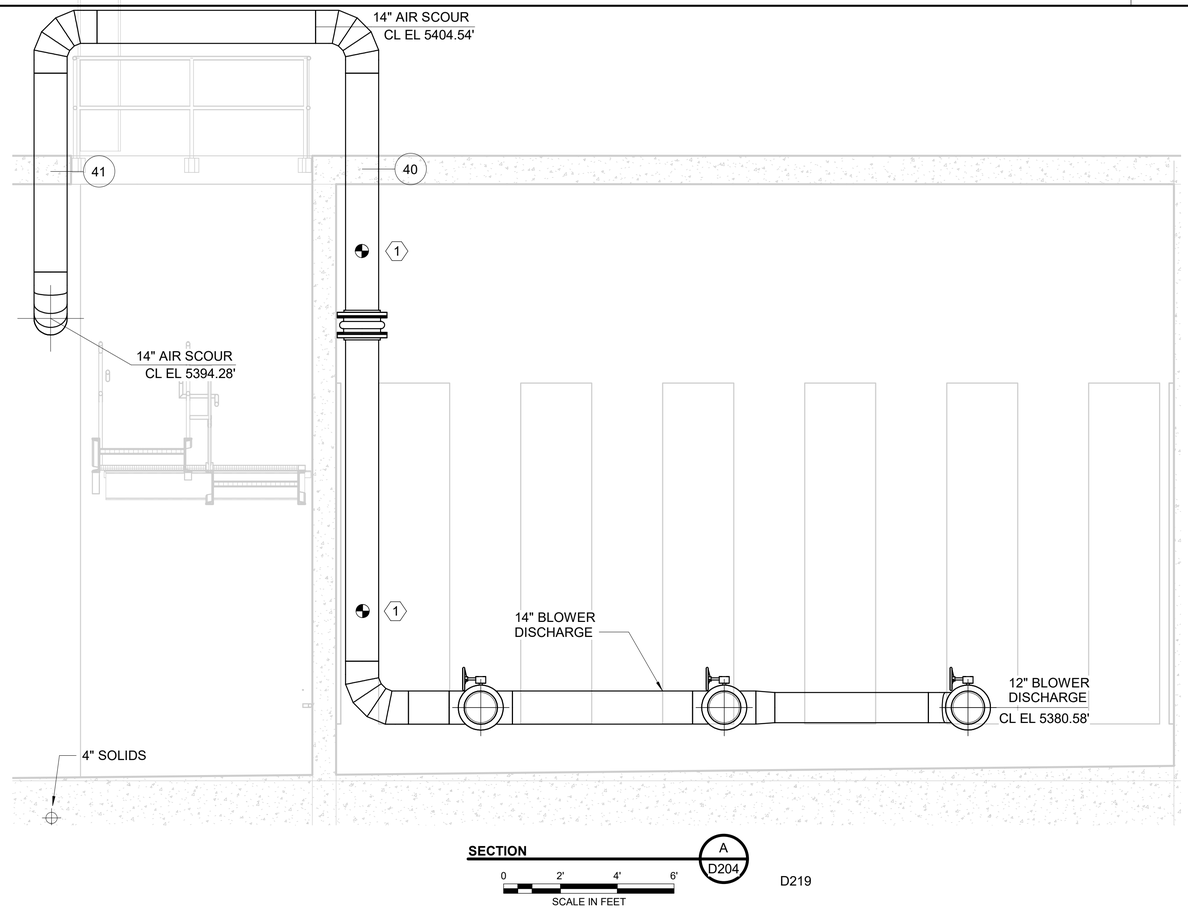
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS V

| | |
|---|---|
| project 98101 | contract |
| drawing **D226 — 1** | rev. |
| sheet 279 of 542 sheets | |
| file 98101_D | |

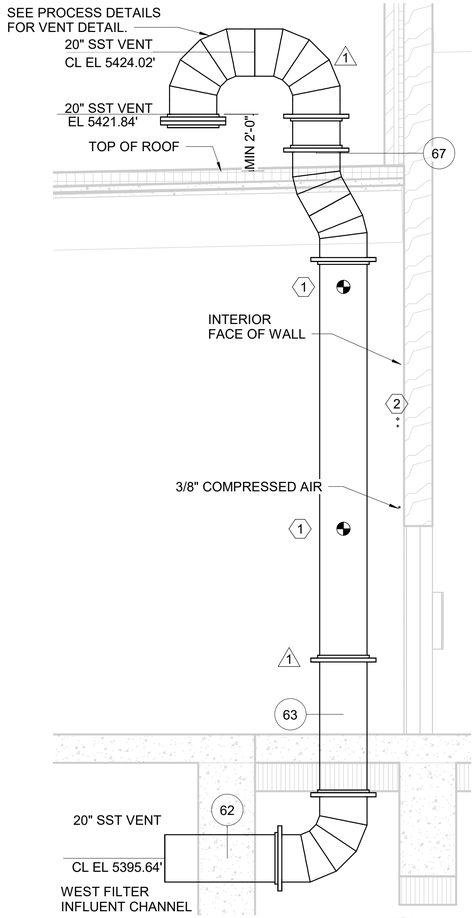
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




SECTION A D204

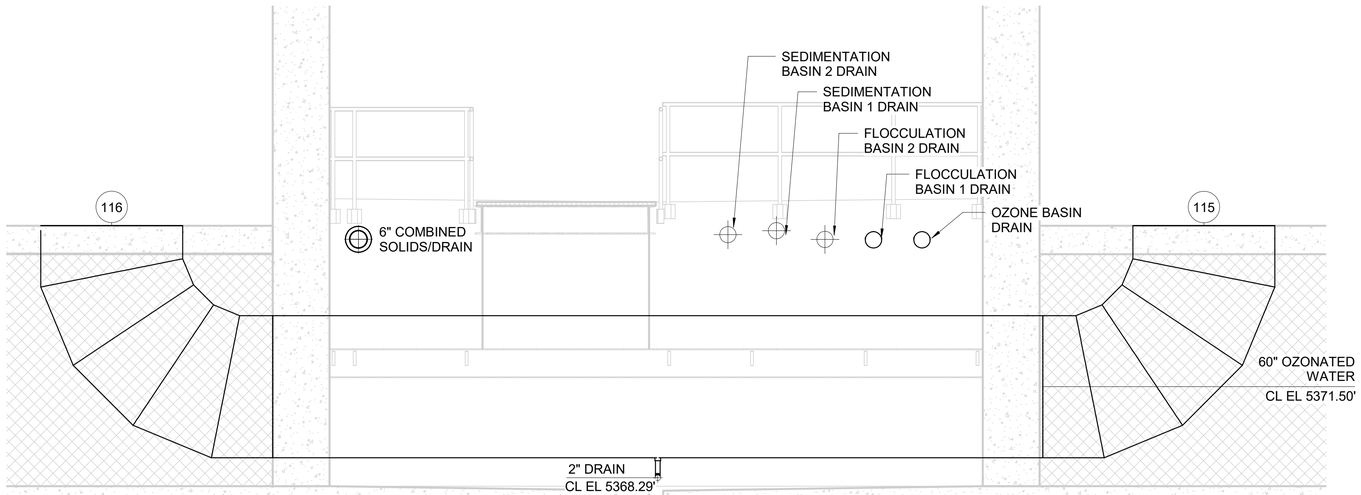
D219




SECTION C D207

KEYED NOTES:

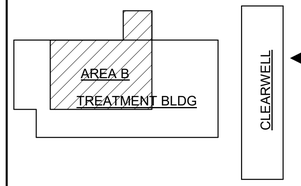
1. PS-9, SEE STRUC DWGS FOR DETAIL.
2. ONE (1) 3/4" PHOSPHORIC ACID CHEMICAL LINE. ONE (1) SODIUM BISULFITE CHEMICAL LINE.




SECTION B D214

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VI

| project | contract |
|---|---|
| 98101 | |

drawing **D227 — 1** rev.

sheet 280 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

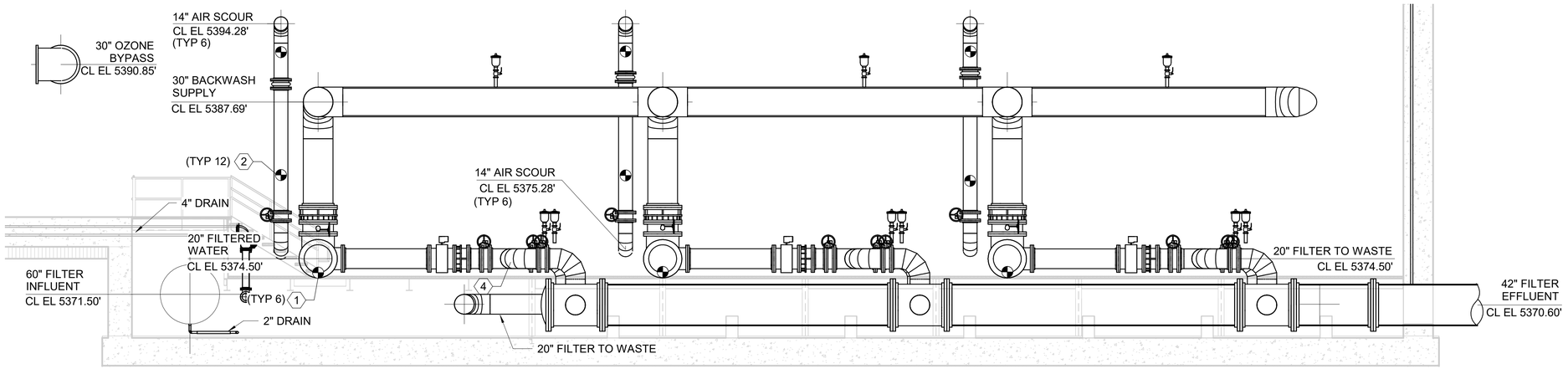
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:
1. SECTIONS ARE REPRESENTATIVE OF BOTH THE EAST AND WEST FILTERS.

KEYED NOTES:

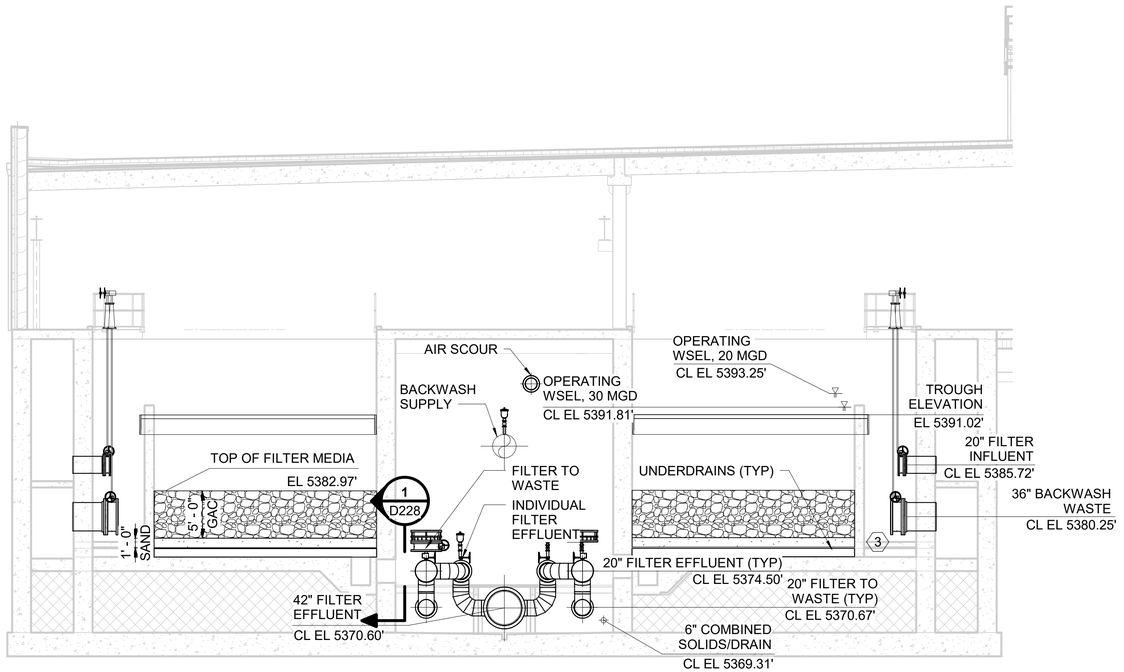
1. PS-2, SEE STRUC DWGS FOR DETAILS.
2. PS-9, SEE STRUC DWGS FOR DETAILS.
3. GROUT FILTER GULLET TO SLOPE TOWARDS 36" BACKWASH WASTE VALVE (TYP ALL FILTERS). GROUT OVERFLOW CELL TO SLOPE TO OVERFLOW PIPE (TYP ALL FILTERS).
4. INSTALL 2" NPT TAP DRAIN CONNECTION WITH BV AT BOTTOM OF TEE (TYP ALL FILTERS).

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |



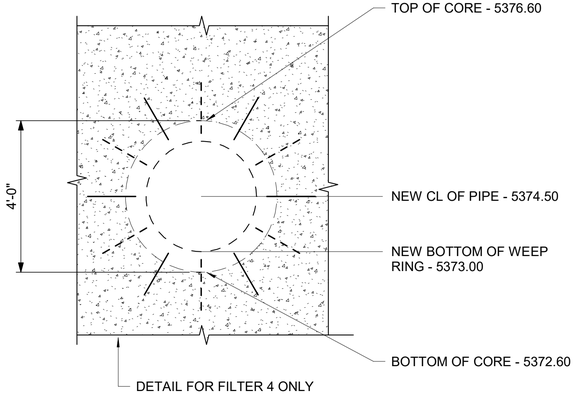

SECTION A D205

SCALE IN FEET




SECTION B D205

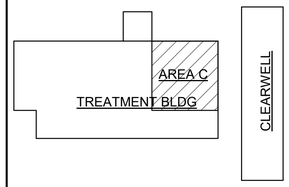
SCALE IN FEET




DETAIL FOR FILTER 4 ONLY

1 SECTION 1 D228

NOT TO SCALE




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed C. CALTAGIRONE |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VII

| | |
|---|---|
| project 98101 | contract |
| drawing **D228 — 1** | rev. |
| sheet 281 of 542 sheets | |
| file 98101_D | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

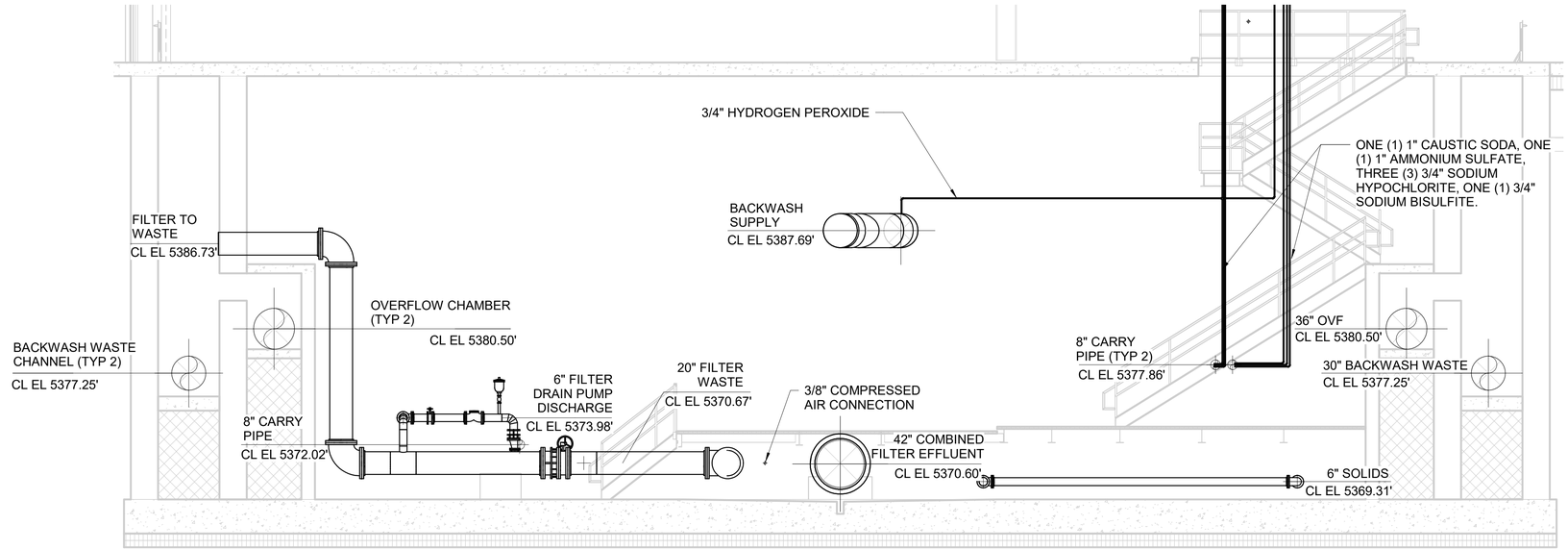
NOTES:

1. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS WHERE POSSIBLE. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.
2. CHEMICAL PIPES MAY BE SHOWN OFFSET FOR CLARITY. ROUTE ALL CHEMICAL PIPES AS CLOSE TO WALL AS POSSIBLE.

KEYED NOTES

(1) PS-1, SEE STRUC DWGS FOR DETAILS.

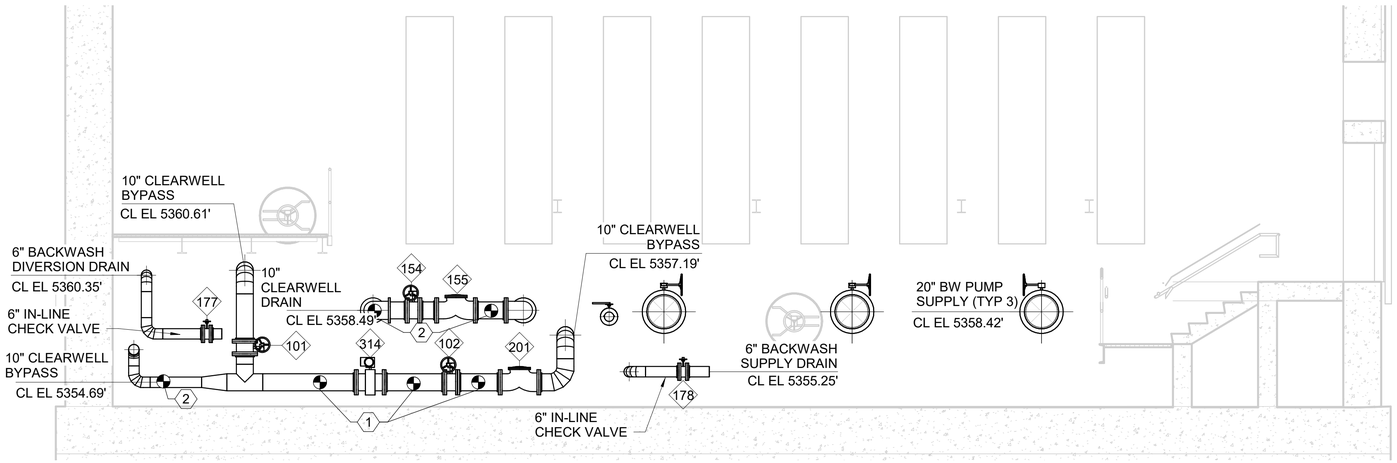
(2) PS-8, SEE STRUC DWGS FOR DETAILS.




SECTION A D205

0 2' 4' 8'

SCALE IN FEET

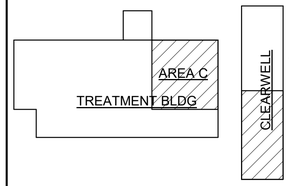



SECTION B D212

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS VIII

| project | contract |
|---|---|
| 98101 | |

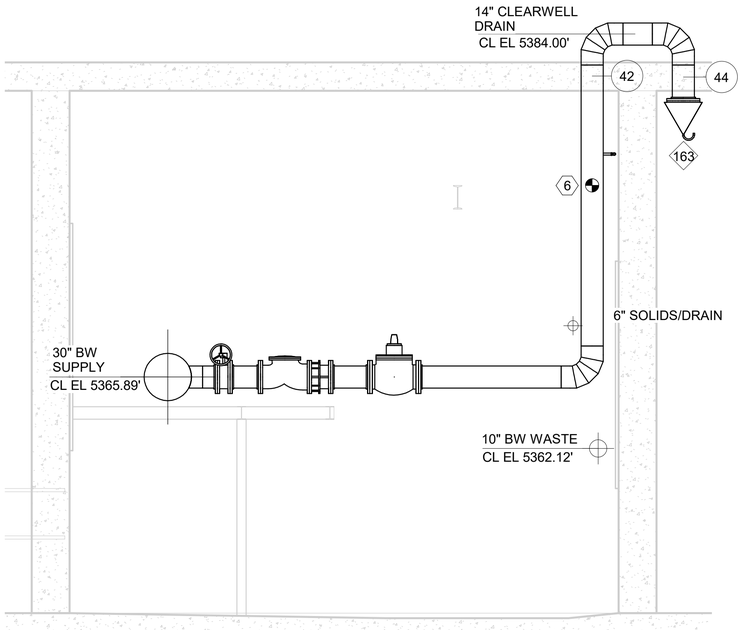
drawing **D229 — 0** rev.

sheet 282 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

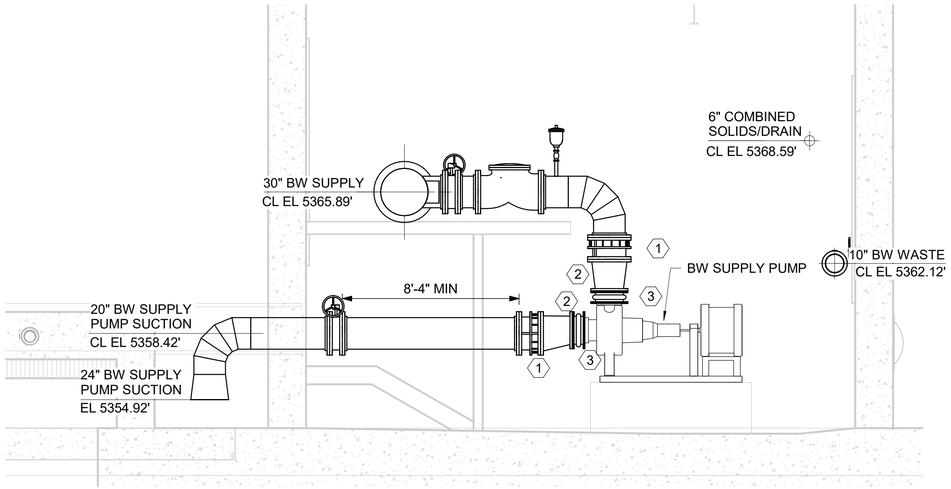
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




SECTION A D212

0 2' 4' 8'

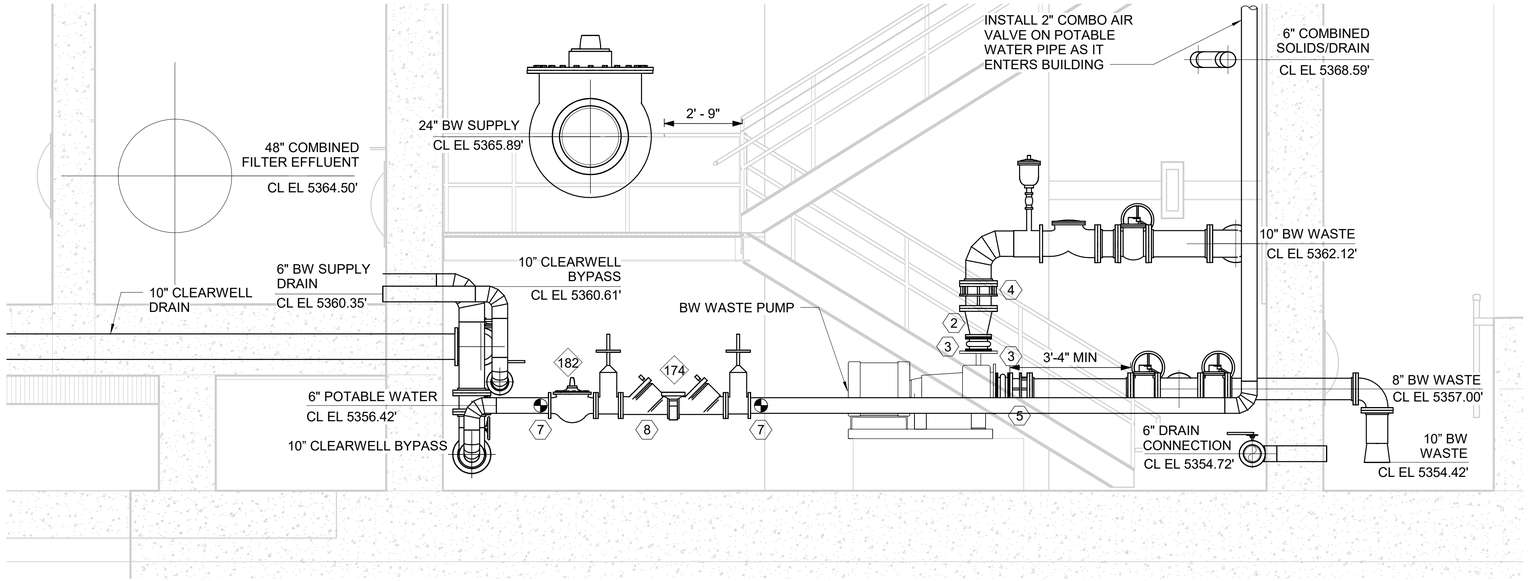
SCALE IN FEET




SECTION B D212

0 2' 4' 8'

SCALE IN FEET




SECTION C D212

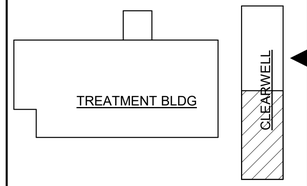
0 2' 4' 6'

SCALE IN FEET

KEYED NOTES:

1. 20" DISMANTLING JOINT.
2. REDUCER, COORDINATE SIZE WITH PUMP MANUFACTURER.
3. EXPANSION JOINT. COORDINATE SIZE WITH PUMP MANUFACTURER.
4. 10" DISMANTLING JOINT.
5. 8" DISMANTLING JOINT.
6. PS-9, SEE STRUC DWGS FOR DETAIL.
7. PS-8. SEE STRUC DWGS FOR DETAIL.
8. ROUTE BACKFLOW PREVENTOR DRAIN TO SUMP.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** C. CALTAGIRONE |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS IX

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** D230 **rev.** 0

**sheet** 283 **of** 542 **sheets**

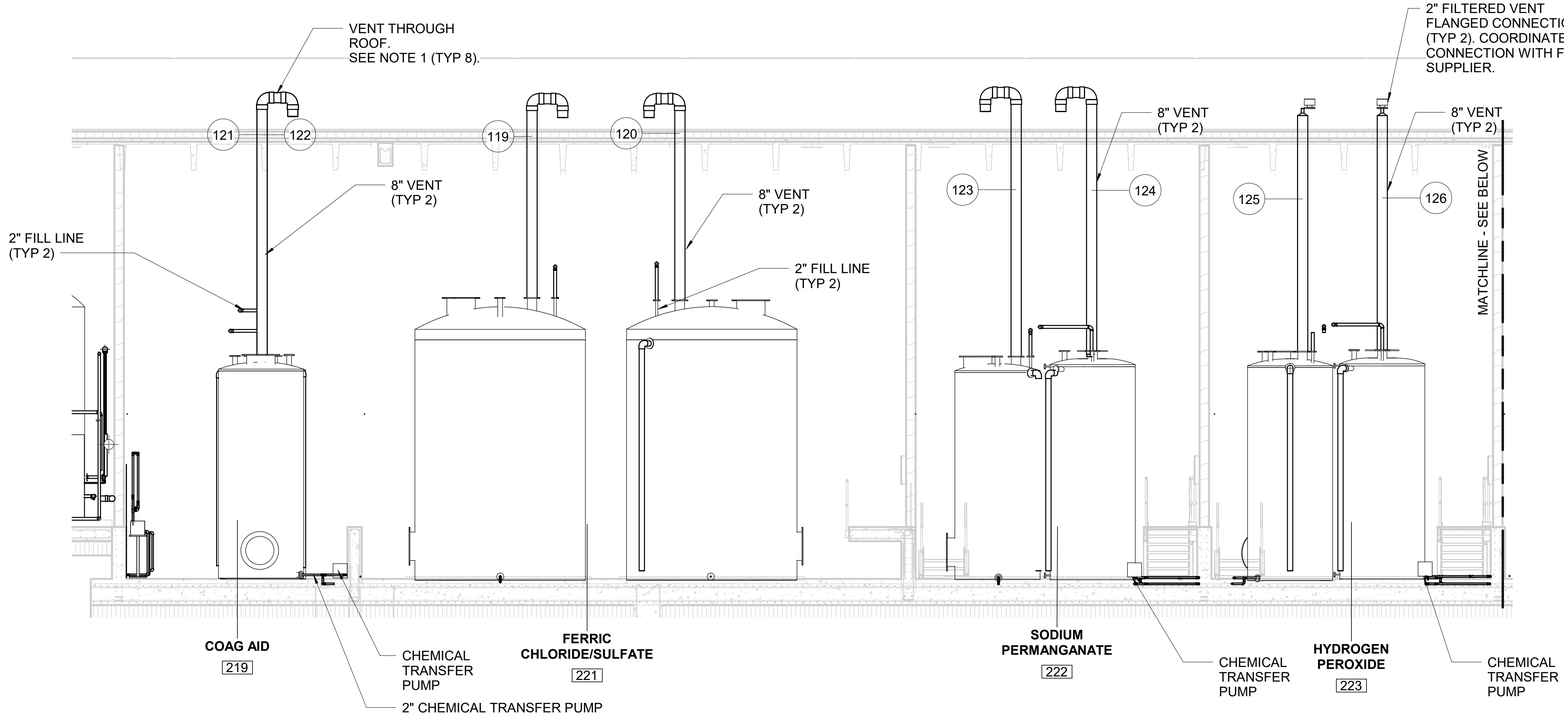
**file** 98101_D

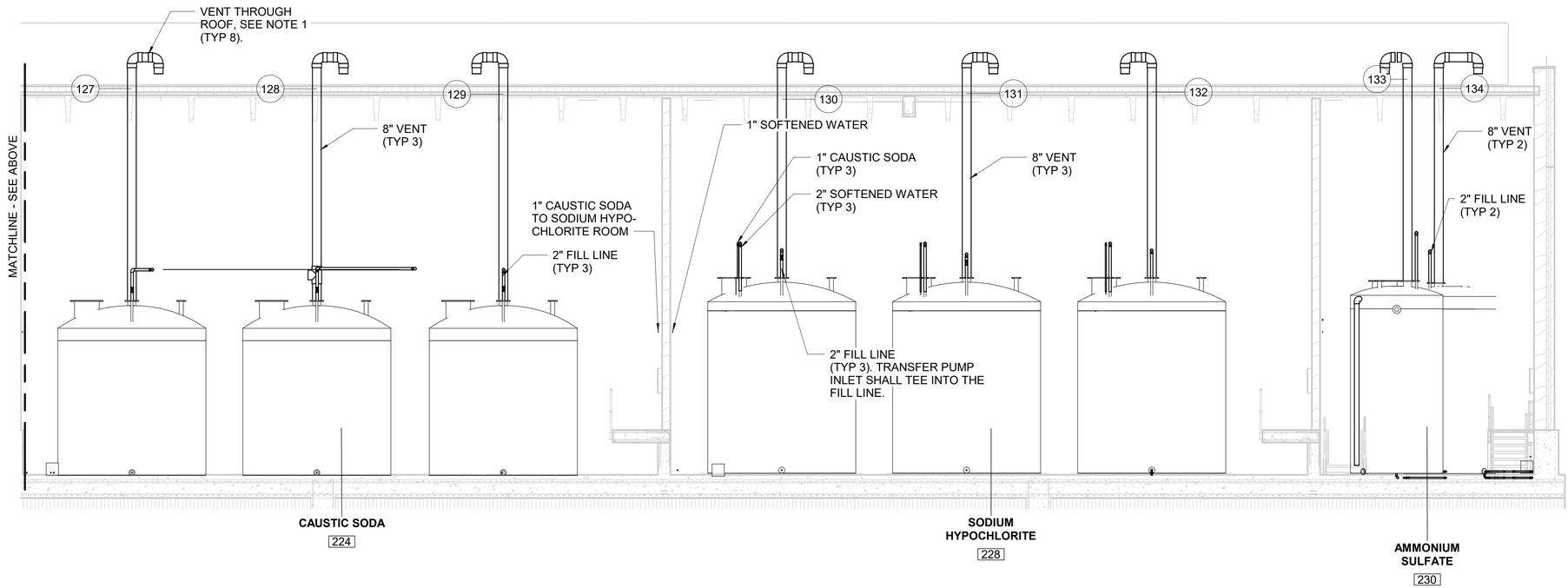
Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




SECTION A / D220

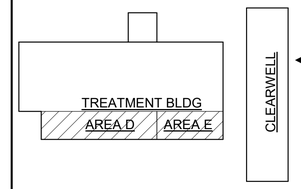
0 2' 4' 8'

SCALE IN FEET

NOTES:

1. VENTS FOR ALL CHEMICALS VENT THOUGH ROOF. SEE VENT DETAIL ON D009.
2. AVOID PLACING CHEMICAL LINE FITTINGS OVER DOORWAYS AND WALKWAYS. SPACE CHEMICAL LINES 4" CENTER TO CENTER WHERE POSSIBLE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
SECTIONS X

| project | contract |
|---|---|
| 98101 | |

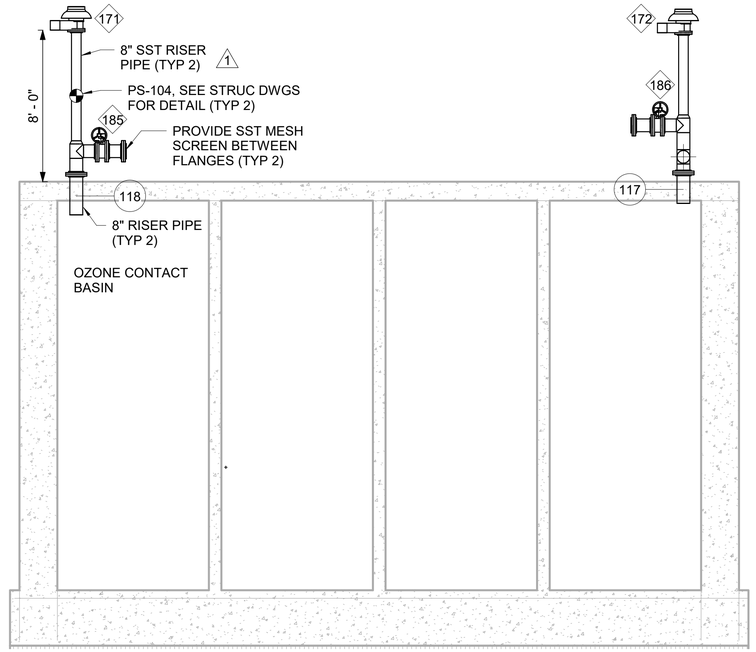
drawing D231 — 1 rev.

sheet 284 of 542 sheets

file 98101_D

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

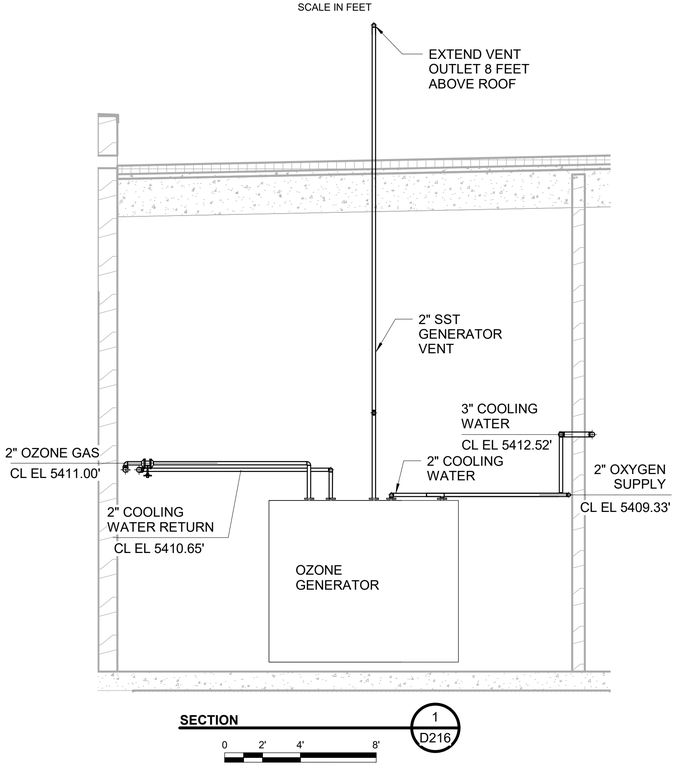
Scale For Microfilming
Millimeters
Inches




**SECTION** C D204 D206

0 2' 4' 8'

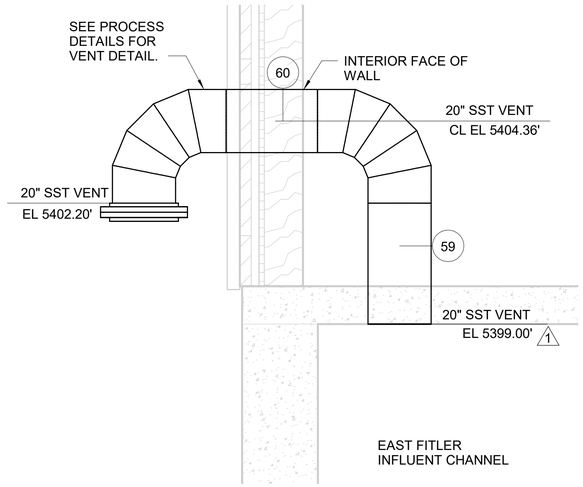
SCALE IN FEET




**SECTION** 1 D216

0 2' 4' 8'

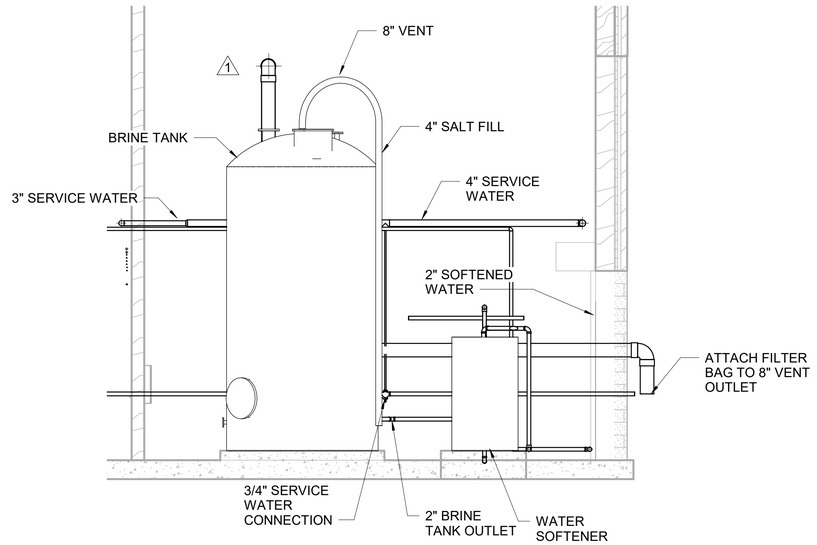
SCALE IN FEET




**SECTION** A D207

0 1' 2' 4'

SCALE IN FEET

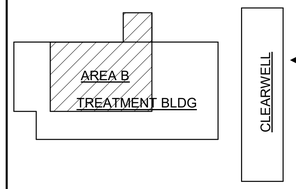



**SECTION** 2 D208

0 2' 4' 8'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECTIONS XI

| project | contract |
|---|---|
| 98101 | |

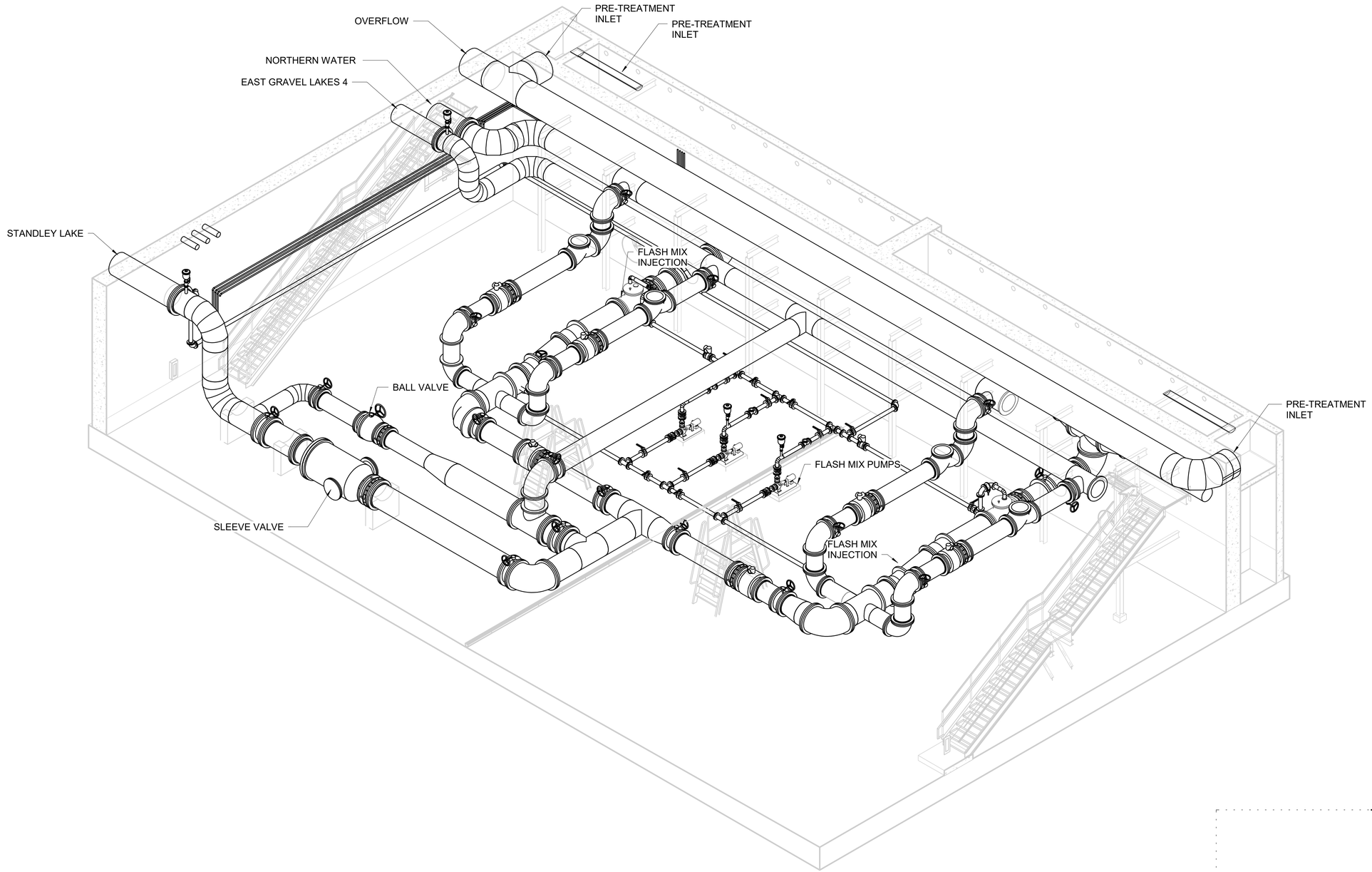
drawing **D232 — 1** rev.

sheet 285 of 542 sheets

file 98101_D

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




INLET PIPE GALLERY ISOMETRIC - SOUTHEAST FACING

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |

AREA A — TREATMENT BLDG

CLEARWELL

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS ISOMETRIC VIEWS I

| project | contract |
|---|---|
| 98101 | |

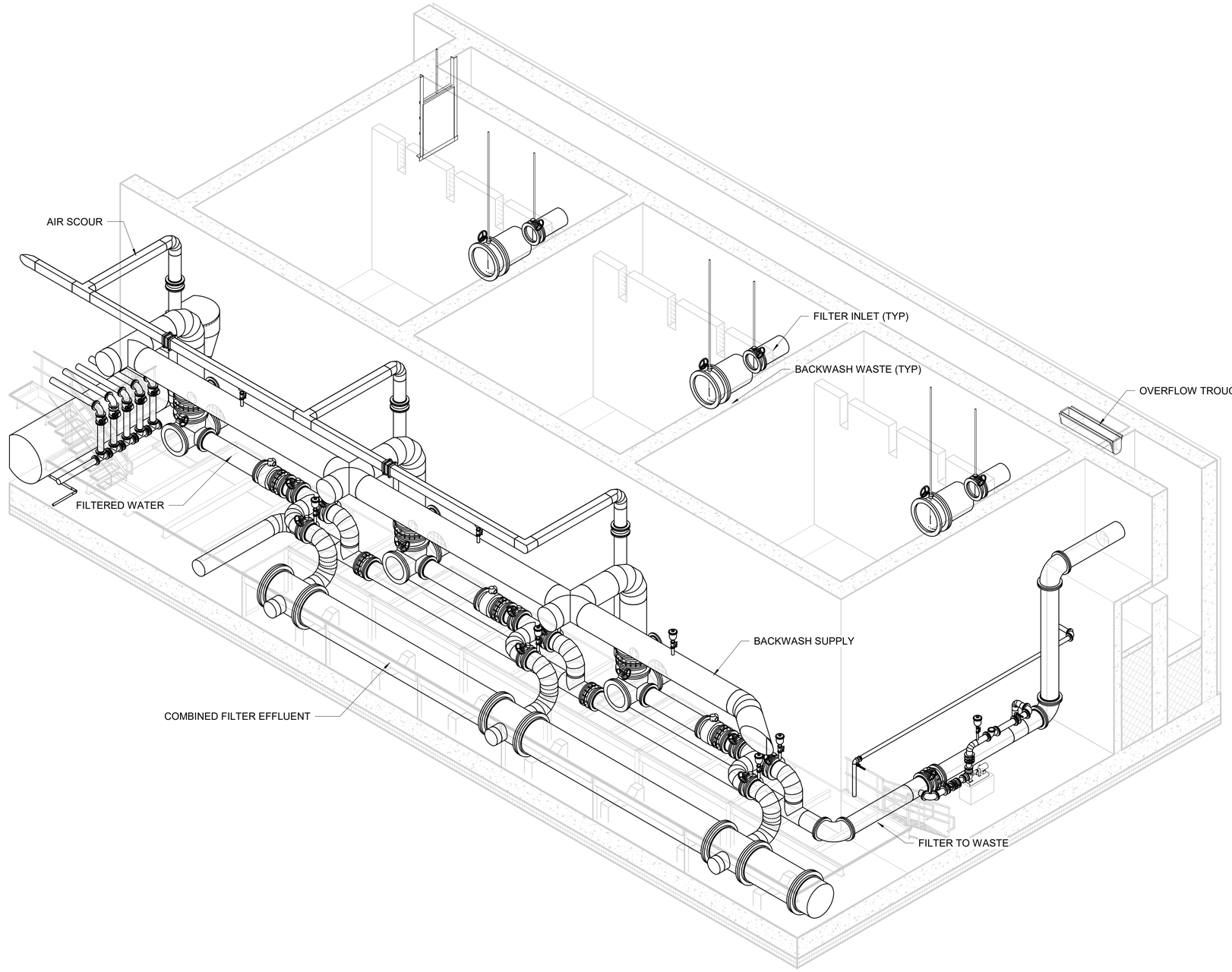
**drawing** D233 — **rev.** 0

**sheet** 286 **of** 542 **sheets**

**file** 98101_D

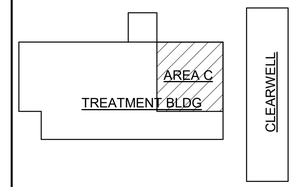
Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




FILTER GALLERY ISOMETRIC - NORTHEAST FACING

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | C. CALTAGIRONE |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS ISOMETRIC VIEWS II

| project | contract |
|---|---|
| 98101 | |

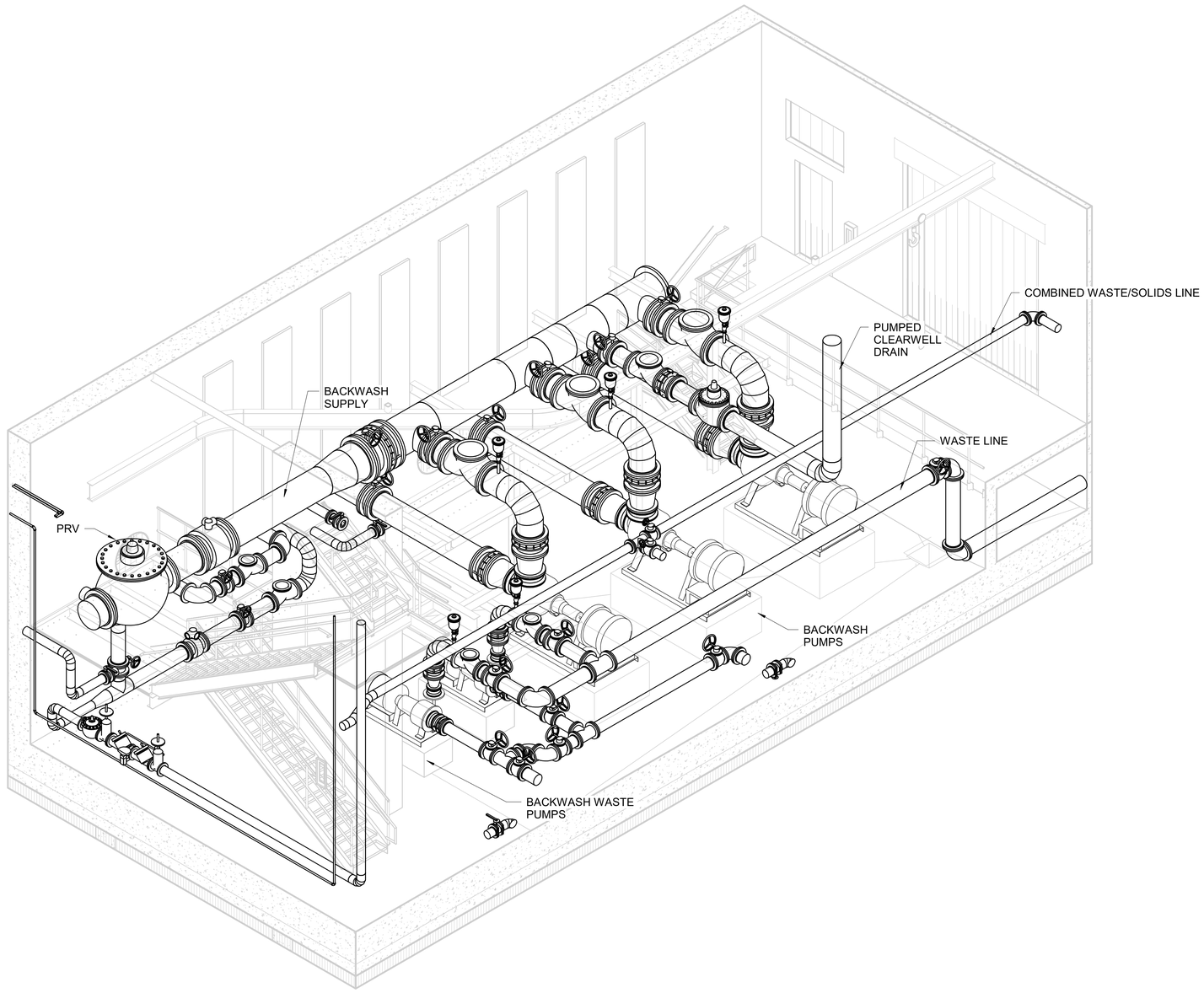
drawing **D234 — 0** rev.

sheet 287 of 542 sheets

file 98101_D

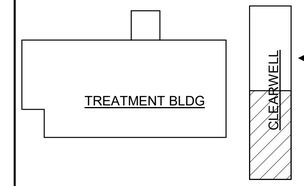
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Inches
Millimeters




BACKWASH PUMP STATION ISOMETRIC - SOUTHEAST FACING

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | LG | EH | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** C. CALTAGIRONE |
| **designed** J. SCHAEFER | **checked** A. BEESON |

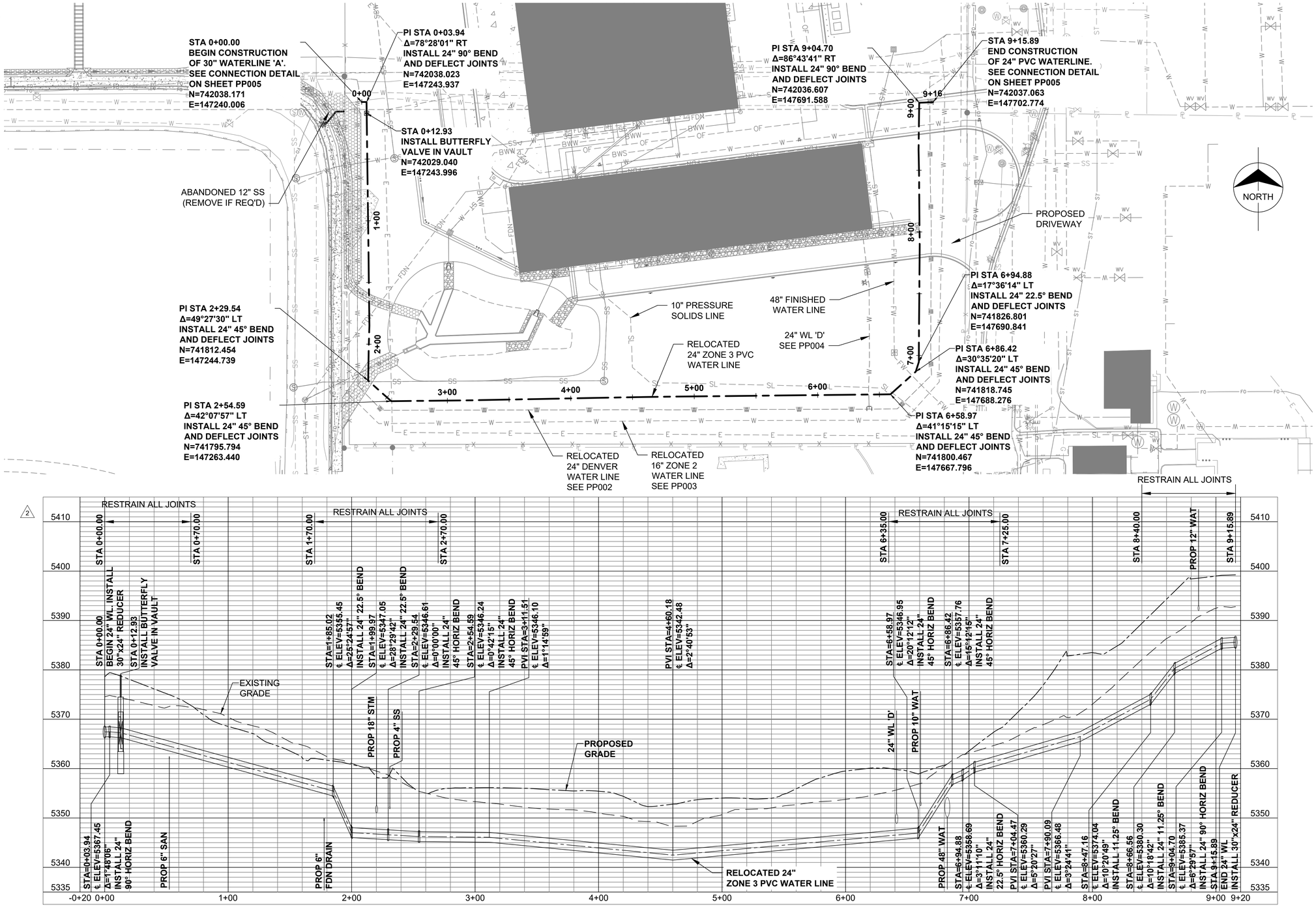
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS ISOMETRIC VIEWS III

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** D235 | **rev.** 0 |
| **sheet** 288 **of** 542 **sheets** | |
| **file** 98101_D | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**NOTES:**

1. **PIPE JOINT DEFLECTIONS SHALL NOT EXCEED 1-DEGREE.**
2. **EXCAVATIONS MAY ENCOUNTER ASBESTOS-CONTAINING SOILS.**

SCALE IN FEET: 0 20' 40' 80'

SCALE IN FEET: 0 5' 10'

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 4/25/18 | DK | JS | WP1 CHANGE ORDER REQUEST 1 |
| 2 | 4/26/20 | DK | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed M. SANDOVAL |
| designed D. KAHLICH | checked K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 1**
24" PVC WATERLINE
ZONE 3 RE-ROUTE

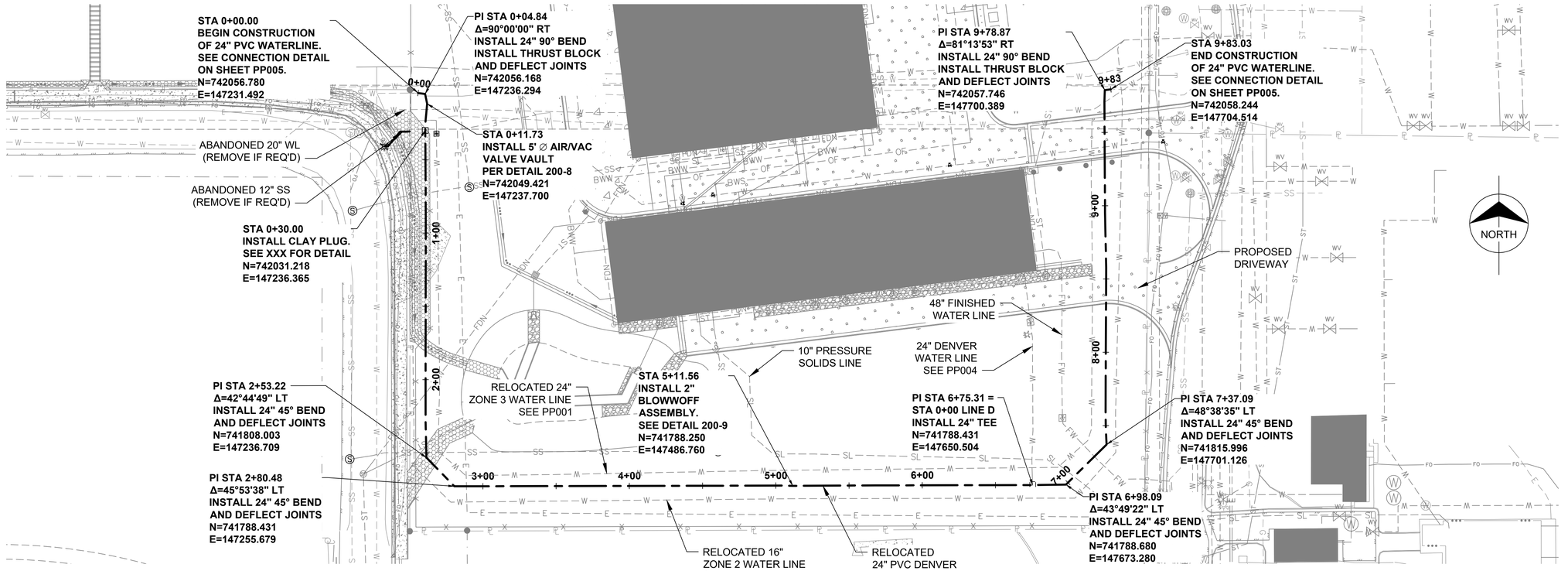
| | |
|---|---|
| project 98101 | contract |
| drawing **PP001** | rev. **2** |
| sheet 289 of 542 sheets | |
| file 98101_WL-PP1.DWG | |

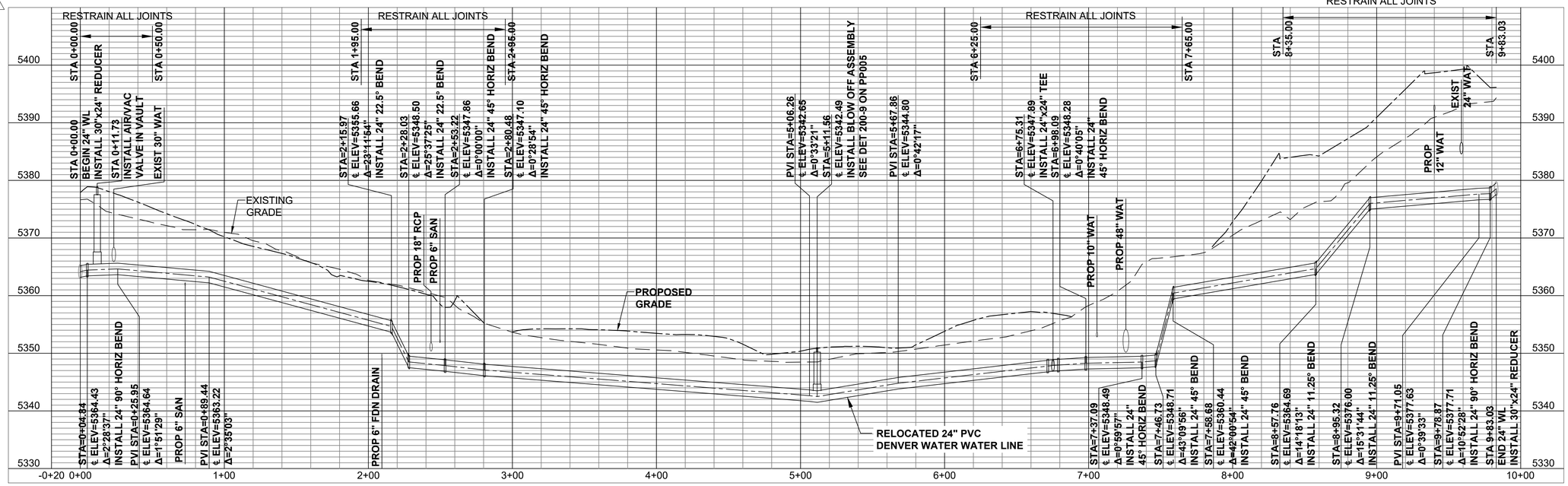
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

Scale For Microfilming
Millimeters
Inches

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 4/26/20 | DK | JS | CONFORMING TO CONSTRUCTION RECORDS |




**NOTES:**

1. **PIPE JOINT DEFLECTIONS SHALL NOT EXCEED 1-DEGREE.**
2. **EXCAVATIONS MAY ENCOUNTER ASBESTOS-CONTAINING SOILS.**

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\WATERLINE\98101_WL-PP2.DWG 4/8/2021 6:26 AM KWEISS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| D. KAHLICH | K. HENSKE |

City of Thornton

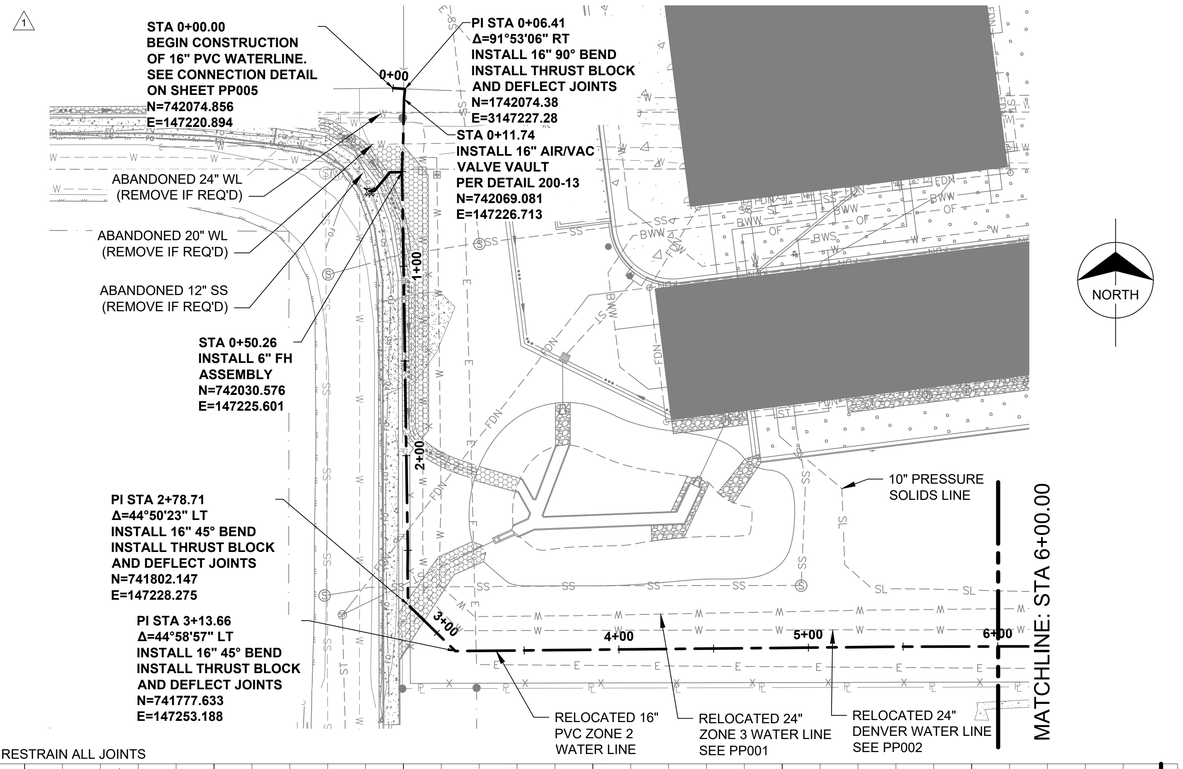
**CITY OF THORNTON**
**TTP - PACKAGE 1**
24" PVC WATERLINE
DENVER WATER RE-ROUTE

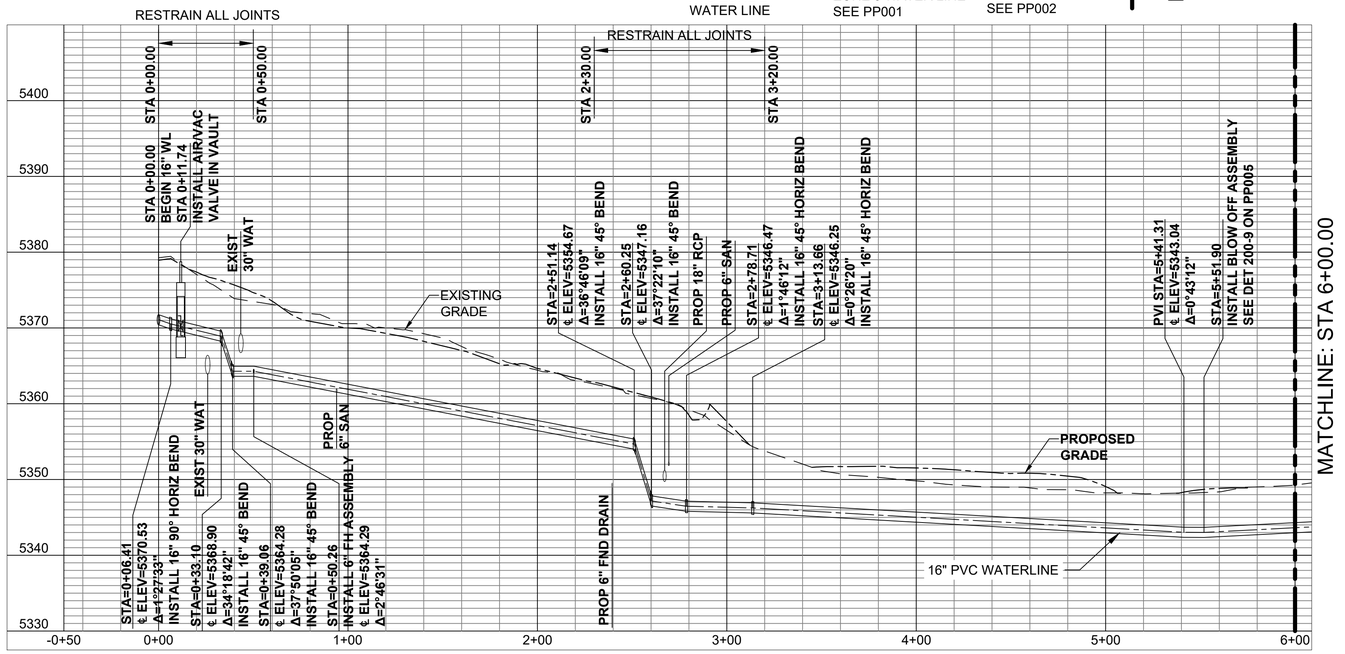
| project | contract |
|---|---|
| 98101 | |

**drawing** **PP002 – 1** **rev.**

**sheet** 290 **of** 542 sheets

**file** 98101_WL-PP2.DWG




**NOTES:**

1. **PIPE JOINT DEFLECTIONS SHALL NOT EXCEED 1-DEGREE.**
2. **EXCAVATIONS MAY ENCOUNTER ASBESTOS-CONTAINING SOILS.**

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DK | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| D. KAHLICH | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 1**
16" PVC WATERLINE
ZONE 2 RE-ROUTE

| project | contract |
|---|---|
| 98101 | |

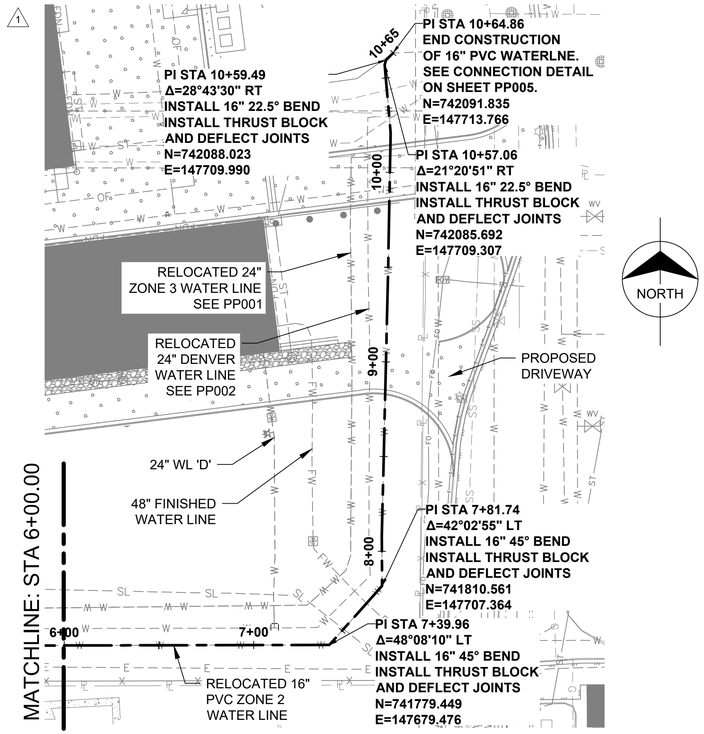
drawing **PP003** – rev. **1**

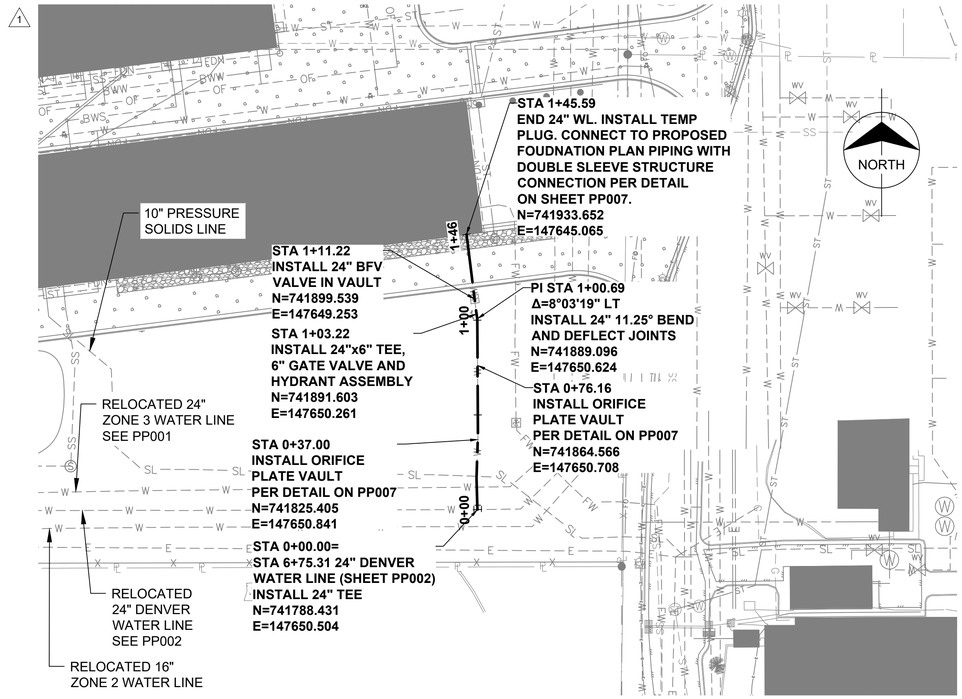
sheet 291 of 542 sheets

file 98101_WL-PP3.DWG

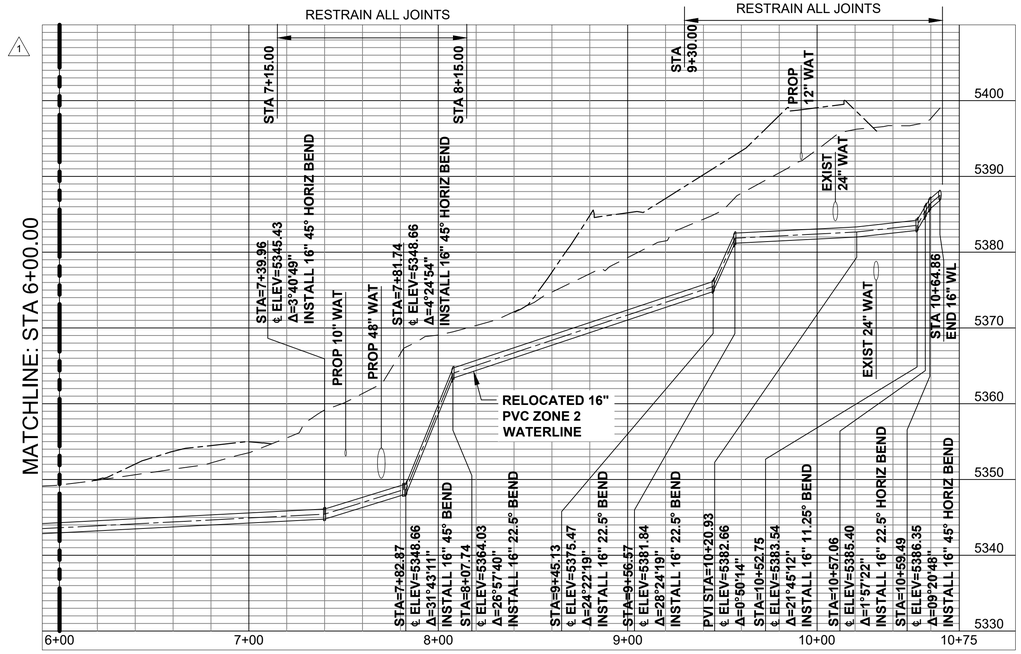
Scale For Microfilming
Millimeters
Inches

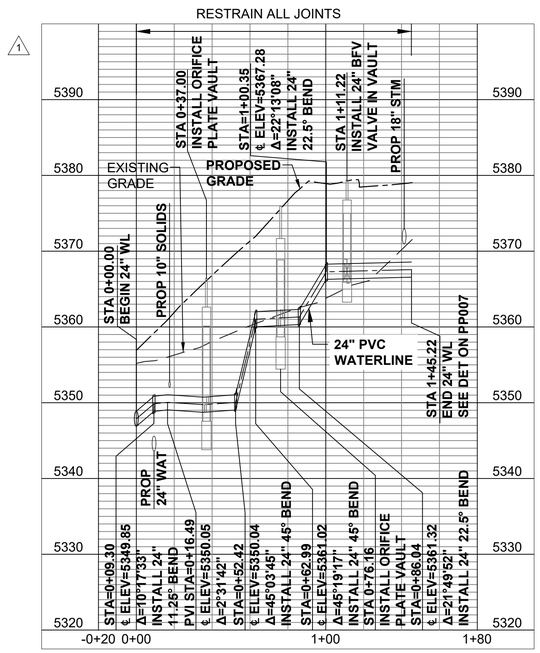
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**24" DENVER WATER - FEED LINE TO NEW CLEARWELL**




**24" DENVER WATER - FEED LINE TO NEW CLEARWELL**

**NOTES:**

1. **PIPE JOINT DEFLECTIONS SHALL NOT EXCEED 1-DEGREE.**
2. **EXCAVATIONS MAY ENCOUNTER ASBESTOS-CONTAINING SOILS.**

0 20' 40' 80'
SCALE IN FEET

0 5' 10'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | DK | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| D. KAHLICH | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 1**
16" & 24" PVC WATERLINE
ZONE 2 & DENVER WATER RE-ROUTE

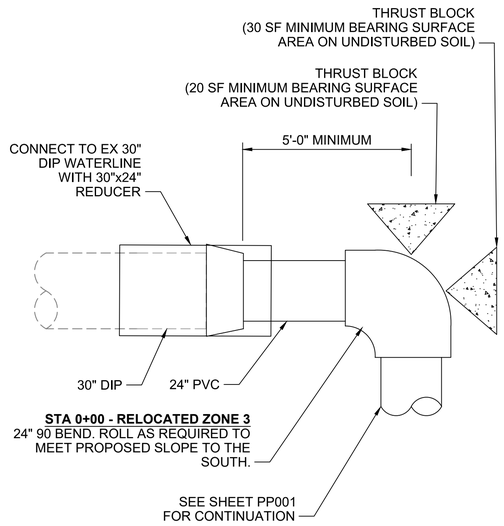
| project | contract |
|---|---|
| 98101 | |

drawing **PP004** rev. **1**

sheet 292 of 542 sheets

file 98101_WL-PP3.DWG

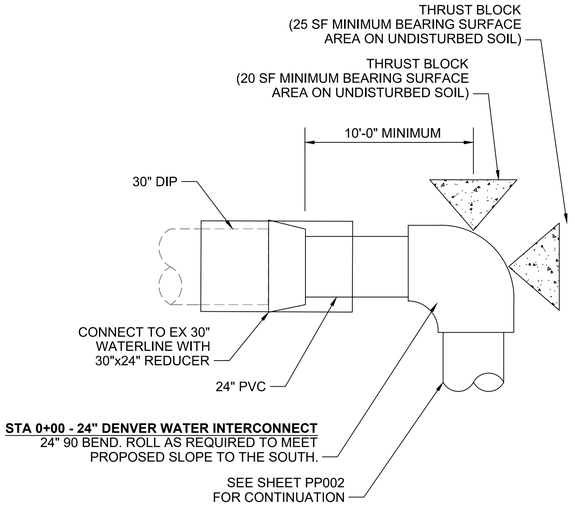
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.

NORTH

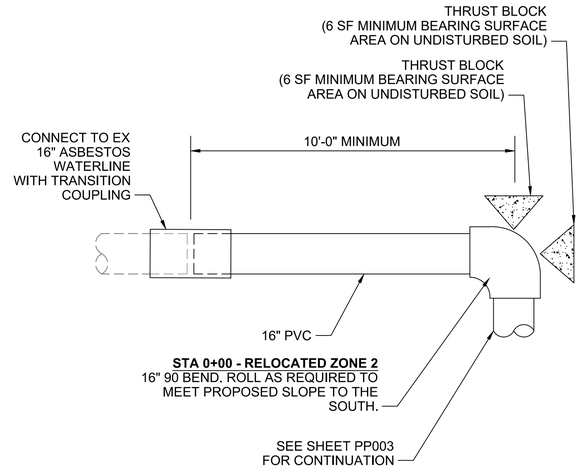
**STA 0+00.00 - RELOCATED 24" ZONE 3**
**WATERLINE MODIFICATION**
**DETAIL** — **101** / PP001
NOT TO SCALE




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.

NORTH

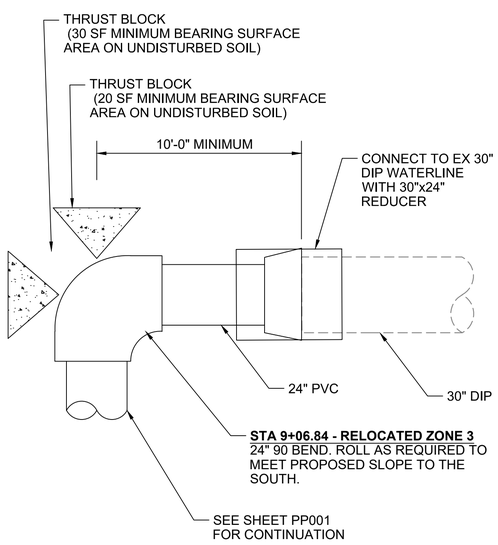
**STA 0+00.00 - 24" DENVER WATER INTERCONNECT**
**WATERLINE MODIFICATION**
**DETAIL** — **102** / PP002
NOT TO SCALE




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.

NORTH

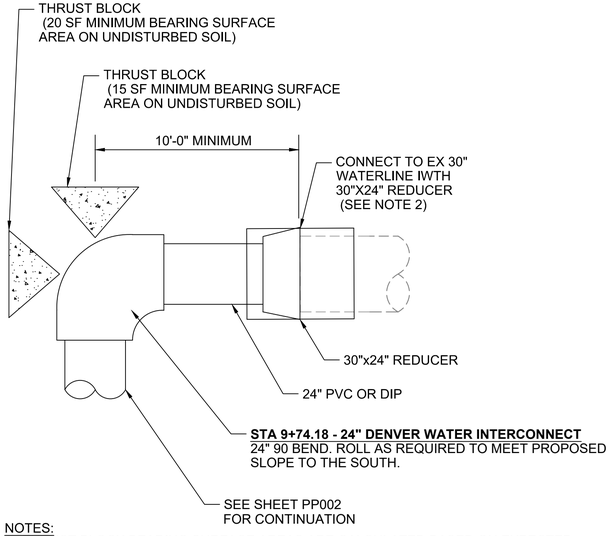
**STA 0+00.00 - RELOCATED 16" ZONE 2**
**WATERLINE MODIFICATION**
**DETAIL** — **103** / PP003
NOT TO SCALE




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.

NORTH

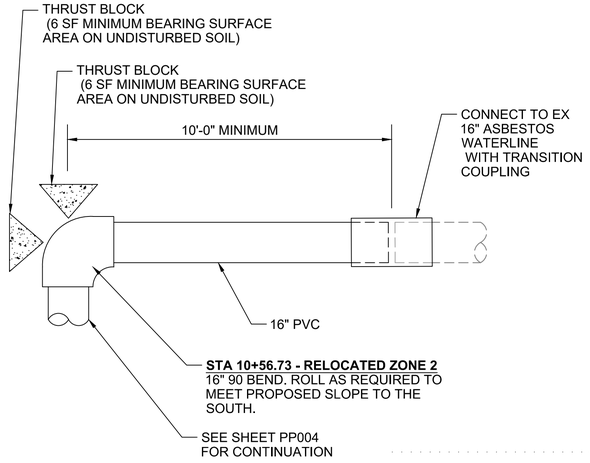
**STA 9+06.84 - RELOCATED 24" ZONE 3**
**WATERLINE MODIFICATION**
**DETAIL** — **104** / PP001
NOT TO SCALE




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.
2. EXISTING WATERLINE MATERIAL IS UNKNOWN. IF DUCTILE IRON, USE RESTRAINED SOLID SLEEVE. IF STEEL, USE TRANSITIONING COUPLING AND CONFIRM OUTSIDE DIAMETER PRIOR TO INSTALLATION.

NORTH

**STA 9+74.18 - 24" DENVER WATER INTERCONNECT**
**WATERLINE MODIFICATION**
**DETAIL** — **105** / PP002
NOT TO SCALE




NOTES:
1. THRUST BLOCK BEARING SURFACE AREAS ARE CALCULATED BASED ON EXPECTED DEPTH AT CONNECTION. IF DEPTH VARIES FROM THE PROFILE VIEW, NOTIFY ENGINEER TO MODIFY THRUST BLOCK SIZE.

NORTH

**STA 10+56.73 - RELOCATED 16" ZONE 2**
**WATERLINE MODIFICATION**
**DETAIL** — **106** / PP004
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/19/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DK | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | D. KAHLICH |
| **designed** | **checked** |
| D. KAHLICH | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONNECTION DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **PP005** – rev. **1**

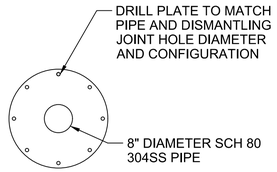
sheet 293 of 542 sheets

file 98101_WL-PP5.DWG

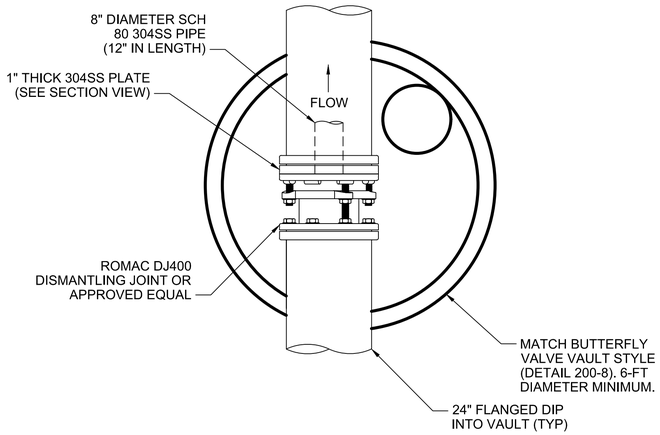
Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

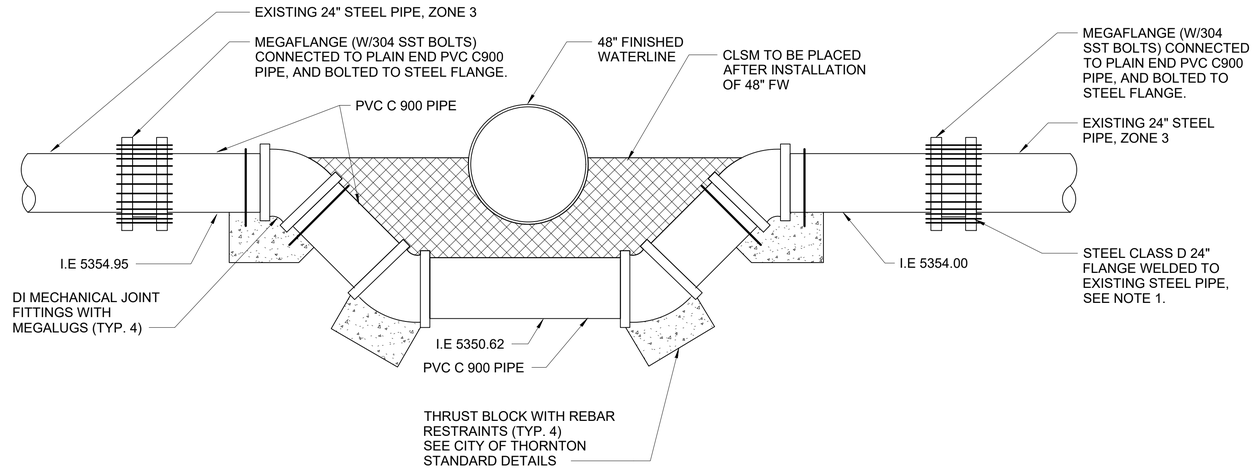
NOTES:
1. ALL NUTS, BOLTS AND RESTRAINT ROD SHALL BE STAINLESS STEEL.
2. FLANGED DIP SHALL BE GIVEN NSF-61 APPROVED FUSION BONDED EPOXY COATING (10-MIL MINIMUM).




SECTION VIEW

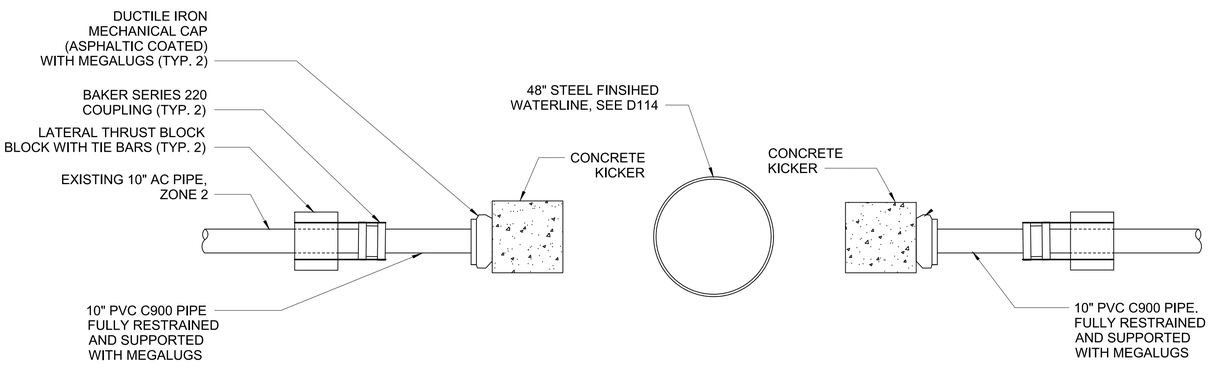



**ORIFICE PLATE VAULT**
NOT TO SCALE

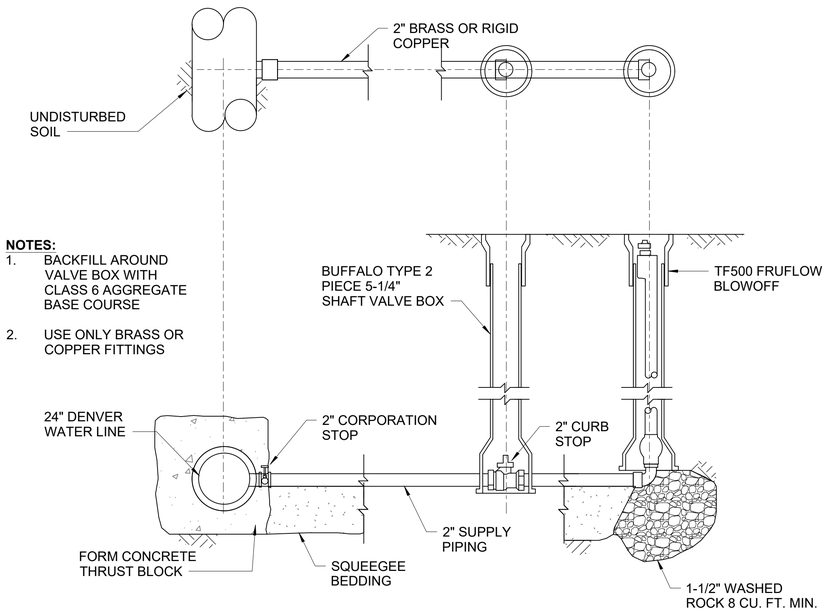



**24" ZONE 3 WATERLINE LOWERING**
NOT TO SCALE

**NOTES:**
1. BARE STEEL COATED WITH AMERLOCK AND WRAPPED IN POLY
2. CLSM = CONTROLLED LOW STRENGTH MATERIAL




**CLAY PLUG FOR REMOVAL OF EXISTING 10" WATERLINE (ZONE 2)**
NOT TO SCALE




**NOTES:**
1. BACKFILL AROUND VALVE BOX WITH CLASS 6 AGGREGATE BASE COURSE
2. USE ONLY BRASS OR COPPER FITTINGS

**2" BLOWOFF ASSEMBLY**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 2/9/18 | DK | KH | ISSUED FOR CONSTRUCTION |
| 1 | 04/26/21 | DK | KH | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | D. KAHLICH |
| **designed** | **checked** |
| D. KAHLICH | K. HENSKE |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 1**
STANDARD DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **PP006 – A** (rev.)

sheet 294 of 542 sheets

file 98101_WL-PP5.DWG

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\CIVIL\PROD_DWGS\WATERLINE\98101_WL-PP5.DWG 4/7/2021 5:33 PM ERGARVEY

## HVAC LEGEND

- CONTROL DAMPER, MOTOR OPERATED
- MANUAL BALANCE DAMPER
- BACKDRAFT DAMPER (BD)
- ACCESS DOOR (AD) ACCESS PANEL (AP) (AD)
- DAMPERS: FIRE (F) - SMOKE (S) - FIRE SMOKE (F/S) - (AD)
- SECURITY BARS (AD)
- FLEXIBLE DUCT CONNECTION
- RECTANGLUAR ELBOW WITH TURNING VANES
- RECTANGULAR TEE WITH TURNING VANES
- RECTANGULAR RADIUS ELBOW
- ROUND & RECTANGULAR DUCT TAKEOFF
- RISE IN RESPECT TO AIR-FLOW (R)
- DROP IN RESPECT TO AIR-FLOW (D)
- SQUARE OR RECTANGULAR TO ROUND TRANSITION
- SUPPLY AIR OR OUTSIDE AIR RECTANGULAR DUCT SECTION
- RETURN AIR RECTANGULAR DUCT SECTION
- EXHAUST AIR RECTANGULAR DUCT SECTION
- SUPPLY AIR OR OUTSIDE AIR ROUND DUCT SECTION
- RETURN AIR ROUND DUCT SECTION
- EXHAUST AIR ROUND DUCT SECTION
- ROUND FLEXIBLE DUCT (5'-0" MAX LENGTH)
- SQUARE OR RECTANGULAR SUPPLY DIFFUSER
- RETURN AIR DIFFUSER
- EXHAUST AIR DIFFUSER
- THERMOSTAT (T)
- HUMIDISTAT (H)
- CARBON DIOXIDE SENSOR (CO2)
- CARBON MONOXIDE SENSOR (CO)
- MOTOR (M)
- OCCUPANCY SENSOR (OCC)
- EMERGENCY SHUT-OFF SWITCH (ESS)
- FAN CONTROL PANEL (FCP)
- STATIC PRESSURE SENSOR (S)
- DIFFERENTIAL PRESSURE SENSOR (DP)
- BREATHING AIR DROP (BA)
- COMPRESSED AIR DROP (CA)
- LINEAR SLOT DIFFUSER
- VARIABLE AIR VOLUME TERMINAL BOX (VAV-)
- FINNED TUBE RADIATION. LENGTH OF ELEMENT SHOWN IN PARENTHESIS ((3'-0"))
- AIRFLOW ARROW

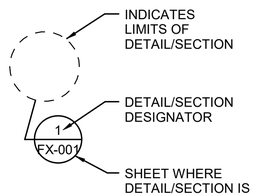
## AIR DISTRIBUTION DEVICE IDENTIFICATION

AIR FLOW — NECK SIZE
QUANTITY — (2)175-8Ø
SA-A
SYSTEM TYPE — SPEC. TYPE

## CONSTRUCTION INTERFACE

- DEMOLITION
- EXISTING — EXISTING
- NEW — NEW
- NEW — DEMOLITION
- EXISTING

## DETAIL / ENLARGED CALLOUT SYMBOL




## MECHANICAL ABBREVIATIONS

| | |
|---|---|
| 12"Ø | ROUND DUCT DIMENSION |
| 24x12 | RECTANGULAR DUCT DIMENSION (INCHES) |
| ACU | AIR CONDITIONING UNIT |
| AFF | ABOVE FINISHED FLOOR |
| AFMS | AIR FLOW MEASURING STATION |
| AHU | AIR HANDLING UNIT |
| ARF | ABOVE RAISED FLOOR |
| AS | AIR SEPARATOR |
| BBO | BOILER BLOW-OFF |
| BOD | BOTTOM OF DUCT |
| BOP | BOTTOM OF PIPE |
| BP | BOOSTER PUMP |
| BS | BRANCH SELECTOR (VRF SYSTEM) |
| CF | CEILING FAN |
| CFM | CUBIC FEET PER MINUTE |
| CHR | CHILLED WATER RETURN |
| CHS | CHILLED WATER SUPPLY |
| CL | CENTER LINE OF PIPE ELEVATION |
| CONC | CONCENTRIC |
| COND | COOLING COIL CONDENSATE DRAIN |
| CRAC | COMPUTER ROOM AIR CONDITIONER |
| CU | CONDENSING UNIT |
| CUH | CABINET UNIT HEATER |
| DB | DRY BULB |
| DH | DEHUMIDIFIER |
| DN | DOWN |
| DRG | DIFFUSER, REGISTER, GRILLE |
| EA | EXHAUST AIR |
| EAT | ENTERING AIR TEMPERATURE |
| EF | EXHAUST FAN |
| EG | EXHAUST GRILLE |
| EL | ELEVATION |
| ELL | ELBOW |
| EMCS | ENERGY MANAGEMENT CONTROL SYSTEM |
| ER | EXHAUST REGISTER |
| ESP | EXTERNAL STATIC PRESSURE |
| ET | EXPANSION TANK |
| EWT | ENTERING WATER TEMPERATURE |
| EXIST | EXISTING |
| FCU | FAN COIL UNIT |
| FD | FEEDWATER |
| FF | FLAT FACED |
| FO | FLAT OVAL |
| FOB | FLAT ON BOTTOM |
| FOT | FLAT ON TOP |
| HWB | HEATING HOT WATER BOILER |
| HWP | HEATING HOT WATER PUMP |
| HWR | HEATING HOT WATER RETURN |
| HWS | HEATING HOT WATER SUPPLY |
| I.E. | INVERT ELEVATION |
| IA | INSTRUMENT AIR |
| IH | INFRARED HEATER |
| IN. W.C | INCHES WATER COLUMN |
| L | LOUVER |
| LAT | LEAVING AIR TEMPERATURE |
| LR | LONG RADIUS |
| LWT | LEAVING WATER TEMPERATURE |
| MA | MIXED AIR |
| MAT | MIXED AIR TEMPERATURE |
| MAU | MAKEUP AIR UNIT |
| MBD | MANUAL BALANCING DAMPER |
| MFR | MANUFACTURER |
| MJ | MECHANICAL JOINT |
| MW | MAKE-UP WATER (AFTER BACKFLOW PREVENTER) |
| NC | NORMALLY CLOSED (FAIL POSITION) |
| NG | NATURAL GAS |
| NO | NORMALLY OPEN (FAIL POSITION) |
| OA | OUTSIDE AIR |
| OB | OPPOSED BLADE |
| OD | OVERFLOW DRAIN |
| PB | PARALLEL BLADE |
| PCW | PROCESS COLD WATER |
| PFX | PLATE AND FRAME HEAT EXCHANGER |
| PSIA | POUNDS PER SQUARE INCH ABSOLUTE |
| PSIG | POUNDS PER SQUARE INCH GAUGE |
| RA | RETURN AIR |
| RED | REDUCER-REDUCING |
| RG | REFRIGERANT HOT GAS DISCHARGE |
| RL | REFRIGERANT LIQUID |
| RMJ | RESTRAINED MECHANICAL JOINT |
| RS | REFRIGERANT SUCTION |
| SA | SUPPLY AIR |
| SCH | SCHEDULE |
| SCR | SPRING RETURN CLOSED |
| SHR | SHORT RADIUS |
| SP | STATIC PRESSURE SENSOR |
| SR | SUPPLY REGISTER |
| ST | STEAM TRAP |
| STM | STEAM |
| SW | SOCKET WELD |
| TA | TRANSFER AIR |
| TOA | TREATED OUTSIDE AIR |
| TOC | TOP OF CONCRETE |
| TOD | TOP OF DUCT |
| TOS | TOP OF STEEL |
| UH | UNIT HEATER |
| V | VENT |
| VAV | VARIABLE AIR VOLUME |
| VFD | VARIABLE FREQUENCY DRIVE |
| VRF | VARIABLE REFRIGERANT FLOW |
| WB | WET BULB |
| WE | WELD END |
| WN | WELD NECK |

## PIPE SYMBOLS

- PIPE ELBOW
- PIPE DOWN
- PIPE UP
- PIPE CONTINUATION

## GENERAL NOTES:

1. LEGEND IS GENERAL IN NATURE AND MAY INDICATE MORE INFORMATION THAN IS APPLICABLE TO PROJECT. SEE PLANS FOR SPECIFIC SYMBOLS AND ABBREVIATIONS.
2. PROVIDE ALL MATERIALS, VALVES, HANGERS, ETC. AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AND AS REQUIRED BY CODE.
3. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
4. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
5. UNLESS OTHERWISE INDICATED MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, CONDUITS, ETC., THROUGHOUT ACCESS ROUTES AND IN MECHANICAL ROOMS.
6. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
7. VERIFY DIMENSIONS AND CONNECTION SIZE WITH FURNISHED EQUIPMENT.
8. ALL ELEVATIONS ARE ABOVE FINISHED FLOOR TO BOTTOM OF DUCT, PIPE, OR PIPE INSULATION UNLESS NOTED OTHERWISE.
9. DUCT DIMENSIONS INDICATED REFER TO SHEET METAL DIMENSIONS. SHEET METAL SIZE SHALL BE AIR OPENING DIMENSION PLUS THE THICKNESS OF ACOUSTICAL LINER WHERE LINER IS INSTALLED. WHERE LINER IS NOT INSTALLED, AIR OPENING SIZE AND SHEET METAL SIZE SHALL BE THE SAME.
10. LOCATE TRANSFER AIR DUCTS AND OPENINGS 24" ABOVE HIGHEST CEILING ELEVATION UNLESS OTHERWISE NOTED.
11. COORDINATE ALL WALL AND ROOF PENETRATIONS WITH STRUCTURAL AND ARCHITECTURAL PLANS.
12. INSTALL TEMPERATURE CONTROLS AT 48" ABOVE FINISHED FLOOR AND COORDINATE WITH OTHER DEVICES LOCATED ON WALLS. COORDINATE WITH ARCHITECTURAL WALL FINISHES.
13. PROVIDE STRUCTURAL EQUIPMENT PADS IN ACCORDANCE WITH STRUCTURAL DRAWINGS AND SPECIFICATIONS.
14. CONTRACTOR SHALL AIR BALANCE ALL GRILLES TO CFM'S SHOWN ON PLANS.
15. DUCT SMOKE DETECTOR SHALL BE INSTALLED IN THE RETURN AIR ON ALL UNITS THAT SUPPLYS 2,000 CFM AND GREATER, IN ACCORDANCE WITH THE IMC 2015. SEE FIRE PROTECTION DRAWINGS
16. DUCTWORK BE CONSTRUCTED IN ACCORDANCE WITH IMC AND SMACNA STANDARDS. DUCTWORK IN THE CHEMICAL ROOMS (INCLUDING THE OZONE GENERATION ROOM) SHALL BE CONSTRUCTED FROM PVC COATED GALVANIZED STEEL, DUCTWORK IN THE ADMIN AREA SHALL BE CONSTRUCTED FROM STANDARD GALVANIZED STEEL AND DUCTWORK IN THE TREATMENT AREA AND PIPE GALLERIES SHALL BE CONSTRUCTED OF ALUMINIUM.
17. ALL DUCTWORK AND PIPING PENETRATIONS THROUGH FULL HEIGHT WALLS SHALL BE SEALED AIR TIGHT.
18. RUNOUTS TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER NECK.
19. ALL MITERED RECTANGULAR DUCT ELBOWS SHALL INCLUDE TURNING VANES. ONLY USE MITERED FITTINGS WHERE RADIUS ELBOWS WILL NOT FIT.
20. PROVIDE NATURAL GAS PRESSURE REDUCING VALVES TO ACHIEVE PRESSURE AS REQUIRED FOR EQUIPMENT. BUILDING NATURAL GAS PRESSURE IS PROVIDED AT 2 PSIG.

## APPLICABLE CODES:

INTERNATIONAL BUILDING CODE 2015
INTERNATIONAL MECHANICAL CODE 2015
INTERNATIONAL PLUMBING CODE 2015
INTERNATIONAL FUEL GAS CODE 2015
INTERNATIONAL ENERGY CONSERVATION CODE 2015
INTERNATIONAL FIRE CODE 2015

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS

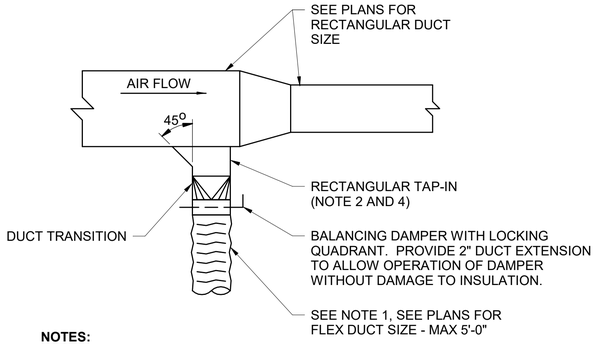
| | |
|---|---|
| project 98101 | contract |
| drawing | rev. |

**M001 — 0**

sheet 295 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

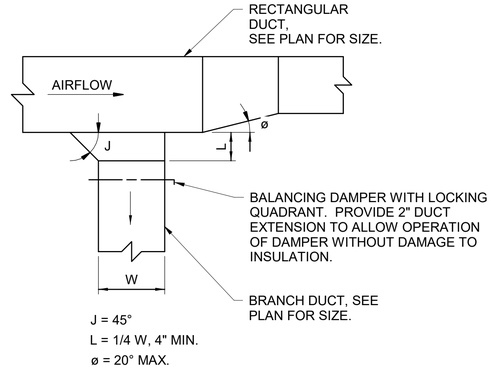
Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. TAKEOFF ON BOTH SIDES OR SINGLE SIDE AS REQUIRED BY PLANS.
2. TAP-IN MAY BE RECTANGULAR OR ROUND. SEE SMACNA MANUAL FOR DETAILS.
3. WHEN FITTING HAS ONLY ONE SIDE SLOPED FOR A SINGLE SIDE TAKE-OFF, THE TAP-IN SHALL BE INSTALLED IN SLOPED SIDE.
4. CLINCH LOCK CONNECTION TO DUCT SHALL HAVE CORNER SEALS (SEE SMACNA MANUAL).

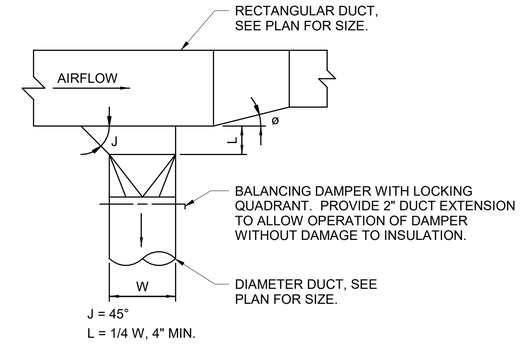
**DIFFUSER TAKE-OFF**
NOT TO SCALE




**NOTES:**

1. TAKEOFF ON BOTH SIDES OR SINGLE SIDE AS REQUIRED BY PLANS.
2. SEE SMACNA MANUAL FOR TAP-IN DETAILS.
3. WHEN FITTING HAS ONLY ONE SIDE SLOPED FOR A SINGLE SIDE TAKE-OFF, THE TAP-IN SHALL BE INSTALLED IN SLOPED SIDE.
4. CLINCH LOCK CONNECTION TO DUCT SHALL HAVE CORNER SEALS. (SEE SMACNA MANUAL).
5. EXTRACTORS, SCOOPS, DEFLECTORS OR DAMPERS THAT PROTRUDE INTO THE MAIN DUCT SHALL NOT BE USED. BALANCING DAMPERS SHALL BE LOCATED TO PREVENT PROTRUSION INTO THE MAIN DUCT AND TO PROVIDE STABLE AIR FLOW AND MINIMAL NOISE WHEN ADJUSTED.

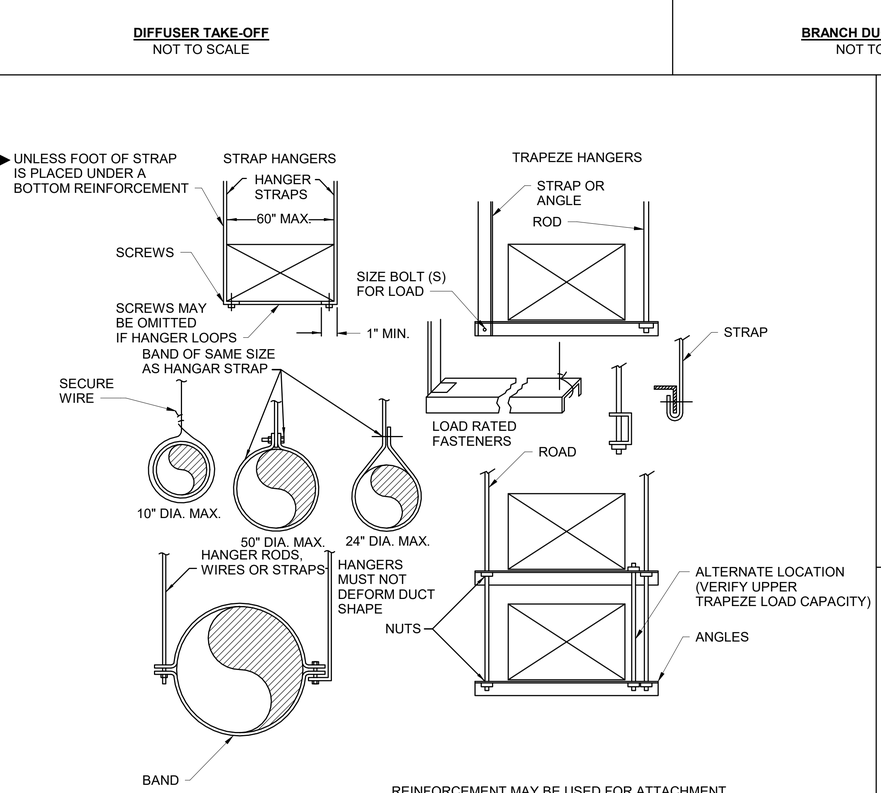
**BRANCH DUCT TAKE-OFF**
NOT TO SCALE



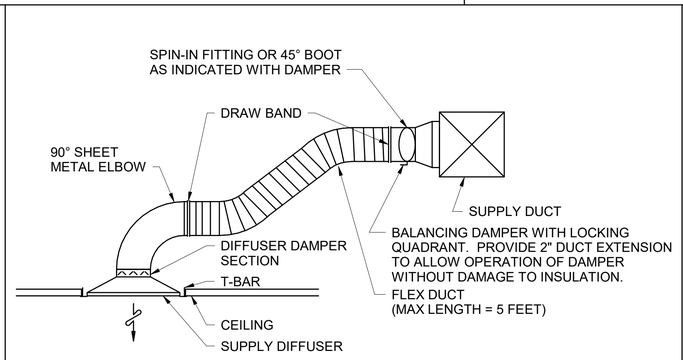

**NOTES:**

1. TAKEOFF ON BOTH SIDES OR SINGLE SIDE AS REQUIRED BY PLANS.
2. SEE SMACNA MANUAL FOR TAP-IN DETAILS.
3. WHEN FITTING HAS ONLY ONE SIDE SLOPED FOR A SINGLE SIDE TAKE-OFF, THE TAP-IN SHALL BE INSTALLED IN SLOPED SIDE.
4. CLINCH LOCK CONNECTION TO DUCT SHALL HAVE CORNER SEALS. (SEE SMACNA MANUAL)

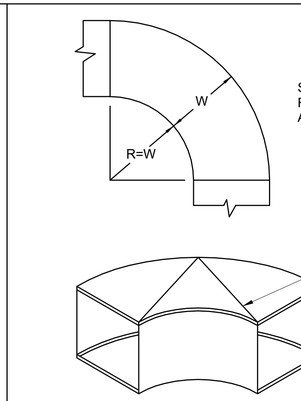
**ROUND BRANCH DUCT TAKE-OFF**
NOT TO SCALE



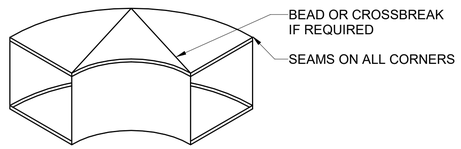

**LOWER DUCT HANGAR ATTACHMENTS**
NOT TO SCALE



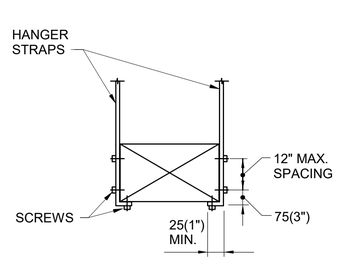

**FLEXIBLE DUCT AT DIFFUSER**
NOT TO SCALE



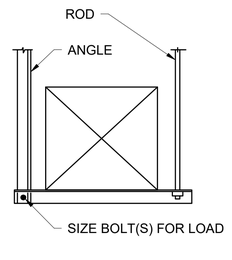

STANDARD RADIUS ELBOW
R=W. CENTERLINE R= 1 1/2 W
ALSO CALLED FULL RADIUS ELBOW.




**STANDARD CURVE AIR DUCT ELBOW**
NOT TO SCALE

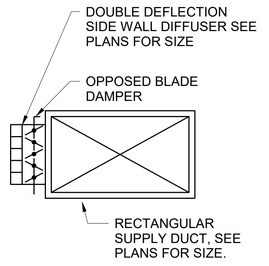



**STRAP HANGERS**




**TRAPEZE HANGERS**

**DUCT HANGERS - STRAP AND TRAPEZE TYPE**
NOT TO SCALE




**SIDE WALL DIFFUSER**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL DETAILS I

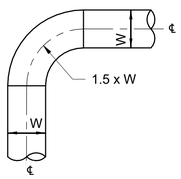
| project | contract |
|---|---|
| 98101 | |

drawing **M002 — 0** rev.

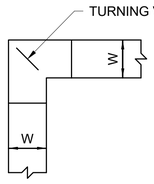
sheet 296 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

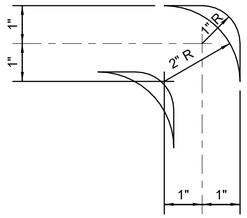
Scale For Microfilming
Millimeters
Inches




**ROUND 90 ELBOW**



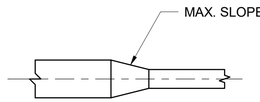

**SQUARE 90 ELBOW**



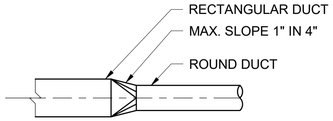

**TURNING VANES DETAIL**

**NOTE:**

1. USE THIS DESIGN WHERE SQUARE 90°ELBOWS ARE SHOWN ON DRAWINGS OR IF SPACE DOES NOT PERMIT ROUND 90° ELBOWS.

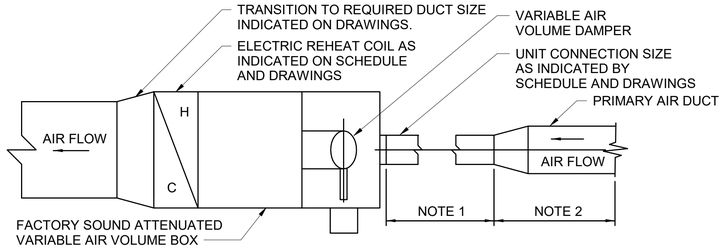



**RECTANGULAR TRANSITION**




**RECTANGULAR TO ROUND TRANSITION**

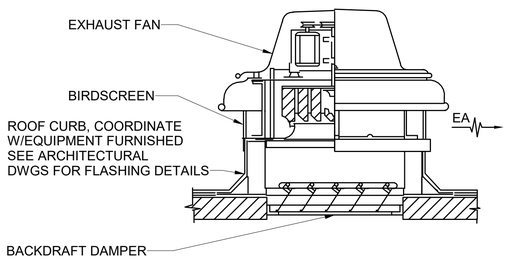
**LOW VELOCITY DUCT LAYOUT**
NOT TO SCALE



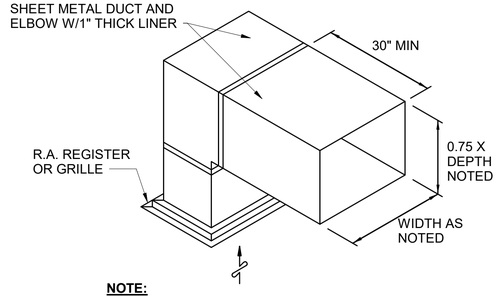

**NOTES:**

1. INLET DUCT TO BE UNIT CONNECTION SIZE WITH A MINIMUM OF 2 FEET LENGTH OF STRAIGHT DUCT.
2. BRANCE CONNECTING DUCT TO BE 2 SIZES LARGER THAN UNIT CONNECTION.
3. NO FLEXIBLE DUCTWORK ON UNIT INLET OR OUTLET DUCT IS ALLOWED.

**VARIABLE AIR VOLUME TERMINAL UNIT**
NOT TO SCALE

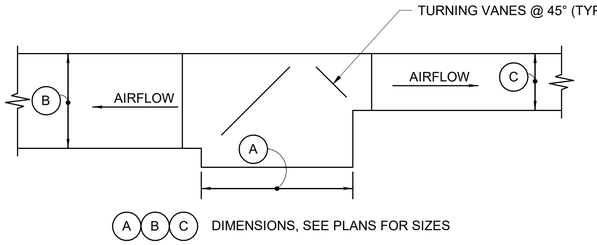



**CENTRIFUGAL ROOF EXHAUST FAN**
NOT TO SCALE

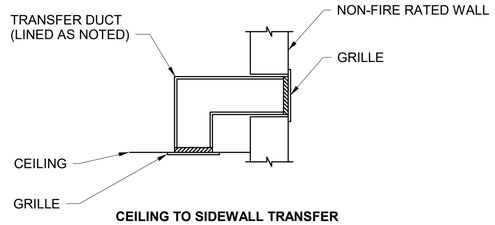



**NOTE:**
TYPICAL FOR ALL RETURN GRILLES OR REGISTERS WHICH ARE NOT DUCTED.

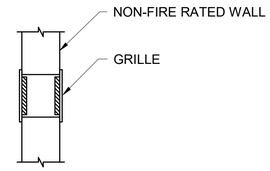
**R.A. SOUND TRAP**
NOT TO SCALE



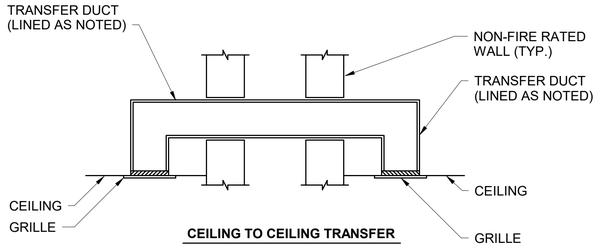

**LOW PRESSURE "TEE" DUCT FITTING**
NOT TO SCALE



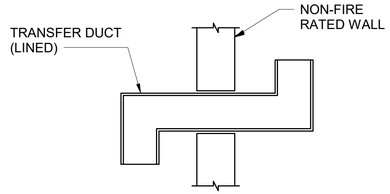

**CEILING TO SIDEWALL TRANSFER**




**SIDEWALL TRANSFER**




**CEILING TO CEILING TRANSFER**

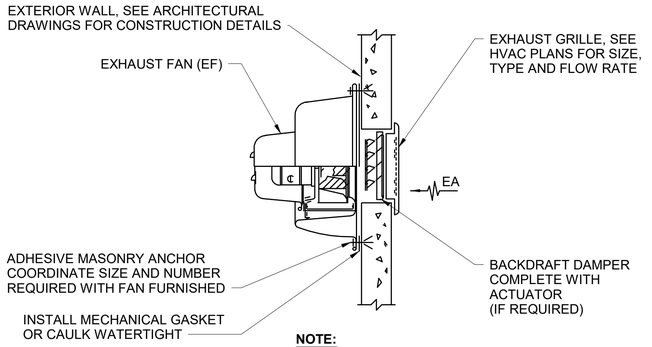



**TOP VIEW SIDEWALL TRANSFER**

**NOTES:**

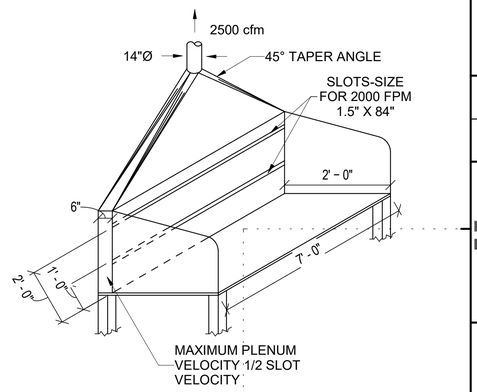
1. PROVIDE TRANSFER DUCT AT FULL HEIGHT WALLS. FIRE RATE? - CONFIRM

**TRANSFER DUCTWORK - NON FIRE RATED**
NOT TO SCALE




**NOTE:**
SEE PLANS FOR EXHAUST FAN LOCATIONS AND UNIT DESIGNATION. SEE SCHEDULES FOR PERFORMANCE DATA.

**SIDE WALL CENTRIFUGAL EXHAUST FAN**
NOT TO SCALE




**WELDING VENTILATION BENCH HOOD**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL DETAILS II

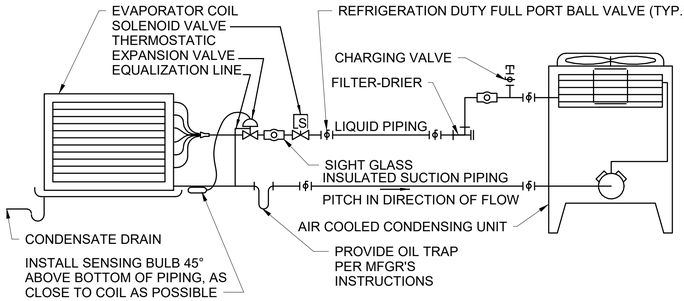
| project | contract |
|---|---|
| 98101 | |

**drawing** **M003 — 0** **rev.**

**sheet** 297 **of** 542 **sheets**
**file** 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

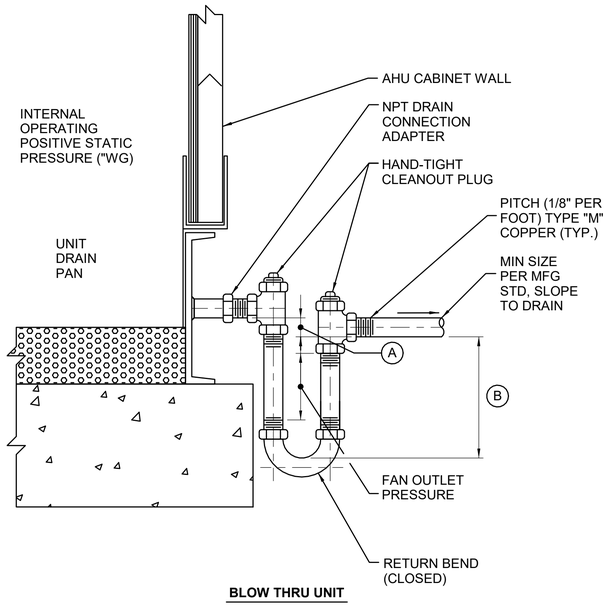
Scale For Microfilming
Millimeters
Inches




**NOTES:**

1. CONTRACTOR IS RESPONSIBLE FOR COORDINATING REFRIGERANT LIQUID AND SUCTION PIPING, SIZES, ROUTING, AND ALL ACCESSORIES WITH EQUIPMENT MANUFACTURER. MAINTAIN UNIFORM SLOPE TO PREVENT OIL FROM POOLING IN LOW POINTS IN THE REFRIGERANT PIPING SYSTEM.

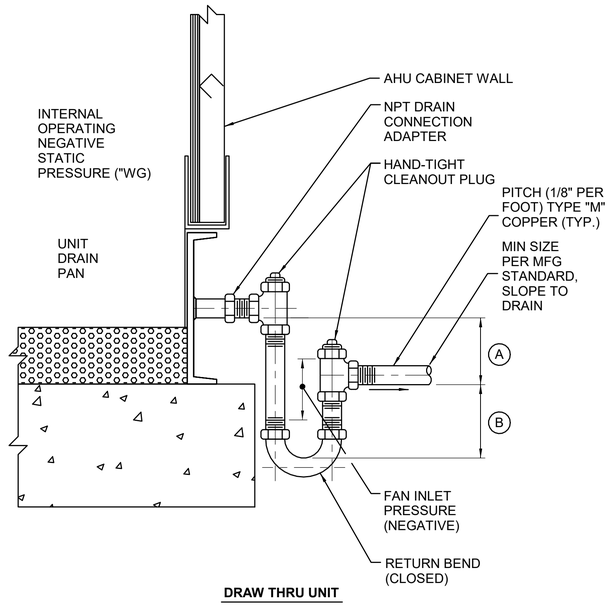
**DX SPLIT SYSTEM PIPING**
NOT TO SCALE




**BLOW THRU UNIT**

**NOTES:**

1. (A) DIMENSION EQUAL TO 1/2" (MIN.)
2. (B) DIMENSION EQUAL TO MAXIMUM FAN OUTLET PRESSURE +1/2" (MIN.)

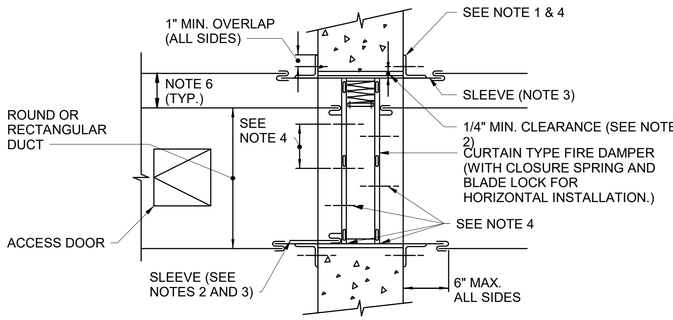



**DRAW THRU UNIT**

**NOTES:**

1. (A) DIMENSION EQUAL TO MAXIMUM FAN INLET PRESSURE (INCH WC) +1" (MIN.)
2. (B) DIMENSION EQUAL TO (A) /2 (MIN.)

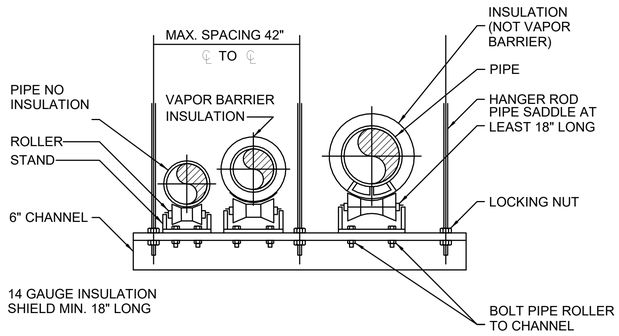
**HVAC CONDENSATE TRAP DRAIN**
NOT TO SCALE




**NOTES:**

1. STEEL RETAINING ANGLES:
   MINIMUM 3" x 3" x 3/16" RETAINING ANGLES MUST LAP STRUCTURAL OPENING 1" MINIMUM AND COVER CORNERS OF OPENINGS.
2. CLEARANCE, DAMPER SLEEVE TO WALL OPENING:
   1/8" PER LINEAR FOOT. 1/4" MINIMUM.
3. STEEL SLEEVE:
   SLEEVE GAUGE SHALL BE AT LEAST EQUAL TO GAUGE OF THE CONNECTING DUCT WHEN USING BREAKAWAY CONNECTIONS (PLAIN 'S', HEMMED 'S' SLIP, STANDING 'S' SLIP, INSIDE SLIP JOINT, OR DOUBLE 'S' SLIP) FOR RIGID CONNECTIONS, SLEEVE SHALL BE MINIMUM 16 GAUGE FOR DAMPERS UP TO 36"W x 24"H OR 24" DIA. AND 14 GAUGE FOR DAMPERS OVER 36"W, 24"H OR 24" DIA.
4. SECURE RETAINING ANGLES TO SLEEVE, DAMPER TO SLEEVE AND MULTIPLE DAMPERS ON 8" CENTER WITH 1/4" BOLTS AND NUTS OR NO.10 STEEL SCREWS. MINIMUM TWO CONNECTIONS IN EACH SIDE.
5. THIS DETAIL SHOWN FOR REFERENCE ONLY, FIRE DAMPER MANUFACTURERS INSTALLATION DETAILS AND INSTRUCTIONS AS TESTED AND APPROVED BY THE U.L. MUST BE USED IN LIEU OF THIS DETAIL WHERE APPLICABLE.
6. DIMENSION VARIES FROM 0" TO 6". PROVIDE UNOBSTRUCTED AIRFLOW WHEREVER POSSIBLE.

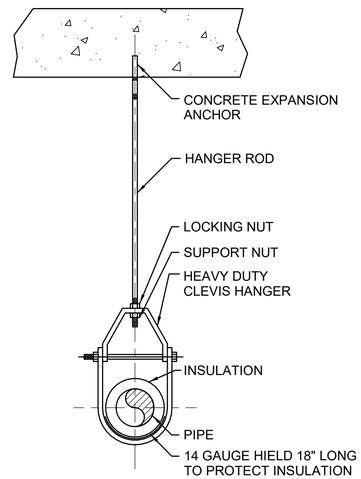
**FIRE DAMPER W/ACCESS DOOR**
NOT TO SCALE




**NOTES:**

1. CONTRACTOR RESPONSIBLE FOR ROUTING AND SUPPORTING REFRIDGE PIPING (IN PLANS)

**PIPE HANGER - TRAPEZE**
NOT TO SCALE




**PIPE HANGER - CLEVIS TYPE**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL DETAILS III

| project | contract |
|---|---|
| 98101 | |

drawing **M004 — 0** rev.

sheet 298 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Inches
Scale For Microfilming

## MAKEUP AIR UNIT SCHEDULE

| TAG | SERVICE AREA | BASIS OF DESIGN | | ARRANGEMENT | ALTITUDE (FT) | FAN | | INT STATIC PRESSURE (IN. WC) | FAN | | COOLING COIL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MANUFACTURER | MODEL | | | AIRFLOW (CFM) | SPEED CONTROL | | EXT STATIC PRESSURE (IN. WC) | MOTOR HP | COOLING TYPE | EVAP FILTER | APPROX EVAP FLOW (GPM) | EAT DB (DEG. F°) | EAT WB (DEG. F°) | LAT DB (DEG. F°) |
| MAU-01 | OZONE GENERATORS 220 | GREENHECK | DG-112.1-H10 | DOWNBLAST | 5400 | 3415 CFM | VFD | 2.5 | 0.29 | 3 | N/A | N/A | 0.0 | N/A | N/A | N/A |
| MAU-02 | MAINTENANCE SHOP 205 | GREENHECK | IGX-110-H12 | DOWNBLAST | 5400 | 2500 CFM | VFD | 2.5 | 0.24 | 2 | EVAPORATIVE (DIRECT) | 2IN ALUM MESH | 0.3 | 94 | 60 | 68 |
| MAU-03A | CHEMICAL ROOMS 216,219,221,222,223 | GREENHECK | DGX-P114-H22 | DOWNBLAST | 5400 | 4400 CFM | VFD | 2.5 | 0.6 | 5 | N/A | N/A | 0.0 | N/A | N/A | N/A |
| MAU-03B | CHEMICAL ROOMS 224,225,226,228,230 | GREENHECK | DGX-P120-H22 | DOWNBLAST | 5400 | 6050 CFM | VFD | 2.5 | 0.5 | 7.5 | N/A | N/A | 0.0 | N/A | N/A | N/A |

## MAKEUP AIR UNIT SCHEDULE (CONTINUED)

| TAG | HEATING COIL | | | | ELECTRICAL | | UNIT WEIGHT (LB) | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | HEATING TYPE | EAT DB (DEG. F.) | LAT DB (DEG. F.) | HEAT OUTPUT (MBH) | VOLTS | PHASE | | |
| MAU-01 | DIRECT NG | -2 | 70 | 236.2 | 460 | 3 | 706 | 1, 2, 3, 4 |
| MAU-02 | INDIRECT NG | -2 | 70.5 | 200 | 460 | 3 | 1066 | 1, 2, 3, 4 |
| MAU-03A | DIRECT NG | -2 | 70 | 309.1 | 460 | 3 | 1171 | 1, 2, 3,4 |
| MAU-03B | DIRECT NG | -2 | 67 | 429 | 460 | 3 | 1264 | 1, 2, 3, 4 |

**REMARKS:**

1. PROVIDE VFD AND DISCONNECTS FOR ALL FANS/MOTORS.
2. PROVIDE MERV8 FILTRATION.
3. PROVIDE ROOF CURBS FOR ALL UNITS.

## ROOF TOP UNIT SCHEDULE

| TAG | AREA SERVED | LOCATION | ALTITUDE (FT) | MAX. AIRFLOW (CFM) | MIN. AIRFLOW (CFM) | MIN. OUTSIDE AIRFLOW (CFM) | EXTERNAL STATIC PRESSURE (IN. W.C.) | INTERNAL STATIC PRESSURE (IN. W.C.) | TOTAL STATIC PRESSURE (IN. W.C.) | SUPPLY FAN | | | | ELECTRICAL | | COOLING COIL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | MOTOR HP | MAX BHP | TYPE | VOLUME CONTROL | VOLTS | PHASE | REFRIGERANT TYPE | EAT DB (DEG. F.) | EAT WB (DEG. F.) | LAT DB (DEG. F.) | LAT WB (DEG. F.) | TOTAL CAPACITY (MBH) |
| RTU-01 | ADMINISTRATION AREA | ROOF | 5400 | 5000 CFM | 5000 CFM | 1000 CFM | 1.25 | 3 | 4.25 | 5 | 3.77 | PLENUM | VFD | 460 | 3 | R-410A | 81.5 | 60.8 | 55 | 53.1 | 150 |
| RTU-02 | CONTROL ROOM 213 | ROOF | 5400 | 1500 CFM | 1500 CFM | 400 CFM | 0.25 | 3 | 3.25 | 1 | 0.482 | PLENUM | VFD | 460 | 3 | R-410A | 81.5 | 60.8 | 45.3 | 45 | 58.1 |
| RTU-03 | LAB 215 | ROOF | 5400 | 1500 CFM | 1500 CFM | 400 CFM | 0.25 | 3 | 3.25 | 1 | 0.482 | PLENUM | VFD | 460 | 3 | R-410A | 81.5 | 60.8 | 45.3 | 54 | 58.1 |
| RTU-04A | TREATMENT 1 233 | ROOF | 5400 | 12000 CFM | 6000 CFM | 6000 CFM | 0.5 | 1.6 | 2.1 | 7.5 | 5.53 | PLENUM | VFD | 460 | 3 | N/A | 81.5 | 60.8 | 0 | 0 | 0 |
| RTU-04B | TREATMENT 2 233 | ROOF | 5400 | 12000 CFM | 6000 CFM | 6000 CFM | 0.5 | 1.6 | 2.1 | 7.5 | 5.53 | PLENUM | VFD | 460 | 3 | N/A | 81.5 | 60.8 | 0 | 0 | 0 |
| RTU-05 | INTAKE PIPE GALLERY 100 | ROOF | 5400 | 5000 CFM | 3100 CFM | 3100 CFM | 0.75 | 1.35 | 2.1 | 3 | 2.4 | PLENUM | VFD | 460 | 3 | N/A | 81.5 | 60.8 | 0 | 0 | 0 |
| RTU-06 | FILTER PIPE GALLERY 101 | ROOF | 5400 | 7500 CFM | 5750 CFM | 5750 CFM | 1.1 | 1.6 | 2.7 | 7.5 | 4.39 | PLENUM | VFD | 460 | 3 | N/A | 81.5 | 60.8 | 0 | 0 | 0 |
| RTU-07 | ELECTRICAL ROOM 229 | ROOF | 5400 | 1950 CFM | 500 CFM | 150 CFM | 0.25 | 2.75 | 3 | 1 | 0.709 | PLENUM | VFD | 460 | 3 | R-410A | 81.5 | 60.8 | 49 | 48.5 | 62 |
| RTU-08 | ELECTRICAL ROOM 218 | ROOF | 5400 | 1950 CFM | 500 CFM | 150 CFM | 0.25 | 2.75 | 3 | 1 | 0.709 | PLENUM | VFD | 460 | 3 | R-410A | 81.5 | 60.8 | 49 | 48.5 | 62 |

## ROOF TOP UNIT SCHEDULE (CONTINUED)

| TAG | HEATING COIL | AIRFLOW (CFM) | HEATING COIL | | | FILTER | | BASIS OF DESIGN | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | TYPE | | EAT (DEG. F.) | LAT (DEG. F.) | TOTAL OUTPUT CAPACITY (MBH) | MIN. EFFICIENCY (MERV RATING) | DIRTY FILTER PRESSURE DROP (IN. W.C.) | WEIGHT (LBS) | MFGR | MODEL | |
| RTU-01 | INDIRECT NG | 5000 CFM | -2 | 93.5 | 223.8 | 8 | 0.5 | 2759 | GREENHECK | RV-25 | 1,2,3,4,6 |
| RTU-02 | INDIRECT NG | 1500 CFM | -2 | 95.6 | 47.9 | 8 | 0.5 | 2590 | GREENHECK | RV-25 | 1,2,4,6 |
| RTU-03 | INDIRECT NG | 1500 CFM | -2 | 95.6 | 47.9 | 8 | 0.5 | 2590 | GREENHECK | RV-25 | 1,2,4,6 |
| RTU-04A | INDIRECT NG | 6000 CFM | -2 | 86 | 565 | 8 | 0.5 | 6330 | PRICE | PMI-IF-12-800H | 1,2,3,4,5 |
| RTU-04B | INDIRECT NG | 6000 CFM | -2 | 86 | 565 | 8 | 0.5 | 6330 | PRICE | PMI-IF-12-800H | 1,2,3,4,5 |
| RTU-05 | INDIRECT NG | 3100 CFM | -2 | 70 | 241 | 8 | 0.5 | 3940 | PRICE | PMI-IF-12-800H | 1,2,3,4,5,6 |
| RTU-06 | INDIRECT NG | 5750 CFM | -2 | 70 | 447 | 8 | 0.5 | 4598 | PRICE | PMI-IF-12-800H | 1,2,3,4,5 |
| RTU-07 | INDIRECT NG | 500 CFM | -2 | 90.2 | 64 | 8 | 0.5 | 2590 | GREENHECK | RV-25 | 1,2,4,6 |
| RTU-08 | INDIRECT NG | 500 CFM | -2 | 90.2 | 64 | 8 | 0.5 | 2590 | GREENHECK | RV-25 | 1,2,4,6 |

**REMARKS:**

1. PROVIDE VFD AND DISCONNECTS FOR ALL FANS/MOTORS.
2. PROVIDE MERV8 FILTRATION.
3. ALL UNITS OVER 2000 CFM SHALL HAVE SMOKE DETECTORS, AS INDICATED IN FIRE PROTECTION DRAWINGS.
4. PROVIDE ROOF CURBS FOR ALL UNITS
5. HEATING COILS SHALL BE AT LEAST 90% EFFICENT INDIRECT FIRED NATURAL GAS
6. PROVIDE INTERNAL RELIEF DAMPER PER MANUFACTURER

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL SCHEDULES I

| | |
|---|---|
| project 98101 | contract |
| drawing M005 | rev. 0 |
| sheet 299 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

## LAB EXHAUST FAN SCHEDULE (LEF)

| TAG NO. | AREA SERVED | SERVICE | FAN TYPE | BASIS OF DESIGN | | ALTITUDE (FT.) | TOTAL AIRFLOW (CFM) | FAN AIRFLOW (CFM) | FAN SPEED (RPM) | DRIVE TYPE | SPEED CONTROL | EXTERNAL STATIC PRESSURE (IN. W.G.) | MIN. MOTOR HP | OPERATING BHP | MOTOR TYPE | STARTER / DISCONNECT PROVIDED BY | VOLTS | PHASE | APPROXIMATE WEIGHT (LBS) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MFGR | MODEL | | | | | | | | | | | | | | | |
| LEF-1 | LAB | FUME HOOD EXHAUST | CENTRIFUGAL | GREENHECK | FJI-12-BI-41-4-100-I-10 | 5400 | 900 CFM | 900 CFM | 1836 | DIRECT | VFD | 0.5 | 1.5 | 0.16 | TEFC | MFGR / MFGR | 460 | 3 | 1000 | 1, 2 |

**REMARKS:**
1. PROVIDE WITH FACTORY INSTALLED DISCONNECT.
2 FURNISH AND INSTALLL MANUFACTURER PROVIDED ROOF CURB. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND REFER TO ARCHITECTURAL FOR FLASHING DETAILS.
3 INCLUDE INSTRUMENTATION PER CONTROL DIAGRAMS.

1

## EXHAUST FAN SCHEDULE (EF)

| TAG NUMBER | AREA SERVED | FAN TYPE | BASIS OF DESIGN | | ALTITUDE (FT.) | AIRFLOW (CFM) | MIN AIRFLOW (CFM) | FAN SPEED (RPM) | EXTERNAL STATIC PRESSURE (IN. W.G.) | MOTOR HP | OPERATING BHP | MOTOR TYPE | SPEED CONTROL | UNIT ELECTRICAL | | DRIVE TYPE | WEIGHT (LBS) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MFGR | MODEL NUMBER | | | | | | | | | | VOLTS | PHASE | | | |
| EF-01 | OZONE GENERATORS 220 | CENTRIFUGAL | COOK | 195ACRUB | 5400 | 3760 CFM | 3760 CFM | 947 | 0.5 | 2 | 0.72 | ODP | EC | 460 | 3 | BELT | 212 | 1, 2, 5 |
| EF-02 | MAINTENANCE SHOP 205 | CENTRIFUGAL | COOK | 150R17D | 5400 | 2854 CFM | 1400 CFM | 1566 | 0.34 | 1.5 | 0.66 | ODP | VFD | 460 | 3 | DIRECT | 185 | 1, 2, 6 |
| EF-03A | TREATMENT AREA 233 | CENTRIFUGAL | COOK | 195R17D (VF2) | 5400 | 5500 CFM | 2800 CFM | 1288 | 0.38 | 3 | 1.52 | TEFC | VFD | 460 | 3 | DIRECT | 366 | 1, 2, 6 |
| EF-03B | TREATMENT AREA 233 | CENTRIFUGAL | COOK | 195R17D (VF2) | 5400 | 5500 CFM | 2800 CFM | 1288 | 0.38 | 3 | 1.52 | TEFC | VFD | 460 | 3 | DIRECT | 366 | 1, 2, 6 |
| EF-03C | TREATMENT AREA 233 | CENTRIFUGAL | COOK | 195R17D (VF2) | 5400 | 5500 CFM | 2800 CFM | 1288 | 0.38 | 3 | 1.52 | TEFC | VFD | 460 | 3 | DIRECT | 366 | 1, 2, 6 |
| EF-03D | TREATMENT AREA 233 | CENTRIFUGAL | COOK | 195R17D (VF2) | 5400 | 5500 CFM | 2800 CFM | 1288 | 0.38 | 3 | 1.52 | TEFC | VFD | 460 | 3 | DIRECT | 366 | 1, 2, 6 |
| EF-03E | TREATMENT AREA 233 | CENTRIFUGAL | COOK | 195R17D (VF2) | 5400 | 5500 CFM | 2800 CFM | 1288 | 0.38 | 3 | 1.52 | TEFC | VFD | 460 | 3 | DIRECT | 366 | 1, 2, 6 |
| EF-06A | POLYMER 216 | CENTRIFUGAL | COOK | 120R15D | 5400 | 990 CFM | 990 CFM | 1534 | 0.75 | 0.25 | 0.22 | ODP | FSC | 115 | 1 | DIRECT | 101 | 1, 2, 5 |
| EF-06C | SODIUM PERMANGANATE 222 | CENTRIFUGAL | COOK | 195RX17D (VF) | 5400 | 825 CFM | 825 CFM | 997 | 0.75 | 0.25 | 0.18 | OPEN | FSC | 115 | 1 | DIRECT | 210 | 1, 2, 5 |
| EF-06D | FERRIC CHLORIDE/SULFATE 221 | CENTRIFUGAL | COOK | 150R17D (VF2) | 5400 | 2141 CFM | 2141 CFM | 1432 | 0.75 | 1 | 0.54 | TEFC | EC | 460 | 3 | DIRECT | 157 | 1, 2, 5 |
| EF-06E | SODIUM BISULFITE 225 | CENTRIFUGAL | COOK | 150RH17D | 5400 | 1053 CFM | 1053 CFM | 1517 | 0.75 | 0.5 | 0.3 | ODP | EC | 115 | 1 | DIRECT | 148 | 1, 2, 5 |
| EF-06F | HYDROGEN PEROXIDE 223 | CENTRIFUGAL | COOK | ACRUD-HP VF | 5400 | 818 CFM | 818 CFM | 867 | 0.75 | 0.5 | 0.049 | TEFC | FSC | 115 | 1 | DIRECT | 125 | 1, 2, 5 |
| EF-07A | PHOSPHORIC ACID 226 | CENTRIFUGAL | COOK | 120R17D (VF) | 5400 | 880 CFM | 880 CFM | 1099 | 0.25 | 0.25 | 0.08 | OPEN | FSC | 115 | 1 | DIRECT | 110 | 1, 2, 5 |
| EF-07B | CAUSTIC SODA 224 | CENTRIFUGAL | COOK | 150R17D (VF2) | 5400 | 2210 CFM | 2210 CFM | 1278 | 0.34 | 0.5 | 0.37 | TEFC | EC | 115 | 1 | DIRECT | 151 | 1, 2, 5 |
| EF-07C | SODIUM HYPOCHLORITE 228 | CENTRIFUGAL | COOK | 150R17D (VF2) | 5400 | 2210 CFM | 2210 CFM | 1278 | 0.34 | 0.5 | 0.37 | TEFC | EC | 115 | 1 | DIRECT | 151 | 1, 2, 5 |
| EF-07D | AMMONIA 230 | CENTRIFUGAL | COOK | 101R17D (VF) | 5400 | 747 CFM | 747 CFM | 1578 | 0.25 | 0.25 | 0.1 | OPEN | FSC | 115 | 1 | DIRECT | 70 | 1, 2, 5 |
| EF-08A | OFFICE RESTROOMS 208 & 209 | CENTRIFUGAL | COOK | ACRUD-HP | 5400 | 556 CFM | 556 CFM | 895 | 0.125 | 0.18 | 0.06 | ODP | FSC | 115 | 1 | DIRECT | 69 | 1, 2, 5 |
| EF-08B | RESTROOM 232 | CENTRIFUGAL | COOK | 100R17DEC | 5400 | 360 CFM | 360 CFM | 1011 | 0.125 | 0.25 | 0.02 | OPEN | FSC | 115 | 1 | DIRECT | 68 | 1, 2,4 |
| EF-09 | BACKWASH PS | CENTRIFUGAL | COOK | 180R17D (VF2) | 5400 | 5350 CFM | 0 CFM | 1476 | 0.35 | 2 | 1.52 | TEFC | EC | 460 | 3 | DIRECT | 293 | 1,3, 5 |
| EF-10 | OZONE DESTRUCT 106 | CENTRIFUGAL | COOK | ACRUD-XP VF | 5400 | 250 CFM | 250 CFM | 641 | 0.25 | 0.25 | 0.2 | ODP | EC | 115 | 1 | DIRECT | 114 | 1,3, 5 |
| EF-11 | MECHANICAL 217 | CENTRIFUGAL | COOK | CUE-090-VG | 5400 | 450 CFM | 0 CFM | 1725 | 1.5 | 3 | 2.83 | TEFC | EC | 277 | 1 | BELT | 171 | 1, 2, 5 |
| EF-13 | FILTER PIPE GALLERY 101 | CENTRIFUGAL | COOK | ACRU-D VF | 5400 | 8250 CFM | 5200 CFM | 1632 | 2 | 5 | 3.34 | TEFC | VFD | 460 | 3 | DIRECT | 260 | 1, 2, 6 |
| EF-14 | OZONE GENERATORS 220 | CENTRIFUGAL | COOK | 300ACRUB | 5400 | 8900 CFM | 8900 CFM | 608 | 0.5 | 3 | 1.57 | ODP | EC | 460 | 3 | BELT | 468 | 1,2, 5 |
| EF-15 | MAINTENANCE SHOP 205 - WELDING HOOD | VANE AXIAL | COOK | 120QMX | 5400 | 2854 CFM | 2854 CFM | 2683 | 2 | 2 | 1.52 | ODP | EC | 460 | 3 | BELT | 363 | 1, 5 |

**REMARKS:**
1. PROVIDE WITH FACTORY INSTALLED DISCONNECT.
2. FURNISH AND INSTALLL MANUFACTURER PROVIDED ROOF CURB. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND REFER TO ARCHITECTURAL FOR FLASHING DETAILS.
3. INTERLOCK TO MOTORIZED DAMPER PER PLAN DRAWINGS.
4. PROVIDE ROOF HOOD.
5. PROVIDE EC AND FSC CONTROLLED FANS WITH REMOTE FAN SPEED DIAL CONTROLLERS.
6. PROVIDE VFD CONTROLLED FANS WITH INVERTER DUTY RATED MOTORS.

## LOUVER SCHEDULE

| TAG | SIZE (INXIN) | AIRFLOW (CFM) | MFG BOD | REMARKS |
|---|---|---|---|---|
| L-01 | 60"x36" | 5350 CFM | RUSKIN | |
| L-02 | 18"x12" | 250 CFM | RUSKIN | |
| L-03 | 60"x60" | 3120 CFM | RUSKIN | ACOUSTIC LOUVER |

**NOTE:**
L-03 ONLY ACHIEVES 3120 CFM OF FLOW WHEN BLOWERS OPERATE, ACTUAL FLOW MAY VARY.

## DIFFUSER, REGISTER, & GRILLE SCHEDULE (DRG)

| TAG | DESCRIPTION | BASIS OF DESIGN | | MOUNTING |
|---|---|---|---|---|
| | | MFGR | MODEL | |
| A | 24"x24" SQUARE SUPPLY | TITUS | TMS | LAY-IN |
| C | 24"x24" SQUARE RETURN OR EXHAUST AIR | TITUS | PXP | LAY-IN |
| D | 24"x24" SQUARE RETURN OR EXHAUST AIR | TITUS | PXP | SURFACE |
| E | ALUMINUM DOUBLE DEFLECTION SUPPLY GRILLE | TITUS | 300FS | SURFACE |
| F | 36"x14" SUPPLY GRILLE | TITUS | 300-FL | SURFACE |
| G | RECTANGULAR RETURN OR EXHAUST AIR GRILLE | TITUS | 350-FL | SURFACE |
| I | DRUM LOUVER | TITUS | DL-SV | SURFACE |

## FUME HOOD AIRFLOW SCHEDULE

| TAG | SERVED BY | HOOD LENGTH (FT) | SASH HEIGHT | HOOD CFM |
|---|---|---|---|---|
| FH-01 | LEF-01 | 6 | 18 | 900 CFM |
| FH-02 | EF-15 | 7 | N/A | 2500 CFM |

**NOTES:**
1. BALANCE FUME HOODS IN ACCORDANCE WITH ASHRAE 110.
2. NEW FUME HOODS PROVIDED BY ARCH. THIS SCHEDULE INTENDED TO CONVEY DESIGN AIRFLOWS ONLY. REFER TO ARCH FOR FUME HOOD DETAILS AND UTILITIES.

## VARIABLE AIR VOLUME BOX SCHEDULE (VAV)

| TAG | AHU CONNECTION | TERMINAL SPEC. TYPE | COOLING MAX AIRFLOW (CFM) | COOLING MIN AIRFLOW (CFM) | ELECTRIC HEAT COIL | | | | VOLTS | PHASE | VAV BOX INLET DIAMETER (IN.) | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | HEATING AIRFLOW (CFM) | LAT (DEG. F.) | CAPACITY (KW) | HEATING STAGES | | | | MFGR | MODEL | |
| VAV-1 | RTU-01 | SINGLE DUCT ELECTRIC REHEAT | 750 | 175 | 290 | 100 | 5 | SCR | 208 | 1 | 10 | TITUS | DESV | 1, 2, 3,4 |
| VAV-2 | RTU-01 | SINGLE DUCT ELECTRIC REHEAT | 400 | 125 | 280 | 100 | 3 | SCR | 208 | 1 | 6 | TITUS | DESV | 1, 2, 3,4 |
| VAV-3 | RTU-01 | SINGLE DUCT ELECTRIC REHEAT | 600 | 150 | 380 | 100 | 5 | SCR | 208 | 1 | 8 | TITUS | DESV | 1, 2, 3,4 |
| VAV-4 | RTU-01 | SINGLE DUCT ELECTRIC REHEAT | 1300 | 325 | 600 | 102 | 7.5 | SCR | 208 | 1 | 10 | TITUS | DESV | 1, 2, 3,4 |

**REMARKS:**
1. PROVIDE WITH FACTORY ACCESS PANEL.
2 PROVIDE FACTORY INSTALLED DISCONNECT.
3 FURNISH AND INSTALL MANUFACTURER'S STANDARD THERMOSTAT AND CONTROLS WITH PROPER INTERCONNECTION TO RTU-01 AS INDICATED ON PLAN DRAWINGS. THERMOSTAT SHALL BE MOUNTED AT APPROXIMATELY 48" AFF.
4. PROVIDE MINIMUM 36" ATTENUATOR.

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL SCHEDULES II

| | |
|---|---|
| project 98101 | contract |
| drawing M006 | rev. 1 |
| sheet 300 of 542 sheets | |
| file 98101_M | |

## FIRE DAMPER, DAMPER AND ACTUATOR SCHEDULE

| TAG NO | AREA SERVED | HEIGHT | WIDTH | FLOW | BASIS OF DESIGN | ACTUATOR | NOTES |
|---|---|---|---|---|---|---|---|
| MD-01 | OZONE DEST. | 18" | 12" | 250 CFM | TAMCO 9000SW | AFB24-SR-S | 1,2,3 |
| MD-02 | BACKWASH PS | 36" | 60" | 5350 CFM | TAMCO 9000SW | AFB24-SR-S | 1,2,3 |
| FD-01 | HLWY TO RM219 | 14" | 12" | 1975 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-02 | HLWY TO RM222 | 8" | 8" | 720 CFM | RUSKIN DFD35 | NA | 4 |
| FD-03 | HLWY TO RM223 | 8" | 8" | 720 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-04 | HLWY TO RM224 | 12" | 12" | 1860 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-05 | HLWY TO RM225 | 8" | 8" | 755 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-06 | HLWY TO RM226 | 8" | 8" | 755 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-07 | HLWY TO RM228 | 12" | 12" | 1860 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-08 | HLWY TO RM230 | 8" | 8" | 625 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-09 | HLWY TO RM234 | 8" | 8" | 50 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-10 | HLWY TO RM234 | 12" | 12" | 50 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-11 | HLWY TO RM206 | 12" | 12" | 180 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-12 | HLWY TO CORR237 | 8" | 8" | 600 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-13 | HLWY TO RM208 | 12" | 12" | 90 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-14 | HLWY TO RM209 | 12" | 12" | 90 CFM | RUSKIN DFD60-3 | NA | 4 |
| FD-15 | HLWY TO RM217 | 24" | 12" | 450 CFM | RUSKIN DFD60-3 | NA | 4 |

**NOTES:**
1. ALL ACTUATOR BASIS OF DESIGN IS BELIMO. INCLUDE LIMIT SWITCHES. DELAY FAN OPERATION UNTIL DAMPERS REACH OPEN POSITION.
2. INTERLOCK DAMPERS TO FANS PER PLAN DRAWINGS.
3. ALL DAMPERS SHALL BE OPPOSED BLADE.
4. DAMPER SHALL HAVE A 3 HOUR FIRE RATING.

## RADIANT HEATER SCHEDULE

| TAG | BURNER | | | | | | ELECTRICAL | | | APPROX. WEIGHT (LBS) | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LENGTH (FT) | FUEL | INPUT (MBH) | MIN / MAX INLET GAS PRESSURE (IN WC) | VENT / COMBUSTION SIZE (IN) | GAS CONNECTION (IN) | VOLTS | PHASE | AMPS | | MFGR | MODEL | |
| IRH-01 | 20 | NATURAL GAS | 65 | 4.6 / 14 | 4 / 4 | 0.75 | 120 | 1 | 1 | 113 | ROBERTS GORDON | HED-60 | |
| IRH-02 | 20 | NATURAL GAS | 65 | 4.6 / 14 | 4 / 4 | 0.75 | 120 | 1 | 1 | 113 | ROBERTS GORDON | HED-60 | |

**REMARKS:**
1. FURNISH AND INSTALL FACTORY REFLECTOR TO DIRECT ALL RADIANT HEATING AT EXTERIOR WALL, DOOR AND FLOOR AREA IN FRONT OF DOOR.
2 PROVIDE FACTORY INSTALLED DISCONNECT.

0

## CONDENSING UNIT SCHEDULE

| TAG | FCU SERVED | MAX COOLING CAPACITY (MBH) | COMPRESSOR TYPE | EFFICIENCY (EER) | RATED OUTDOOR DB (°F) | REFRIGERANT TYPE | UNIT ELECTRICAL | | | WEIGHT (LBS) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | VOLT | PH. | MCA | | |
| CU-01 | FCU-01 | 12 | TWIN ROTARY | 8.2 | 95 | R410A | 208 | 1 | 1 | 90 | 1, 2, 3, 4 |
| CU-02 | FCU-02 | 12 | TWIN ROTARY | 8.2 | 95 | R410A | 208 | 1 | 1 | 90 | 1, 2, 3, 4 |
| CU-03 | FCU-03 | 12 | TWIN ROTARY | 8.2 | 95 | R410A | 208 | 1 | 1 | 90 | 1, 2, 3, 4 |
| CU-04 | FCU-04 | 12 | TWIN ROTARY | 8.2 | 95 | R410A | 208 | 1 | 1 | 90 | 1, 2, 3, 4 |

**REMARKS:**
1. MANUFACTURER SHALL SIZE REFRIGERANT LINES AND PROVIDE NECESSARY REFRIGERATION SPECIALITIES.
2 MANUFACTURER SHALL GUARANATEE AND ASSURE PROPER OPERATION OF REFRIGERANT SYSTEM.
3 PROVIDE FACTORY CONTROLLER AND LOW AMBIENT KIT.
4. LOCAL DISCONECT SWITCH SHALL BE FURNISHED BY MANUFACTURER AND FIELD INSTALLED BY DIVISION 26/ELECTRICAL.

## FAN COIL SCHEDULE

| TAG | ASSOCIATED CONDENSING UNIT | ROOMS SERVED | TYPE | TOTAL AIRFLOW (CFM) | COOLING TOTAL CAPACITY (MBH @ 95 DEG F) | HEATING TOTAL CAPACITY (MBH @ 47 DEG F) | ELECTRICAL | | | BASIS OF DESIGN | | WEIGHT (LBS) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | VOLTS | PHASE | STARTER / DISCONNECT BY | MFGR | MODEL | | |
| FCU-01 | CU-01 | IT (211) | WALL MOUNTED | 425 CFM | 12 | 37 | 208 | 1 | MFGR / MFRG | MITSUBISHI | PKA-A12H A | 29 | 1, 2, 3 |
| FCU-02 | CU-02 | IT (211) | WALL MOUNTED | 425 CFM | 12 | 37 | 208 | 1 | MFGR / MFRG | MITSUBISHI | PKA-A12H A | 29 | 1, 2, 3 |
| FCU-03 | CU-03 | SCADA (210) | WALL MOUNTED | 425 CFM | 12 | 37 | 208 | 1 | MFGR / MFRG | MITSUBISHI | PKA-A12H A | 29 | 1, 2, 3 |
| FCU-04 | CU-04 | SCADA (210) | WALL MOUNTED | 425 CFM | 12 | 37 | 208 | 1 | MFGR / MFRG | MITSUBISHI | PKA-A12H A | 29 | 1, 2, 3 |

**REMARKS:**
1. FURNISH MANUFACTURER RECOMMENDED CONDENSATE PUMP. MECHANICAL CONTRACTOR SHALL INSTALL CONDENSATE PUMP AND ASSOCIATED CONDENSATE PIPING.
2. 240V, 2 POLE, NON-FUSIBLE, NEMA 3R DICONNECT SWITCH FOR EACH CONDENSER UNIT. DIVISION 26 SUBCONTRACTOR TO FURNISH AND INSTALL SWITCHES.
3. PROVIDE UNIT WITH FACTORY CONTROLS. FURNISH AND INSTALL MANUFACTURER'S STANDARD THERMOSTAT AS INDICATED ON PLAN DRAWINGS. THERMOSTAT SHALL BE MOUNTED AT APPROXIMATELY 4' AFF.

## HEATER SCHEDULE (UH & CUH)

| TAG | AREA SERVED | POSITION | CONFIGURATION | FAN TYPE | AIRFLOW (CFM) | HEAT INPUT (MBH) | OUTPUT CAPACITY (MBH) | GAS CONNECTION (IN) | VENT / COMBUSTION SIZE (IN) | ELECTRICAL | | | APPROXIMATE WEIGHT (LBS) | BASIS OF DESIGN | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | FAN MOTOR HP | VOLTS | PHASE | | MFGR | MODEL | |
| EUH-01 | OZONE DESTRUCT 107 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 410 CFM | 8.87 | 8.87 | 0 | 0 / 0 | 0.025 | 208 | 1 | 35 | CHROMALOX | LUH-02-81-34-41-1 | 2, 3 |
| UH-01 | MECHANICAL ROOM 217 | CEILING MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-02 | CAUSTIC SODA 224 | CEILING MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 1,2 |
| UH-03 | CAUSTIC SODA 224 | CEILING MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 1,2 |
| UH-04 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-05 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-06 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-07 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-08 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-09 | BACKWASH PUMP STATION 300 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-10 | HALLWAY | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-11 | HALLWAY | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-12 | TREATMENT | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-13 | TREATMENT | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-14 | TREATMENT | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |
| UH-15 | MAINTENANCE 205 | WALL MOUNTED | POWER VENTILATED | VANE AXIAL | 456 CFM | 30 | 24.6 | 0.5 | 4 / 4 | 0.06 | 115 | 1 | 55 | REZNOR | UDAS 30 | 2 |

**REMARKS:**
1. UNIT HEATERS UH-02 AND UH-03 SHALL BE STAINLESS STEEL OR APPROVED EQUAL, AND SHALL BE SUITABLE FOR INSTALLATION IN CORROSIVE ENVIRONMENT.
2 PROVIDE LOCAL UNIT MOUNTED THERMOSTAT FOR UNIT HEATERS UNLESS OTHERWISE SHOWN. HEATER SHALL THROW AT LEAST 30'.
3. ELECTRIC UNIT HEATER.
4. PROVIDE PRESSURE REDUCING VALVE. BUILDING NATURAL GAS PRESSURE IS 2 PSIG.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 1/11/19 | BJR | DLO | ISSUED PER PCO 24 |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

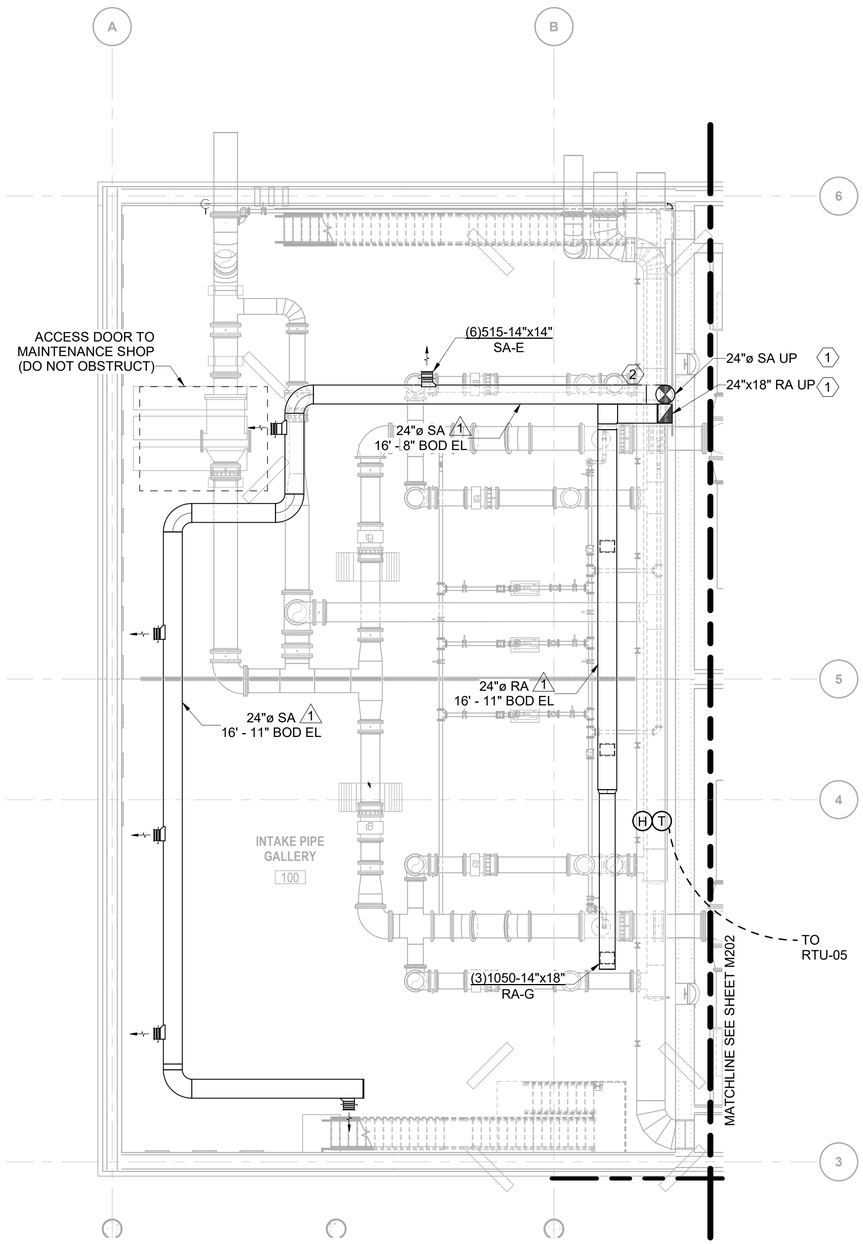
| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL SCHEDULES III

| | |
|---|---|
| project 98101 | contract |
| drawing M007 | rev. 1 |
| sheet 301 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA A**

0 4' 8' 16'

SCALE IN FEET

NORTH

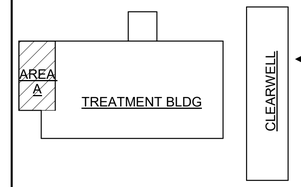
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INSTALL THERMOSTAT/HUMIDISTAT AT 4'-0" AFF.

**KEYED NOTE:** (#)

1. PROVIDE APPROVED NON COMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION AROUND THE ANNULAR SPACE AROUND THE PENETRATING DUCT. REDUCE DUCT CROSS SECTION AS REQUIRED TO USE FLOOR PENETRATION. SEE CONTINUATION ON M204.
2. COORDINATE FINAL ROUTING WITH PROCESS PIPING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A

| project | contract |
|---|---|
| 98101 | |

drawing **M201 — 1** rev.

sheet 302 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INSTALL THERMOSTAT AT 4'-0" AFF.

**KEYED NOTES:** (#)

1. FIELD ROUTE DUCTWORK TO AVOID INTERFERENCE WITH PIPING, PIPE SUPPORTS AND EQUIPMENT.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

MATCHLINE SEE SHEET M201

MATCHLINE SEE SHEET M203

FLOCCULATION 1

FLOCCULATION 2

SEDIMENTATION BASIN 1

SEDIMENTATION BASIN 2

FILTER PIPE GALLERY
101

BLOWER ROOM
110

(2)720-16"x16"
SA-E

1 24"ø SA
17' - 3" BOD EL

24"ø SA 1
17' - 0" BOD EL

16"ø SA 1
17' - 4" BOD EL

H T
TO RTU-06

720-16"x16"
SA-E

L-03
14' AFF

AREA B
TREATMENT BLDG

CLEARWELL

**LOWER LEVEL PLAN AREA B**

0 4' 8' 16'
SCALE IN FEET

NORTH

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B

| project | contract |
|---|---|
| 98101 | |

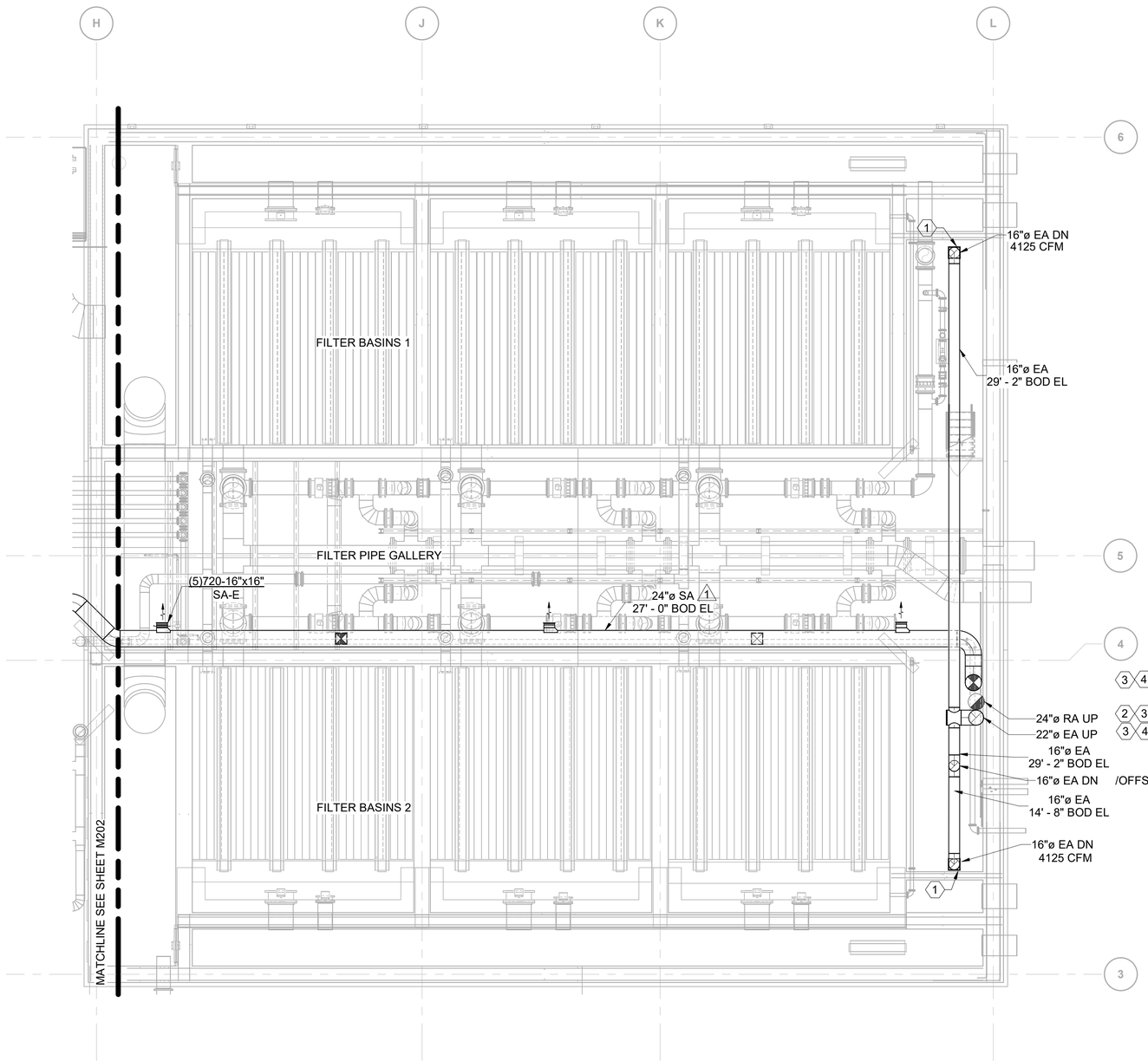
drawing **M202 — 1** rev.

sheet 303 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH

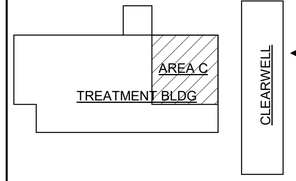
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. CONTRACTOR TO COORDINATE DUCT ROUTING TO ELIMINATE INTERFERENCES WITH PIPING, LIGHTING, AND OTHER EQUIPMENT.
3. DUCT HEIGHTS ON THIS DRAWING ARE FROM THE FILTER AREA FOUNDATION.

**KEYED NOTES:** (#)

1. ROUTE EXHAUST DUCT TO WITHIN 1'0" AFF. TERMINATE WITH 1/2" ALUMINUM MESH BIRDSCREEN.
2. TERMINATE 12" BELOW CEILING. PROVIDE 1/2" MESH SCREEN.
3. PROVIDE APPROVED NON COMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION AROUND THE ANNULAR SPACE AROUND THE PENETRATING DUCT.
4. SEE CONTINUATION ON M206.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C

| project | contract |
|---|---|
| 98101 | |

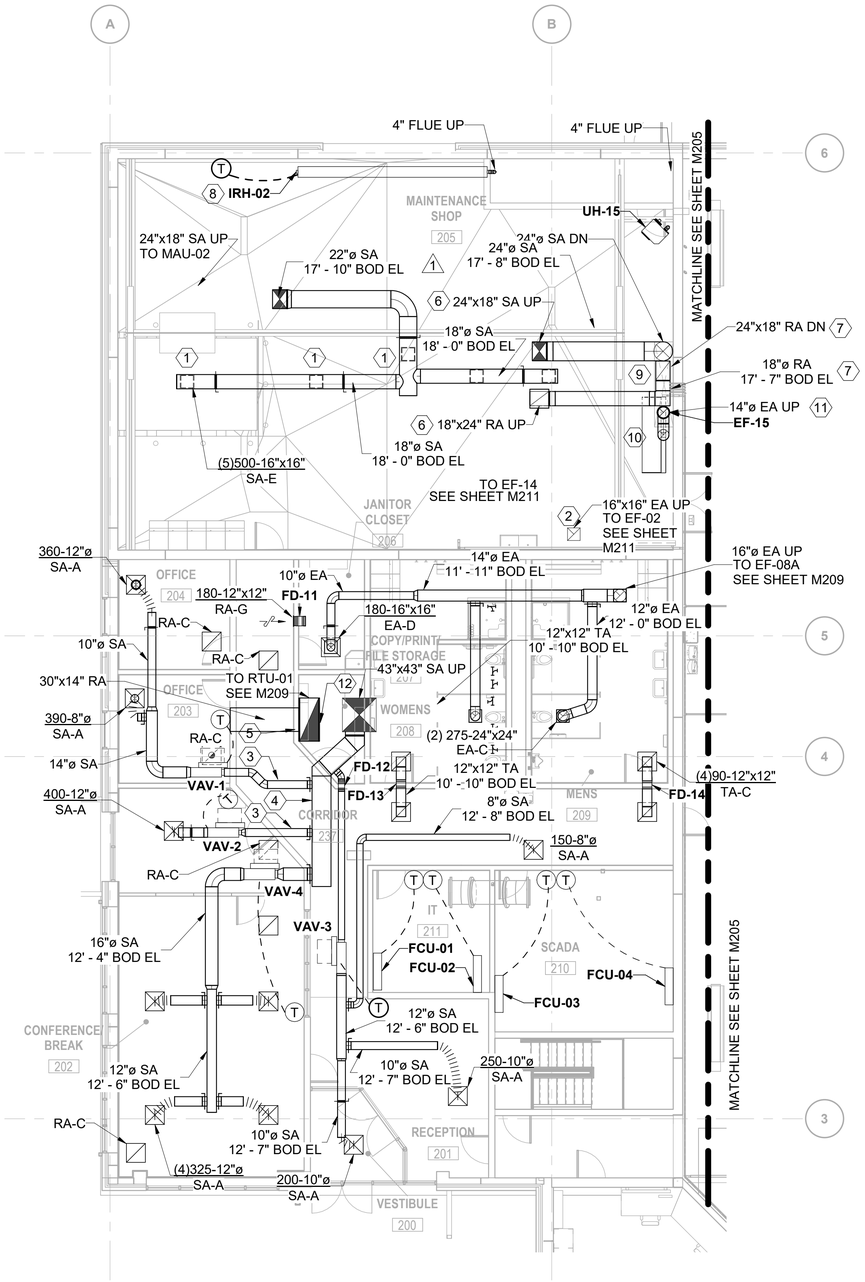
drawing **M203 — 1** rev.

sheet 304 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA A**

0 4' 8' 16'

SCALE IN FEET

NORTH

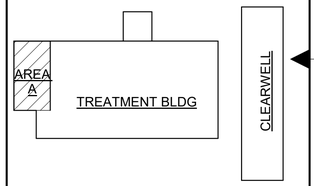
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INSTALL UNIT HEATERS 8'-0" AFF WITH FACTORY WALL MOUNTING BRACKET. INSTALL RADIANT HEATER AT 15'-0" AFF.
3. ROUTE REFRIDGERANT LINES FROM FCU-01 THRU FCU-04 TO CU-01 THRU CU-04 ON ROOF
4. INSTALL THERMOSTATS AT 4'0" AFF.
5. PROVIDE A MANUAL BALANCING DAMPER FOR ALL SUPPLY DIFFUSERS.

**KEYED NOTES:** (#)

1. DIFFUSERS SHALL NOT BE BELOW 17'3" AFF. CONTRACTOR TO COORDINATE ELEVATION TO AVOID LIGHTING AND BRIDGE CRANE INTERFERENCE.
2. TERMINATE 12" BELOW CEILING, PROVIDE 1/2" MESH SCREEN.
3. 10" DIA SA 12'-9" BOD EL.
4. 24"x24" SA 12'-0" BOD EL.
5. 24"x24" RA UP TO RTU-01, SEE M209.
6. DUCTWORK TO RTU-05. REFER TO SHEET M209 FOR CONTINUATION.
7. SEE CONTINUATION ON M201.
8. COORDINATE FINAL LOCATION WITH ROLL UP DOOR AND MANUFACTURERS REQUIRED CLEARANCE. TILT AS NEEDED TO HEAT THE BASE OF THE DOOR.
9. REDUCE CROSS SECTION OF DUCT WORK TO PASS THROUGH CONCRETE PENETRATION AS REQUIRED.
10. WELDING FUME HOOD. SEE DETAIL ON M003. ROUTE DUCTWORK UP TO EF-15, UP THRU ROOF. TERMINATE WITH WITCHES CAP. COORDINATE HOOD WITH CITY OF THORNTON WELDING TABLE REQUIREMENTS.
11. SEE M209 FOR CONTINUATION. TERMINATE DUCT WITH WITCHES CAP.
12. PROVIDE OPENING FOR RETURN AIR FROM SOUTH SIDE OF FIRE WALL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

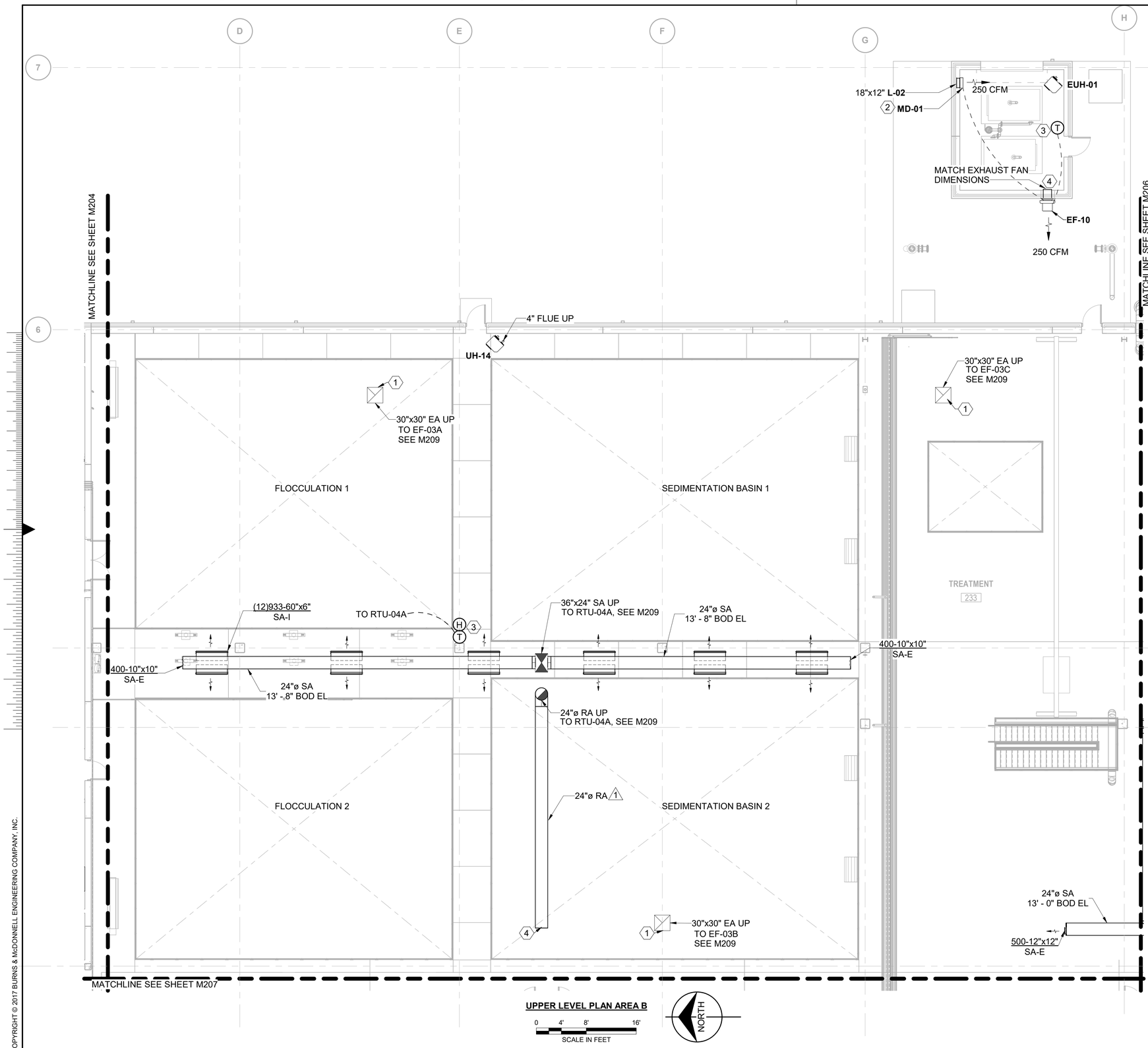
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A

| | |
|---|---|
| project 98101 | contract |
| drawing M204 | rev. 1 |
| sheet 305 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA B**

0 4' 8' 16'

SCALE IN FEET

NORTH

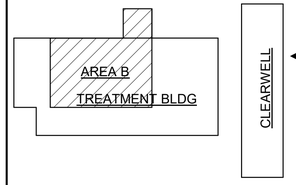
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INCLUDE A MANUAL BALANCING DAMPER FOR EACH SUPPLY DIFFUSER.
3. MOUNT ALL UNIT HEATERS 8'0" AFF WITH FACTORY WALL MOUNTING BRACKET.
4. DUCTWORK IN THE TREATMENT AREA SHALL BE ALUMINUM. AIR TERMINAL MATERIAL SHALL MATCH DUCTWORK.
5. ANGLE DRUM LOUVERS AT 45 DEGREE ANGLE TOWARD TREATMENT FLOOR.

**KEYED NOTES:** (#)

1. TERMINATE 12" BELOW CEILING, PROVIDE 1/2" ALUMINUM MESH SCREEN.
2. INTERLOCK MD-01 WITH EF-10. DELAY FAN START UNTIL DAMPER IS FULLY OPEN.
3. MOUNT THERMOSTAT 4'-0" AFF.
4. COVER WITH 1/2" MESH SCREEN.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 03/31/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B

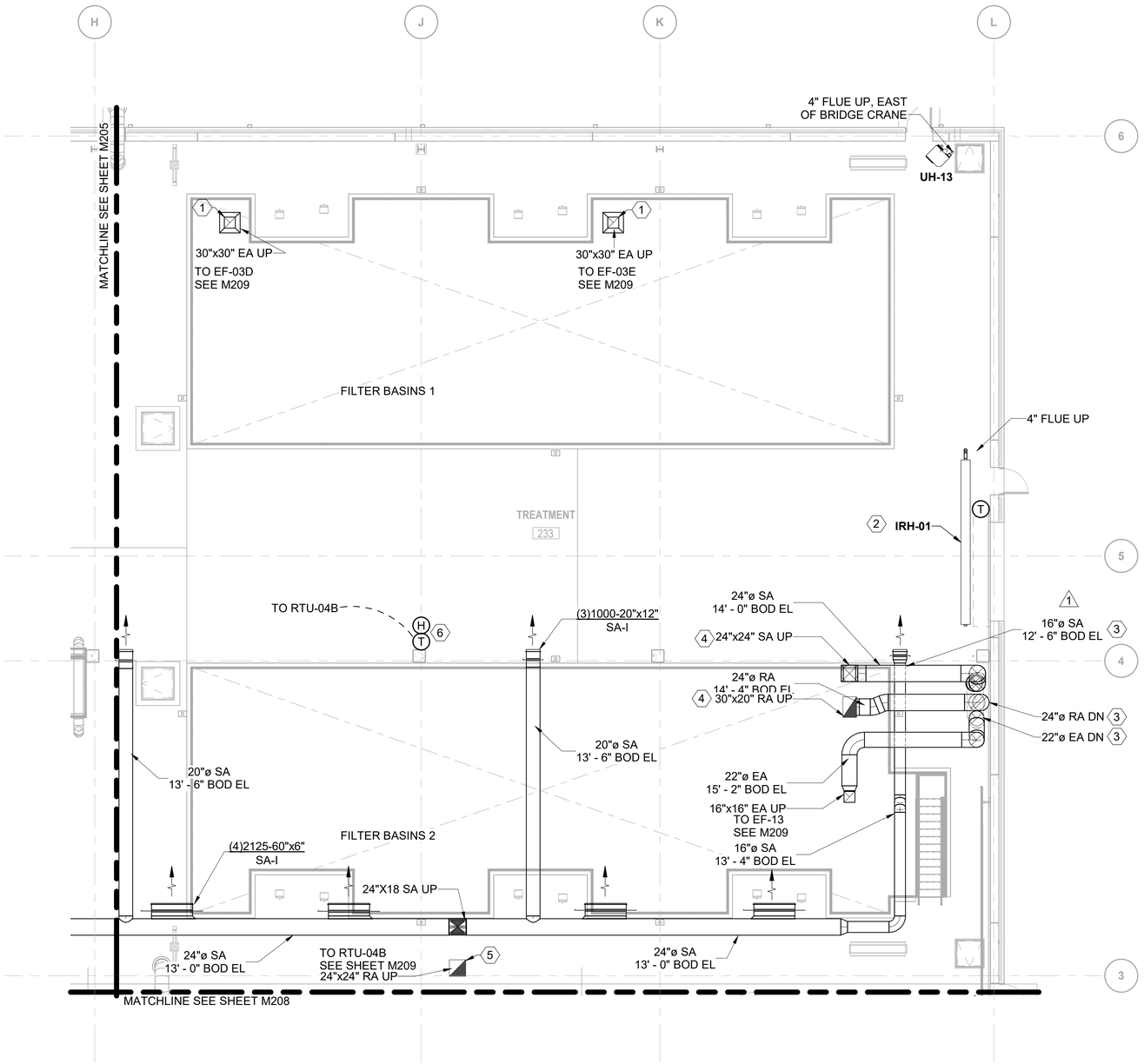
| project | contract |
|---|---|
| 98101 | |

drawing **M205 — 1** rev.

sheet 306 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA C**

0 4' 8' 16'

SCALE IN FEET

NORTH

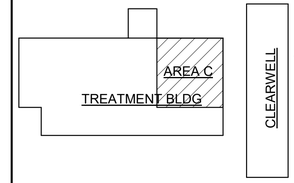
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. PROVIDE A MANUAL BALANCING DAMPER FOR EACH SUPPLY GRILLE.
3. MOUNT UNIT HEATERS 8'-0" AFF WITH FACTORY WALL MOUNTING BRACKET. INSTALL RADIANT HEATER 15'-0" AFF.
4. DUCTWORK IN THE TREATMENT AREA SHALL BE ALUMINUM. AIR TERMINAL MATERIAL SHALL MATCH DUCTWORK.
5. ANGLE DRUM LOUVERS AT 45 DEGREE ANGLE TOWARD TREATMENT FLOOR.

**KEYED NOTES:** (#)

1. TERMINATE 12" BELOW CEILING, PROVIDE 1/2" ALUMINUM MESH SCREEN.
2. COORDINATE FINAL LOCATION WITH ROLL UP DOOR AND MANUFACTURERS REQUIRED CLEARANCE.
3. SEE SHEET M203 FOR CONTINUATION. FIELD ROUTE DUCT THROUGH FLOOR PENETRATION. SEE STRUCTURAL FOR COORDINATION. REDUCE DUCT SIZE(S) AS REQUIRED TO FIT FLOOR PENETRATION.
4. TO RTU-06, SEE M209.
5. TERMINATE 60" BELOW CEILING, PROVIDE 1/2' ALUMINUM MESH SCREEN.
6. MOUNT THERMOSTAT 4'-0" AFF.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JGG | ABD | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C

| | |
|---|---|
| project 98101 | contract |
| drawing **M206** | rev. **1** |
| sheet 307 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

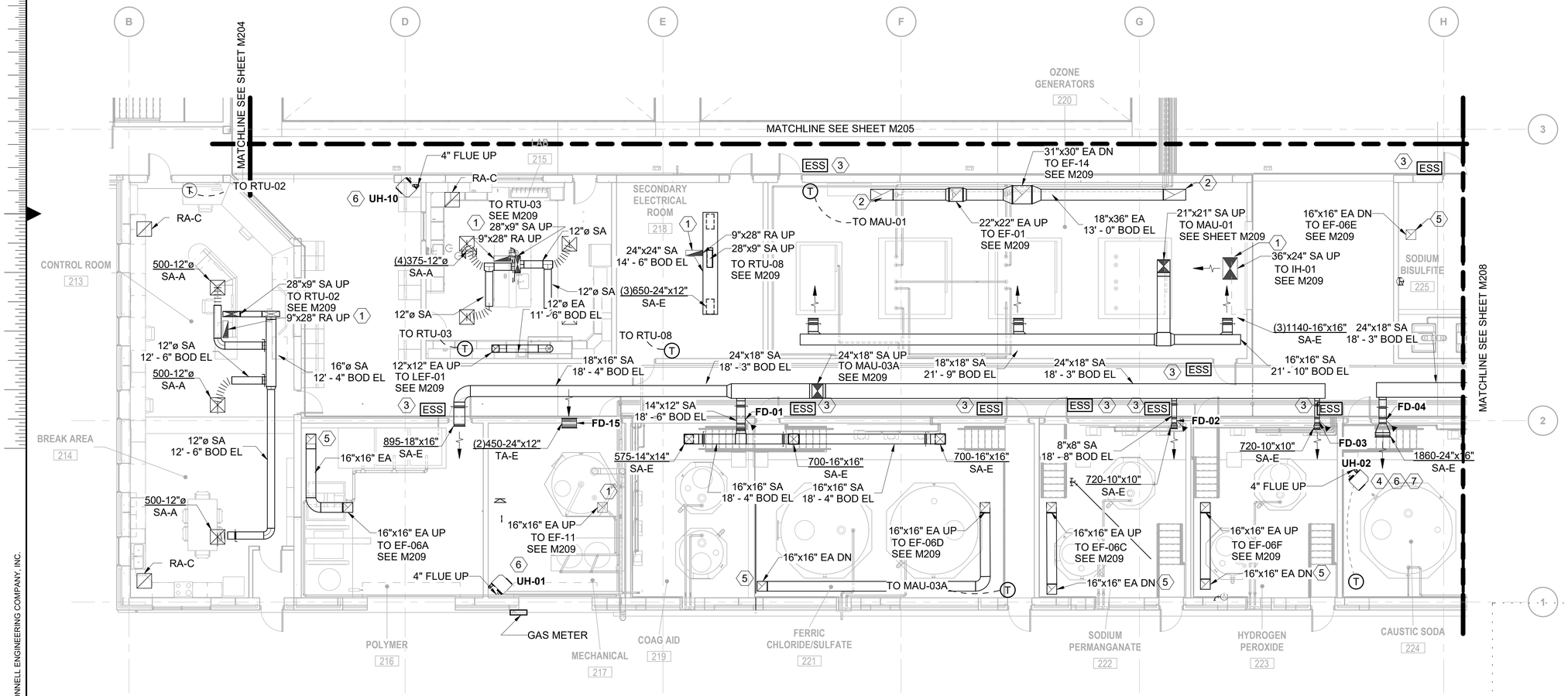
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INSTALL UNIT HEATERS 8'0" AFF.
3. PROVIDE PVC COATED GALVANIZED DUCTWORK FOR MAU-03A AND MAU-01.
4. INSTALL THERMOSTATS AT 4'-0" AFF.

**KEYED NOTES:** (#)

1. TERMINATE DUCT WORK 12" BELOW CEILING, PROVIDE 1/2" MESH SCREEN.
2. TERMINATE DUCT WITHIN 1'-0" AFF. PROVIDE 1/2" MESH SCREEN.
3. PROVIDE BREAK-GLASS SWITCH MANUAL SHUTOFF CONTROL WITH SIGNAGE "VENTILATION SYSTEM EMERGENCY SHUT-OFF." EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF VENTILATION SYSTEM INCLUDING SUPPLY AND EXHAUST UNITS ASSOCIATED WITH THE ROOM.
4. UNIT HEATERS IN THE CAUSTIC SODA ROOM SHALL BE OF STAINLESS STEEL CONSTRUCTION AND SUITABLE FOR CORROSIVE ENVIRONMENTS.
5. ROUTE DUCT DOWN TO 10" AFF. BOTTOM OF UPPER GRILLE SHALL BE MOUNTED AT 8'-0" AFF AND THE BOTTOM OF THE LOWER GRILLE SHALL BE MOUNTED AT 12" AFF. MATCH GRILLE SIZE TO DUCT WORK, USE GRILLE TYPE G.
6. MOUNT UNIT HEATERS 8'-0" AFF WITH FACTORY WALL MOUNTING BRACKET.
7. UNIT HEATER SET POINT SHALL BE 65 DEGREES F (ADJ).

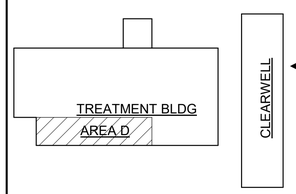



**UPPER LEVEL PLAN AREA D**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D

| project | contract |
|---|---|
| 98101 | |

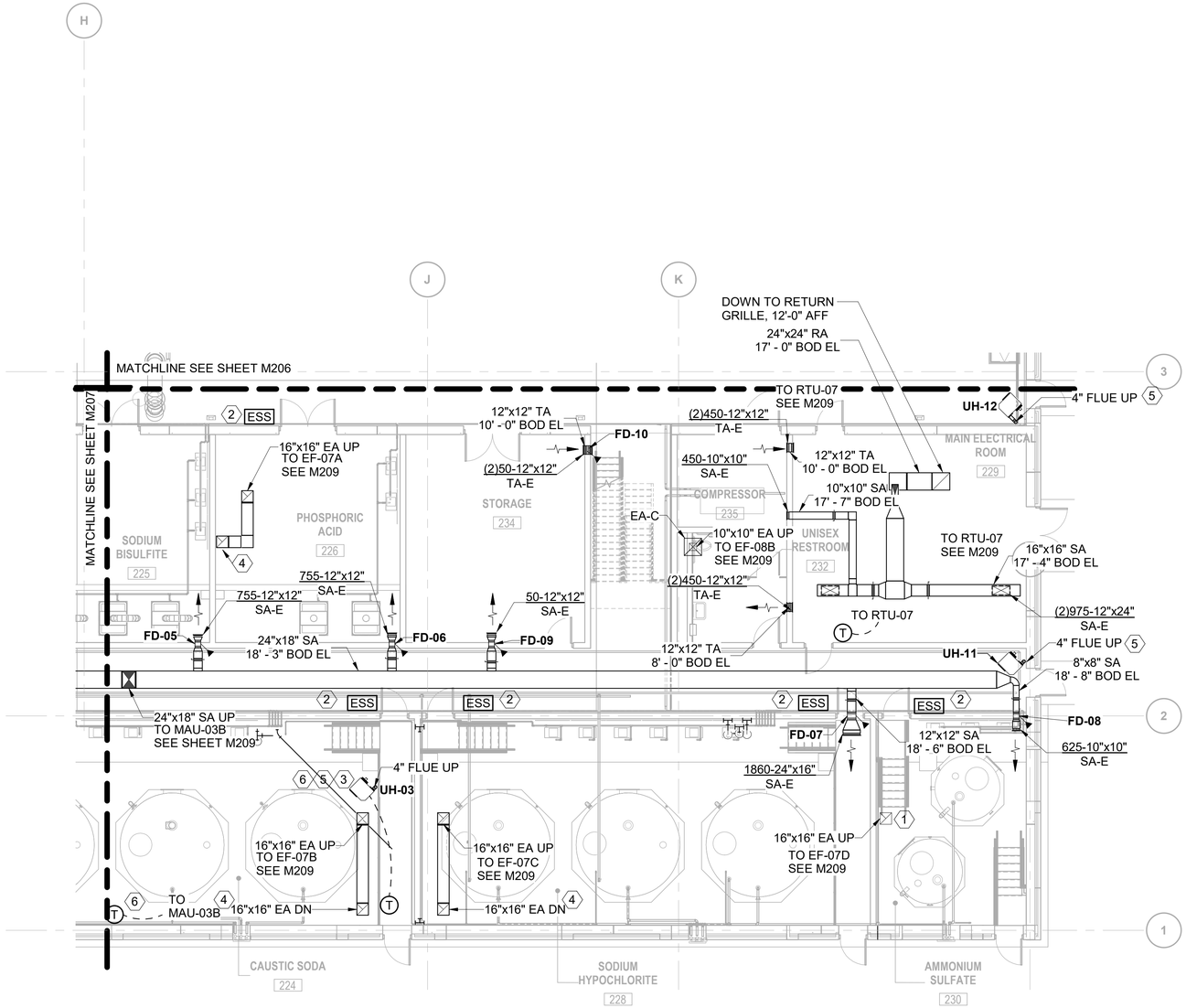
drawing **M207** rev. **0**

sheet 308 of 542 sheets

file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN AREA E**

0 4' 8' 16'

SCALE IN FEET

NORTH

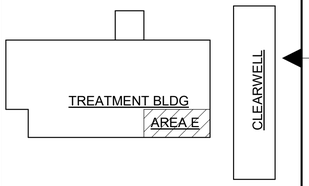
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. INSTALL THERMOSTATS AT 4'-0" AFF UNLESS NOTED OTHERWISE.
3. PROVIDE A MANUAL BALANCING DAMPER FOR EACH SUPPLY DIFFUSER. DIRECT FLOW FOR OPTIMAL AIR DISTRIBUTION.
4. PROVIDE PVC COATED GALVANIZED DUCT WORK FOR MAU-03B.

**KEYED NOTES:** (#)

1. TERMINATE DUCTWORK 12" BELOW CEILING. PROVIDE 1/2" MESH SCREEN.
2. PROVIDE BREAK-GLASS SWITCH MANUAL SHUTOFF CONTROL WITH SIGNAGE "VENTILATION SYSTEM EMERGENCY SHUT-OFF." EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF VENTILATION SYSTEM INCLUDING SUPPLY AND EXHAUST UNITS ASSOCIATED WITH THE ROOM.
3. UNIT HEATERS IN THE CAUSTIC SODA ROOM SHALL BE OF STAINLESS STEEL CONSTRUCTION AND SUITABLE FOR CORROSIVE ENVIRONMENTS.
4. ROUTE DUCT DOWN TO 10" AFF. BOTTOM OF UPPER GRILLE SHALL BE MOUNTED AT 8'-0" AFF AND THE BOTTOM OF THE LOWER GRILLE SHALL BE MOUNTED AT 12" AFF. MATCH GRILLE SIZE TO DUCT WORK, USE GRILLE TYPE G.
5. MOUNT UNIT HEATERS 8'-0" AFF WITH FACTORY WALL MOUNTING BRACKET.
6. CAUSTIC SODA HEATING SET POINT SHALL BE 65 DEGREES F (ADJ).

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E

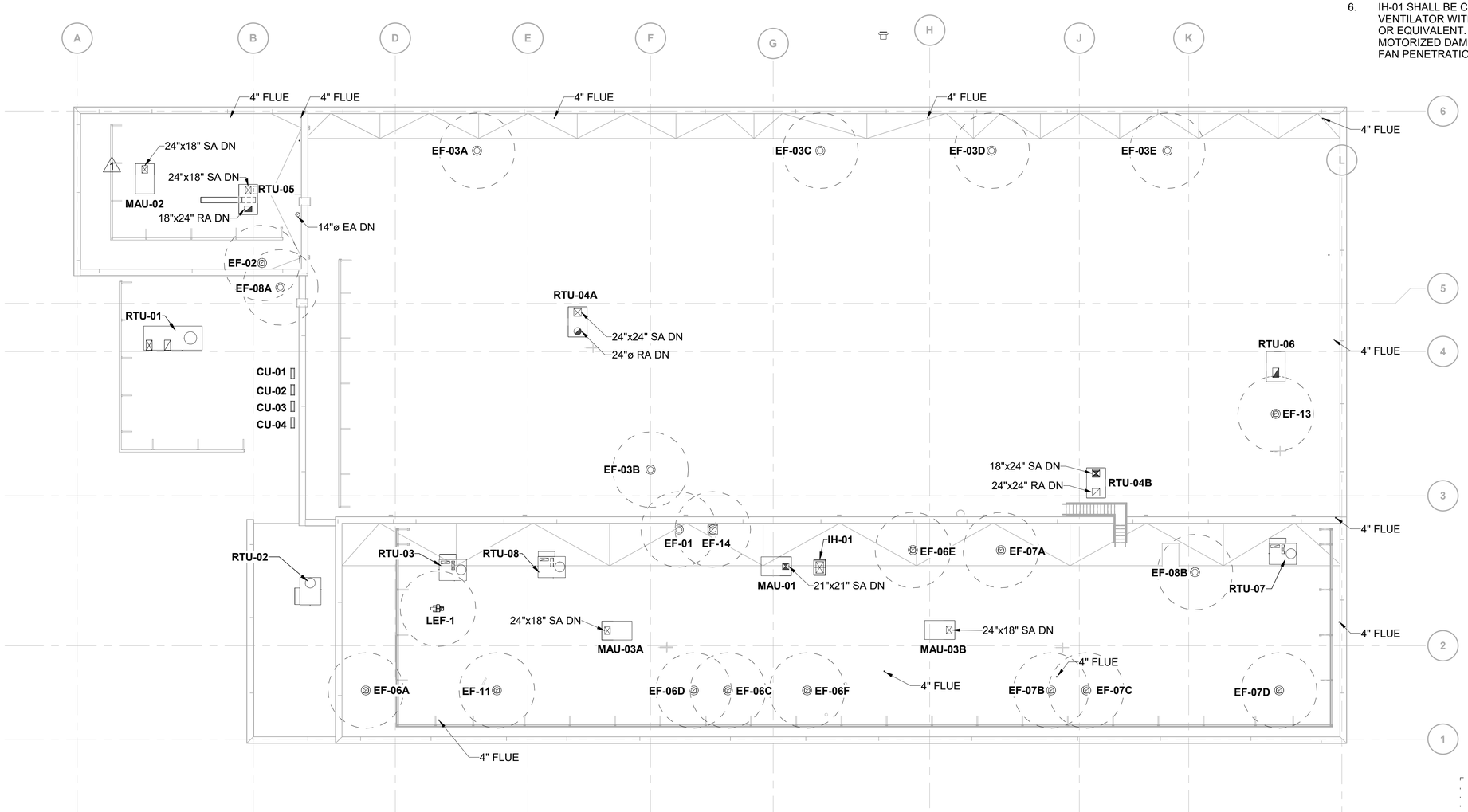
| | |
|---|---|
| project 98101 | contract |
| drawing **M208** | rev. **0** |
| sheet 309 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. PROVIDE ISOLATION/ROOF CURBS WITH ALL MAU'S AND RTU'S.
3. PROVIDE CAP FOR FLUE VENTS AND EF-14 DUCT PENETRATION.
4. FIELD ROUTE REFRIDGERANT LINES AND ASSOCIATED APPERTENUANCES FROM CONDENSING UNITS CU-01 THRU CU-04 TO THEIR RESPECTIVE FAN COIL UNITS. SIZE PER MANUFACTURERS GUIDELINES.
5. FOR ALL RTU AND MAU UNITS, PROVIDE CONDENSATE TRAP DRAIN. SIZE PER MFG INSTRUCTIONS AND SLOPE TO DRAIN.
6. IH-01 SHALL BE COOK GR GRAVITY RELIEF VENTILATOR WITH 36"x24" ROOF CONNECTION, OR EQUIVALENT. PROVIDE COMPLETE WITH MOTORIZED DAMPER AND ROOF CURB. MATCH FAN PENETRATION DETAILS FOR INSTALLATION.




**OVERALL ROOF PLAN**

0 8' 16' 32'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF PLAN

| project | contract |
|---|---|
| 98101 | |

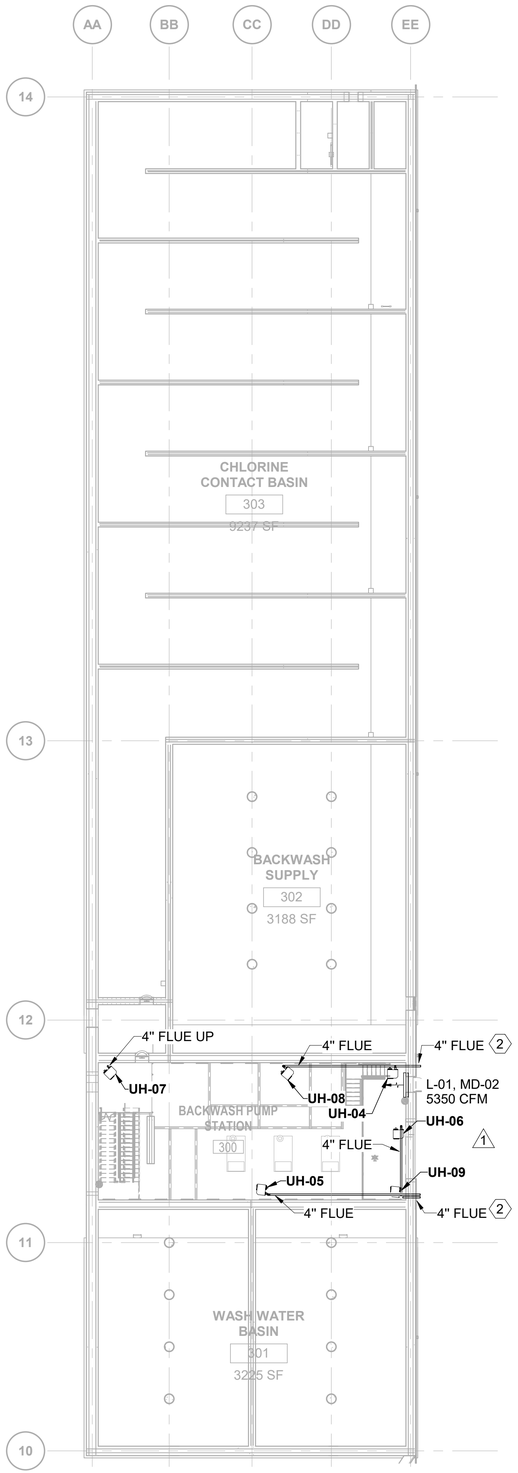
drawing **M209 — 1** rev.

sheet 310 of 542 sheets

file 98101_M

Scale For Microfilming
Millimeters
Inches

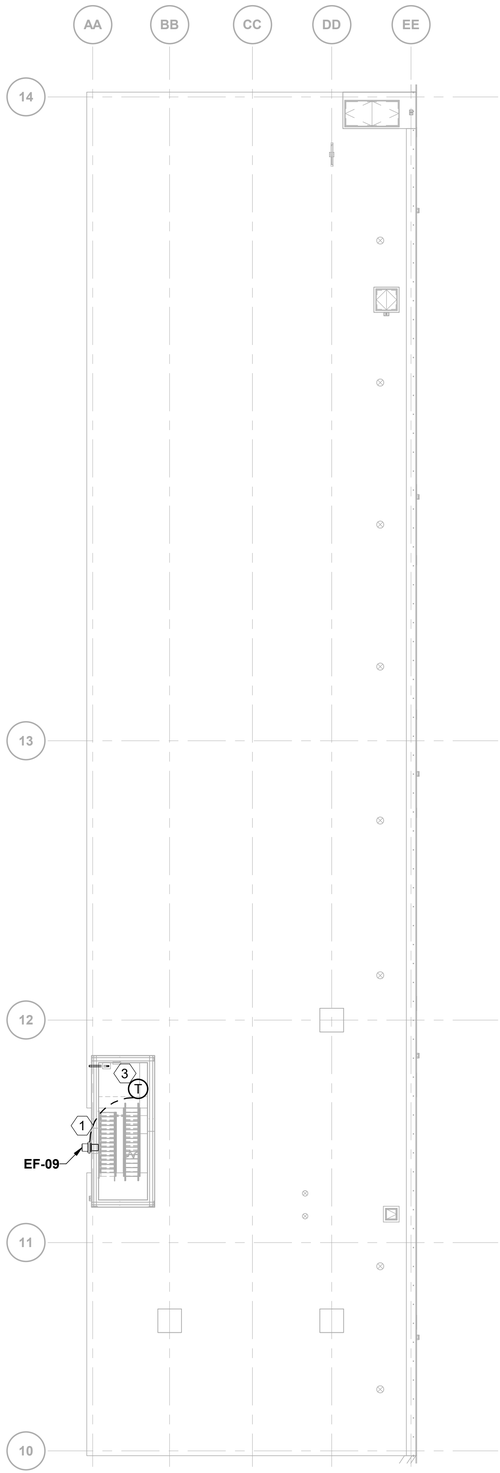
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**OVERALL LOWER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH




**OVERALL UPPER LEVEL PLAN**

0 8' 16' 32'
SCALE IN FEET

NORTH

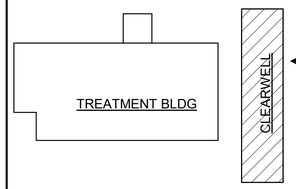
**NOTES:**

1. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE DRAWING M001.
2. MOUNT UNIT HEATERS 8'0" AFF. USE FACTORY WALL MOUNT BRACKET.
3. INTERLOCK MD-02 TO EF-09. DELAY FAN START UNTIL DAMPER IS FULLY OPEN.

**KEYED NOTES:** (#)

1. PROVIDE BIRDSCREEN FOR EF-09 ON INTERIOR OF PENETRATION. MOUNT 8'0" AFF.
2. ROUTE UNIT HEATER CONCENTRIC VENT/FLUE THROUGH SOUTH WALL OF BACKWASH PUMP STATION. TURN UP AND PROVIDE CAPS. ELEVATION OF EAST VENTS SHALL PENETRATE WALL NO LESS THAN 10' ABOVE THE TOP OF L-01.
3. MOUNT THERMOSTAT AT 4'-0" AFF.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

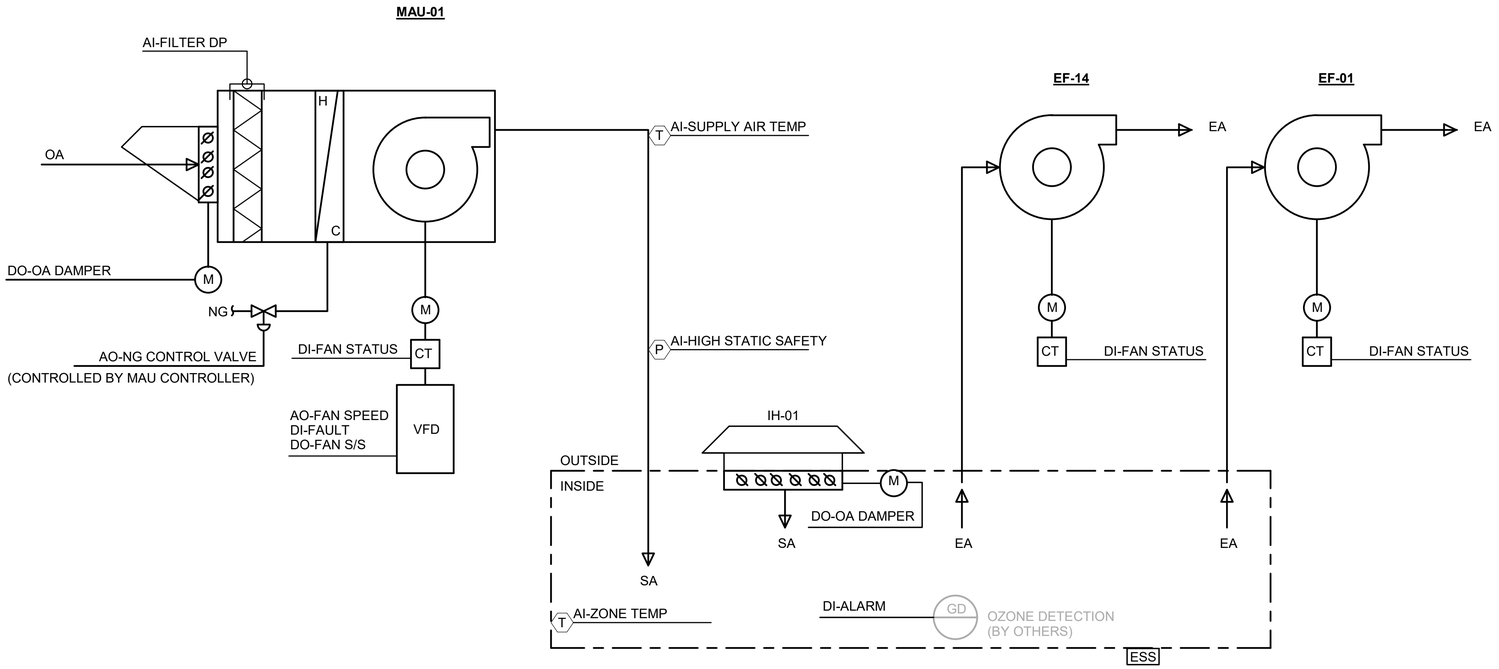
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL CLEARWELL PLAN

| | |
|---|---|
| project 98101 | contract |
| drawing **M210** | rev. **1** |
| sheet 311 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**OZONE GENERATION ROOM (220)**

| DEVICE | HARDWARE: INPUTS: DIGITAL: STATUS | ALARM | SMOKE | ANALOG: TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | OUTPUTS: DIGITAL: STATUS | ON / OFF | START/STOP | ANALOG: POSITION | SPEED | SETPOINT | SOFTWARE: ALARMS: GENERAL | HIGH/LOW ALARM | FAILURE TO START | FUNCTIONS: EQUIPMENT RUNTIME | DATA TREND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAKE UP AIR UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| OUTDOOR AIR DAMPER | | | | | | | X | | | | X | | | | | | | |
| FILTERS (MERV 8) | | X | | | | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| SUPPLY AIR FAN | X | X | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS (TEMP) | | X | | X | | | | | | | | | | | X | | | |
| SUPPLY AIR CONDITIONS (PRESSURE) | | X | | | X | | | | | | | | | | X | | | |
| OZONE DETECTION (BY OTHERS) | | X | | | | | | | | | | | | | | | | |
| ZONE TEMPERATURE | | | | X | | | | X | | | | | | | X | | | |
| EXHUAST FAN EF-01 | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | X | | | | | | | | X | | X | | X | | X | | X |
| EXHUAST FAN EF-14 | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | X | | | | | | | | X | | X | | X | | X | | X |
| OZONE DETECTOR (BY OTHERS) | | X | | | | | | | | | | X | | | | | | |

**HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF MAKE UP AIR UNIT (MAU-01) WITH A SUPPLY FAN, OUTSIDE AIR DAMPER, FILTER, AND A ROOM AIR TEMPERATURE SENSOR/TRANSMITTER. THE SUPPLY UNIT WILL BE INTERLOCKED WITH AN EXHAUST FAN (EF-01). THE SYSTEM WILL OPERATE CONTINUOUSLY TO HEAT AND VENTILATE THE SPACE. THE ROOM SET POINTS SHALL BE ADJUSTABLE. UPON OZONE DETECTION EF-14 SHALL ENERGIZE AND DRAW AIR IN THROUGH THE ROOF MOUNTED INTAKE HOOD.

B. NORMAL OPERATION
1. VENTILATION:
1.1 SUPPLY FAN SHALL OPERATE TO PROVIDE A MINIMUM OF 6 ACH OF OUTSIDE AIR.
1.2 EF-14 MAY BE MANUALLY ENERGIZED TO ACHIEVE 20 ACH VIA A WALL MOUNTED SWITCH.
1.3 EXHAUST FAN EF-01 SHALL BE INTERLOCKED TO MAU-01 AND EXHAUST 6 ACH DURING NORMAL OPERATION.
1.4 WHEN THE SPACE TEMPERATURE IS GREATER THAN 80 DEGREES F, EF-14 SHALL ENERGIZE AND/OR INCREASE SPEED AND RUN CONTINUOUSLY TO MAINTAIN SPACE TEMPERATURE.
2. HEATING
2.1 GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE OF 60 DEGREES F AS CONTROLLED BY A WALL MOUNTED THERMOSTAT.

C. EMERGENCY OPERATION
1. OZONE DETECTION
1.1 IF A HIGH OZONE READING OF 0.1 PPM (ADJUSTABLE) IS EXCEEDED BY A SINGLE DETECTOR, IH-01 SHALL PROVIDE 20 ACH OF OUTSIDE AIR AND EF-14 SHALL EXHAUST 20 ACH. ONCE THE OZONE CONCENTRATION IS REDUCED TO BELOW 0.1 PPM, THE VENTILATION SYSTEM WILL CONTINUE TO OPERATE IN THIS MODE FOR AN ADDITIONAL 5 MINUTES THEN RETURN TO NORMAL OPERATION. (NOTE: OZONE UNITS SHUT DOWN UPON DETECTION OF 0.3 PPM.)
1.2 THE HEATING COIL SHALL CONTINUE TO OPERATE AT NORMAL LEVELS. THE HEATING COIL SHALL BE SIZED FOR 6 ACH OPERATION ONLY.
2. EQUIPMENT FAILURE
2.1 INDICATION SHALL BE TAKEN DIRECTLY FROM MAU-01 AND EF-01 FAN MOTOR CURRENT TRANSDUCERS. IF THE CURRENT FAILS, AN ALARM (AUDIBLE PLUS STROBE) SHALL BE GENERATED.
2.2 IF THE SPACE TEMPERATURE FALLS BELOW SET POINT FOR MORE THAN 10 MINUTES, AN ALARM SHALL BE GENERATED.
2.3 A TEMPERATURE SENSOR IN THE MAU-01 DUCTWORK SHALL SENSE THE SUPPLY AIR TEMPERATURE AND SHALL ALARM WHEN THE SUPPLY AIR TEMPERATURE IS BELOW 40 DEGREES F OR ABOVE 125 DEGREES F.
2.4 HIGH STATIC ALARM AND VFD FAULT ALARM SHALL RESULT IN A SHUT DOWN OF SUPPLY AND EXHAUST UNITS.

D. EMEGENCY WALL SWITCH (ESS)
1. PROVIDE BREAK-GLASS SWITCH MANUAL SHUTOFF CONTROL WITH SIGNAGE "VENTILATION SYSTEM EMERGENCY SHUT-OFF." EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF VENTILATION SYSTEM INCLUDING SUPPLY AND EXHAUST UNITS ASSOCIATED WITH THE ROOM. EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF MAU-01 FAN AND CLOSE OUTSIDE AIR DAMPER, CLOSE IH-01 INTAKE DAMPER AND SHUT DOWN EF-01 AND EF-14.

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS I

| project | contract |
|---|---|
| 98101 | |

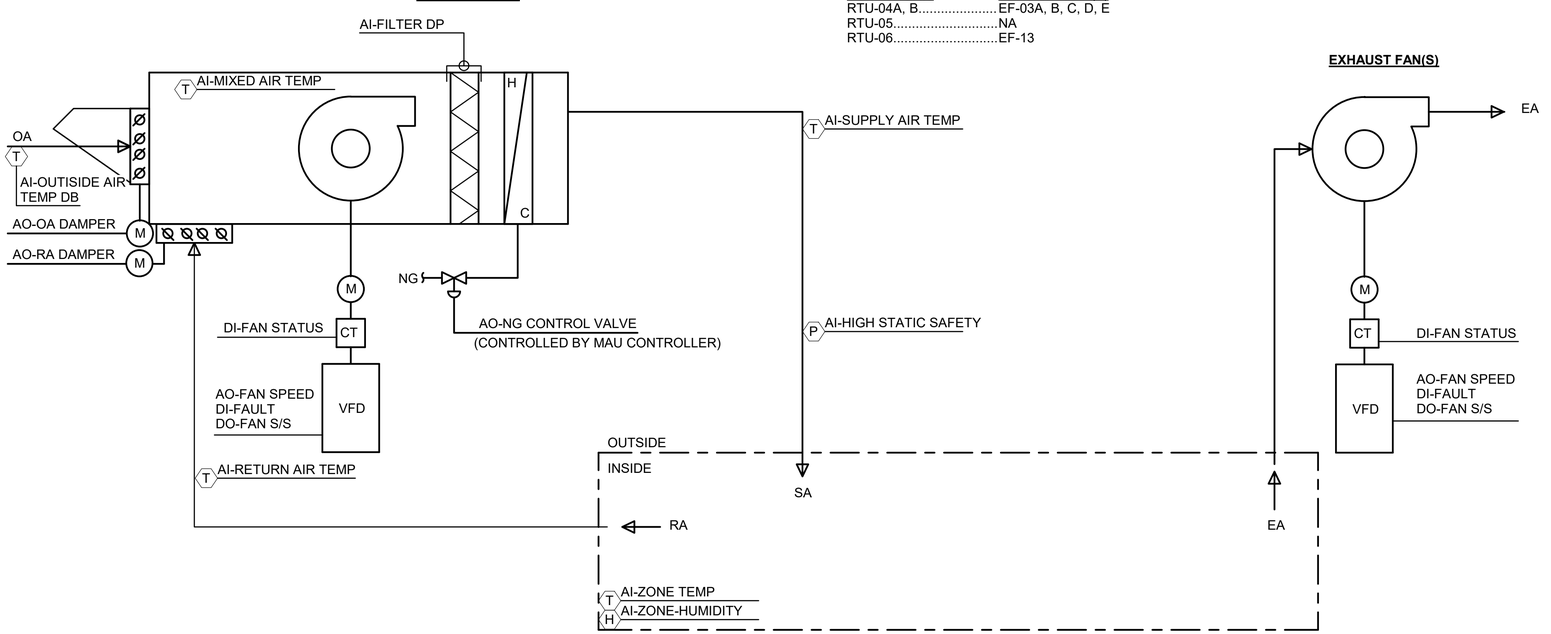
drawing **M301 — 0** rev.

sheet 312 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**ROOF TOP UNIT**

SUPPLY UNIT — EXHAUST FAN(S)
RTU-04A, B..... EF-03A, B, C, D, E
RTU-05..... NA
RTU-06..... EF-13




**EXHAUST FAN(S)**




**TREATMENT (233), FILTER PIPE GALLERY (101), INTAKE PIPE GALLERY (100)**

| DEVICE | HARDWARE | | | | | | | | | | | | | SOFTWARE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INPUTS | | | | | | | OUTPUTS | | | | | | ALARMS | | | FUNCTIONS | |
| | DIGITAL | | | ANALOG | | | | DIGITAL | | | ANALOG | | | | | | | |
| | STATUS | ALARM | SMOKE | TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | STATUS | ON / OFF | START/STOP | POSITION | SPEED | SETPOINT | GENERAL | HIGH/LOW ALARM | FAILURE TO START | EQUIPMENT RUNTIME | DATA TREND |
| ROOF TOP UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| RETURN AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| RETURN AIR CONDITIONS | | | | X | | | | | | | | | | | X | | | |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | X | | |
| OUTDOOR AIR CONDITIONS | | | | X | | X | | | | | | | | | | | | |
| MIXED AIR CONDITIONS | | | | X | | | | | | | | | | | | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| SUPPLY AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | X | | | |
| ZONE TEMPERATURE/HUMIDITY | | | | X | | X | | | | | | | | | X | | | X |
| DUCT HIGH STATIC | | | | | | | | | | | | | | | X | | | |
| EXHUAST FAN | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |

**HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

PERTAINS TO THE TREATMENT UNITS, THE FILTER PIPE GALLERY UNIT AND THE INTAKE PIPE GALLERY UNIT. RTU-04A & RTU-04B SHALL INTERLOCK WITH EF-03A, EF-03B, AND EF-03C, EF-03D AND EF-03E. RTU-05 IS A RETURN AIR ONLY UNIT AND POINTS PERTAINING TO THE EXHUAST FAN AND OUTSIDE AIR DAMPER DO NOT APPLY IN THIS SPACE. RTU-06 SHALL INTERLOCK WITH EF-13.

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF AN ECONOMIZER, MIXED AIR SECTION, INDIRECT GAS FIRED HEATING COIL, SUPPLY FAN AND EXHAUST FAN(S).

B. OPERATING MODES OF SYSTEM:
1. SYSTEM SHALL OPERATE CONTINOUSLY TO PROVIDE MINIMUM OUTDOOR AIR REQUIREMENTS.
2. THE INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE OF 60 DEGREES F (ADJ) BASED ON A WALL MOUNTED THERMOSTAT.
3. WHEN THE SPACE TEMPERATURE IS GREATER THAN 80 DEGREES F (ADJ), THE VENTILATION SYSTEM SHALL INCREASE SPEED AND RUN CONTINUOUSLY TO MAINTAIN SPACE TEMPERATURE.
4. WHEN THE SPACE HUMIDITY IS GREATER THAN 50% RH (ADJ), THE VENTILATION SYSTEM SHALL INCREASE SPEED AND RUN CONTINUOUSLY TO MAINTAIN SPACE HUMIDITY.

C. ECONOMIZER SEQUENCE:
1. ECONOMIZER MODE SHALL BE DETERMINED BASED ON THE OUTSIDE AIR TEMPERATURE SENSOR (DB) AND THE RETURN AIR TEMPERATURE SENSOR.
1.1 ECONOMIZER MODE ON (COOLING): OUTSIDE AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR SETPOINT OF 60 DEGREES F (ADJ), AND THE SUPPLY AIR FAN/EXHAUST FAN(S) SHALL MODULATE TO MAINTAIN THE SPACE SET POINT. THE ECONOMIZER MODE SHALL BE USED WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
1.2 ECONOMIZER MODE ON (HEATING): OUTSIDE AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR SETPOINT OF 60 DEGREES F (ADJ), AND THE SUPPLY AIR FAN/EXHAUST FAN(S) SHALL MODULATE TO MAINTAIN THE SPACE SET POINT. THE ECONOMIZER MODE SHALL BE USED WHEN THE OUTSIDE AIR TEMPERATURE IS HIGHER THAN THE RETURN AIR TEMPERATURE.
1.3 ECONOMIZER MODE OFF: RETURN DAMPER SHALL FULLY OPEN AND OUTSIDE AIR DAMPER SHALL RETURN TO MINIMUM POSITION, SET BY TAB CONTRACTOR. THE UNIT SHALL RETURN TO HEATING OR COOLNG MODE DETEMINED BY CONTROLS LOGIC. THE ECONOMIZER MODE SHALL BE OFF WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE RETURN AIR TEMPERATURE.

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

3. INTAKE PIPE GALLARY DOES NOT INCLUDE AN EXHAUST FAN AND NO POINTS/CONTROL ARE REQURIED FOR THE AREA.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS II

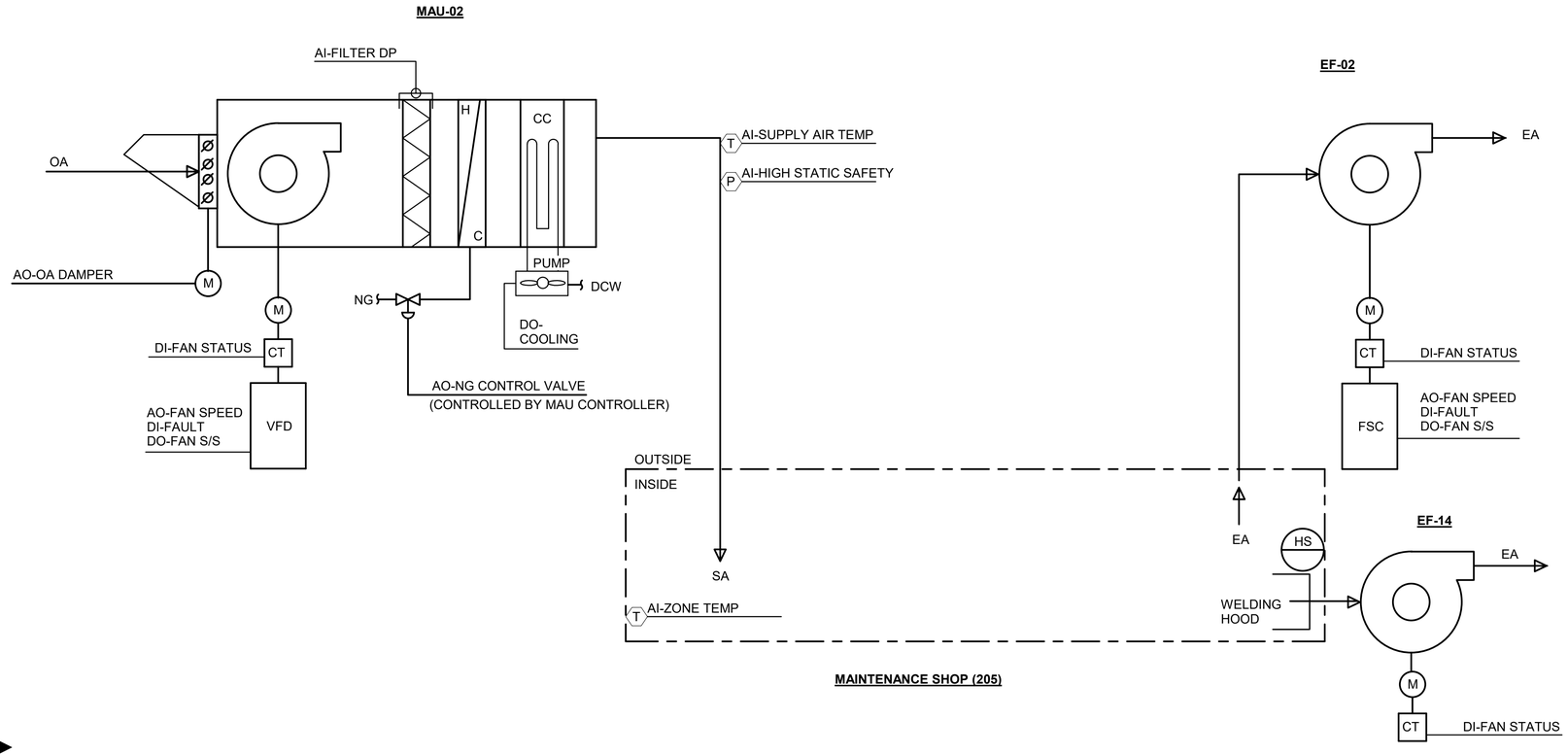
| project | contract |
|---|---|
| 98101 | |

drawing **M302** rev. **0**

sheet 313 of 542 sheets
file 98101_M

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF A VARIABLE VOLUME MAKE UP AIR UNIT WITH A SUPPLY FAN, OUTSIDE AIR DAMPER, DIRECT FIRED NATURAL GAS HEATING COIL, EVAPORATIVE COOLING COIL AND A ROOM AIR TEMPERATURE ELEMENT. THE SUPPLY UNIT WILL BE PAIRED WITH AN VARIABLE EXHAUST FAN. THE SYSTEM WILL OPERATE CONTINUOUSLY TO COOL/HEAT AND VENTILATE. THE ROOM SET POINTS SHALL BE ADJUSTABLE.

B. NORMAL OPERATION
1. VENTILATION:
1.1 SUPPLY FAN SHALL OPERATE TO PROVIDE MINIMUM OUTSIDE AIR.
1.2 EXHAUST FAN VARIABLE SPEED OF EF-02 SHALL BE INTERLOCKED TO MAU-02.
2. HEATING
2.1 INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE NOT BELOW 68 DEGREES F (ADJ).
3. COOLING CONTROL
3.1 AN EVAPORATIVE COOLING COIL SHALL ENERGIZE TO MAINTAIN ROOM TEMPERATURE OF 80 DEGREES F. EVAPORATIVE COOLING COIL AND ALL ASSOCIATED APPURTENANCES SHALL OPERATE PER MANUFACTURERS STANDARD.
4. WELDING FUME HOOD
4.1 WELDING FUME HOOD AND ASSOCIATED EXHAUST FAN SHALL BE ACTIVATED BY A WALL MOUNTED ON/OFF HAND SWITCH. EF-02 TO TURN ON WHEN EF-14 IS TURNED OFF. EF-02 TO TURN OFF WHEN EF-14 IS TURNED ON.

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

3. PROVIDE STANDARD FREEZE PROTECTION ON THE EVAPORATOR SECTIONS OF MAU-02 WITH SHUTOFF AND DRAIN DOWN LINES IN UNCONDITIONED.

| DEVICE | HARDWARE INPUTS DIGITAL STATUS | ALARM | SMOKE | ANALOG TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | HARDWARE OUTPUTS DIGITAL STATUS | ON / OFF | START/STOP | ANALOG POSITION | SPEED | SETPOINT | SOFTWARE ALARMS GENERAL | HIGH/LOW ALARM | FAILURE TO START | FUNCTIONS EQUIPMENT RUNTIME | DATA TREND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAKE UP AIR UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| EVAPORATIVE COOLER | X | | | | | | | | | | | | | X | | X | X | X |
| SUPPLY AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | X | | | |
| ZONE TEMPERATURE | | | | X | | | | | | | | | | | X | | | |
| EXHUAST FAN | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| HAND SWITCH | | | | | | | | | X | | | X | | | | | | |
| WELDING FUME HOOD FAN | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | | | | | | | | | X | | | | X | | X | | X |
| HAND SWITCH | | | | | | | | | X | | | | | | | | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS III

| project | contract |
|---|---|
| 98101 | |

drawing **M303 — 0** rev.

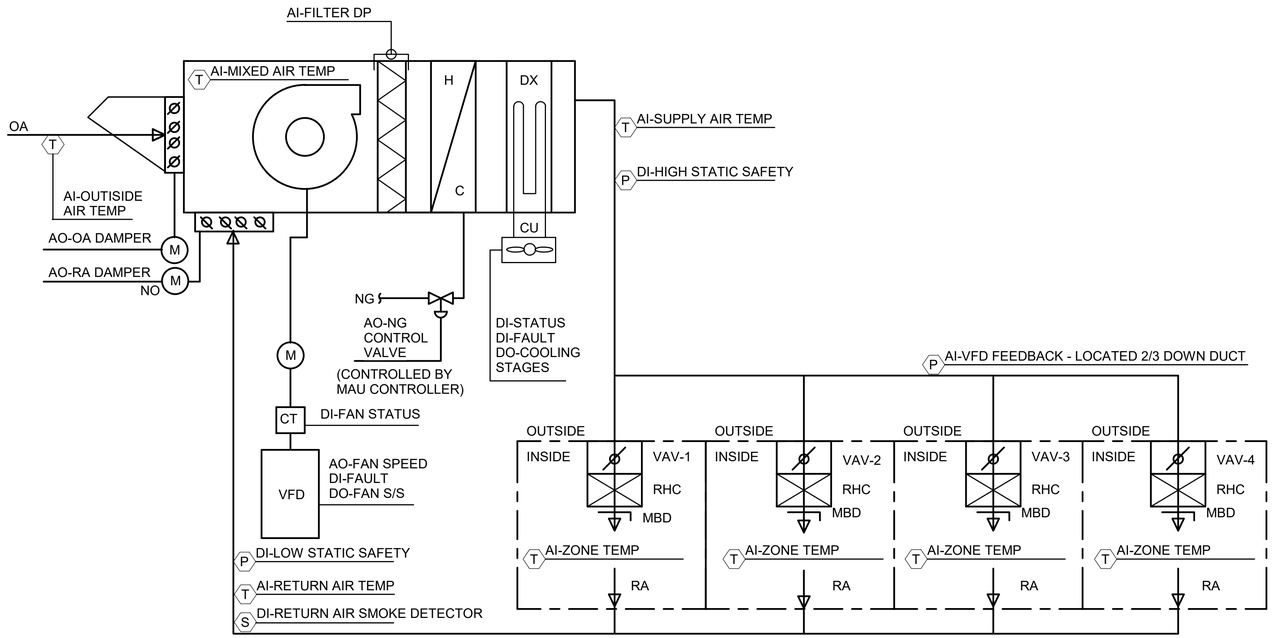
sheet 314 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

Scale For Microfilming
Millimeters
Inches

**RTU-01**




| DEVICE | HARDWARE | | | | | | | | | | | | | | SOFTWARE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INPUTS | | | | | | | OUTPUTS | | | | | | | ALARMS | | | FUNCTIONS | |
| | DIGITAL | | | ANALOG | | | | DIGITAL | | | ANALOG | | | | | | | | |
| | STATUS | ALARM | SMOKE | TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | STATUS | ON / OFF | START/STOP | POSITION | SPEED | SETPOINT | | GENERAL | HIGH/LOW ALARM | FAILURE TO START | EQUIPMENT RUNTIME | DATA TREND |
| MAKE UP AIR UNIT | | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | | X | | X | X | X |
| RETURN AIR DAMPER | X | | | | | | | | | | X | | | | | | | | |
| RETURN AIR CONDITIONS | | | | X | | | | | | | | | | | | X | | | |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | | | | |
| OUTDOOR AIR CONDITIONS | | | | X | | | | | | | | | | | | | | | |
| MIXED AIR CONDITIONS | | | | X | | | | | | | | | | | | X | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | | X | | X | | X |
| SUPPLY AIR FAN | X | | | | X | | | | | X | | X | | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | | X | | | |
| ZONE TEMPERATURE | | | | X | | | | | | | | | | | | X | | | |
| DUCT HIGH STATIC | | | | | | | | | | | | | | | | | | | |
| DUCT SMOKE DETECTOR | | | X | | | | | | X | | | | | | X | | | | |

**RTU HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF AN ECONOMIZER, MIXED AIR SECTION, INDIRECT GAS FIRED HEATING COIL, DX COOLING COIL SUPPLY FAN.

B. OPERATING MODES OF SYSTEM:
1. SYSTEM SHALL OPERATE CONTINOUSLY TO PROVIDE MINIMUM OUTDOOR AIR REQUIREMENTS.
2. THE INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE OF 72 DEGREES F BASED ON A WALL MOUNTED THERMOSTAT. ON A DECREASE OF LOCALIZED ROOM TEMPERATURE AS READ FROM THE ROOM TEMPERATURE CONTROLLER, THE VAV TERMINAL UNIT SHALL ENERGIZE ITS REHEAT COIL (RHC). RHC WILL LIMIT HIGH AIR TEMPERATURE TO 95 DEGREES F; AT MAX TEMPERATURE LIMIT THE DAMPER SHALL OPEN TO PROVIDE ADDITIONAL AIR.
3. PROVIDE STATIC PRESSURE SENSOR MOUNTED WITHIN DUCTWORK FOR CONTROL OF MAIN FAN SPEED ADJUSTED PER VAV REQUIREMENTS.
4. WHEN ONE ZONE CALLS FOR COOLING CHANGE OVER TO COOLING MODE (DX OR ECONOMIZER) (RHC TO HEAT REMAINING ZONE).

C. ECONOMIZER SEQUENCE (COOLING):
1. ECONOMIZER MODE SHALL BE DETERMINED BASED ON THE OUTSIDE AIR TEMPERATURE SENSOR AND THE RETURN AIR TEMPERATURE SENSOR.
1.1 ECONOMIZER MODE ON: OUTSIDE AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR SETPOINT OF 55-60 DEGREES F (ADJ), AND THE SUPPLY AIR FAN SHALL MODULATE TO MAINTAIN THE SPACE SET POINT. THE ECONOMIZER MODE SHALL BE USED WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
1.2 ECONOMIZER MODE OFF: RETURN DAMPER SHALL FULLY OPEN AND OUTSIDE AIR DAMPER SHALL RETURN TO MINIMUM POSITION, SET BY TAB CONTRACTOR. THE UNIT SHALL RETURN TO HEATING OR COOLNG MODE DETEMINED BY CONTROLS LOGIC. THE ECONOMIZER MODE SHALL BE OFF WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE RETURN AIR TEMPERATURE.

D. VAV CONTROL
1. THE CONTROLLER SHALL MONITOR ROOM TEMPERATURE AND RESET THE CFM SET POINT UP OR DOWN IN RESPONSE TO COOLING/HEATING DEMAND.
2. ON A RISE IN ROOM TEMPERATURE, MODULATE THE AIR DAMPER TOWARDS ITS MAXIMUM COOLING CFM SETPOINT UNTIL COOLING SETPOINT HAS BEEN ACHIEVED.
3. WHEN THE ZONE TEMPERATURE IS BETWEEN THE COOLING SETPOINT AND THE HEATING SETPOINT, THE ZONE DAMPER SHALL CONTROL TO ITS MINIMUM OCCUPIED AIRFLOW (ADJ).
4. ON A CONTINUED FALL IN ROOM TEMPERATURE, CONTINUE DELIVERING THE SCHEDULED MINIMUM AIR FLOW AND INCREASE THE REHEAT OUTPUT PROPORTIONALLY UNTIL THE HEATING SETPOINT HAS BEEN ACHIEVED.

E. FIRE PROTECTION
1. UPON DETECTION OF SMOKE FROM THE DUCT MOUNTED SMOKE DETECTOR, A SIGNAL SHALL BE SENT TO THE FIRE ALARM PANEL AND THE SUPPLY AND EXHAUST FANS SHALL BE SHUT DOWN. SEE FA DRAWINGS FOR SENSORS AND CONTROLS TO CONNECT TO.

ADJUSTABLE SET POINTS:
72 DEGREES F (COOLING), 70 DEGREES F (HEATING)

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| **designed** | **checked** |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS IV

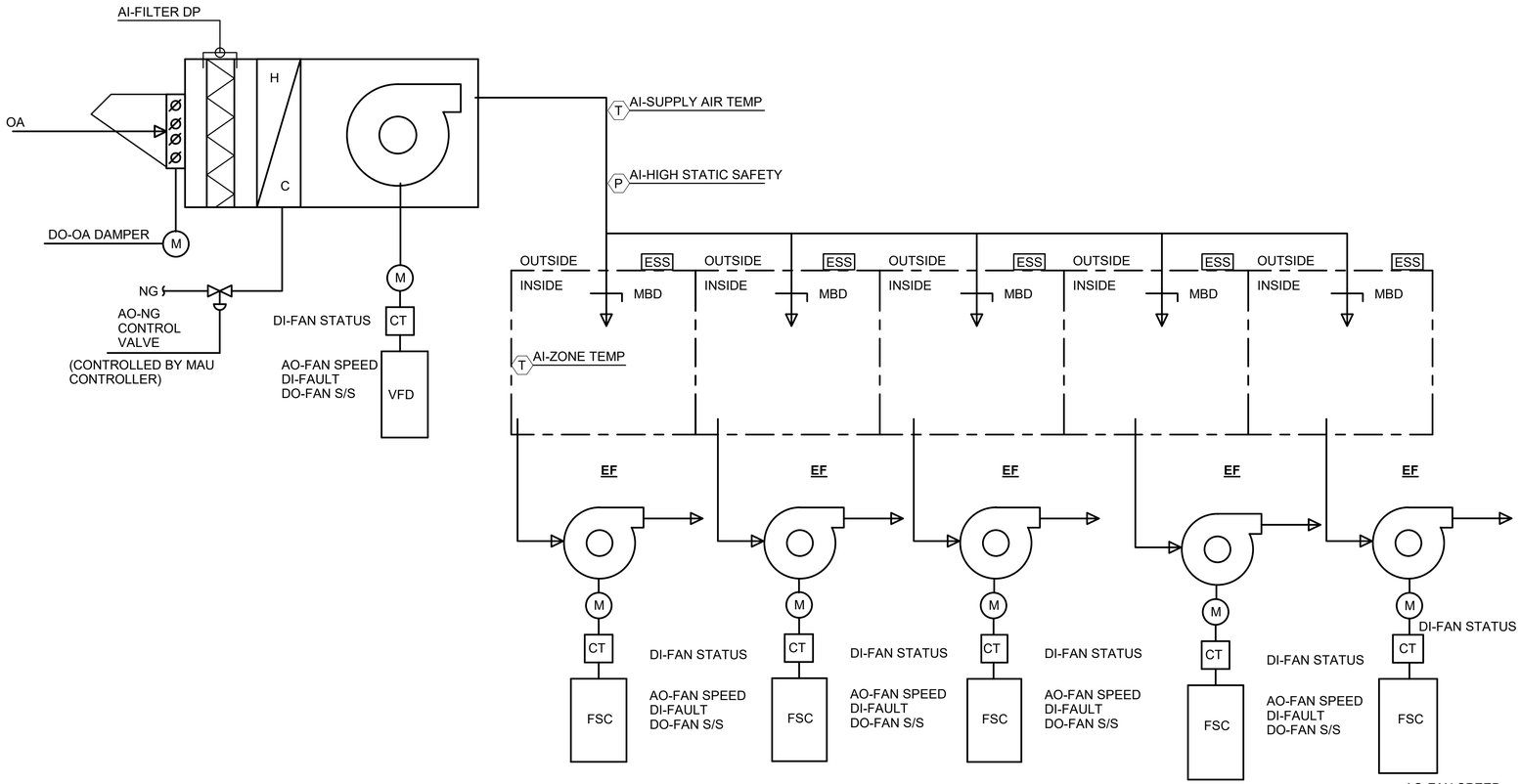
| project | contract |
|---|---|
| 98101 | |

drawing **M304 — 0** rev.

sheet 315 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## MAKE UP AIR UNIT
MAU-03A, MAU-03B




| DEVICE | HARDWARE: INPUTS: DIGITAL: STATUS | ALARM | SMOKE | ANALOG: TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | OUTPUTS: DIGITAL: STATUS | ON / OFF | START/STOP | ANALOG: POSITION | SPEED | SETPOINT | SOFTWARE: ALARMS: GENERAL | HIGH/LOW ALARM | FAILURE TO START | FUNCTIONS: EQUIPMENT RUNTIME | DATA TREND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAKE UP AIR UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| SUPPLY AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | X | | | |
| ZONE TEMPERATURE | | | | X | | | | | | | | | | | X | | | |
| HAND/OFF/AUTO | | | | | | | | | X | | | X | | | | | | |
| EXHUAST FANS | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| EXHAUST AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| HAND/OFF/AUTO | | | | | | | | | X | | | X | | | | | | |

## HEATING AND VENTILATING SEQUENCE OF OPERATIONS

PERTAINS TO TWO VENTILATION SYSTEMS:
1. MAU-03A WITH EF-06A (POLYMER ROOM), EF-06B (COAG AID), EF-06C(SODIUM PERMANGANATE), EF-06D (FERRIC CHLORIDE), AND EF-06F (HYDROGEN PEROXIDE).
2. MAU-03B WITH EF-07A (PHOSPHORIC ACID), EF-07B (CAUSTIC SODA), EF-07C (SODIUM HYPOCHLORATE), EF-07D (AMMONIA SULFATE), EF-06E (SODIUM BISULFATE)

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF A CONSTANT VOLUME MAKE UP AIR UNIT WITH A SUPPLY FAN, MODULATING OUTSIDE AIR DAMPER, FILTER, A ROOM AIR TEMPERATURE SENSOR/TRANSMITTER AND AN EXHAUST FAN FOR EACH SPACE. THE SYSTEM WILL OPERATE CONTINUOUSLY TO HEAT AND VENTILATE THE SPACES. THE ROOM SET POINTS SHALL BE ADJUSTABLE.

B. NORMAL OPERATION
1. VENTILATION:
1.1 SUPPLY FAN SHALL OPERATE TO PROVIDE MINIMUM OUTSIDE AIR.
1.2 MAKE UP AIR UNIT AND ALL ASSOCIATED EXHAUST FANS MAY BE MANUALLY SHUT OFF VIA A BREAK-GLASS MANUAL SHUTOFF CONTROL LOCATED OUTSIDE EACH ROOM.
2. HEATING
2.1 INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE OF 50 DREES F ( 65 DEGREES F FOR ZONE WITH CAUSTIC SODA ROOM)AS CONTROLLED BY A WALL MOUNTED THERMOSTAT - SEE PLAN FOR THERMOSTAT LOCATION.

C. EMERGENCY OPERATION
1. EQUIPMENT FAILURE
1.1 INDICATION SHALL BE TAKEN DIRECTLY FROM MAKE UP AIR UNIT AND EXHAUST FAN MOTOR CURRENT TRANSDUCERS. IF THE CURRENT FAILS, AN ALARM SHALL BE GENERATED.
1.2 IF THE SPACE TEMPERATURE FALLS BELOW SET POINT FOR MORE THAN 20 MINUTES, AN ALARM SHALL BE GENERATED.
1.3 A TEMPERATURE SENSOR IN THE MAKE UP AIR UNIT DUCTWORK SHALL SENSE THE SUPPLY AIR TEMPERATURE AND SHALL ALARM WHEN THE SUPPLY AIR TEMPERATURE IS BELOW A 40 DEGREES F OR ABOVE 125 DEGREES F.

D. EMEGENCY WALL SWITCH (ESS)
1. PROVIDE BREAK-GLASS SWITCH MANUAL SHUTOFF CONTROL WITH SIGNAGE "VENTILATION SYSTEM EMERGENCY SHUT-OFF." EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF VENTILATION SYSTEM INCLUDING SUPPLY AND EXHAUST UNITS ASSOCIATED WITH THE ROOM. EMERGENCY SHUT OFF SWITCH SHALL SHUT OFF ASSOCIATED MAU FAN AND CLOSE OUTSIDE AIR DAMPER, AND SHUT DOWN ALL EXHAUST FANS IN MAU ZONE.

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

3. CAUSTIC SODA ROOM SHALL HAVE AN ADJUSTABLE 65 DEGREE F SET POINT FOR HEATING.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | B. RICH |
| designed | checked |
| B. RICH | D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS V

| project | contract |
|---|---|
| 98101 | |

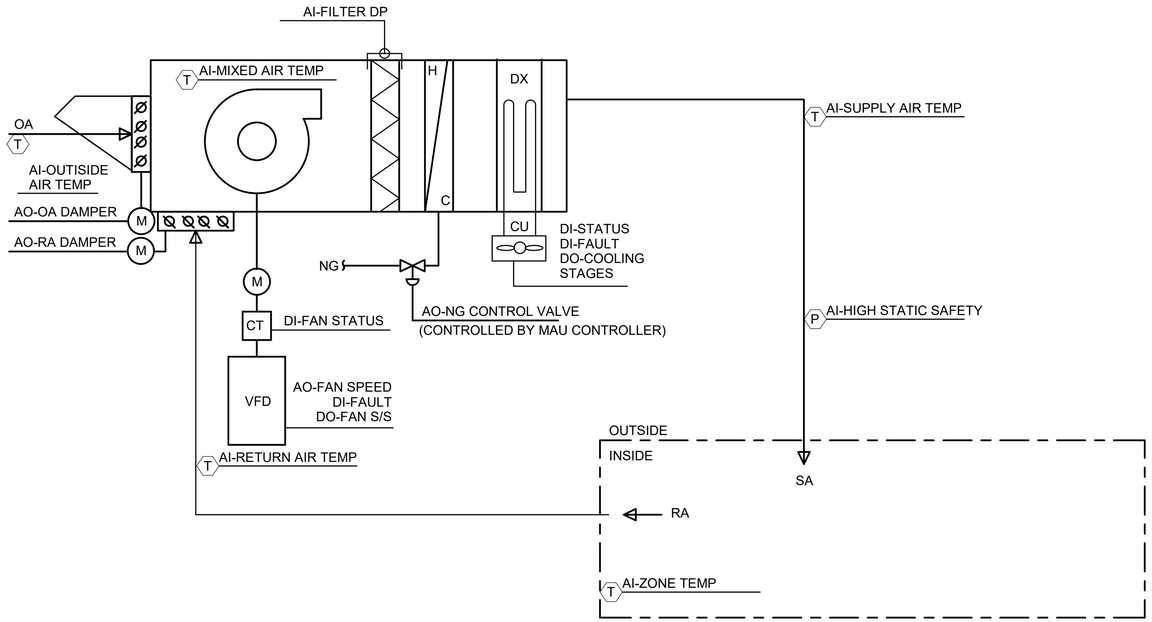
drawing **M305 — 0** rev.

sheet 316 of 542 sheets
file 98101_M

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**ROOF TOP UNIT**
RTU-02, RTU-09, RTU-07




**CONTROL ROOM, ELECTRICAL 218, ELECTRICAL 229**

| DEVICE | HARDWARE | | | | | | | | | | | | | SOFTWARE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INPUTS | | | | | | | OUTPUTS | | | | | | ALARMS | | | FUNCTIONS | |
| | DIGITAL | | | ANALOG | | | | DIGITAL | | | ANALOG | | | | | | | |
| | STATUS | ALARM | SMOKE | TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | STATUS | ON / OFF | START/STOP | POSITION | SPEED | SETPOINT | GENERAL | HIGH/LOW ALARM | FAILURE TO START | EQUIPMENT RUNTIME | DATA TREND |
| ROOF TOP UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| RETURN AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| RETURN AIR CONDITIONS | | | | X | | | | | | | | | | | X | | | |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| OUTDOOR AIR CONDITIONS | | | | X | | | | | | | | | | | | | | |
| MIXED AIR CONDITIONS | | | | X | | | | | | | | | | | | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| SUPPLY AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | X | | | |
| ZONE TEMPERATURE | | | | X | | | | | | | | | | | X | | | |
| DUCT HIGH STATIC | | | | | | | | | | | | | | | X | | | |

**RTU HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF AN ECONOMIZER, MIXED AIR SECTION, INDIRECT GAS FIRED HEATING COIL, DX COOLING COIL AND SUPPLY FAN.

B. OPERATING MODES OF SYSTEM:
1. SYSTEM SHALL OPERATE CONTINOUSLY TO PROVIDE MINIMUM OUTDOOR AIR REQUIREMENTS.
2. THE INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE SET POINT BASED ON A WALL MOUNTED THERMOSTAT.
3. WHEN THE SPACE TEMPERATURE IS GREATER THAN SPACE SET POINT THE VENTILATION SYSTEM SHALL INCREASE SPEED AND/OR ENERGIZE DX COOLING COIL TO MAINTAIN SPACE TEMPERATURE.

C. ECONOMIZER SEQUENCE:
1. ECONOMIZER MODE SHALL BE DETERMINED BASED ON THE OUTSIDE AIR TEMPERATURE SENSOR AND THE RETURN AIR TEMPERATURE SENSOR.
1.1 ECONOMIZER MODE ON: OUTSIDE AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR SETPOINT, AND THE SUPPLY AIR FAN SHALL MODULATE TO MAINTAIN THE SPACE SET POINT. THE ECONOMIZER MODE SHALL BE USED WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
1.2 ECONOMIZER MODE OFF: RETURN DAMPER SHALL FULLY OPEN AND OUTSIDE AIR DAMPER SHALL RETURN TO MINIMUM POSITION, SET BY TAB CONTRACTOR. THE UNIT SHALL RETURN TO HEATING OR COOLNG MODE DETEMINED BY CONTROLS LOGIC. THE ECONOMIZER MODE SHALL BE OFF WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE RETURN AIR TEMPERATURE.

ADJUSTABLE SET POINTS:
CONTROL ROOM: 72 DEGREES F (COOLING), 70 DEGREES F (HEATING)
ELECTRICAL ROOM: 80 DEGREES F (COOLING), 50 DEGREES F (HEATING)

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

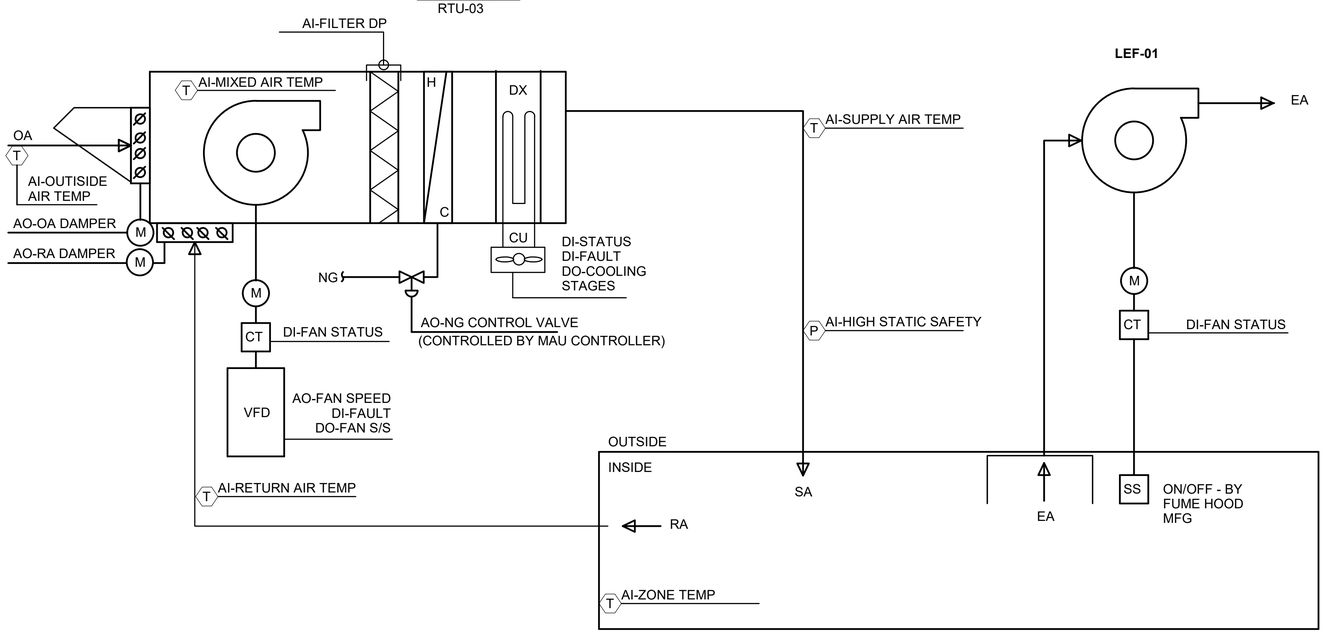
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS VI

| | |
|---|---|
| project 98101 | contract |
| drawing M306 | rev. 0 |
| sheet 317 of 542 sheets | |
| file 98101_M | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Inches
Scale For Microfilming




**LAB 215**

| DEVICE | HARDWARE | | | | | | | | | | | | | SOFTWARE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INPUTS | | | | | | | OUTPUTS | | | | | | ALARMS | | | FUNCTIONS | |
| | DIGITAL | | | ANALOG | | | | DIGITAL | | | ANALOG | | | | | | | |
| | STATUS | ALARM | SMOKE | TEMPERATURE | PRESSURE | HUMIDITY | VALUE (GPM, PPM, %) | STATUS | ON / OFF | START/STOP | POSITION | SPEED | SETPOINT | GENERAL | HIGH/LOW ALARM | FAILURE TO START | EQUIPMENT RUNTIME | DATA TREND |
| MAKE UP AIR UNIT | | | | | | | | | | | | | | | | | | |
| UNIT OPERATION | X | | | | | | | | | | | | | X | | X | X | X |
| RETURN AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| RETURN AIR CONDITIONS | | | | X | | | | | | | | | | | X | | | |
| OUTDOOR AIR DAMPER | X | | | | | | | | | | X | | | | | | | |
| OUTDOOR AIR CONDITIONS | | | | X | | | | | | | | | | | | | | |
| MIXED AIR CONDITIONS | | | | X | | | | | | | | | | | | | | |
| FILTERS (MERV 8) | | | | | X | | | | | | | | | X | | | | |
| NATURAL GAS BURNER | X | | | | | | | | | | X | | | X | | X | | X |
| SUPPLY AIR FAN | X | | | | | | | | | X | | X | | X | | X | | X |
| SUPPLY AIR CONDITIONS | | | | X | X | | | | | | | | | | X | | | |
| ZONE TEMPERATURE | | | | X | | | | | | | | | | | X | | | |
| DUCT HIGH STATIC | | | | | | | | | | | | | | | | | | |
| LAB EXHAUST FAN | | | | | | | | | | | | | | | | | | |
| LAB EXHUAST FAN STATUS | X | | | | | | | | X | | | | | | | | | |

**RTU HEATING AND VENTILATING SEQUENCE OF OPERATIONS**

A. OVERVIEW
1. THE VENTILATION SYSTEM CONSISTS OF AN ECONOMIZER, MIXED AIR SECTION, INDIRECT GAS FIRED HEATING COIL, DX COOLING COIL AND SUPPLY FAN.

B. OPERATING MODES OF SYSTEM:
1. SYSTEM SHALL OPERATE CONTINOUSLY TO PROVIDE MINIMUM OUTDOOR AIR REQUIREMENTS.
2. THE INDIRECT GAS FIRED HEATING COIL SHALL HEAT SUPPLY AIR TO MAINTAIN ROOM SPACE TEMPERATURE OF 72 DEGREES F BASED ON A WALL MOUNTED THERMOSTAT.
3. WHEN THE SPACE TEMPERATURE IS GREATER THAN 75 DEGREES F, THE VENTILATION SYSTEM SHALL INCREASE SPEED AND/OR ENERGIZE DX COOLING COIL TO MAINTAIN SPACE TEMPERATURE.
4. WHEN THE LAB EXHAUST FAN LEF-1 IS ENERGIZED, THE RTU SHALL APPROXIMATLY MATCH AIR FLOW EXHAUSTED BY LEF-01.

C. ECONOMIZER SEQUENCE:
1. ECONOMIZER MODE SHALL BE DETERMINED BASED ON THE OUTSIDE AIR TEMPERATURE SENSOR AND THE RETURN AIR TEMPERATURE SENSOR.
1.1 ECONOMIZER MODE ON: OUTSIDE AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR SETPOINT OF 72 DEGREES F (ADJ), AND THE SUPPLY AIR FAN SHALL MODULATE TO MAINTAIN THE SPACE SET POINT. THE ECONOMIZER MODE SHALL BE USED WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
1.2 ECONOMIZER MODE OFF: RETURN DAMPER SHALL FULLY OPEN AND OUTSIDE AIR DAMPER SHALL RETURN TO MINIMUM POSITION, SET BY TAB CONTRACTOR. THE UNIT SHALL RETURN TO HEATING OR COOLNG MODE DETEMINED BY CONTROLS LOGIC. THE ECONOMIZER MODE SHALL BE OFF WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE RETURN AIR TEMPERATURE.
1.3 WHEN FUME HOOD IS ENERGIZED, MODULATE RETURN AIR AND OUTSIDE AIR DAMPERS TO PROVIDE 900 CFM OF MAKE UP AIR WHILE RETURNING THE BALANCE.

ADJUSTABLE SET POINTS:
72 DEGREES F (COOLING), 70 DEGREES F (HEATING)

GENERAL NOTES:
1. COORDINATE ALL SENSORS AND WIRING NOT PROVIDED BY TAGGED EQUIPMENT MANUFACTURER WITH CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR.

2. CONTROL SHALL BE ACCOMPLISHED VIA HONEYWELL JACE WITH BACNET AND THE USE OF NIAGARA TIED THROUGH SUPERVISOR AX AS COORDINATED BY CONTROL SOLUTIONS, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | BJR | DLO | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | DLO | DLO | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed B. RICH |
| designed B. RICH | checked D. OLSEN |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
MECHANICAL CONTROLS VII

| | |
|---|---|
| project 98101 | contract |
| drawing **M307** | rev. **0** |
| sheet 318 of 542 sheets | |
| file 98101_M | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## LIGHT FIXTURE SYMBOLS

- CEILING OR SURFACE MOUNTED FIXTURE
- RECESSED FIXTURE
- WALL MOUNTED FIXTURE
- SURFACE MOUNTED BATTERY PACK, LIGHT
- SINGLE FACE EXIT LIGHT, ARROW DENOTES DIRECTION OF EGRESS, NO ARROW DENOTES NO EGRESS DIRECTION
- DOUBLE FACE EXIT LIGHT, ARROW DENOTES DIRECTION OF EGRESS, NO ARROW DENOTES NO EGRESS DIRECTION
- POLE MOUNTED AREA LIGHT
- SURFACE OR PENDANT STRIP FIXTURE
- RECESSED STRIP FIXTURE
- SURFACE OR PENDANT EMERGENCY STRIP FIXTURE WITH BATTERY BALLAST
- RECESSED EMERGENCY STRIP FIXTURE WITH BATTERY BALLAST

## FIRE DETECTION & ALARM SYMBOLS

- FACP — FIRE ALARM CONTROL PANEL WITH INTEGRAL STANDBY BATTERY
- F — FIRE ALARM MANUAL PULL STATION, MOUNT AT +46" AFF UON
- FIRE ALARM AUDIBLE/VISUAL SIGNALING DEVICE, MOUNT AT +82" AFF TO BOTTOM OF DEVICE
- FIRE ALARM VISUAL SIGNALING DEVICE, MOUNT AT +82" AFF TO BOTTOM OF DEVICE
- ANN — ANNUNCIATOR
- H X — HEAT DETECTOR, IN POSITION X, F FOR FIXED, R FOR RATE OF RISE
- SD X — SMOKE DETECTOR, IN POSITION X, I FOR IONIZATION, P FOR PHOTOELECTRIC, B FOR BEAM
- P — DUCT SMOKE DETECTOR, PHOTOELECTRIC
- FS — SPRINKLER FLOW SWITCH
- TS — SPRINKLER TAMPER SWITCH

## GROUNDING SYMBOLS

- GROUNDING ROD
- GROUNDING TEST WELL
- COPPER GROUND CONDUCTOR
- BONDING CONNECTION

## SYMBOL MODIFIERS

| | |
|---|---|
| R | RECESSED |
| WP | WEATHERPROOF WHILE-IN-USE |
| 3MP | 3 MEGAPIXEL CAMERA RESOLUTION |
| 5MP | 5 MEGAPIXEL CAMERA RESOLUTION |
| 15MP | 15 MEGAPIXEL RESOLUTION, 180-DEGREE VIEW RANGE |

## PLAN SYMBOLS

- DUPLEX RECEPTACLE, NEMA 5-20R, 18" AFF UON
- DUPLEX RECEPTACLE, NEMA 5-20R, WITH GND FAULT CKT INTERRUPTER, 18" AFF UON
- X — SINGLE SPECIAL PURPOSE RECEPTACLE, "X" INDICATES NEMA STYLE IN SCHEDULE
- QUADRUPLEX RECEPTACLE, NEMA 5-20R, 18" AFF UON
- J — JUNCTION BOX
- PB — CONTROL STATION NEMA 14
- DISCONNECT SWITCH, SURFACE MOUNTED
- COMBINATION MOTOR STARTER, SURFACE MOUNTED
- PANELBOARD, SURFACE MOUNTED
- H — HANDHOLE
- ELECTRICAL DUCT BANK
- CONDUIT AND WIRING TURNING DOWN
- CONDUIT AND WIRING TURNING UP
- CONDUIT STUB OFF BELOW GROUND, CAPPED UON
- X — KEYED NOTE, "X" INDICATES KEYED NOTE NUMBER
- $ — WALL SWITCH, 20A, 120/277V RATED, (AC ONLY), SINGLE POLE SINGLE THROW, MOUNT 46" AFF UON
- $2 — WALL SWITCH, 20A, 120/277V RATED, (AC ONLY), DOUBLE POLE DOUBLE THROW, CENTER OFF, MOUNT 46" AFF UON
- $3 — WALL SWITCH, 20A, 120/277V RATED, (AC ONLY), THREE WAY (SINGLE POLE DOUBLE THROW), MOUNT 46" AFF UON
- $4 — WALL SWITCH, 20A, 120/277V RATED, (AC ONLY), FOUR WAY (DOUBLE POLE DOUBLE THROW REVERSING), MOUNT 46" AFF UON
- $M — MOTOR RATED SWITCH WITH THERMAL OVERLOADS
- $V — DIMMER SWITCH, 20A, 120V, AS REQUIRED, MOUNT 46" AFF UON
- $OS — SWITCH WITH INTEGRAL OCCUPANCY SENSOR, 20A, 120V, WATTAGE AS REQUIRED, MOUNT 46" AFF UON.
- $V/OS — DIMMER WITH INTEGRAL OCCUPANCY SENSOR, 20A, 120V, WATTAGE AS REQUIRED, MOUNT 46" AFF UON.
- PC — INTEGRAL PHOTOELECTRIC CELL AND RELAY (PHOTOCONTROL)
- D (X) — DATA TERMINAL OUTLET, 2" x 4" BOX, QTY DENOTED BY (X)
- C — CCTV OUTLET, 2" x 4" BOX
- TB — TELEPHONE BACKBOARD, 3/4" PLYWOOD
- AIR TERMINAL
- L — LIGHTNING PROTECTION CONDUCTOR

## PLAN SYMBOLS CONT.

- W — WIRE WAY
- M — MOTOR
- LC — LIGHTING CONTACTOR
- WIRING RUN CONCEALED IN CEILING OR WALL. CONDUCTOR SIZES ARE NOTED IN THE PANEL SCHEDULES. ARROWHEAD DENOTES HOMERUN. "X" INDICATES PANEL NAME AND CIRCUIT NUMBER. ALL CONDUITS SHALL HAVE A GREEN EQUIPMENT GROUNDING CONDUCTOR
- X — SAME AS ABOVE EXCEPT EXPOSED IN CEILING OR ON WALL
- X — SAME AS ABOVE EXCEPT CONCEALED IN FLOOR
- C — FEEDER AND/OR CIRCUIT IDENTIFIER SYMBOL. SEE SCHEDULE FOR WIRE AND CONDUIT SIZES
- CONDUIT AND WIRING CONTINUATION
- DRY TYPE TRANSFORMER
- T — PAD MOUNTED OIL FILLED TRANSFORMER
- EM — EMERGENCY MANUAL ALARM PUSH BUTTON
- F — EMERGENCY MANUAL ALARM AUDIBLE/VISUAL DEVICE
- GROUND BUS

## ONE-LINE & SCHEMATIC SYMBOLS

- POWER TRANSFORMER, kVA RATING, WINDING VOLTAGES, AND CONNECTIONS ARE SHOWN NEXT TO SYMBOL
- PT — POTENTIAL TRANSFORMER, CONNECTIONS AS SHOWN
- CTS — CURRENT TRANSFORMER
- CT — CORE BALANCED CURRENT TRANSFORMER
- GROUNDING CONNECTION. WHEN USED WITH TRANSFORMER WINDING SYMBOL IT DENOTES A NEUTRAL GROUNDING CONNECTION (ON SECONDARY SIDE ONLY)
- GROUNDING WYE WINDING CONNECTION
- DELTA WINDING CONNECTION
- RELAY OR CONTACTOR CONTACTS
- SEPARABLE CONNECTOR OR CONNECTION FOR DRAWOUT ASSEMBLIES
- CONDUCTOR CONNECTION
- CIRCUIT BREAKER , MOLDED CASE, TRIP CURRENT (A) AND QUANTITY OF POLES (P) SHOWN
- 1200A 3P — DISCONNECT SWITCH, NON-FUSED, LOAD BREAK, "1200A, 3P" INDICATES A "1200 AMPS, 3 POLE SWITCH"
- DISCONNECT SWITCH, FUSED, LOAD BREAK, FUSE AMPERE RATING (NUMERAL) AND U.L. CLASS SHOWN NEXT TO SYMBOL
- FUSE, AMPERE RATING (NUMERAL) AND U.L. CLASS SHOWN NEXT TO SYMBOL
- MOTOR THERMAL OVERLOAD PROTECTOR
- CAPACITOR
- L / R — LOCAL-OFF-REMOTE SELECTOR SWITCH
- H / O / A — HAND-OFF-AUTO SELECTOR SWITCH
- XX — PLC INPUT/OUTPUT, WHERE XX=DO IS DIGITAL OUTPUT, AND XX=DI IS DIGITAL INPUT
- ETM — ELAPSED TIME METER
- XXX — CONTACTOR COIL
- PUSHBUTTON-NORMALLY OPEN-MOMENTARY
- PUSHBUTTON-NORMALLY CLOSED-MOMENTARY
- LIGHTNING ARRESTER
- G — ENGINE-GENERATOR
- INTERLOCK SYSTEM

## ONE-LINE & SCHEMATIC SYMBOLS CONT.

- (A) (B) — (A) LIMIT SWITCH-NORMALLY CLOSED (B) LIMIT SWITCH-NORMALLY CLOSED-HELD OPEN
- (A) (B) — (A) LIMIT SWITCH-NORMALLY OPEN (B) LIMIT SWITCH-NORMALLY OPEN-HELD CLOSED
- (A) (B) — (A) FLOW ACTUATED SWITCH-OPENING ON INCREASE IN FLOW (B) FLOW ACTUATED SWITCH-CLOSING ON INCREASE IN FLOW
- (A) (B) — (A) TEMPERATURE ACTUATED SWITCH-OPENING ON RISING TEMPERATURE (B) TEMPERATURE ACTUATED SWITCH-CLOSING ON RISING TEMPERATURE
- (A) (B) — PRESSURE OR VACUUM ACTUATED SWITCH (A) OPENING ON RISING PRESSURE (B) CLOSING ON RISING PRESSURE
- (A) (B) — LIQUID LEVEL ACTUATED SWITCH (A) OPENING ON RISING LEVEL (B) CLOSING ON RISING LEVEL
- (A) (B) — (A) CLOSED SWITCH WITH TIME DELAY OPENING (TDO) AFTER ENERGIZATION (B) OPEN SWITCH WITH TIME DELAY CLOSING (TDC) AFTER ENERGIZATION
- (A) (B) — (A) CLOSED SWITCH WITH TIME DELAY CLOSING (TDC) AFTER DE-ENERGIZATION (B) OPEN SWITCH WITH TIME DELAY OPENING (TDO) AFTER DE-ENERGIZATION
- EQUIPMENT ENCLOSURE
- XXXHP — MOTOR, XXX DENOTES MOTOR HP
- (X) — INDICATING LIGHT, X DENOTES COLOR

| | |
|---|---|
| R-RED | A-AMBER |
| G-GREEN | W-WHITE |
| B-BLUE | O-ORANGE |

- DMS — DIGITAL METERING SYSTEM
- MPR — MOTOR PROTECTION RELAY
- VFD — VARIABLE FREQUENCY DRIVE
- RVSS — REDUCED VOLTAGE SOLID STATE
- SPD — SURGE PROTECTIVE DEVICE
- HCU — HARMONIC CORRECTION UNIT
- SSOL — SOLID STATE OVERLOAD RELAY
- TORQUE SWITCH
- SOLENOID VALVE
- LINE REACTOR
- ANTENNA

## SECURITY SYSTEM SYMBOLS

- C — CARD READER
- K — KEYPAD
- D — DOOR INTRUSION SWITCH
- L — MAGNETIC LOCK
- S — MOTION SENSOR
- I — INTERCOM STATION
- G — BREAK GLASS SENSOR
- P — PANIC BUTTON
- Q — REQUEST-TO-EXIT
- VS — MOTION-ACTIVATED CAMERA, ARROW DENOTES ANGLE OF CENTER VIEW

## ABBREVIATIONS

| | |
|---|---|
| A | AMPERES |
| AC | ALTERNATING CURRENT |
| AF | AMPS FRAME |
| AFF | ABOVE FINISHED FLOOR |
| AHU | AIR HANDLING UNIT |
| A.I.C. | AMPERE INTERRUPTING CAPACITY |
| AMP | AMPLIFIER |
| AMPS | AMPERES |
| AS | AMPS SYMMETRICAL |
| AT | AMPS TRIP |
| ATS | AUTOMATIC TRANSFER SWITCH |
| AUX | AUXILIARY |
| AWG | AMERICAN WIRE GAGE |
| C | CONDUIT |
| CALC | CALCULATED |
| CB | CIRCUIT BREAKER |
| CKT | CIRCUIT |
| DC | DIRECT CURRENT |
| EA | EACH |
| EF | EXHAUST FAN |
| EST | ESTIMATED |
| ETM | ELAPSED TIME METER |
| EWC | ELECTRIC WATER COOLER |
| EXIST | EXISTING |
| FACP | FIRE ALARM CONTROL PANEL |
| FLA | FULL LOAD AMPS |
| GFCI | GROUND FAULT CIRCUIT INTERRUPTER |
| GND | GROUND |
| GRC | GALVANIZED RIGID STEEL CONDUIT |
| HAD | HEAT ACTIVATED DEVICE |
| HP | HORSEPOWER |
| HZ | HERTZ |
| ISC | INTERRUPTING SHORT CIRCUIT |
| JB | JUNCTION BOX |
| kVA | KILOVOLT AMPERES |
| kV | KILOVOLTS |
| kWH | KILOWATT HOURS |
| LC | LIGHTING CONTACTOR |
| L-L | LINE-TO-LINE |
| L-N | LINE-TO-NEUTRAL |
| LTG | LIGHTING |
| MCC | MOTOR CONTROL CENTER |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MTD | MOUNTED |
| MTG | MOUNTING |
| N.C. | NORMALLY CLOSED |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| NEUT | NEUTRAL |
| NIC | NOT IN CONTRACT |
| N.O. | NORMALLY OPEN |
| NO. | NUMBER |
| NTS | NOT TO SCALE |
| OHD | OVERHEAD DOOR |
| OH | OVERHEAD |
| P | POLE |
| PE | PHOTOELECTRIC |
| PLC | PROGRAMMABLE LOGIC CONTROLLER |
| PH | PHASE |
| PRI | PRIMARY |
| PVC | POLYVINYL CHLORIDE |
| RECPT | RECEPTACLE |
| REQ'D | REQUIRED |
| RGS | RIGID GALVANIZED STEEL |
| RTU | ROOF TOP UNIT |
| SEC | SECONDARY |
| SPACE | SPACE ONLY (NO BREAKER) |
| SPARE | SPARE BREAKER |
| SYM. | SYMMETRICAL |
| TB | TELEPHONE BACKBOARD |
| TOC | TOP OF CONCRETE |
| TSP | TWISTED SHIELDED PAIR |
| TYP | TYPICAL |
| U.L. | UNDERWRITER'S LABORATORIES |
| UON | UNLESS OTHERWISE NOTED |
| V | VOLTS |
| VA | VOLT-AMPERES |
| VFD | VARIABLE FREQUENCY DRIVE |
| W | WATTS |
| W/ | WITH |
| 1/C | SINGLE CONDUCTOR CABLE |
| ∅ | PHASE |
| + | USED WITH A NUMERAL WHICH DENOTES HEIGHT OF ITEM ABOVE FINISHED FLOOR LEVEL |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 7/29/19 | AG | JS | ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked J. SCHAEFER |

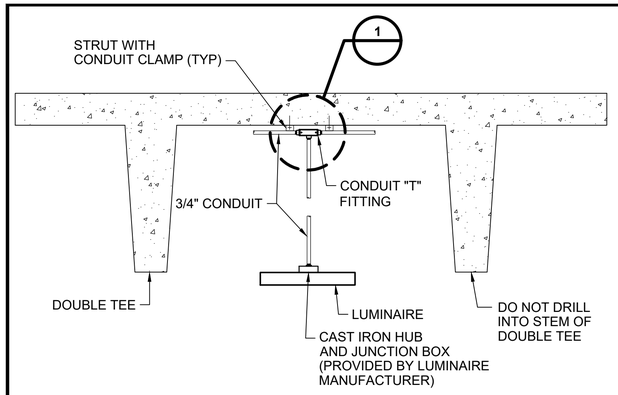
City of Thornton

**CHEMICAL UPGRADES PROJECT AT EGL #4 PUMP STATION**
ELECTRICAL LEGEND

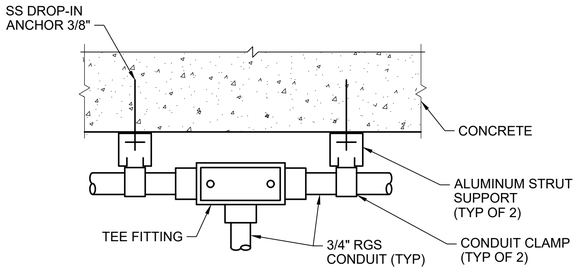
| | |
|---|---|
| project 98101 | contract |
| drawing E001 | rev. 0 |
| sheet 319 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming: Millimeters / Inches

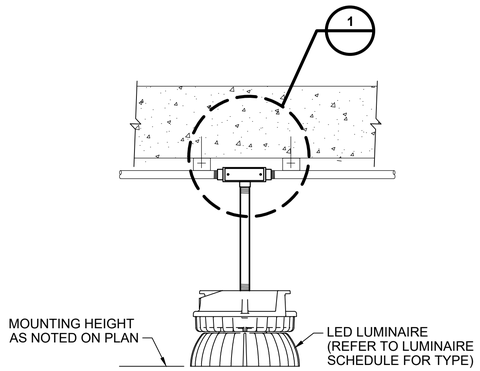
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



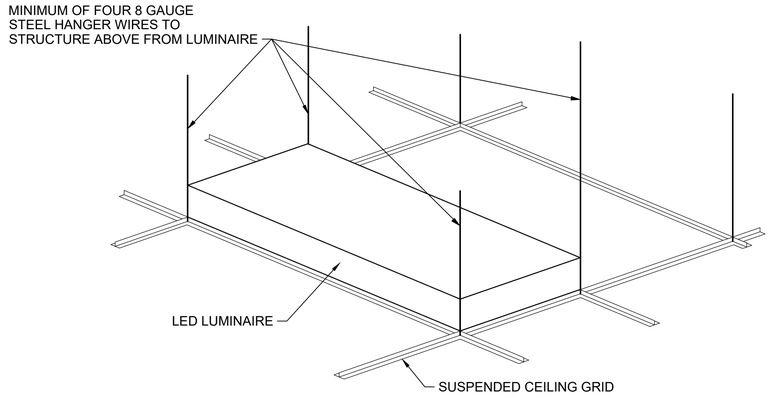

**TYPE L6/L6A AND L7/L7A INSTALLATION DETAIL**
NOT TO SCALE



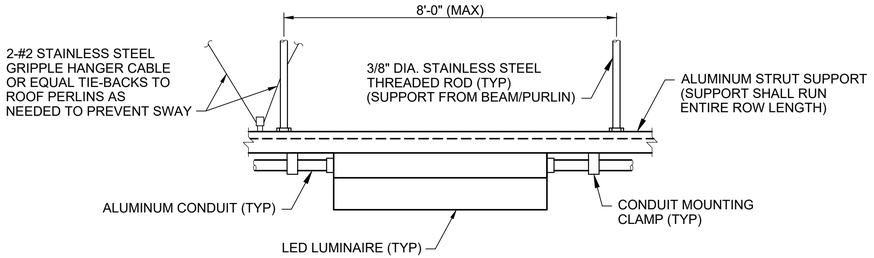

**DETAIL 1**
NOT TO SCALE




**TYPICAL PENDANT MOUNTED LED LUMINAIRE MOUNTING DETAIL (BACKWASH PUMP STATION)**
NOT TO SCALE

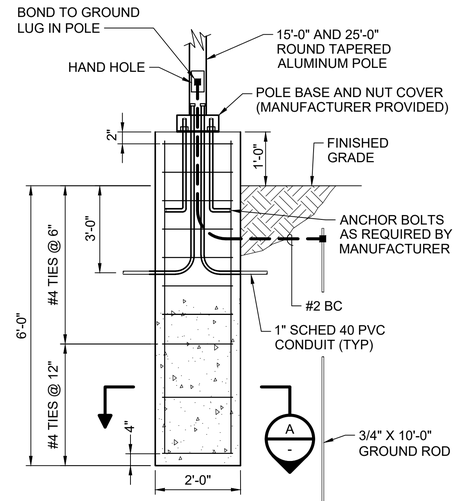



**TYPICAL RECESSED LIGHT FIXTURE SUPPORT DETAIL**
NOT TO SCALE



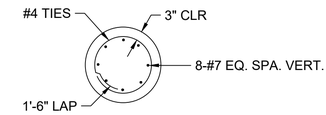

**GENERAL NOTE:**
1. CHAIN MOUNTING OF STRIP LUMINAIRES SHALL NOT BE ACCEPTABLE ALL SUPPORTS SHALL BE RIGID UTILIZING CONDUIT OR STAINLESS STEEL THREADED ROD WITH STRUT SUPPORTS PER THIS DETAIL.

**TYPICAL STRIP LUMINAIRE MOUNTING DETAIL**
NOT TO SCALE

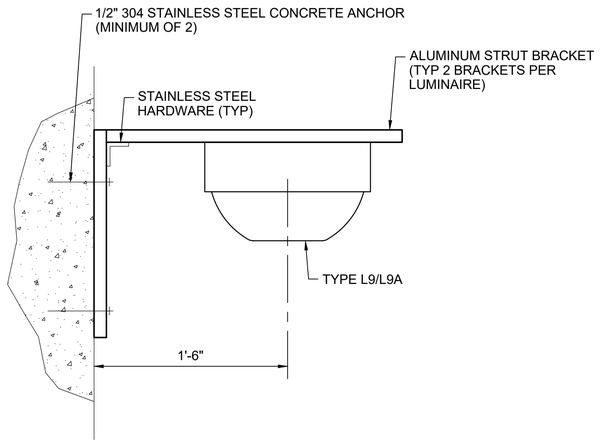



**GENERAL NOTE:**
1. LIGHT POLE FOUNDATIONS INSTALLED IN THE RAISED MEDIAN AT THE ENTRANCE GATE SHALL BE INSTALLED FLUSH WITH THE STAMPED CONCRETE.

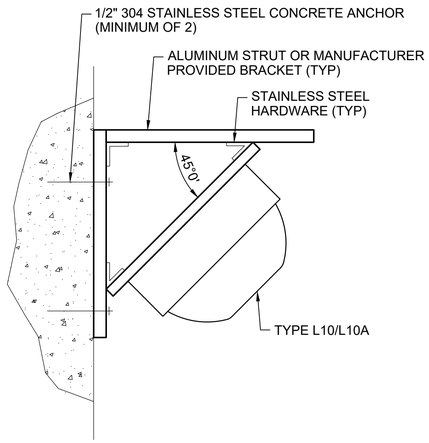
**POLE BASE FOUNDATION DETAIL**
NOT TO SCALE




**SECTION A -**
NOT TO SCALE




**HORIZONTAL MOUNTING (TYPE L9/L9A) DETAIL**
NOT TO SCALE




**45 DEGREE MOUNTING (TYPE L10/L10A) DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LUMINAIRE INSTALLATION
DETAILS

| project | contract |
|---|---|
| 98101 | |

**drawing** E002 **–** **rev.** 0

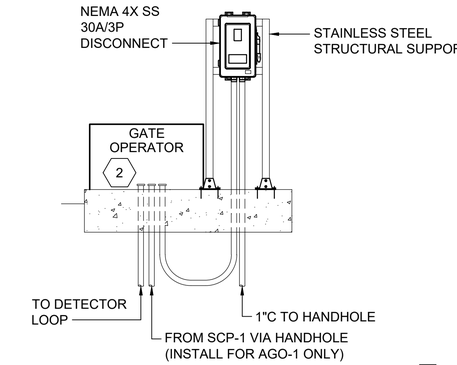
**sheet** 320 **of** 542 sheets

**file** 98101_E002.dwg

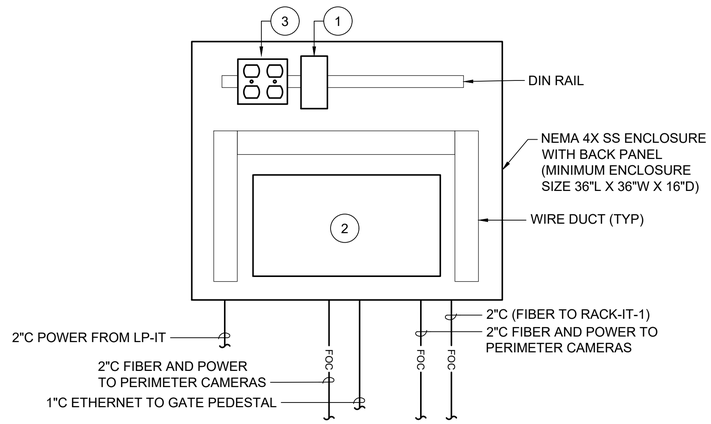
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E002.DWG 10/14/2020 6:36 PM JHDAVIS




**TYPICAL ENTRANCE GATE DISCONNECT ELEVATION** (1)
(TYPICAL AUTOMATIC GATE OPERATOR DISCONNECT SWITCH INSTALLATION FOR GATE OPERATORS AGO-1 AND AGO-2)
NOT TO SCALE




**EQUIPMENT TAGS:**

1. ES-NGATE-ICOM
   UNMANAGED SWITCH, 120-VAC, (1) FIBER, (2) POE
2. 72-PORT FIBER OPTIC PATCH PANEL
3. 20A QUADPLEX RECEPTACLE

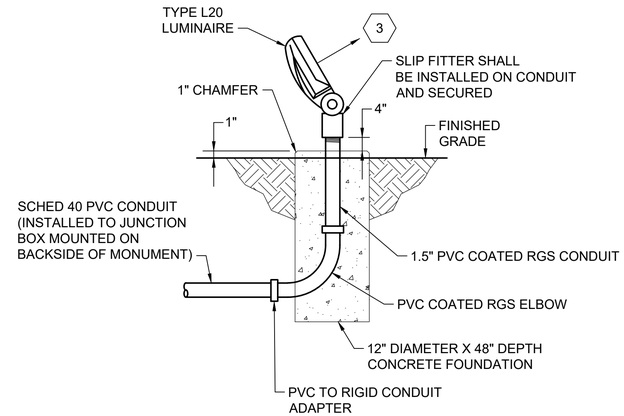
**LCP-NGATE CONTROL PANEL LAYOUT DETAIL**
NOT TO SCALE

**KEYED NOTES:**

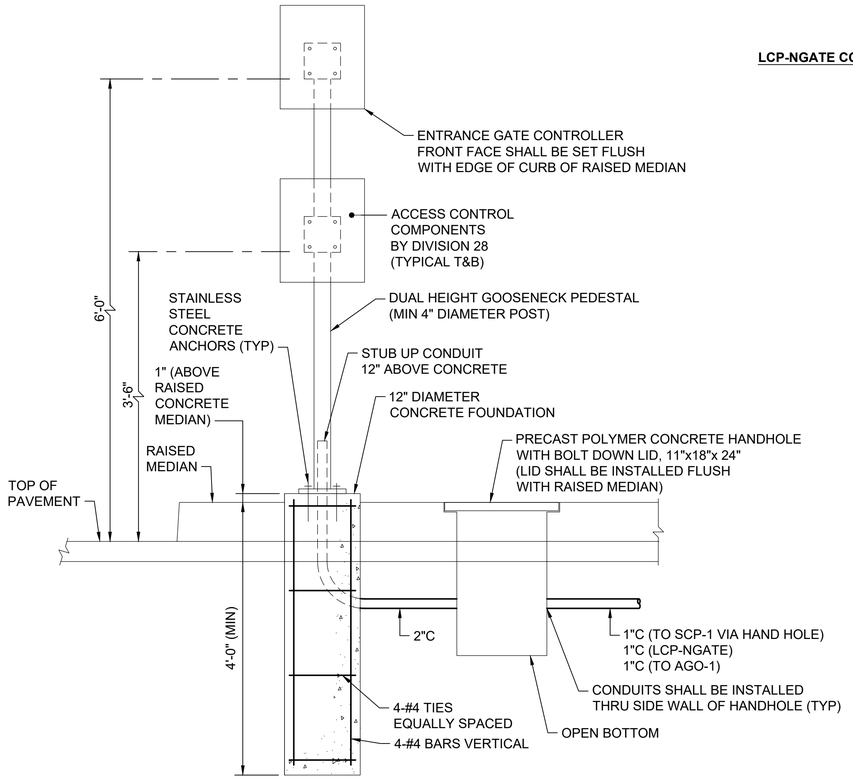
1. LAYOUT OF THE EQUIPMENT AND GATE OPERATOR SHOWN DO NOT NECESSARILY REFLECT ACTUAL LAYOUT, COORDINATE LAYOUT WITH ACTUAL FIELD CONDITIONS.
2. COORDINATE CONDUIT STUB UPS WITH GATE OPERATOR PROVIDED.
3. MONUMENT LIGHTING SHALL BE FIELD ADJUSTED TO ILLUMINATE THE CITY OF THORNTON MONUMENT.

**GENERAL NOTES:**

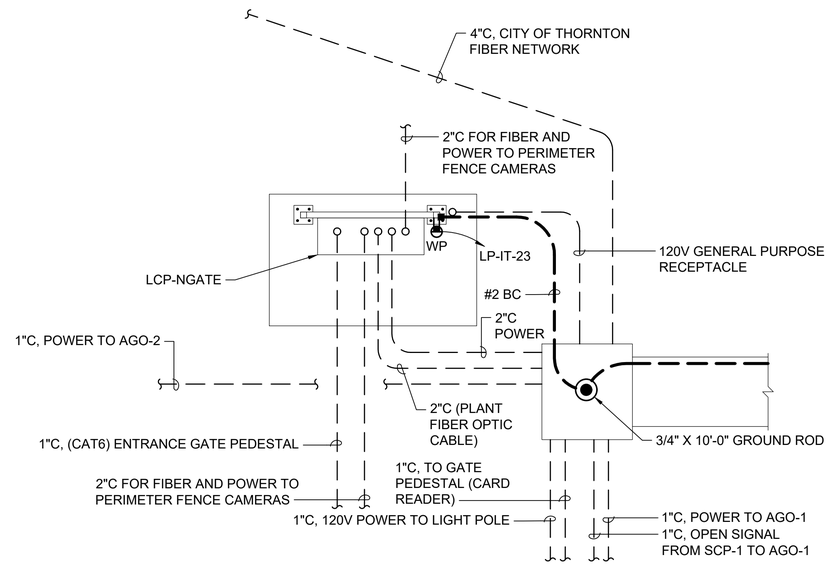
1. REFER TO E308 AND E309 FOR THE LUMINAIRE SCHEDULE.




**TYPICAL TYPE L20 MONUMENT LIGHT INSTALLATION DETAIL**
NOT TO SCALE




**GATE PEDESTAL ELEVATION**
NOT TO SCALE




**DETAIL - ENLARGED PLAN** (1 / E101)
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENTRANCE GATE DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **E003** – rev. **0**

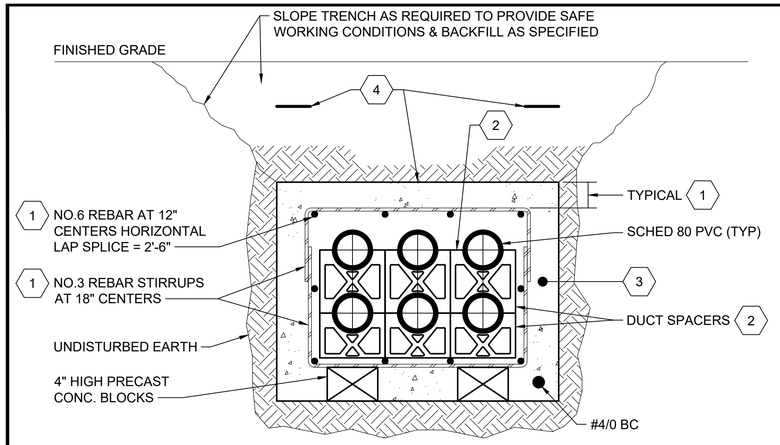
sheet 321 of 542 sheets

file 98101_E003.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E003.DWG 10/14/2020 6:36 PM JHDAVIS




**GENERAL NOTES:**

1. MINIMUM COVER FOR DUCT BANKS SHALL BE 24-INCHES.
2. COMPLETE CAGE REINFORCING STEEL SHALL BE USED FOR ALL OF THE FOLLOWING CONDITIONS:
   A. USE COMPLETE CAGE REINFORCING WHERE A DUCT BANK IS INSTALLED UNDER OR CROSSES UNDER ALL ROADWAYS, PARKING AND FOR A DISTANCE OF 10 FEET ON EITHER SIDE.

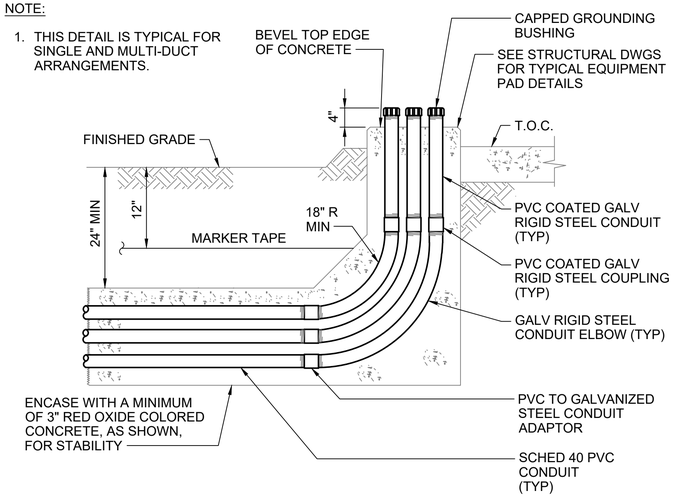
**KEYED NOTES:**

1. DO NOT ALLOW REINFORCING STEEL TO BE IN CONTACT WITH DUCTS & PROVIDE A MINIMUM OF 3" OF CONCRETE COVER OVER THE REINFORCING STEEL.
2. INSTALL PREFABRICATED, INTERLOCKING TYPE PLASTIC DUCT SPACERS AT 6'-0" MAX. INTERVALS TO MAINTAIN A 7.5 INCH MINIMUM HORIZONTAL AND VERTICAL SPACING BETWEEN CENTERLINE OF DUCTS.
3. ALL CONCRETE SHALL BE DYED RED AT THE CONCRETE PLANT.
4. INSTALL METALLIC MARKER TAPE TAPE 12-INCHES BELOW GRADE. DUCT BANKS SHALL BE INSTALLED A MINIMUM OF 30" FROM TOP OF DUCT BANK TO FINISHED GRADE.

**TYPICAL STEEL REINFORCED CONCRETE ENCASED DUCT BANK SECTION** — 1 / E100
NOT TO SCALE

NOTE:

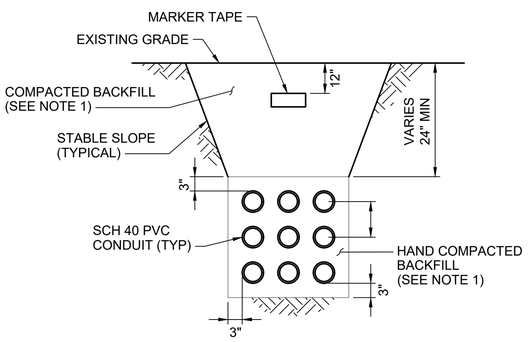
1. THIS DETAIL IS TYPICAL FOR SINGLE AND MULTI-DUCT ARRANGEMENTS.



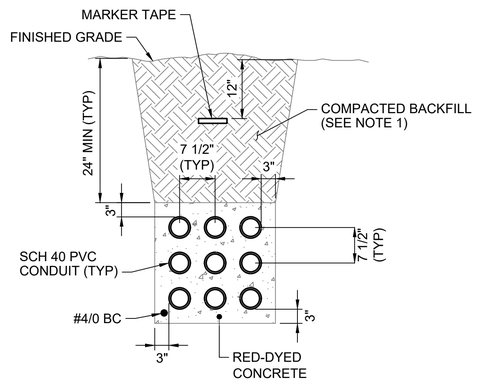

**TYPICAL STUBBED DUCT BANK RISER DETAIL**
NOT TO SCALE

**GENERAL NOTES:**

1. SEE E001 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.




**TYPICAL DIRECT BURIED CONDUIT INSTALLATION** — 2 / E100
NOT TO SCALE




**TYPICAL CONCRETE ENCASED DUCT BANK SECTION** — 3 / E100
NOT TO SCALE

DETAIL NOTES:

1. REFER TO SECTION 31 23 33 - TRENCHING AND BACKFILLING FOR UTILITIES.
2. DETAIL ALSO APPLIES TO MULTIPLE CONDUIT INSTALLATION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DUCT BANK DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **E004** – rev. **0**

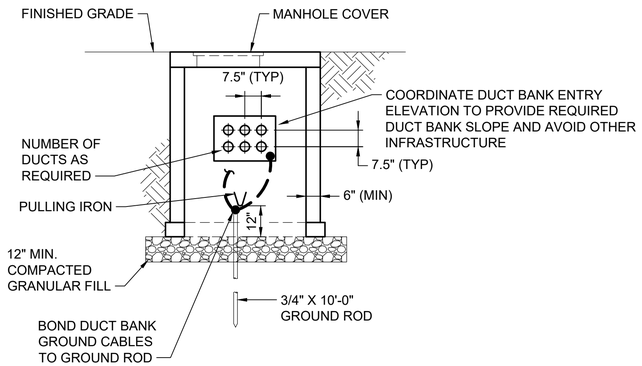
sheet 322 of 542 sheets

file 98101_E004.dwg

Scale For Microfilming: Millimeters / Inches

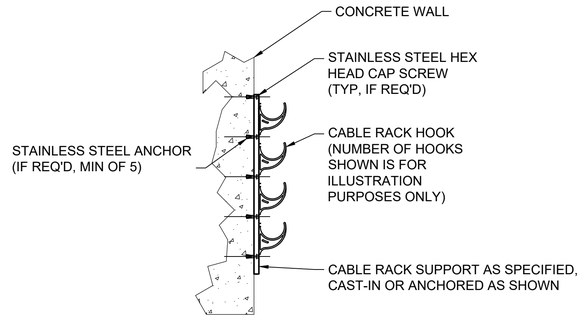
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E004.DWG 10/14/2020 6:26 PM JHDAVIS




**TYPICAL HAND HOLE DETAIL**
NOT TO SCALE

| HAND HOLE SCHEDULE | | | |
|---|---|---|---|
| HAND HOLE | INTERIOR DIMENSION (WXL) | DEPTH | TRAFFIC RATED (H20) |
| EHH-1 | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-1A | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-2 | 6'-0" X 6'-0" | 5'-6" | YES |
| EHH-2A | 5'-0" X 5'-0" | 5'-6" | NO |
| EHH-3 | 4'-0" X 4'-0" | 5'-0" | YES |
| EHH-3A | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-3B | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-4 | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-4A | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-4B | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-4C | 4'-0" X 4'-0" | 5'-0" | NO |
| EHH-5 | 7'-0" X 7'-0" | 7'-0" | YES |
| | | | |




**TYPICAL HAND HOLE CABLE RACK DETAIL**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

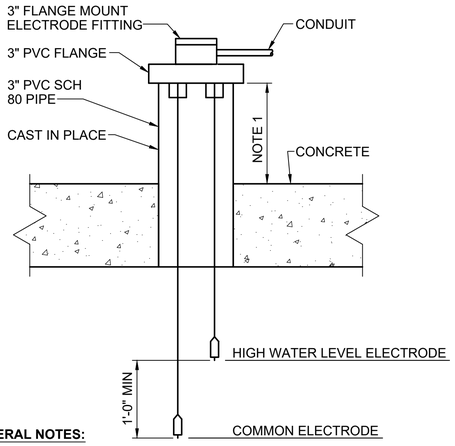
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HAND HOLE DETAILS

| | |
|---|---|
| project 98101 | contract |
| drawing **E005** – | rev. **0** |
| sheet 323 of 542 sheets | |
| file 98101_E005.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

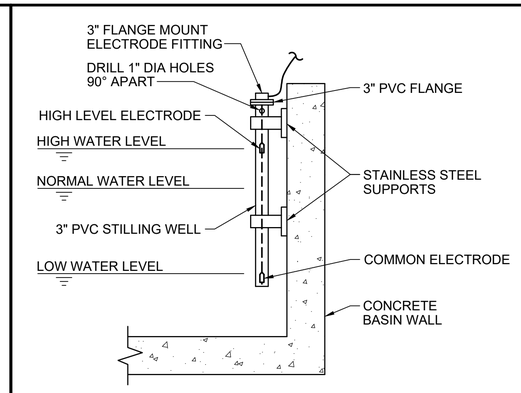
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E005.DWG 10/14/2020 6:35 PM JHDAVIS



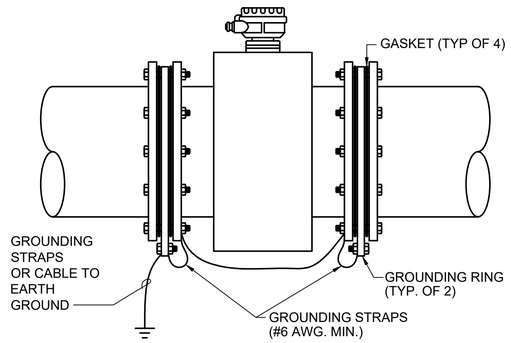

**GENERAL NOTES:**

1. 1'-0" OR AS REQUIRED TO BE 1'-0" ABOVE FINAL GRADE.

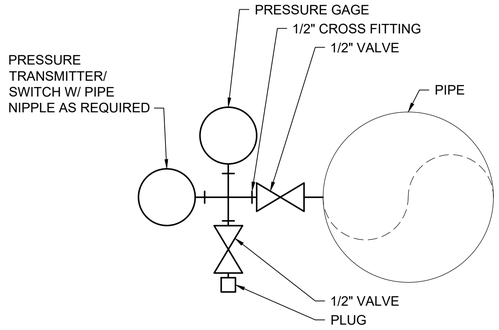
**CONDUCTIVITY SINGLE POINT LEVEL SWITCH MOUNTING DETAIL**
NTS



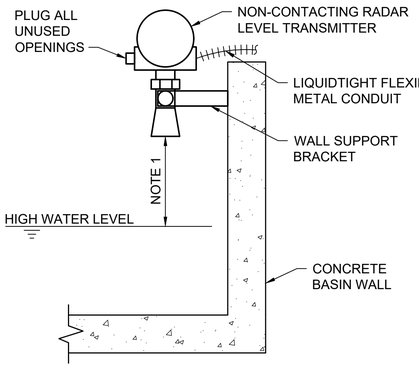

**CONDUCTIVITY SINGLE POINT LEVEL SWITCH BASIN MOUNTING DETAIL**
NTS




**MAGMETER GROUNDING DETAIL**
NTS



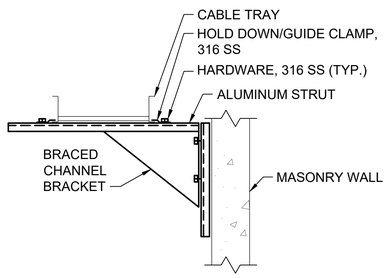

**PRESSURE SWITCH OR TRANSMITTER DETAIL**
NTS



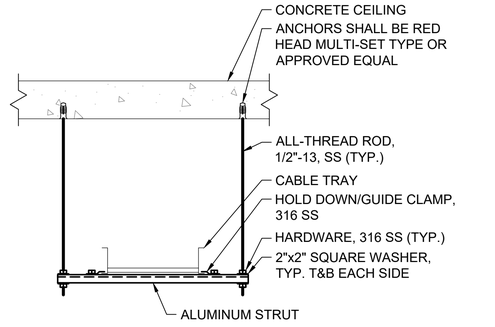

**GENERAL NOTES:**

1. MANUFACTURER-RECOMMENDED MINIMUM DISTANCE.

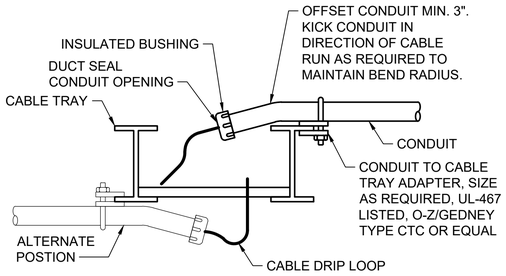
**NON-CONTACT RADAR MOUNTING DETAIL**
NTS




**TYPICAL CABLE TRAY SUPPORT FROM MASONRY WALL**
NTS



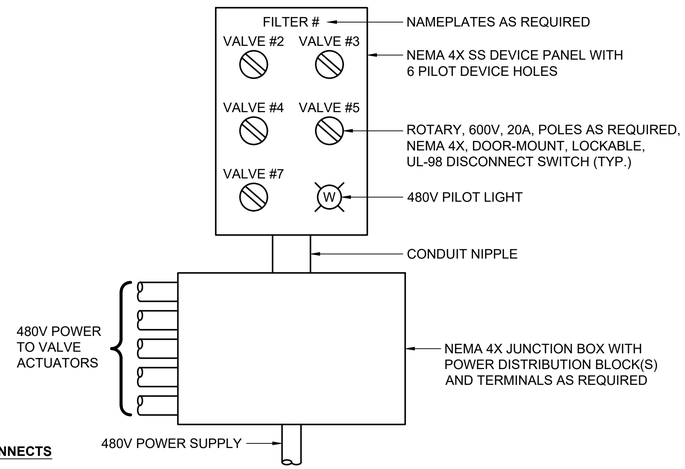

**TYPICAL CABLE TRAY TRAPEZE SUPPORT**
NTS



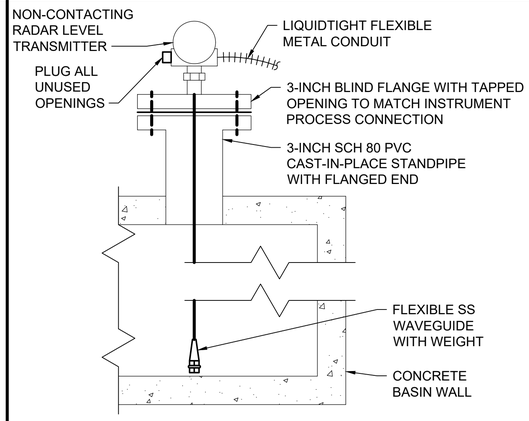

**TYPICAL CONDUIT TO CABLE TRAY TRANSITION**
NTS

**GENERAL NOTES:**

1. THIS DETAIL ILLUSTRATES ONE POSSIBLE GROUP-MOUNT VALVE DISCONNECT SOLUTION. DESIGN-BUILDER MAY PROPOSE ALTERNATIVE SOLUTIONS.
2. PROVIDE MOUNTING HARDWARE AS REQUIRED.




**TYPICAL GROUP-MOUNT VALVE DISCONNECTS**
NTS




**GENERAL NOTES:**

1. 1'-0" OR AS REQUIRED TO BE 1'-0" ABOVE FINAL GRADE.

**TYPICAL GUIDED WAVE RADAR DETAIL**
NTS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL INSTRUMENT DETAILS

| project | contract |
|---|---|
| 98101 | |

drawing **E006** – rev. **0**

sheet 324 of 542 sheets

file 98101_E006.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E006.DWG 10/14/2020 6:35 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | AG | ED | ISSUED FOR COR 034 |
| 2 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

TO CITY OF THORNTON EXISTING FIBER (NORTH SIDE OF THORNTON PARKWAY)

EXISTING CONDUITS BELOW ROADWAY (REFER TO DRAWING E101 FOR ADDITIONAL INSTALLATION DETAILS)

EXIST TANK (TYP)

2 E101

4

C E104

EHH-2A

1 UTILITY CONNECTION CABINET

DB

S E105

F E104

B E104

Q E105

EHH-4

R E105

F E104

3 PV-INV-03

EHH-3A

EHH-3

EHH-2

2

IT ROOM

EXISTING RADIO TOWER 9

EXISTING RADIO HUT 9

(4) 2"C #4/0 AWG

H E104

M E105

3 PV-INV-04

PV MET STATION 3

SECONDARY ELECTRICAL ROOM

EXISTING FIBER CONDUIT

EXISTING FIBER OPTIC HAND HOLE

(5) 2"C #4/0 AWG

(5) 2"C (1) 1"C #4/0 AWG

LOX

(2) 2"C DB

1

FUTURE PV ARRAY AREA

3 PV EQUIPMENT

EHH-4B

2 UTILITY XFMR

A E104

SWGR-MAIN

E E104

5 SWGR-1

EG-1

AT&T PULL BOX

1 E310

I E104

EHH-5

CITY OF THORNTON EXISTING FIBER VAULT

N E105

NEW UTILITY (XCEL) TRANSFORMER

EXISTING DETENTION BASIN

LIT-24501 7

BELOW-GRADE ROUTING FOR SECONDARY ELECTRIC FEED, BY UTILITY (XCEL)

NEW CT METERING CABINET

J

(1) 1"C

EHH-4C

P E105

8

EXISTING ZONE 3/4 PUMP STATION

6

**ELECTRICAL SITE PLAN**

0 60' 120'

SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. SEE CIVIL PLANS FOR UNDERGROUND UTILITIES.
2. CONDUITS FOR CONNECTIONS TO CITY FIBER BY DESIGN-BUILDER. FIBER CABLE INSTALLATION AND TERMINATION BY CITY.
3. REFER TO DRAWINGS E004 AND E005 FOR ELECTRICAL DUCT BANK AND IN GROUND HAND HOLE DETAILS AND HAND HOLE SCHEDULE.
4. HAND HOLES AND MANHOLES REQUIRING FUTURE ACCESS SHALL BE LOCATED TO AVOID UNSAFE SLOPES.

**KEYED NOTES:**

1. UTILITY PRIMARY FEEDERS FURNISHED AND INSTALLED BY UTILITY. SPARE CONDUITS SHALL BE STUBBED UP WITHIN UTILITY CONNECTION CABINET AND CAPPED. INSTALL A PULL STRING IN EACH SPARE CONDUIT.
2. UTILITY TRANSFORMER FURNISHED AND INSTALLED BY UTILITY.
3. INSTALLED BY FUTURE CONTRACT. FOR PV-INV-03/04 AND MET STATION, TERMINATE CONDUIT AT IN-GROUND HANDHOLE AS INDICATED. FOR THE PV EQUIPMENT, STUB CONDUITS UP INSIDE GENERATOR AREA.
4. REFER TO DRAWING E101 FOR CONDUIT ROUTING BETWEEN LCP-NGATE AND IN GROUND HAND HOLE.
5. PROVIDE SWITCHGEAR WITH UTILITY METERING SECTION. UTILITY (XCEL ENERGY) WILL FURNISH THE CT AND METER SOCKET, REFER TO XCEL ENERGY STANDARDS.
6. PROVIDE CONDUIT AS REQUIRED TO ACCESS GATE (~30-FEET BEYOND DWG LIMITS).
7. PROVIDE NEW STRUT RACK WITH JUNCTION BOX FOR LIT-24501 INSTALLATION. STUB CONDUIT UP INTO JUNCTION BOX FOR ROUTING OF CABLE TO EXISTING ZONE 3/4 PUMP STATION.
8. REPLACE EXISTING FIBER JUNCTION BOX AND USE EXISTING CHASE NIPPLE TO ENTER BUILDING.
9. INSTALL A COMPLETE 900MHZ WIRELESS RADIO COMMUNICATION SYSTEM BETWEEN THE NEW THORNTON WTP AND TWO REMOTE LOCATIONS: 1) 102nd & URA LN ELEVATED STORAGE TANK AND 2) EAST GRAVEL LAKE (EGL) PUMP STATION. UTILIZE THE EXISTING RADIO TOWER AND RADIO HUT FOR THE INSTALLATION OF NEW RADIO COMMUNICATION EQUIPMENT AT THE NEW THORNTON WTP. INSTALL A NEW OMNI ANTENNA AND A NEW COMMUNICATION PLC IN THE EXISTING RADIO HUT AT THE NEW THORNTON WTP. INSTALL A NEW DIRECTIONAL YAGI ANTENNA AT THE TWO REMOTE LOCATIONS. INSTALL ALL REQUIRED COMMUNICATION AND ETHERNET CABLING FOR A COMPLETE SYSTEM, INCLUDING FIBER CONNECTION TO THE NEW THORNTON WTP SCADA. REFER TO THE NETWORK ARCHITECTURE DIAGRAM SHOWN ON DRAWING E331 AND SPECIFICATION SECTION 40 66 00.

1

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

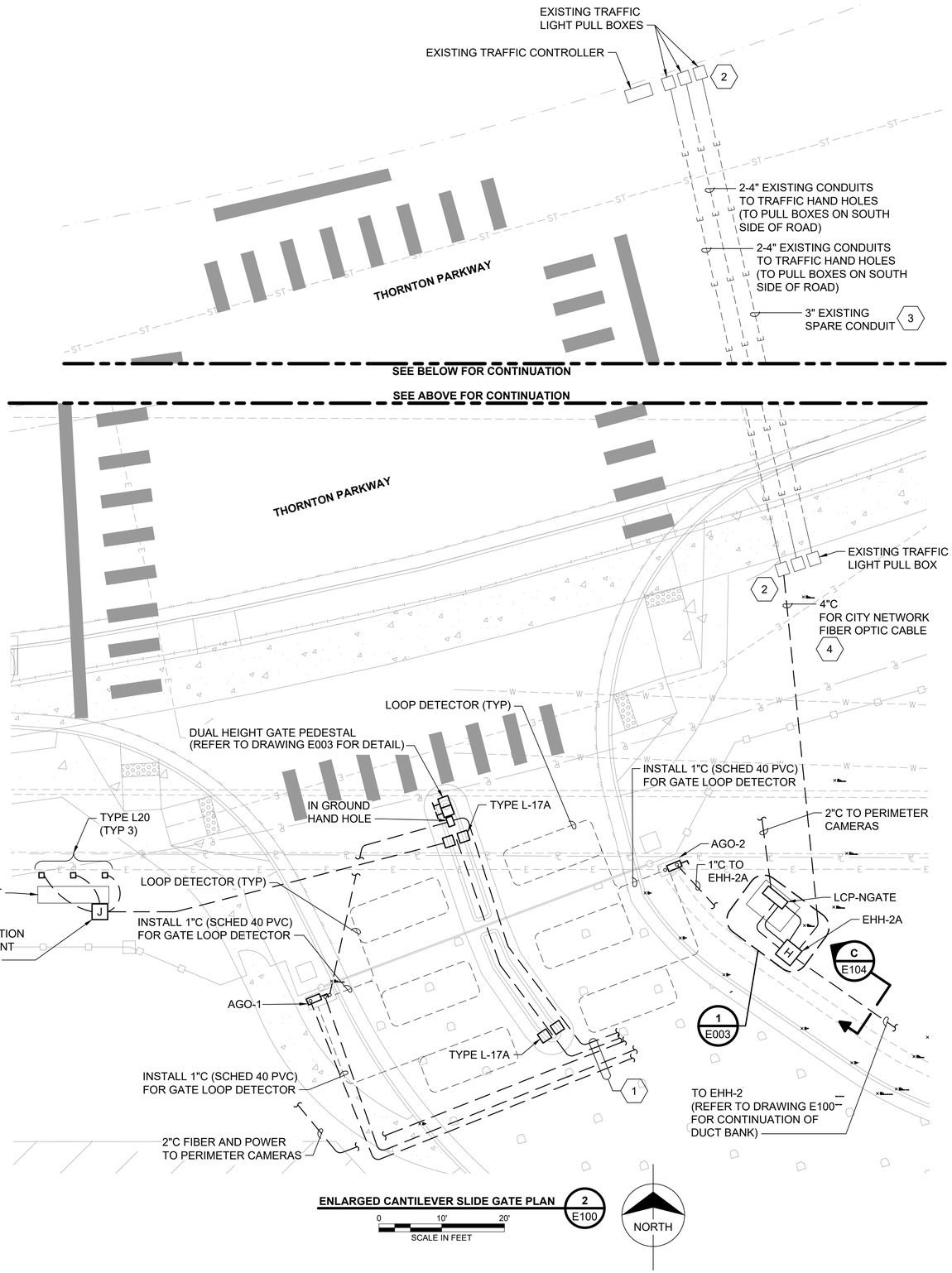
**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL SITE PLAN

| project | contract |
|---|---|
| 98101 | |

drawing **E100** rev. **2**

sheet 325 of 542 sheets

file 98101_E100.dwg




**GENERAL NOTES:**

1. REFER TO E001 FOR ELECTRICAL LEGEND.
2. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

1. CONDUITS SHALL BE INSTALLED TO HAND HOLE. REFER TO DRAWING E003 FOR ENLARGED PLAN FOR ADDITIONAL ROUTING DETAILS.
2. DISTANCE BETWEEN TRAFFIC LIGHT PULL BOXES IS APPROXIMATELY 125-FEET FOR CABLE ESTIMATE. LOCATION OF PULL BOXES IS APPROXIMATE, FIELD VERIFY EXACT LOCATION OF PULL BOXES AND UNDERGROUND CONDUITS.
3. UTILIZE EXISTING SPARE 3-INCH CONDUIT FOR NEW FIBER INSTALLATION FROM EXISTING TRAFFIC LIGHT PULL BOX NORTH OF THORNTON PARKWAY AS SHOWN.
4. INSTALL CONDUITS INTO EXISTING PULL BOX. SPARE CONDUITS SHALL BE CAPPED AND A PULL STRING INSTALLED FOR FUTURE USE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ENLARGED ELECTRICAL SITE PLANS I

| project | contract |
|---|---|
| 98101 | |

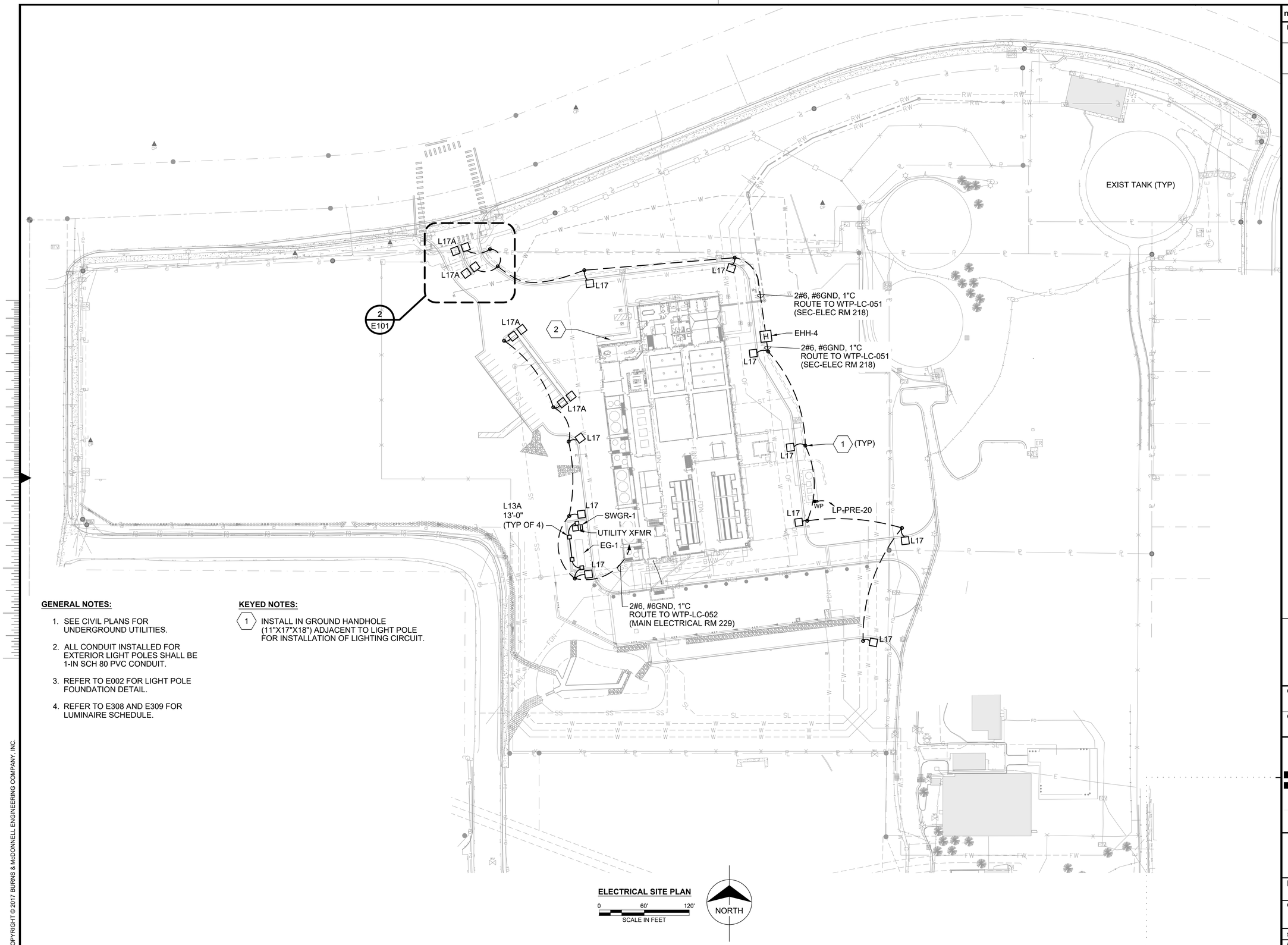
drawing **E101** – rev. **0**

sheet 326 of 542 sheets

file 98101_E101.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E101.DWG 10/14/2020 6:35 PM JHDAVIS




**GENERAL NOTES:**

1. SEE CIVIL PLANS FOR UNDERGROUND UTILITIES.
2. ALL CONDUIT INSTALLED FOR EXTERIOR LIGHT POLES SHALL BE 1-IN SCH 80 PVC CONDUIT.
3. REFER TO E002 FOR LIGHT POLE FOUNDATION DETAIL.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

(1) INSTALL IN GROUND HANDHOLE (11"X17"X18") ADJACENT TO LIGHT POLE FOR INSTALLATION OF LIGHTING CIRCUIT.

**ELECTRICAL SITE PLAN**

0 60' 120'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | M. SANDOVAL |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL SITE LIGHTING PLAN

| project | contract |
|---|---|
| 98101 | |

**drawing** E102 **rev.** – 0

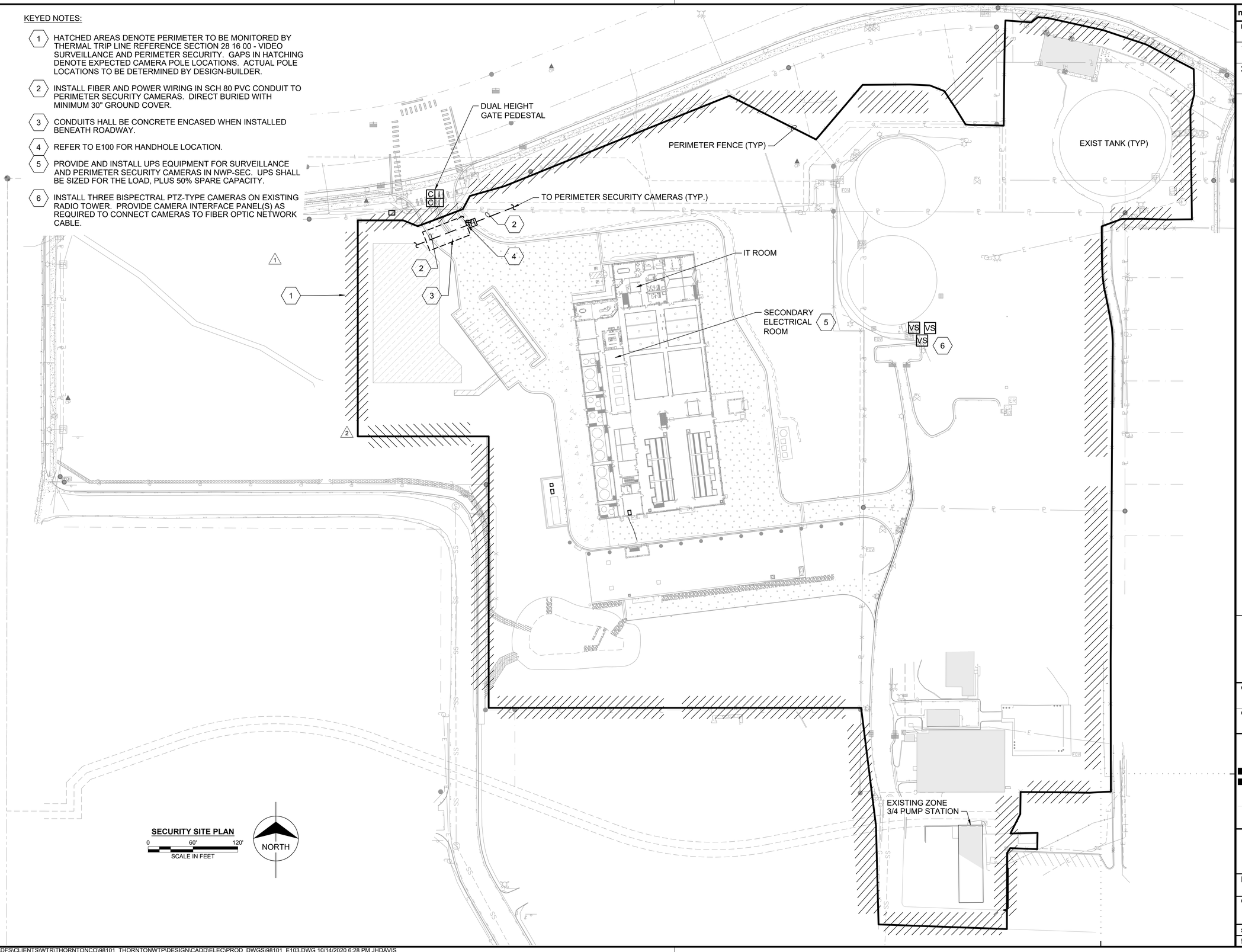
**sheet** 327 **of** 542 sheets

**file** 98101_E102.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES:

1. HATCHED AREAS DENOTE PERIMETER TO BE MONITORED BY THERMAL TRIP LINE REFERENCE SECTION 28 16 00 - VIDEO SURVEILLANCE AND PERIMETER SECURITY. GAPS IN HATCHING DENOTE EXPECTED CAMERA POLE LOCATIONS. ACTUAL POLE LOCATIONS TO BE DETERMINED BY DESIGN-BUILDER.
2. INSTALL FIBER AND POWER WIRING IN SCH 80 PVC CONDUIT TO PERIMETER SECURITY CAMERAS. DIRECT BURIED WITH MINIMUM 30" GROUND COVER.
3. CONDUITS HALL BE CONCRETE ENCASED WHEN INSTALLED BENEATH ROADWAY.
4. REFER TO E100 FOR HANDHOLE LOCATION.
5. PROVIDE AND INSTALL UPS EQUIPMENT FOR SURVEILLANCE AND PERIMETER SECURITY CAMERAS IN NWP-SEC. UPS SHALL BE SIZED FOR THE LOAD, PLUS 50% SPARE CAPACITY.
6. INSTALL THREE BISPECTRAL PTZ-TYPE CAMERAS ON EXISTING RADIO TOWER. PROVIDE CAMERA INTERFACE PANEL(S) AS REQUIRED TO CONNECT CAMERAS TO FIBER OPTIC NETWORK CABLE.




**SECURITY SITE PLAN**

0 60' 120'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | AG | ED | ISSUED FOR COR 034 |
| 2 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY SITE PLAN

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E103** — **rev.** **2**

**sheet** 328 **of** 542 sheets

**file** 98101_E103.DWG

Scale For Microfilming
Millimeters
Inches

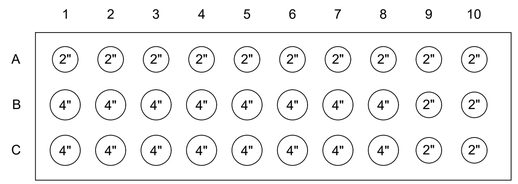
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E103.DWG 10/14/2020 6:28 PM JHDAVIS

**GENERAL NOTES:**

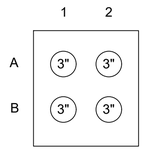
1. SEE E001 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. REFER TO DRAWING E004 FOR DUCT BANK DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 10/11/19 | AG | ED | ISSUED FOR COR 034 |
| 2 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

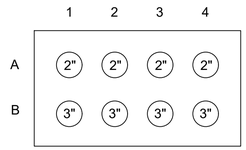



**EDB-1**

△1




**EDB-2**




**EDB-3**

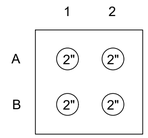
**NOT USED**

**SECTION** A E100
NOT TO SCALE

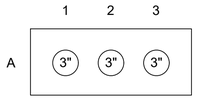
△2
**SECTION** B E100
NOT TO SCALE

**SECTION** C E100
NOT TO SCALE

**SECTION** D E100
NOT TO SCALE

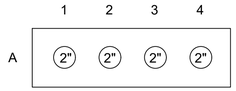



**EDB-5**




**EDB-6**

**NOT USED**



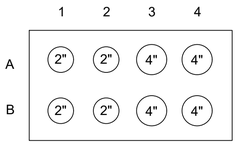

**EDB-8**

**SECTION** E E100
NOT TO SCALE

**SECTION** F E100
NOT TO SCALE

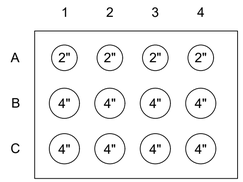
**SECTION** G E100
NOT TO SCALE

△2
**SECTION** H E100
NOT TO SCALE

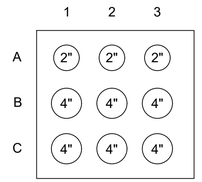



**EDB-9**

**NOT USED**




**EDB-11**




**EDB-12**

△2
**SECTION** I E100
NOT TO SCALE

**SECTION** J E100
NOT TO SCALE

**SECTION** K E101
NOT TO SCALE

**SECTION** L E101
NOT TO SCALE

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DUCT BANK SECTIONS I

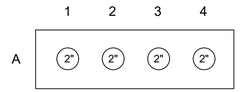
| project | contract |
|---|---|
| 98101 | |

**drawing** E104 – **rev.** 2

**sheet** 329 **of** 542 sheets

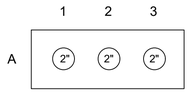
**file** 98101_E104.DWG

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**EDB-13**

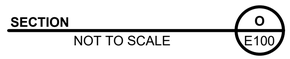


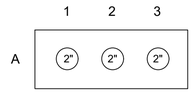




**EDB-14**



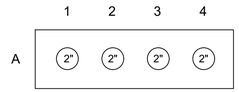

**NOT USED**



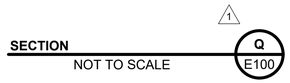



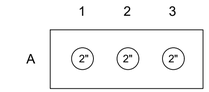

**EDB-16**



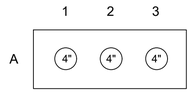

**EDB-17**




**EDB-18**




**EDB-19**

**NOTE:**
1. MINIMUM 30" COVER FOR PRIMARY FEEDER DUCT BANK.




**GENERAL NOTES:**

1. SEE E001 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. REFER TO DRAWING E004 FOR DUCT BANK DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DUCT BANK SECTIONS II

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** E105 – **rev.** 1

**sheet** 330 **of** 542 sheets

**file** 98101_E105.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

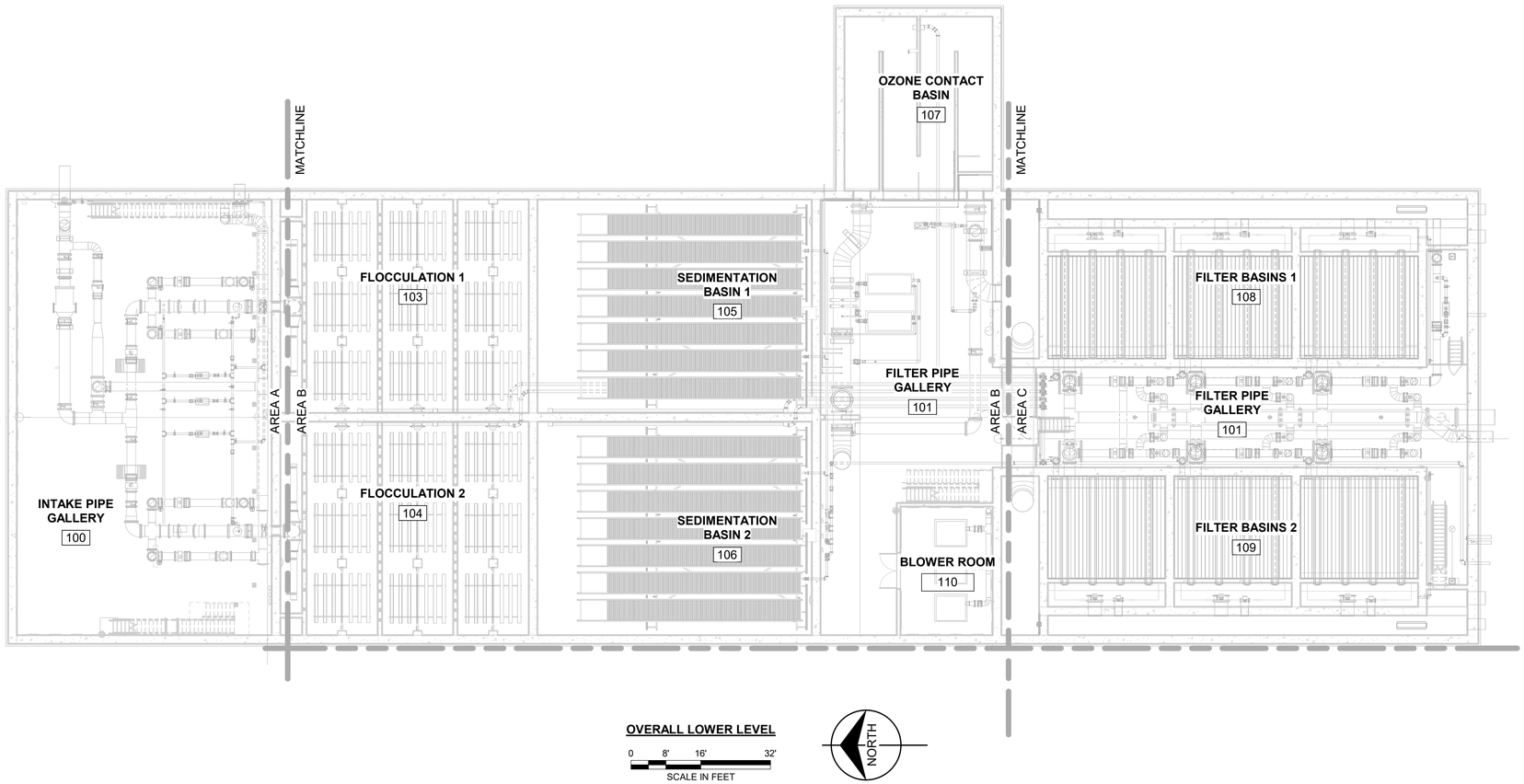
Scale For Microfilming
Millimeters
Inches

| LOWER LEVEL PLAN | | | | | | |
|---|---|---|---|---|---|---|
| AREA | DESCRIPTION | POWER AND GROUNDING PLAN | LIGHTING PLAN | I&C | COMMUNICATION | SECURITY |
| A | RAW WATER | E203 | E217 | E229 | E242 | E255 |
| B | PRETREATMENT | E204 | E218 | E230 | E243 | E256 |
| C | FILTRATION | E205 | E219 | E231 | E244 | E257 |

| MISC PLANS | | | | | |
|---|---|---|---|---|---|
| AREA | POWER AND GROUNDING PLAN | LIGHTING PLAN | I&C | COMMUNICATION | SECURITY |
| ROOF PLANS | E211 | E225 | E237 | E250 | E263 |
| CLEARWELL WEST LOWER | E212 | E226 | E238 | E251 | E264 |
| CLEARWELL EAT LOWER | E213 | E227 | E239 | E252 | E265 |
| CLEARWELL WEST UPPER | E214 | E228 | E240 | E253 | E266 |
| CLEARWELL EAST UPPER | E215 | NA | E241 | E254 | E267 |

NOTES:

1. SEE E202 FOR UPPER LEVEL MAIN BUILDING OVERALL PLAN

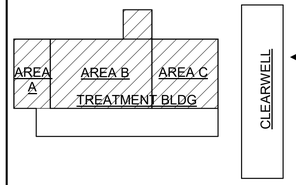



OVERALL LOWER LEVEL

0 8' 16' 32'

SCALE IN FEET

NORTH




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
OVERALL LOWER LEVEL

| project | contract |
|---|---|
| 98101 | |

drawing E201 — rev. 0

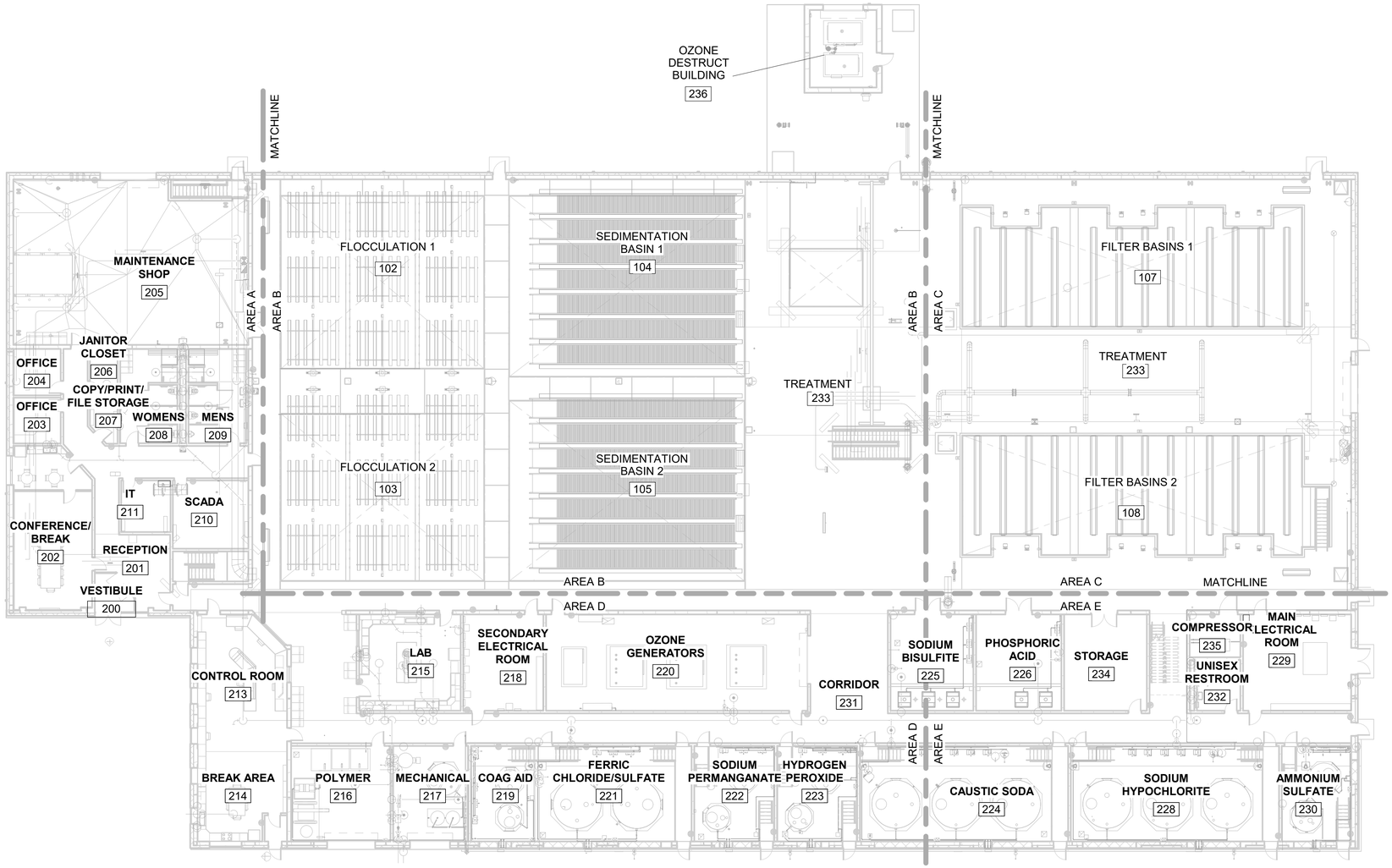
sheet 331 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

| UPPER LEVEL PLAN | | | | | | |
|---|---|---|---|---|---|---|
| AREA | DESCRIPTION | POWER AND GROUNDING PLAN | LIGHTING PLAN | I&C | COMMUNICATION | SECURITY |
| A | ADMIN | E206 | E220 | E232 | E245 | E258 |
| B | PRETREATMENT | E207 | E221 | E233 | E246 | E259 |
| C | FILTRATION | E208 | E222 | E234 | E247 | E260 |
| D | CONTROL ROOM, LAB, CHEM ROOMS, OZONE | E209 | E223 | E235 | E248 | E261 |
| E | CHEM RMS, MECH ROOM, BLWR RM, ELEC RM | E210 | E224 | E236 | E249 | E262 |



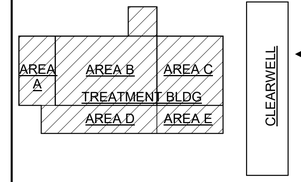

OVERALL UPPER LEVEL

0 8' 16' 32'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL UPPER LEVEL

| project | contract |
|---|---|
| 98101 | |

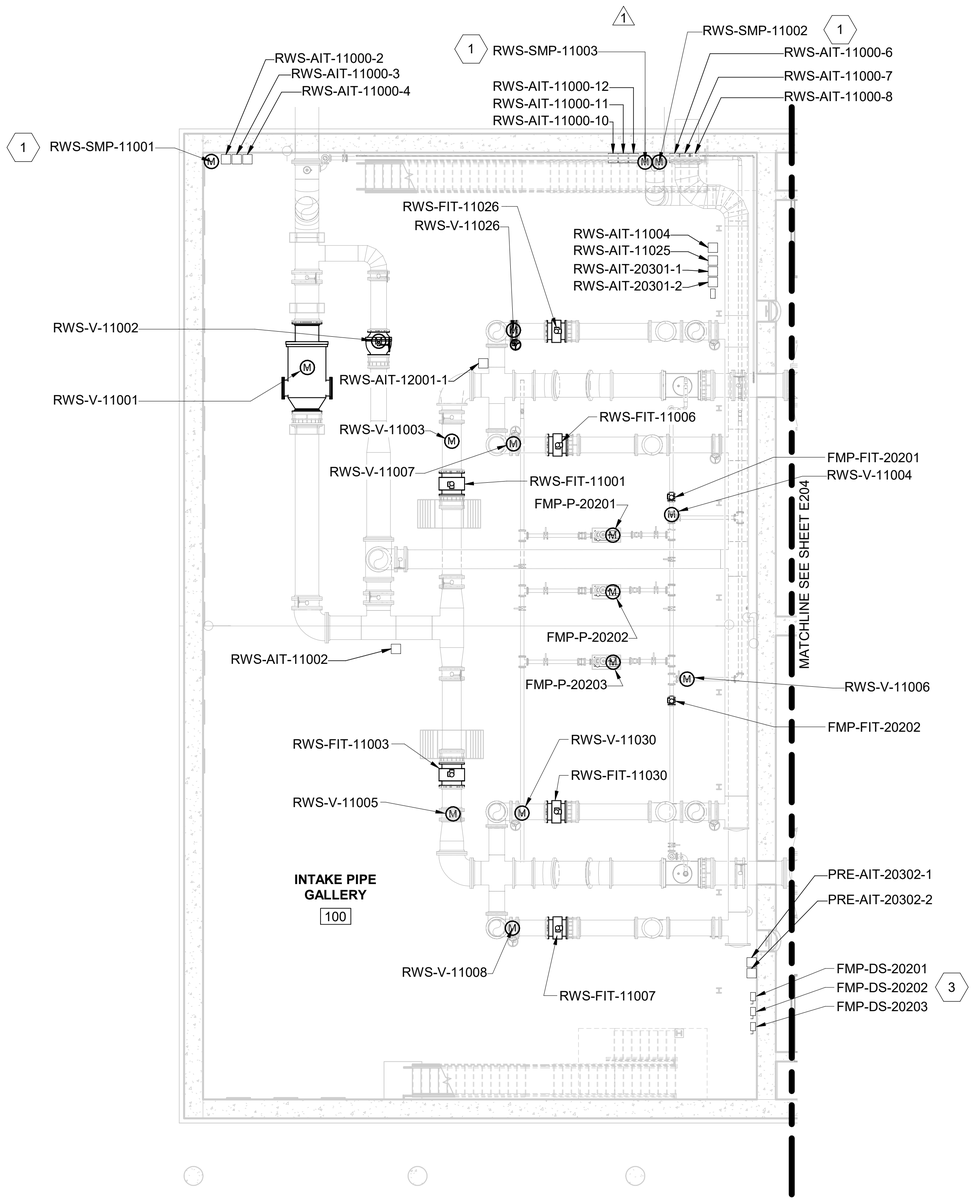
drawing **E202** rev. **0**

sheet 332 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA A POWER AND GROUNDING**

0 4' 8' 16'

SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. REFER TO E317A FOR IN-SLAB CONDUIT ROUTING AND GROUNDING.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

1. REFER TO E330 FOR SAMPLING PUMP DETAIL AND WIRING.
2. NOT USED.
3. PROVIDE AND INSTALL 600V, 3P, 30A, NON-FUSED, NEMA 4X DISCONNECT FOR EACH FLASH MIX PUMP.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A - POWER AND GROUNDING

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E203 | **rev.** 1 |
| **sheet** 333 **of** 542 **sheets** | |
| **file** 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**GENERAL NOTES:**

1. REFER TO E317B FOR IN-SLAB CONDUIT ROUTING AND GROUNDING.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

1. REFER TO E330 FOR SAMPLING PUMP INSTALLATION AND WIRING DIAGRAM.
2. PROVIDE AND INSTALL 600V, 3P, 30A, NON-FUSED, ENCLOSED NEMA 4X DISCONNECT FOR EACH SLUDGE VALVE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

MATCHLINE SEE SHEET E203

FLOCCULATION 1
103

FLOCCULATION 2
104

SEDIMENTATION BASIN 1
105

SEDIMENTATION BASIN 2
106

OZONE CONTACT BASIN
107

FILTER PIPE GALLERY
101

BLOWER ROOM
110

OZO-AIT-36001-2
OZO-AIT-36001-1
OZO-AIT-36001-3
OZO-AIT-36001-4
OZO-AIT-36001-5
1 OZO-SMP-36001
1 OZO-SMP-36002
HYP-AIT-78023
OZO-SMP-36003 1
OZO-SMP-36004 1
OZO-P-36501
SWI-P-30101
SWI-P-30102
SWI-SKD-30101
OZO-AIT-30001-2
OZO-AIT-30002-2
SWI-SKD-30102
SWI-JB-30102
SWI-JB-30101
OZO-AIT-30001-1
OZO-AIT-30002-1
GROUNDING FOR THIS AREA SHOWN ON DRAWING E317B
MATCHLINE SEE SHEET E205
SLD-FIT-20202
2 SLD-DS-22102
2 SLD-DS-22103
2 SLD-DS-22202
2 SLD-DS-22203
SLD-V-22102
SLD-V-22103
SLD-V-22202
SLD-V-22203
FLT-BLWR-44001
FLT-BLWR-44002
PRE-AIT-26101
PRE-AIT-26201
FLT-BLWR-44003
1 PRE-SMP-26100
PRE-SMP-26200 1

**LOWER LEVEL PLAN AREA B**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

AREA B
TREATMENT BLDG

CLEARWELL

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

drawing **E204** rev. **1**

sheet 334 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

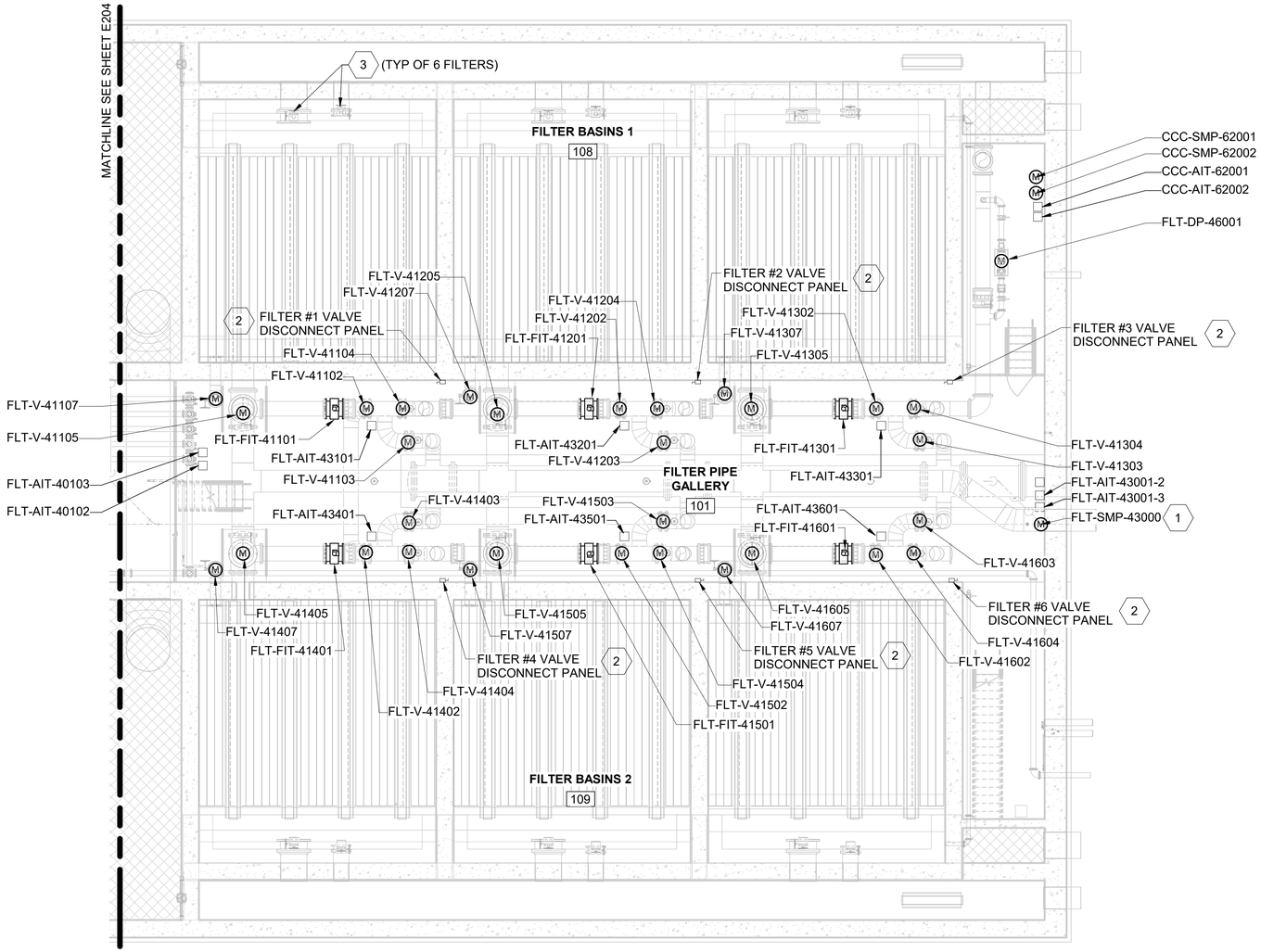
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
2. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

1. REFER TO E330 FOR SAMPLING PUMP INSTALLATION AND WIRING DIAGRAM.
2. REFER TO E006 FOR GROUP-MOUNT VALVE DISCONNECT DETAIL.
3. VALVE ACTUATOR LOCATED ON UPPER LEVEL. REFER TO E208 FOR ACTUATOR CALL-OUTS.

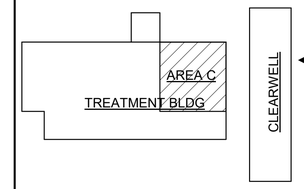



**LOWER LEVEL PLAN AREA C**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C - POWER AND GROUNDING

| | |
|---|---|
| **project** 98101 | **contract** |

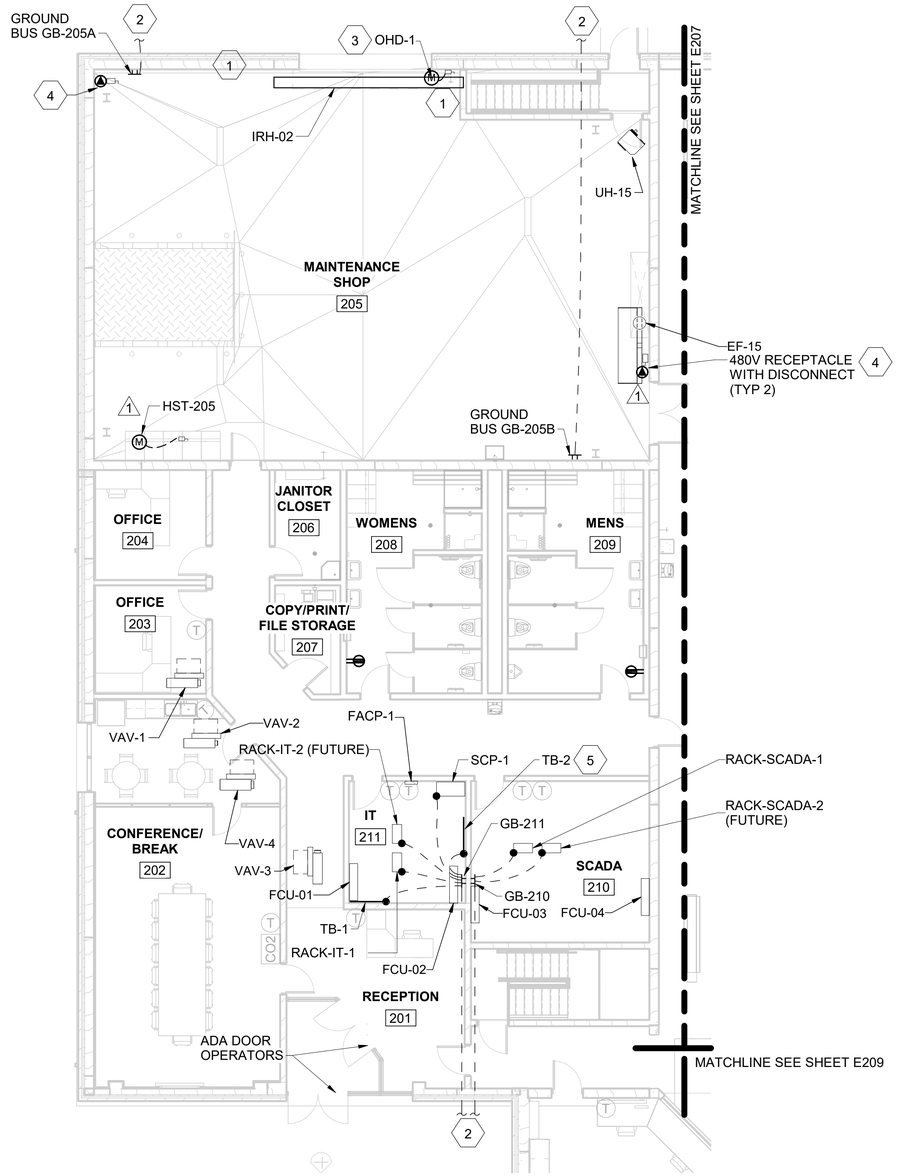
**drawing** **E205** **rev.** **0**

**sheet** 335 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN AREA A**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. INSTALL LOCAL DISCONNECTS SHIPPED LOOSE WITH HVAC EQUIPMENT.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

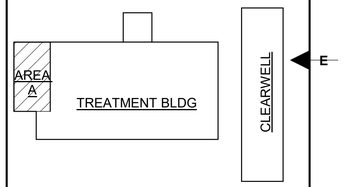
1. PROVIDE 240V, 2P, 30A, NON-FUSED, NEMA 12 DISCONNECT SWITCH.
2. ROUTE #4/0 AWG BC FROM GROUND BUS TO GROUND GRID, REFER TO DRAWING EG002.
3. COORDINATE WITH DOOR SUPPLIER FOR REQUIRED CONTROLS. INSTALL CONDUIT AS REQUIRED FOR DOOR CONTROLS.
4. PROVIDE CROUSE-HINDS ARKTITE WSRD63542 OR EQUAL.
5. COORDINATE POWER INSTALLATION REQUIREMENTS WITH DIVISION 27.

△1

DUCT BANK CONDUIT SCHEDULE

| EQUIPMENT/ LOCATION | CONDUIT TAG | SERVICE |
|---|---|---|
| SCP-1 | EDB2-B3 | SPARE |
| RACK-IT-1 | EDB2-A1 | CITY FIBER 1 |
| RACK-IT-1 | EDB2-A2 | CITY FIBER 2 |
| RACK-IT-1 | EDB2-A3 | GATE/PERIMETER CAMERAS |
| RACK-IT-1 | EDB2-B1 | SPARE |
| RACK-IT-1 | EDB17-A1 | ZONE 3/4 PS FIBER |
| SPARE | EDB2-B3 | |
| IT ROOM (N WALL) | EDB8-B2 | SPARE |
| RACK-SCADA-1 | EDB17-A2 | RADIO FIBER |
| LP-PRE | EDB17-A3 | LIGHTS |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

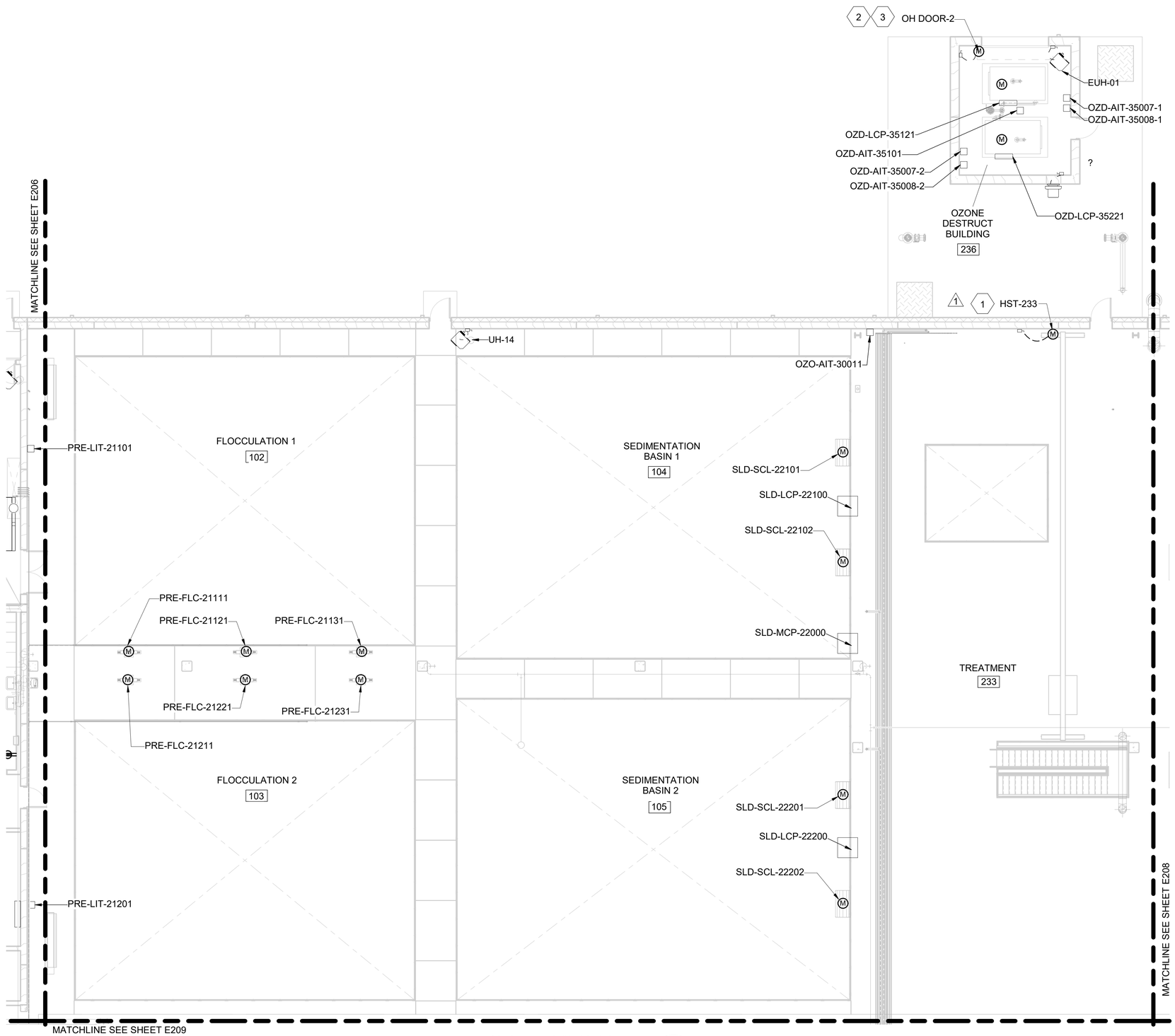
drawing **E206 — 1** rev.

sheet 336 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN AREA B**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. INSTALL LOCAL DISCONNECT SHIPPED LOOSE WITH HVAC EQUIPMENT.

   REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.

   REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

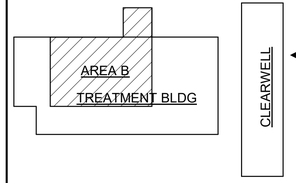
**KEYED NOTES:**

1 (1) PROVIDE 480V, 2P, 30A, NON-FUSED, NEMA 4X DISCONNECT SWITCH.

(2) PROVIDE 240V, 2P, 30A, NON-FUSED, NEMA 12 DISCONNECT SWITCH.

(3) COORDINATE WITH DOOR SUPPLIER FOR REQUIRED CONTROLS. INSTALL CONDUIT AS REQUIRED FOR DOOR CONTROLS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

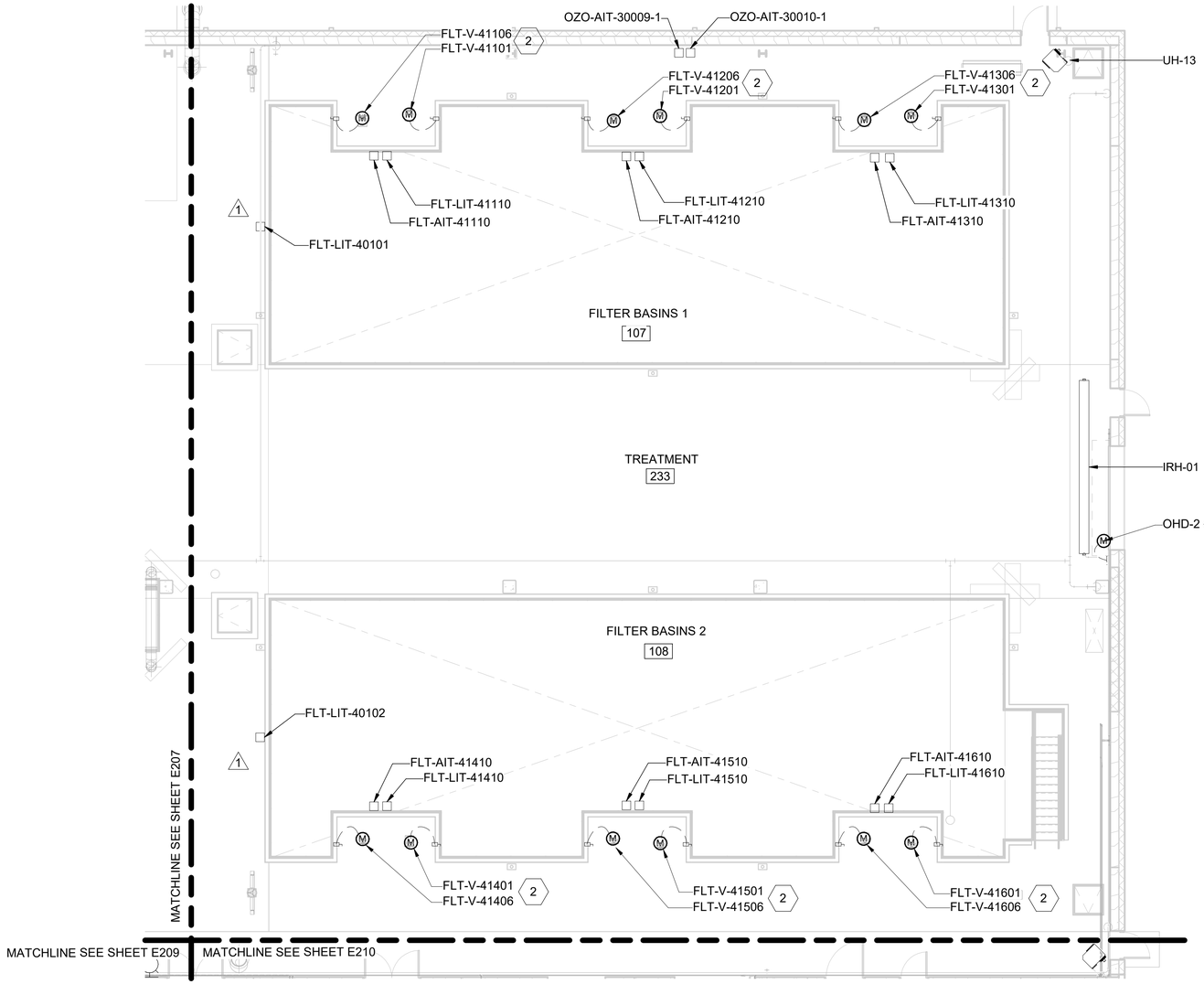
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B - POWER AND GROUNDING

| | |
|---|---|
| project 98101 | contract |
| drawing E207 | rev. 1 |
| sheet 337 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN AREA C**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

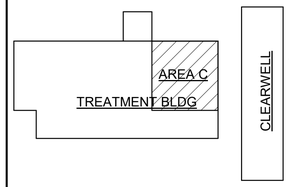
**GENERAL NOTES:**

1. INSTALL LOCAL DISCONNECTS SHIPPED LOOSE WITH HVAC EQUIPMENT.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

1. PROVIDE 240V, 2P, 30A, NON-FUSED, NEMA 4 DISCONNECT SWITCH.
2. PROVIDE 600V, 3P, 30A, NON-FUSED, ENCLOSED NEMA 4X DISCONNECT.
3. COORDINATE WITH DOOR SUPPLIER FOR REQUIRED CONTROLS. INSTALL CONDUIT AS REQUIRED FOR DOOR CONTROLS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

drawing **E208 — 1** rev.

sheet 338 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

△1

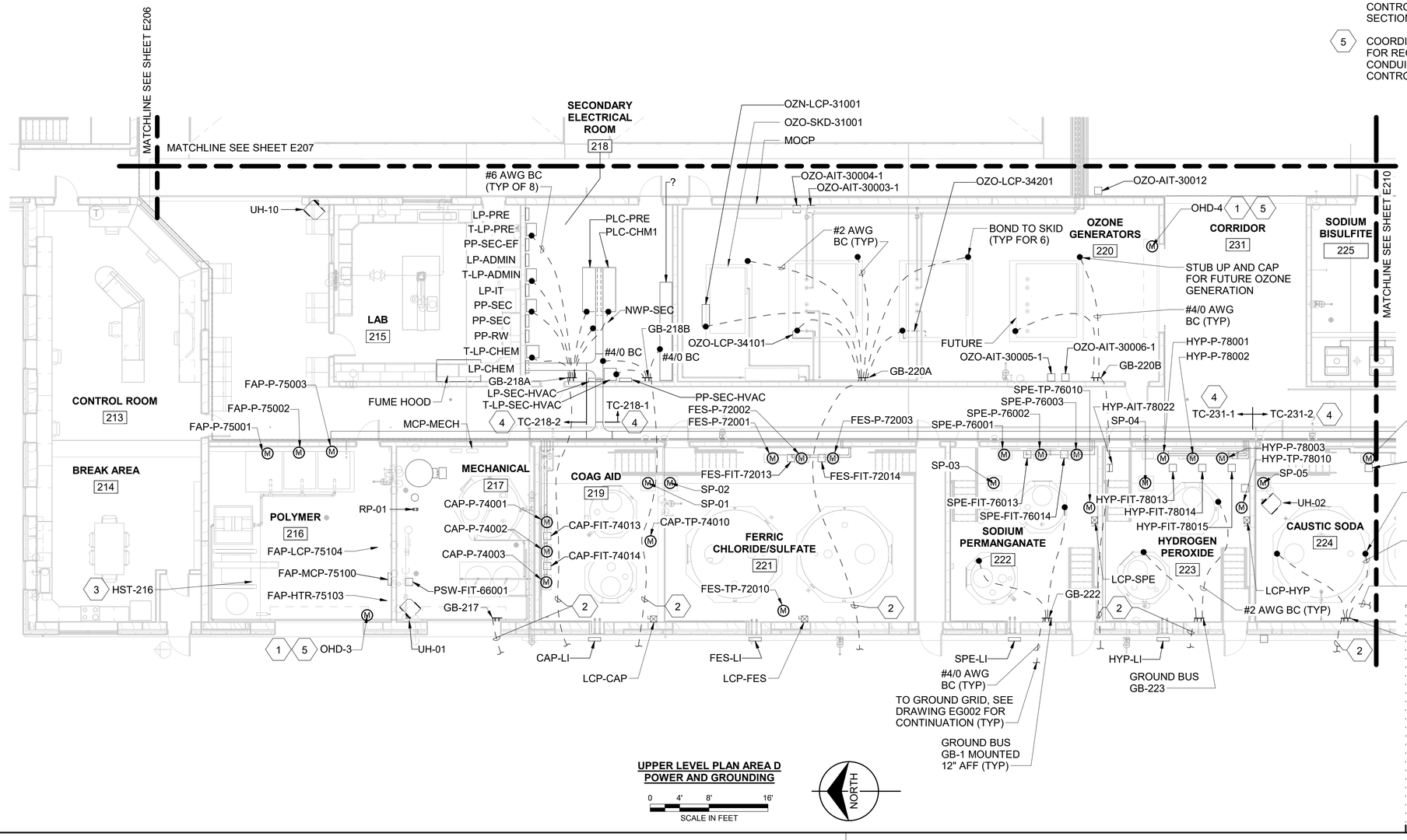
| DUCT BANK CONDUIT SCHEDULE | | |
|---|---|---|
| EQUIPMENT/ LOCATION | CONDUIT TAG | SERVICE |
| PP-SEC | EDB8-A1 | ACCESS GATE POWER |
| NWP-SEC | EDB8-A2 | 120V POWER TO PERIMETER CAMERAS/ACCESS GATE |
| SEC ELEC RM (NW CORNER) | EDB8-A3 | SPARE |

**GENERAL NOTES:**

1. INSTALL LOCAL DISCONNECTS SHIPPED LOOSE WITH HVAC EQUIPMENT.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. ROUTE CONDUIT ON WEST EXTERIOR WALL SO AS NOT TO IMPEDE STRUCTURAL KNOCK-OUT PANELS.

**KEYED NOTES:**

1. PROVIDE 240V, 2P, 30A, NON-FUSED, NEMA 12 DISCONNECT SWITCH FOR OVERHEAD DOOR.
2. ROUTE #4/0 AWG BC FROM GROUND BUS TO GROUND GRID. REFER TO DWG EG002.
3. PROVIDE 600V, 3P, 30A, NON-FUSED, NEMA 12 DISCONNECT SWITCH FOR HOIST.
4. 12"W x 6"H ALUMINUM CABLE TRAY WITH 9" LADDER RUNGS MOUNTED AT 11'-6" AFF FOR 120V POWER AND CONTROL CABLE. REFER TO SECTION 26 05 36 - CABLE TRAY.
5. COORDINATE WITH DOOR SUPPLIER FOR REQUIRED CONTROLS. INSTALL CONDUIT AS REQUIRED FOR DOOR CONTROLS.




**UPPER LEVEL PLAN AREA D**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

drawing **E209 — 1** rev.

sheet 339 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

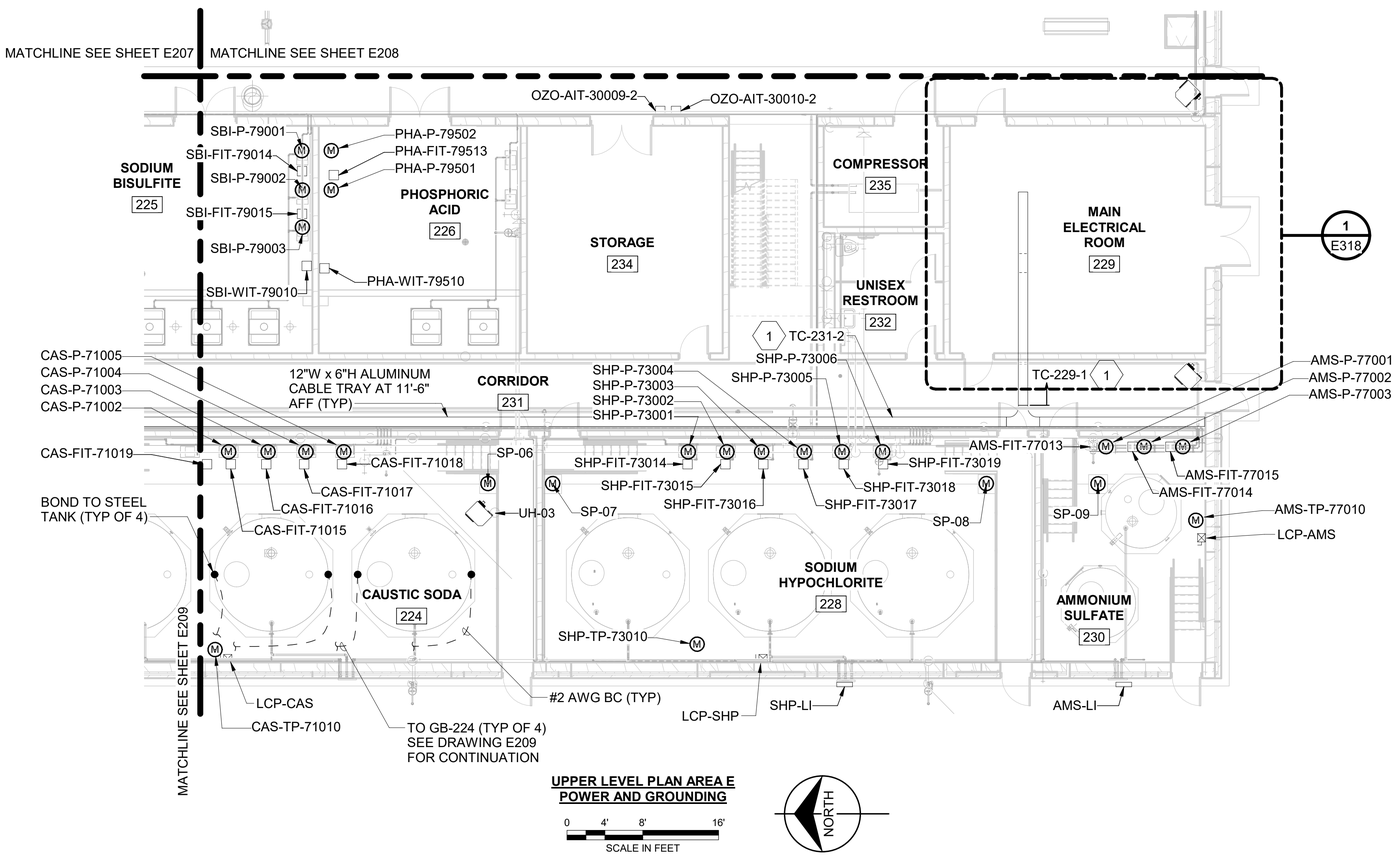
**GENERAL NOTES:**

1. INSTALL LOCAL DISCONNECTS SHIPPED LOOSE WITH HVAC EQUIPMENT.
2. REFER TO E300/1 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. ROUTE CONDUIT ON WEST EXTERIOR WALL SO AS NOT TO IMPEDE STRUCTURAL KNOCK-OUT PANELS.

**KEYED NOTES:**

1. 12"W x 6"H ALUMINUM CABLE TRAY WITH 9" LADDER RUNGS MOUNTED AT 11'-6" AFF FOR 120V POWER AND CONTROL CABLE. REFER TO SECTION 26 05 36 - CABLE TRAY.

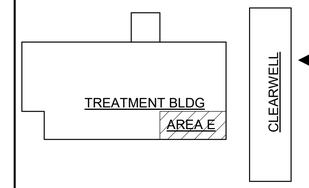
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL PLAN AREA E**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

drawing **E210** rev. **0**

sheet 340 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

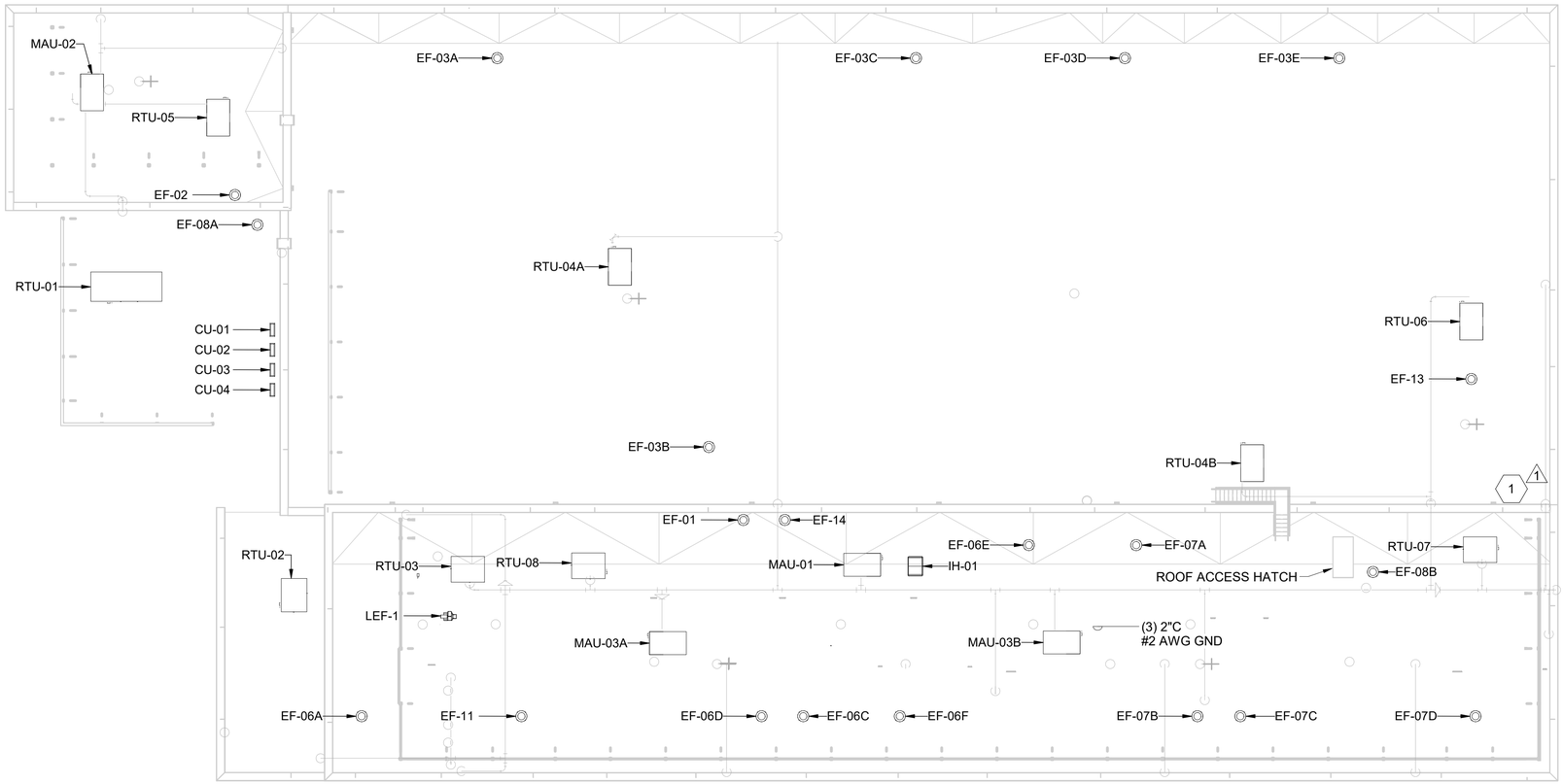
**GENERAL NOTES:**

1. DISCONNECTS FOR EXHAUST FANS PROVIDED LOOSE BY MECHANICAL CONTRACTOR. COORDINATE INSTALLATION WITH MECHANICAL CONTRACTOR.
2. MAKE-UP AIR UNIT AND ROOF TOP UNIT DISCONNECT SWITCHES PROVIDED INTEGRAL TO EQUIPMENT.
3. REFER TO E329 FOR EXHAUST FAN CONTROL SCHEMATICS.
4. INSTALL SPEED CONTROL DIALS FOR EC AND FSC CONTROLLED FANS IN THE SPACE SERVED BY THE FAN.

**KEYED NOTE:** (#)

1. PASS SIX (6) 2" CONDUITS THROUGH ROOF ALONG EAST FACE OF WALL. FOUR (4) CONDUITS SHALL BE EXTENDED FROM DUCT BANK RISER BELOW AND CAPPED FOR FUTURE EXTENSION. TWO (2) CONDUITS SHALL BE CAPPED ON BOTH SIDES FOR SPARE.

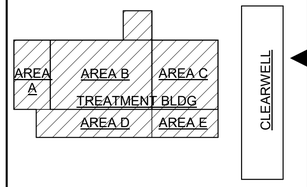
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | AG | ED | ISSUED FOR PCO 018 |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**OVERALL ROOF**
**POWER AND GROUNDING**

0 8' 16' 32'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF - POWER AND GROUNDING

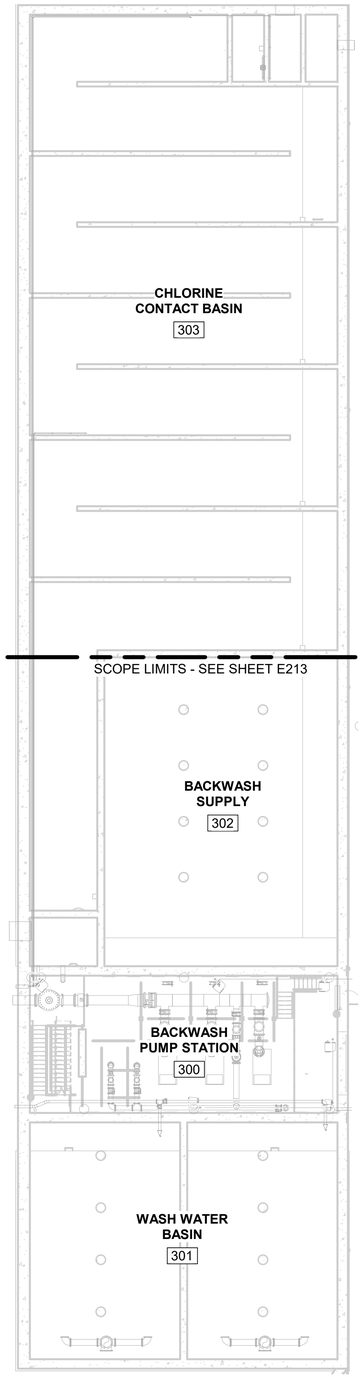
| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E211 — 1**

**sheet** 341 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

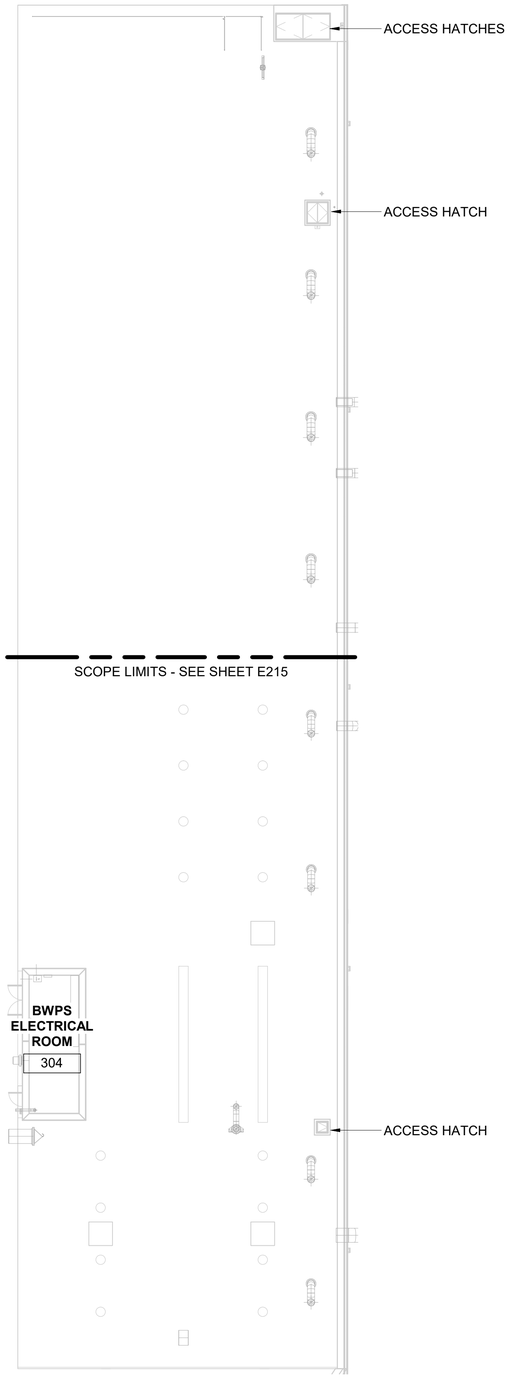
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**OVERALL CLEARWELL**
**LOWER LEVEL ELE. 5372'**

0 8' 16' 32'
SCALE IN FEET

NORTH

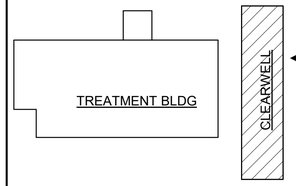



**OVERALL CLEARWELL**
**UPPER LEVEL ELE. 5410'**

0 8' 16' 32'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL CLEARWELL - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

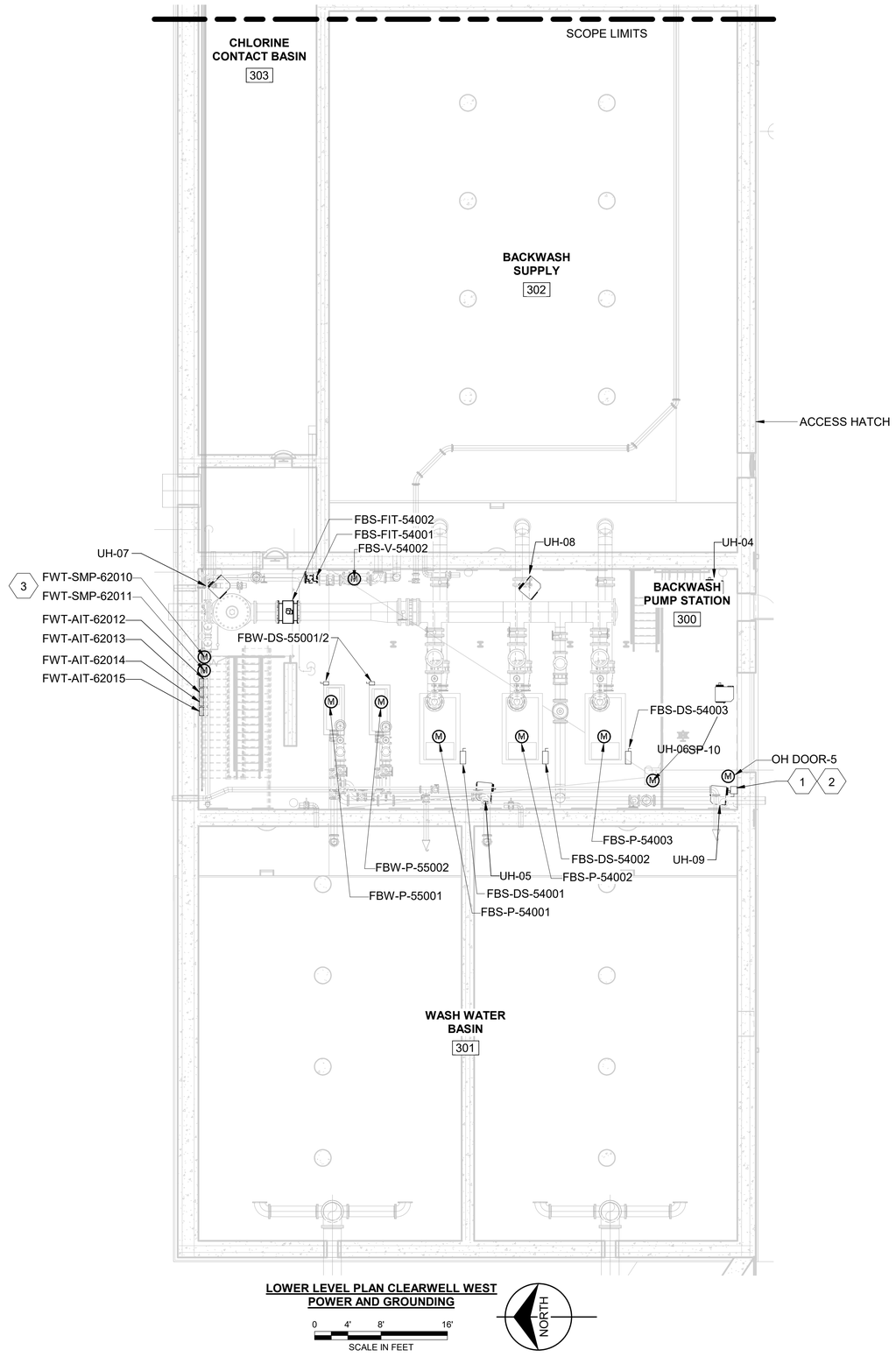
**drawing** **E212** **rev.** **0**

**sheet** 342 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN CLEARWELL WEST**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

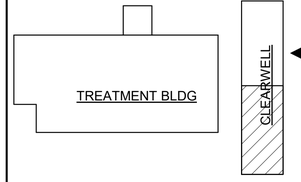
**GENERAL NOTES:**

1. REFER TO E317B FOR IN-SLAB CONDUIT ROUTING AND GROUNDING.
2. REFER TO E300 AND E301 FOR ONE-LINE DIAGRAMS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

1. PROVIDE 240V, 2P, 30A, NON-FUSED, NEMA 4 DISCONNECT SWITCH FOR OVERHEAD DOOR.
2. COORDINATE WITH DOOR SUPPLIER FOR REQUIRED DOOR CONTROLS. INSTALL CONDUIT AS REQUIRED FOR DOOR CONTROLS.
3. REFER TO E330 FOR SAMPLE PUMP INSTALLATION AND WIRING DIAGRAM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST - POWER AND GROUNDING

| project | contract |
|---|---|
| 98101 | |

drawing **E213** rev. **0**

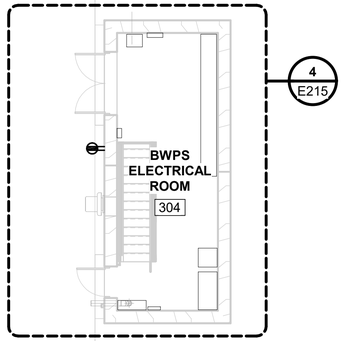
sheet 343 of 542 sheets

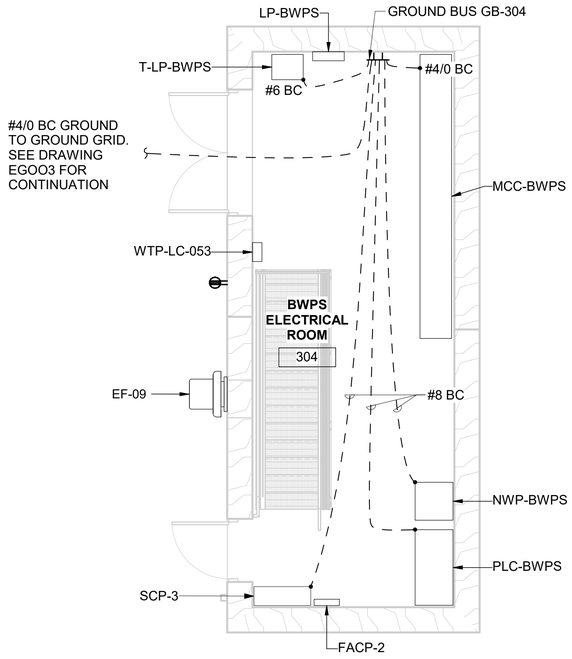
file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

SCOPE LIMITS




DETAIL 4 / E215

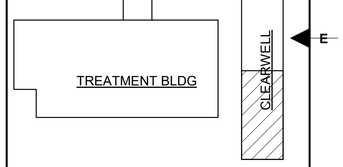
0 2' 4' 8'
SCALE IN FEET

**UPPER LEVEL PLAN CLEARWELL WEST**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

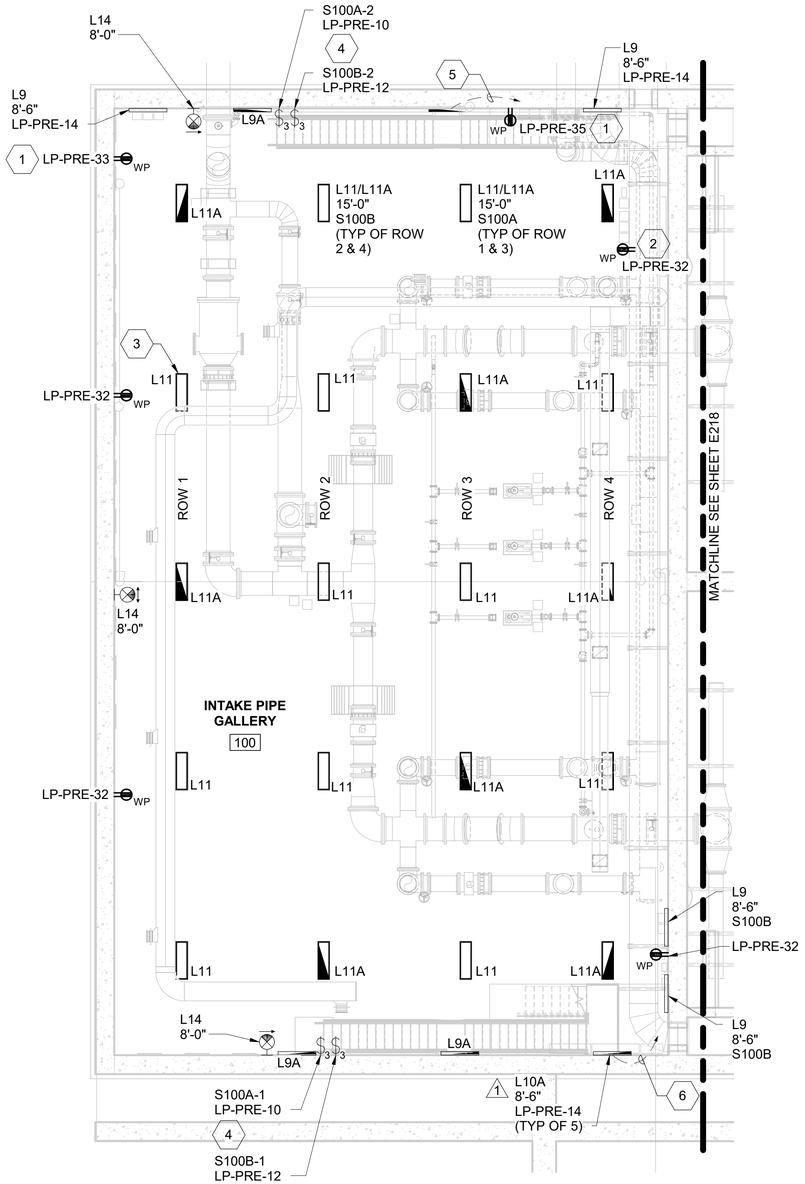
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST - POWER AND GROUNDING

| | |
|---|---|
| project 98101 | contract |
| drawing E215 | rev. 0 |
| sheet 344 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA A LIGHTING**

0 4' 8' 16'

SCALE IN FEET

NORTH

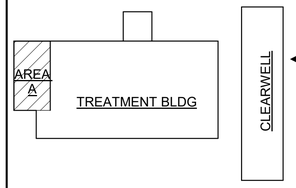
**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR AND POWERED FROM ADJACENT NON-SWITCHED LIGHTING CIRCUITS.
2. REFER TO TYPICAL STRIP LUMINAIRE INSTALLATION DETAIL ON DRAWING E002 FOR LUMINAIRE TYPE L6/L6A.
3. ALL RECEPTACLES SHOWN TO BE WEATHER-PROOF AND GFI PROTECTED.
4. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
5. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

1. COORDINATE RECEPTACLE LOCATION WITH SAMPLE PUMP LOCATION.
2. INSTALL RECEPTACLE ON ANALYZER EQUIPMENT RACK.
3. COORDINATE LUMINAIRE LOCATION TO MAINTAIN CLEAR SPACE BENEATH ACCESS HATCH.
4. INSTALLED BELOW LIGHT AT END OF STAIRS 4-FEET ABOVE FINISHED FLOOR.
5. REFER TO DRAWING E220 FOR CONTINUATION TO UPPER LEVEL LIGHT(S).
6. REFER TO DRAWING E321 FOR CONTINUATION TO UPPER LEVEL LIGHT(S).

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A - LIGHTING AND RECEPTACLES

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E217 — 1** **rev.**

**sheet** 345 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

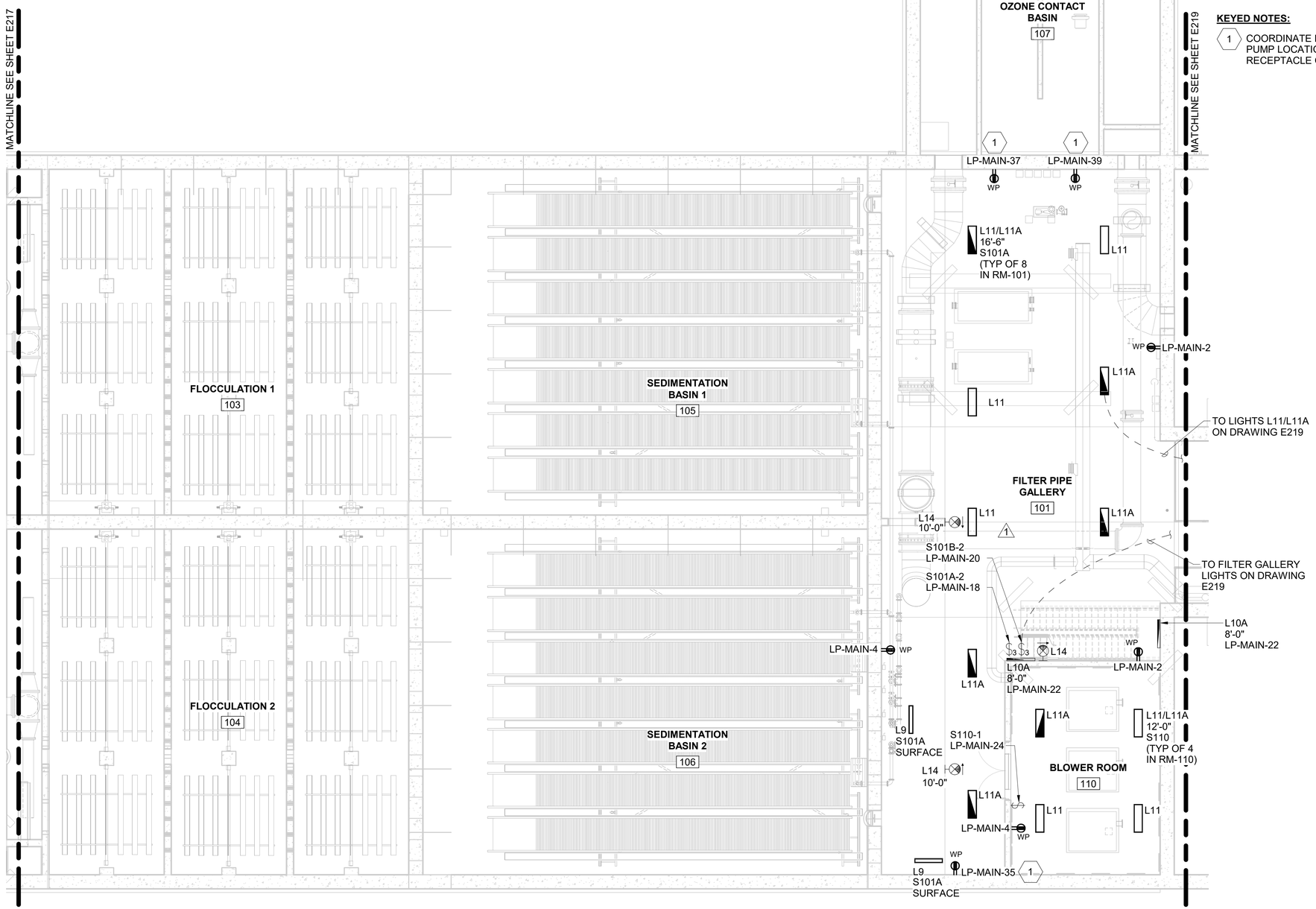
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON AND POWERED FROM ADJACENT NON-SWITCHED LIGHTING CIRCUITS.
2. ALL RECEPTACLES SHOWN TO BE WEATHER-PROOF AND GFI PROTECTED.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

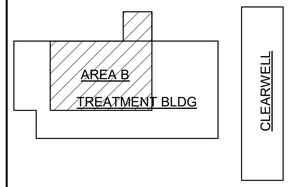
1. COORDINATE RECEPTACLE LOCATION WITH SAMPLE PUMP LOCATION. WHERE REQUIRED, INSTALL RECEPTACLE ON ANALYZER RACK.




**LOWER LEVEL PLAN AREA B LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B - LIGHTING AND RECEPTACLES

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E218 — 1** **rev.**

**sheet** 346 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

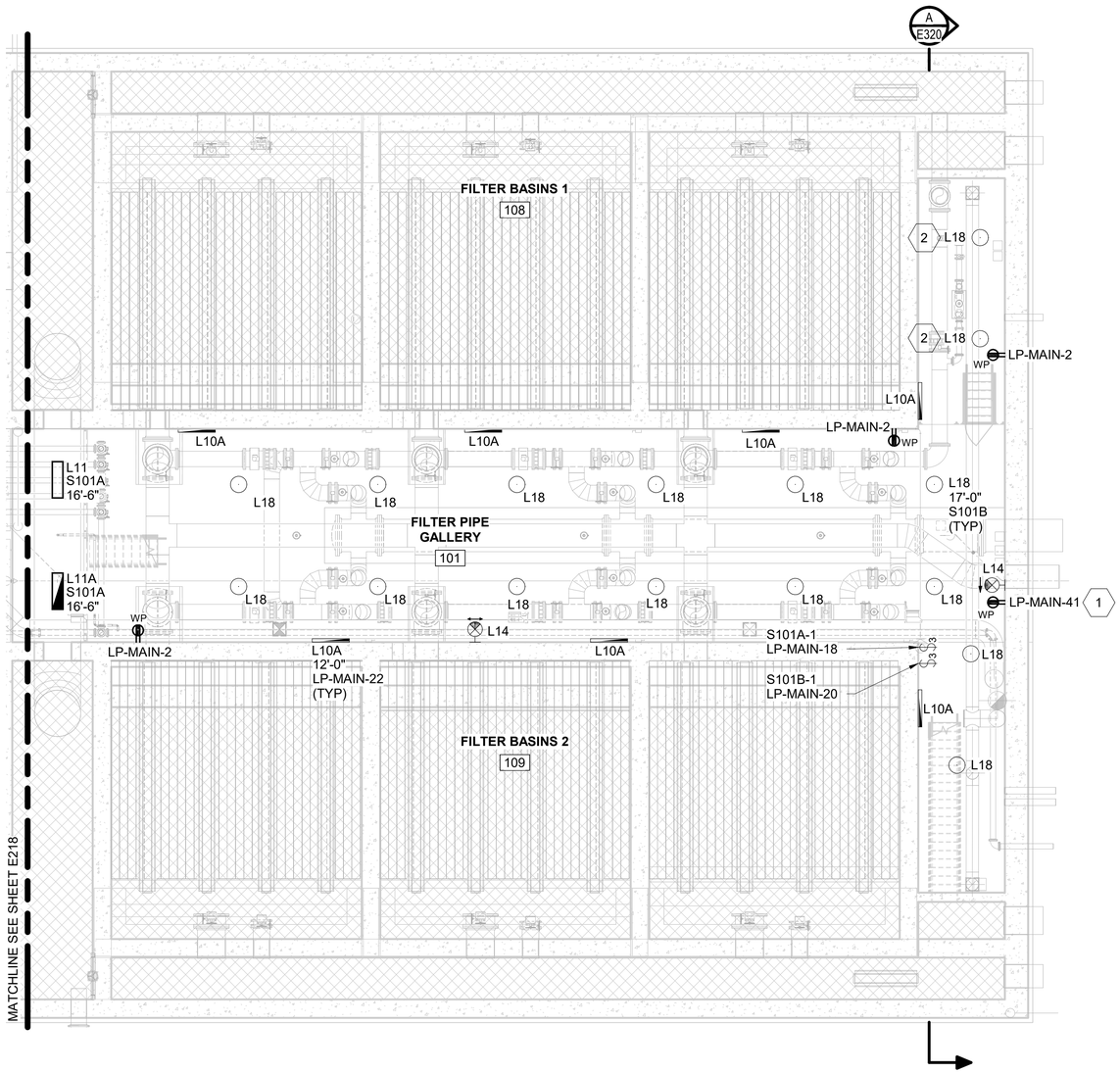
Millimeters
Scale For Microfilming
Inches

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON AND POWERED FROM ADJACENT NON-SWITCHED LIGHTING CIRCUITS.
2. ALL RECEPTACLES SHOWN TO BE WEATHER-PROOF AND GFI PROTECTED.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

1. COORDINATE RECEPTACLE LOCATION WITH SAMPLE PUMP LOCATION. WHERE REQUIRED, INSTALL RECEPTACLE ON ANALYZER RACK.
2. LUMINAIRE ELEVATION TO MATCH L18 LUMINAIRES OVER PLATFORMED AREA. REFER TO SECTION A ON E320.

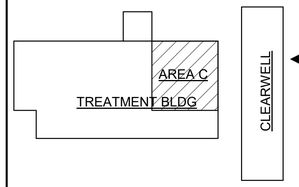



**LOWER LEVEL PLAN AREA C LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C - LIGHTING AND RECEPTACLES

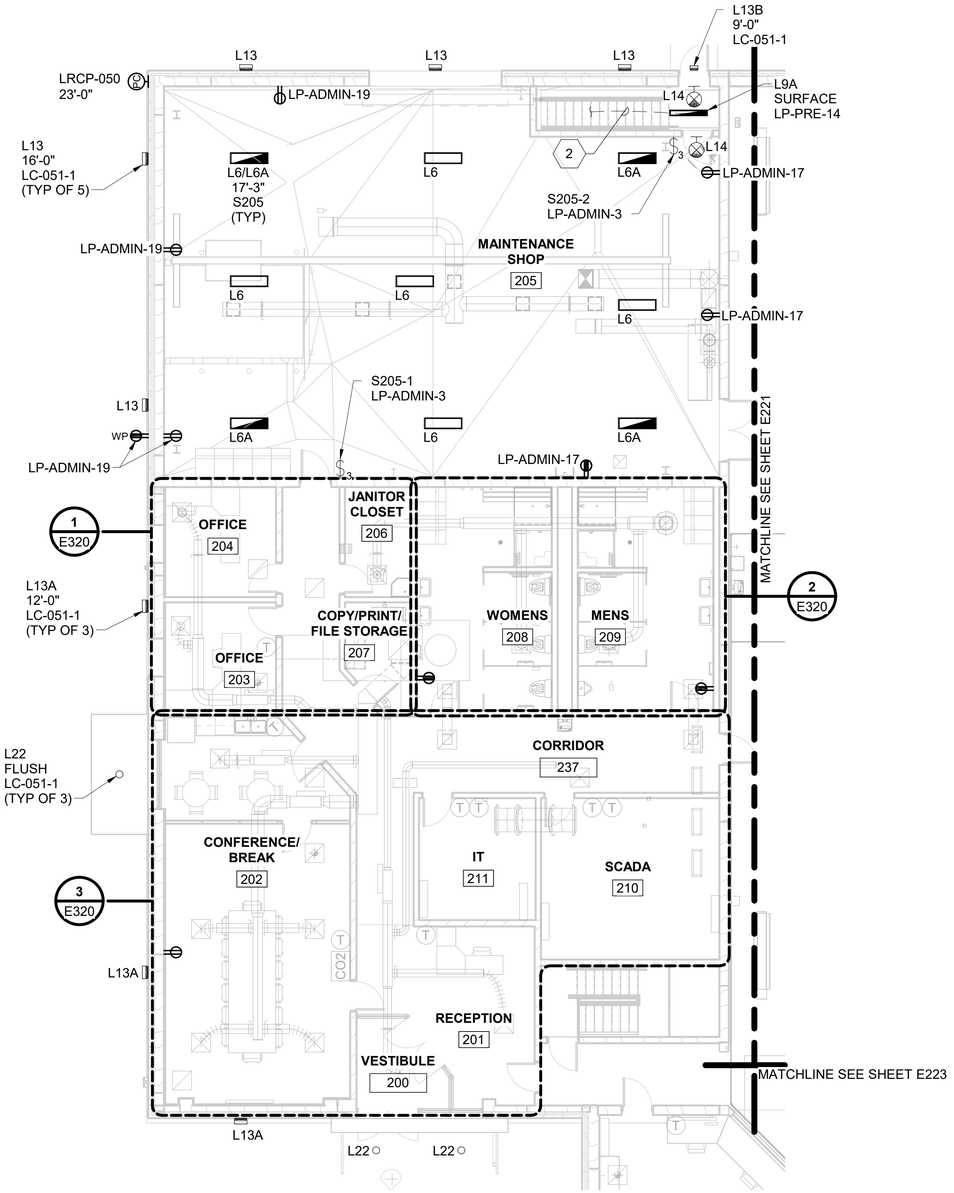
| project | contract |
|---|---|
| 98101 | |

drawing **E219** rev. **0**

sheet 347 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA A**
**LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. REFER TO E308/9 FOR LUMINAIRE SCHEDULE.
4. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
5. REFER TO E324 FOR LIGHTING CONTACTOR SCHEMATICS.

**KEYED NOTES:**

1. INSTALL LUMINAIRE 8-FEET ABOVE FINISHED FLOOR. REFER TO DRAWING E002 FOR HORIZONTAL MOUNTING DETAIL.
2. REFER TO DRAWING E217 FOR CONTINUATION TO LOWER LEVEL STAIR WELL LIGHTS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A - LIGHTING AND RECEPTACLES

| project | contract |
|---|---|
| 98101 | |

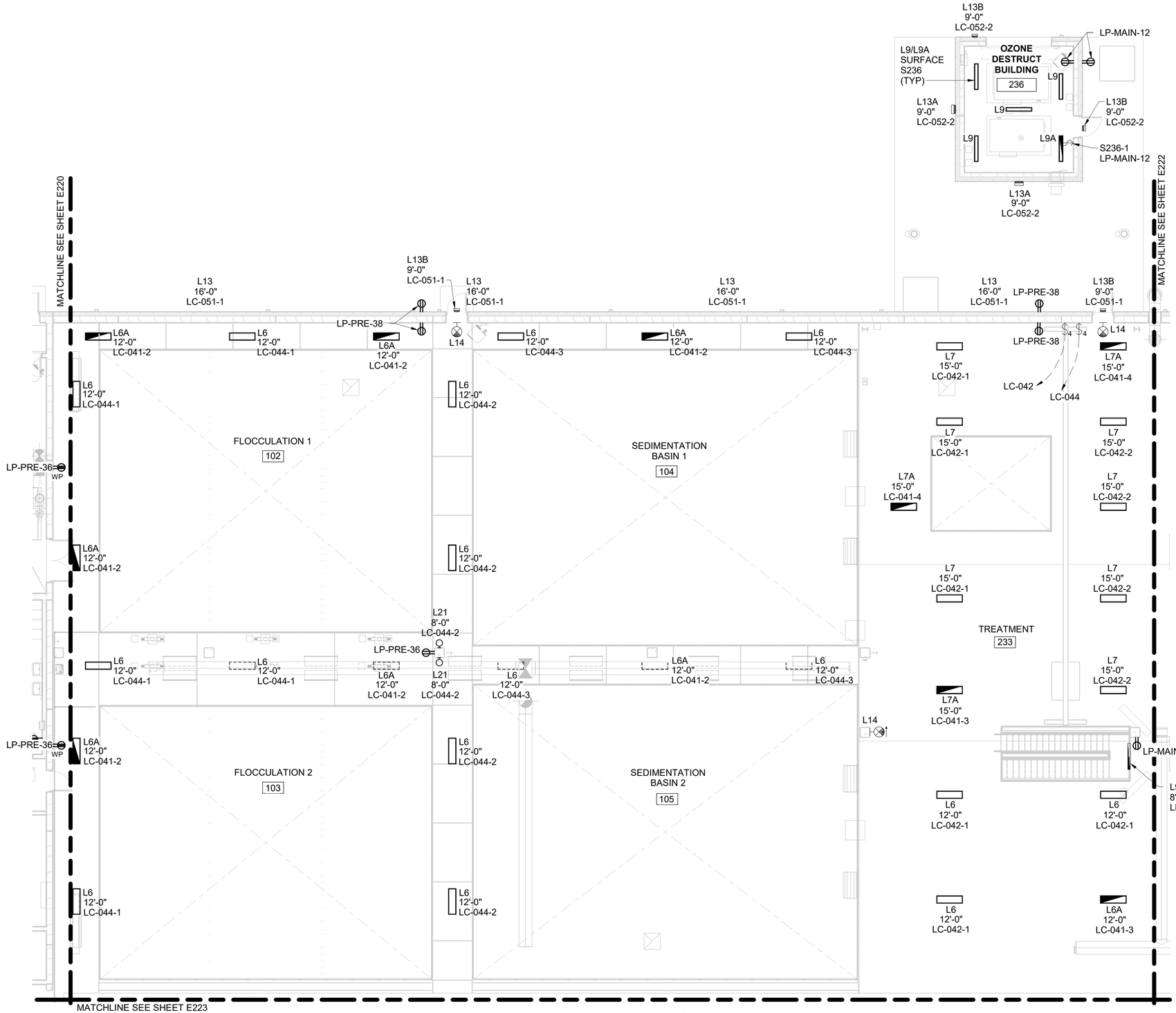
drawing **E220** rev. **0**

sheet 348 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN AREA B LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. ALL RECEPTACLES TO BE GFI-PROTECTED WITH WEATHER-PROOF COVERS.
3. REFER TO E002 FOR LIGHTING DETAILS.
4. COORDINATE FINAL LUMINAIRE ELEVATIONS TO AVOID CONFLICTS WITH BRIDGE CRANE AND HVAC. ADJUST FINAL ELEVATIONS AS REQUIRED.
5. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
6. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.
7. REFER TO E324 FOR LIGHTING CONTROL SCHEMATICS.

**KEYED NOTES:**

1. MOUNT LUMINAIRES 8-FEET ABOVE STAIR PLATFORM. REFER TO HORIZONTAL MOUNTING DETAIL ON DRAWING E002 FOR INSTALLATION DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B - LIGHTING AND RECEPTACLES

| project | contract |
|---|---|
| 98101 | |

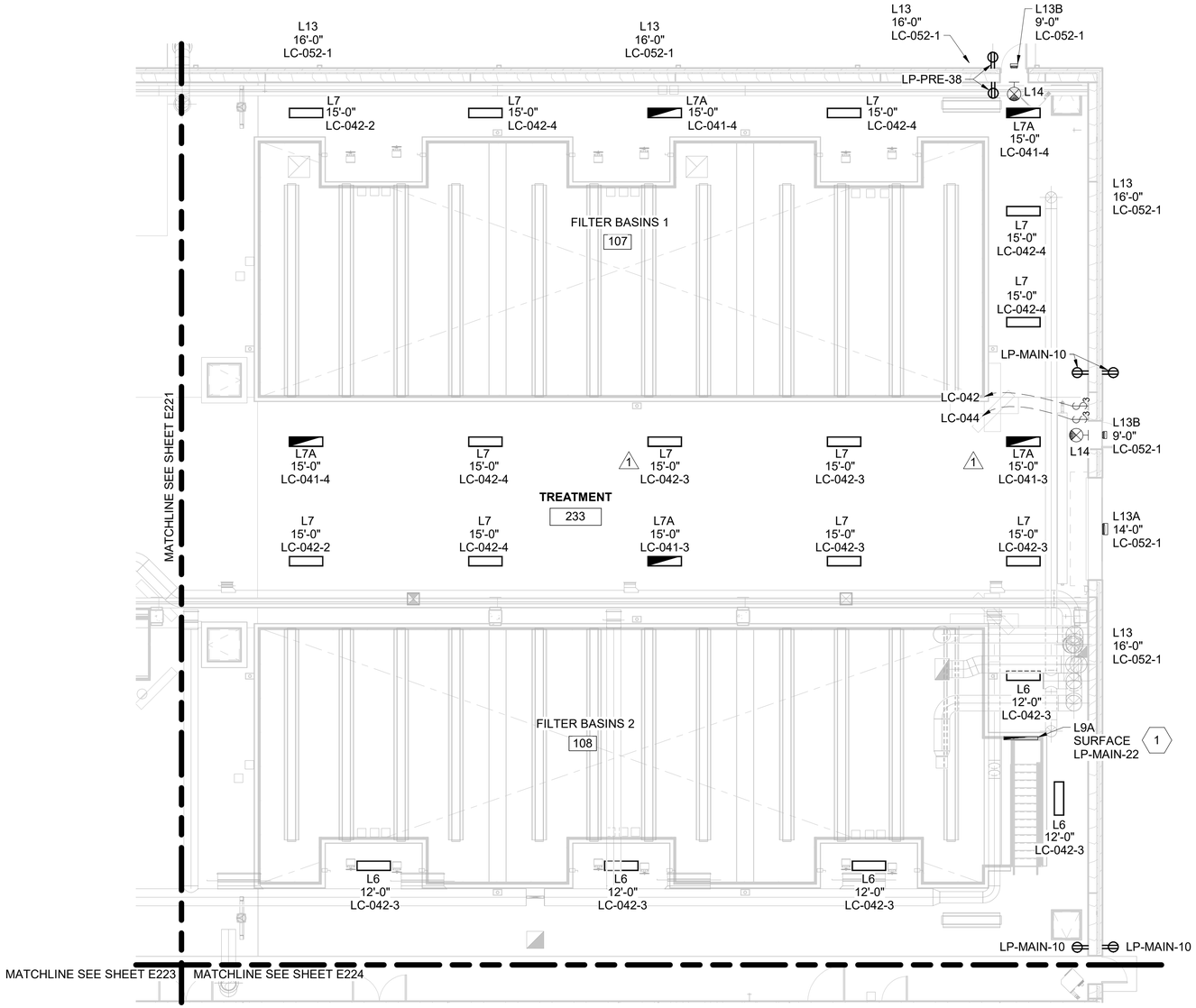
drawing **E221 — 1** rev.

sheet 349 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches




**UPPER LEVEL PLAN AREA C LIGHTING**

0 4' 8' 16'

SCALE IN FEET

NORTH

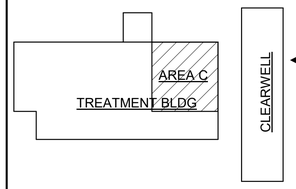
**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. ALL RECEPTACLES TO BE GFI-PROTECTED WITH WEATHER-PROOF COVERS.
3. REFER TO E002 FOR LIGHTING DETAILS.
4. COORDINATE FINAL LUMINAIRE ELEVATIONS TO AVOID CONFLICTS WITH BRIDGE CRANE AND HVAC. ADJUST FINAL ELEVATIONS AS REQUIRED.
5. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
6. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.
7. REFER TO E324 FOR LIGHTING CONTROL SCHEMATICS.

**KEYED NOTES:**

1. MOUNT LUMINAIRE ON FACE OF CONCRETE APPROXIMATELY 7'-0" ABOVE STAIR PLATFORM. REFER TO SECTION A ON E320.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C - LIGHTING AND RECEPTACLES

| | |
|---|---|
| project 98101 | contract |
| drawing E222 — 1 | rev. |
| sheet 350 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

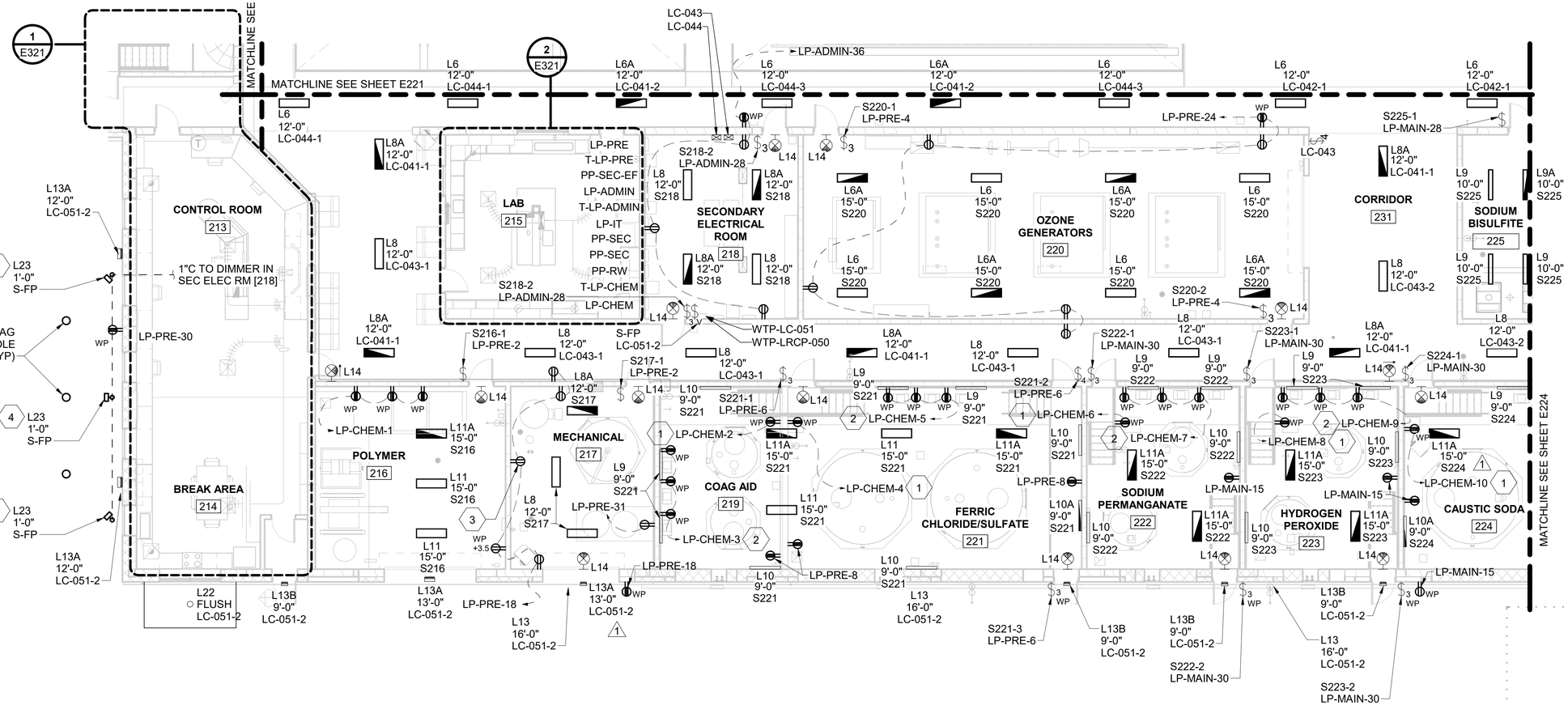
Scale For Microfilming
Millimeters
Inches

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. COORDINATE FINAL LUMINAIRE ELEVATIONS TO AVOID CONFLICTS WITH CHEMICAL PIPING AND HVAC. ADJUST FINAL ELEVATIONS AS REQUIRED.
4. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
5. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.
6. REFER TO E324 FOR LIGHTING CONTROL SCHEMATICS.

**KEYED NOTES:**

1. REFER TO E330 FOR SUMP PUMP CIRCUIT DETAIL.
2. COORDINATE RECEPTACLES WITH METERING PUMP SKID LOCATIONS.
3. COORDINATE LOCATION OF RECEPTACLE WITH RP-01 WATER PUMP.
4. AIM LUMINAIIRE TOWARD TOP OF FLAG POLE TO ILLUMINATE FLAG. ADJUST LUMINAIRE BARN DOORS AS REQUIRED TO LIMIT LIGHT THROW.




**UPPER LEVEL PLAN AREA D LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D - LIGHTING AND RECEPTACLES

| project | contract |
|---|---|
| 98101 | |

drawing E223 — 1 rev.

sheet 351 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

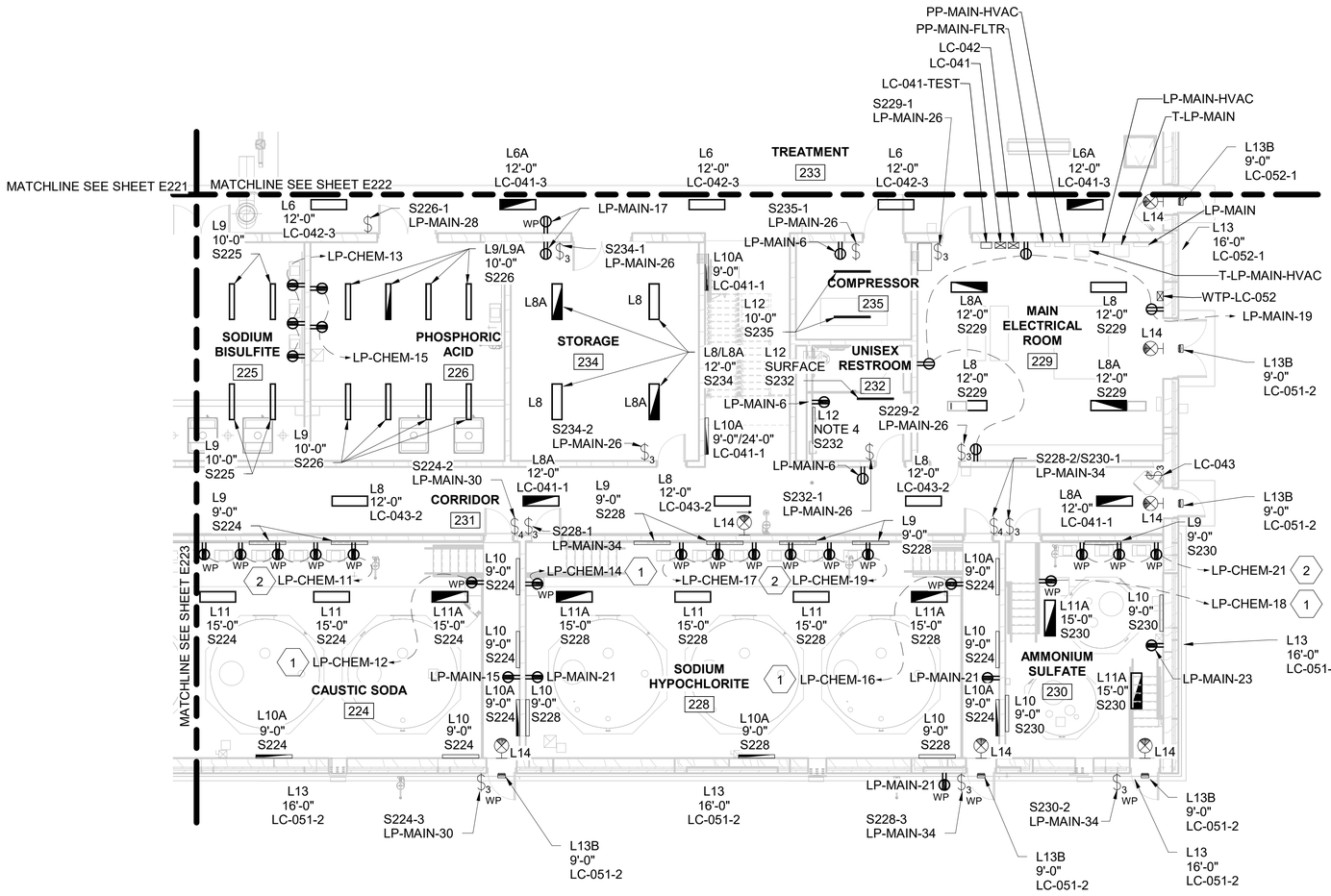
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. COORDINATE FINAL LUMINAIRE ELEVATIONS TO AVOID CONFLICTS WITH CHEMICAL PIPING AND HVAC. ADJUST FINAL ELEVATIONS AS REQUIRED.
4. SURFACE-MOUNT LUMINAIRE ON WALL 6" ABOVE MIRROR. JUNCTION BOX TO BE ROTATED 90 DEGREES SO AS TO BE CONCEALED BY INSTALLED LUMINAIRE.
5. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
6. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.
7. REFER TO E324 FOR LIGHTING CONTROL SCHEMATICS.

**KEYED NOTES:**

1. REFER TO E330 FOR SUMP PUMP CIRCUIT DETAIL.
2. COORDINATE RECEPTACLES WITH METERING PUMP SKID LOCATIONS.

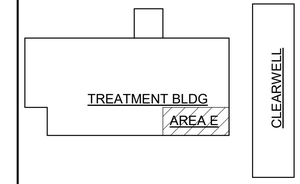



**UPPER LEVEL PLAN AREA E LIGHTING**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E - LIGHTING AND RECEPTACLES

| project | contract |
|---|---|
| 98101 | |

drawing **E224** rev. **0**

sheet 352 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

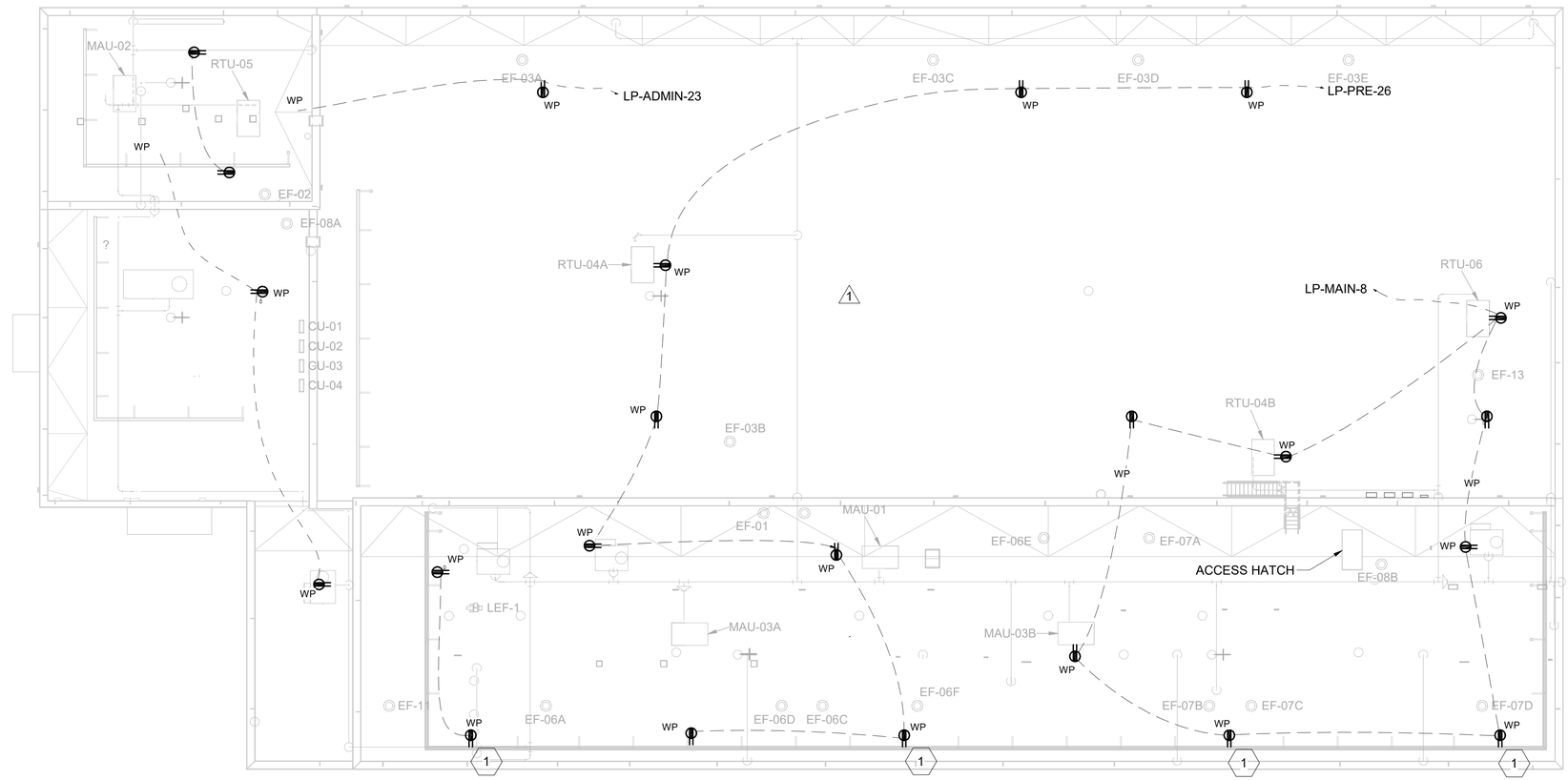
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

**GENERAL NOTES:**

1. PROVIDE STRUT RACKS AS NECESSARY FOR RECEPTACLES.
2. COORDINATE WITH MECHANICAL CONTRACTOR FOR EQUIPMENT WITH OPTIONAL RECEPTACLES WITHIN UNIT ENCLOSURE. WHERE RECEPTACLES NOT PROVIDED WITH EQUIPMENT, INSTALL RECEPTACLE(S) ON STRUT RACK NEAR EQUIPMENT.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.

**KEYED NOTES:**

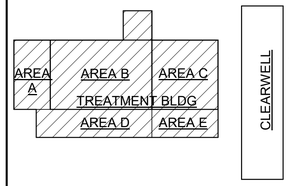
1 MOUNT RECEPTACLE TO SCREEN WALL SUPPORT COLUMN.




**OVERALL ROOF LIGHTING**

0 8' 16' 32'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF - LIGHTING AND RECEPTACLES

| project | contract |
|---|---|
| 98101 | |

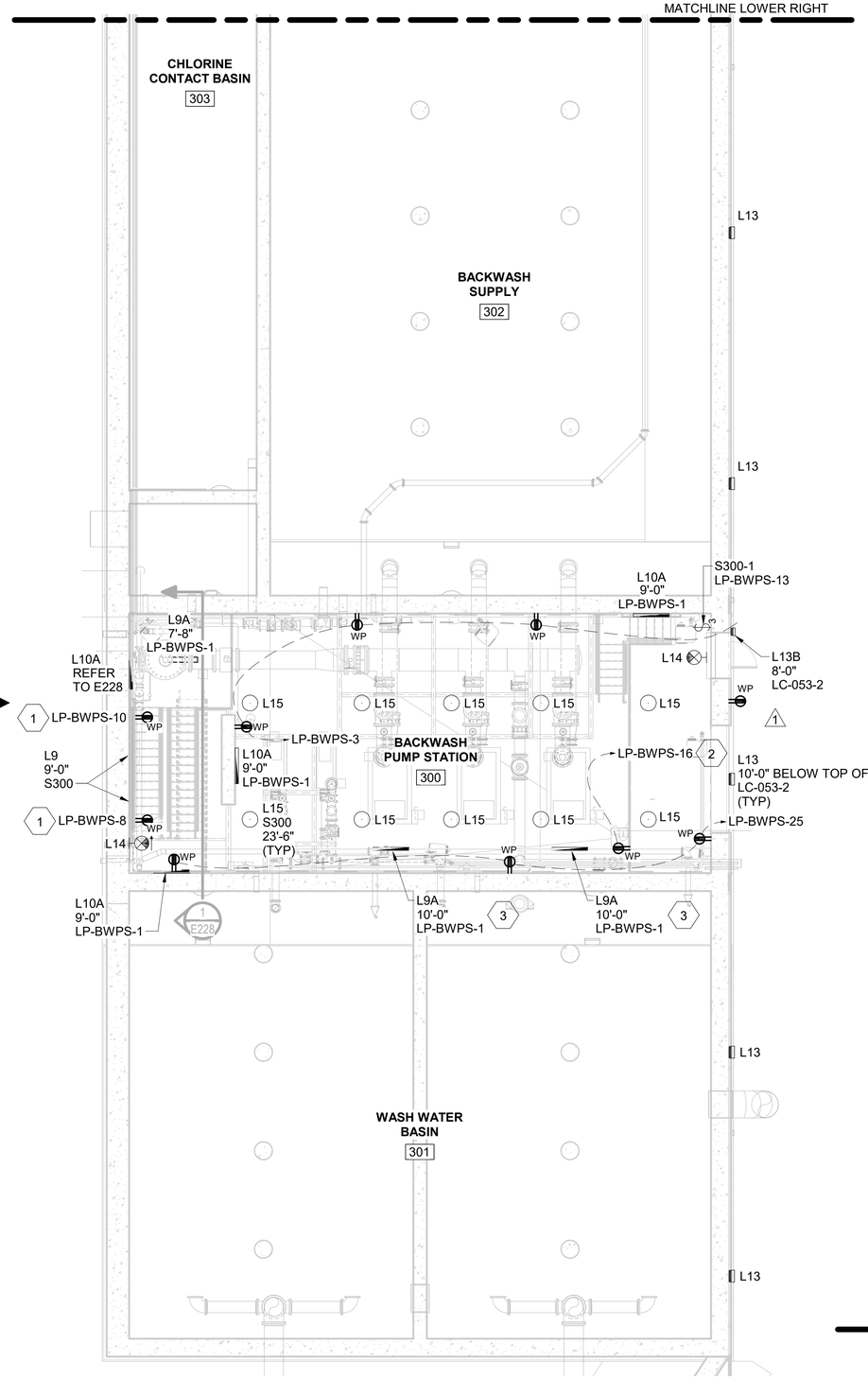
drawing **E225 — 1** rev.

sheet 353 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

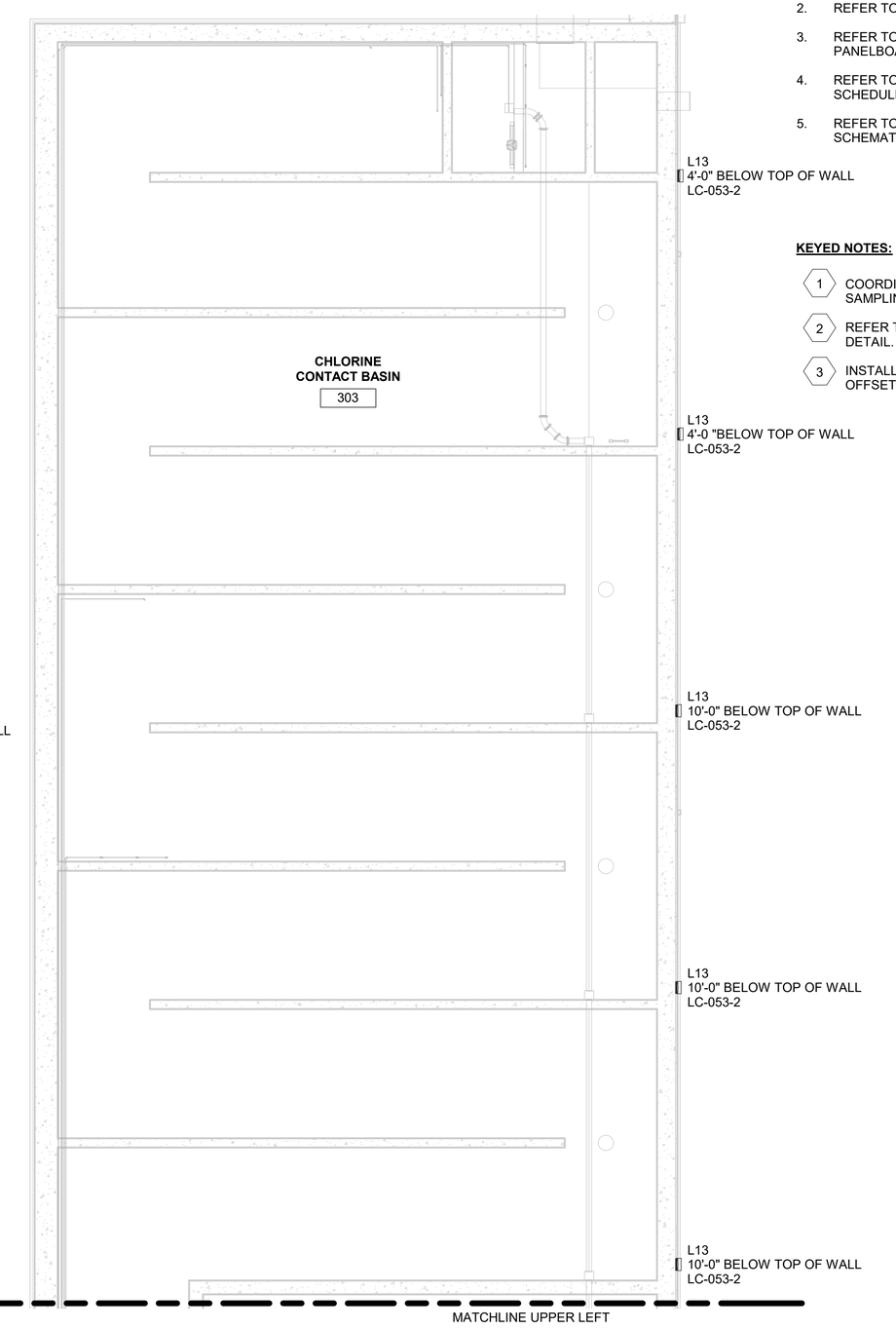



**LOWER LEVEL PLAN CLEARWELL WEST LIGHTING**

0 4' 8' 16'

SCALE IN FEET

NORTH




**LOWER LEVEL PLAN CLEARWELL WEST LIGHTING**

0 4' 8' 16'

SCALE IN FEET

NORTH

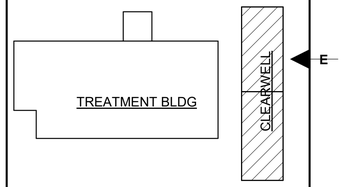
**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.
5. REFER TO E324 FOR LIGHTING CONTROL SCHEMATICS.

**KEYED NOTES:**

1. COORDINATE RECEPTACLES WITH SAMPLING PUMP LOCATIONS.
2. REFER TO E330 FOR SUMP PUMP CIRCUIT DETAIL.
3. INSTALL ALUMINUM STRUT BRACKET TO OFFSET LUMINAIRE 2'-6" FROM WALL.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

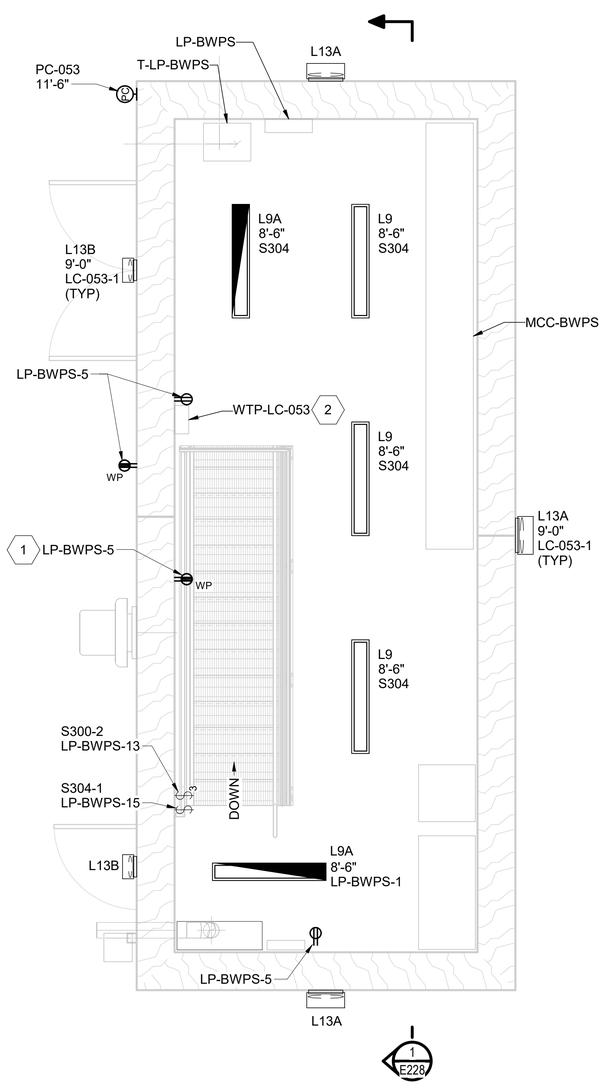
City of Thornton

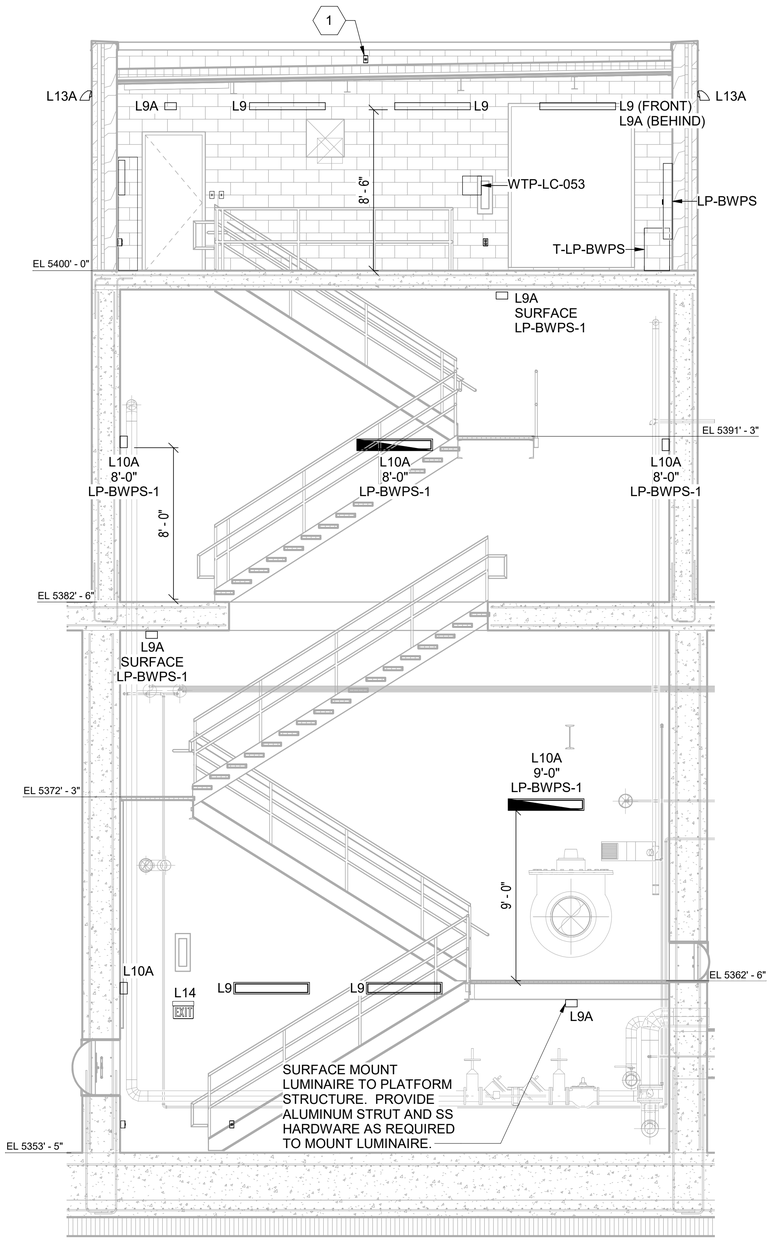
**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST - LIGHTING AND RECEPTACLES

| | |
|---|---|
| project 98101 | contract |
| drawing E226 — 1 | rev. |
| sheet 354 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SHEDULE.
5. REFER TO E324 FOR LIGHTING CONTROL SCHEMATIC.

**KEYED NOTES:**

1. RECEPTACLE ON ROOF FOR EXHAUST FAN SERVICING.
2. INSTALL WITH HAND-OFF-AUTO CONTROL WHERE AUTO MODE IS CONTROLLED BY PC-053.

**UPPER LEVEL PLAN CLEARWELL WEST LIGHTING AND RECEPTACLES**

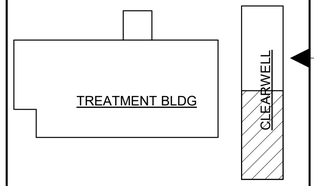
0 2' 4' 6'
SCALE IN FEET

NORTH

**SECTION** 1 / E226

0 2' 4' 8'
SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST - LIGHTING AND RECEPTACLES

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E228** **rev.** **0**

**sheet** 355 **of** 542 **sheets**

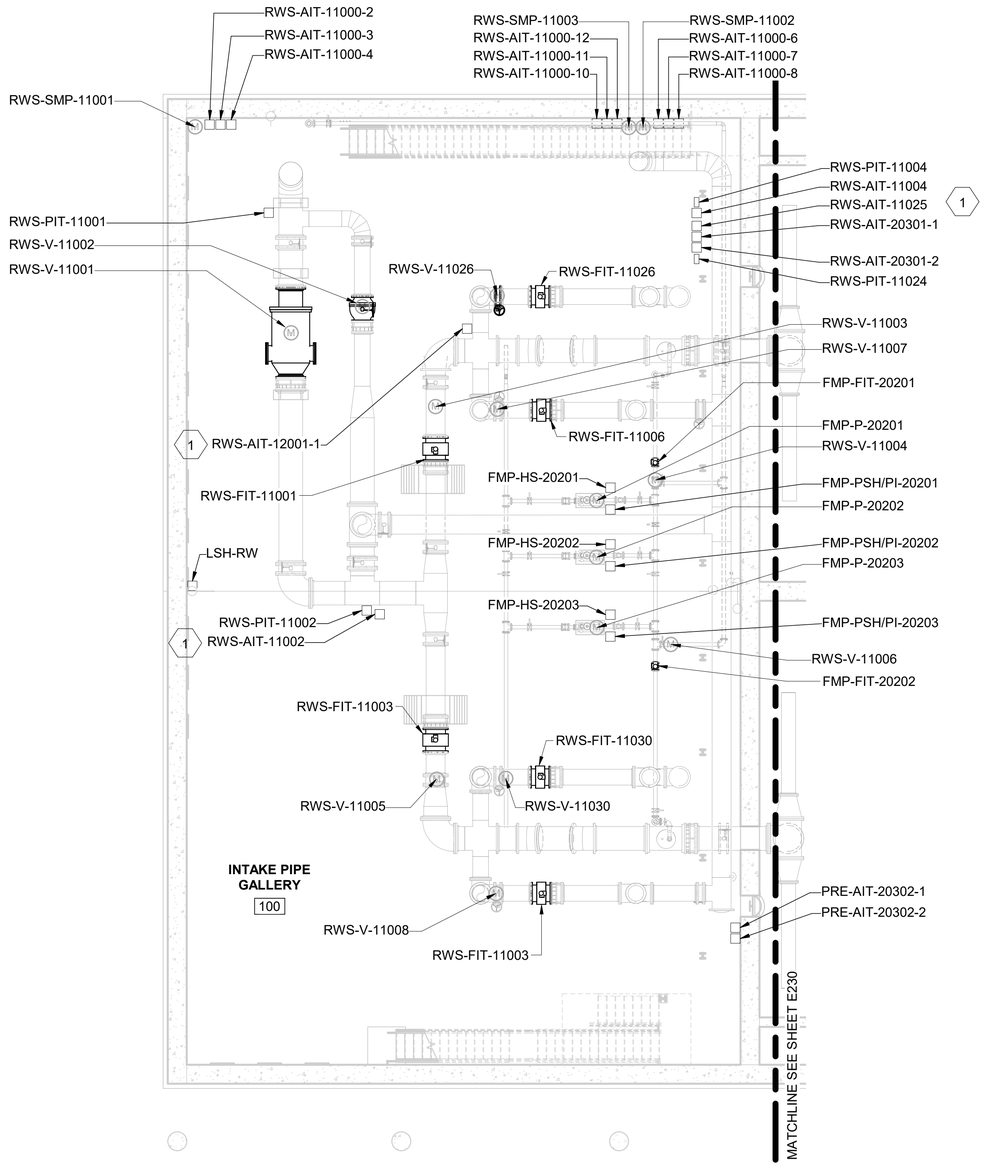
**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**KEYED NOTES:**

1. PROVIDE STRUT RACK FOR ANALYZERS.

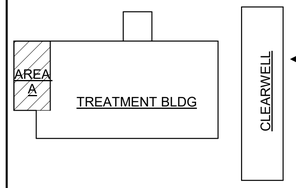



**LOWER LEVEL PLAN AREA A**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A - INSTRUMENTATION & CONTROL

| | |
|---|---|
| project 98101 | contract |
| drawing **E229** | rev. **0** |
| sheet 356 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

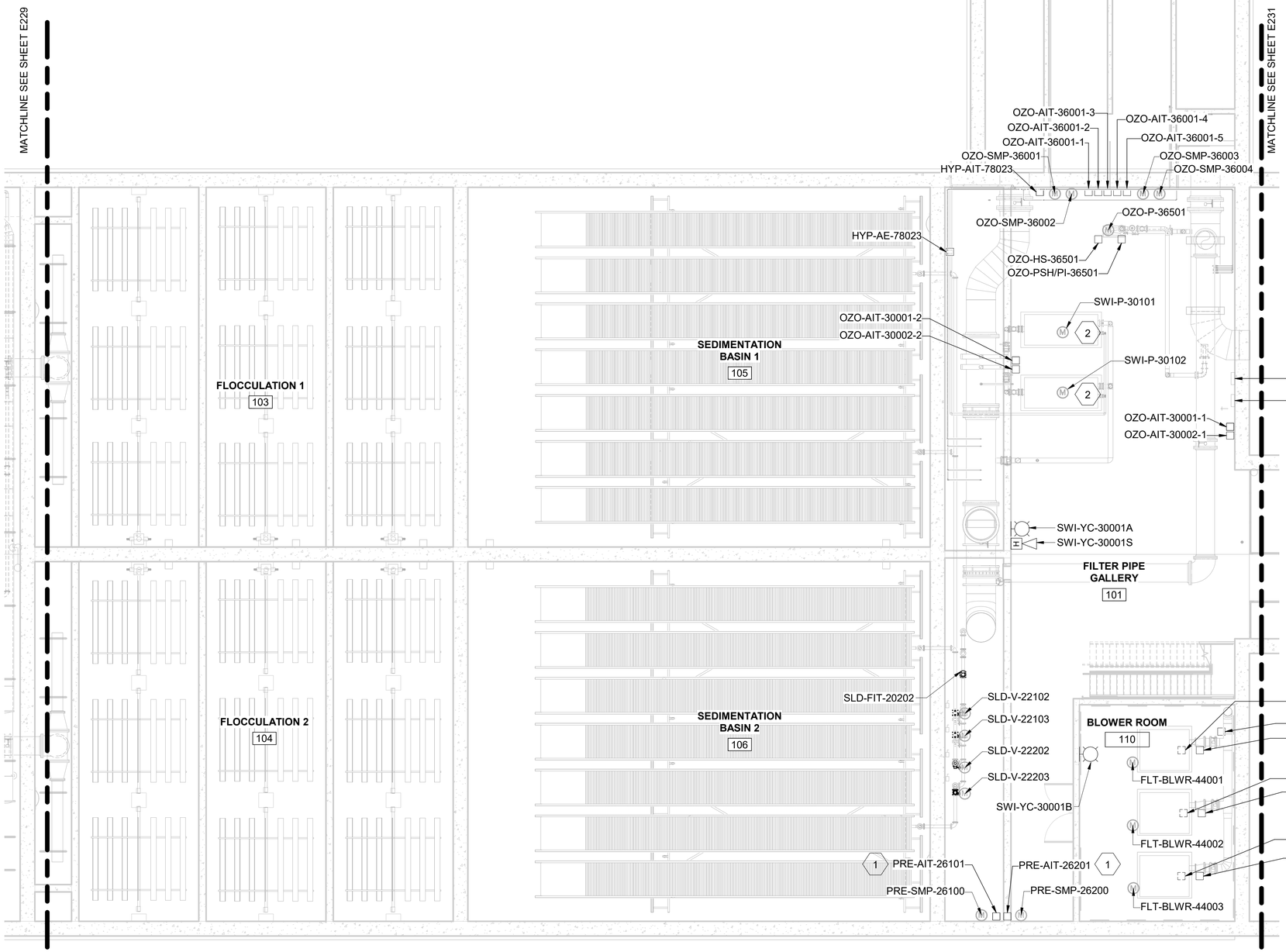
**KEYED NOTES:**

1. INSTALL ANALYZERS ON STRUT RACK.
2. REFER TO P&ID'S FOR SKIDDED INSTRUMENTATION.

**GENERAL NOTE:**

1. PROVIDE EMERGENCY ALARMS FOR GROUP H OCCUPANCIES IN ACCORDANCE WITH IFC 908.1, 5004.9, AND 5004.10 AS INDICATED. INSTALL OZONE GAS DETECTION SYSTEMS IN ACCORDANCE WITH IFC 904.8 AND 6005.3.2 AS INDICATED.

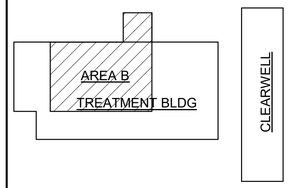
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**LOWER LEVEL PLAN AREA B**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B - INSTRUMENTATION & CONTROL

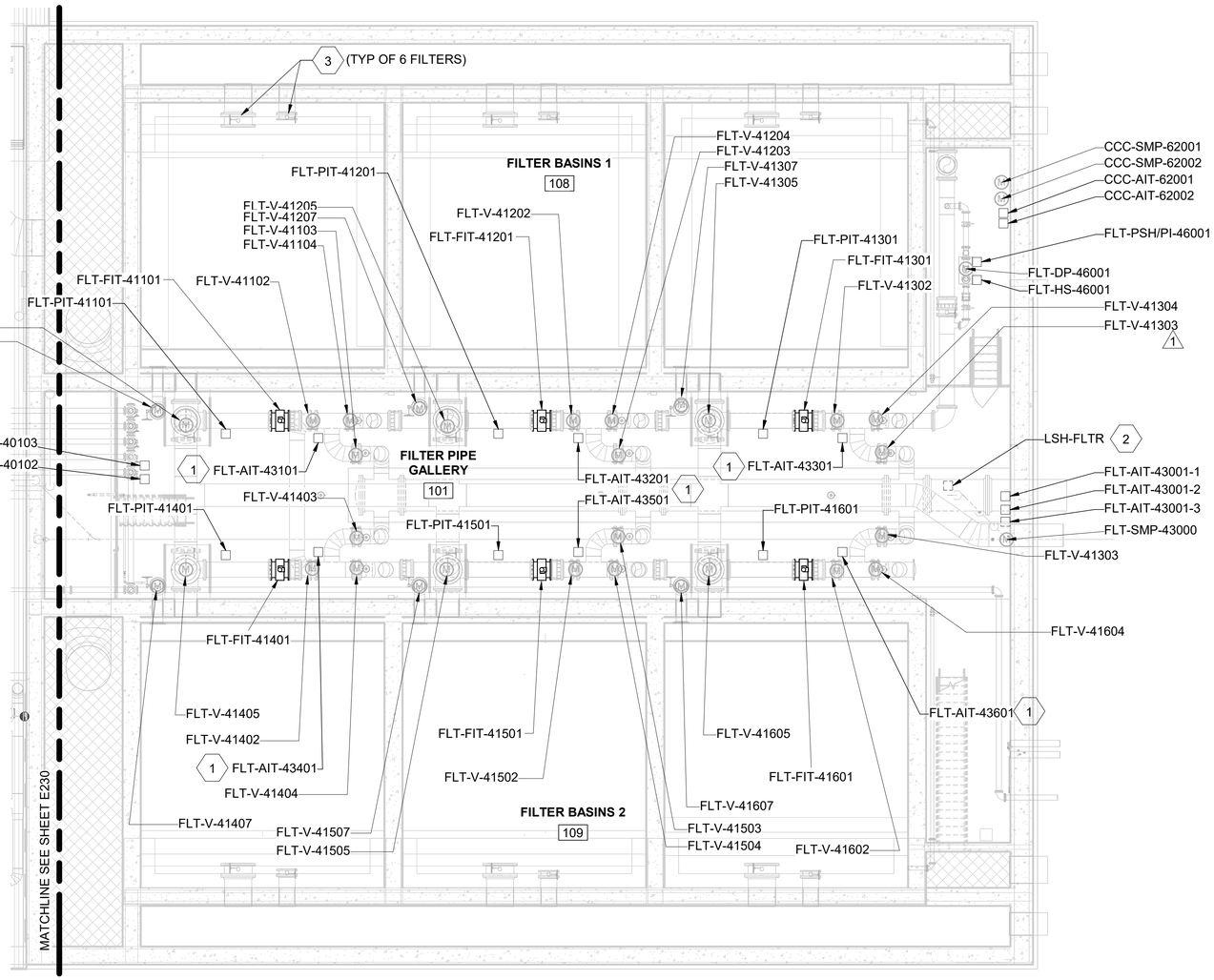
| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E230 | **rev.** 0 |
| **sheet** 357 **of** 542 **sheets** | |
| **file** 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES:

1. INSTALL ANALYZERS ON STRUT RACK.
2. INSTALL LEVEL SWITCH TO ALARM ON WATER LEVELS ABOVE THE LIMITS OF THE TRENCH DRAIN.
3. VALVE ACTUATORS LOCATED ON UPPER LEVEL. REFER TO E234 FOR VALVE ACTUATOR CALL-OUTS.

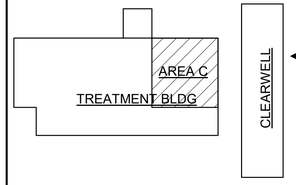



**LOWER LEVEL PLAN AREA C**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C - INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

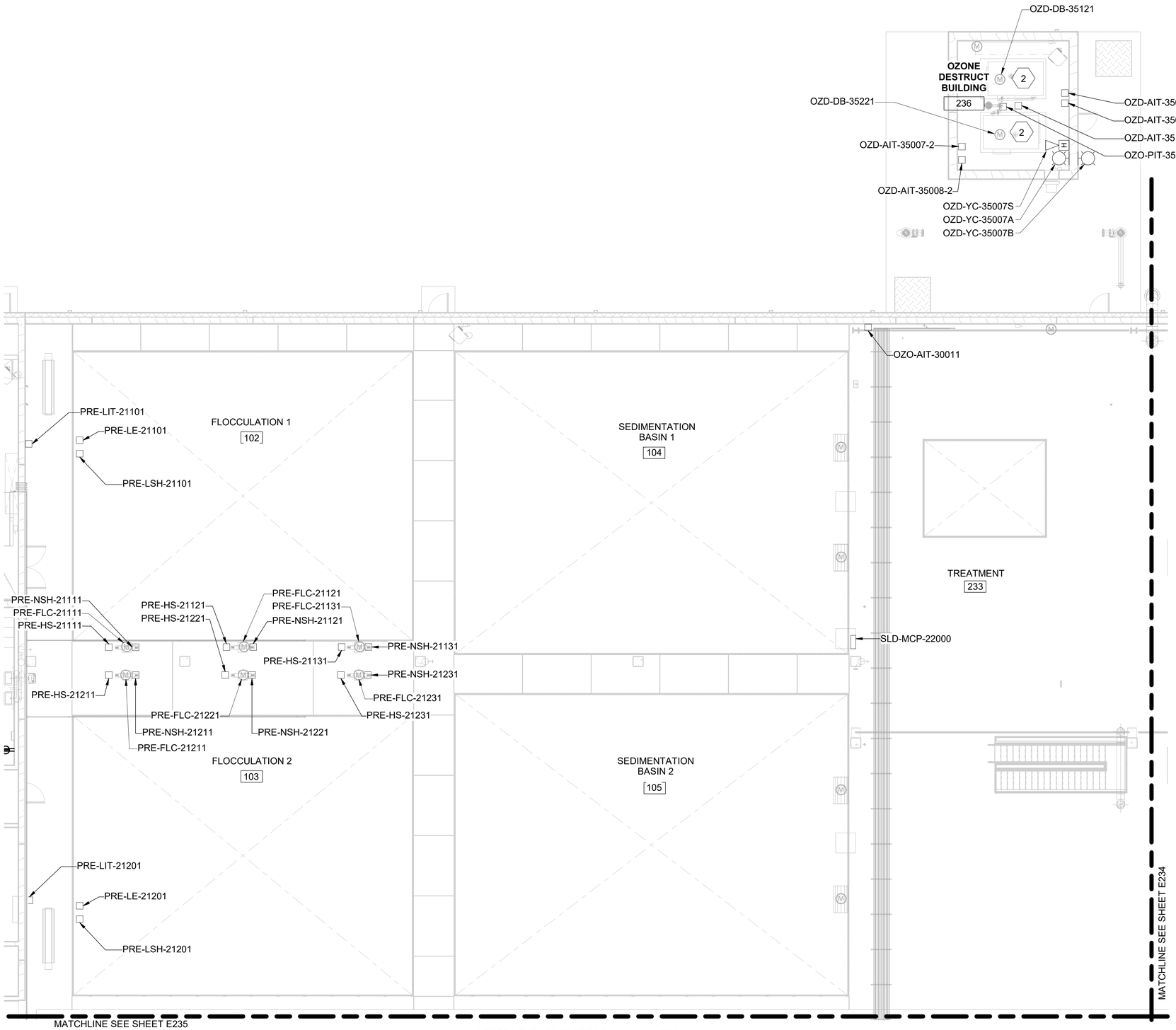
drawing **E231 — 1** rev.

sheet 358 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches




**UPPER LEVEL PLAN AREA B**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH

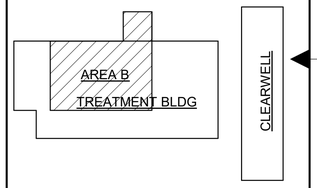
**KEYED NOTES:**

1 REFER TO P&ID'S FOR SKIDDED INSTRUMENTATION.

**GENERAL NOTE:**

1. PROVIDE EMERGENCY ALARMS FOR GROUP H OCCUPANCIES IN ACCORDANCE WITH IFC 908.1, 5004.9, AND 5004.10 AS INDICATED. INSTALL OZONE GAS DETECTION SYSTEMS IN ACCORDANCE WITH IFC 904.8 AND 6005.3.2 AS INDICATED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B - INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

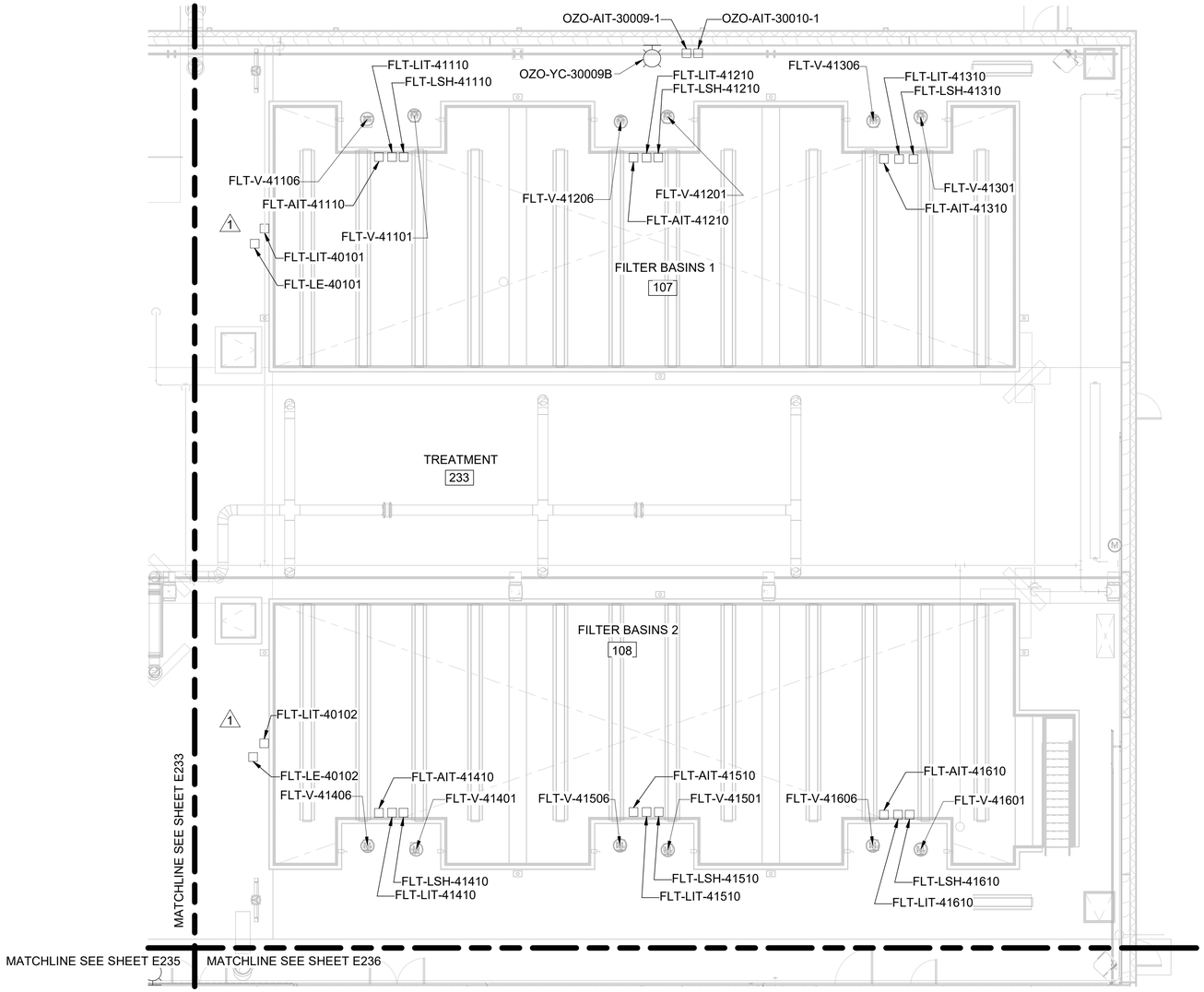
drawing **E233** rev. **0**

sheet 359 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA C**
**INSTRUMENTATION & CONTROL**

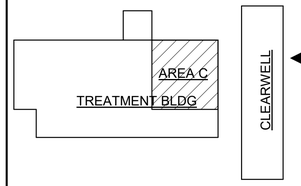
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTE:**

1. PROVIDE EMERGENCY ALARMS FOR GROUP H OCCUPANCIES IN ACCORDANCE WITH IFC 908.1, 5004.9, AND 5004.10 AS INDICATED. INSTALL OZONE GAS DETECTION SYSTEMS IN ACCORDANCE WITH IFC 904.8 AND 6005.3.2 AS INDICATED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C -
INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E234 — 1**

**sheet** 360 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

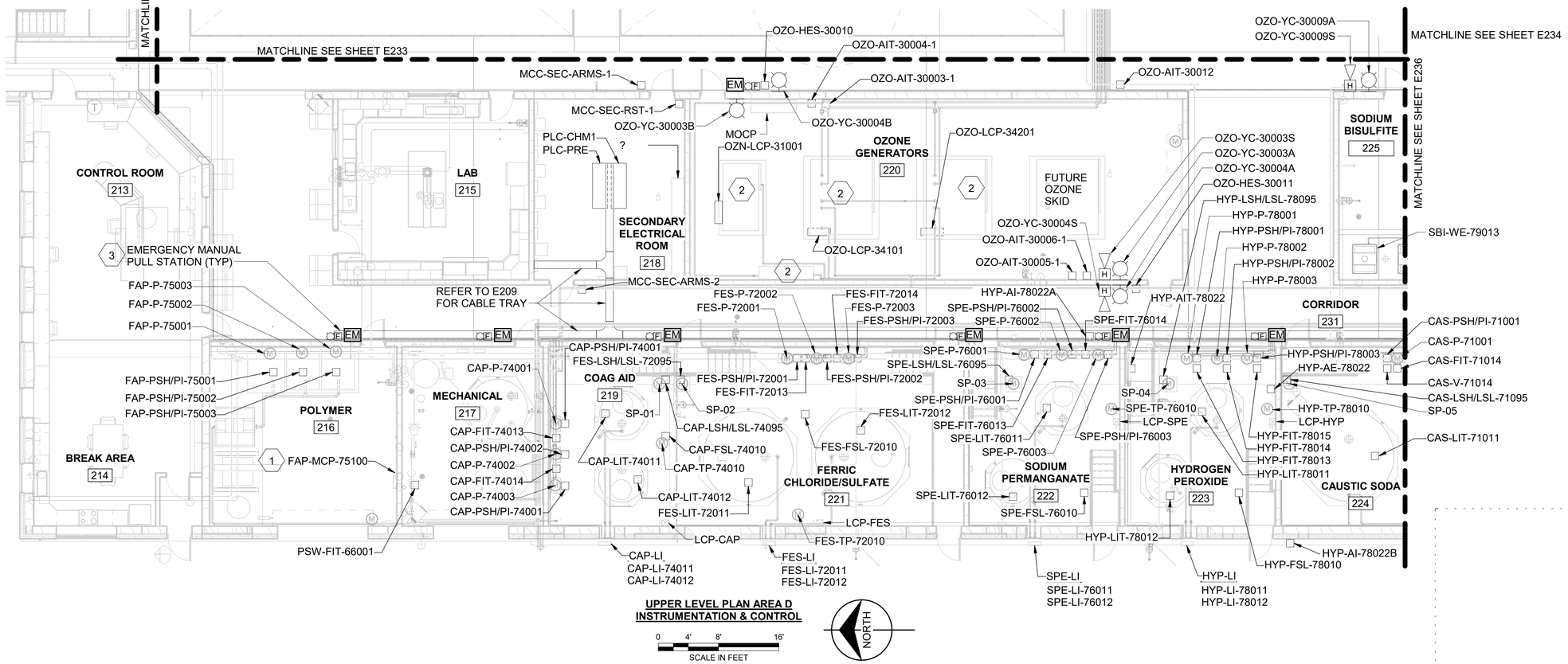
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

**GENERAL NOTES:**

1. REFER TO OZONE EQUIPMENT SUPPLIER DOCUMENTATION FOR MOCP WIRING AND SKIDDED INSTRUMENTATION.
2. PROVIDE EMERGENCY ALARMS FOR GROUP H OCCUPANCIES IN ACCORDANCE WITH IFC 908.1, 5004.9, AND 5004.10 AS INDICATED. INSTALL OZONE GAS DETECTION SYSTEMS IN ACCORDANCE WITH IFC 904.8 AND 6005.3.2 AS INDICATED.

**KEYED NOTES:**

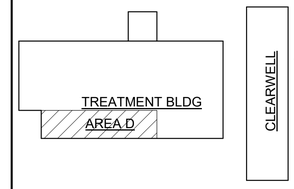
1. COORDINATE FAP BATCHING SYSTEM INSTRUMENTATION WITH SUPPLIER.
2. REFER TO P&IDs FOR SKIDDED INSTRUMENTATION.
3. REFER TO E325 FOR EMERGENCY MANUAL ALARM STATION WIRING DIAGRAM.




**UPPER LEVEL PLAN AREA D**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D -
INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

drawing **E235** rev. **0**

sheet 361 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

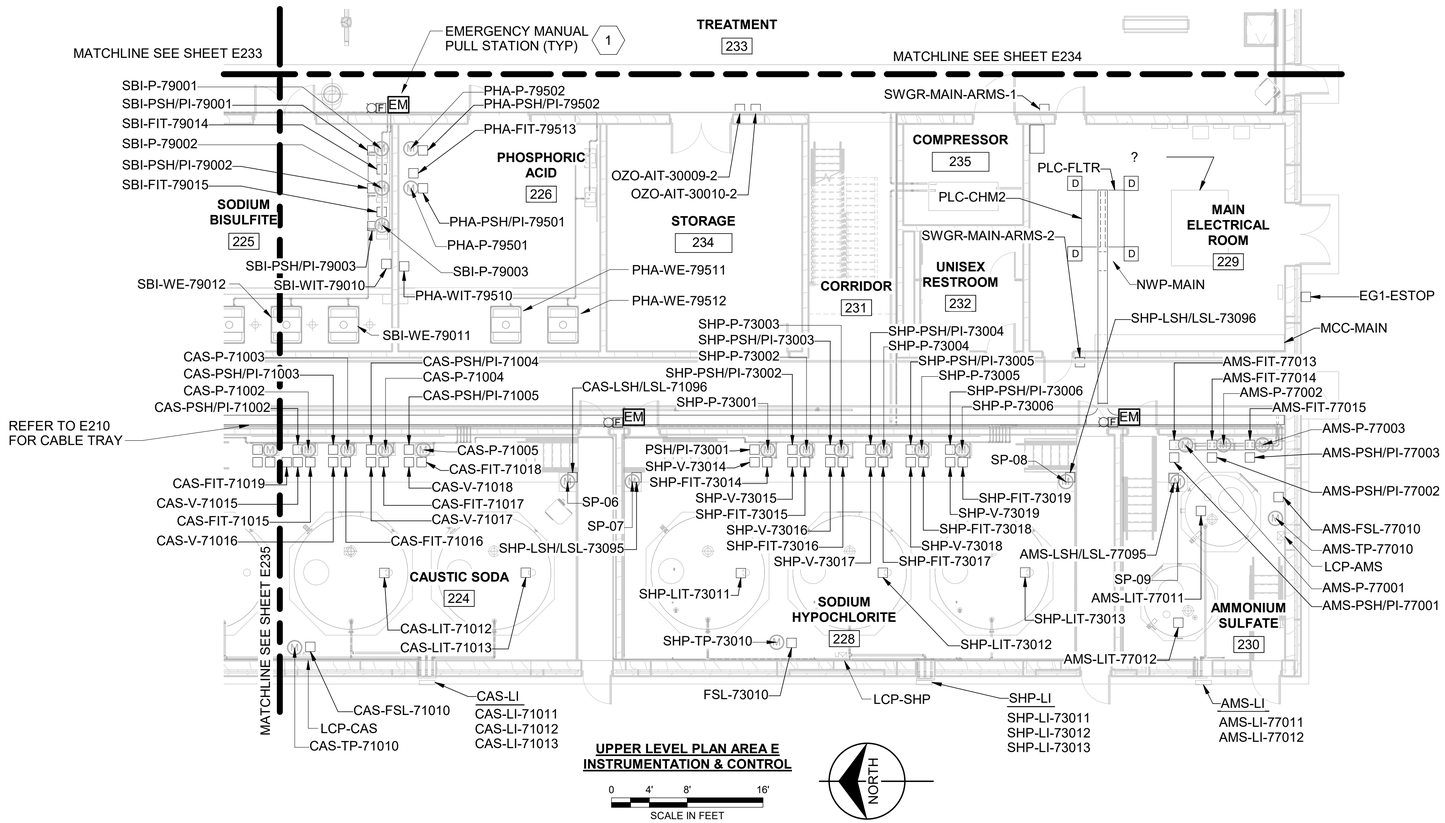
Millimeters
Scale For Microfilming
Inches

**KEYED NOTES:**

1. SEE E325 FOR EMERGENCY MANUAL ALARM STATION WIRING DIAGRAM.

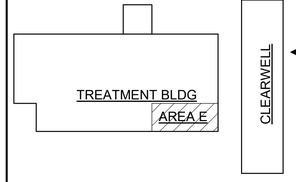
**GENERAL NOTE:**

1. PROVIDE EMERGENCY ALARMS FOR GROUP H OCCUPANCIES IN ACCORDANCE WITH IFC 908.1, 5004.9, AND 5004.10 AS INDICATED. INSTALL OZONE GAS DETECTION SYSTEMS IN ACCORDANCE WITH IFC 904.8 AND 6005.3.2 AS INDICATED.




**UPPER LEVEL PLAN AREA E**
**INSTRUMENTATION & CONTROL**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E - INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

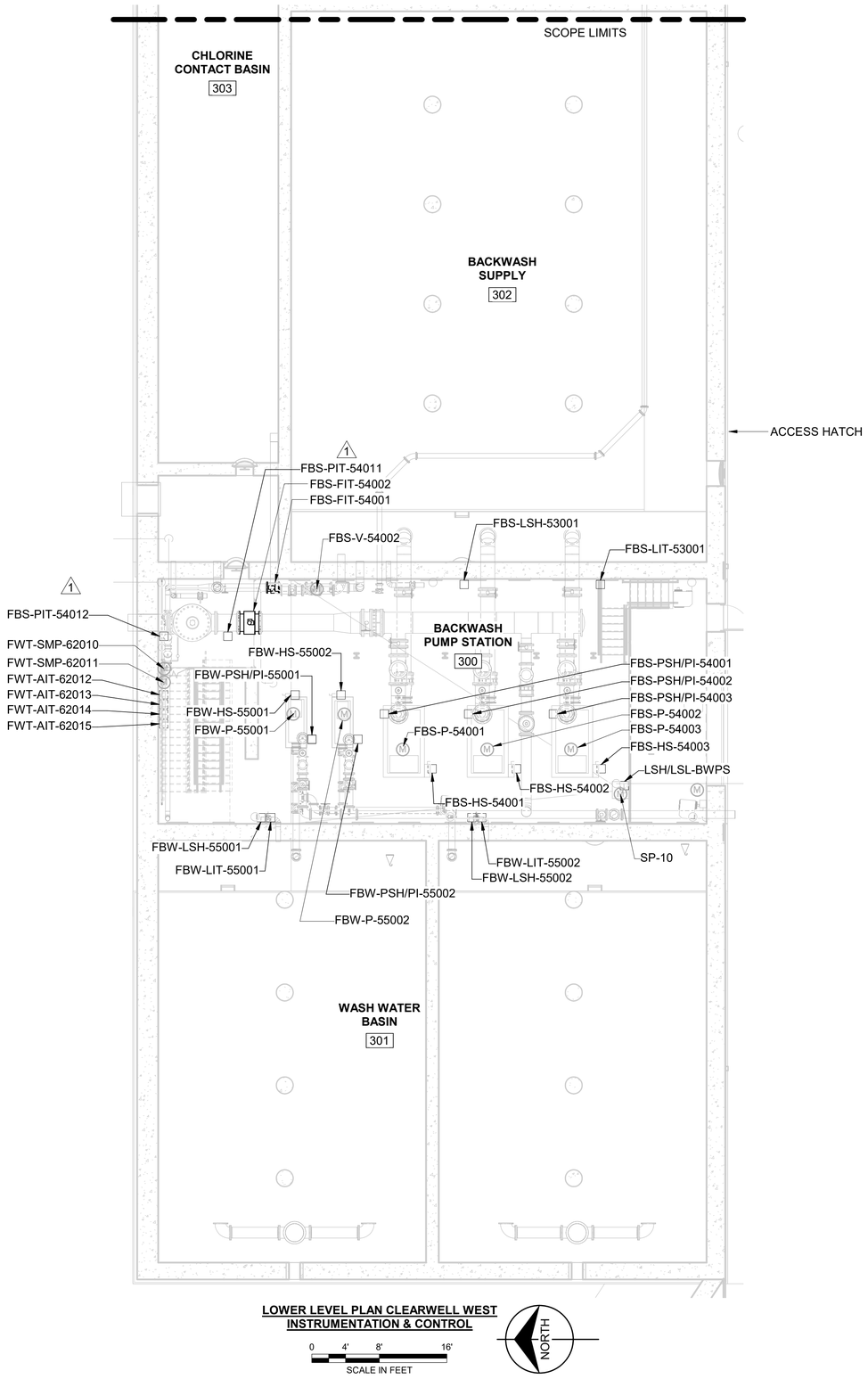
drawing **E236** rev. **0**

sheet 362 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN CLEARWELL WEST INSTRUMENTATION & CONTROL**

0 4' 8' 16'

SCALE IN FEET

NORTH

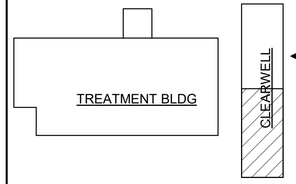
Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST - INSTRUMENTATION & CONTROL

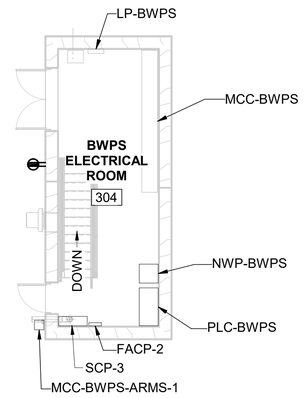
| project | contract |
|---|---|
| 98101 | |

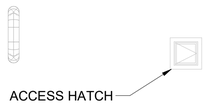
drawing **E238 — 1** rev.

sheet 363 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

MATCHLINE SEE SHEET E241



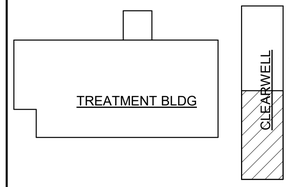




**UPPER LEVEL PLAN CLEARWELL WEST**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. ABBOTT |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST - INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

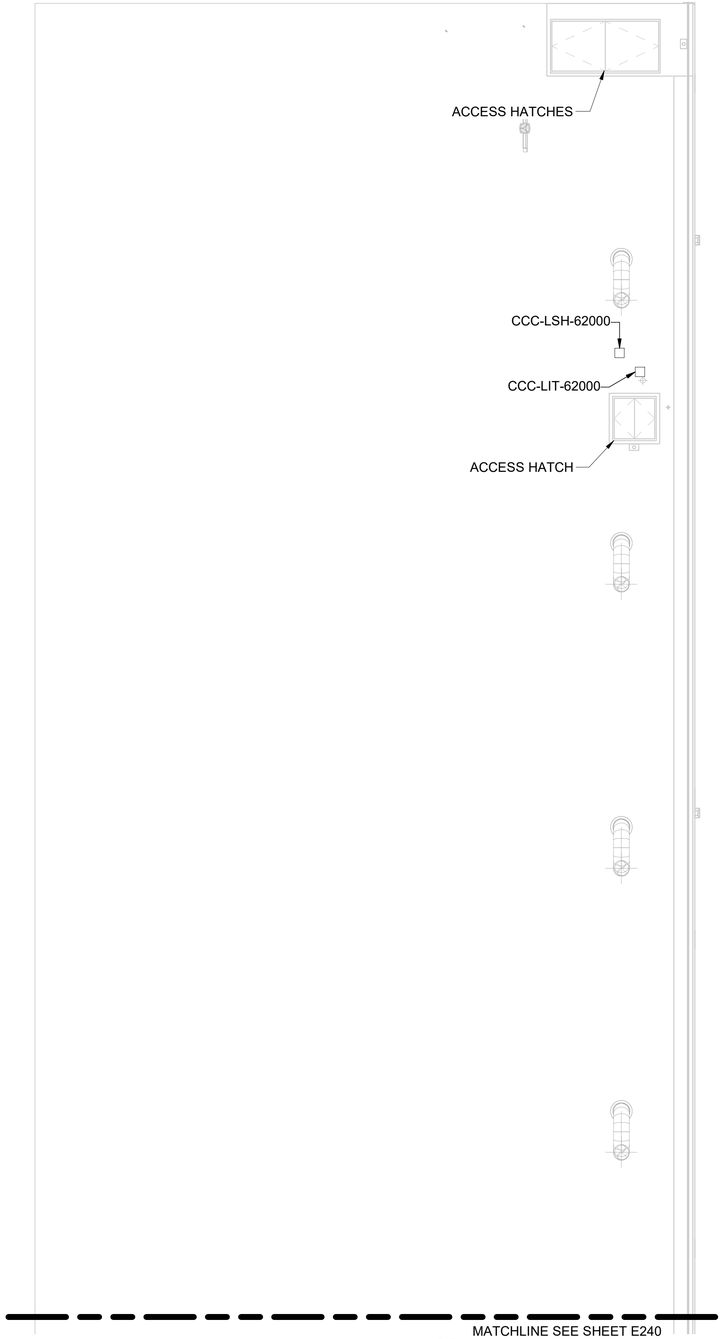
**drawing** **E240 — 0** **rev.**

**sheet** 364 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



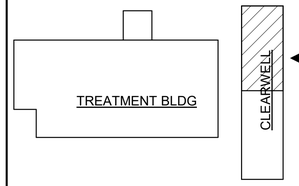

MATCHLINE SEE SHEET E240

**UPPER LEVEL PLAN CLEARWELL EAST**
**INSTRUMENTATION & CONTROL**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. ABBOTT |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL EAST - INSTRUMENTATION & CONTROL

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E241 — 0**

**sheet** 365 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.

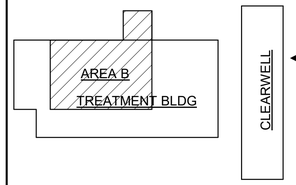
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**LOWER LEVEL PLAN AREA B COMMUNICATION**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. ABBOTT |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B - COMMUNICATION

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E243 — 0** **rev.**

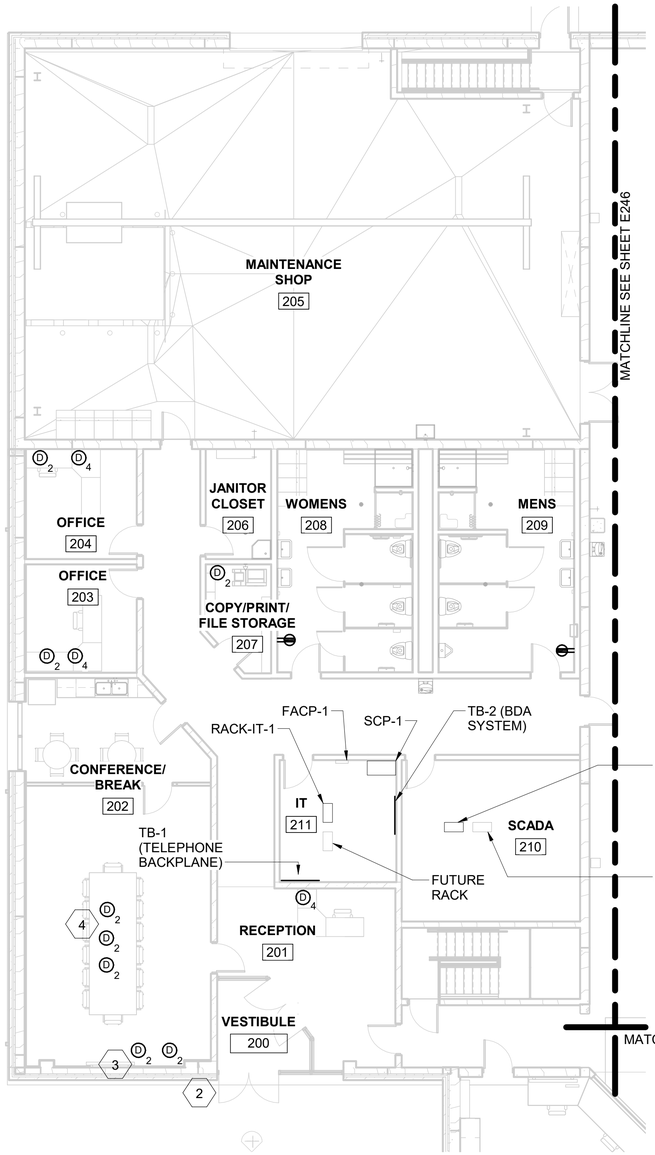
**sheet** 366 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches




**UPPER LEVEL PLAN AREA A COMMUNICATION**

0 4' 8' 16'
SCALE IN FEET

NORTH

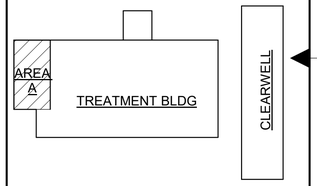
**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.
2. EACH DATA JACK LOCATION SHALL BE PROVIDED WITH 2 PORTS. ONE PORT SHALL BE CONNECTED TO THE ADMIN NEETWORK (BLUE). ONE PORT SHALL BE CONNECTED TO THE SCADA NETWORK (ORANGE). SEE E337 FOR DATA JACK DETAILS.
3. DATA JACK LOCATIONS SHOWN WITH 4 PORTS SHALL BE PROVIDED WITH ONE PORT CONNECTED TO THE ADMIN NETWORK (BLUE), ONE PORT CONNECTED TO THE SCADA NETWORK (ORANGE), ONE PORT CONNECTED TO THE ICOM NETWORK (GREEN), AND ONE SPARE PORT. SEE E337 FOR DATA JACK DETAILS.
4. INSTALL DATA JACKS AT 18" AFF UNLESS OTHERWISE NOTED.

**KEYED NOTES:**

1. NOT USED.
2. INSTALL INTERCOM DOOR STATION AS INDICATED ON E258. CONNECT DOOR STATION TO ICOM NETWORK.
3. INSTALL DATA JACK TO BE CONCEALED BY CONFERENCE SCREEN. COORDINATE LOCATION WITH CONFERENCE SCREEN.
4. INSTALL DATA JACK IN RECESSED FLOOR BOXES AS INDICATED BY DETAILS ON E337. REFER TO E320 FOR FLOOR BOX LOCATIONS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. ABBOTT |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A - COMMUNICATION

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E245** **rev.** **0**

**sheet** 367 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

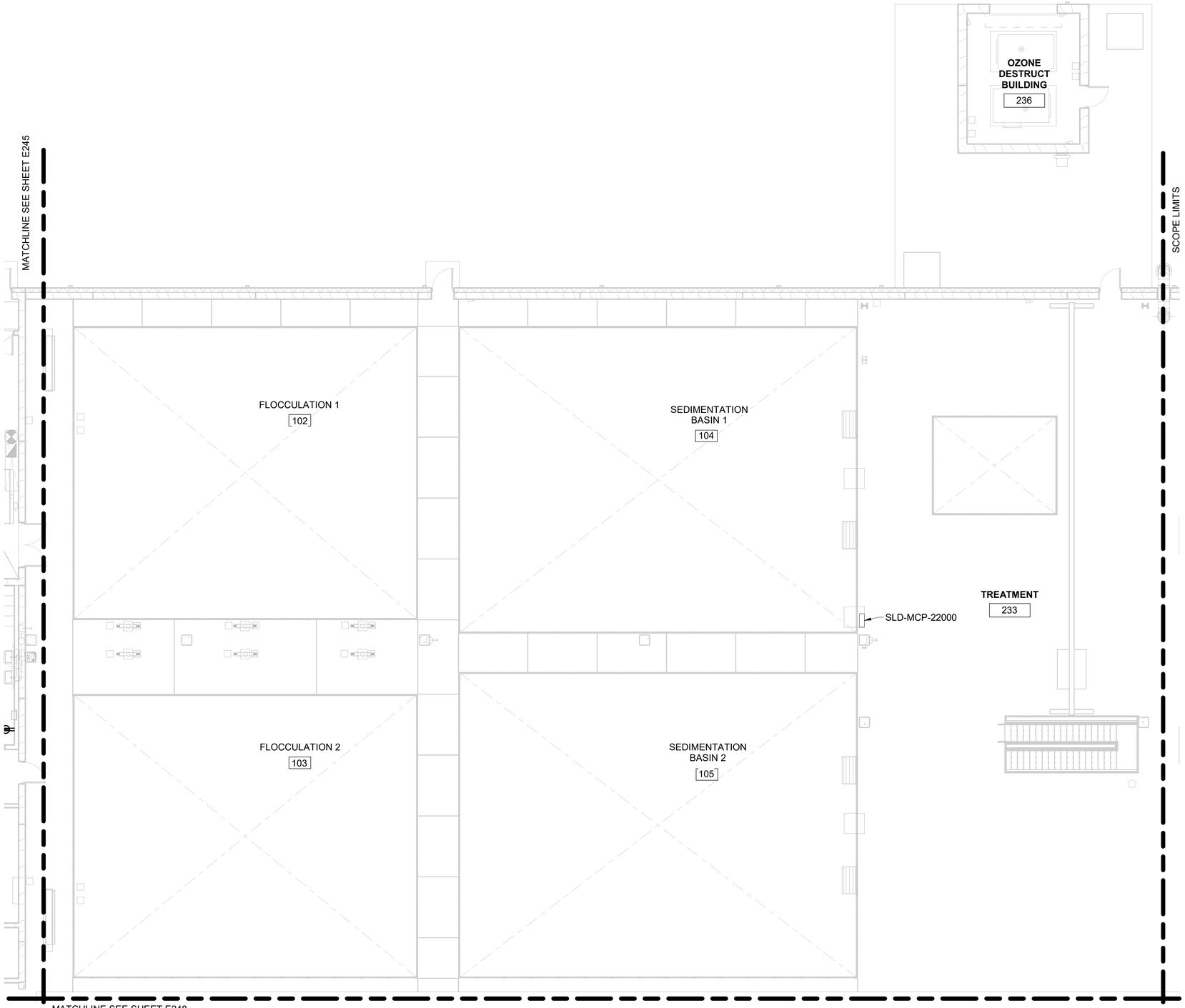
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.

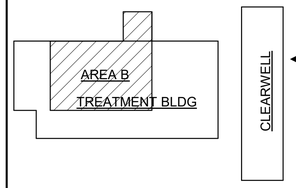
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL PLAN AREA B COMMUNICATION**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. ABBOTT |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B - COMMUNICATION

| project | contract |
|---|---|
| 98101 | |

drawing **E246 — 0** rev.

sheet 368 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

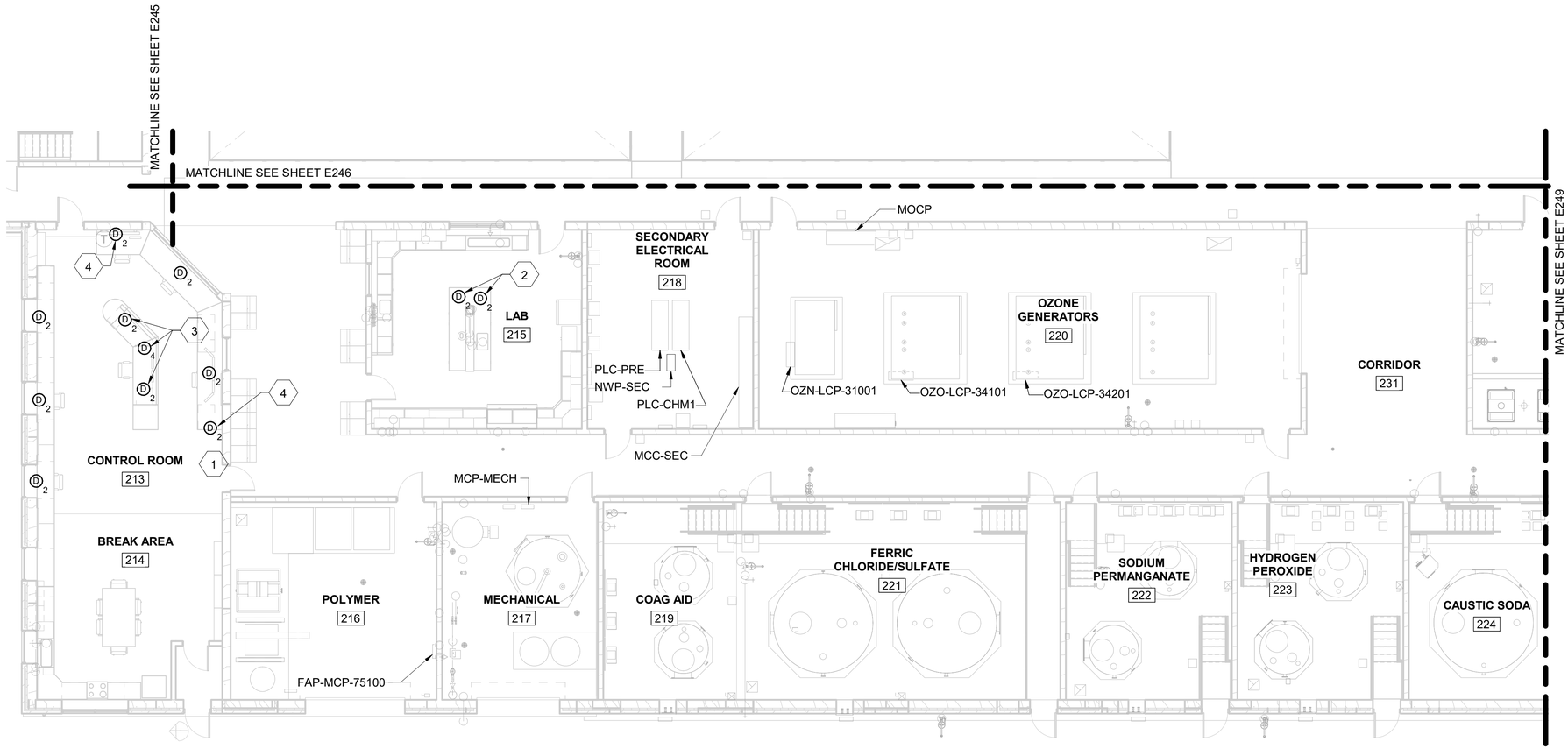
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.
2. INSTALL DATA JACKS AT 18" AFF UNLESS OTHERWISE NOTED.

**KEYED NOTES:**

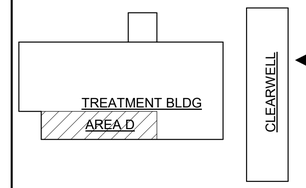
1. INSTALL RED ANALOG EMERGENCY PHONE ON WALL. INSTALL REQUIRED BOX, JACK, AND CABLING.
2. INSTALL DATA JACKS IN COUNTER DIVIDER AT PROVIDED SPACES. COORDINATE LOCATION WITH CABINETRY. REFER TO DETAIL 2 ON E321 FOR CONDUIT ROUTING NOTES.
3. INSTALL RECESSED OUTLET BOX FOR DATA JACKS IN FLOOR. COORDINATE LOCATIONS WITH FURNITURE. REFER TO E337 FOR FLOOR BOX DETAILS.
4. INSTALL DATA JACK TO BE CONCEALED BY CONFERENCE SCREEN. COORDINATE LOCATION WITH CONFERENCE SCREEN. REFER TO E337 FOR DATA JACK DETAILS.




**UPPER LEVEL PLAN AREA D COMMUNICATION**

0 4' 8' 16'
SCALE IN FEET

NORTH




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. ABBOTT |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D - COMMUNICATION

| project | contract |
|---|---|
| 98101 | |

**drawing** **E248 — 0** **rev.**

**sheet** 369 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

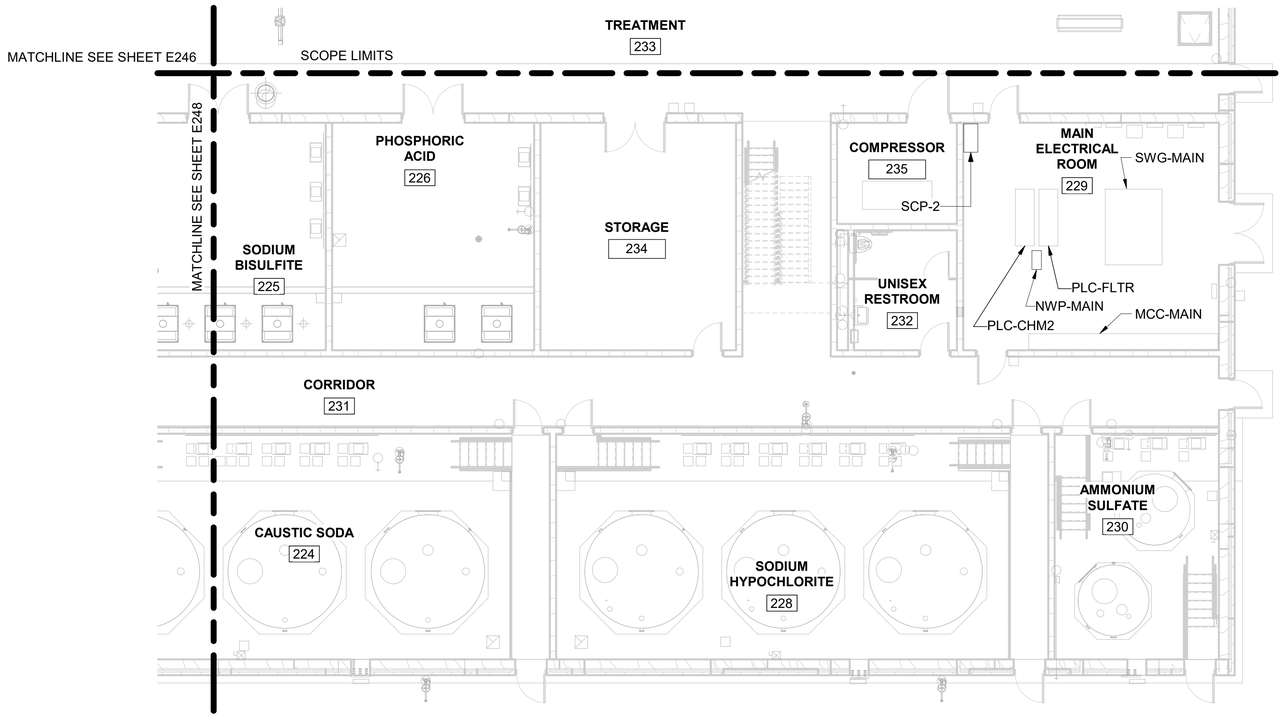
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

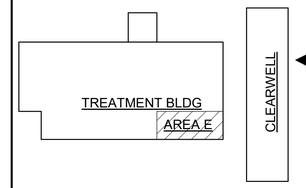



**UPPER LEVEL PLAN AREA E COMMUNICATION**

0 4' 8' 16'

SCALE IN FEET

NORTH




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. ABBOTT |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

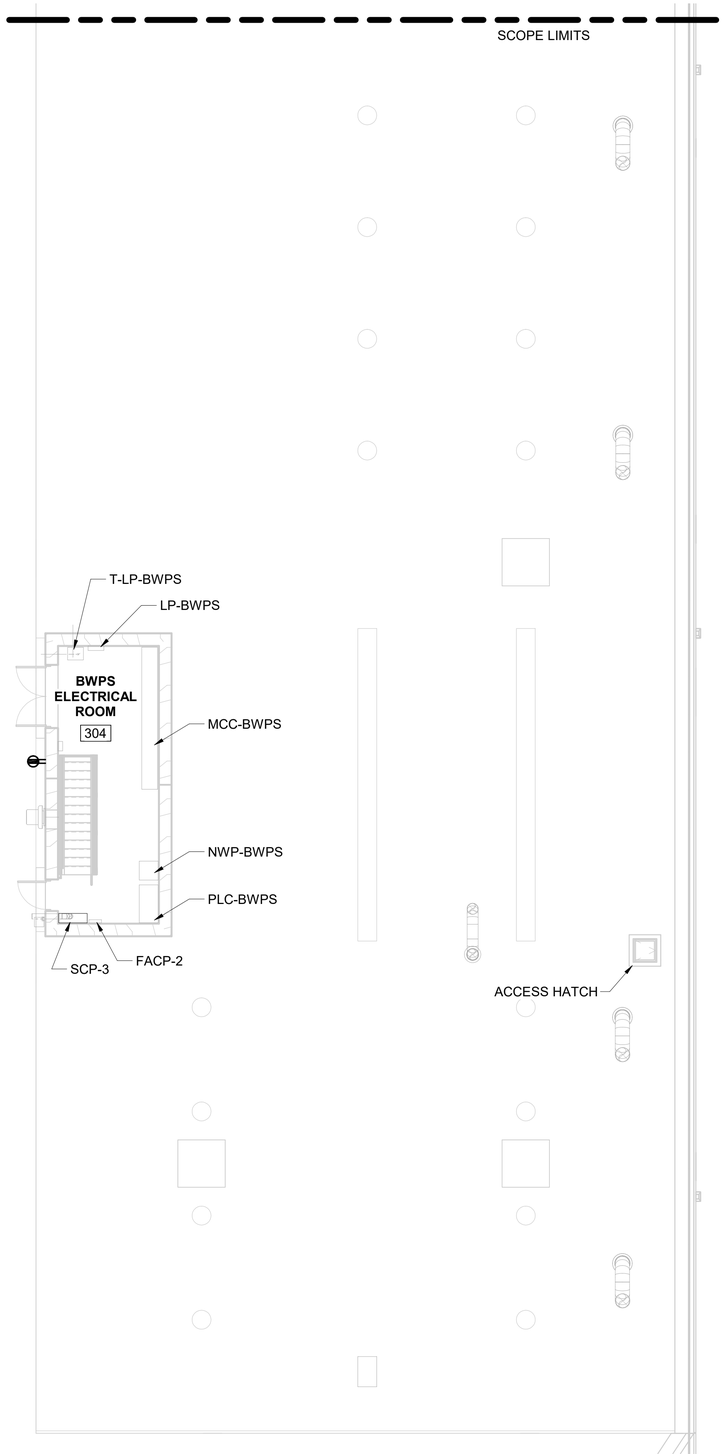
**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E - COMMUNICATION

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E249 | **rev.** 0 |
| **sheet** 370 **of** 542 **sheets** | |
| **file** 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**UPPER LEVEL PLAN CLEARWELL WEST COMMUNICATION**

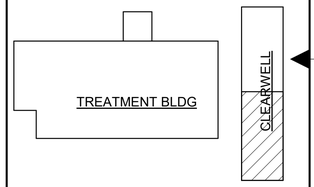
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. SEE E331 FOR NETWORK ARCHITECTURE DIAGRAM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. ABBOTT |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST - COMMUNICATION

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E253 — 0** **rev.**

**sheet** 371 **of** 542 **sheets**

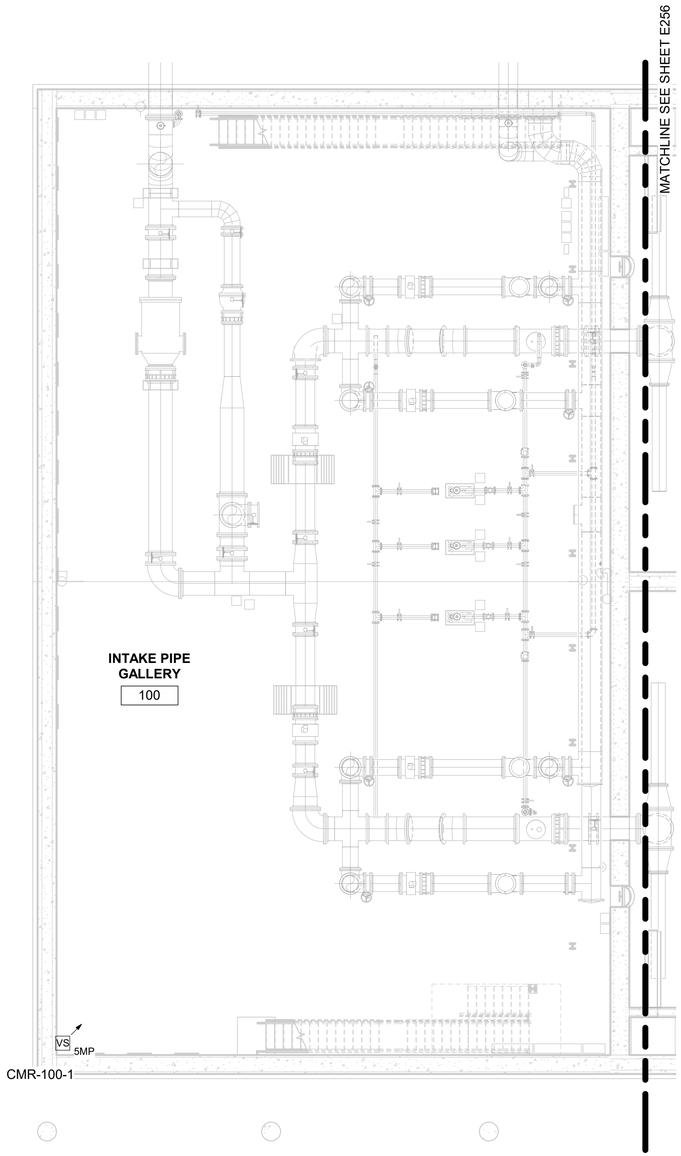
**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

**GENERAL NOTES:**

1. REFER TO E339 FOR CAMERA RISER DIAGRAM.

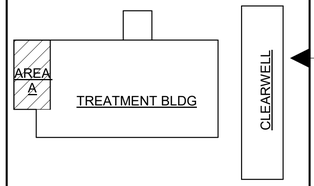



**LOWER LEVEL PLAN AREA A SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A - SECURITY

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E255 — 0**

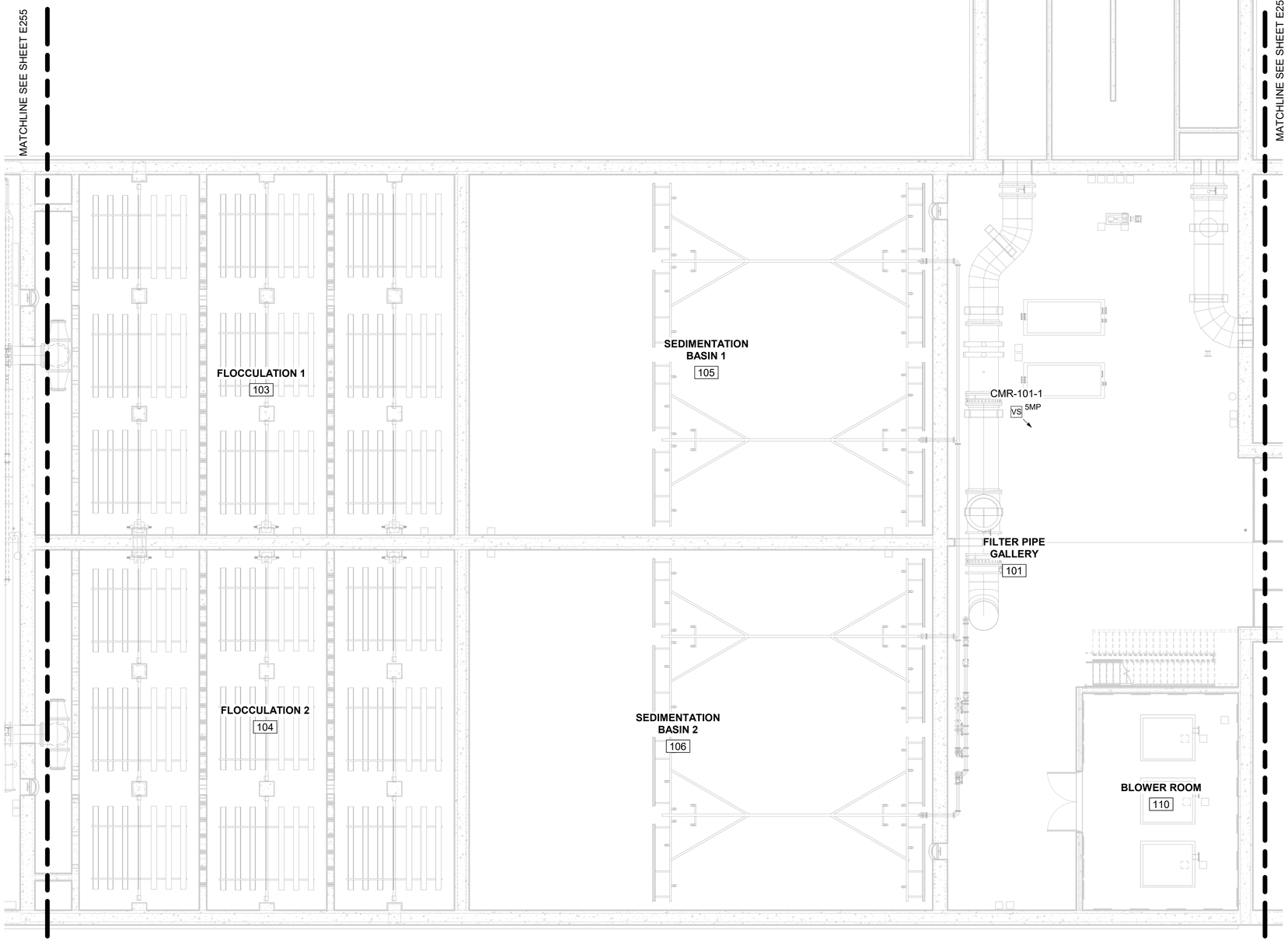
**sheet** 372 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.

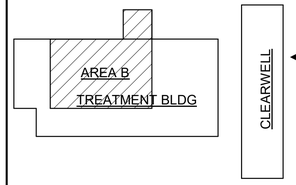
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**LOWER LEVEL PLAN AREA B**
**SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA B - SECURITY

| project | contract |
|---|---|
| 98101 | |

**drawing** **E256 — 0** **rev.**

**sheet** 373 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

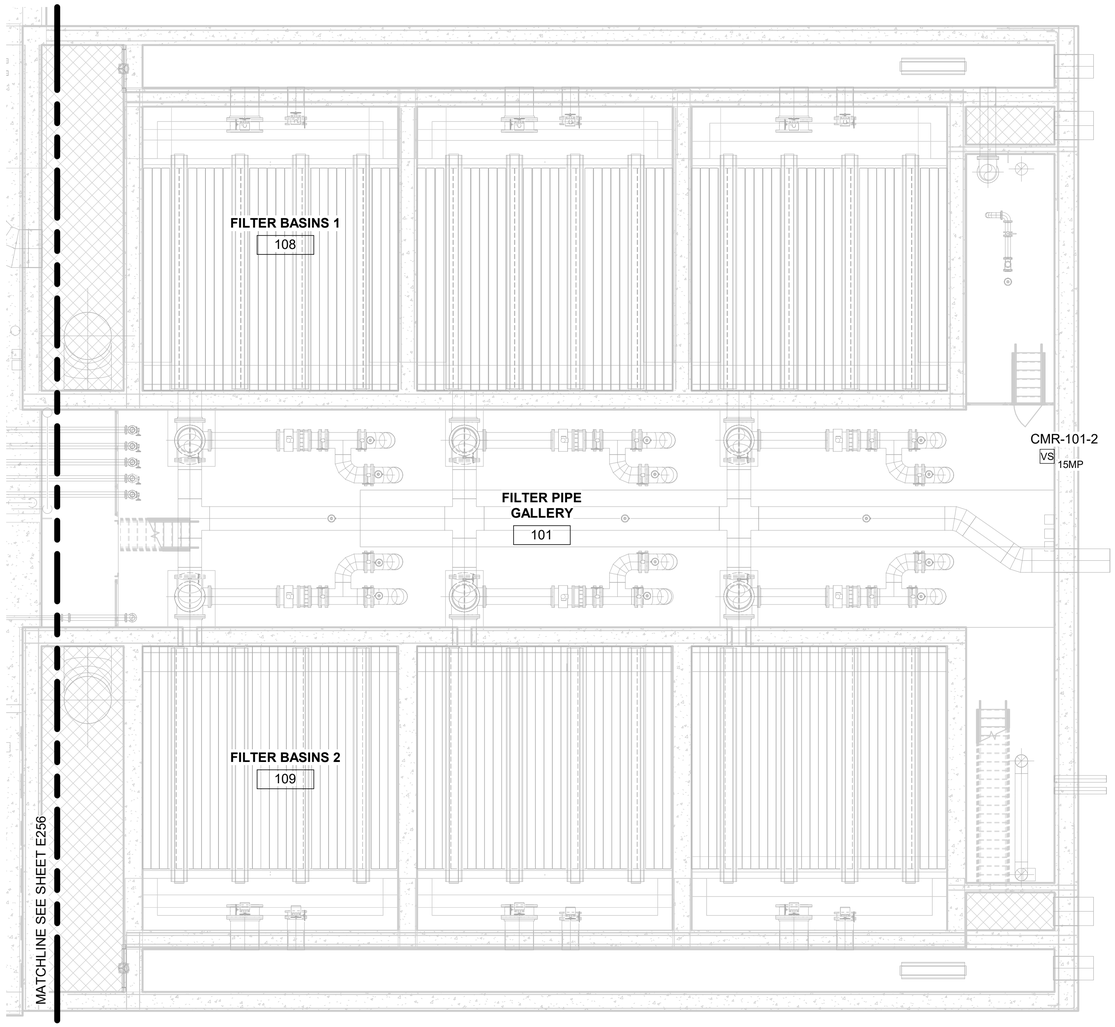
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

**GENERAL NOTES:**

1. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.

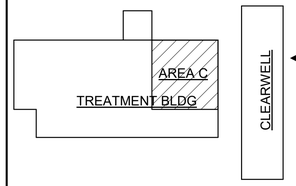
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**LOWER LEVEL PLAN AREA C SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA C - SECURITY

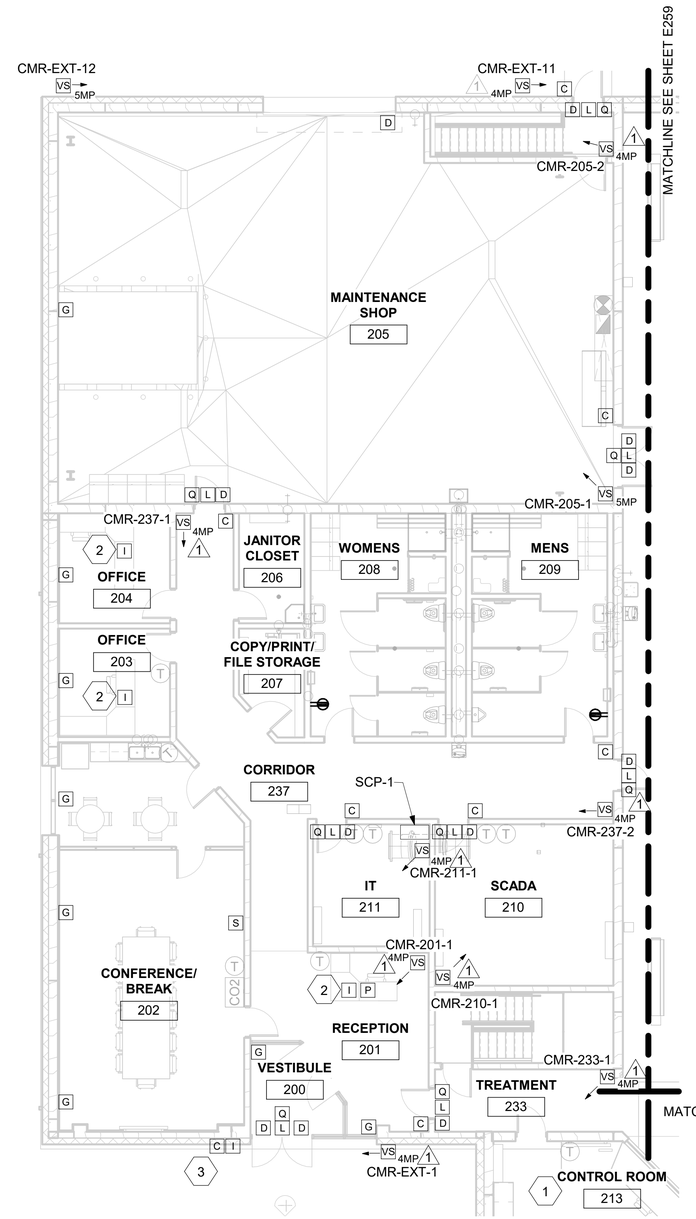
| project | contract |
|---|---|
| 98101 | |

**drawing** E257 — **rev.** 0

**sheet** 374 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA A SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH

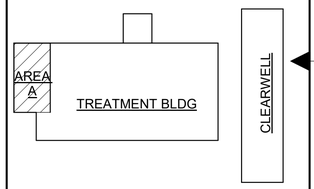
**GENERAL NOTES:**

1. REFER TO E339 FOR SECURITY CAMERA RISER DIAGRAM.
2. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
3. REFER TO E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAM.

**KEYED NOTES:**

1. SEE E261 FOR CONTROL ROOM SECURITY.
2. MASTER INTERCOM STATION.
3. DOOR INTERCOM STATION. INTERLOCK DOOR INTERCOM STATION DOOR RELEASE CONTACT WITH REQUEST-TO-EXIT CIRCUIT.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA A - SECURITY

| project | contract |
|---|---|
| 98101 | |

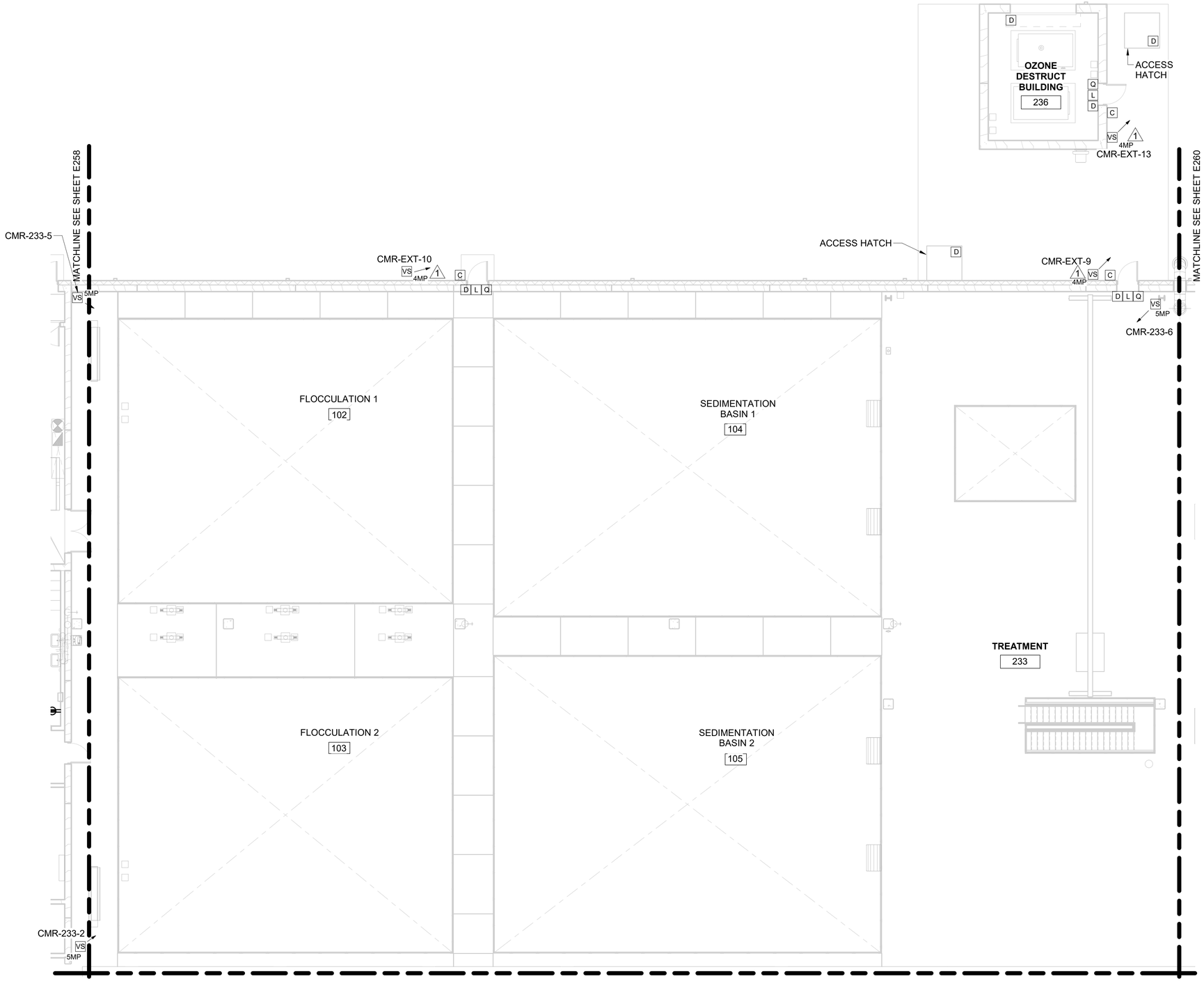
drawing **E258 — 1** rev.

sheet 375 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**UPPER LEVEL PLAN AREA B SECURITY**

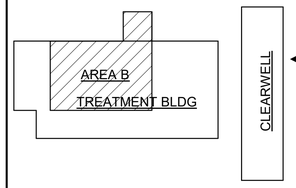
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
2. REFER TO E340 FOR SECURITY CAMERA RISER DIAGRAM.
3. REFER TO E341 AND E342 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

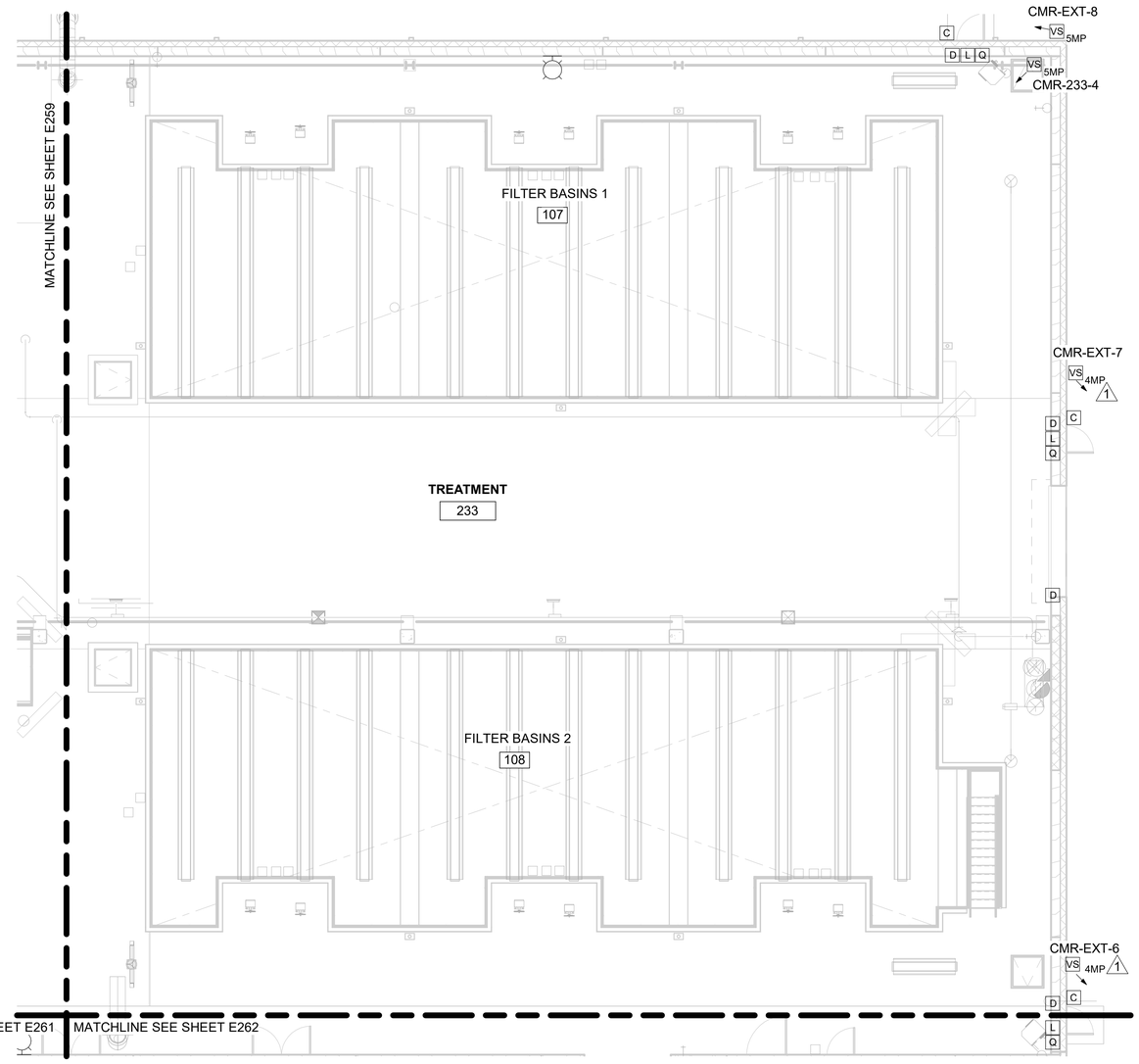
**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA B - SECURITY

| | |
|---|---|
| project 98101 | contract |
| drawing E259 — 1 | rev. |
| sheet 376 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
2. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.
3. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

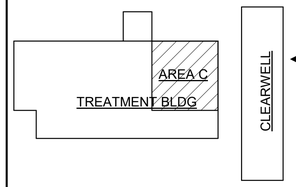



**UPPER LEVEL PLAN AREA C SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA C - SECURITY

| project | contract |
|---|---|
| 98101 | |

drawing **E260 — 1** rev.

sheet 377 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

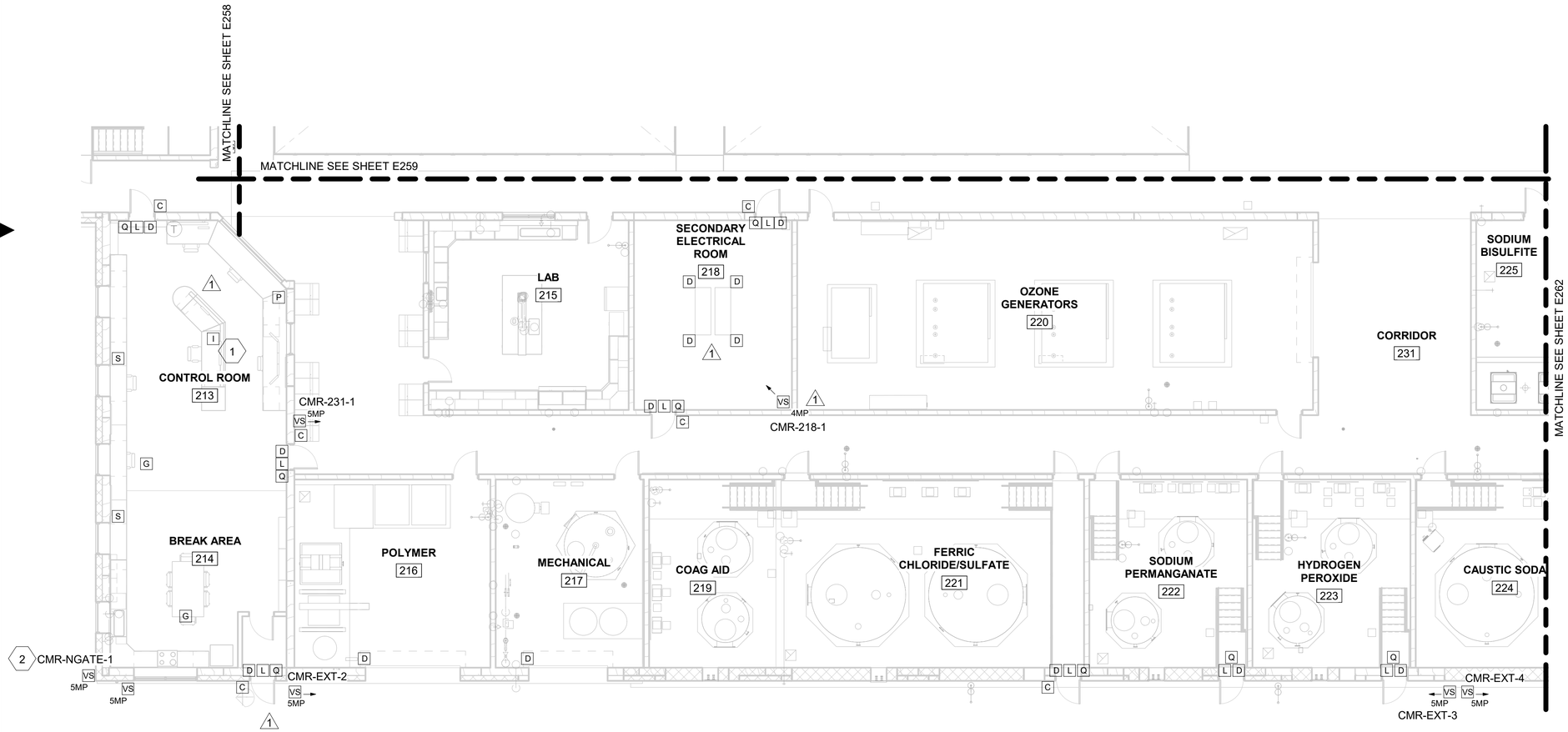
**GENERAL NOTES:**

1. REFER TO E340 FOR SECURITY CAMERA RISER DIAGRAM.
2. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
3. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

**KEYED NOTES:**

1 (1) MASTER INTERCOM STATION.

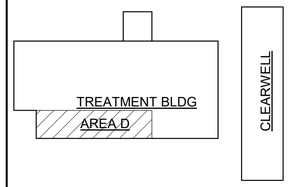
(2) AIM CAMERA TOWARD FRONT GATE TO CAPTURE INCOMING TRAFFIC.




**UPPER LEVEL PLAN AREA D SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA D - SECURITY

| project | contract |
|---|---|
| 98101 | |

drawing **E261 — 1** rev.

sheet 378 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

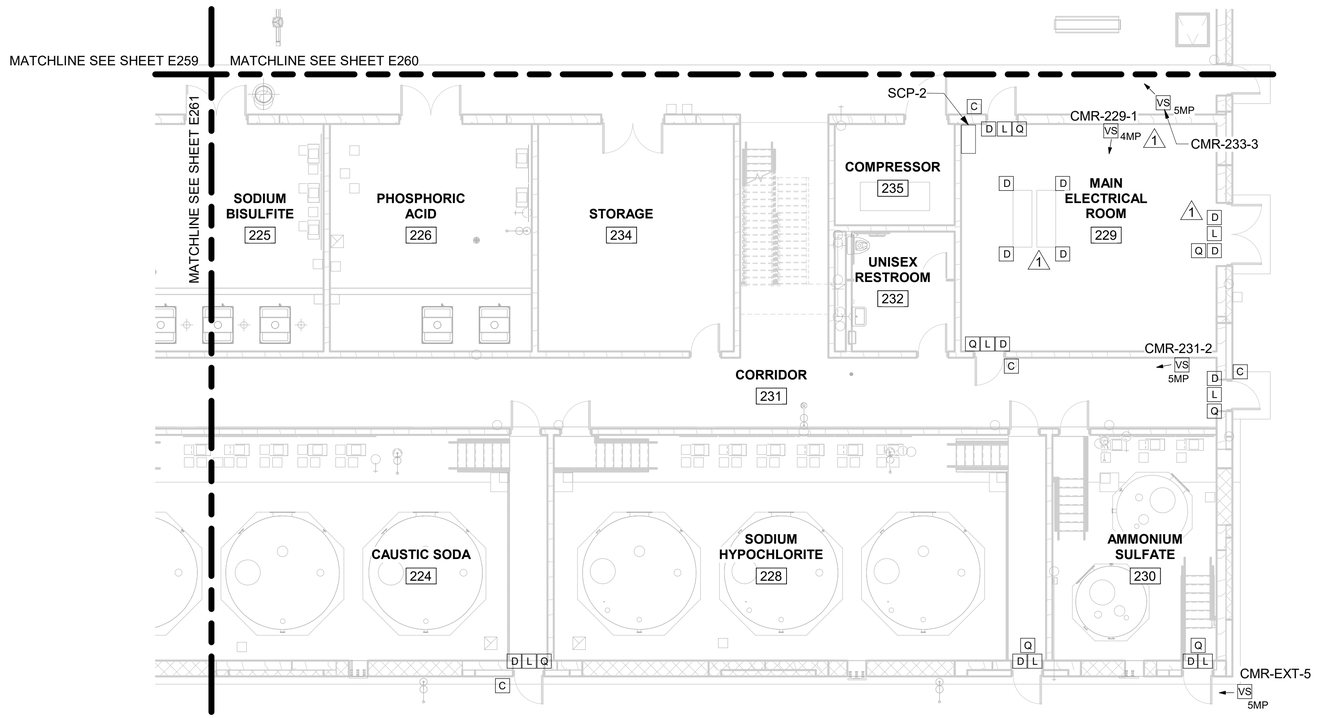
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches

**GENERAL NOTES:**

1. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
2. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.
3. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

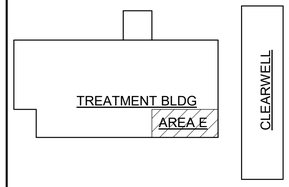
| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




**UPPER LEVEL PLAN AREA E SECURITY**

0 4' 8' 16'
SCALE IN FEET

NORTH




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN AREA E - SECURITY

| project | contract |
|---|---|
| 98101 | |

drawing **E262 — 1** rev.

sheet 379 of 542 sheets
file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

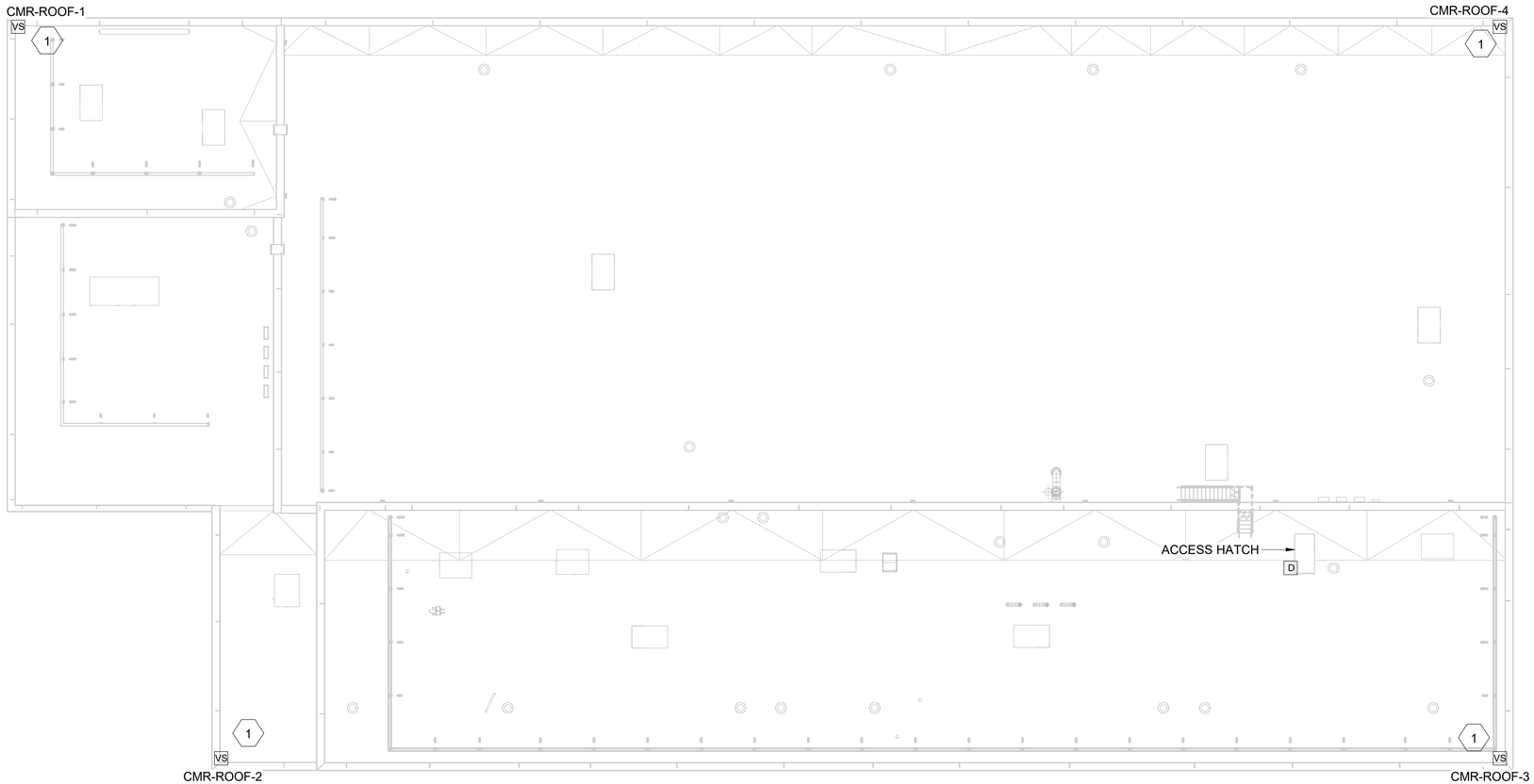
Millimeters
Scale For Microfilming
Inches

**GENERAL NOTES:**

1. REFER TO E339 THRU E341 FOR SECURITY CAMERA RISER DIAGRAMS.
2. REFER TO E343 AND 344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

**KEYED NOTES:**

1. ROOF-MOUNT CAMERA TO BE PTZ-TYPE WITH MOTION TRACKING. INSTALL CAMERA INTERFACE PANEL ADJACENT TO CAMERA LOCATION.




**OVERALL ROOF SECURITY**

0 8' 16' 32'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL ROOF - SECURITY

| project | contract |
|---|---|
| 98101 | |

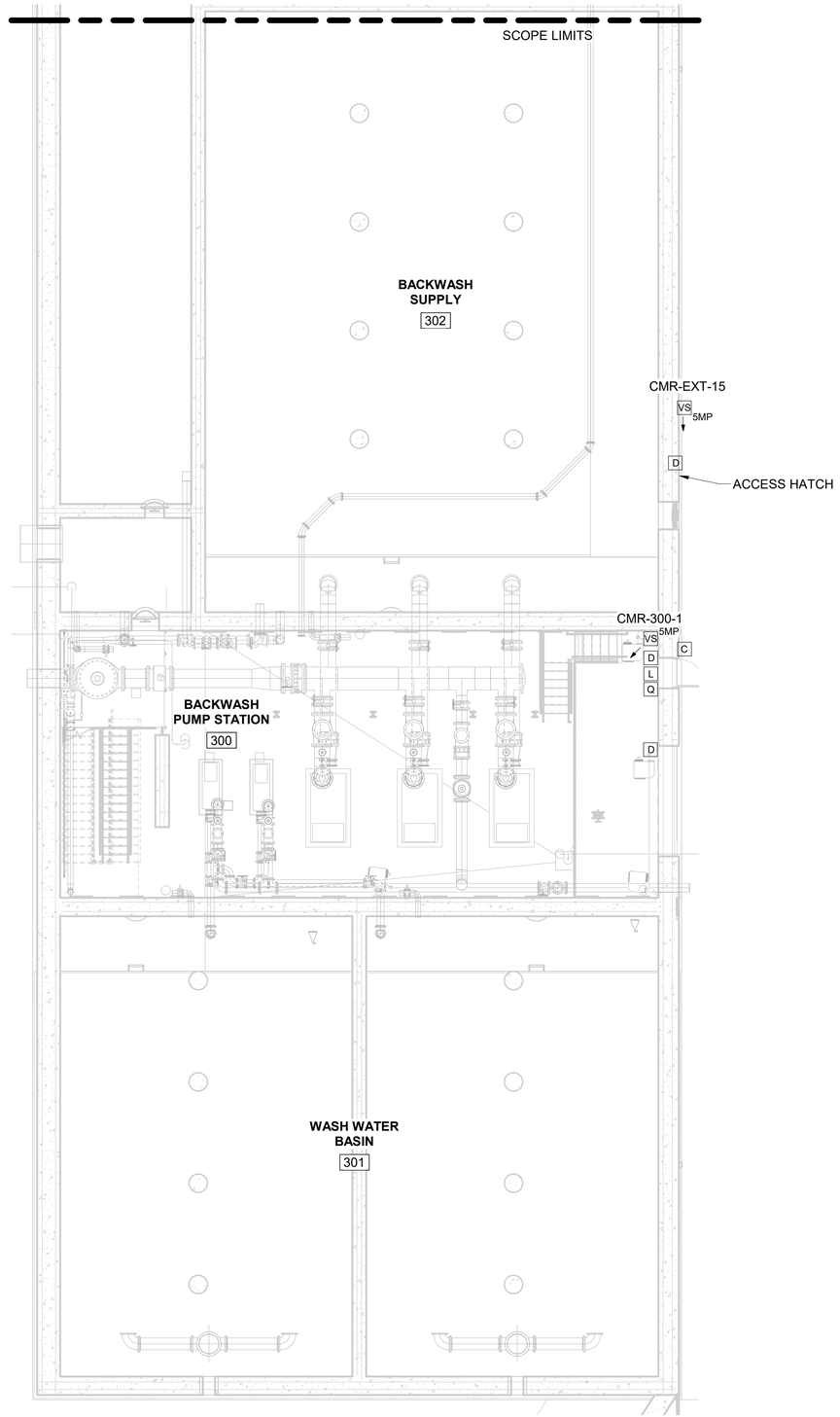
drawing **E263 — 0** rev.

sheet 380 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**LOWER LEVEL PLAN CLEARWELL WEST SECURITY**

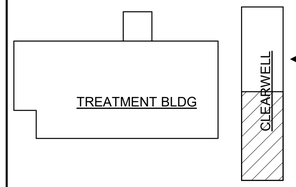
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
2. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.
3. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN CLEARWELL WEST - SECURITY

| project | contract |
|---|---|
| 98101 | |

**drawing** **E264 — 0** **rev.**

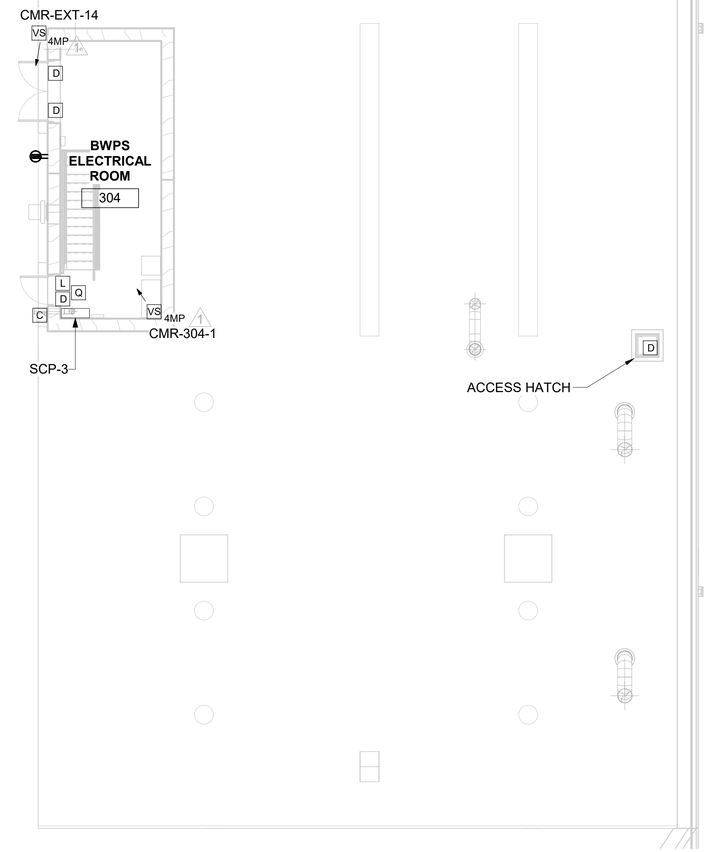
**sheet** 381 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

MATCHLINE SEE SHEET E267




**UPPER LEVEL PLAN CLEARWELL WEST SECURITY**

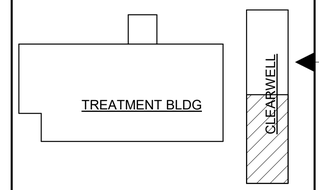
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. ALL MAGNETICALLY LOCKED DOORS SHALL BE INSTALLED WITH A MANUAL REQUEST-TO-EXIT DEVICE. ADDITIONALLY, DOORS INDICATED WITH CARD READER ACCESS SHALL BE INSTALLED WITH MOTION SENSOR REQUEST-TO-EXIT DEVICES.
2. REFER TO E341 FOR SECURITY CAMERA RISER DIAGRAM.
3. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL WEST - SECURITY

| project | contract |
|---|---|
| 98101 | |

**drawing** **E266** **rev.** **1**

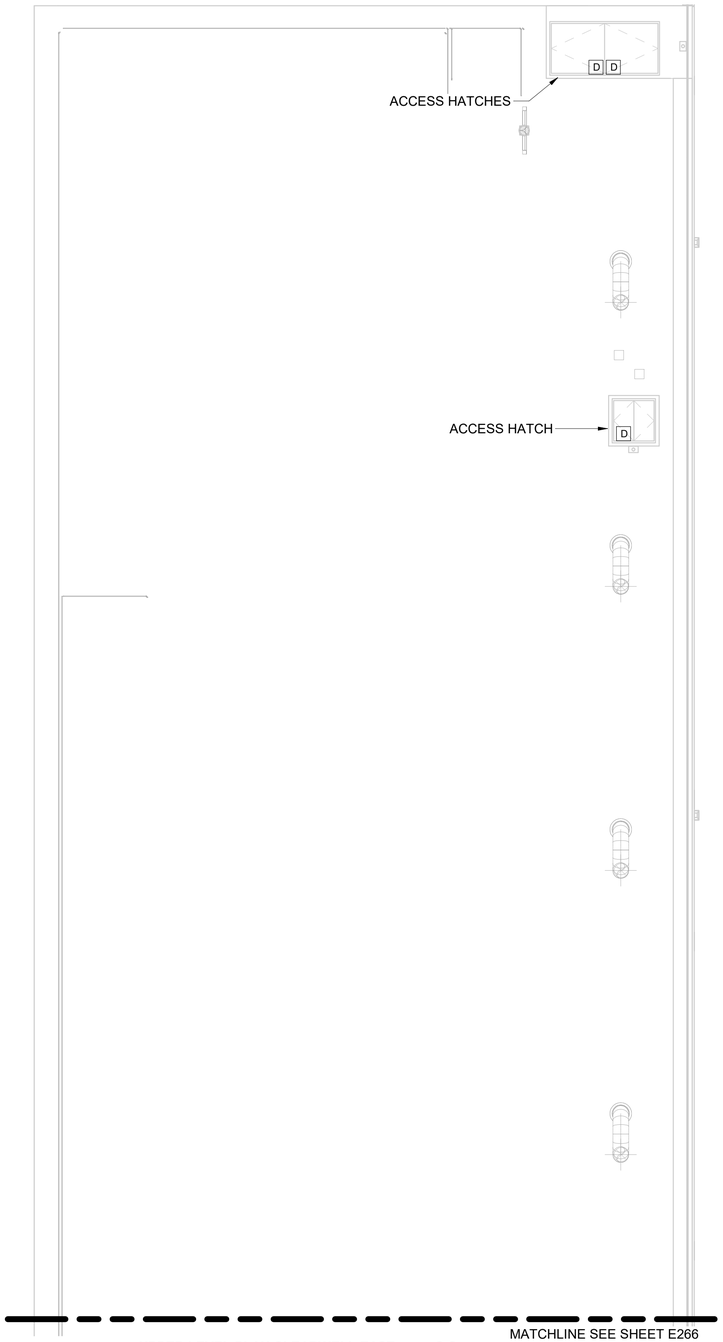
**sheet** 382 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters
Scale For Microfilming
Inches




**UPPER LEVEL PLAN CLEARWELL EAST SECURITY**

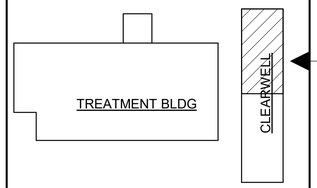
0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. REFER TO E343 AND E344 FOR ACCESS CONTROL SYSTEM RISER DIAGRAMS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
UPPER LEVEL PLAN CLEARWELL EAST - SECURITY

| project | contract |
|---|---|
| 98101 | |

**drawing** E267 — 0 **rev.**

**sheet** 383 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

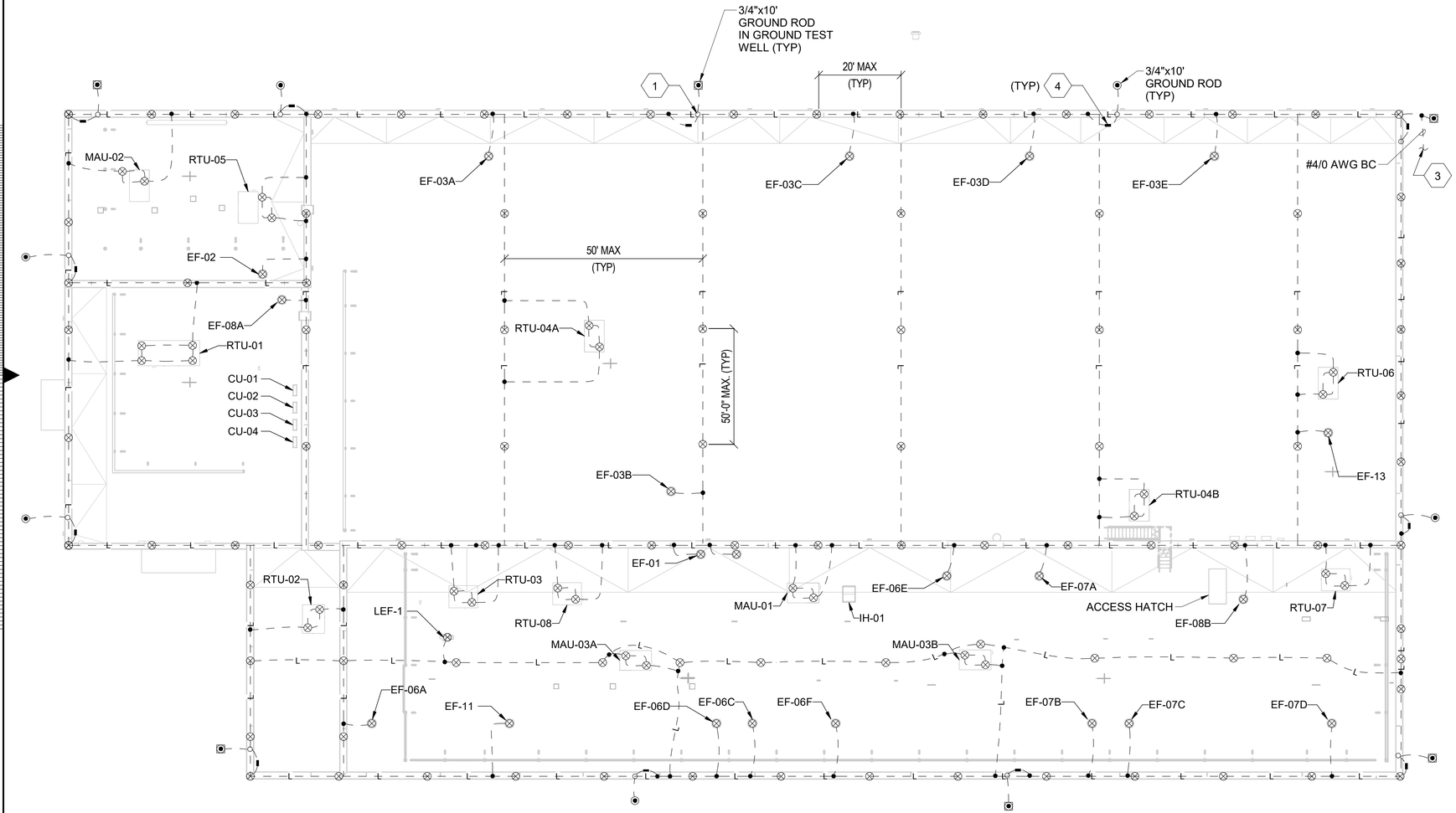
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**GENERAL NOTES:**

1. LIGHTNING PROTECTION SYSTEM INDICATED ON THIS DRAWING IS FOR INFORMATION PURPOSES ONLY. PROVIDE LIGHTNING PROTECTION FOR ALL ROOF-TOP UNITS AND BOND STACKS, POSTS, AND ETC. TO THE LIGHTNING PROTECTION SYSTEM, AS REQUIRED. CONTRACTOR SHALL PROVIDE A LIGHTNING PROTECTION SYSTEM THAT MEETS THE REQUIREMENTS OF NFPA 780, NFPA 70, AND LOCAL/CITY ORDINANCES AND SHALL OBTAIN UL MASTER LABEL.
2. PARAPET ALONG THE ROOF EDGE IS COVERED WITH GALVANIZED STEEL COPING. LIGHTNING PROTECTION COMPONENTS INSTALLED ON THE PARAPET SHALL BE COMPATIBLE WITH THE COPING MATERIAL.

**KEYED NOTES:**

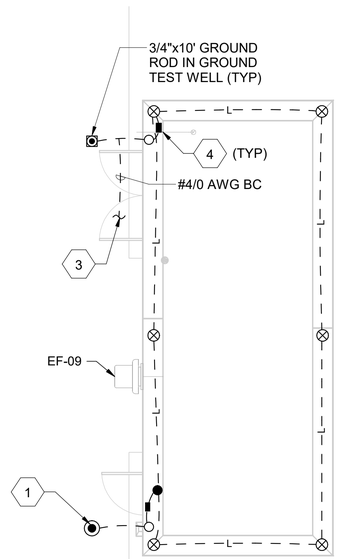
1. ROUTE COPPER DOWN CONDUCTORS IN 3/4" RGS CONDUIT EMBEDDED IN VERTICAL WALLS FROM ROOF TO 30 INCHES BELOW GRADE (MINIMUM), EXIT WALL AND CONNECT TO GROUND ROD. BOND EACH CONDUIT END TO DOWN CONDUCTOR.
2. NOT USED.
3. BOND THE LIGHTNING PROTECTION SYSTEM TO THE BUILDING GROUND GRID.
4. PROVIDE BIMETALLIC CONNECTORS WHEN TRANSITIONING FROM ALUMINIUM TO COPPER, AS REQUIRED.




**TREATMENT BUILDING ROOF PLAN LIGHTNING PROTECTION**

0 8' 16' 32'
SCALE IN FEET

NORTH

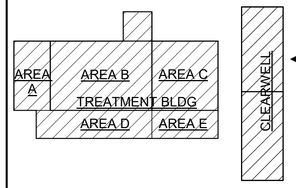



**CLEARWELL ROOF PLAN LIGHTNING PROTECTION**

0 4' 8' 12'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LIGHTNING PROTECTION ROOF PLANS

| project | contract |
|---|---|
| 98101 | |

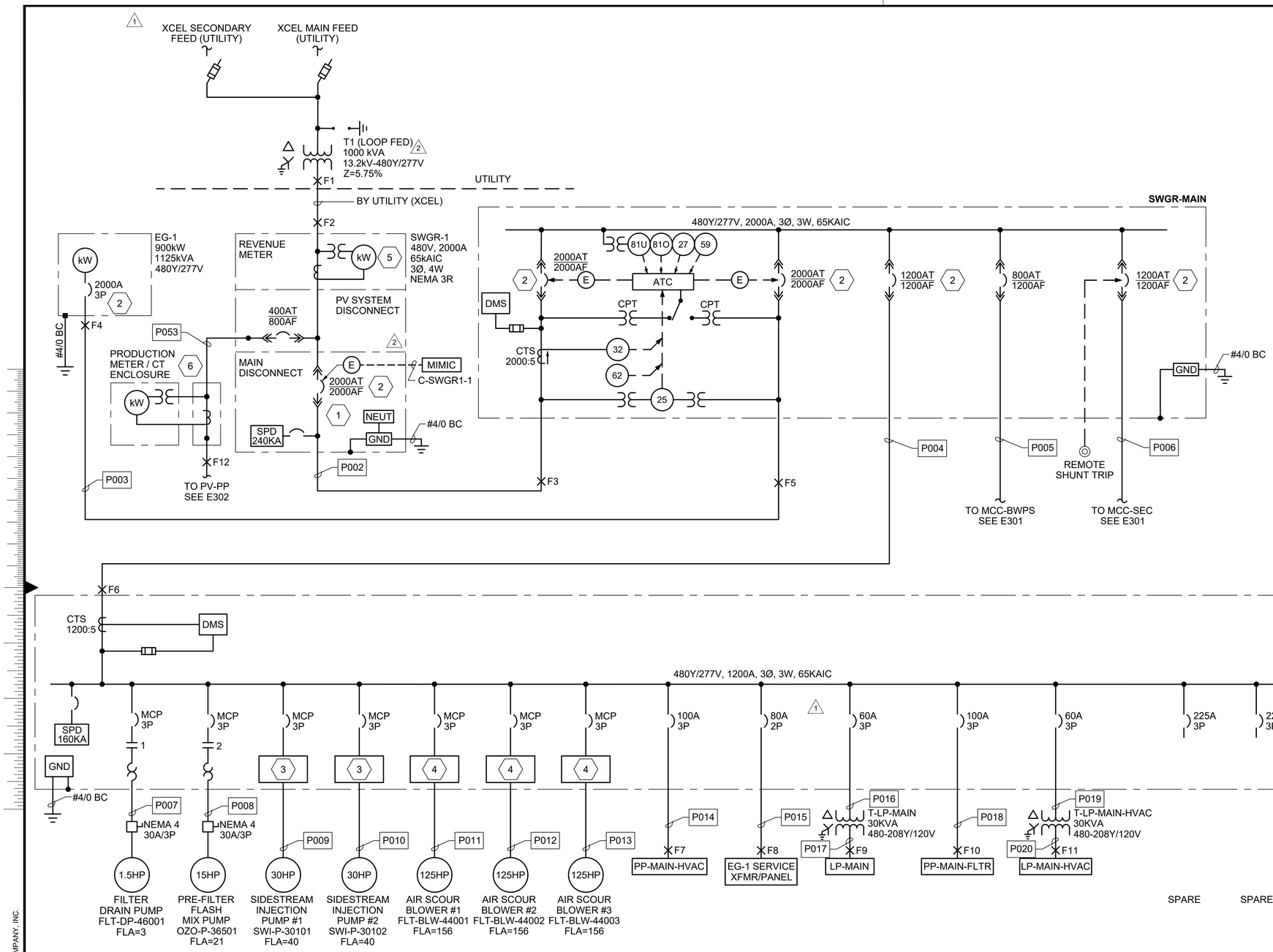
drawing **E268 — 0** rev.

sheet 384 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.







**MCC-MAIN ONE-LINE DIAGRAM**

| SWGR-MAIN LOAD SUMMARY | | | |
|---|---|---|---|
| LOAD | CONNECTED KVA | DEMAND FACTOR | DEMAND KVA |
| MCC-MAIN | 693.01 | 0.51 | 350.83 |
| MCC-SEC | 756.66 | 0.61 | 464.37 |
| MCC-BWPS | 496.17 | 0.28 | 140.57 |
| | | | |
| TOTAL | 1946 | 0.49 | 956 |
| | | | |
| AMPS AT 480V | 2340 | | 1150 |
| LARGEST MOTOR FLA X 0.25 | 225 | | 225 |
| FEEDER AMPS | 2565 | | 1375 |

| FAULT CURRENT TABLE | |
|---|---|
| NO. | FAULT CURRENT |
| F1 | 25,299 A |
| F2 | 25,035 A |
| F3 | 23,417 A |
| F4 | 9,447 A (GEN ONLY) |
| F5 | 9,296 A (GEN ONLY) |
| F6 | 23,087 A |
| F7 | 19,820 A |
| F8 | 4,616 A |
| F9 | 3,279 A |
| F10 | 19,858 A |
| F11 | 3,310 A |
| F12 | 23,258 A |

GENERAL NOTES:

1. SEE E346 THRU E369 FOR CABLE SCHEDULES.
2. SEE E302 FOR LOAD SUMMARIES.
3. SEE E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. FAULT CURRENT TABLE VAULES INDICATED ARE BASED ON THE SHOWN UTILITY TRANSFORMER IMPEDANCE VAULES. NOTIFY ENGINEER IMMEDIATELY IF ACTUAL IMPEDANCE DIFFERS.

KEYED NOTES:

1. BREAKER TO BE SIZED BY EQUIPMENT MANUFACTURER BASED ON SPD MANUFACTURER RECOMMENDATIONS.
2. PROVIDE BREAKER WITH ELECTRONIC TRIP UNIT. TRIP UNIT SHALL HAVE DUAL PROTECTION PARAMETERS FOR IMPLEMENTATION OF AN ARC FLASH ENERGY REDUCTION SWITCH.
3. 6-PULSE, NORMAL DUTY VFD WITH 3% LINE REACTOR.
4. 18-PULSE OR ACTIVE FRONT END VFD FOR LOW HARMONICS. SHALL BE HEAVY DUTY FOR USE WITH POSITIVE DISPLACEMENT BLOWERS.
5. BI-DIRECTIONAL UTILITY METER.
6. UTILITY PRODUCTION METER AND CT ENCLOSURE. PROVIDE METER ENCLOSURE AND NEMA 3R CT ENCLOSURE FOR 400A, 480Y/277V, 4-WIRE SYSTEM IN ACCORDANCE WITH UTILITY STANDARDS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | AG | ED | ISSUED FOR PCO 018 |
| 2 | 10/11/19 | AG | ED | ISSUED FOR COR 034 |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ONE-LINE DIAGRAM I

| | |
|---|---|
| project 98101 | contract |
| drawing **E300** | rev. **2** |
| sheet 385 of 542 sheets | |
| file 98101_E300.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E300.DWG 10/19/2020 12:04 PM AGREENLIEF

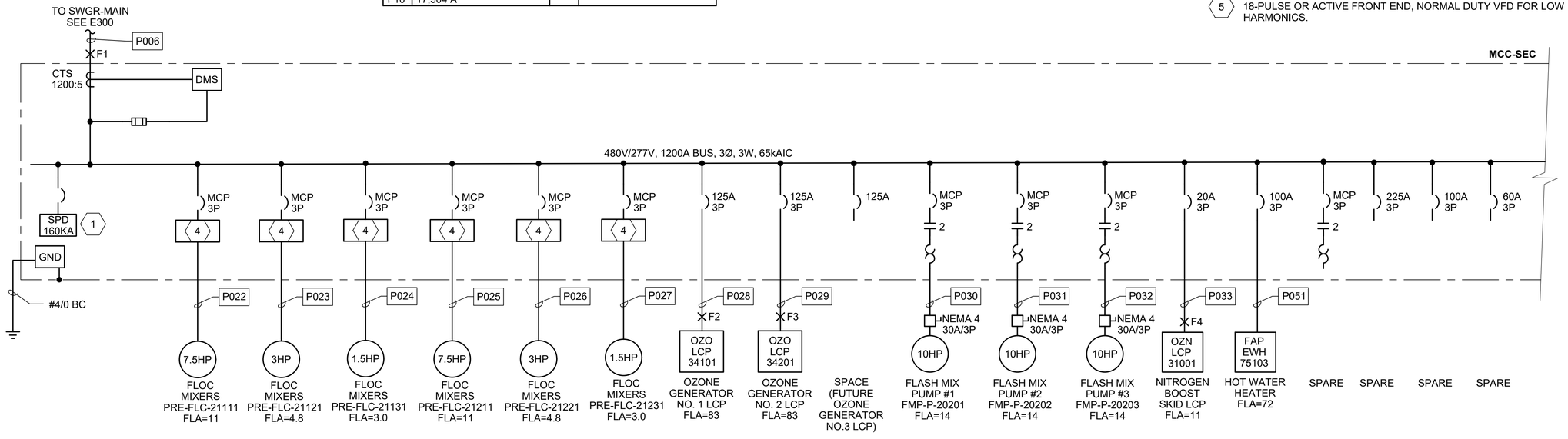
| FAULT CURRENT TABLE | | | |
|---|---|---|---|
| NO. | FAULT CURRENT | NO. | FAULT CURRENT |
| F1 | 19,392 A | F11 | 3,063 A |
| F2 | 14,205 A | F12 | 16,877 A |
| F3 | 13,384 A | F13 | 4,772 A |
| F4 | 3,736 A | F14 | 20,303 A |
| F5 | 18,339 A | F15 | 3,676 A |
| F6 | 4,753 A | | |
| F7 | 17,524 A | | |
| F8 | 4,505 A | | |
| F9 | 3,117 A | | |
| F10 | 17,504 A | | |

GENERAL NOTES:

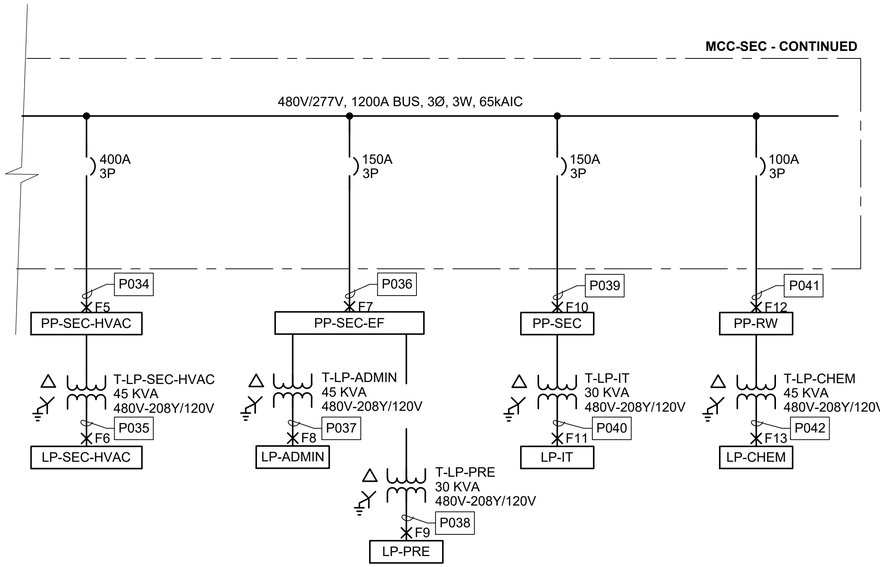
1. SEE E346 THRU E369 FOR CABLE SCHEDULES.
2. SEE E302 FOR LOAD SUMMARIES.
3. SEE E303 THRU E307 FOR PANELBOARD SCHEDULES.

KEYED NOTES:

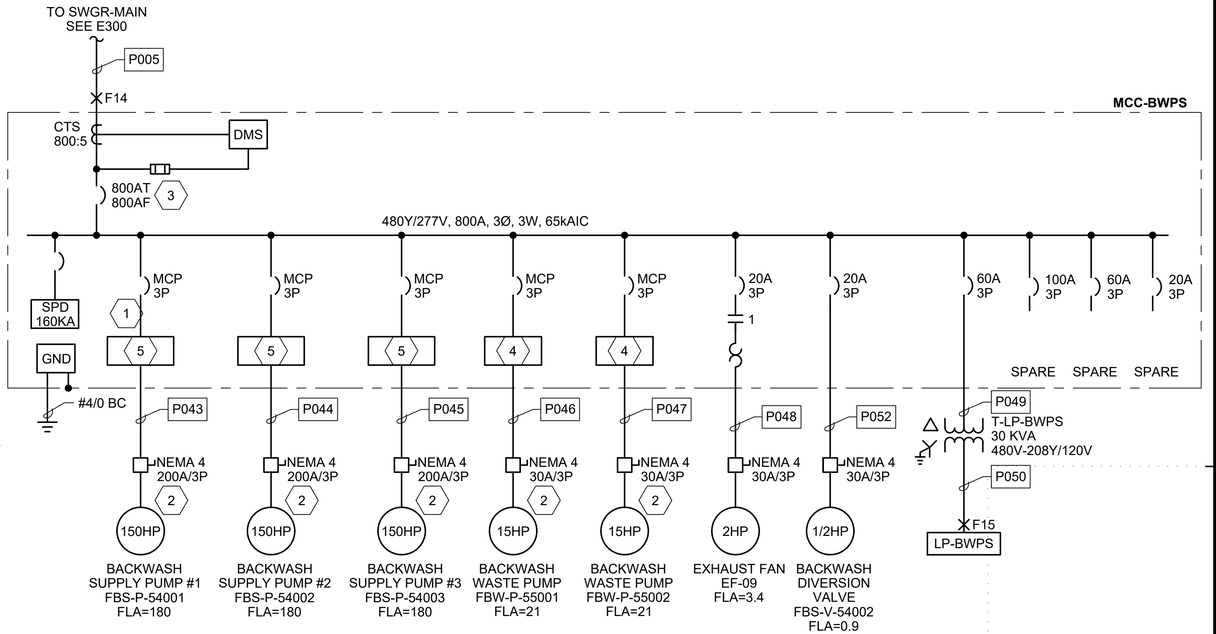
1. BREAKER TO BE SIZED BY EQUIPMENT MANUFACTURER BASED ON SPD MANUFACTURER RECOMMENDATIONS.
2. PROVIDE DISCONNECT WITH AUXILIARY CONTACTS FOR INTERLOCKING WITH VFD CONTROLS.
3. PROVDE BREAKER WITH ELECTRONIC TRIP UNIT. TRIP UNIT SHALL HAVE DUAL PROTECTION PARAMETERS FOR IMPLEMENTATION OF AN ARC FLASH ENERGY REDUCTION SWITCH.
4. 6-PULSE, NORMAL DUTY VFD WITH 3% LINE REACTOR.
5. 18-PULSE OR ACTIVE FRONT END, NORMAL DUTY VFD FOR LOW HARMONICS.




MCC-SEC ONE-LINE DIAGRAM




MCC-SEC ONE-LINE DIAGRAM (CONT.)




MCC-BWPS ONE-LINE DIAGRAM

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 7/2/19 | AG | ED | ISSUED FOR PCO 018 |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
ONE-LINE DIAGRAM II

| project | contract |
|---|---|
| 98101 | |

drawing E301 – rev. 1

sheet 386 of 542 sheets

file 98101_E301.DWG

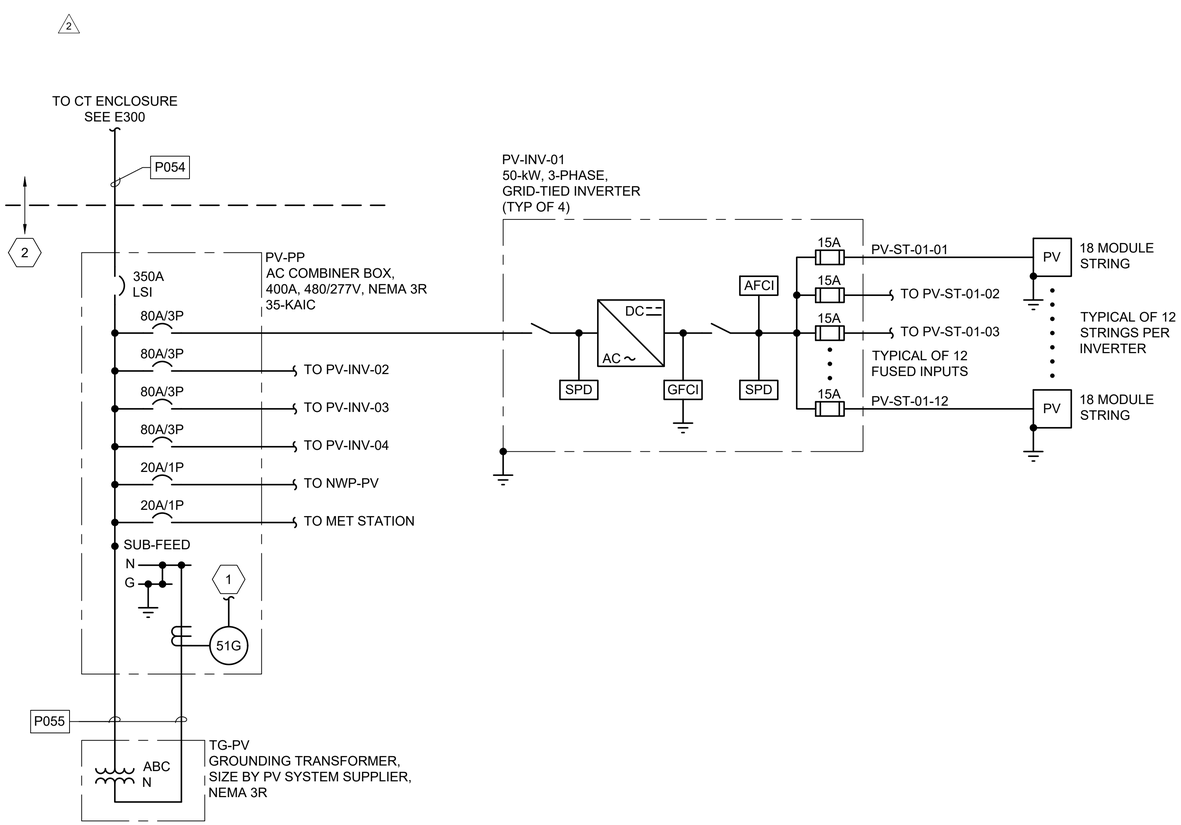
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E301.DWG 10/19/2020 12:08 PM AGREENLIEF

| MCC-MAIN LOAD SUMMARY | | | |
|---|---|---|---|
| LOAD | CONNECTED kVA | DEMAND FACTOR | DEMAND kVA |
| FLT-DP-46001 | 2.50 | 0.00 | 0.00 |
| OZO-P-36501 | 17.45 | 0.80 | 13.96 |
| SWI-P-32001 | 33.30 | 0.80 | 26.64 |
| SWI-P-32002 | 33.30 | 0.00 | 0.00 |
| FLT-BLW-44001 | 129.64 | 0.72 | 93.34 |
| FLT-BLW-44002 | 129.64 | 0.72 | 93.34 |
| FLT-BLW-44003 | 129.64 | 0.00 | 0.00 |
| PP-MAIN-HVAC | 76.48 | 0.65 | 49.71 |
| EG-1 SERVICE PANEL | 30.00 | 0.30 | 9.00 |
| T-LP-MAIN | 20.07 | 0.96 | 19.29 |
| PP-MAIN-FLTR | 69.00 | 0.15 | 10.35 |
| T-LP-MAIN-HVAC | 16.61 | 0.63 | 10.41 |
| | | | |
| TOTAL | 688 | 0.47 | 326 |
| | | | |
| AMPS AT 480V | 827 | | 392 |
| LARGEST MOTOR FLA X 0.25 | 39 | | 39 |
| FEEDER AMPS | 866 | | 431 |

| MCC-SEC LOAD SUMMARY | | | |
|---|---|---|---|
| LOAD | CONNECTED kVA | DEMAND FACTOR | DEMAND kVA |
| PRE-FLC-21111 | 6.32 | 0.80 | 5.05 |
| PRE-FLC-21121 | 3.99 | 0.80 | 3.19 |
| PRE-FLC-21131 | 2.49 | 0.80 | 2.00 |
| PRE-FLC-21211 | 6.32 | 0.80 | 5.05 |
| PRE-FLC-21221 | 3.99 | 0.80 | 3.19 |
| PRE-FLC-21231 | 2.49 | 0.80 | 2.00 |
| OZO-GEN-34101 | 69.00 | 0.80 | 55.20 |
| OZO-GEN-34201 | 69.00 | 0.80 | 55.20 |
| OZO-GEN-34301 (FUTURE) | 69.00 | 0.00 | 0.00 |
| FMP-P-20201 | 11.60 | 0.80 | 9.28 |
| FMP-P-20202 | 11.60 | 0.80 | 9.28 |
| FMP-P-20203 | 11.60 | 0.00 | 0.00 |
| OZN-LCP-31001 | 9.14 | 0.80 | 7.31 |
| FAP-EWH-75103 | 60.00 | 1.00 | 60.00 |
| PP-SEC-HVAC | 192.79 | 0.61 | 117.36 |
| PP-SEC-EF | 90.15 | 0.79 | 71.46 |
| PP-SEC | 85.57 | 0.56 | 47.78 |
| PP-RW | 51.60 | 0.21 | 11.01 |
| | | 0.00 | 0.00 |
| TOTAL | 757 | 0.61 | 464 |
| | | | |
| AMPS AT 480V | 910 | | 559 |
| LARGEST MOTOR FLA X 0.25 | 4 | | 4 |
| FEEDER AMPS | 914 | | 563 |

| MCC-BWPS LOAD SUMMARY | | | |
|---|---|---|---|
| LOAD | CONNECTED kVA | DEMAND FACTOR | DEMAND kVA |
| FBS-P-54001 | 149.65 | 0.80 | 119.72 |
| FBS-P-54002 | 149.65 | 0.00 | 0.00 |
| FBS-P-54003 | 149.65 | 0.00 | 0.00 |
| FBW-P-55001 | 17.46 | 0.80 | 13.97 |
| FBW-P-55002 | 17.46 | 0.00 | 0.00 |
| EF-09 | 1.75 | 0.65 | 1.13 |
| T-LP-BWPS | 10.57 | 0.54 | 5.75 |
| | | | |
| TOTAL | 496 | 0.28 | 141 |
| | | | |
| AMPS AT 480V | 597 | | 169 |
| LARGEST MOTOR FLA X 0.25 | 45 | | 45 |
| FEEDER AMPS | 642 | | 214 |




**GENERAL NOTES:**

1. PV ARRAYS SHALL BE NEGATIVELY GROUNDED.
2. ALL CIRCUIT BREAKERS ASSOCIATED WITH PV-PP SHALL BE BI-DIRECTIONAL.
3. ALL EQUIPMENT SHOWN BY FUTURE CONTRACT. INSTALL BELOW GRADE CONDUITS AND RISERS TO EQUIPMENT AS INDICATED.

**KEYED NOTES:** (#)

1. GROUND FAULT RELAY OUTPUT TO PROVIDE REMOTE SHUNT TRIP COMMAND TO THE PP-PV MAIN CIRCUIT BREAKER. PV SYSTEM SUPPLIER TO PROVIDE TRIP SETPOINT.
2. BY FUTURE CONTRACT (PV SYSTEM INSTALLER). REFER TO PLANS FOR PROVISIONS INCLUDED IN THIS CONTRACT.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | AG | ED | ISSUED FOR PCO 018 |
| 2 | 10/11/19 | AG | ED | ISSUED FOR COR 034 |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOAD SUMMARIES I

| project | contract |
|---|---|
| 98101 | |

drawing **E302** – rev. **2**

sheet 387 of 542 sheets

file 98101_E302.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E302.DWG 10/19/2020 12:15 PM AGREENLIEF

PANEL BOARD PP-MAIN-HVAC | 480/277 VOLTS | 3 PHASE | 3 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1,3,5 | 20 | #12 | EF-03D (VFD) | 1330 | | | 2 | -2,4,6 | 25 | #10 | MAU-03B |
| 3 | | | | | 3910 | 1330 | | 4 | | | | |
| 5 | | | | | | 3910 | 1330 | 6 | | | | |
| 7 | -7,9,11 | 20 | #12 | EF-03E (VFD) | 1330 | | | 8 | -8,10,12 | 40 | #8 | RTU-04B |
| 9 | | | | | 6100 | 1330 | | 10 | | | | |
| 11 | | | | | | 6100 | 1330 | 12 | | | | |
| 13 | - | 20 | - | SPARE | - | | | 14 | -14,16,18 | 40 | #8 | RTU-06 |
| 15 | | | | | 6100 | - | | 16 | | | | |
| 17 | | | | | | 6100 | - | 18 | | | | |
| 19 | - | 20 | - | SPARE [1] | - | | | 20 | -20,22,24 | 20 | #12 | RTU-07 |
| 21 | | | | | 3770 | - | | 22 | | | | |
| 23 | | | | | | 3770 | - | 24 | | | | |
| 25 | - | 20 | - | SPARE | - | | | 26 | - | 20 | - | SPARE |
| 27 | | | | | - | - | | 28 | | | | |
| 29 | | | | | | - | - | 30 | | | | |
| 31 | - | 20 | - | SPARE | - | | | 32 | - | 20 | - | SPARE |
| 33 | | | | | - | - | | 34 | | | | |
| 35 | | | | | | - | - | 36 | | | | |
| 37 | -37,39,41 | 20 | #12 | EF-13 (VFD) | 2105 | | | 38 | - | 20 | - | SPARE |
| 39 | | | | | - | 2105 | | 40 | | | | |
| 41 | | | | | | - | 2105 | 42 | | | | |
| | | | | | 18430 | 18430 | 18430 | | | | | |

TOTAL CONNECTED LOAD: 69.6 AMPERES | 57.9 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND: | 37.6 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 45.2 A |
| HVAC | 57.9 | 0.65 | 37.6 | | |
| POWER | 0 | 1 | 0 | DEMAND WITH EXPANSION: | 57 A |

PANEL BOARD LP-MAIN | 208/120 VOLTS | 3 PHASE | 4 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | PLC-FLTR | 1000 | | | 2 | -2 | 20 | #12 | COs [101] |
| 3 | -3 | 20 | #12 | PLC-CHM2 | 900 | 1000 | | 4 | -4 | 20 | #12 | COs [110] |
| 5 | -5 | 20 | #12 | NWP-MAIN | | 180 | 500 | 6 | -6 | 20 | #12 | COs [232,235] |
| 7 | -7 | 20 | #12 | LOX-LCP-33001 | 250 | | 720 | 8 | -8 | 20 | #10 | COs [ROOF] |
| 9 | -9 | 20 | #12 | SPARE [1] | 1440 | 1600 | | 10 | -10 | 20 | #12 | COs [233 SOUTH] |
| 11 | - | 20 | - | SPARE | | 720 | - | 12 | -12 | 20 | #12 | LIGHTS/COs [236] |
| 13 | - | 20 | - | SPARE | - | | 380 | 14 | - | 20 | - | SPARE |
| 15 | -15 | 20 | #12 | COs [222,223,224] | - | 720 | | 16 | - | 20 | - | SPARE |
| 17 | -17 | 20 | #12 | COs [225,226,234] | | - | 900 | 18 | -18 | 20 | #12 | LIGHTS [101 NORTH] |
| 19 | -19 | 20 | #12 | COs [229] | 900 | | 980 | 20 | -20 | 20 | #12 | LIGHTS [101 SOUTH] |
| 21 | -21 | 20 | #12 | COs [228] | 640 | 720 | | 22 | -22 | 20 | #12 | NIGHT LIGHTS [101] |
| 23 | -23 | 20 | #12 | COs [230] | | 400 | 180 | 24 | -24 | 20 | #12 | LIGHTS [110] |
| 25 | - | 20 | - | SPARE | - | | 360 | 26 | -26 | 20 | #12 | LIGHTS [229,232,234,235] |
| 27 | - | 20 | - | SPARE | 892 | - | | 28 | -28 | 20 | #12 | LIGHTS [225,226] |
| 29 | - | 20 | - | SPARE | | 640 | - | 30 | -30 | 20 | #12 | LIGHTS [222,223,224] |
| 31 | -31 | 20 | #12 | CCC-SMP-62001/2 | 200 | | 1392 | 32 | - | 20 | - | SPARE |
| 33 | -33 | 20 | #12 | PRE-SMP-26100 | - | 100 | | 34 | -34 | 20 | #12 | LIGHTS [228,230] |
| 35 | -35 | 20 | #12 | PRE-SMP-26200 | | 1054 | 100 | 36 | - | 20 | - | SPARE |
| 37 | -37 | 20 | #12 | OZO-SMP-36001/2 | 200 | | - | 38 | -38 | 20 | #12 | LC-052-1 |
| 39 | -39 | 20 | #12 | OZO-SMP-36003/4 | 376 | 200 | | 40 | -40 | 20 | #12 | LC-052-2 |
| 41 | -41 | 20 | #12 | FLT-SMP-43000 | | 72 | 100 | 42 | -42 | 20 | #6 | LC-052-3 |
| | | | | | 6522 | 7406 | 6762 | | | | | |

TOTAL CONNECTED LOAD: 57.5 AMPERES | 20.7 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0.7 | 1 | 0.7 | TOTAL ESTIMATED DEMAND: | 19.6 KVA |
| LIGHTS | 7.7 | 1 | 7.7 | | |
| RECEPTACLES | 8.3 | 1 | 8.3 | TOTAL ESTIMATED DEMAND AMPS: | 54.4 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 3.6 | 0.8 | 2.9 | DEMAND WITH EXPANSION: | 69 A |

PANEL BOARD PP-MAIN-FLTR | 480/277 VOLTS | 3 PHASE | 3 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1,3,5 | 20 | #12 | FLT-V-41106/41206/41306 | 1500 | | | 2 | -2,4,6 | 20 | #12 | FLT-V-41406/41506/41606 |
| 3 | | | | | 1500 | 1500 | | 4 | | | | |
| 5 | | | | | | 1500 | 1500 | 6 | | | | |
| 7 | -7,9 | 20 | #12 | FLT-V-41102/3/4/7 | 1250 | | | 8 | -8,10 | 20 | #12 | FLT-V-41402/3/4/7 |
| 9 | | | | | 1250 | 1250 | | 10 | | | | |
| 11 | -11,13 | 20 | #12 | FLT-V-41202/3/4/7 | | 1250 | 1250 | 12 | -12,14 | 20 | #12 | FLT-V-41502/3/4/7 |
| 13 | | | | | 1250 | | | 14 | | | | |
| 15 | -15,17 | 20 | #12 | FLT-V-41302/3/4/7 | | 1250 | | 16 | -16,18 | 20 | #12 | FLT-V-41602/3/4/7 |
| 17 | | | | | | | 1250 | 18 | | | | |
| 19 | -19,21,23 | 20 | #12 | FLT-V-41105 | 300 | | | 20 | -20,22,24 | 20 | #12 | FLT-V-41405 |
| 21 | | | | | 300 | 300 | | 22 | | | | |
| 23 | | | | | | 300 | 300 | 24 | | | | |
| 25 | -25,27,29 | 20 | #12 | FLT-V-41205 | 300 | | | 26 | -26,28,30 | 20 | #12 | FLT-V-41505 |
| 27 | | | | | 300 | 300 | | 28 | | | | |
| 29 | | | | | | 300 | 300 | 30 | | | | |
| 31 | -31,33,35 | 20 | #12 | FLT-V-41305 | 300 | | | 32 | -32,34,36 | 20 | #12 | FLT-V-41605 |
| 33 | | | | | 300 | 300 | | 34 | | | | |
| 35 | | | | | | 300 | 300 | 36 | | | | |
| 37 | -37,39 | 20 | #12 | FLT-V-41101/41201/41301 | 1000 | | | 38 | -38,40 | 20 | #12 | FLT-V-41401/41501/41601 |
| 39 | | | | | 1000 | 1000 | | 40 | | | | |
| 41 | -41,43 | 20 | #12 | SLD-V-22102/3 | 500 | | 500 | 42 | -42,44 | 20 | #12 | SLD-V-22202/3 |
| 43 | | | | | 500 | | | 44 | | | | |
| 45 | - | 20 | - | SPARE | - | | | 46 | - | 20 | - | SPARE |
| 47 | | | | | - | | - | 48 | | | | |
| 49 | - | 20 | - | SPARE | - | | | 50 | - | 20 | - | SPARE |
| 51 | | | | | - | - | | 52 | | | | |
| 53 | | | | | | | - | 54 | | | | |
| | | | | | 12800 | 11800 | 10800 | | | | | |

TOTAL CONNECTED LOAD: 43 AMPERES | 35.4 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 35.4 | 0.15 | 5.3 | TOTAL ESTIMATED DEMAND: | 5.3 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 6.4 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 0 | 1 | 0 | DEMAND WITH EXPANSION: | 8 A |

**GENERAL NOTES:**

1. CIRCUIT NUMBER SHALL CONSIST OF PANELBOARD TAG AND POLE NUMBER. e.g. LP-MAIN-5

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PANELBOARD SCHEDULES I

| project | contract |
|---|---|
| 98101 | |

drawing **E303** – rev. **1**

sheet 388 of 542 sheets

file 98101_E303.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

PANEL BOARD PP-SEC-HVAC | 480/277 VOLTS | 3 PHASE | 3 WIRE | 400 AMP. MAINS

400 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1,3,5 | 15 | #12 | MAU-01 | 1750 | | | 2 | -2,4,6 | 20 | #12 | RTU-05 |
| 3 | | | | | 3600 | 1750 | | 4 | | | | |
| 5 | | | | | | 3600 | 1750 | 6 | | | | |
| 7 | -7,9,11 | 15 | #12 | MAU-02 | 1135 | | | 8 | -8,10,12 | 20 | #12 | RTU-08 |
| 9 | | | | | 3770 | 1135 | | 10 | | | | |
| 11 | | | | | | 3770 | 1135 | 12 | | | | |
| 13 | -13,15,17 | 15 | #12 | MAU-03A | 2715 | | | 14 | - | 20 | - | SPARE |
| 15 | | | | | - | 2715 | | 16 | | | | |
| 17 | | | | | | - | 2715 | 18 | | | | |
| 19 | -19,21,23 | 70 | #4 | RTU-01 | 18090 | | | 20 | - | 20 | - | SPARE |
| 21 | | | | | - | 18090 | | 22 | | | | |
| 23 | | | | | | - | 18090 | 24 | | | | |
| 25 | -25,27,29 | 20 | #12 | RTU-02 | 3770 | | | 26 | - | 20 | - | SPARE |
| 27 | | | | | - | 3770 | | 28 | | | | |
| 29 | | | | | | - | 3770 | 30 | | | | |
| 31 | -31,33,35 | 20 | #12 | RTU-03 | 3770 | | | 32 | -32,34,36 | 20 | #12 | AIR COMPRESSOR |
| 33 | | | | | 3900 | 3770 | | 34 | | | | |
| 35 | | | | | | 3900 | 3770 | 36 | | | | |
| 37 | -37,39,41 | 40 | #8 | RTU-04A | 6100 | | | 38 | -38,40,42 | 80 | #4 | T-LP-SEC-HVAC |
| 39 | | | | | 15800 | 6100 | | 40 | | | | |
| 41 | | | | | | 15800 | 6100 | 42 | | | | |
| | | | | | 60235 | 60235 | 60235 | | | | | |

TOTAL CONNECTED LOAD: 219.9 AMPERES | 182.7 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 11.7 | 0.33 | 3.9 | TOTAL ESTIMATED DEMAND: | 112.0 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 134.8 A |
| HVAC | 123.6 | 0.65 | 80.3 | | |
| POWER | 47.2 | 0.59 | 27.8 | DEMAND WITH EXPANSION: | 169 A |

PANEL BOARD LP-SEC-HVAC | 208/120 VOLTS | 3 PHASE | 4 WIRE | 225 AMP. MAINS

150 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | OHD-1 | 1650 | | | 2 | -2,4 | 20 | - | EUH-01 [236] (2) |
| 3 | -3 | 20 | #12 | OHD-3 | 1300 | 1650 | | 4 | | | | |
| 5 | -5 | 20 | #12 | OHD-4 | | 1300 | 1650 | 6 | -6,8 | 20 | - | SPARE |
| 7 | -7 | 20 | #12 | UH-01 | 450 | | | 8 | | | | |
| 9 | -9 | 20 | #12 | UH-02 | - | 450 | | 10 | -10,12 | 20 | - | SPARE |
| 11 | -11 | 20 | #12 | UH-03 | | - | 450 | 12 | | | | |
| 13 | -13 | 20 | #12 | UH-11, UH-12 | 900 | | | 14 | -14,16 | 20 | - | SPARE |
| 15 | -15 | 20 | #12 | UH-16 | - | 450 | | 16 | | | | |
| 17 | -17 | 20 | #12 | UH-15, IRH-02 (2) | | - | 600 | 18 | -18,20 | 15 | #12 | CU-01 |
| 19 | -19 | 20 | #12 | EF-06A | 1400 | | 1350 | 20 | | | | |
| 21 | -21 | 20 | #12 | EF-06C, EF-06F | 1350 | 1200 | | 22 | -22,24 | 15 | #12 | CU-02 |
| 23 | -23 | 20 | #12 | EF-06E (2) | | 1350 | 1200 | 24 | | | | |
| 25 | -25 | 20 | #12 | EF-08A | 530 | | 1350 | 26 | -26,28 | 15 | #12 | CU-03 |
| 27 | -27,29 | 30 | #10 | VAV-01 | 1350 | 2500 | | 28 | | | | |
| 29 | | | | | | 1350 | 2500 | 30 | -30,32 | 15 | #12 | CU-04 |
| 31 | -31,33 | 20 | #12 | VAV-02 | 1500 | | 1350 | 32 | | | | |
| 33 | | | | | 1350 | 1500 | | 34 | -34 | 20 | #12 | EF-11 (2) |
| 35 | -35,37 | 30 | #10 | VAV-03 | | 1200 | 2500 | 36 | -36 | 20 | #12 | EF-06D CONTROL DAMPERS (2) |
| 37 | | | | | 2500 | | 70 | 38 | -38 | 20 | #12 | CONTROL DAMPERS (2) |
| 39 | -39,41 | 40 | #8 | VAV-04 | 210 | 3750 | | 40 | - | 20 | - | SPARE |
| 41 | | | | | | - | 3750 | 42 | - | 20 | - | SPARE |
| | | | | | 14490 | 16700 | 15770 | | | | | |

TOTAL CONNECTED LOAD: 140 AMPERES | 47.0 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND: | 30.5 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 85 A |
| HVAC | 47.0 | 0.65 | 30.5 | | |
| POWER | 0 | 0.8 | 0 | DEMAND WITH EXPANSION: | 106 A |

PANEL BOARD LP-MAIN-HVAC | 208/120 VOLTS | 3 PHASE | 4 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | EF-07A | 530 | | | 2 | -2 | 20 | #12 | OHD-2 |
| 3 | -3 | 20 | #12 | EF-07D | 1650 | 700 | | 4 | -4 | 20 | #12 | UH-13, UH-14, IRH-01 |
| 5 | -5 | 20 | #12 | EF-08B | | 1050 | 700 | 6 | - | 20 | - | SPARE |
| 7 | -7 | 20 | #12 | EF-10 | 700 | | | 8 | - | 20 | - | SPARE |
| 9 | -9,11 | 20 | #12 | EUH-1 | - | 1500 | | 10 | - | 20 | - | SPARE |
| 11 | | | | | | - | 1500 | 12 | - | 20 | - | SPARE |
| 13 | -13 | 20 | #12 | EF-07B (2) | 1200 | | | 14 | - | 20 | - | SPARE |
| 15 | -15 | 20 | #12 | EF-07C (2) | - | 1200 | | 16 | - | 20 | - | SPARE |
| 17 | -17 | 20 | - | SPARE | | - | - | 18 | - | 20 | - | SPARE |
| 19 | - | | - | SPACE | - | | | 20 | -20 | 20 | #12 | LC-041-1 |
| 21 | - | | - | SPACE | 635 | - | | 22 | -22 | 20 | #12 | LC-041-2 |
| 23 | - | | - | SPACE | | 1089 | - | 24 | -24 | 20 | #12 | LC-041-3 |
| 25 | - | | - | SPACE | - | | 703 | 26 | -26 | 20 | #12 | LC-041-4 |
| 27 | - | | - | SPACE | 1020 | - | | 28 | -28 | 20 | #12 | LC-042-1 |
| 29 | - | | - | SPACE | | 1357 | - | 30 | -30 | 20 | #12 | LC-042-2 |
| 31 | - | | - | SPACE | - | | 1020 | 32 | -32 | 20 | #12 | LC-042-3 |
| 33 | - | | - | SPACE | 1308 | - | | 34 | -34 | 20 | #12 | LC-042-4 |
| 35 | - | | - | SPACE | | 1360 | - | 36 | - | 20 | - | SPARE |
| 37 | - | | - | SPACE | - | | - | 38 | - | 20 | - | SPARE |
| 39 | - | | - | SPACE | - | - | | 40 | - | 20 | - | SPARE |
| 41 | - | | - | SPACE | | - | - | 42 | - | 20 | - | SPARE |
| | | | | | 7043 | 8256 | 3923 | | | | | |

TOTAL CONNECTED LOAD: 69 AMPERES | 19.3 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND: | 15.5 KVA |
| LIGHTS | 8.5 | 1 | 8.5 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 44 A |
| HVAC | 10.8 | 0.65 | 7.0 | | |
| POWER | 0 | 0.8 | 0 | DEMAND WITH EXPANSION: | 54 A |

**GENERAL NOTES:**

1. CIRCUIT NUMBER SHALL CONSIST OF PANELBOARD TAG AND POLE NUMBER. e.g. LP-MAIN-5

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 1/11/19 | AG | ED | ISSUED PER CPR 24 |
| 2 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
PANELBOARD SCHEDULES II

| project | contract |
|---|---|
| 98101 | |

drawing E304 – rev. 2

sheet 389 of 542 sheets

file 98101_E304.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

PANEL BOARD PP-SEC-EF | 480/277 VOLTS | 3 PHASE | 3 WIRE | 250 AMP. MAINS

150 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1,3,5 | 20 | #12 | LEF-1 (EC) | 900 | 900 | 900 | 2 | -2,4,6 | 20 | #12 | EF-06D (EC) |
| 3 | | | | | 500 | 500 | 500 | 4 | | | | |
| 5 | | | | | | | | 6 | | | | |
| 7 | -7,9,11 | 20 | #12 | EF-01 (EC) | 2100 | 2100 | 2100 | 8 | - | 20 | - | SPARE |
| 9 | | | | | - | - | - | 10 | | | | |
| 11 | | | | | | | | 12 | | | | |
| 13 | -13,15,17 | 20 | #12 | EF-02 (VFD) | 830 | 830 | 830 | 14 | -14,16,18 | 20 | #12 | EF-14 (EC) |
| 15 | | | | | 1330 | 1330 | 1330 | 16 | | | | |
| 17 | | | | | | | | 18 | | | | |
| 19 | -19,21,23 | 20 | #12 | EF-03A (VFD) | 1330 | 1330 | 1330 | 20 | -20,22,24 | 20 | #12 | EF-15 (EC) |
| 21 | | | | | 950 | 950 | 950 | 22 | | | | |
| 23 | | | | | | | | 24 | | | | |
| 25 | -25,27,29 | 20 | #12 | EF-03B (VFD) | 1330 | 1330 | 1330 | 26 | - | 20 | - | SPARE |
| 27 | | | | | - | - | - | 28 | | | | |
| 29 | | | | | | | | 30 | | | | |
| 31 | -31,33,35 | 20 | #12 | EF-03C (VFD) | 1330 | 1330 | 1330 | 32 | - | 20 | - | SPARE |
| 33 | | | | | - | - | - | 34 | | | | |
| 35 | | | | | | | | 36 | | | | |
| 37 | -37,39,41 | 80 | #4 | T-LP-ADMIN | 14964 | 11114 | 10701 | 38 | -38,40,42 | 60 | #6 | T-LP-PRE |
| 39 | | | | | 7109 | 5912 | 8470 | 40 | | | | |
| 41 | | | | | | | | 42 | | | | |
| | | | | | 31343 | 26296 | 28441 | | | | | |

TOTAL CONNECTED LOAD: 114 AMPERES 86.1 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND: | 65.7 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 80 A |
| HVAC | 27.8 | 0.65 | 18.0 | | |
| POWER | 58.3 | 0.82 | 47.7 | DEMAND WITH EXPANSION: | 99 A |

PANEL BOARD LP-ADMIN | 208/120 VOLTS | 3 PHASE | 4 WIRE | 225 AMP. MAINS

150 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | LIGHTS [210,211] | 260 | | | 2 | -2,4 | 40 | #8 | OVEN [214] |
| 3 | -3 | 20 | #12 | LIGHTS [205] | 4500 | 1089 | | 4 | | | | |
| 5 | -5 | 20 | #12 | LIGHTS [200,202] | | 4500 | 471 | 6 | -6 | 20 | #12 | GARBAGE DISPOSAL [214] |
| 7 | -7 | 20 | #12 | LIGHTS [210] | 171 | | 1750 | 8 | -8 | 20 | #12 | DISHWASHER [214] 1 |
| 9 | -9 | 20 | #12 | LIGHTS [203,204,206,207,208,209] | 1750 | 366 | | 10 | -10 | 20 | #12 | COs [204] |
| 11 | -11 | 20 | #12 | COs [208], HAND DRYER 1 | | 720 | 1800 | 12 | -12 | 20 | #12 | COS [202] |
| 13 | -13 | 20 | #12 | WATER COOLER [103] | 300 | | 900 | 14 | -14 | 20 | #12 | COS [202] |
| 15 | -15 | 20 | #12 | COs [200,201] | 900 | 540 | | 16 | -16 | 20 | #12 | COs [202] |
| 17 | -17 | 20 | #12 | COs [205] | | 540 | 540 | 18 | -18 | 20 | #12 | REFRIGERATOR [202] |
| 19 | -19 | 20 | #12 | COs [205] | 720 | | 1000 | 20 | -20 | 20 | #12 | ADMIN AREA NL [201] |
| 21 | -21 | 20 | #12 | COs [203] | 223 | 720 | | 22 | -22 | 20 | #12 | COs [214] |
| 23 | -23 | 20 | #10 | COs [ROOF] | | 540 | 1080 | 24 | -24 | 20 | #12 | COs [214] |
| 25 | -25 | 20 | #12 | COs [206,207,208,209] | 900 | | 360 | 26 | -26 | 20 | #12 | REFRIGERATOR [214] |
| 27 | -27 | 20 | #12 | COs [201] | 1000 | 360 | | 28 | -28 | 20 | #12 | LIGHTS [213,214,215,218] |
| 29 | -29 | 20 | #12 | COs [210] | | 1279 | 720 | 30 | -30 | 20 | #12 | COs [215 LAB ISLAND] |
| 31 | -31 | 20 | #12 | COs [211] | 720 | | 720 | 32 | -32 | 20 | #12 | COs [215] |
| 33 | -33 | 20 | #12 | COs [215] | 720 | 100 | | 34 | -34 | 20 | #12 | COS [215] |
| 35 | -35 | 20 | #12 | GLASS WASHER [215] | | - | 100 | 36 | -36 | 20 | #12 | COs [218] |
| 37 | -37 | 20 | #12 | REFRIGERATOR [215] | 1000 | | 900 | 38 | -38 | 20 | #12 | COs [209], HAND DRYER 1 |
| 39 | -39 | 20 | #12 | LAB ISLAND 1 | 1800 | 360 | | 40 | - | 20 | - | SPARE |
| 41 | - | 20 | - | SPARE | | - | - | 42 | - | 20 | - | SPARE |
| | | | | | 14964 | 11114 | 10341 | | | | | |

TOTAL CONNECTED LOAD: 125 AMPERES 36.5 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 3.5 | 0.05 | 0.2 | TOTAL ESTIMATED DEMAND: | 26.3 KVA |
| LIGHTS | 3.9 | 1 | 3.9 | | |
| RECEPTACLES | 14.3 | 1 | 14.3 | TOTAL ESTIMATED DEMAND AMPS: | 74 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 14.8 | 0.5 | 7.9 | DEMAND WITH EXPANSION: | 93 A |

PANEL BOARD LP-PRE | 208/120 VOLTS | 3 PHASE | 4 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | LC-051-1 | 534 | | | 2 | -2 | 20 | #12 | LIGHTS [216,217] |
| 3 | -3 | 20 | #12 | LC-051-2 | 528 | 717 | | 4 | -4 | 20 | #12 | LIGHTS [220] |
| 5 | -5 | 20 | #6 | LC-051-3 | | 1020 | 1485 | 6 | -6 | 20 | #12 | LIGHTS [219,220] |
| 7 | - | 20 | - | SPARE 1 | - | | 674 | 8 | -8 | 20 | #12 | COs [219,221] |
| 9 | -9 | 20 | #12 | LC-043-1 | 540 | 461 | | 10 | -10 | 20 | #12 | LIGHTS [100] |
| 11 | -11 | 20 | #12 | LC-043-2 | | 1210 | 435 | 12 | -12 | 20 | #12 | LIGHTS [100] |
| 13 | -13 | 20 | #12 | LC-044-1 | 847 | | 970 | 14 | -14 | 20 | #12 | NL [100,STAIRWELLS] |
| 15 | -15 | 20 | #12 | LC-044-2 | 280 | 484 | | 16 | -16 | 20 | #12 | COs [213] |
| 17 | -17 | 20 | #12 | LC-044-3 | | 720 | 726 | 18 | -18 | 20 | #12 | COs [216,217] |
| 19 | - | 20 | - | SPARE | 180 | | 900 | 20 | -20 | 20 | #8 | COs [LOX] |
| 21 | -21 | 20 | #12 | UH-10 [231] 1 | - | 100 | | 22 | - | 20 | - | SPARE |
| 23 | - | 20 | - | SPARE | | - | - | 24 | -24 | 20 | #12 | COs [220] |
| 25 | -25 | 20 | #12 | COs [ROOF] 1 | 360 | | 1080 | 26 | -26 | 20 | #10 | COs [ROOF] |
| 27 | - | 20 | - | SPARE | 1440 | - | | 28 | -28 | 20 | #12 | COs [213] |
| 29 | - | 20 | - | SPARE | | 900 | - | 30 | -30 | 20 | #12 | COs [213] |
| 31 | -31 | 20 | #12 | WATER SOFTENER | 100 | | 900 | 32 | -32 | 20 | #12 | COs [100] |
| 33 | -33 | 20 | #12 | RWS-SMP-11000-1 | 720 | 100 | | 34 | - | 20 | - | SPARE |
| 35 | -35 | 20 | #12 | RWS-SMP-11000-5/9 | | - | 200 | 36 | -36 | 20 | #12 | COs [233 NORTH] |
| 37 | -37 | 20 | #12 | SLD-MCP-22000 | 500 | | 900 | 38 | -38 | 20 | #12 | COs [233 EAST] |
| 39 | -39 | 20 | #12 | RP-01 | 1080 | 200 | | 40 | - | 20 | - | SPARE |
| 41 | -41 | 20 | #12 | GAC FILTERS | | - | 200 | 42 | - | 20 | - | SPARE |
| | | | | | 7109 | 5912 | 8470 | | | | | |

TOTAL CONNECTED LOAD: 55.9 AMPERES 21.5 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0.4 | 1 | 0.4 | TOTAL ESTIMATED DEMAND: | 21.4 KVA |
| LIGHTS | 10.2 | 1 | 10.2 | | |
| RECEPTACLES | 10.2 | 1 | 10.2 | TOTAL ESTIMATED DEMAND AMPS: | 60 A |
| HVAC | 0.1 | 0.65 | 0.1 | | |
| POWER | 0.6 | 0.8 | 0.5 | DEMAND WITH EXPANSION: | 75 A |

**GENERAL NOTES:**

1. CIRCUIT NUMBER SHALL CONSIST OF PANELBOARD TAG AND POLE NUMBER. e.g. LP-MAIN-5

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
PANELBOARD SCHEDULES III

| project | contract |
|---|---|
| 98101 | |

drawing E305 – rev. 1

sheet 390 of 542 sheets

file 98101_E305.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

PANEL BOARD PP-SEC | 480/277 VOLTS | 3 PHASE | 3 WIRE | 250 AMP. MAINS

150 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 2500 | | | 2 | | | | |
| 3 | -1,3,5 | 20 | #12 | OZD-LCP-35101 | 8000 | 2500 | | 4 | -2,4,6 | 40 | #8 | HST-205 |
| 5 | | | | | | 8000 | 2500 | 6 | | | | |
| 7 | | | | | 2500 | | 8000 | 8 | | | | |
| 9 | -7,9,11 | 20 | #12 | OZD-LCP-35201 | 2200 | 2500 | | 10 | -8,10,12 | 20 | #12 | HST-233 |
| 11 | | | | | | 2200 | 2500 | 12 | | | | |
| 13 | | | | | 600 | | 2200 | 14 | | | | |
| 15 | -13,15,17 | 20 | #12 | AGO-1 (ENTRANCE GATE) | 10000 | 600 | | 16 | -14,16,18 | 60 | #6 | WELDING RECEPTACLES [205] |
| 17 | | | | | | 10000 | 600 | 18 | | | | |
| 19 | | | | | 3000 | | 10000 | 20 | | | | |
| 21 | -19,21,23 | 90 | #12 | FAP-MCP-75100 | 580 | 3000 | | 22 | -20,22,24 | 20 | #12 | HST-216 |
| 23 | | | | | | 580 | 3000 | 24 | | | | |
| 25 | | | | | 500 | | 580 | 26 | | | | |
| 27 | -25,27,29 | 30 | #12 | SLD-LCP-22100 | - | 500 | | 28 | - | 20 | - | SPARE |
| 29 | | | | | | - | 500 | 30 | | | | |
| 31 | | | | | 500 | | - | 32 | | | | |
| 33 | -31,33,35 | 15 | #12 | SLD-LCP-22200 | - | 500 | | 34 | - | 30 | - | SPARE |
| 35 | | | | | | - | 500 | 36 | | | | |
| 37 | | | | | 600 | | - | 38 | | | | |
| 39 | -37,39,41 | 20 | #12 | AGO-2 (EXIT GATE) | 6860 | 600 | | 40 | -38,40,42 | 60 | #6 | T-LP-IT |
| 41 | | | | | | 6860 | 600 | 42 | | | | |
| | | | | | | | 6860 | | | | | |
| | | | | | 37840 | 37840 | 37840 | | | | | |

TOTAL CONNECTED LOAD: 137 AMPERES 113.6 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 36.0 | 0.05 | 1.8 | TOTAL ESTIMATED DEMAND: | 72.3 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 30.0 | 1 | 30.0 | TOTAL ESTIMATED DEMAND AMPS: | 87 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 47.6 | 0.85 | 40.5 | DEMAND WITH EXPANSION: | 109 A |

PANEL BOARD PP-RW | 480/277 VOLTS | 3 PHASE | 3 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 35,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 800 | | | 2 | | | | |
| 3 | -1,3,5 | 20 | #12 | RWS-V-11001 | 200 | 800 | | 4 | -2,4,6 | 20 | #12 | RWS-V-11003 |
| 5 | | | | | | 200 | 800 | 6 | | | | |
| 7 | | | | | 1000 | | 200 | 8 | | | | |
| 9 | -7,9,11 | 20 | #12 | RWS-V-11002 | 200 | 1000 | | 10 | -8,10,12 | 20 | #12 | RWS-V-11005 |
| 11 | | | | | | 200 | 1000 | 12 | | | | |
| 13 | | | | | 200 | | 200 | 14 | | | | |
| 15 | -13,15 | 20 | #12 | RWS-V-11004 | 200 | 200 | | 16 | -14,16 | 20 | #12 | RWS-V-11006 |
| 17 | | | | | | 200 | 400 | 18 | | | | |
| 19 | -17,19 | 20 | #12 | RWS-V-11007 | 400 | | 400 | 20 | -18,20 | 20 | #12 | RWS-V-11026 |
| 21 | | | | | | 400 | | 22 | | | | |
| 23 | -21,23 | 20 | #12 | RWS-V-11008 | | 400 | 400 | 24 | -22,24 | 20 | #12 | RWS-V-11030 |
| 25 | | | | | - | | | 26 | | | | |
| 27 | - | 20 | - | SPARE | - | - | | 28 | - | 20 | - | SPARE |
| 29 | | | | | | - | - | 30 | | | | |
| 31 | | | | | - | | | 32 | | | | |
| 33 | - | 20 | - | SPARE | - | - | | 34 | - | 20 | - | SPARE |
| 35 | | | | | | - | - | 36 | | | | |
| 37 | | | | | - | | | 38 | | | | |
| 39 | - | 20 | - | SPARE | 12200 | - | | 40 | -38,40,42 | 80 | #4 | T-LP-CHEM |
| 41 | | | | | | 12200 | - | 42 | | | | |
| | | | | | | | 12200 | | | | | |
| | | | | | 15600 | 15600 | 16000 | | | | | |

TOTAL CONNECTED LOAD: 56.8 AMPERES 47.2 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 47.2 | 0.15 | 7.1 | TOTAL ESTIMATED DEMAND: | 7.1 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 8.9 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 0 | 0.4 | 0 | DEMAND WITH EXPANSION: | 11 A |

PANEL BOARD LP-IT | 208/120 VOLTS | 3 PHASE | 4 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | PLC-PRE | 1000 | | | 2 | -2,4 | 30 | #10 | NWP-SEC |
| 3 | -3 | 20 | #12 | PLC-CHM1 | 2000 | 1000 | | 4 | | | | |
| 5 | - | 20 | - | SPARE | | 2000 | - | 6 | - | 30 | - | SPARE |
| 7 | -7 | 40 | #8 | MOCP | 2500 | | - | 8 | | | | |
| 9 | - | 20 | - | SPARE | - | - | | 10 | - | 30 | - | SPARE |
| 11 | -11 | 30 | #10 | SCP-1 | | - | 2400 | 12 | | | | |
| 13 | -13 | 20 | #12 | FACP-1 | 400 | | - | 14 | -14,16 | 30 | #10 | RACK-IT-1 |
| 15 | -15 | 20 | #12 | OZN-LCP-31001 | 2000 | 500 | | 16 | | | | |
| 17 | -17 | 20 | #12 | BDA BACKPLANE | | 2000 | 1250 | 18 | -18,20 | 30 | #10 | RACK-SCADA-1 |
| 19 | -19 | 20 | #12 | ANALOG BACKPLANE | 200 | | 2000 | 20 | | | | |
| 21 | -21 | 20 | #12 | MCP-MECH | 2000 | 500 | | 22 | - | 20 | - | SPARE |
| 23 | -23 | 20 | #10 | COs [NGATE] | | - | 180 | 24 | - | 20 | - | SPARE |
| 25 | - | 20 | - | SPARE | - | | - | 26 | | | | |
| 27 | - | 20 | - | SPARE | - | - | | 28 | - | 20 | - | SPARE |
| 29 | - | 20 | - | SPARE | | - | - | 30 | | | | |
| 31 | | | | | - | | | 32 | | | | |
| 33 | - | 30 | - | SPARE | - | - | | 34 | - | 30 | - | SPARE |
| 35 | | | | | | - | - | 36 | | | | |
| 37 | | | | | - | | | 38 | | | | |
| 39 | - | 20 | - | SPARE | - | - | | 40 | - | 20 | - | SPARE |
| 41 | | | | | | - | - | 42 | | | | |
| | | | | | 10100 | 6000 | 5830 | | | | | |

TOTAL CONNECTED LOAD: 60.9 AMPERES 21.9 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND: | 19.3 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 53.5 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 21.9 | 0.88 | 19.3 | DEMAND WITH EXPANSION: | 67 A |

**NOTES:**

1. CIRCUIT NUMBER SHALL CONSIST OF PANELBOARD TAG AND POLE NUMBER. e.g. LP-MAIN-5

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
PANELBOARD SCHEDULES IV

| project | contract |
|---|---|
| 98101 | |

drawing E306 – rev. 1

sheet 391 of 542 sheets

file 98101_E306.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

PANEL BOARD LP-CHEM | 208/120 VOLTS | 3 PHASE | 4 WIRE | 225 AMP. MAINS

150 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | POLYMER [216] | 750 | | | 2 | -2 | 20 | #12 | SUMP [219] |
| 3 | -3 | 20 | #12 | COAG AID [219] | 1200 | | | 4 | -4 | 20 | #12 | SUMP [221] |
| 5 | -5 | 20 | #12 | FERRIC [221] | | 1500 | | 6 | -6 | 20 | #12 | SUMP [222] |
| 7 | -7 | 20 | #12 | PERMANGANATE [222] | | 1200 | | 8 | -8 | 20 | #12 | SUMP [223] |
| 9 | -9 | 20 | #12 | PEROXIDE [223] | | | 1500 | 10 | -10 | 20 | #12 | SUMP [224] |
| 11 | -11 | 20 | #12 | CAUSTIC [224] | 425 | | 1200 | 12 | -12 | 20 | #12 | SUMP [224] |
| 13 | -13 | 20 | #12 | BISULFITE [225] | 1200 | | | 14 | -14 | 20 | #12 | SUMP [228] |
| 15 | -15 | 20 | #12 | PHOSPHORIC [226] | | 600 | | 16 | -16 | 20 | #12 | SUMP [228] |
| 17 | -17 | 20 | #12 | HYPO [228] | | 1200 | | 18 | -18 | 20 | #12 | SUMP [230] |
| 19 | -19 | 20 | #12 | HYPO [228] | | | 750 | 20 | -20,22,24 | 20 | #12 | CAP-TP-74010 |
| 21 | -21 | 20 | #12 | AMMONIUM SULFATE [230] | 750 | | 1200 | 22 | | | | |
| 23 | -23 | 20 | #12 | AIR DRYER [217] | | 900 | | 24 | | | | |
| 25 | | | | | | 300 | | 26 | | | | |
| 27 | -25,27,29 | 20 | #12 | CAS-TP-71010 | 820 | | 1000 | 28 | -26,28,30 | 20 | #12 | FES-TP-72010 |
| 29 | | | | | 575 | | 300 | 30 | | | | |
| 31 | | | | | | 820 | | 32 | | | | |
| 33 | -31,33,35 | 20 | #12 | SHP-TP-73010 | 450 | | 1000 | 34 | -32,34,36 | 20 | #12 | SPE-TP-76010 |
| 35 | | | | | 820 | | 300 | 36 | | | | |
| 37 | | | | | | 575 | | 38 | | | | |
| 39 | -37,39,41 | 20 | #12 | AMS-TP-77010 | 450 | | 1000 | 40 | -38,40,42 | 20 | #12 | HYP-TP-78010 |
| 41 | | | | | | 450 | 300 | 42 | | | | |
| 43 | -43 | 20 | #12 | CAUSTIC [224] | 1500 | | | 44 | - | 20 | - | SPARE |
| 45 | - | 20 | - | SPARE | - | - | | 46 | | | | |
| 47 | - | 20 | - | SPARE | | | - | 48 | | | | |
| 49 | - | 20 | - | SPARE | - | | | 50 | - | 20 | - | SPARE |
| 51 | - | 20 | - | SPARE | | - | | 52 | | | | |
| 53 | - | 20 | - | SPARE | | | - | 54 | | | | |
| | | | | | 12515 | 11190 | 11840 | | | | | |

TOTAL CONNECTED LOAD: 98.8 AMPERES 35.6 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 35.6 | 0.5 | 17.8 | TOTAL ESTIMATED DEMAND: | 17.8 KVA |
| LIGHTS | 0 | 1 | 0 | | |
| RECEPTACLES | 0 | 1 | 0 | TOTAL ESTIMATED DEMAND AMPS: | 50 A |
| HVAC | 0 | 0.65 | 0 | | |
| POWER | 0 | 0.8 | 0 | DEMAND WITH EXPANSION: | 63 A |

PANEL BOARD LP-BWPS | 208/120 VOLTS | 3 PHASE | 4 WIRE | 100 AMP. MAINS

100 AMP. MAIN BKR. | 10,000 SYM. A.I.C. MIN. | SURFACE MOUNTED

| POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED | LOAD - VA Ø A | Ø B | Ø C | POLE NO. | CIRCUIT NO. | TRIP AMPS | WIRE SIZE | LOAD SERVED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1 | 20 | #12 | NL LIGHTS [300,304] | 400 | | | 2 | -2 | 20 | #12 | PLC-BWPS |
| 3 | -3 | 20 | #12 | COs [300] | 1000 | | | 4 | -4 | 20 | #12 | NWP-BWPS |
| 5 | -5 | 20 | #12 | COs [304] | | 720 | | 6 | -6 | 20 | #12 | SCP-3 |
| 7 | -7 | 20 | #12 | UH-5, UH-6, UH-9 | | 500 | | 8 | -8 | 20 | #12 | FWT-SMP-62011 ⚠1 |
| 9 | -9 | 20 | #12 | UH-4, UH-7, UH-8 | 1350 | | 720 | 10 | -10 | 20 | #12 | FWT-SMP-62010 ⚠1 |
| 11 | -11 | 20 | #12 | EF CONTROL DAMPERS ⚠1 | 1650 | | 500 | 12 | -12 | 20 | #12 | OHD-5 |
| 13 | -13 | 20 | #12 | LIGHTS [300] | | 1350 | | 14 | - | 20 | - | SPARE |
| 15 | -15 | 20 | #12 | LIGHTS [304] | | 1650 | | 16 | -16 | 20 | #12 | SUMP [300] |
| 17 | - | 20 | - | SPARE | | | 70 | 18 | - | 20 | - | SPARE |
| 19 | -19 | 20 | #12 | LC-053-1 | 470 | | 1650 | 20 | - | 20 | - | SPARE |
| 21 | -21 | 20 | #12 | LC-053-2 | - | | | 22 | - | 20 | - | SPARE |
| 23 | - | 20 | - | SPARE | | 160 | | 24 | - | 20 | - | SPARE |
| 25 | -25 | 20 | #12 | COs [300] | | 1200 | | 26 | - | 20 | - | SPARE |
| 27 | - | 20 | - | SPARE | | | - | 28 | - | 20 | - | SPARE |
| 29 | - | 20 | - | SPARE | 540 | | | 30 | - | 20 | - | SPARE |
| 31 | - | 20 | - | SPARE | - | - | | 32 | - | 20 | - | SPARE |
| 33 | - | 20 | - | SPARE | | - | | 34 | - | 20 | - | SPARE |
| 35 | - | 20 | - | SPARE | 134 | | | 36 | - | 20 | - | SPARE |
| 37 | - | 20 | - | SPARE | - | | - | 38 | - | 20 | - | SPARE |
| 39 | - | 20 | - | SPARE | | 246 | | 40 | - | 20 | - | SPARE |
| 41 | - | 20 | - | SPARE | | - | | 42 | - | 20 | - | SPARE |
| | | | | | 5544 | 5826 | 2920 | | | | | |

TOTAL CONNECTED LOAD: 49 AMPERES 14.3 KVA

| LOAD CLASSIFICATION | CONNECTED LOAD | DEMAND FACTOR | ESTIMATED DEMAND | PANEL TOTALS | |
|---|---|---|---|---|---|
| MOTOR | 6.2 | 0.75 | 4.7 | TOTAL ESTIMATED DEMAND: | 11.8 KVA |
| LIGHTS | 1.4 | 1 | 1.4 | | |
| RECEPTACLES | 1.4 | 1 | 1.4 | TOTAL ESTIMATED DEMAND AMPS: | 33 A |
| HVAC | 1.5 | 0.65 | 1.0 | | |
| POWER | 3.8 | 0.85 | 3.3 | DEMAND WITH EXPANSION: | 41 A |

**NOTES:**

1. CIRCUIT NUMBER SHALL CONSIST OF PANELBOARD TAG AND POLE NUMBER. e.g. LP-MAIN-5

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PANELBOARD SCHEDULES V

| project | contract |
|---|---|
| 98101 | |

drawing **E307** – rev. **1**

sheet 392 of 542 sheets

file 98101_E307.dwg

Scale For Microfilming
Millimeters
Inches
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## LUMINAIRE SCHEDULE

| ACCEPTABLE MANUFACTURER | CATALOG NUMBER | CONSTRUCTION | TYPE OF FIXTURE | OPTICS | LAMP | DRIVER | ACCESSORIES/NOTES |
|---|---|---|---|---|---|---|---|
| HE WILLIAMS OR APPROVED EQUAL | PT-2-4-L38/835-DIM-UNV | HEAVY-DUTY COLD ROLLED STEEL CONSTRUCTION, UNIT IS PAINTED AFTER FABRICATION (WHITE POWDER COAT), ACCESS TO ELECTRICAL COMPONENTS FROM ROOM-SIDE | 2X4 SHALLOW TROFFER | INDIRECT DIFFUSED ACRYLIC | LED, 3800 LUMENS 82 CRI, 3500K CCT | 120-277V DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 31 WATTS<br>2. 10% DIMMING DRIVER PREWIRED FOR 0-10V<br>3. CEILING GRID MOUNTED |
| HE WILLIAMS OR APPROVED EQUAL | PT-2-4-L38/835-EM/10W-DIM-UNV | SAME AS LUMINAIRE TYPE L1 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| HE WILLIAMS OR APPROVED EQUAL | L60-L20C/835-CS-W-DIM-120 | DIE-FORMED GALVANIZED STEEL WITH EXTRUDED ALUMINUM HEAT SINK, LOW-IRIDESCENT ALUMINUM REFLECTOR, RECESSED MOUNTED | 6" RECESSED ROUND DOWNLIGHT | CLEAR SEMI-SPECULAR REFLECTOR | LED, 1700 LUMENS 80 CRI, 3500K | 120V DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 26 WATTS<br>2.10% DIMMING DRIVER PREWIRED FOR 0-10V<br>3. RECESSED MOUNTED IN SUSPENDED CEILING.<br>4. PROVIDE MANUFACTURER TRIM RING.<br>5. PROVIDE MOUNTING BRACKETS TO SUPPORT FROM SUSPENDED CEILING GRID. |
| HE WILLIAMS OR APPROVED EQUAL | 50-G-S-2-4-L33/835-F-AF12125-DRV-UNV | DIE-FORMED COLD ROLLED STEEL HOUSING WITH GASKETED DOOR FRAME AND LENS, WHITE POWDER COATING FINISH | 2X4 TROFFER | FROSTED ACRYLIC | LED, 3300 LUMENS 80 CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 26 WATTS<br>2. CEILING GRID MOUNTED |
| HE WILLIAMS OR APPROVED EQUAL | 50-G-S-2-4-L33/835-F-AF12125-EM/10W-DRV-UNV | SAME AS LUMINAIRE TYPE L3 | | | | | 1. TOTAL WATTAGE PER FIXTURE: 23 WATTS<br>2. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY).<br>3. CEILING GRID MOUNTED |
| HE WILLIAMS OR APPROVED EQUAL | 50-F-S-1-4-L27/835-F-AF12125-DRV-UNV | DIE-FORMED COLD ROLLED STEEL HOUSING WITH GASKETED DOOR FRAME AND LENS, WHITE POWDER COATING FINISH | 1X4 TROFFER | FROSTED ACRYLIC | LED, 2700 LUMENS 80 CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 22 WATTS<br>2. FLUSH MOUNTED IN GYP BOARD CEILING |
| HE WILLIAMS OR APPROVED EQUAL | 50-F-S-1-4-L27/835-F-AF12125-EM/10W-DRV-UNV | SAME AS LUMINAIRE TYPE L4 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| HE WILLIAMS OR APPROVED EQUAL | LSL60-L40C/835-DGL-DRV-120V | DIE-FORMED GALVANIZED STEEL WITH EXTRUDED ALUMINUM HEAT SINK, LOW-IRIDESCENT ALUMINUM REFLECTOR, RECESSED MOUNTED, SUITED FOR INSTALLATION IN A SHOWER | 6" RECESSED ROUND SHOWER LIGHT | DROP OPAL PLASTIC DIFFUSER W/ ABS TRIM RING | LED, 900 LUMENS 80 CRI, 3500K CCT | 120V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 39 WATTS |
| HE WILLIAMS OR APPROVED EQUAL | GL-4-L150-835-HUB MT 3/4"-DRV-UNV-PHSCHA1185 | DIE-FORMED ALUMINUM HOUSING WITH STEEL DOOR FRAME. POLYESTER POWDER COAT PAINT. PIANO HINGED STEEL DOOR FRAME, CAST IRON HUB AND JUNCTION BOX FOR SINGLE 3/4" PENDANT MOUNT. | LOW PROFILE INDUSTRIAL | HIGH-TEMP NON-PRISMATIC ACRYLIC LENS | LED, 15000 LUMENS, 80 CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 121 WATTS |
| HE WILLIAMS OR APPROVED EQUAL | GL-4-L150-835-HUB MT 3/4"-DRV-UNV-EM/12W/BMTD-PHSCHA1185 | SAME AS LUMINAIRE TYPE L6 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 12W BATTERY). BATTERY SHALL BE BACK MOUNTED TO LUMINAIRE |
| HE WILLIAMS OR APPROVED EQUAL | GL-4-L200-835-HUB MT 3/4"-DRV-UNV-PHSCHA1185 | DIE-FORMED ALUMINUM HOUSING WITH STEEL DOOR FRAME. POLYESTER POWDER COAT PAINT. PIANO HINGED STEEL DOOR FRAME, CAST IRON HUB AND JUNCTION BOX FOR SINGLE 3/4" PENDANT MOUNT. | LOW PROFILE INDUSTRIAL | HIGH-TEMP NON-PRISMATIC ACRYLIC LENS | LED, 20000 LUMENS, 80 CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 170 WATTS |
| HE WILLIAMS OR APPROVED EQUAL | GL-4-L200-835-HUB MT 3/4"-DRV-UNV-EM/12W/BMTD-PHSCHA1185 | SAME AS LUMINAIRE TYPE L7 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 12W BATTERY). BATTERY SHALL BE BACK MOUNTED TO LUMINAIRE |
| HE WILLIAMS OR APPROVED EQUAL | 82-4-L107-835-DRV-UNV | DIE-FORMED COLD ROLLED STEEL HOUSING, WHITE POWDER COATING FINISH | 1X4 INDUSTRIAL STRIP | OPEN BOTTOM | LED, 10700 LUMENS 82 CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 87 WATTS |
| HE WILLIAMS OR APPROVED EQUAL | 82-4-L107-835-EM/10W-DRV-UNV | SAME AS LUMINAIRE TYPE L8 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| HE WILLIAMS OR APPROVED EQUAL | 96-4-L40-840-HIAFR-WET/2-DRV-UNV | FIBERGLASS HOUSING, GASKETED, INTERNAL HOUSING SHALL BE ALUMINUM, MANUFACTURER 1/2" WATERTIGHT HUB INSTALLED ON EACH END. ENCLOSURE RATED NEMA 4X | 1X4 INDUSTRIAL FULLY ENCLOSED AND GASKETED STRIP | FROSTED, IMPACT-RESITANT ACRYLIC | LED, 4000 LUMENS 82 CRI, 4000K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 40 WATTS<br>2. UL LISTED FOR DAMP LOCATIONS. |
| HE WILLIAMS OR APPROVED EQUAL | 96-4-L40-840-HIAFR-EM/10W-WET/2-DRV-UNV | SAME AS LUMINAIRE TYPE L9 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| HE WILLIAMS OR APPROVED EQUAL | 96-4-L40-840-HIAFR-WET/2-WMB-DRV-UNV | FIBERGLASS HOUSING, GASKETED, INTERNAL HOUSING SHALL BE ALUMINUM, MANUFACTURER 1/2" WATERTIGHT HUB INSTALLED ON EACH END. 45-DEGREE STAINLESS STEEL WALL MOUNTING BRACKET. ENCLOSURE RATED NEMA 4X | 1X4 INDUSTRIAL FULLY ENCLOSED AND GASKETED STRIP | FROSTED, IMPACT-RESITANT ACRYLIC | LED, 4000 LUMENS 82 CRI, 4000K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 40 WATTS<br>2. UL LISTED FOR DAMP LOCATIONS.<br>3. MANUFACTURER STAINLESS STEEL 45-DEGREE WALL MOUNTING BRACKET. |
| HE WILLIAMS OR APPROVED EQUAL | 96-4-L40-840-HIAFR-WET/2-WMB-EM/10W-DRV-UNV | SAME AS LUMINAIRE TYPE L10 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY).<br>2. UL LISTED FOR DAMP LOCATIONS.<br>3. MANUFACTURER STAINLESS STEEL 45-DEGREE WALL MOUNTING BRACKET. |
| HE WILLIAMS OR APPROVED EQUAL | EGL2-4-L107-840-HIAFR-WET/2-DRV-UNV | FIBERGLASS HOUSING, GASKETED, INTERNAL HOUSING SHALL BE ALUMINUM, MANUFACTURER 1/2" WATERTIGHT HUB INSTALLED ON EACH END. ENCLOSURE RATED NEMA 4X | INDUSTRIAL FULLY ENCLOSED AND GASKETED STRIP | FROSTED, IMPACT-RESITANT ACRYLIC | LED, 10000 LUMENS 82 CRI, 4000K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 89 WATTS<br>2. UL LISTED FOR DAMP LOCATIONS. |
| HE WILLIAMS OR APPROVED EQUAL | EGL2-4-L107-840-HIAFR-EM/10W-WET/2-DRV-UNV | SAME AS LUMINAIRE TYPE L11 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| HE WILLIAMS OR APPROVED EQUAL | 75R-4-L65-840-EM/10WLP-DRV-UNV | DIE-FORMED COLD ROLLED STEEL ENCLOSURE, POLYESTER POWDER COAT PAINT | LOW PROFILE STRIP | ROUND DIFFUSED LENS | LED, 6600 LUMENS 80 CRI, 4000K CCT | 120V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 49 WATTS<br>2. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |

**REFER TO DRAWING E309 FOR CONTINUATION**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed J. RECKART |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LUMINAIRE SCHEDULE

| project | contract |
|---|---|
| 98101 | |

drawing **E308** rev. **0**

sheet 393 of 542 sheets

file 98101_E308.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E308.DWG 12/7/2018 10:12 AM AGREENLIEF

REFER TO DRAWING E308 FOR CONTINUATION

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L13 | LUMARK OR APPROVED EQUAL | XTOR4B-W-120 | DIE-CAST ALUMINUM HOUSING WITH ALUMINUM HINGED REMOVABLE DOOR, CARBON BRONZE POLYESTER POWDER COAT PAINT. MOUNTS TO A 4" RECESSED JBOX WITH GASKET. MIRRORED ANODIZED REFLECTOR, WITH TEMPERED GLASS OPTICS. | WALL PACK | FULL CUTOFF | LED, 4205 LUMENS 70 CRI, 4000K CCT | 120-277V DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 38 WATTS<br>2. TEMPERED GLASS LENS. |
| L13A | LUMARK OR APPROVED EQUAL | XTOR2B-W-120 | DIE-CAST ALUMINUM HOUSING WITH ALUMINUM HINGED REMOVABLE DOOR, CARBON BRONZE POLYESTER POWDER COAT PAINT. MOUNTS TO A 4" RECESSED JBOX WITH GASKET. MIRRORED ANODIZED REFLECTOR, WITH TEMPERED GLASS OPTICS. | WALL PACK | FULL CUTOFF | LED, 2103 LUMENS 70 CRI, 4000K | 120V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 18 WATTS<br>2. TEMPERED GLASS LENS. |
| L13B | MULE LIGHTING OR APPROVED EQUAL | MERU-LED-ACEM-DB | DIE-CAST ALUMINUM HOUSING WITH POLYCARBONATE LENS, DARK BRONZE POLYESTER POWDER COAT FINISH, INTEGRAL AC POWER INDICATOR AND TEST SWITCH LOCATED ON THE BOTTOM OF THE LUMINAIRE. INTEGRAL NiCAD BATTERY FOR EGRESS LIGHTING, DARK SKY COMPLIANT | WALL PACK | FULL CUTOFF | LED, 1600 LUMENS UNDER NORMAL AC OPERATION, 600 LUMENS IN EMERGENCY MODE, 4000K | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 18 WATTS |
| L14 | HE WILLIAMS OR APPROVED EQUAL | EXIT-R-EM-WHT-SDT | HIGH-IMPACT THERMOPLASTIC WHITE HOUSING WITH UNIVERSAL MOUNTING AND FACE UNIT | EXIT SIGN RED LETTERS | N/A | LED | N/A | 1. TOTAL WATTAGE PER FIXTURE: 3.8 WATTS<br>2. SELF-DIAGNOSTIC TEST PACKAGE |
| L15 | HOLOPHANE OR APPROVED EQUAL | PHG-18L-35K-80CRI-AS-P-G-WGG-FR | CAST ALUMINUM HEAT SINK WITH OFFSET ALUMINUM ELECTRICAL COMPARTMENT. PENDANT MOUNTED FROM 3/4" CONDUIT. LISTED FOR INSTALLATION IN DAMP LOCATIONS. | HIGH BAY | ONE-PIECE PRISMATIC BOROSILICATE GLASS REFLECTOR | LED, 18000 LUMENS, 80CRI, 3500K CCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 131 WATTS |
| L15A | HOLOPHANE OR APPROVED EQUAL | PHG-18L-35K-80CRI-AS-P-G-WGG-FR -PS30250 | SAME AS LUMINAIRE TYPE L15 | | | | | 1. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 33W BATTERY). |
| L16 | HE WILLIAMS OR APPROVED EQUAL | WMA-4-L32-835-AF-EM/10WDRV-UNV | EXTRUDED ALUMINUM HOUSING WITH ALUMINUM END CAPS, WHITE POLYESTER POWDER COAT PAINT, PAINTED AFTER FABRICATION, UP AND DOWN LIGHT | 4-FOOT WALL MOUNT STRIP | FROSTED ACRYLIC | LED, 3,200 LUMENS 80 CRI, 3500KCCT | 120-277V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 41 WATTS<br>2. SELF-CONTAINED EMERGENCY LED POWER PACK. (MIN. 10W BATTERY). |
| L17 | LUMARK OR ENGINEER APPROVED EQUAL | PRV-A60-D-UNV-T4-SA-BZ | POLE MOUNTED AREA LIGHT, HEAVY-DUTY, SINGLE PIECE DIE-CAST ALUMINUM. GASKETED SEALED DOOR TO HOUSING, DARK-SKY COMPLIANT FULL CUTOFF. POLE SHALL BE ROUND TAPERED ALUMINUM, DARK BRONZE, WITH HANDHOLE COVER AND GROUND LUG, MANUFACTURER INSTALLED VIBRATION DAMPNER, PROVIDE BASEPLATE COVER, COLOR SHALL MATCH POLE COLOR | SINGLE POLE MOUNTED LUMINAIRE | TYPE IV | 2 LEDs LUMEN OUTPUT OF 18,935 (MIN) 4000K CCT, 70 CRI | 120-277V 60HZ DUAL RATED DRIVER | 1. TOTAL WATTAGE PER FIXTURE: 163 WATTS<br>2. EATON POLE: RTA-8-L-25-A-C-M-1-G-V. |
| L17A | LUMARK OR ENGINEER APPROVED EQUAL | PRV-A25-D-UNV-T3-SA-BZ | POLE MOUNTED AREA LIGHT, HEAVY-DUTY, SINGLE PIECE DIE-CAST ALUMINUM. GASKETED SEALED DOOR TO HOUSING, DARK-SKY COMPLIANT FULL CUTOFF. POLE SHALL BE ROUND TAPERED ALUMINUM, DARK BRONZE, WITH HANDHOLE COVER AND GROUND LUG, MANUFACTURER INSTALLED VIBRATION DAMPNER, PROVIDE BASEPLATE COVER, COLOR SHALL MATCH POLE COLOR | 2 POLE MOUNTED LUMINAIRES (MOUNTED AT 180 DEGREES) | TYPE III | 2 LEDs LUMEN OUTPUT OF 10,200 (MIN) 4000K CCT, 70 CRI | 120-277V 60HZ DUAL RATED DRIVER | 1. TOTAL WATTAGE PER FIXTURE: 87 WATTS<br>2. EATON POLE: RTA-5-T-15-N-C-M-2-G-V. |
| L18 | HOLOPHANE OR APPROVED EQUAL | BALED 5L 4K AS P A | ALUMINUM HOUSING, LOW PROFILE. PENDANT MOUNTED FROM 3/4" CONDUIT. LISTED FOR INSTALLATION IN DAMP LOCATIONS. | LOW PROFILE ENCLOSED LED LOW BAY | ONE-PIECE PRISMATIC BOROSILICATE GLASS REFLECTOR | LED, 4692 LUMENS, 70CRI (MIN), 4000K CCT | AUTO SENSING 120V-277V | 1. TOTAL WATTAGE PER FIXTURE: 39 WATTS<br>2. PENDANT MOUNT ON 3/4-INCH CONDUIT |
| NOT USED | | | | | | | | |
| L20 | HE WILLIAMS OR APPROVED EQUAL | VF1-L20/730-MF-SR-DBZ-FVS-VF1CS-DBZ-120 | DIE-CAST HOUSING, LOW-PROFILE, IP66 RATED, INTEGRAL HEAT SINK, HALF CUTOFF SHIELD, STRAIGHT MOUNTING | ARCHITECTURAL FLOOD | REFRACTIVE ACRYLIC | LED, 70 CRI, 3000K | 120V NON-DIMMING TYPE | 1. CUTOFF SHIELD.<br>2. FLUSH VANDAL SHIELD.<br>3. TENON REDUCER.<br>4. STRAIGHT ARM MOUNTING. |
| L21 | PHOENIX OR APPROVED EQUAL | DLAW-16LED-40-42-120 | MARINE GRADE, ALUMINUM HOUSING, YELLOW POWDER COAT, SS HARDWARE | DOCK LIGHT | CLEAR POLYCARBONATE | LED, 70 CRI, 6300K | 120V NON-DIMMING TYPE | 1. ZINC PLATE STEEL BRACKET.<br>2. 42-INCH ARM.<br>3. 3-CONDUCTOR GROUNDED CORD WITH SWITCH. |
| L22 | SPECTRUM LIGHTING OR APPROVED EQUAL | SGE4LEDOS-30L-40K-E-1-BZ-WL-FG | DIE-FORMED GALVANIZED STEEL WITH EXTRUDED ALUMINUM HEAT SINK, LOW-IRIDESCENT ALUMINUM REFLECTOR, SHALLOW PLENUM DESIGN FOR RECESSED MOUNTING IN EXTERIOR SOFFIT | 4" ROUND DOWNLIGHT | FROSTED GLASS | LED, 3000 LUMENS 83 CRI, 4000K | 120V NON-DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 28 WATTS<br>2. RECESSED MOUNTED IN EXTERIOR SOFFIT<br>3. PROVIDE NECESSARY BAR HANGERS FOR INSTALLATION IN SOFFIT.<br>4. PROVIDE MANUFACTURER TRIM RING<br>5. WET LOCATION RATED |
| L23 | KIM LIGHTING | CFL-NF-214K35-UV-DB-BD-CFL-SM18 | ONE-PIECE DIE-CAST LOW COPPER ALUMINUM HOUSING WITH INTEGRAL COOLING FINS OVER THE ENTIRE LENGTH OF HOUSING. DARK BRONZE POLYESTER POWDERCOAT FINISH. STANDARD SWIVEL (.5" NPSM) THAT ALLOWS 5-DEGREE ADJUSTMENT INTERVALS. STANDARD SWIVEL SHALL MOUNT TO STANCHION MOUNT STAND. PROVIDE STANCHION MOUNT STAND WITH INTEGRAL HANDHOLE, DARK BRONZE POWDER COAT FINISH (STAND SHALL BE ENCASED IN CONCRETE REFER TO PLAN DRAWINGS FOR LOCATION). LUMINAIRE SHALL BE FULLY GASKETTED. | FLOOD LIGHT | NARROW FLOOD | LED, 3251 LUMENS 70 CRI, 4000K | 120-277V 350mA DIMMING TYPE | 1. TOTAL WATTAGE PER FIXTURE: 24 WATTS<br>2. LUMINAIRE SHALL HAVE ADJUSTABLE OPTICS AND DIMMING VIA DIMMER INSTALLED IN ELEC-SEC (RM 218) .<br>3. WET LOCATION RATED (IP66 SEALED OPTICAL CHAMBER).<br>4. STANCHION MOUNT STAND SHALL BE PROVIDED BY SAME MANUFACTURER AS LUMINAIRE MANUFACTURER.<br>5. PROVIDE BARN SHUTTERS FROM SAME MANUFACTURER AS LUMINAIRE.<br>6. BARN SHUTTERS, DIMMER AND LUMINAIRE ANGLE SHALL BE FIELD ADJUSTED. |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LUMINAIRE SCHEDULE - CONTINUED

| project | contract |
|---|---|
| 98101 | |

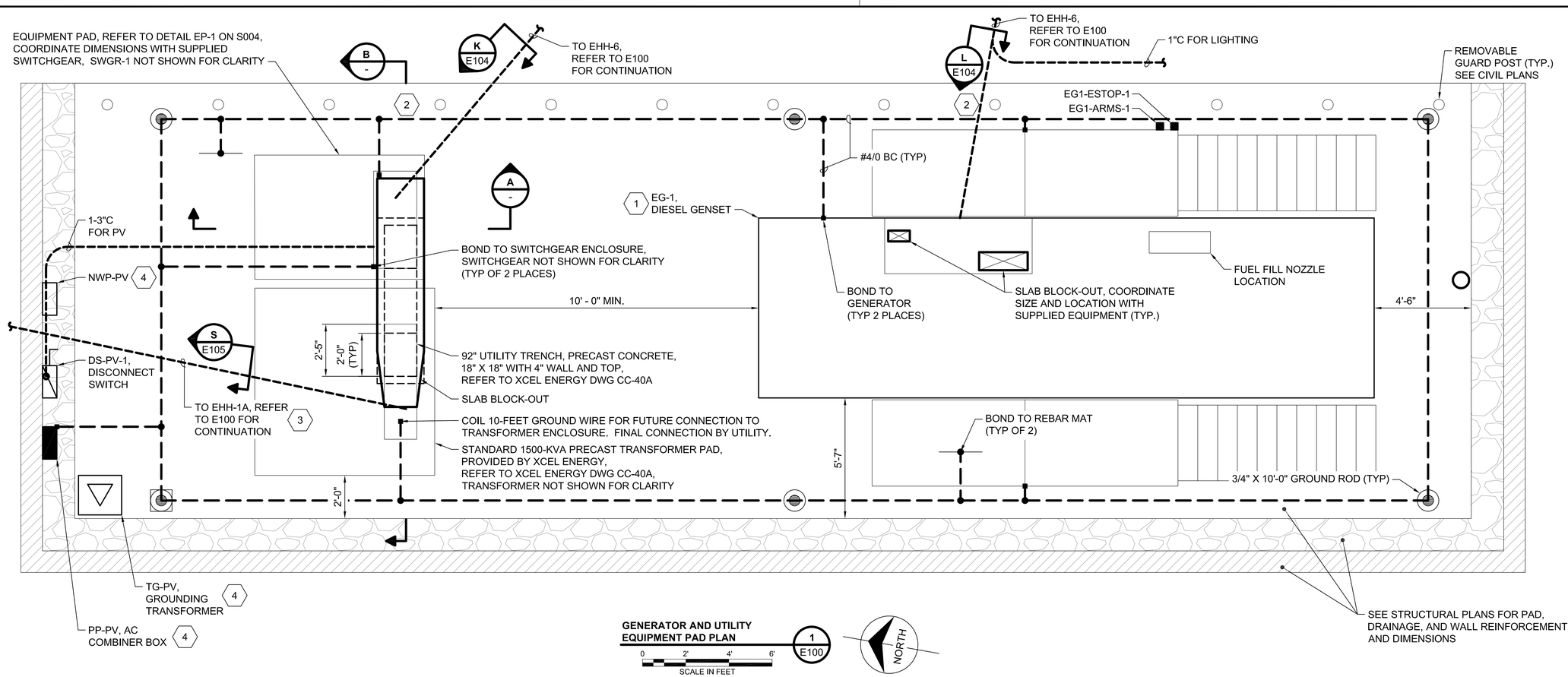
drawing **E309** – rev. **0**

sheet 394 of 542 sheets

file 98101_E309.dwg

Scale For Microfilming
Millimeters
Inches

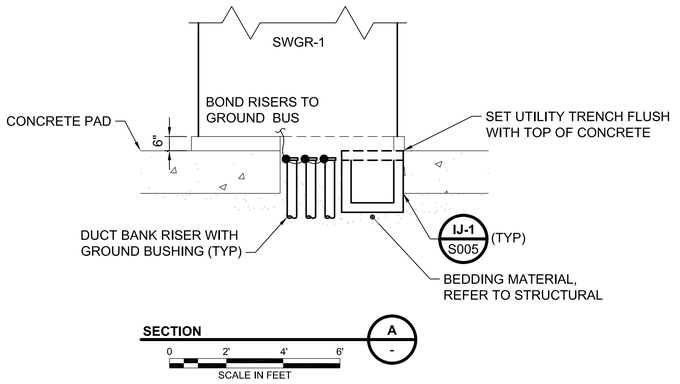
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**GENERATOR AND UTILITY EQUIPMENT PAD PLAN** 1 / E100

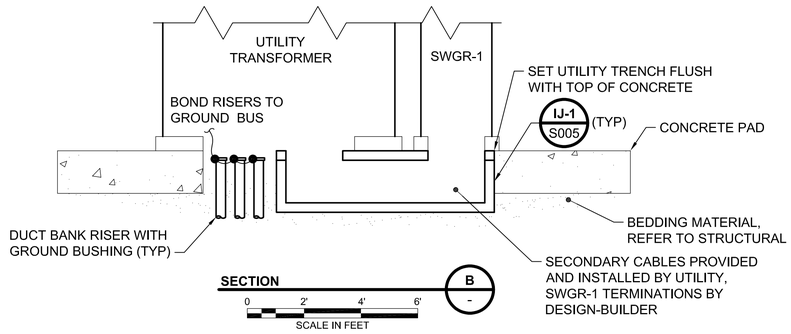
0 2' 4' 6'
SCALE IN FEET

NORTH




**SECTION** A -

0 2' 4' 6'
SCALE IN FEET




**SECTION** B -

0 2' 4' 6'
SCALE IN FEET

**GENERAL NOTES:**

1. REFER TO E001 FOR ELECTRICAL LEGEND.
2. REFER TO XCEL DWG CC-40A FOR UTILITY INSTALLATION STANDARD.
3. BASIC GENSET INFORMATION (REFER TO CIVIL DWGS FOR CODE-REQUIRED SETBACK DISTANCES):
   - 3.1. FUEL TYPE: #2 DIESEL
   - 3.2. FUEL CAPACITY: 4500 GALLONS
   - 3.3. TANK STYLE: UL 2085

**KEYED NOTES:**

1. DUCT BANK ROUTING IS APPROXIMATE. COORDINATE DUCT BANK RISER LOCATIONS WITH SUPPLIED GENERATOR.
2. BOND DUCT BANK GROUND WIRE TO GROUND GRID WHERE DUCT BANK CROSSES GROUND GRID.
3. UTILITY TO PROVIDE, INSTALL, AND TERMINATE PRIMARY FEEDERS.
1 4. EQUIPMENT BY FUTURE CONTRACT. INSTALL BELOW GRADE CONDUITS AND RISERS AS INDICATED.

2 DUCT BANK CONDUIT SCHEDULE

| EQUIPMENT/ LOCATION | CONDUIT TAG | SERVICE |
|---|---|---|
| SWGR-1 | EDB11-A1 | CONTROL TO MIMIC PANEL |
| SWGR-1 | EDB11-A2/3/4 | SPARE |
| SWGR-1 | EDB11-B1/2/3/4 | MAIN FEED |
| SWGR-1 | EDB11-C1/2 | MAIN FEED |
| SWGR-1 | EDB11-C3/4 | SPARE |
| EG-1 | EDB12-A1 | CONTROLS |
| EG-1 | EDB12-A2 | NETWORK |
| EG-1 | EDB12-A3/B4/C3/C4 | SPARE |
| EG-1 | EDB12-B1/B2/B3/C1 | MAIN FEED |
| EG-1 | EDB12-B4 | SPARE |
| EG-1 | EDB12-C2 | SERVICE XFMR/PANEL |
| T-1 | EDB19-A1/2/3 | PRIMARY AND SPARES |
| GENERATOR AREA (S WALL) | EDB12-A4 | LIGHTS |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | AG | ED | ISSUED FOR PCO 018 |
| 2 | 3/31/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date MARCH 2021 | detailed A. GREENLIEF |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
GENERATOR AND UTILITY EQUIPMENT ENLARGED PLAN

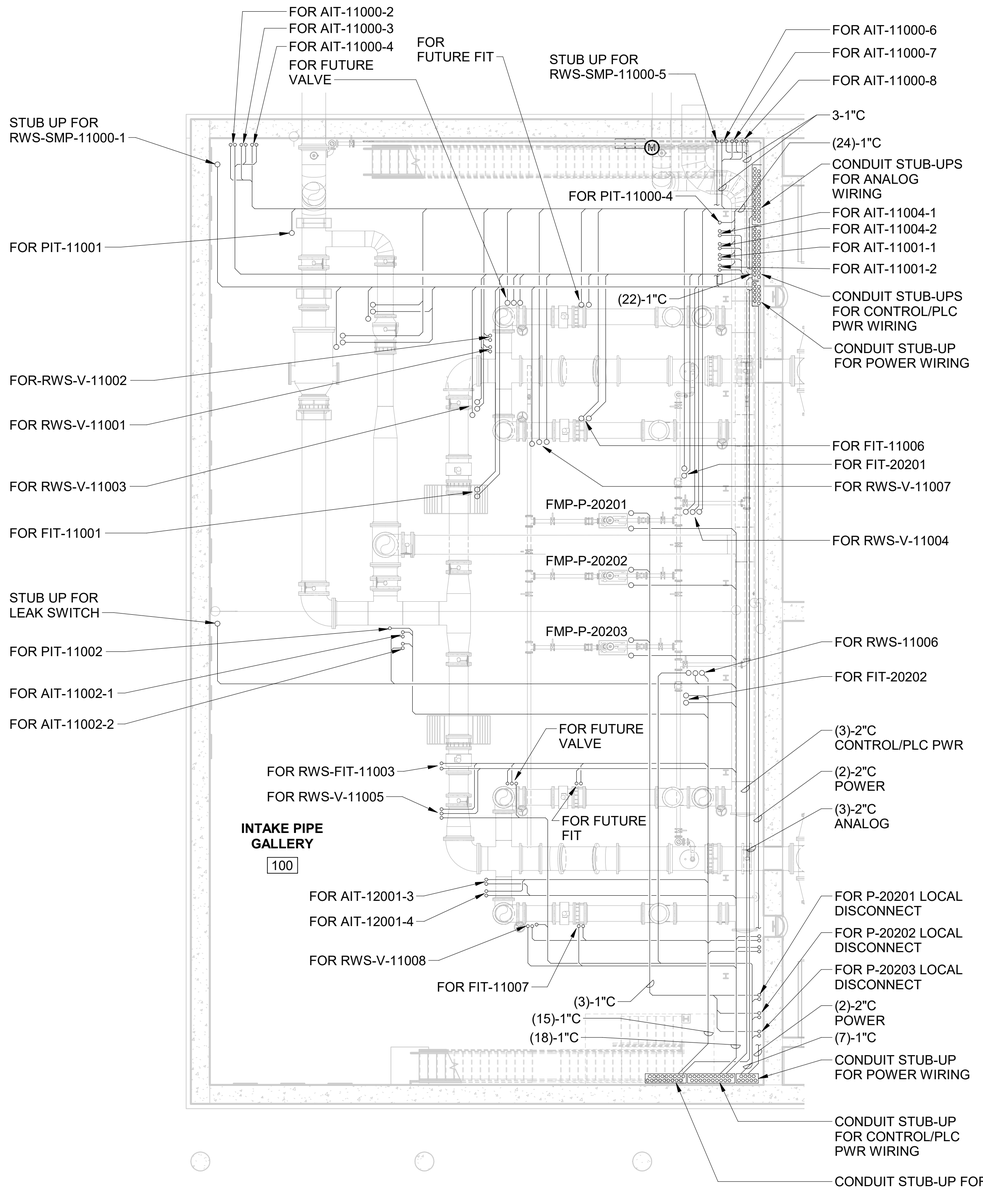
| project | contract |
|---|---|
| 98101 | |

drawing **E310** rev. **2**

sheet 395 of 542 sheets

file 98101_E300.DWG

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL PLAN AREA A**
**POWER AND GROUNDING**

0 4' 8' 16'
SCALE IN FEET

NORTH

**GENERAL NOTES:**

1. SEE LIGHTING AND RECEPTACLE PLANS FOR ESTIMATED RECEPTACLE LOCATIONS FOR SAMPLE PUMPS.
2. FOR CLARITY, THE CONDUIT RUNS EMBEDDED IN THE FLOOR SLAB ARE SHOWN AS SOLID LINES IN LIEU OF DASHED LINE.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL PLAN AREA A - CONDUIT PLAN

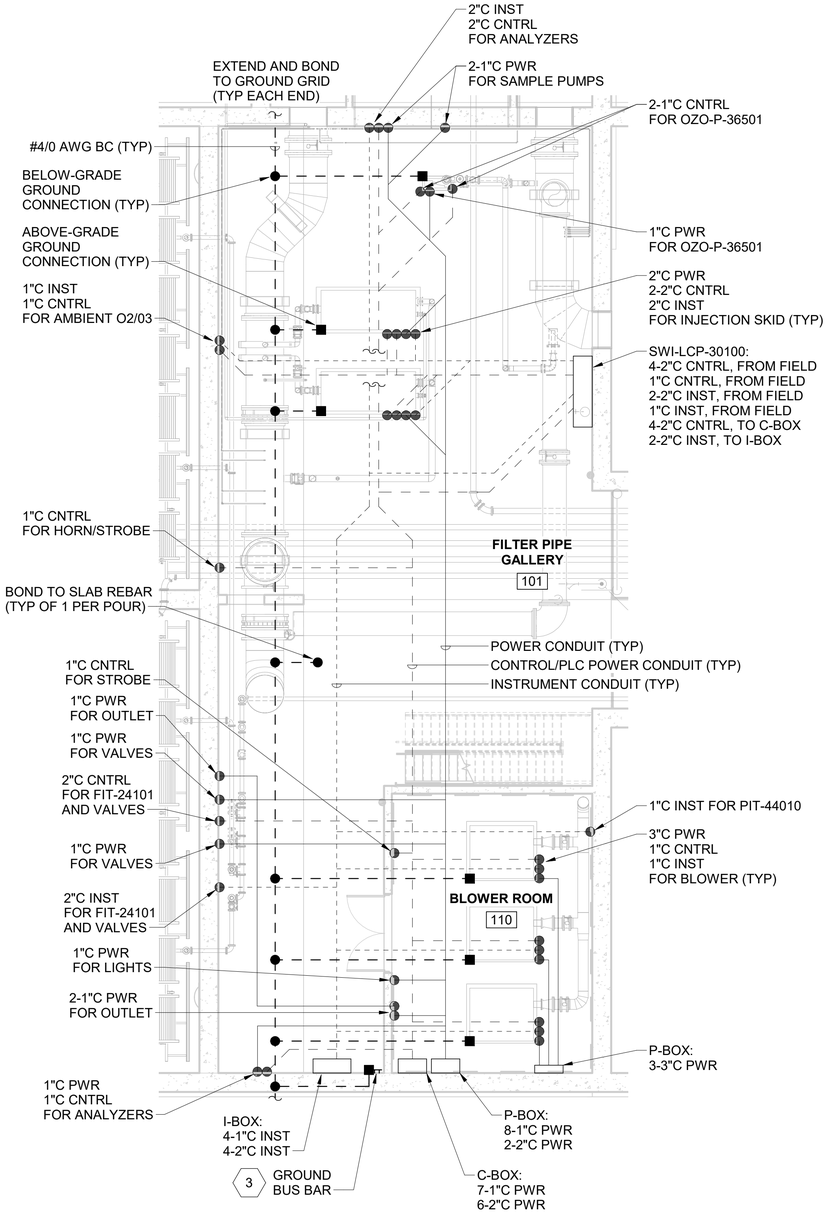
| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E317A — 0**

**sheet** 396 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**LOWER LEVEL - IN-SLAB CONDUIT PLAN**

0 4' 8' 16'
SCALE IN FEET

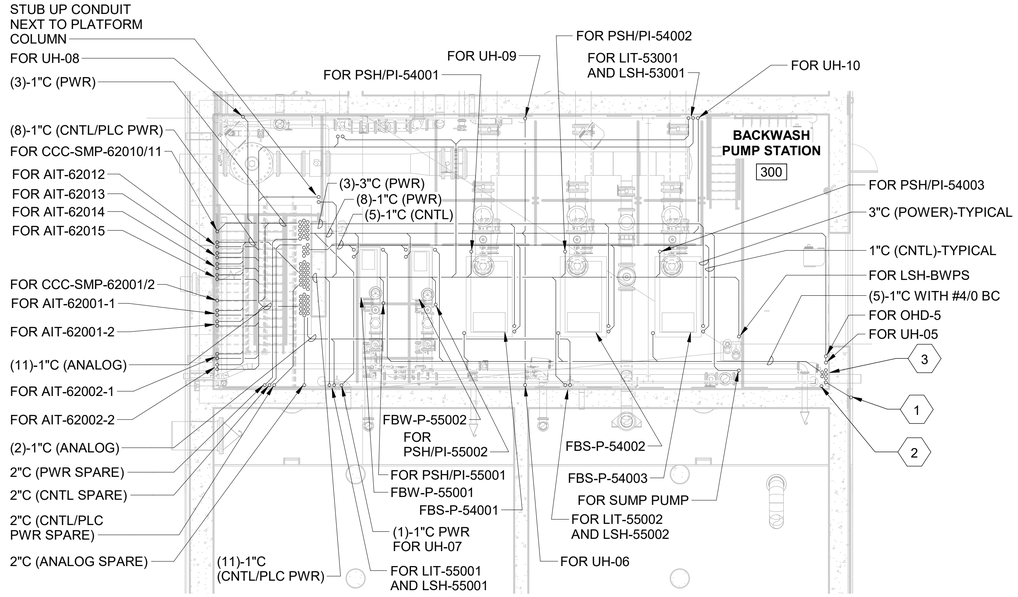
NORTH

**GENERAL NOTES:**

1. SEE LIGHTING AND RECEPTACLE PLANS FOR ESTIMATED RECEPTACLE LOCATIONS FOR SAMPLE PUMPS.
2. FOR CLARITY, THE CONDUIT RUNS EMBEDDED IN THE FLOOR SLAB ARE SHOWN AS SOLID LINES IN LIEU OF DASHED LINE.

**KEYED NOTES:**

1. ROUTE #4/0 BC ON EXTERIOR OF VERTICAL CONCRETE WALL TO 30 INCHES BELOW FINISHED GRADE FOR CONNECTION TO GROUND COUNTERPOISE GRID.
2. 1"C STUBUP WITH #4/0 BC. BOND END TO BOTTOM MAT OF REINFORCING STEEL. LEAVE 5' OF #4/0 BC ABOVE FINISHED FLOOR FOR CONNECTION TO FUTURE GROUND BAR.
3. LEAVE 5' OF #4/0 BC FOR CONNECTION TO FUTURE GROUND BAR. TYPICAL FOR ALL.




**CLEARWELL -LOWER LEVEL CONDUIT PLAN**

0 4' 8' 16'
SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

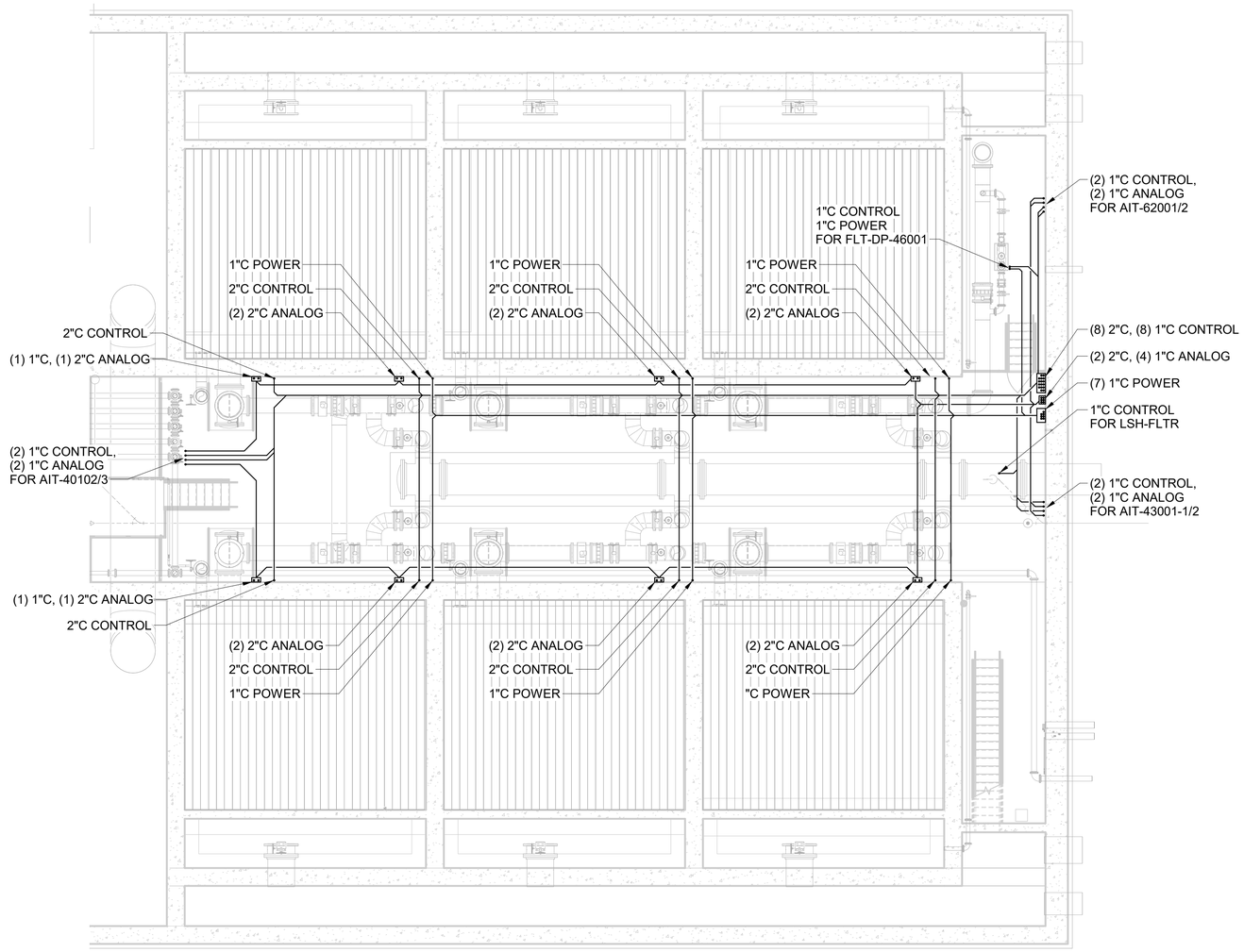
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONDUIT PLANS

| | |
|---|---|
| project 98101 | contract |
| drawing **E317B** | rev. **0** |
| sheet 397 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**FILTER GALLERY - IN-SLAB CONDUIT PLAN**

NORTH

0 4' 8' 16'

SCALE IN FEET

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOWER LEVEL AREA C - IN-SLAB CONDUIT

| project | contract |
|---|---|
| 98101 | |

drawing **E317C** rev. **0**

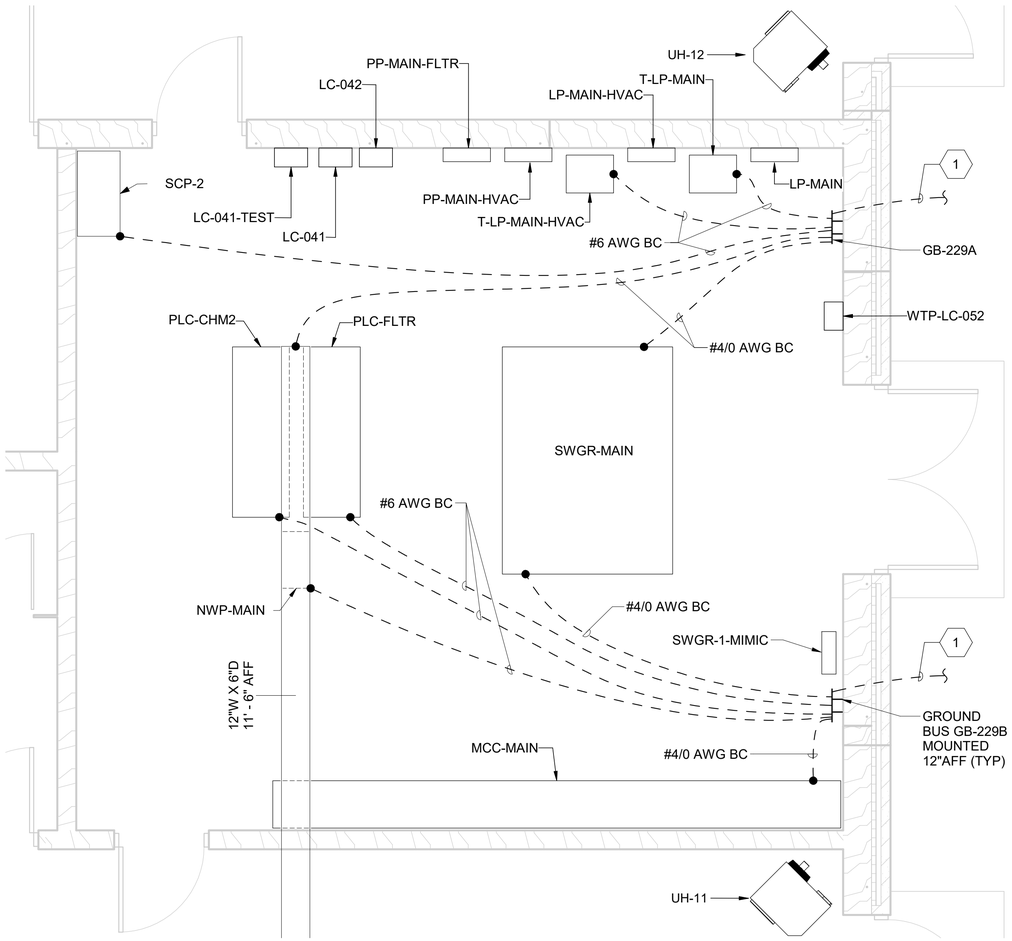
sheet 398 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**MAIN ELECTRICAL ROOM ENLARGED POWER AND GROUNDING PLAN** (1 / E210)

0 2' 4' 6'
SCALE IN FEET

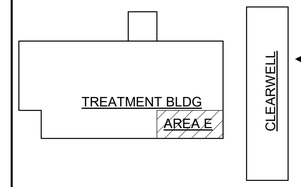
**KEYED NOTES:**

1. ROUTE #4/0 AWG BC FROM GROUND BUS TO GROUND GRID. REFER TO DRAWING EG002.

1

| DUCT BANK CONDUIT SCHEDULE | | |
|---|---|---|
| EQUIPMENT/ LOCATION | CONDUIT TAG | SERVICE |
| SCP-2 | EDB1-A4 | SPARE |
| NWP-MAIN | EDB1-A3 | DATA TO NWP-BWPS |
| SWGR-MAIN | EDB1-A5 | DATA TO EG-1 |
| SWGR-MAIN | EDB1-B1/2/3/4/5/6 | 480V FROM SWGR-1 |
| SWGR-MAIN | EDB1-C1/2/3/4/5/6 | 480V FROM EG-1 |
| SWGR-MAIN | EDB1-B7/8 | SPARE |
| SWGR-MAIN | EDB1-C7/8 | SPARE |
| LP-MAIN | EDB5-A1 | 120V TO LOX |
| MAIN ELEC RM (SE CORNER) | EDB1-A8 | SPARE |
| MAIN ELEC RM (SE CORNER) | EDB5-B2 | SPARE |
| MAIN ELEC RM (SE CORNER) | EDB5-B1 | CONTROLS FROM MOCP TO LOX |
| INST PULL POINT | EDB1-A6 | INST TO BWPS |
| INST PULL POINT | EDB5-A2 | INST FROM POND |
| LC-052 | EDB1-A7 | AREA LIGHTS |
| SWGR-1-MIMIC | EDB1-A2 | CONTROL TO EG-1 |
| MCC-MAIN | EDB1-A1 | EG-1 SERVICE XTMR/PANEL |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. ABBOTT |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL ROOM DETAIL - POWER AND GROUNDING

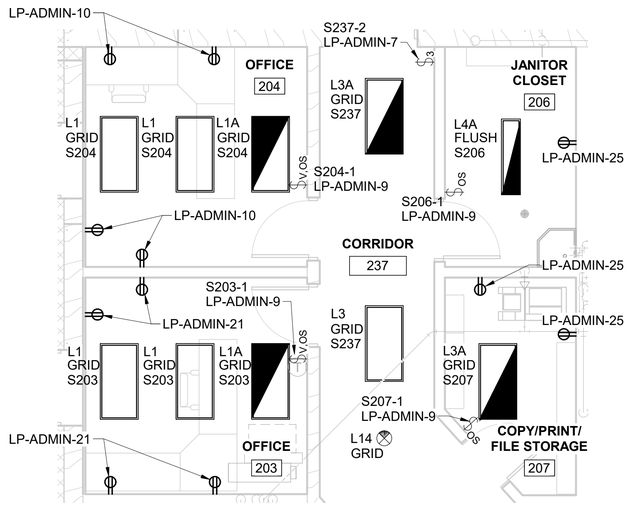
| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E318 — 1** **rev.**

**sheet** 399 **of** 542 **sheets**

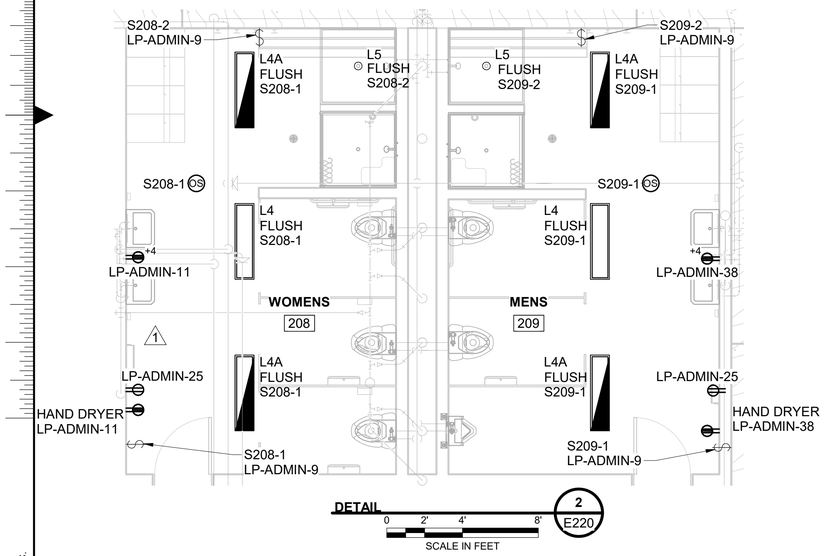
**file** 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



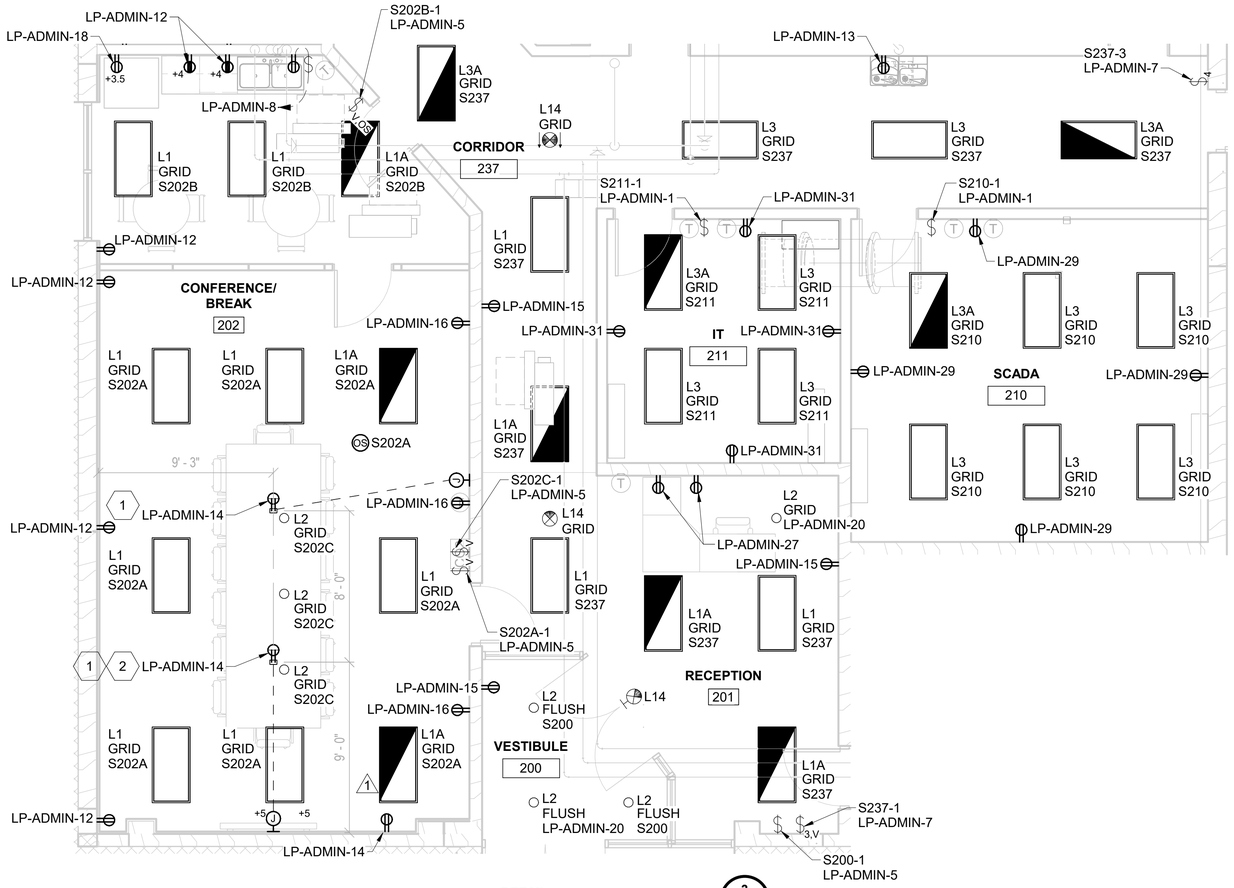

DETAIL 1 / E220

SCALE IN FEET 0 2' 4' 8'



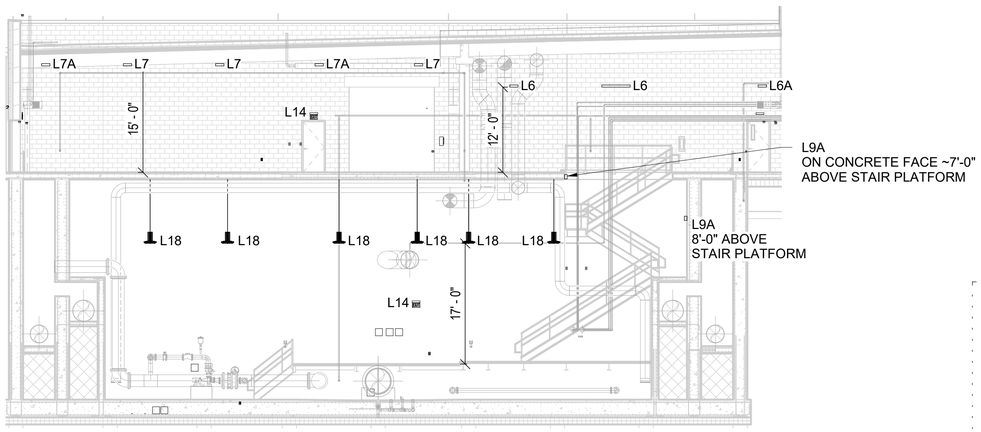

DETAIL 2 / E220

SCALE IN FEET 0 2' 4' 8'




DETAIL 3 / E220

SCALE IN FEET 0 2' 4' 8'




SECTION A / E219

SCALE IN FEET 0 2' 4' 8'

**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED 8'-0" ABOVE FINISHED FLOOR UON. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

1. INSTALL RECESSED CONCRETE FLOOR BOX BENEATH FURNITURE. FLOOR BOX TO INCLUDE 120V POWER AND DATA CONNECTIONS. REFER TO E337 FOR DETAILS.
2. FLOOR BOX TO INCLUDE MULTIMEDIA PROVISIONS. REFER TO E337 FOR DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

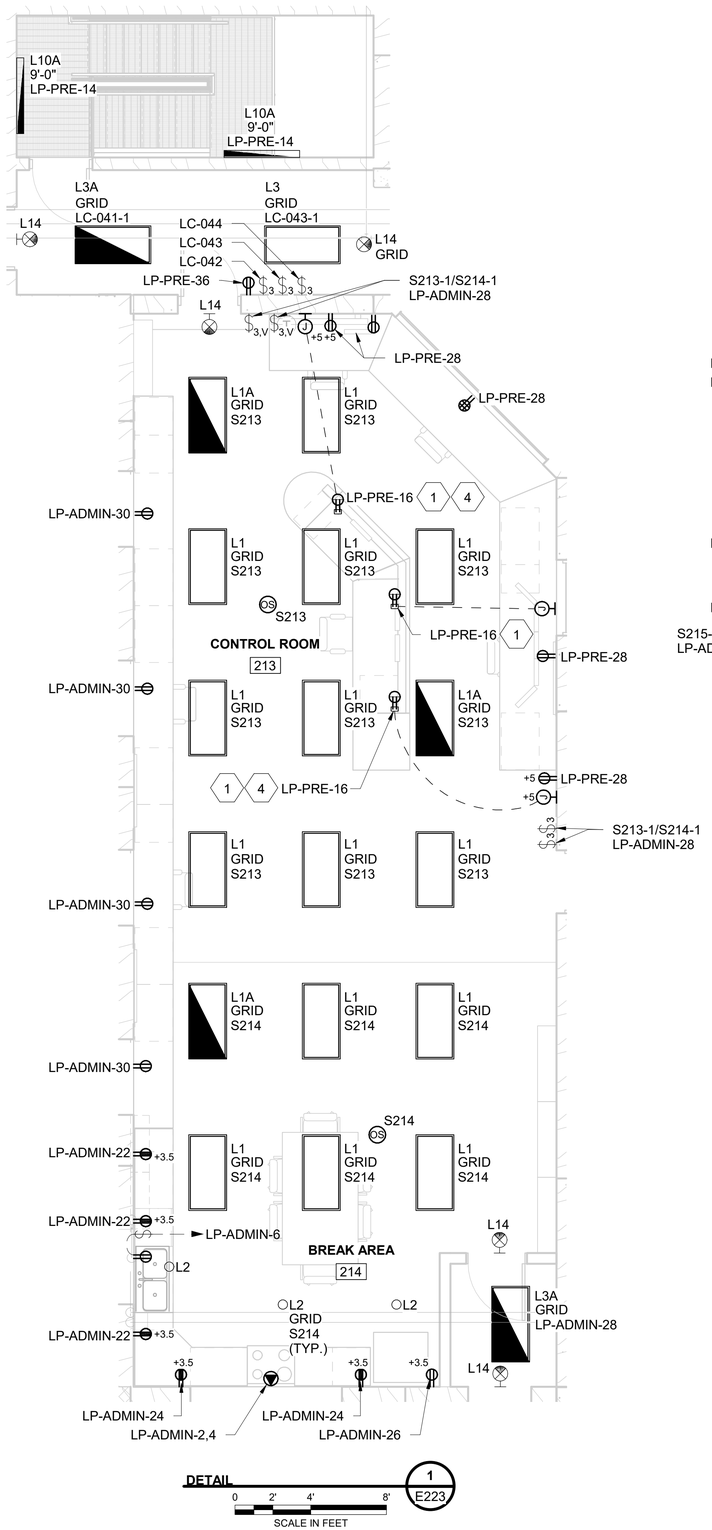
City of Thornton

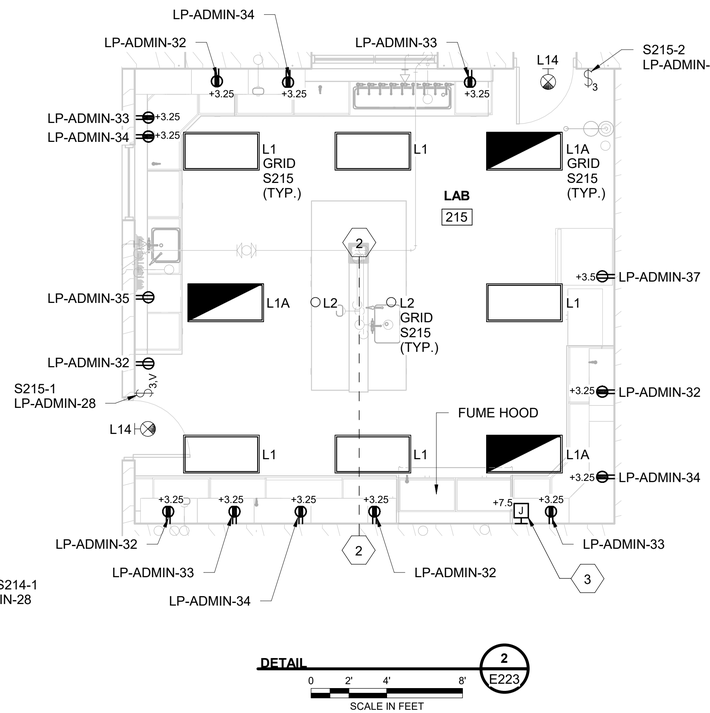
**CITY OF THORNTON**
**TTP - PACKAGE 3**
LIGHTING DETAILS I

| | |
|---|---|
| project 98101 | contract |
| drawing **E320 — 1** | rev. |
| sheet 400 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




**GENERAL NOTES:**

1. EXIT SIGNS SHALL BE INSTALLED AT 8'-0" ABOVE FINISHED FLOOR UON. POWER SIGNS FROM AN ADJACENT, NON-SWITCHED LIGHTING CIRCUIT.
2. REFER TO E002 FOR LIGHTING DETAILS.
3. REFER TO E303 THRU E307 FOR PANELBOARD SCHEDULES.
4. REFER TO E308 AND E309 FOR LUMINAIRE SCHEDULE.

**KEYED NOTES:**

1. INSTALL RECESSED CONCRETE FLOOR BOX BENEATH FURNITURE. FLOOR BOX TO INCLUDE 120V POWER AND DATA CONNECTIONS. REFER TO E337 FOR DETAILS.
2. EMBED (3) 1"C IN SLAB BETWEEN CORRIDOR [233] AND LAB BENCH. STUB CONDUIT UP INTO CABINETRY CHASE. INSTALL (5) DUPLEX RECEPTACLES INTO PROVIDED SPACES ON REAGEANT RACK (CENTER DIVIDER).
3. INSTALL SURFACE FS BOX WITH BLANK COVER AND 3/4"C (WITH PULL STRING) TO ABOVE CEILING GRID.
4. FLOOR BOX TO INCLUDE MULTIMEDIA PROVISIONS. REFER TO E337 FOR DETAILS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed L. PIRTLE |
| designed A. GREENLIEF | checked E. DIENBERG |

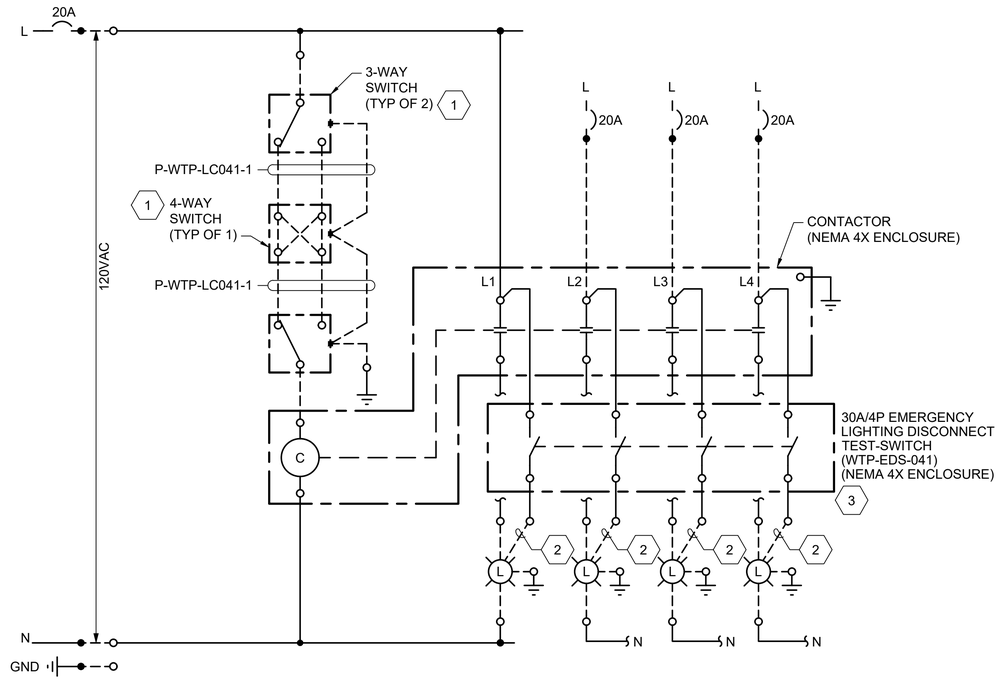
City of Thornton

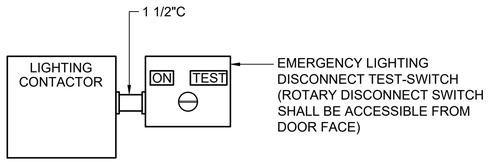
**CITY OF THORNTON**
**TTP - PACKAGE 3**
LIGHTING DETAILS II

| | |
|---|---|
| project 98101 | contract |
| drawing **E321** | rev. **0** |
| sheet 401 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**ENCLOSURE ELEVATIONS**
NOT TO SCALE

**GENERAL NOTE:**

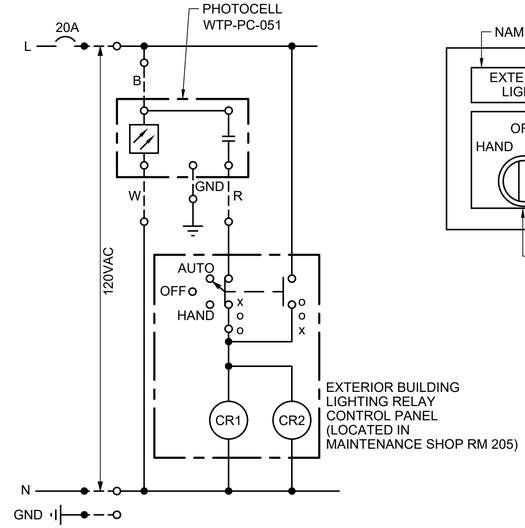
1. REFER TO THE CONDUIT AND CABLE SCHEDULE AND THE PANELBOARD SCHEDULES FOR CONDUIT AND CABLING DETAILS ASSOCIATED WITH EACH LIGHTING CIRCUIT.
2. OMIT TEST SWITCH COMPONENTS FOR LIGHTING CONTACTORS LC-042 THRU LC-044.

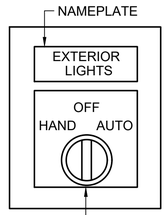
**KEYED NOTES:**

1. REFER TO LIGHTING PLAN DRAWINGS FOR LOCATIONS OF 3-WAY AND 4-WAY SWITCHES.
2. INSTALL UNSWITCHED HOT CONDUCTOR TO EACH OF THE DESIGNATED EMERGENCY FIXTURES ON THE INDICATED CIRCUIT. CONNECT HOT CONDUCTOR TO THE FIXTURE EMERGENCY BATTERY DRIVER OR BALLAST AS REQUIRED FOR PROPER FUNCTION.
3. ALL EMERGENCY BATTERY DRIVER HOT LEGS SHALL BE ROUTED THRU DISCONNECT SWITCH AS INDICATED. ROTARY STYLE DISCONNECT SWITCH SHALL BE USED FOR TESTING THE EMERGENCY BATTERY DRIVER OPERATION. PROVIDE LABELING AS REQUIRED FOR NORMAL AND TEST (ON-OFF) POSITION.

**LIGHTING CONTACTOR WTP-LC-041 CONTROL DIAGRAM (PROCESS HIGH BAY AREAS)**
(TYPICAL FOR LIGHTING CONTACTOR WTP-LC-042, WTP-LC-043, AND WTP-LC-044)

| LIGHTING EQUIPMENT NAMEPLATE SCHEDULE AREA ZONE CONTROL | | | |
|---|---|---|---|
| ZONE | AREA OF ZONE CONTROL | LIGHTING CONTACTOR | TEST-SWITCH |
| 1 | NIGHT LIGHTS | WTP-LC-041 | WTP-ETS-041 |
| 2 | FILTER AREA (TREAMENT 233) | WTP-LC-042 | N/A |
| 3 | CHEM HALLWAY (CORRIDOR 231) | WTP-LC-043 | N/A |
| 4 | PRETREATMENT BASINS (TREATMENT 233) | WTP-LC-044 | N/A |




**GENERAL NOTE:**

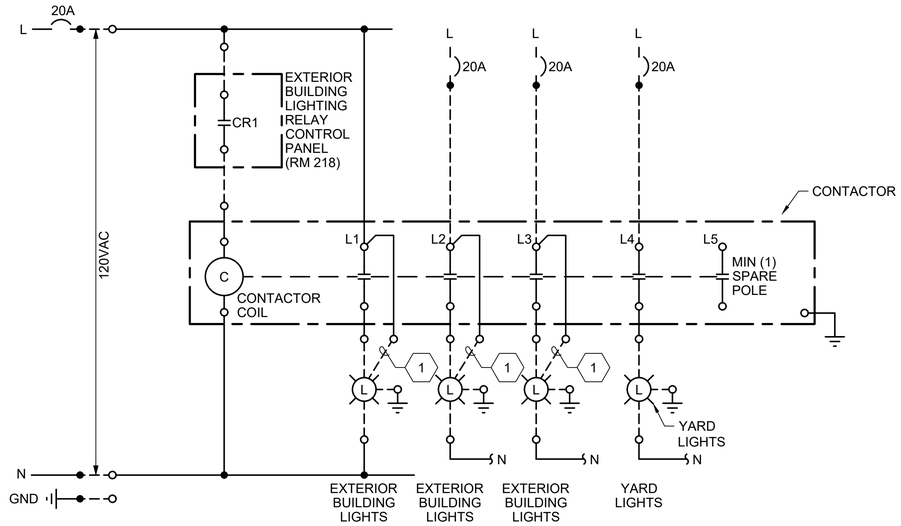
1. REFER TO THE CONDUIT AND CABLE SCHEDULE AND THE PANELBOARD SCHEDULES FOR CONDUIT AND CABLING DETAILS ASSOCIATED WITH EACH LIGHTING CIRCUIT.

**KEYED NOTES:**

1. INSTALL UNSWITCHED HOT CONDUCTOR TO EACH OF THE EXTERIOR SINGLE/DOUBLE MAN DOOR LUMINAIRES ON THE INDICATED CIRCUIT. CONNECT HOT CONDUCTOR TO THE FIXTURE EMERGENCY BATTERY DRIVER AS REQUIRED FOR PROPER FUNCTION.

| EXTERIOR LIGHTING CONTROL RELAY/CONTACTOR SCHEDULE | | |
|---|---|---|
| CONTROL RELAY | EXTERIOR LIGHTING CONTACTOR CONTROLLED | CONTACTOR LOCATION (ROOM) |
| CR1 | WTP-LC-051 | RM 218 |
| CR2 | WTP-LC-052 | RM 229 |
| | | |

**EXTERIOR BUILDING LIGHTING RELAY CONTROL PANEL WTP-LRCP-050 CONTROL DIAGRAM**




**GENERAL NOTE:**

1. REFER TO THE CONDUIT AND CABLE SCHEDULE AND THE PANELBOARD SCHEDULES FOR CONDUIT AND CABLING DETAILS ASSOCIATED WITH EACH LIGHTING CIRCUIT.

**KEYED NOTES:**

1. INSTALL UNSWITCHED HOT CONDUCTOR TO EACH OF THE EXTERIOR SINGLE/DOUBLE MAN DOOR LUMINAIRES ON THE INDICATED CIRCUIT. CONNECT HOT CONDUCTOR TO THE FIXTURE EMERGENCY BATTERY DRIVER AS REQUIRED FOR PROPER FUNCTION.

**EXTERIOR BUILDING LIGHTING CONTACTOR WTP-LC-051 CONTROL DIAGRAM**
(TYPICAL FOR EXTERIOR BUILDING LIGHTING CONTACTOR WTP-LC-052)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LIGHTING CONTROL SCHEMATICS

| project | contract |
|---|---|
| 98101 | |

drawing **E324** rev. **0**

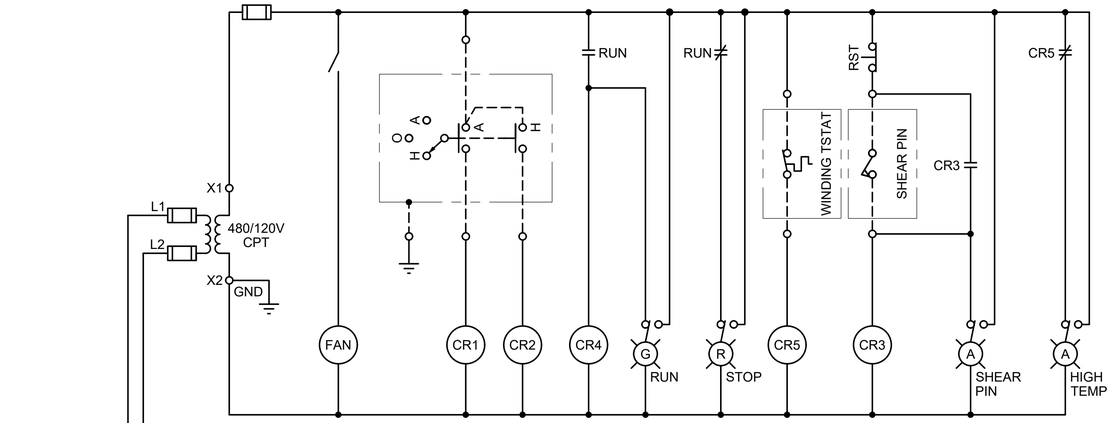
sheet 402 of 542 sheets

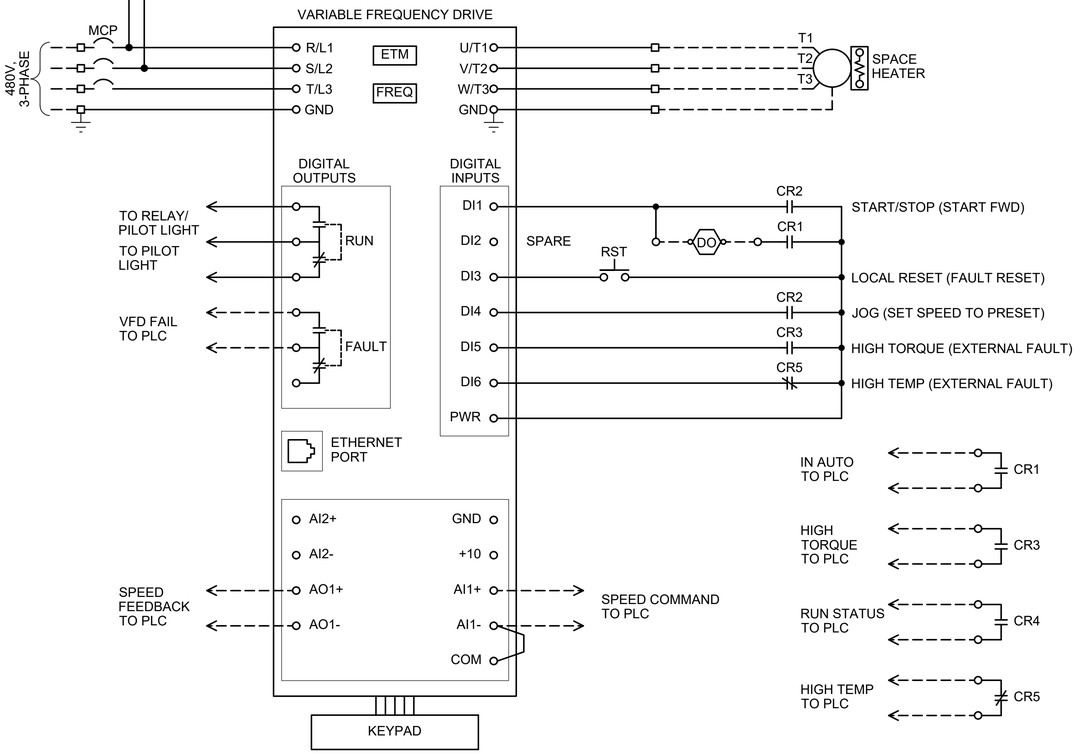
file 98101_E324.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

**MATERIAL NOTES:**

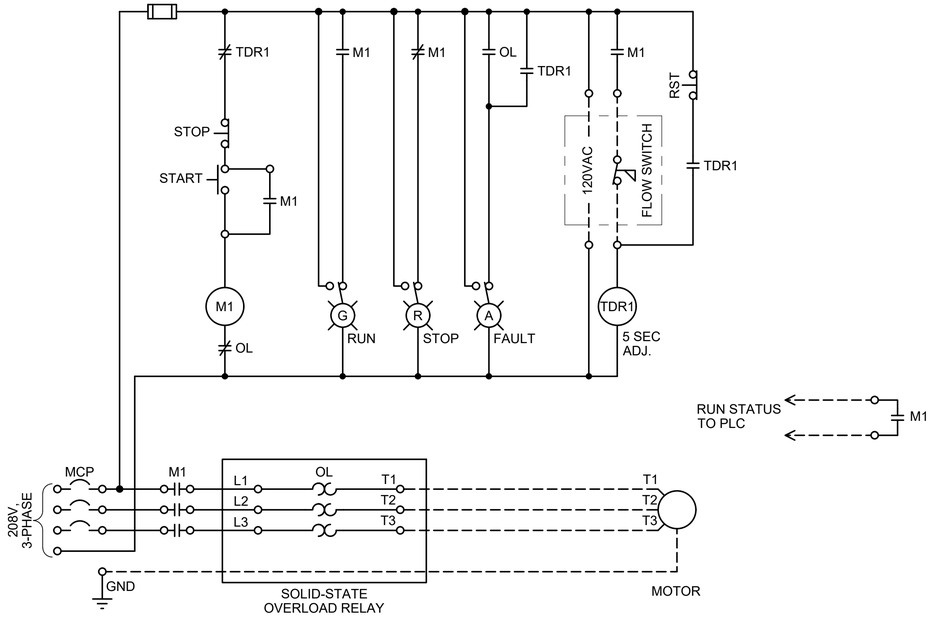
1. TIME DELAY RELAY TO BE VOLTAGE CONTROLLED WITH MINIMUM 1-10 SECOND ADJUSTMENT.
2. EMERGENCY MANUAL ALARM PUSH BUTTON MAINTAINED DOUBLE POLE, SINGLE THROW, ALLEN BRADLEY NO. 800T-FX6A5, 800T-ITZ.
3. ALARM AUDIO/VISUAL STROBE (A/V DEVICE), ALLEN BRADLEY NO. 855T-G-10GC5 & 855T-GVM.



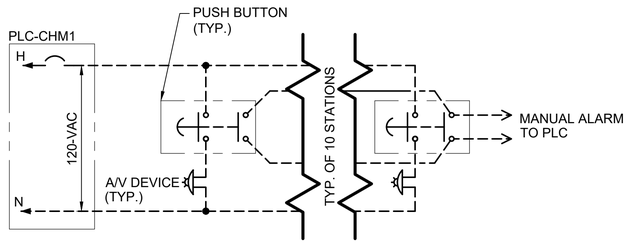

| TABLE OF CORRESPONDING DEVICES AND CIRCUITS | | | | |
|---|---|---|---|---|
| EQUIPMENT | VFD | HAND STATION | PLC | HORSEPOWER |
| PRE-FLC-21111 | PRE-VFD-21110 (MCC-SEC) | PRE-HS-21111 | PLC-PRE | 7.5 |
| PRE-FLC-21121 | PRE-VFD-21120 (MCC-SEC) | PRE-HS-21121 | PLC-PRE | 3 |
| PRE-FLC-21131 | PRE-VFD-21130 (MCC-SEC) | PRE-HS-21131 | PLC-PRE | 1.5 |
| PRE-FLC-21211 | PRE-VFD-21210 (MCC-SEC) | PRE-HS-21211 | PLC-PRE | 7.5 |
| PRE-FLC-21221 | PRE-VFD-21220 (MCC-SEC) | PRE-HS-21221 | PLC-PRE | 3 |
| PRE-FLC-21231 | PRE-VFD-21230 (MCC-SEC) | PRE-HS-21231 | PLC-PRE | 1.5 |

**TYPICAL VARIABLE SPEED FLOCCULATOR DRIVE**




| TABLE OF CORRESPONDING DEVICES AND CIRCUITS | | | | |
|---|---|---|---|---|
| EQUIPMENT | MOTOR CONTROLLER | FLOW SWITCH | PLC | HORSEPOWER |
| CAS-TP-71010 | LCP-CAS | CAS-FSH-71010 | PLC-CHM2 | 1.5 |
| AMS-TP-77010 | LCP-AMS | AMS-FSH-77010 | PLC-CHM2 | 1 |
| HYP-TP-78010 | LCP-HYP | HYP-FSH-78010 | PLC-CHM1 | 0.75 |
| FES-TP-72010 | LCP-FES | FES-FSH-72010 | PLC-CHM1 | 1 |
| SHP-TP-73010 | LCP-SHP | SHP-FSH-73010 | PLC-CHM2 | 0.75 |
| SPE-TP-76010 | LCP-SPE | SPE-FSH-76010 | PLC-CHM1 | 1.5 |
| CAP-TP-74010 | LCP-CAP | CAP-FSH-74010 | PLC-CHM1 | 0.5 |

**TYPICAL CHEMICAL TRANSFER PUMP MOTOR SCHEMATIC**




**EMERGENCY MANUAL ALARM STATION SCHEMATIC**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL CONTROL SCHEMATICS I

| project | contract |
|---|---|
| 98101 | |

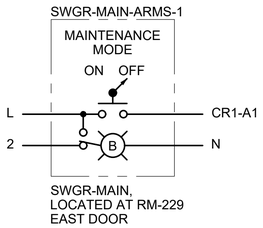
drawing **E325** — rev. **0**

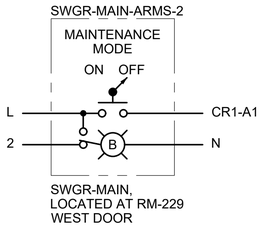
sheet 403 of 542 sheets

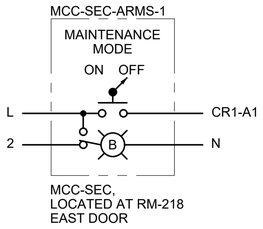
file 98101_E325.dwg

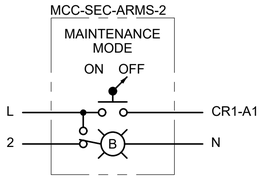
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

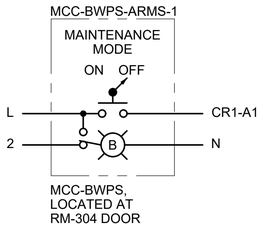
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E325.DWG 10/14/2020 6:07 PM JHDAVIS

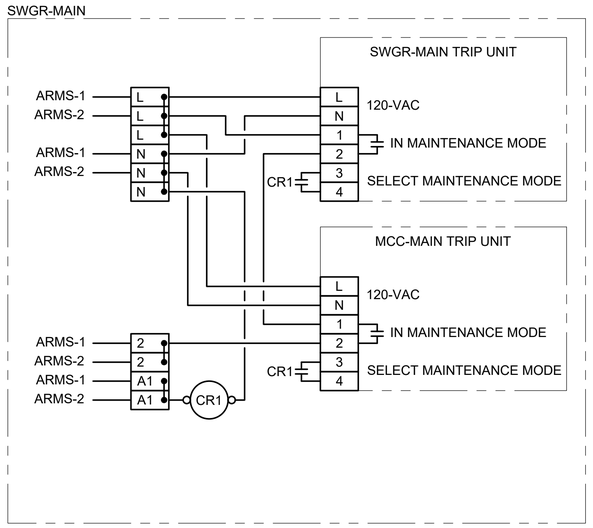


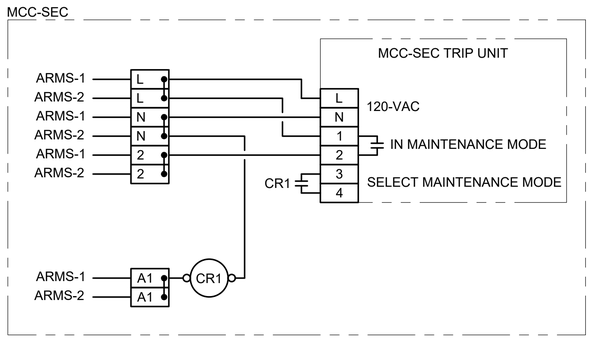



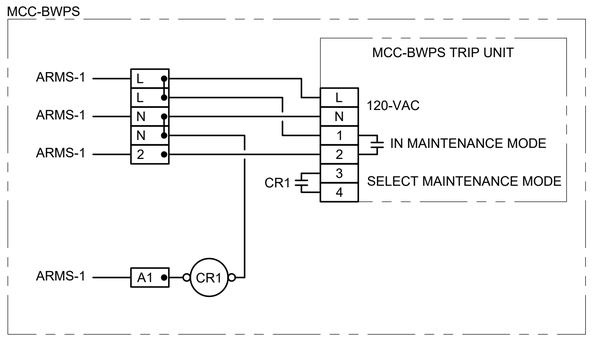



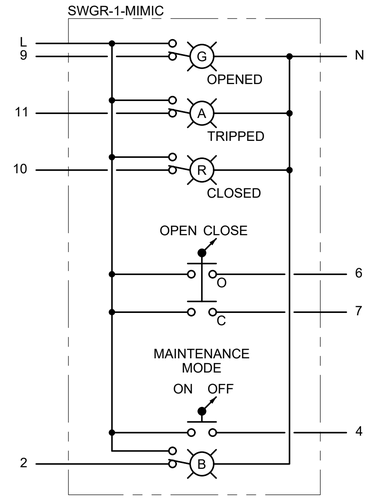



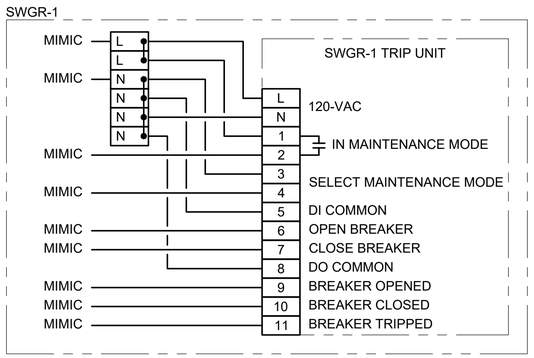



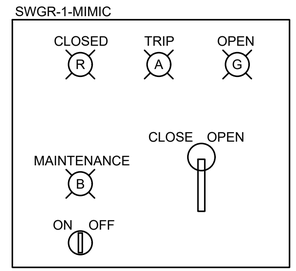




**MAINTENANCE MODE SWITCH SCHEMATICS**




**SWGR-1 MIMIC PANEL SCHEMATIC AND FRONT**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL CONTROL SCHEMATICS II

| project | contract |
|---|---|
| 98101 | |

drawing **E326** – rev. **0**

sheet 404 of 542 sheets

file 98101_E326.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E326.DWG 10/14/2020 6:07 PM JHDAVIS

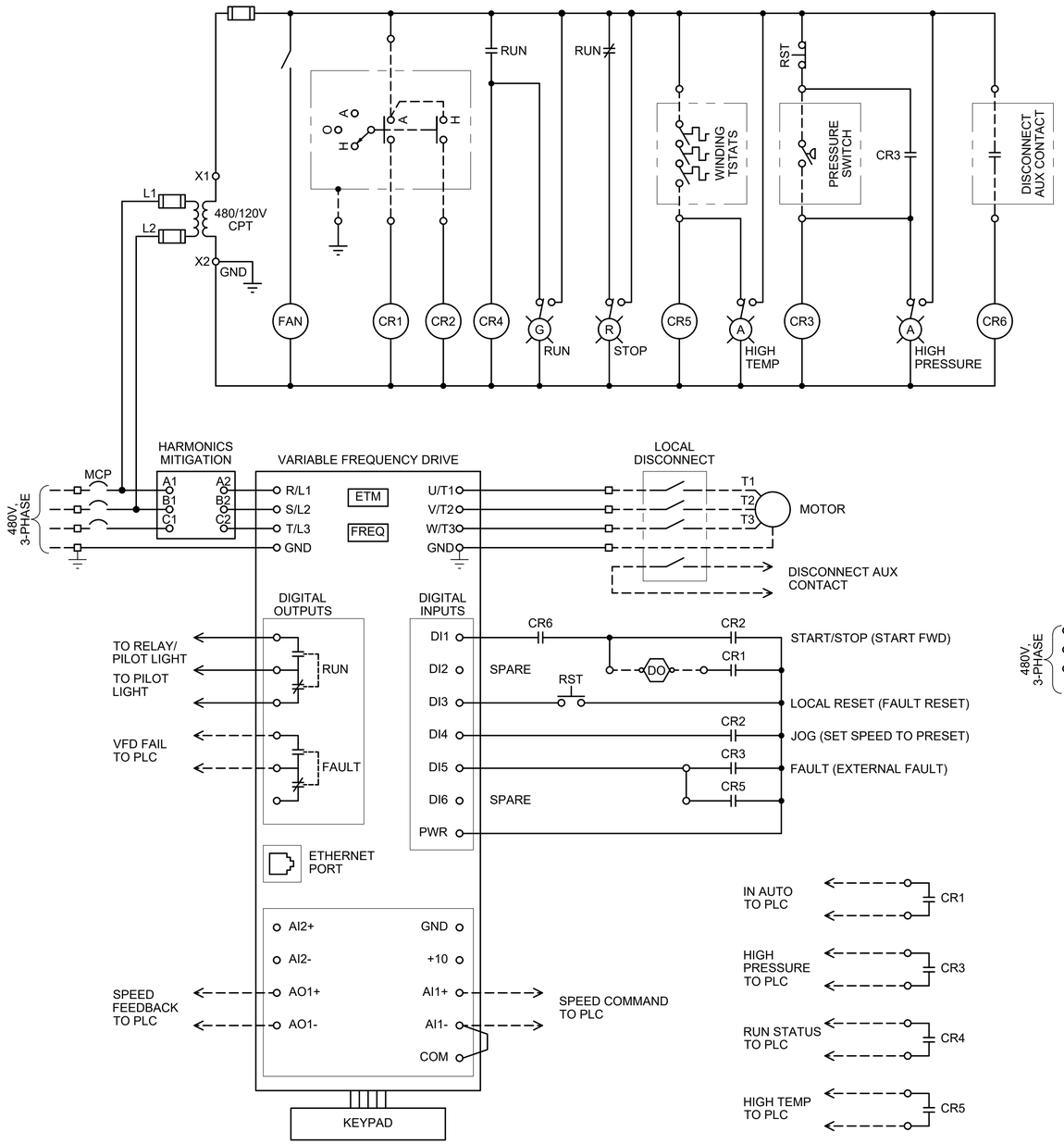



**TABLE OF CORRESPONDING DEVICES AND CIRCUITS**

| EQUIPMENT | VFD | HAND STATION | PRESSURE SWITCH | PLC | HORSEPOWER | ARCHITECTURE | DISCONNECT |
|---|---|---|---|---|---|---|---|
| FBS-P-54001 | FBS-VFD-54001 (MCC-BWPS) | HS-54001 | PSH-54001 | PLC-BWPS | 150 | 18-PULSE OR AFE | NEMA 4, 400A |
| FBS-P-54002 | FBS-VFD-54002 (MCC-BWPS) | HS-54002 | PSH-54002 | PLC-BWPS | 150 | 18-PULSE OR AFE | NEMA 4, 400A |
| FBS-P-54003 | FBS-VFD-54003 (MCC-BWPS) | HS-54003 | PSH-54003 | PLC-BWPS | 150 | 18-PULSE OR AFE | NEMA 4, 400A |
| FBW-P-55001 | FBW-VFD-55001 (MCC-BWPS) | HS-55001 | PSH-55001 | PLC-BWPS | 15 | 6-PULSE W/ 3% LR | NEMA 4, 30A |
| FBW-P-55002 | FBW-VFD-55002 (MCC-BWPS) | HS-55002 | PSH-55002 | PLC-BWPS | 15 | 6-PULSE W/ 3% LR | NEMA 4, 30A |

**TYPICAL VARIABLE SPEED PUMP**

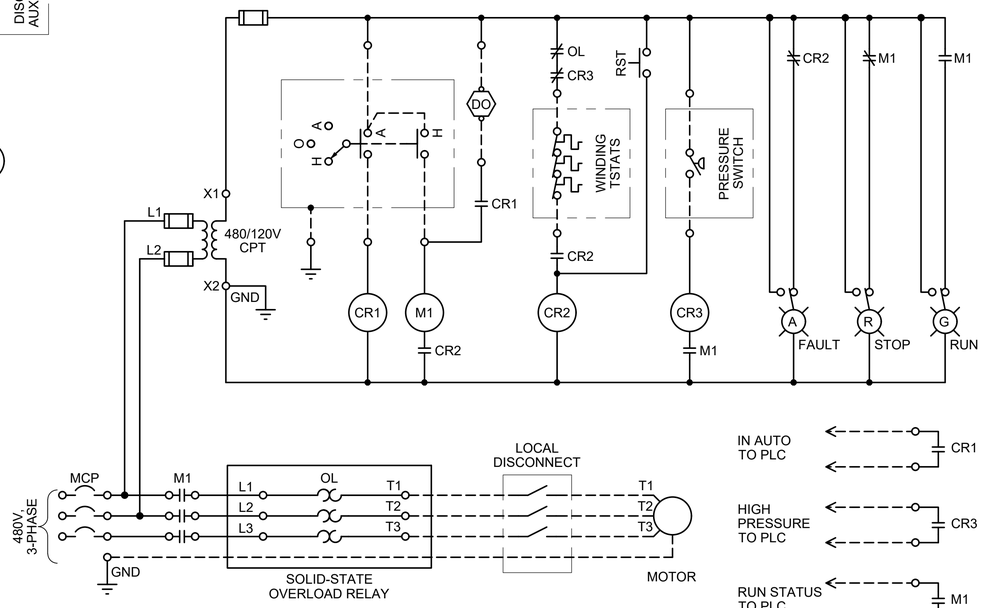



**TABLE OF CORRESPONDING DEVICES AND CIRCUITS**

| EQUIPMENT | MCC | HAND STATION | PRESSURE SWITCH | PLC | HORSEPOWER | DISCONNECT |
|---|---|---|---|---|---|---|
| FMP-P-20201 | MCC-SEC | HS-20201 | PSH-20201 | PLC-PRE | 10 | NEMA 4, 30A |
| FMP-P-20202 | MCC-SEC | HS-20202 | PSH-20202 | PLC-PRE | 10 | NEMA 4, 30A |
| FMP-P-20203 | MCC-SEC | HS-20203 | PSH-20203 | PLC-PRE | 10 | NEMA 4, 30A |
| OZO-P-36501 | MCC-MAIN | HS-36501 | PSH-36501 | PLC-FLTR | 20 | NEMA 4, 60A |
| FLT-DP-46001 | MCC-MAIN | HS-46001 | PSH-46001 | PLC-FLTR | 2 | NEMA 4, 30A |

**TYPICAL CONSTANT SPEED PUMP MOTOR SCHEMATIC**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL CONTROL SCHEMATICS III

| project | contract |
|---|---|
| 98101 | |

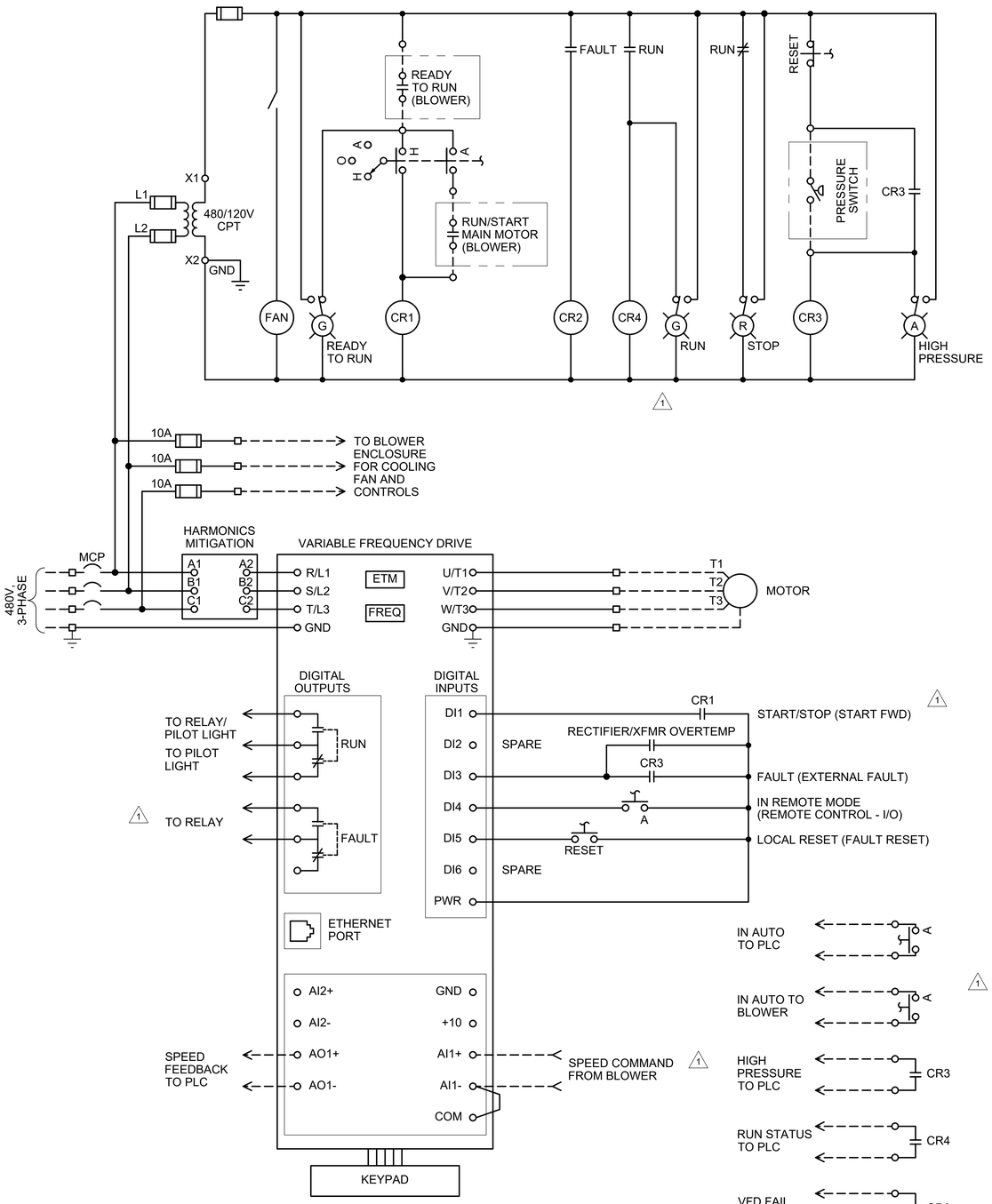
**drawing** E327 – **rev.** 0

**sheet** 405 **of** 542 sheets

**file** 98101_E327.dwg

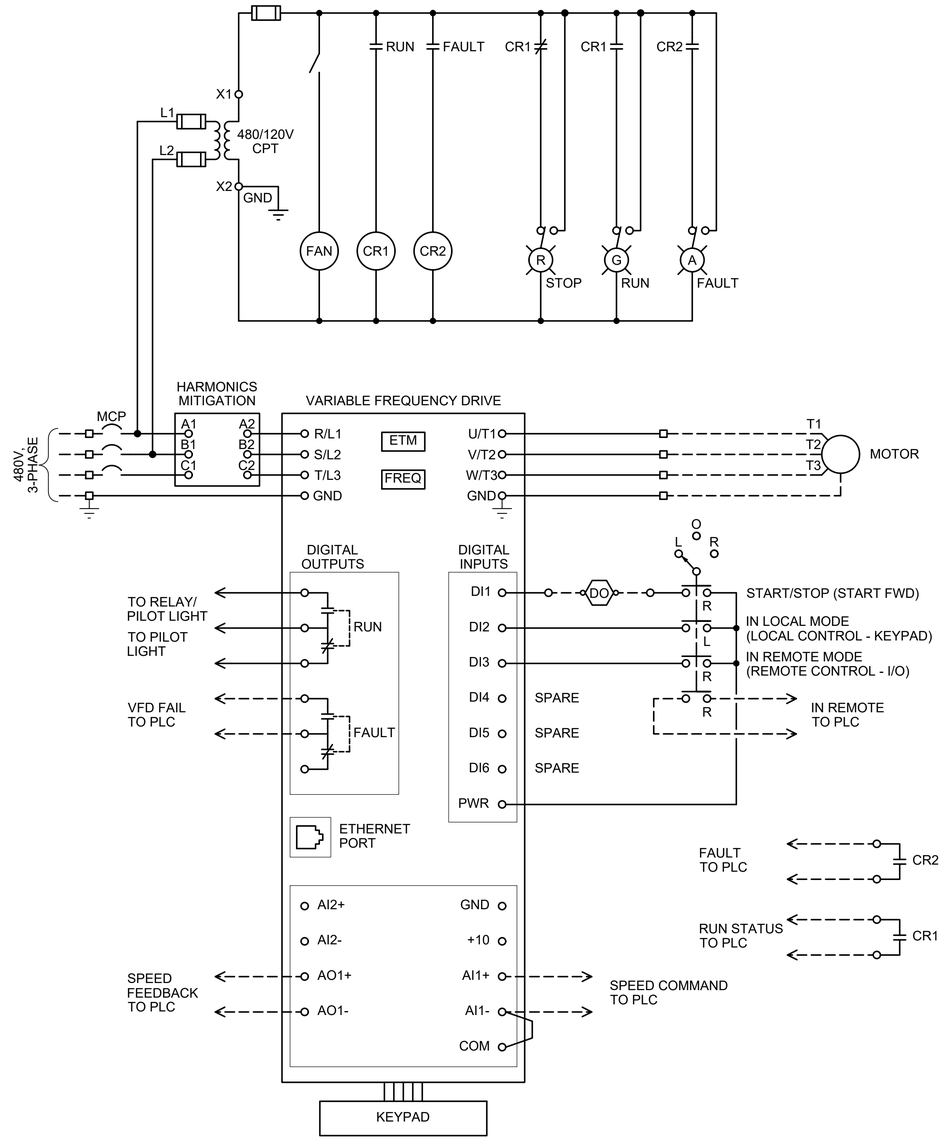
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E327.DWG 10/14/2020 6:07 PM JHDAVIS




| TABLE OF CORRESPONDING DEVICES AND CIRCUITS | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT | VFD | PRESSURE SWITCH | PLC | HORSEPOWER | ARCHITECTURE |
| FLT-BLW-44001 | FLT-VFD-44001 (MCC-MAIN) | PSH-44001 | PLC-FLTR | 125 | 18-PULSE OR AFE |
| FLT-BLW-44002 | FLT-VFD-44002 (MCC-MAIN) | PSH-44002 | PLC-FLTR | 125 | 18-PULSE OR AFE |
| FLT-BLW-44003 | FLT-VFD-44003 (MCC-MAIN) | PSH-44003 | PLC-FLTR | 125 | 18-PULSE OR AFE |

**TYPICAL AIR SCOUR BLOWER**




| TABLE OF CORRESPONDING DEVICES AND CIRCUITS | | | |
|---|---|---|---|
| EQUIPMENT | VFD | PLC | HORSEPOWER |
| SWI-P-32001 | SWI-VFD-32001 (MCC-MAIN) | MOCP | 30 |
| SWI-P-32002 | SWI-VFD-32002 (MCC-MAIN) | MOCP | 30 |

**TYPICAL SIDESTREAM INJECTION PUMP**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 12/21/18 | AG | ED | WP3 - REVISED PER RFI #?? |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

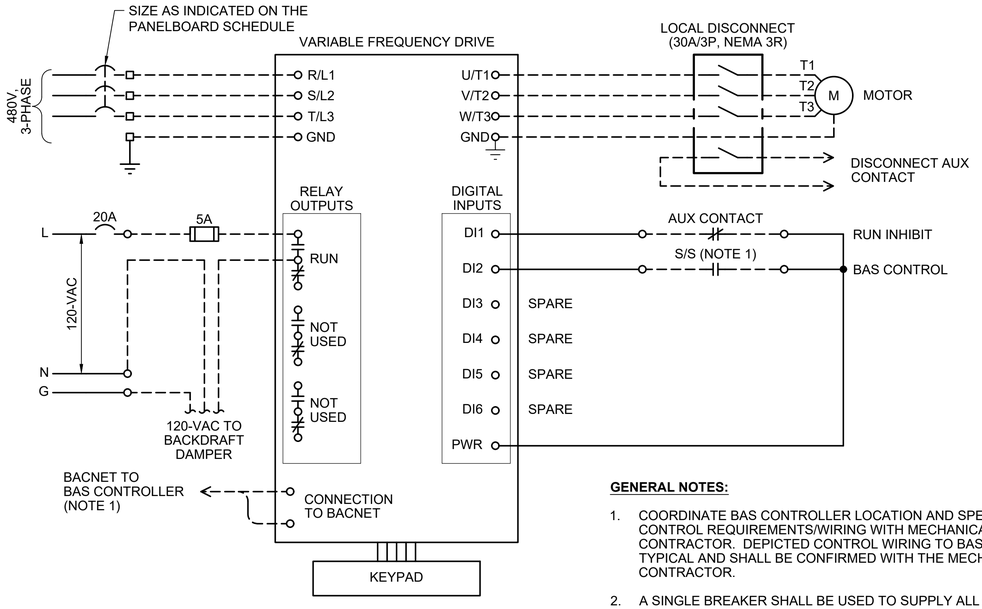
City of Thornton

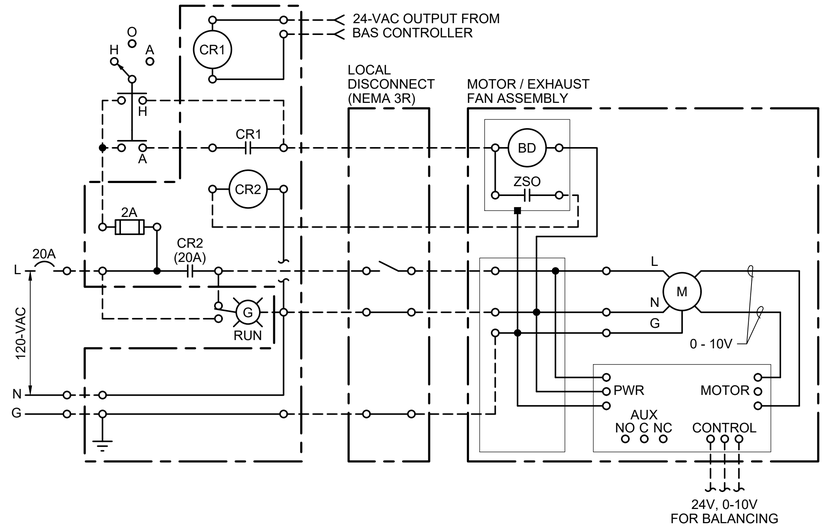
**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL CONTROL SCHEMATICS IV

| | |
|---|---|
| project 98101 | contract |
| drawing E328 | rev. 1 |
| sheet 406 of 542 sheets | |
| file 98101_E328.dwg | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E328.DWG 10/14/2020 6:12 PM JHDAVIS




**GENERAL NOTES:**

1. COORDINATE BAS CONTROLLER LOCATION AND SPECIFIC CONTROL REQUIREMENTS/WIRING WITH MECHANICAL CONTRACTOR. DEPICTED CONTROL WIRING TO BAS IS TYPICAL AND SHALL BE CONFIRMED WITH THE MECHANICAL CONTRACTOR.
2. A SINGLE BREAKER SHALL BE USED TO SUPPLY ALL CONTROL DAMPERS ASSOCIATED WITH A LIGHTING PANEL.
3. FANS SHALL BE CONFIGURED TO SOFT START SO AS TO PROVIDE THE BACKDRAFT DAMPER TIME TO FULLY OPEN PRIOR TO REACHING FULL OPERATING SPEED.

**KEYED NOTES:** (#)

1. LEF-1 NOT PROVIDED WITH BACKDRAFT DAMPER.

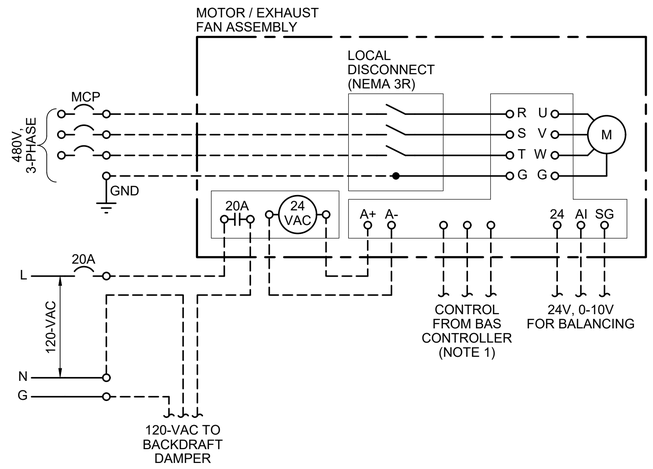
**TABLE OF CORRESPONDING DEVICES AND CIRCUITS**

| EQUIPMENT | VFD | SUPPLIED BY | DAMPER SUPPLY | HORSEPOWER |
|---|---|---|---|---|
| EF-1 | EF-1-VFD | PP-SEC-EF | LP-SEC-HVAC | 2 |
| EF-2 | EF-2-VFD | PP-SEC-EF | LP-SEC-HVAC | 1 1/2 |
| EF-3A | EF-3A-VFD | PP-SEC-EF | LP-SEC-HVAC | 3 |
| EF-3B | EF-3B-VFD | PP-SEC-EF | LP-SEC-HVAC | 3 |
| EF-3C | EF-3C-VFD | PP-SEC-EF | LP-SEC-HVAC | 3 |
| EF-3D | EF-3D-VFD | PP-MAIN-HVAC | LP-MAIN-HVAC | 3 |
| EF-3E | EF-3E-VFD | PP-MAIN-HVAC | LP-MAIN-HVAC | 3 |
| EF-9 | EF-9-VFD | MCC-BWPS | LP-BWPS | 2 |
| EF-13 | EF-13-VFD | PP-MAIN-HVAC | LP-MAIN-HVAC | 5 |
| EF-14 | EF-14-VFD | PP-SEC-EF | LP-SEC-HVAC | 3 |
| EF-15 | EF-15-VFD | PP-SEC-EF | LP-SEC-HVAC | 2 |
| 1 LEF-1 | LEF-1-VFD | PP-SEC-EF | N/A | 1 1/2 |

**TABLE OF CORRESPONDING DEVICES AND CIRCUITS**

| EQUIPMENT | SUPPLIED BY | HORSEPOWER |
|---|---|---|
| EF-6A | LP-SEC-HVAC | 1/4 |
| EF-6C | LP-SEC-HVAC | 1/4 |
| EF-6E | LP-SEC-HVAC | 1/2 |
| EF-6F | LP-SEC-HVAC | 1/2 |
| EF-7A | LP-MAIN-HVAC | 1/6 |
| EF-7B | LP-MAIN-HVAC | 1/2 |
| EF-7C | LP-MAIN-HVAC | 1/2 |
| EF-7D | LP-MAIN-HVAC | 1/4 |
| EF-8A | LP-SEC-HVAC | 1/6 |
| EF-8B | LP-MAIN-HVAC | 1/4 |
| EF-10 | LP-MAIN-HVAC | 1/4 |
| EF-11 | LP-SEC-HVAC | 1/2 |

**TYPICAL VFD CONTROLLED EXHAUST FAN MOTOR SCHEMATIC**
(NOT TO SCALE)




**TYPICAL 120V EXHAUST FAN MOTOR SCHEMATIC**
(NOT TO SCALE)

**TABLE OF CORRESPONDING DEVICES AND CIRCUITS**

| EQUIPMENT | MOTOR STARTER | SUPPLIED BY | DAMPER SUPPLY | HORSEPOWER |
|---|---|---|---|---|
| EF-6D | EF-6D-MS | PP-SEC-EF | LP-SEC-HVAC | 1 1/2 |

**GENERAL NOTES:**

1. COORDINATE BAS CONTROLLER LOCATION AND SPECIFIC CONTROL REQUIREMENTS/WIRING WITH MECHANICAL CONTRACTOR.

**TYPICAL 480V CONSTANT SPEED EXHAUST FAN MOTOR SCHEMATIC**
(NOT TO SCALE)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 3/6/20 | AG | ED | WP3 - RE-ISSUED FOR CONSTRUCTION |
| 2 | 4/8/20 | AG | ED | WP3 - RE-ISSUED FOR CONSTRUCTION |
| 3 | 4/20/20 | AG | ED | WP3 - RE-ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ELECTRICAL CONTROL SCHEMATICS V

| project | contract |
|---|---|
| 98101 | |

drawing **E329** rev. **3**

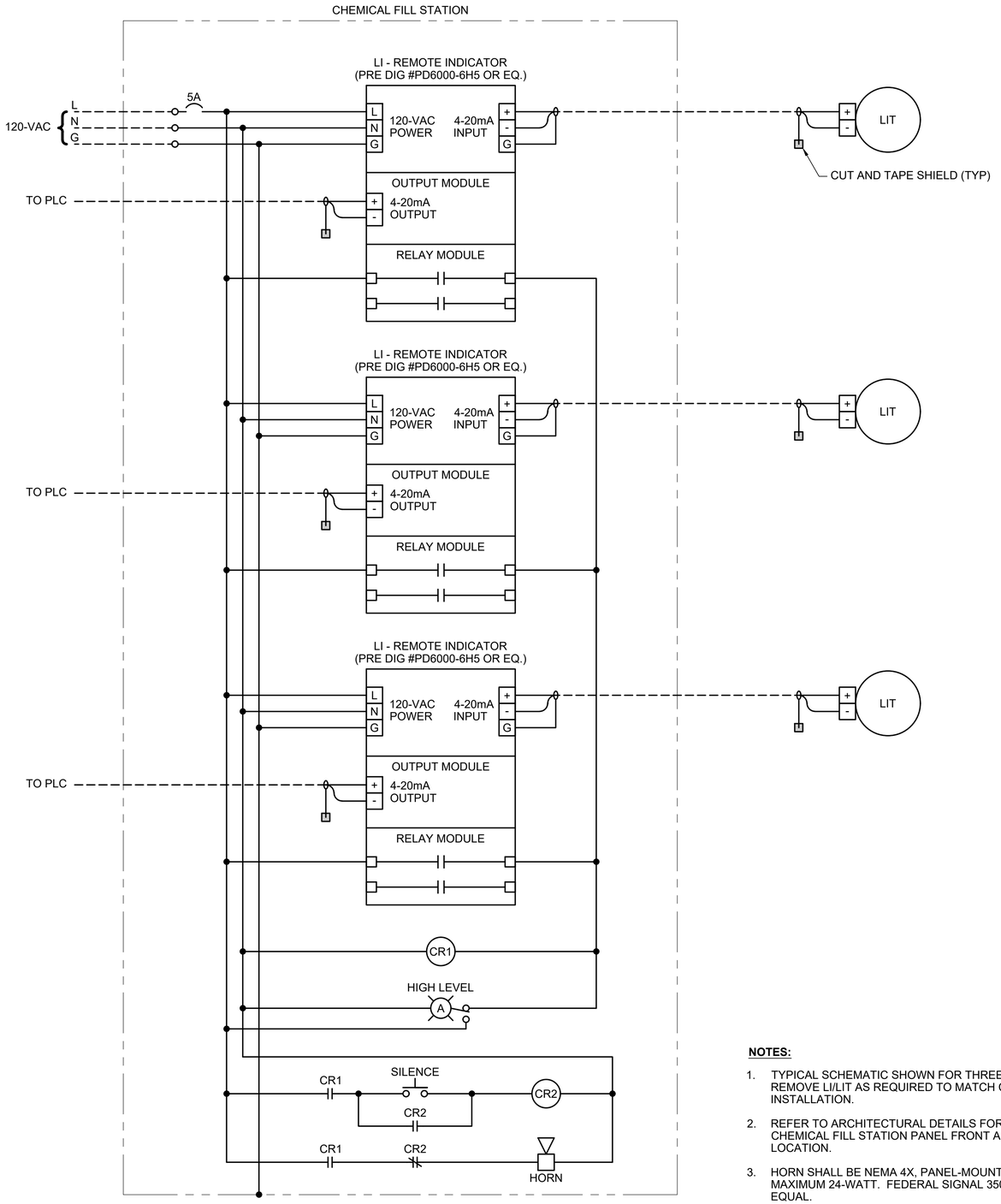
sheet 407 of 542 sheets

file 98101_E329.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

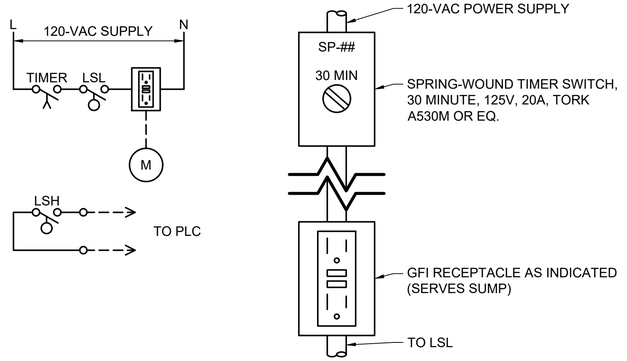
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E329.DWG 10/14/2020 6:07 PM JHDAVIS



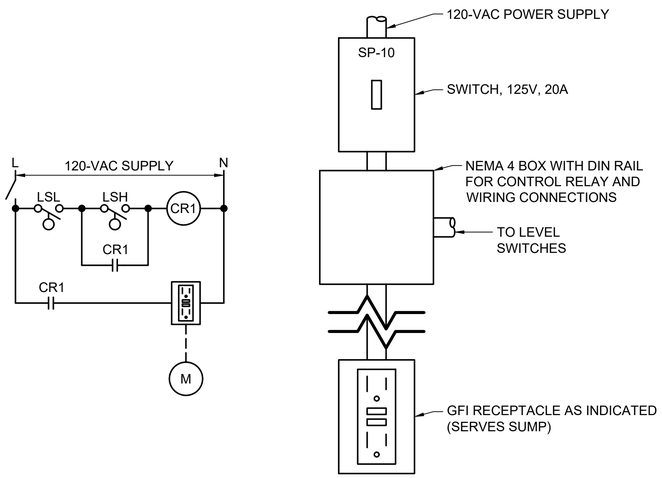

**TYPICAL REMOTE FILL PANEL SCHEMATIC**
(NOT TO SCALE)

**NOTES:**

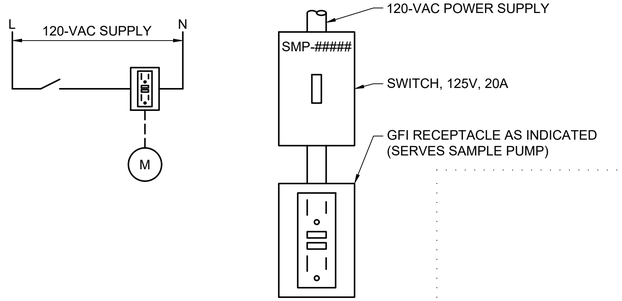
1. TYPICAL SCHEMATIC SHOWN FOR THREE TANKS. REMOVE LI/LIT AS REQUIRED TO MATCH CHEMICAL INSTALLATION.
2. REFER TO ARCHITECTURAL DETAILS FOR CHEMICAL FILL STATION PANEL FRONT AND LOCATION.
3. HORN SHALL BE NEMA 4X, PANEL-MOUNT, 120-VAC, MAXIMUM 24-WATT. FEDERAL SIGNAL 350 OR EQUAL.




**TYPICAL CHEMICAL ROOM SUMP**
(NOT TO SCALE)




**BACKWASH PUMP STATION SUMP (SP-10)**
(NOT TO SCALE)




**TYPICAL SAMPLE PUMP**
(NOT TO SCALE)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

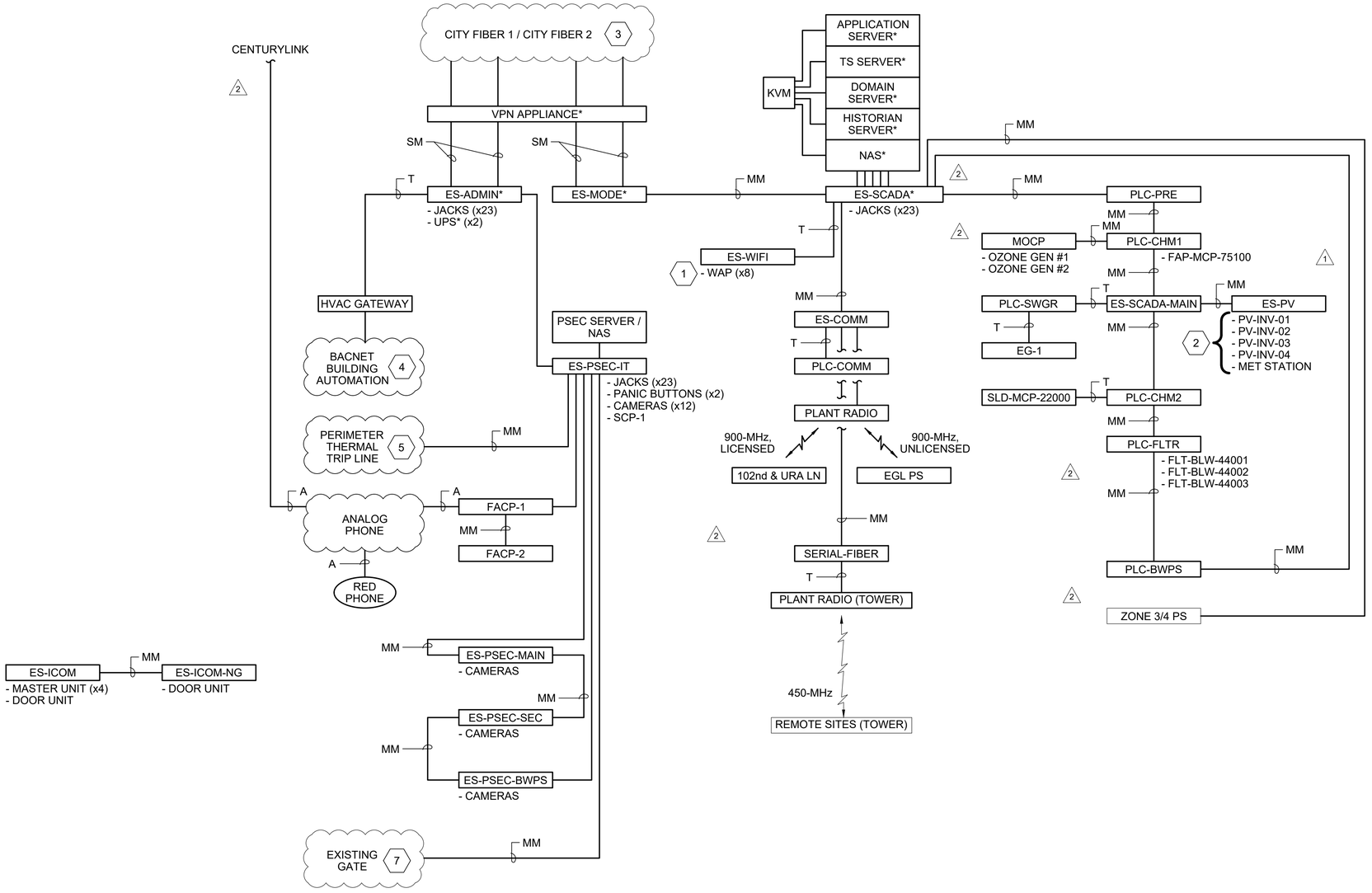
**CITY OF THORNTON**
**TTP - PACKAGE 3**
TYPICAL REMOTE FILL PANEL SCHEMATIC

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| E330 – | 0 |

sheet 408 of 542 sheets
file 98101_E330.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**GENERAL NOTES:**

1. '*' DENOTES EQUIPMENT SUPPLIED BY THE CITY OF THORNTON.
2. SOLAR SYSTEM EQUIPMENT TO BE PROVIDED AND INSTALLED BY FUTURE CONTRACT. PROVIDE INTERCONNECTION PROVISIONS AS INDICATED.

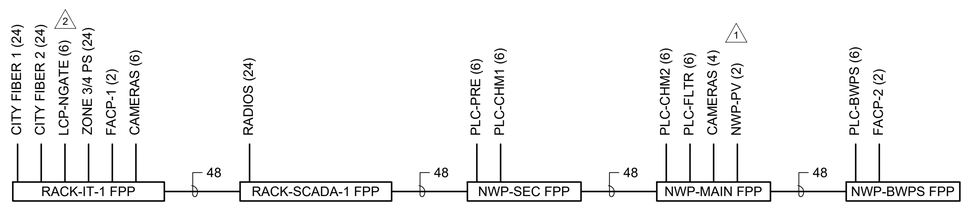
**KEYED NOTES:**

1. QUANTITY SHOWN IS APPROXIMATE. INSTALL WIRELESS ACCESS POINTS AS REQUIRED TO PROVIDE ADEQUATE COVERAGE IN NEW PLANT BUILDINGS. REFER TO DIVISION 27 SPECIFICATIONS.
2. CABLE DISTANCE SHALL NOT EXCEED 300-FEET.
3. CITY OF THORNTON'S FIBER NETWORK RING. COORDINATE FIBER TERMINATIONS WITH OWNER.
4. REFER TO MECHANICAL DRAWINGS FOR BACNET DETAILS.
5. BY SECURITY CONTRACTOR.
6. NOT USED.
7. EXISTING GATE NEAR ZONE 3/4 PUMP STATION. INCORPORATE EXISTING GATE INTO NEW ACCESS CONTROL SYSTEM.

**ABBREVIATIONS:**

| | |
|---|---|
| A | - ANALOG PHONE CABLE |
| CPP | - COPPER PATCH PANEL |
| ES | - ETHERNET SWITCH |
| EX | - EXISTING |
| FACP | - FIRE ALARM CONTROL PANEL |
| FPP | - FIBER PATCH PANEL |
| ISP | - INTERNET SERVICE PROVIDER |
| KVM | - KEYBOARD, VIDEO, MOUSE |
| NIC | - NETWORK INTERFACE CARD |
| MM | - MULTI-MODE FIBER |
| RIO | - REMOTE I/O |
| SCP | - SECURITY CONTROL PANEL |
| SM | - SINGLE-MODE FIBER |
| T | - COPPER NETWORK CABLE |
| TS | - TERMINAL SERVICE |
| WAP | - WIRELESS ACESS POINT |

**NETWORK ARCHITECTURE DIAGRAM**




**FIBER PATCH PANELS AND RISERS**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/1/19 | AG | ED | ISSUED FOR PCO 018 |
| 2 | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

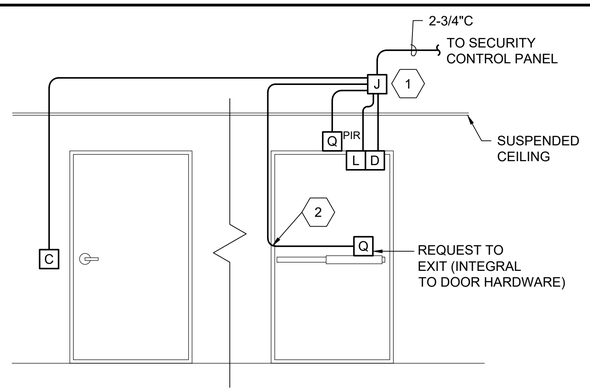
| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
NETWORK ARCHITECTURE

| | |
|---|---|
| project 98101 | contract |
| drawing E331 | rev. 2 |
| sheet 409 of 542 sheets | |
| file 98101_E331.DWG | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.



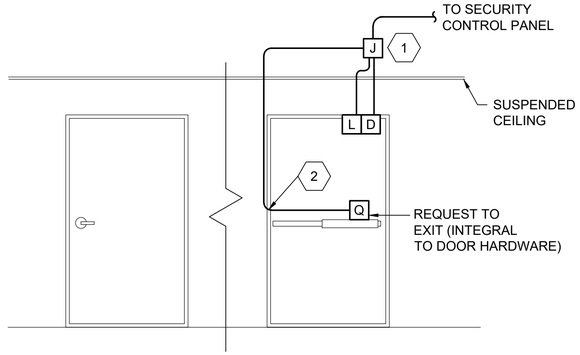

**GENERAL NOTES:**

1. ALL CONDUIT SHALL BE INSTALLED WITHIN WALL IF DEVICES ARE LOCATED IN A FINISHED AREA.
2. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED IF INSTALLED WITHIN UNFINISHED INTERIOR AREAS.
3. IF CARD READER IS LOCATED ON THE EXTERIOR SIDE OF BUILDING, JUNCTION BOX SHALL BE FLUSH MOUNTED WITHIN EXTERIOR WALL.
4. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 12-INCHES ABOVE CEILING.
2. USE POWER TRANSFER HARDWARE TO TRANSITION WIRES FROM DOOR TO DOOR FRAME.

**SINGLE ENTRY DOOR - WITH CARD READER**
NOT TO SCALE



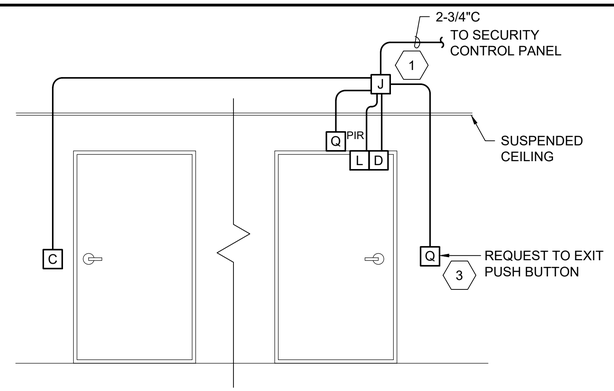

**GENERAL NOTES:**

1. ALL CONDUIT SHALL BE INSTALLED WITHIN WALL IF DEVICES ARE LOCATED IN A FINISHED AREA.
2. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED IF INSTALLED WITHIN UNFINISHED INTERIOR AREAS.
3. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 12-INCHES ABOVE FINISHED CEILING OR A MINIMUM OF 9-FEET ABOVE FINISHED FLOOR.
2. USE POWER TRANSFER HARDWARE TO TRANSITION WIRES FROM DOOR TO DOOR FRAME.

**SINGLE ENTRY DOOR - EGRESS ONLY MONITORED**
NOT TO SCALE



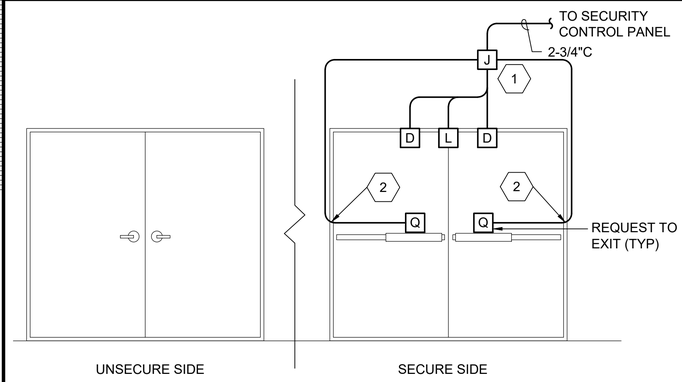

**GENERAL NOTES:**

1. ALL CONDUIT SHALL BE INSTALLED WITHIN WALL IF DEVICES ARE LOCATED IN A FINISHED AREA.
2. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED IF INSTALLED WITHIN UNFINISHED INTERIOR AREAS.
3. IF CARD READER IS LOCATED ON THE EXTERIOR SIDE OF BUILDING, JUNCTION BOX SHALL BE FLUSH MOUNTED WITHIN EXTERIOR WALL.
4. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 12-INCHES ABOVE CEILING.
2. USE POWER TRANSFER HARDWARE TO TRANSITION WIRES FROM DOOR TO DOOR FRAME.
3. INSTALL REQUEST TO EXIT PUSH BUTTON JUNCTION BOX AT 42-INCHES FROM CENTERLINE OF BOX TO FINISHED FLOOR.

**SINGLE ENTRY DOOR OPENING INTO SECURED SPACE - WITH CARD READER**
NOT TO SCALE



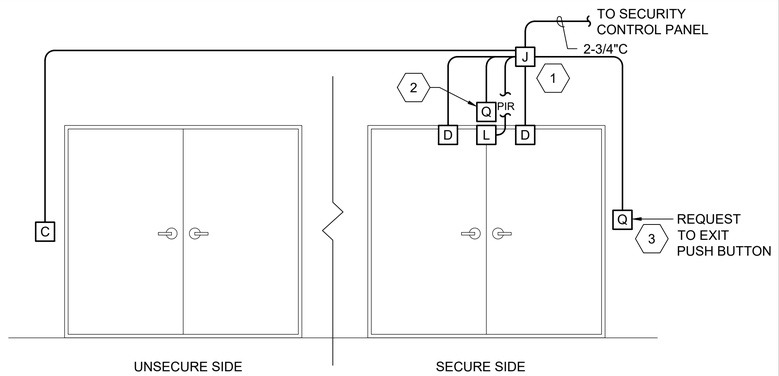

**GENERAL NOTES:**

1. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED IF INSTALLED WITHIN UNFINISHED INTERIOR AREAS.
2. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. SECURITY JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 9-FEET ABOVE FINISHED FLOOR.
2. USE POWER TRANSFER HARDWARE TO TRANSITION WIRES FROM DOOR TO DOOR FRAME.

**DOUBLE ENTRY DOOR (UNFINISHED AREA) - MONITORED**
NOT TO SCALE



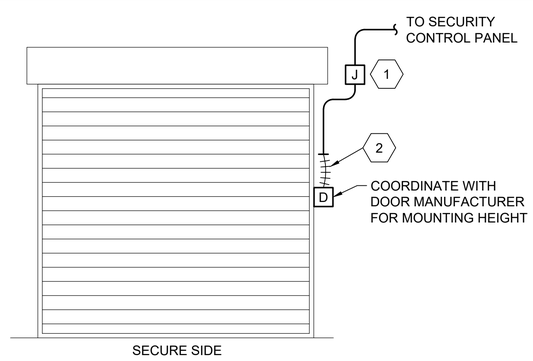

**GENERAL NOTES:**

1. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED.
2. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. SECURITY JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 9-FEET ABOVE FINISHED FLOOR.
2. REQUEST TO EXIT PIR SENSOR SHALL BE INSTALLED ABOVE DOOR.
3. INSTALL REQUEST TO EXIT PUSH BUTTON JUNCTION BOX AT 42-INCHES FROM CENTERLINE OF BOX TO FINISHED FLOOR.

**DOUBLE ENTRY DOOR (UNFINISHED AREA) - MONITORED**
NOT TO SCALE




**GENERAL NOTE:**

1. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.

**KEYED NOTES:**

1. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 10-FEET ABOVE FINISHED FLOOR.
2. INSTALL 18-INCHES OF FLEXIBLE CONDUIT FOR CONNECTION TO DOOR INTRUSION SWITCH.

**OVERHEAD DOOR - MONITORED**
NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

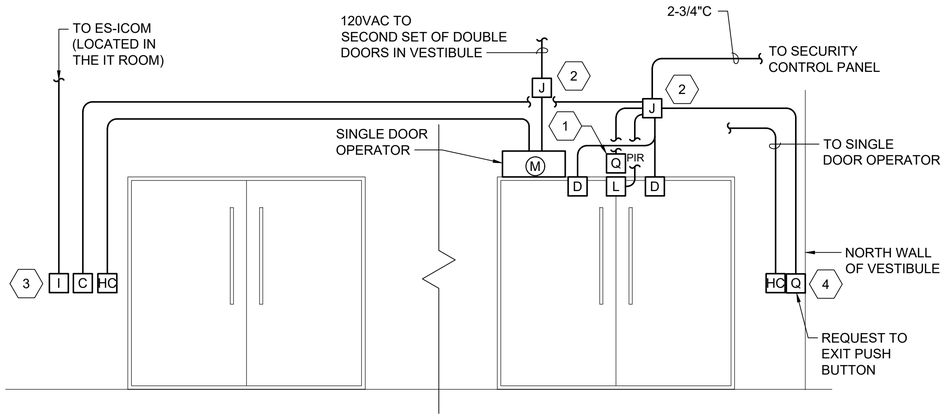
| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY DETAILS I

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E335 | **rev.** – 0 |
| **sheet** 410 **of** 542 sheets | |
| **file** 98101_E335.dwg | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**GENERAL NOTES:**

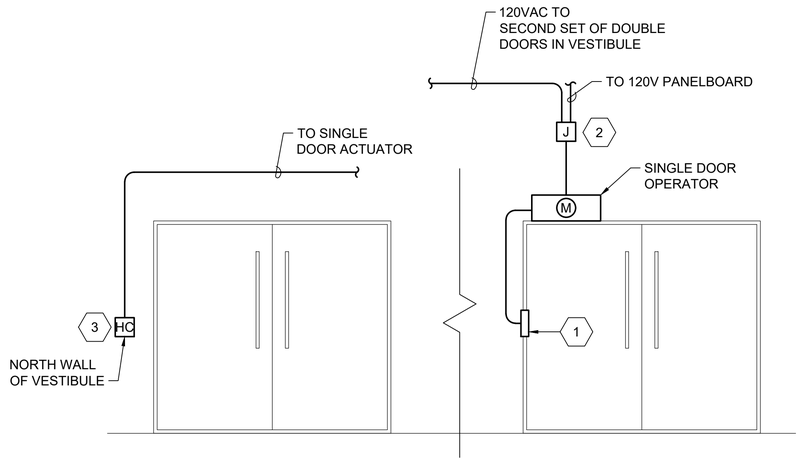
1. ALL CONDUIT SHALL BE INSTALLED WITHIN WALL IF DEVICES ARE LOCATED IN A FINISHED AREA.
2. JUNCTION BOXES FOR CARD READER, INTERCOM AND HANDICAP DOOR OPERATOR PUSH PLATE BOXES SHALL BE FLUSH MOUNTED WITHIN EXTERIOR WALL. ALL CONDUIT SHALL BE KEPT CONCEALED WITHIN WALL AND ABOVE CEILING IN VESTIBULE.
3. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.
4. INSTALL DOOR OPERATORS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COORDINATE QUANTITY OF POWER CONNECTIONS TO DOOR OPERATOR.
5. ADJUST DOOR OPERATOR TIMER SETTINGS TO ALLOW SUFFICIENT TIME TO CLEAR DOOR. VERIFY OPERATION OF PIR PROXIMITY SENSORS.

**KEYED NOTES:**

1. REQUEST TO EXIT PIR SENSOR SHALL BE INSTALLED ABOVE DOOR.
2. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 12-INCHES ABOVE FINISHED CEILING.
3. INSTALL EXTERIOR BOXES AT 42-INCHES FROM CENTERLINE OF BOX TO CONCRETE WALKWAY.
4. INSTALL HANDICAP PUSH PLATE JUNCTION BOX AND REQUEST TO EXIT PUSH BUTTON JUNCTION BOX AT 42-INCHES FROM CENTERLINE OF BOX TO FINISHED FLOOR.

**MAIN BUILDING ENTRY DOORS - WITH CARD READER, INTERCOM AND HANDICAP DOOR OPERATOR PUSH PLATE**

NOT TO SCALE




**GENERAL NOTES:**

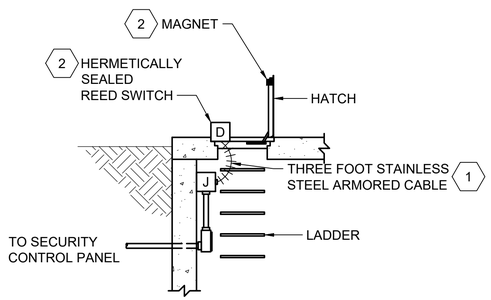
1. ALL CONDUIT SHALL BE INSTALLED CONCEALED WITHIN WALL IF DEVICES ARE LOCATED IN A FINISHED AREA.
2. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE.
3. INSTALL DOOR OPERATOR IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COORDINATE QUANTITY OF POWER CONNECTIONS TO DOOR OPERATOR.
4. ADJUST DOOR OPERATOR TIMER SETTINGS TO ALLOW SUFFICIENT TIME TO CLEAR DOOR. VERIFY OPERATION OF PIR PROXIMITY SENSORS.

**KEYED NOTES:**

1. INSTALL JAMB MOUNTED BOX (FOR HANDICAP PUSH PLATE) AT 42-INCHES FROM CENTERLINE OF BOX TO FINISHED FLOOR.
2. JUNCTION BOX SHALL BE INSTALLED A MINIMUM OF 12-INCHES ABOVE FINISHED CEILING.
3. INSTALL HANDICAP PUSH PLATE JUNCTION BOX AT 42-INCHES FROM CENTERLINE OF BOX TO FINISHED FLOOR.

**MAIN BUILDING ENTRY DOORS - JAMB MOUNTED HANDICAP DOOR OPERATOR PUSH PLATE**

NOT TO SCALE




**GENERAL NOTES:**

1. ALL CONDUIT SHALL BE 3/4-INCH UNLESS NOTED OTHERWISE. ALL BURIED CONDUIT SHALL BE A MINIMUM OF 1-INCH.
2. CONDUIT AND JUNCTION BOXES SHALL BE SURFACE MOUNTED.

**KEYED NOTES:**

1. JUNCTION BOX SHALL BE INSTALLED 12-INCHES BELOW UNDERSIDE OF TOP SLAB NEAR HATCH OPENING. SPLICES IN MANUFACTURER CABLES WILL NOT BE ACCEPTABLE. PROXIMITY SWITCH CABLE SHALL BE TERMINATED ON TERMINAL BLOCKS WITHIN JUNCTION BOX.
2. COORDINATE WITH PROXIMITY SWITCH MANUFACTURER FOR INSTALLATION ON HATCH AND HATCH OPENING.

**HATCH OPENING - MONITORED**

NOT TO SCALE

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

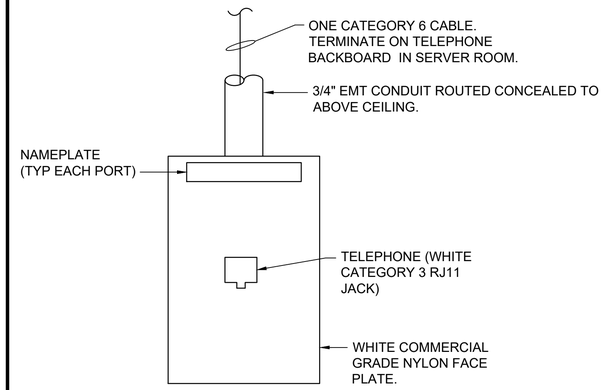
**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY DETAILS II

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E336 | **rev.** 0 |
| **sheet** 411 **of** 542 sheets | |
| **file** 98101_E336.dwg | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

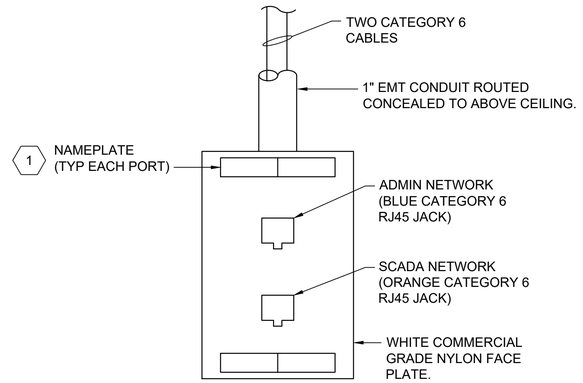
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E336.DWG 10/14/2020 6:06 PM JHDAVIS

Scale For Microfilming: Millimeters / Inches




**TYPICAL VOICE ONLY OUTLET FACEPLATE CONFIGURATION**
NOT TO SCALE

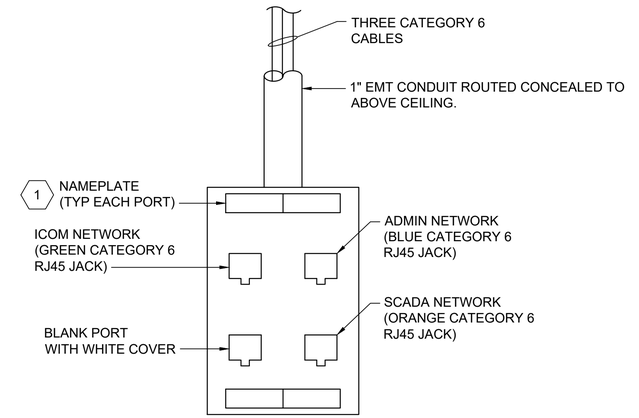
**PLAN SYMBOL**
(D)T




**TYPICAL ADMIN AND SCADA NETWORKS OUTLET FACEPLATE CONFIGURATION**
NOT TO SCALE

**PLAN SYMBOL**
(D)2

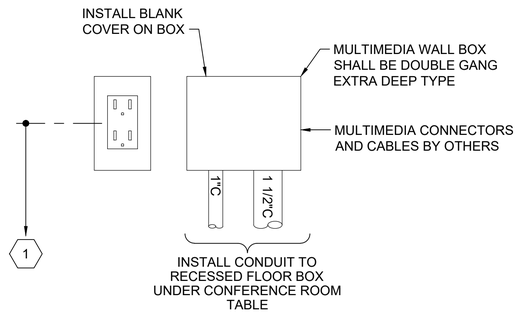
**KEYED NOTE:**
1. NAMEPLATE SHALL BE INSCRIBED WITH THE NETWORK DESIGNATION AND PATCH PANEL INDEX. e.g. ADMIN-17, ICOM-9.




**TYPICAL ADMIN, SCADA, ICOM NETWORKS OUTLET FACEPLATE CONFIGURATIONS**
NOT TO SCALE

**PLAN SYMBOL**
(D)4

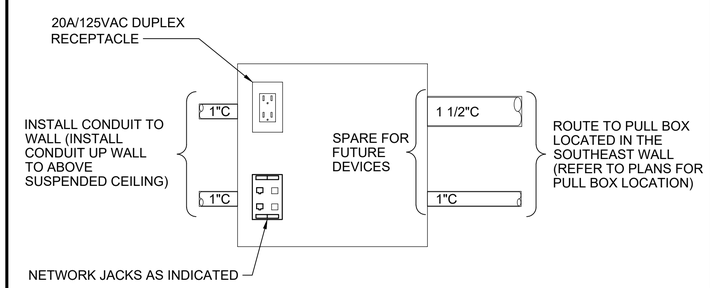
**KEYED NOTE:**
1. NAMEPLATE SHALL BE INSCRIBED WITH THE NETWORK DESIGNATION AND PATCH PANEL INDEX. e.g. ADMIN-17, ICOM-9.



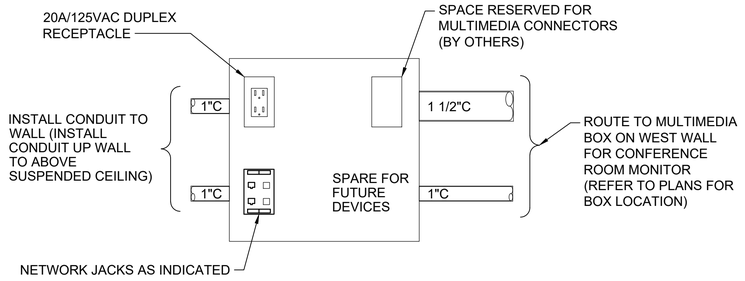

**TYPICAL MULTIMEDIA OUTLET CONFIGURATION FOR MONITOR SCREEN**
NOT TO SCALE

**PLAN SYMBOL**
(D)MM

**KEYED NOTE:**
1. INSTALL BOXES 4'-6" ABOVE FINISHED FLOOR. BOXES SHALL BE INSTALLED BEHIND MONITOR COORDINATE FINAL MONITOR LOCATION WITH OWNER. ADJUST LOCATION AS NEEDED TO INSTALL BEHIND THE MONITOR.




**TYPICAL RECESSED FLOOR BOX LAYOUT WITH NETWORK JACKS AND 120V POWER (LOCATED IN CONFERENCE ROOM 202 AND CONTROL ROOM 213)**
(NOT TO SCALE)




**TYPICAL RECESSED FLOOR BOX LAYOUT WITH NETWORK JACKS, 120V POWER, AND MULTIMEDIA**
(NOT TO SCALE)

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COMMUNICATION DETAILS

| project | contract |
|---|---|
| 98101 | |

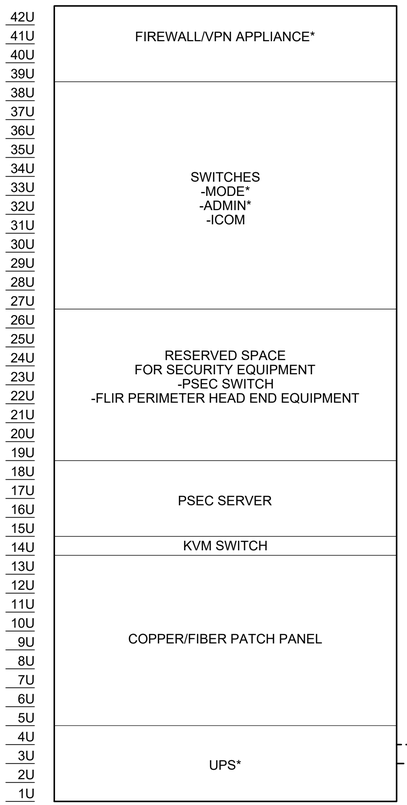
**drawing** E337 – **rev.** 0

**sheet** 412 **of** 542 sheets

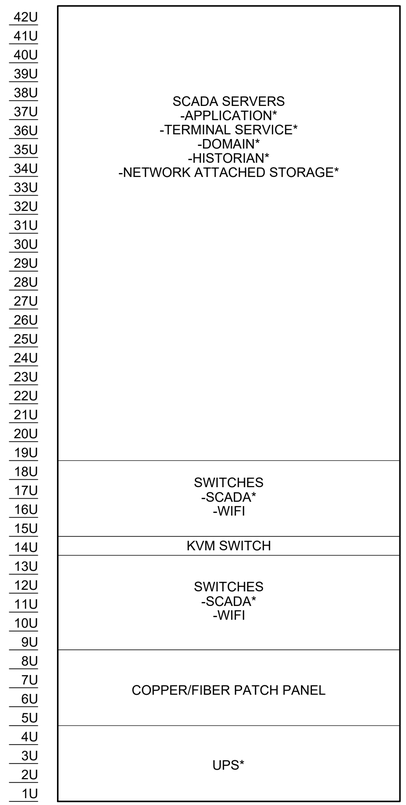
**file** 98101_E337.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

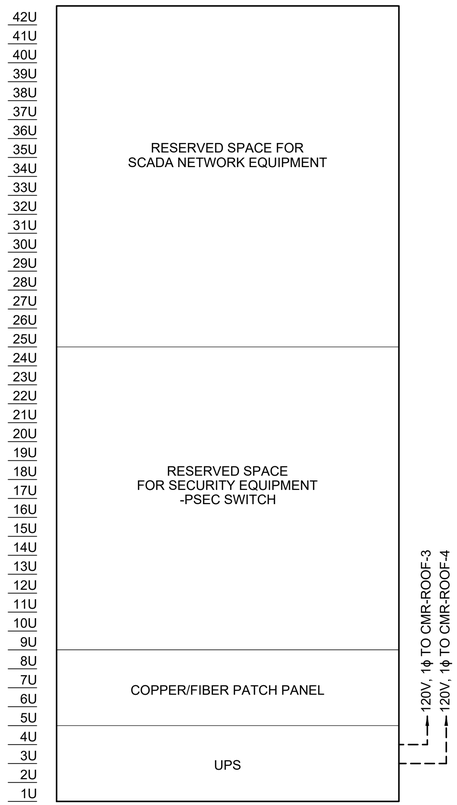
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E337.DWG 10/14/2020 6:09 PM JHDAVIS



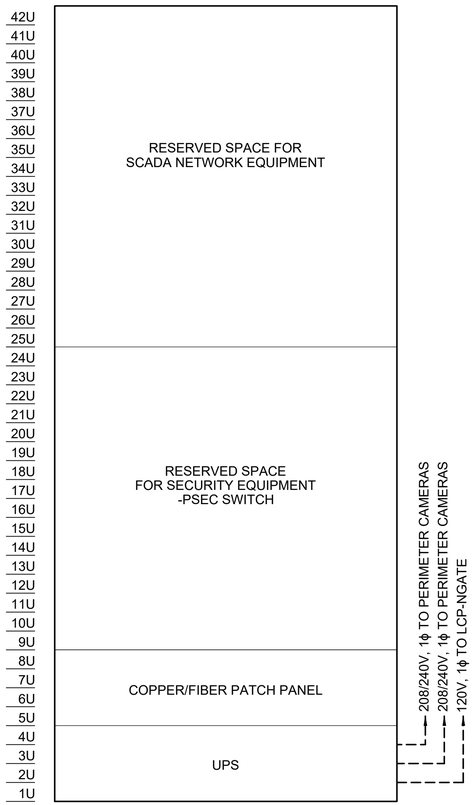

**RACK-IT-1 ELEVATION**
**(LOCATED IN ROOM 211)**
NOT TO SCALE



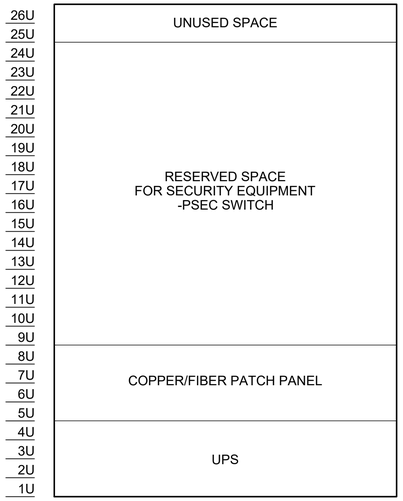

**RACK-SCADA-1 ELEVATION**
**(LOCATED IN ROOM 210)**
NOT TO SCALE




**NWP-MAIN ELEVATION**
**(LOCATED IN ROOM 229)**
NOT TO SCALE




**NWP-SEC ELEVATION**
**(LOCATED IN ROOM 218)**
NOT TO SCALE




**NWP-BWPS ELEVATION**
**(LOCATED IN RM 304)**
NOT TO SCALE

**GENERAL NOTES:**

1. PROVIDE ALL NETWORK RACKS WITH ZERO-U, VERTICAL MOUNT. RACK METERED POWER DISTRIBUTION UNIT WITH LOAD CAPACITY AS REQUIRED AND A MINIMUM OF EIGHT (8) NEMA 5-20R RECEPTACLES.
2. PROVIDE ALL NETWORK RACKS WITH A MINIMUM 2U COPPER PATCH PANEL. MINIMUM DENSITY SHALL BE 24-PORTS PER RACK UNIT.
3. PROVIDE ALL NETWORK RACKS WITH A MINIMUM 2U FIBER PATCH PANEL. MINIMUM DENSITY SHALL BE 4 CASSETTES PER RACK UNIT. EACH CASSETTE SHALL BE PROVIDED WITH DUPLEX LC CONNECTORS WITH ADAPTER COLOR AS SCHEDULED. MINIMUM DENSITY SHALL BE 12 FIBER STRANDS PER CASSETTE.
4. '*' DENOTES EQUIPMENT PROVIDED BY THE CITY OF THORNTON.

| NETWORK COLOR CODE | |
|---|---|
| NETWORK | NETWORK COLOR DESIGNATION |
| ADMIN | BLUE |
| ICOM | GREEN |
| SCADA | ORANGE |
| PSEC* | BEIGE |
| SINGLE-MODE FIBER** | YELLOW |
| ANALOG TELEPHONE | WHITE |
| | |

*PANIC BUTTONS, ACCESS CONTROL, CAMERAS
**SINGLE-MODE FIBER SHALL BE YELLOW REGARDLESS OF NETWORK AFFILIATION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

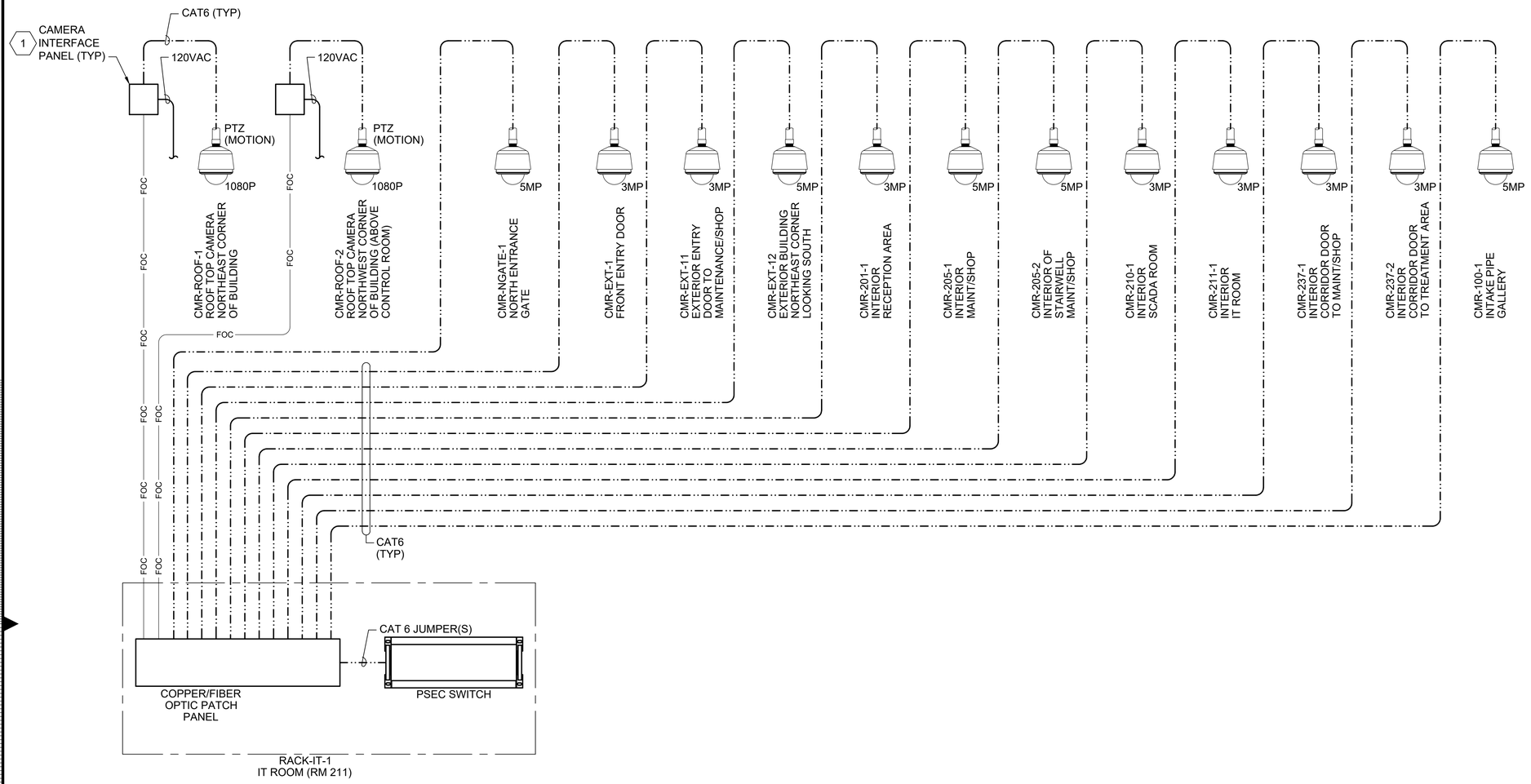
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
RACK ELEVATIONS

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E338 | **rev.** 0 |
| **sheet** 413 **of** 542 sheets | |
| **file** 98101_E338.dwg | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECURITY CAMERA RISER DIAGRAM**

**KEYED NOTES:**

1 CAMERA INTERFACE PANEL BY DIVISION 28.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY CAMERA RISER DIAGRAMS I

| | |
|---|---|
| **project** 98101 | **contract** |

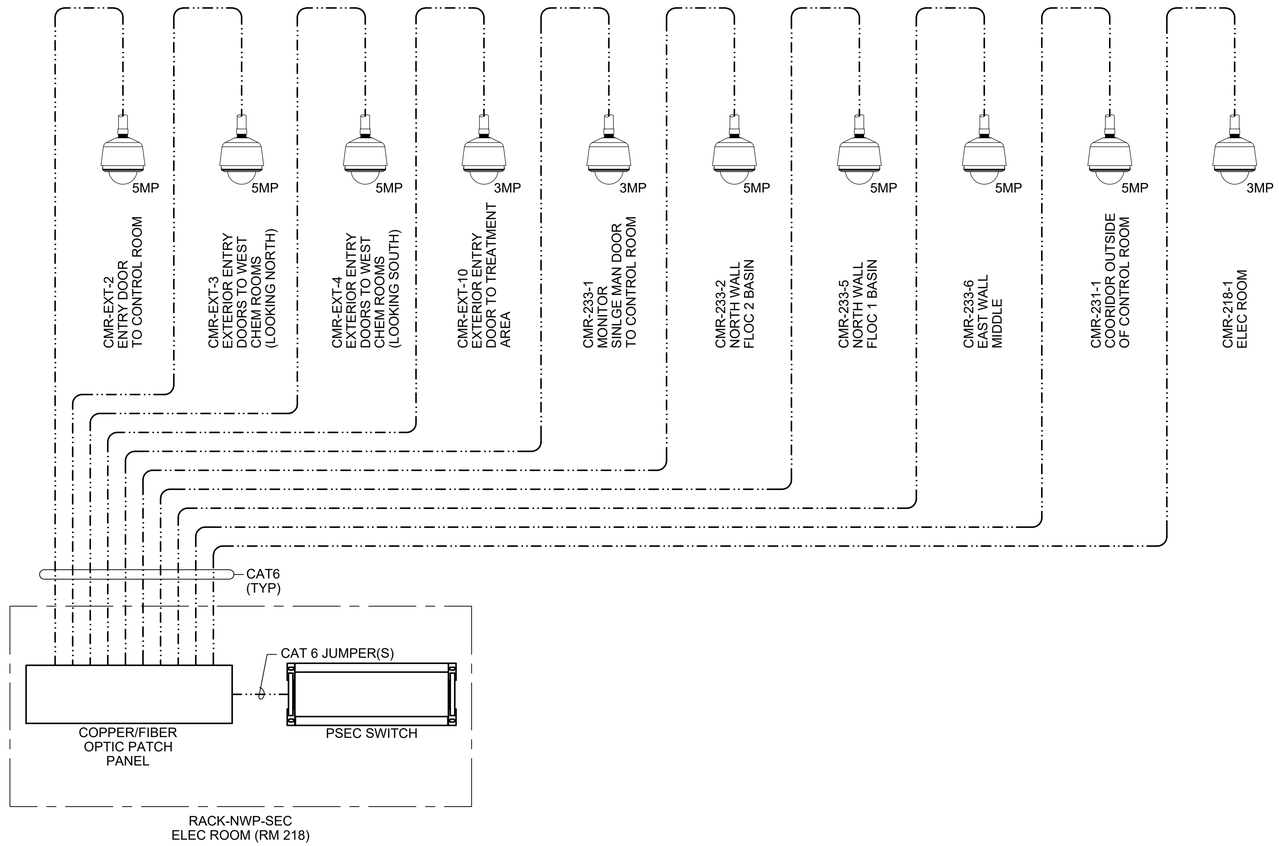
**drawing** E339 – **rev.** 0

**sheet** 414 **of** 542 sheets

**file** 98101_E339.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches




**SECURITY CAMERA RISER DIAGRAM**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY CAMERA
RISER DIAGRAMS II

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** E340 – **rev.** 0

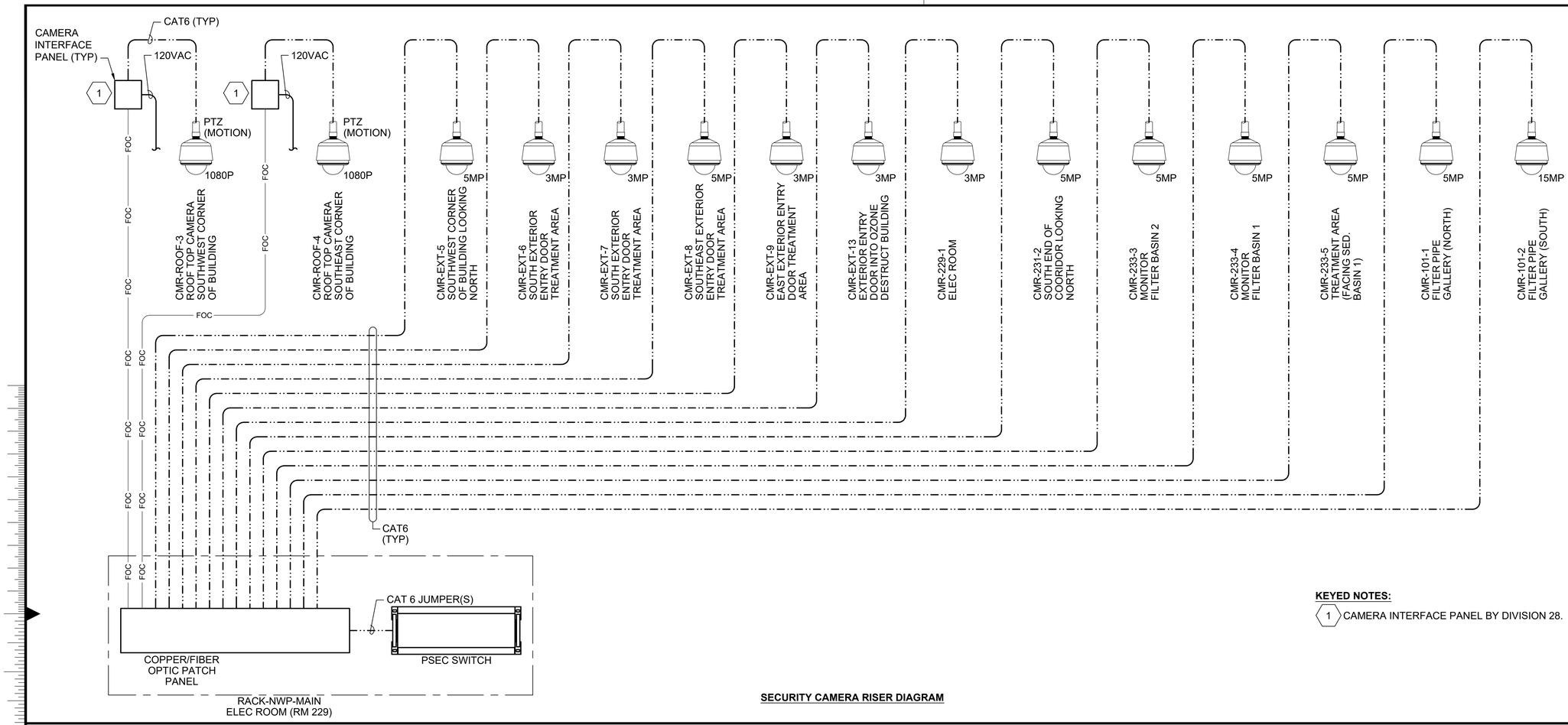
**sheet** 415 **of** 542 sheets

**file** 98101_E340.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

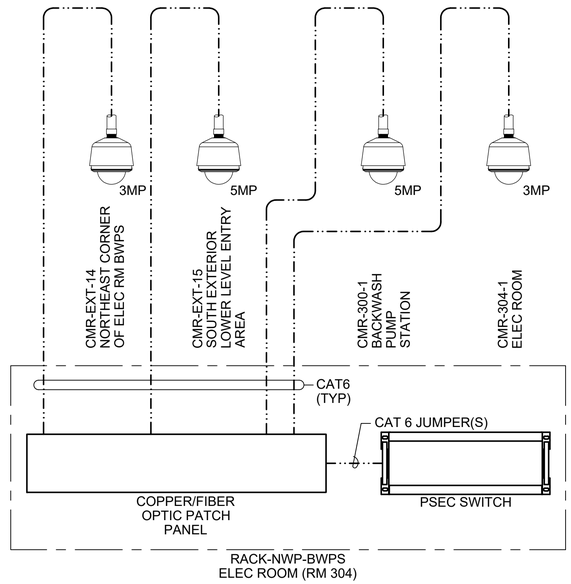
Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E340.DWG 10/14/2020 6:06 PM JHDAVIS




**KEYED NOTES:**

1 CAMERA INTERFACE PANEL BY DIVISION 28.

**SECURITY CAMERA RISER DIAGRAM**




**SECURITY CAMERA RISER DIAGRAM**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SECURITY CAMERA RISER DIAGRAMS III

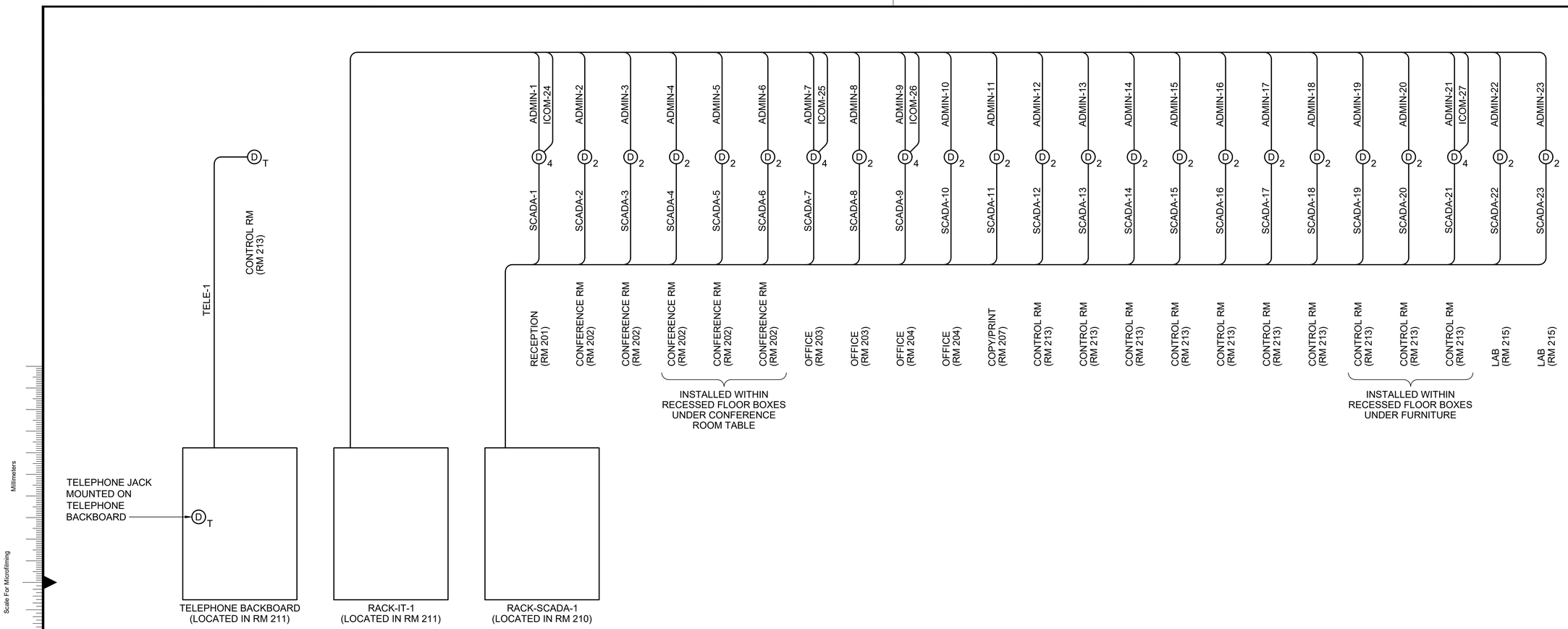
| project | contract |
|---|---|
| 98101 | |

drawing **E341** – rev. **0**

sheet 416 of 542 sheets

file 98101_E341.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**COMMUNICATION RISER DIAGRAM**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

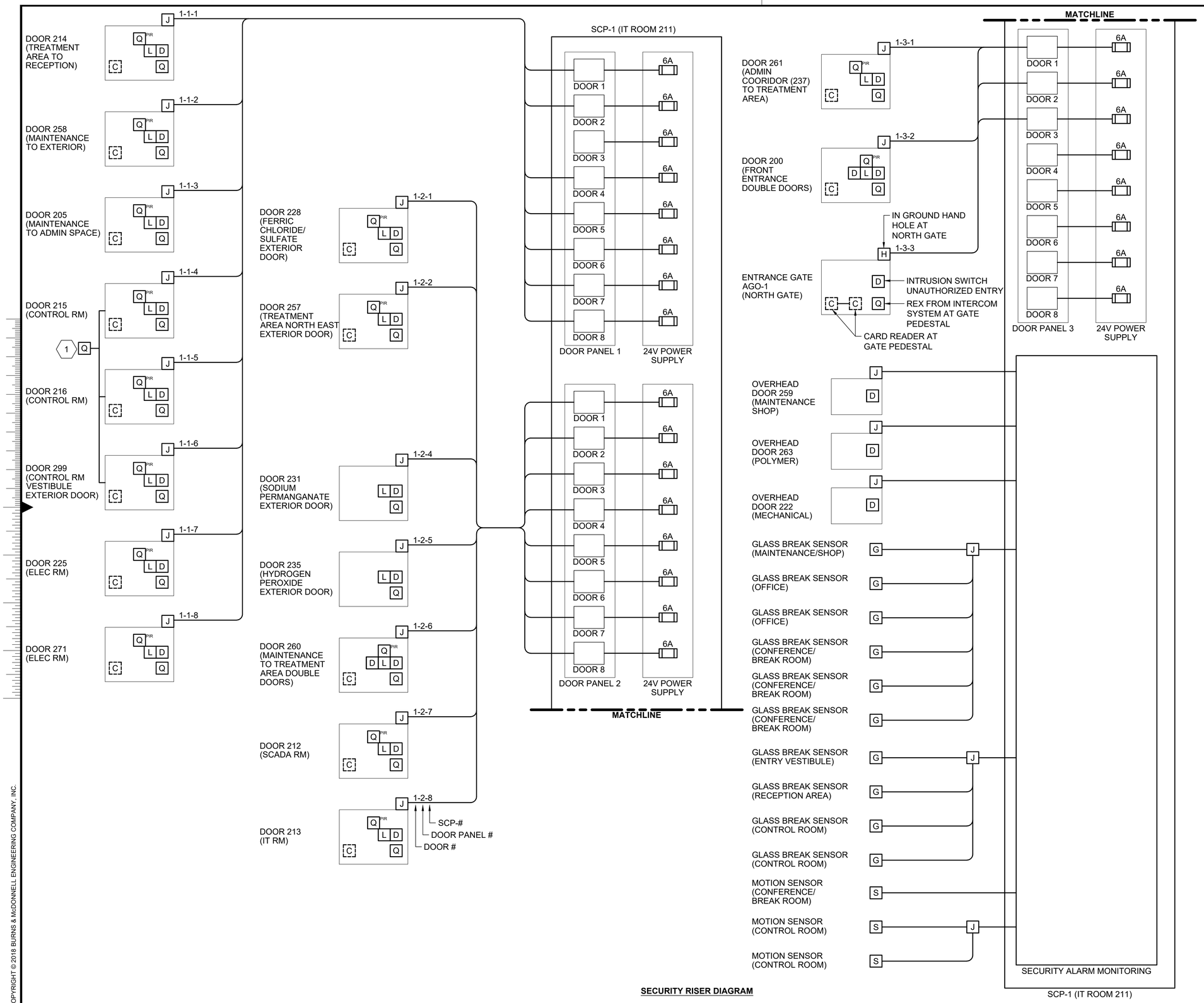
| | |
|---|---|
| **date** APRIL 2021 | **detailed** J. RECKART |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COMMUNICATION RISER DIAGRAM

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** E342 | **rev.** 0 |
| **sheet** 417 **of** 542 sheets | |
| **file** 98101_E342.dwg | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECURITY RISER DIAGRAM**

**GENERAL NOTES:**

1. REFER TO ARCH SHEETS FOR DOOR NUMBERS.

**KEYED NOTES:**

1. REMOTE REQUEST-TO-EXIT PUSH BUTTON TO BE MOUNTED ON CENTRAL DESK IN CONTROL ROOM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

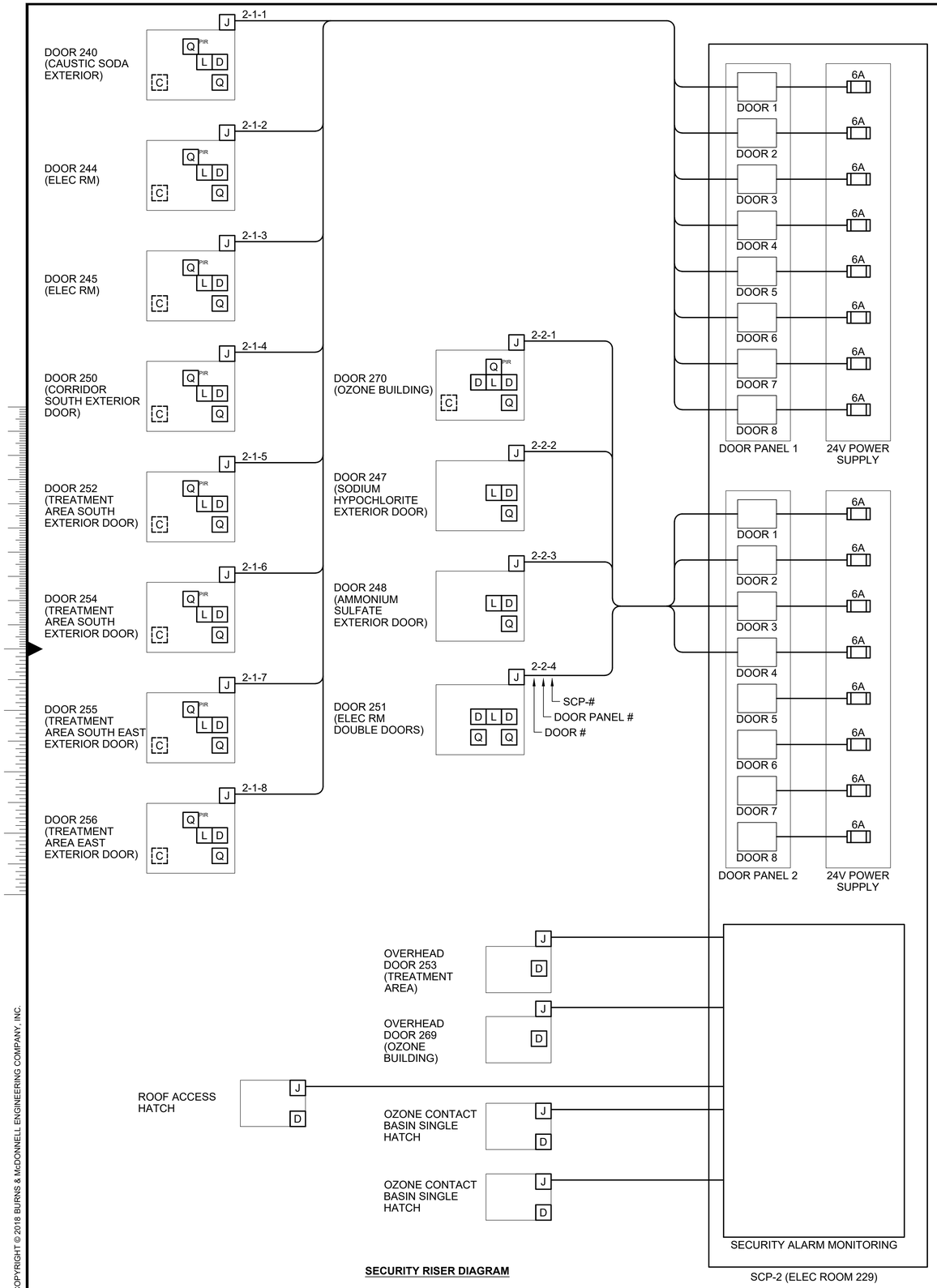
| | |
|---|---|
| date APRIL 2021 | detailed J. RECKART |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

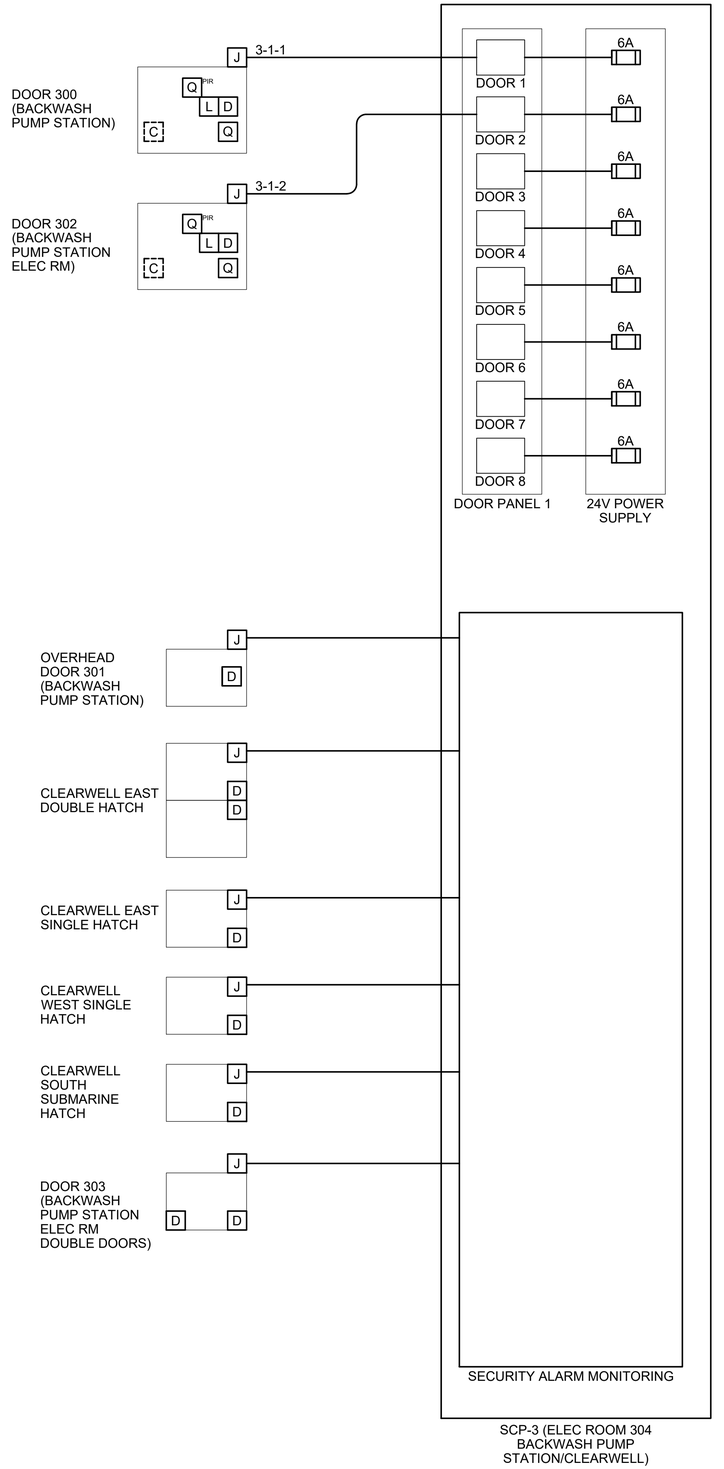
**CITY OF THORNTON**
**TTP - PACKAGE 3**
SCP-1 SECURITY RISER DIAGRAM

| | |
|---|---|
| project 98101 | contract |
| drawing **E343** | rev. **0** |
| sheet 418 of 542 sheets | |
| file 98101_E343.dwg | |

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.




**SECURITY RISER DIAGRAM**




**SECURITY RISER DIAGRAM**

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SCP-2 AND SCP-3
SECURITY RISER DIAGRAMS

| project | contract |
|---|---|
| 98101 | |

**drawing** E344 — **rev.** 0

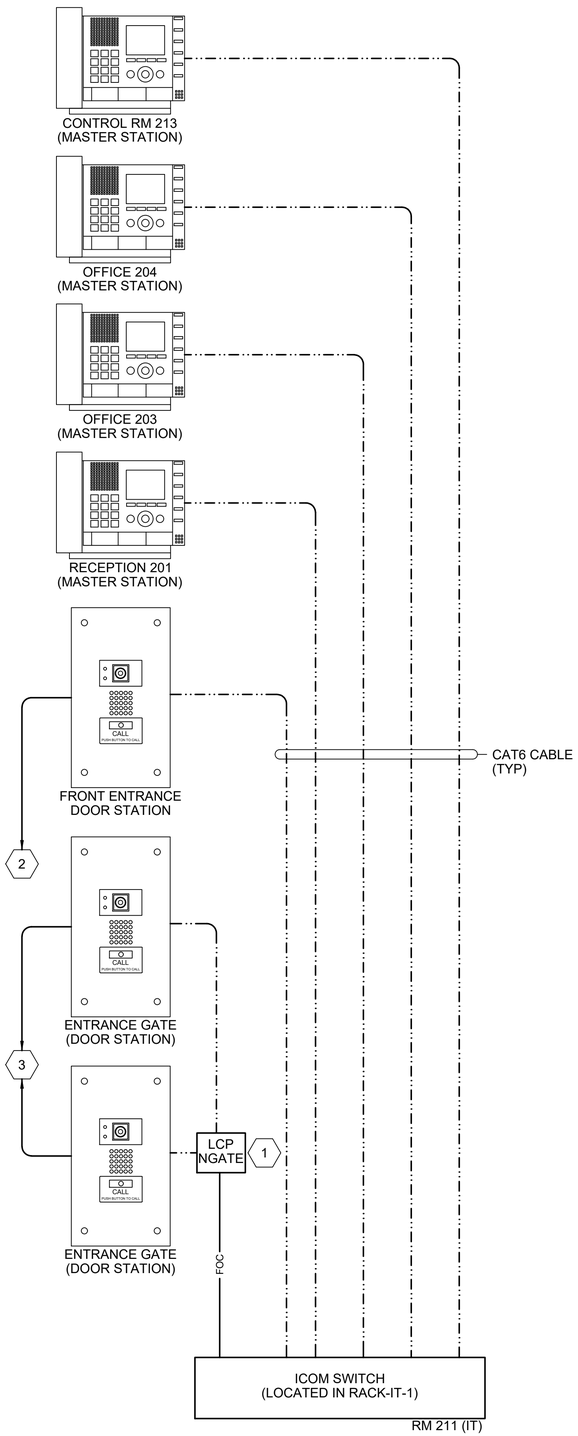
**sheet** 419 **of** 542 sheets

**file** 98101_E344.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E344.DWG 10/14/2020 6:10 PM JHDAVIS




**INTERCOM RISER DIAGRAM**

**KEYED NOTES:**

1. INSTALL FIBER TO COPPER SWITCH IN JUNCTION BOX ADJACENT TO THE GATE OPERATOR. INSTALL CAT 6 CABLE BETWEEN DOOR STATION CONTROLLER AND SWITCH. MULTI-MODE FIBER OPTIC CABLE SHALL BE INSTALLED BETWEEN THE SWITCH AND THE ICOM SWITCH. REFER TO DRAWING E003 FOR DETAILS.
2. INSTALL CABLE BETWEEN DOOR RELEASE CONTACT OF DOOR STATION CONTROLLER AND REQUEST-TO-EXIT DEVICE TO ALLOW FOR OPENING OF FRONT ENTRANCE DOOR FROM MASTER STATIONS.
3. INSTALL CABLE BETWEEN DOOR RELEASE CONTACT OF DOOR STATION CONTROLLER LOCATED ON PEDESTAL AND GATE OPERATOR TO ALLOW FOR OPENING OF FRONT ENTRANCE GATE FROM MASTER STATIONS.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | ED | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | J. RECKART |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
INTERCOM RISER DIAGRAM

| project | contract |
|---|---|
| 98101 | |

**drawing** E345 – **rev.** 0

**sheet** 420 **of** 542 sheets

**file** 98101_E345.dwg

COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\ELEC\PROD_DWGS\98101_E345.DWG 10/14/2020 6:10 PM JHDAVIS

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P003-1 | EG-1 | EMERGENCY GENERATOR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P003-2 | EG-1 | EMERGENCY GENERATOR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P003-3 | EG-1 | EMERGENCY GENERATOR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P003-4 | EG-1 | EMERGENCY GENERATOR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P-FAPAUG75116 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-AUG-75116 | FLOC-AID POLYMER AUGER FEED | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FAPC75105 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-C-75105 | FLOC-AID POLYMER AIR COMPRESSOR | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FIT75101 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75101 | GAC FILTER #1 FLOW | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FIT75102 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75102 | GAC FILTER #2 FLOW | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FIT75141 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75141 | FLOC-AID TO TRAIN #1 FLOW | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FIT75142 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75142 | FLOC-AID TO TRAIN #2 FLOW | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FAPMXR75120 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-MXR-75120 | FLOC-AID POLYMER MIXER | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FAPP75110 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75110 | FLOC-AID POLYMER MAKEUP PUMP | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| P-FAPVIB75116 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-VIB-75116 | FLOC-AID POLYMER BIN VIBRATOR | PWR | | 0 | | | | HOLD FOR SUBMITTAL |
| LC051-3 | LC-051 | LIGHTING CONTACTOR [218] | AREA LIGHTS | | PWR | SE2 | 2 | 1/C | #6 AWG | #10 AWG | |
| LC052-3 | LC-052 | LIGHTING CONTACTOR [229] | AREA LIGHTS | | PWR | SE2 | 2 | 1/C | #6 AWG | #10 AWG | |
| P-AMSTP77010 | LCP-AMS | TRANSFER PUMP CONTROLLER | AMS-TP-77010 | AMMONIUM SULFATE TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-CAPTP74010 | LCP-CAP | TRANSFER PUMP CONTROLLER | CAP-TP-74010 | COAG AID POLYMER TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-CASTP71010 | LCP-CAS | TRANSFER PUMP CONTROLLER | CAS-TP-71010 | CAUSTIC SODA TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-FESTP72010 | LCP-FES | TRANSFER PUMP CONTROLLER | FES-TP-72010 | FERRIC SULFATE TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-HYPTP78010 | LCP-HYP | TRANSFER PUMP CONTROLLER | HYP-TP-78010 | HYDROGEN PEROXIDE TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-SHPTP73010 | LCP-SHP | TRANSFER PUMP CONTROLLER | SHP-TP-73010 | SODIUM HYPO TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P-SPETP76010 | LCP-SPE | TRANSFER PUMP CONTROLLER | SPE-TP-76010 | SODIUM PERMANGANATE TRANSFER PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE I

| | |
|---|---|
| project 98101 | contract |
| drawing E346 — 0 | rev. |
| sheet 421 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPADMIN-15 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [200,201] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-27 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [201] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-12 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [202] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-14 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [202] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-16 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [202] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-21 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [203] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-10 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [204] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-17 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [205] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-19 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [205] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-25 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [206,207,208,209] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-11 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [208,209 GFI] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-29 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [210] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-31 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [211] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-22 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [214] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-24 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [214] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-30 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-32 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-33 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-34 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-36 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [218] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-23 | LP-ADMIN | 120/208V LIGHTING PANEL | COs [ROOF] | | PWR | SE2 | 2 | 1/C | #10 AWG | #12 AWG | |
| LPADMIN-6 | LP-ADMIN | 120/208V LIGHTING PANEL | GD-214 | GARBAGE DISPOSAL [214] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-8 | LP-ADMIN | 120/208V LIGHTING PANEL | GD-237 | GARBAGE DISPOSAL [237] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-35 | LP-ADMIN | 120/208V LIGHTING PANEL | GLASS WASHER [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-5 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [200,202] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-20 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [201] | NIGHT LIGHTS | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-9 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [203,204,206,207,208,209] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-3 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [205] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-1 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [210,211] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-7 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [210] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-28 | LP-ADMIN | 120/208V LIGHTING PANEL | LIGHTS [213,214,215,218] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-2,4 | LP-ADMIN | 120/208V LIGHTING PANEL | OVEN [214] | OVEN [214] | PWR | SVN3 | 2 | 1/C | #8 AWG | #10 AWG | |
| LPADMIN-18 | LP-ADMIN | 120/208V LIGHTING PANEL | REFRIGERATOR [202] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-26 | LP-ADMIN | 120/208V LIGHTING PANEL | REFRIGERATOR [214] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-37 | LP-ADMIN | 120/208V LIGHTING PANEL | REFRIGERATOR [215] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPADMIN-13 | LP-ADMIN | 120/208V LIGHTING PANEL | WATER COOLER [201] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE II

| | |
|---|---|
| project 98101 | contract |

drawing **E347 — 0** rev.

sheet 422 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPBWPS-25 | LP-BWPS | 120/208V LIGHTING PANEL | COs [300] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-3 | LP-BWPS | 120/208V LIGHTING PANEL | COs [300] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-5 | LP-BWPS | 120/208V LIGHTING PANEL | COs [304] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-10 | LP-BWPS | 120/208V LIGHTING PANEL | FWT-SMP-62010 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FWT-SMP-62011, INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPBWPS-19 | LP-BWPS | 120/208V LIGHTING PANEL | LC-053 | LIGHTING CONTACTOR [304] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-053-1 |
| LPBWPS-21 | LP-BWPS | 120/208V LIGHTING PANEL | LC-053 | LIGHTING CONTACTOR [304] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-053-2 |
| LPBWPS-13 | LP-BWPS | 120/208V LIGHTING PANEL | LIGHTS [300] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-15 | LP-BWPS | 120/208V LIGHTING PANEL | LIGHTS [304] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-1 | LP-BWPS | 120/208V LIGHTING PANEL | NIGHT LIGHTS [BWPS] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-4 | LP-BWPS | 120/208V LIGHTING PANEL | NWP-BWPS | BWPS ELEC ROOM [304] NETWORK RACK | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-12 | LP-BWPS | 120/208V LIGHTING PANEL | OHD-5 | OVERHEAD DOOR [300] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| LPBWPS-2 | LP-BWPS | 120/208V LIGHTING PANEL | PLC-BWPS | CLEARWELL PLC CABINET | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-6 | LP-BWPS | 120/208V LIGHTING PANEL | SCP-3 | SECURITY PANEL [304] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-16 | LP-BWPS | 120/208V LIGHTING PANEL | SP-10 | SUMP PUMP [300] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | INSTALL THROUGH TIMER SWITCH |
| LPBWPS-7 | LP-BWPS | 120/208V LIGHTING PANEL | UH-5, UH-6 | UNIT HEATER [300] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-9 | LP-BWPS | 120/208V LIGHTING PANEL | UH-7, UH-8 | UNIT HEATER [300] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPBWPS-11 | LP-BWPS | 120/208V LIGHTING PANEL | UH-9, UH-10 | UNIT HEATER [300] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE III

| project | contract |
|---|---|
| 98101 | |

**drawing** E348 — 0 **rev.**

**sheet** 423 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPCHEM-21 | LP-CHEM | 120/208V LIGHTING PANEL | AMS-P-77001 | AMMONIUM SULFATE DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & AMS-P-77002/3 |
| LPCHEM-3 | LP-CHEM | 120/208V LIGHTING PANEL | CAP-P-74001 | COAG AID POLYMER DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & CAP-P-74002/3 |
| LPCHEM-11 | LP-CHEM | 120/208V LIGHTING PANEL | CAS-P-71001 | CAUSTIC SODA DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & CAS-P-71002/3/4/5 |
| LPCHEM-1 | LP-CHEM | 120/208V LIGHTING PANEL | FAP-P-75001 | FLOC-AID POLYMER DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & FAP-P-75002/3 |
| LPCHEM-5 | LP-CHEM | 120/208V LIGHTING PANEL | FES-P-72001 | FERRIC SULFATE DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & FES-P-72002/3 |
| LPCHEM-9 | LP-CHEM | 120/208V LIGHTING PANEL | HYP-P-78001 | HYDROGEN PEROXIDE DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & HYP-P-78002/3 |
| LPCHEM-37,39,41 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-AMS | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-20,22,24 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-CAP | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-25,27,29 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-CAS | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-26,28,30 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-FES | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-38,40,42 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-HYP | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-31,33,35 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-SHP | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-32,34,36 | LP-CHEM | 120/208V LIGHTING PANEL | LCP-SPE | TRANSFER PUMP CONTROLLER | PWR | SVV1 | 1 | 5/C | #12 AWG | | |
| LPCHEM-15 | LP-CHEM | 120/208V LIGHTING PANEL | PHA-P-79501 | PHOSPHORIC ACID DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & PHA-P-79502 |
| LPCHEM-23 | LP-CHEM | 120/208V LIGHTING PANEL | PSA-AF-66100 | CHEMICAL AREA AIR DRYER/FILTER | PWR | SVV1 | 1 | 3/C | #12 AWG | | |
| LPCHEM-13 | LP-CHEM | 120/208V LIGHTING PANEL | SBI-P-79001 | SODIUM BISULFITE DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & SBI-P-79002/3 |
| LPCHEM-17 | LP-CHEM | 120/208V LIGHTING PANEL | SHP-P-73001 | SODIUM HYPO DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & SHP-P-73002/3 |
| LPCHEM-19 | LP-CHEM | 120/208V LIGHTING PANEL | SHP-P-73004 | SODIUM HYPO DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & SHP-P-73005/6 |
| LPCHEM-2 | LP-CHEM | 120/208V LIGHTING PANEL | SP-01 | SUMP PUMP [219] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-4 | LP-CHEM | 120/208V LIGHTING PANEL | SP-02 | SUMP PUMP [221] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-6 | LP-CHEM | 120/208V LIGHTING PANEL | SP-03 | SUMP PUMP [222] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-8 | LP-CHEM | 120/208V LIGHTING PANEL | SP-04 | SUMP PUMP [223] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-10 | LP-CHEM | 120/208V LIGHTING PANEL | SP-05 | SUMP PUMP [224] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-12 | LP-CHEM | 120/208V LIGHTING PANEL | SP-06 | SUMP PUMP [224] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-14 | LP-CHEM | 120/208V LIGHTING PANEL | SP-07 | SUMP PUMP [228] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-16 | LP-CHEM | 120/208V LIGHTING PANEL | SP-08 | SUMP PUMP [228] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-18 | LP-CHEM | 120/208V LIGHTING PANEL | SP-09 | SUMP PUMP [230] | PWR | SVV1 | 1 | 3/C | #12 AWG | | INSTALL THROUGH TIMER SWITCH |
| LPCHEM-7 | LP-CHEM | 120/208V LIGHTING PANEL | SPE-P-76001 | SODIUM PERMANGANATE DOSING PUMP | PWR | SVV1 | 1 | 3/C | #12 AWG | | & SPE-P-76002/3 |
| LPIT-23 | LP-IT | 120/208V LIGHTING PANEL | COs [NGATE] | | PWR | SE2 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPIT-13 | LP-IT | 120/208V LIGHTING PANEL | FACP-1 | MAIN BUILDING FIRE ALARM PANEL | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-21 | LP-IT | 120/208V LIGHTING PANEL | MCP-MECH | BUILDING AUTOMATION CONTROLS | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-7 | LP-IT | 120/208V LIGHTING PANEL | MOCP | MAIN OZONE CONTROL PANEL | PWR | SVN3 | 2 | 1/C | #8 AWG | #10 AWG | |
| LPIT-2,4 | LP-IT | 120/208V LIGHTING PANEL | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPIT-15 | LP-IT | 120/208V LIGHTING PANEL | OZN-LCP-31001 | NITROGEN BOOST PANEL | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-3 | LP-IT | 120/208V LIGHTING PANEL | PLC-CHM1 | CHEMICAL AREA PLC CABINET | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-1 | LP-IT | 120/208V LIGHTING PANEL | PLC-PRE | PRE TREATMENT PLC CABINET | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-14,16 | LP-IT | 120/208V LIGHTING PANEL | RACK-IT-1 | IT ROOM NETWORK RACK | PWR | SVN3 | 3 | 1/C | #10 AWG | #10 AWG | |
| LPIT-18,20 | LP-IT | 120/208V LIGHTING PANEL | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | PWR | SVN3 | 3 | 1/C | #10 AWG | #10 AWG | |
| LPIT-11 | LP-IT | 120/208V LIGHTING PANEL | SCP-1 | SECURITY PANEL [211] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-17 | LP-IT | 120/208V LIGHTING PANEL | TB-1 | ANALOG TELEPHONE BACKPLANE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPIT-19 | LP-IT | 120/208V LIGHTING PANEL | TB-2 | FIRE BDA SYSTEM BACKPLANE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE IV

| project | contract |
|---|---|
| 98101 | |

**drawing** **E349 — 0** **rev.**

**sheet** 424 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPMAIN-31 | LP-MAIN | 120/208V LIGHTING PANEL | CCC-SMP-62001 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & CCC-SMP-62002, INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPMAIN-2 | LP-MAIN | 120/208V LIGHTING PANEL | COs [101] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-4 | LP-MAIN | 120/208V LIGHTING PANEL | COs [110] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-15 | LP-MAIN | 120/208V LIGHTING PANEL | COs [222,223,224] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-17 | LP-MAIN | 120/208V LIGHTING PANEL | COs [225,226,234] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-21 | LP-MAIN | 120/208V LIGHTING PANEL | COs [228] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-19 | LP-MAIN | 120/208V LIGHTING PANEL | COs [229] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-23 | LP-MAIN | 120/208V LIGHTING PANEL | COs [230] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-6 | LP-MAIN | 120/208V LIGHTING PANEL | COs [232,235] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-10 | LP-MAIN | 120/208V LIGHTING PANEL | COs [233 SOUTH] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-8 | LP-MAIN | 120/208V LIGHTING PANEL | COs [ROOF] | | PWR | SE2 | 2 | 1/C | #10 AWG | #12 AWG | |
| LPMAIN-41 | LP-MAIN | 120/208V LIGHTING PANEL | FLT-SMP-43000 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPMAIN-38 | LP-MAIN | 120/208V LIGHTING PANEL | LC-052 | LIGHTING CONTACTOR [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-052-1 |
| LPMAIN-40 | LP-MAIN | 120/208V LIGHTING PANEL | LC-052 | LIGHTING CONTACTOR [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-052-2 |
| LPMAIN-42 | LP-MAIN | 120/208V LIGHTING PANEL | LC-052 | LIGHTING CONTACTOR [229] | PWR | SVN3 | 2 | 1/C | #6 AWG | #10 AWG | LC-052-3 |
| LPMAIN-18 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [101] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-20 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [101] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-22 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [101] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-24 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [110] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-30 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [222,223,224] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-28 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [225,226] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-34 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [228,230] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-26 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS [229,232,234,235] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-12 | LP-MAIN | 120/208V LIGHTING PANEL | LIGHTS/COs [236] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-7 | LP-MAIN | 120/208V LIGHTING PANEL | LOX-LCP-33001 | LIQUID OXYGEN PANEL | PWR | SE2 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-5 | LP-MAIN | 120/208V LIGHTING PANEL | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-37 | LP-MAIN | 120/208V LIGHTING PANEL | OZO-SMP-36001/2 | SAMPLING PUMPS | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-39 | LP-MAIN | 120/208V LIGHTING PANEL | OZO-SMP-36003/4 | SAMPLING PUMPS | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-3 | LP-MAIN | 120/208V LIGHTING PANEL | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-1 | LP-MAIN | 120/208V LIGHTING PANEL | PLC-FLTR | FILTER PLC CABINET | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAIN-33 | LP-MAIN | 120/208V LIGHTING PANEL | PRE-SMP-26100 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPMAIN-35 | LP-MAIN | 120/208V LIGHTING PANEL | PRE-SMP-26200 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPMAIN-9 | LP-MAIN | 120/208V LIGHTING PANEL | SCP-2 | SECURITY PANEL [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE V

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E350 — 0**

**sheet** 425 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPMAINHVAC-1 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | EF-07A | EXHAUST FAN [226] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPMAINHVAC-3 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | EF-07D | EXHAUST FAN [230] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPMAINHVAC-5 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | EF-08B | EXHAUST FAN [232] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPMAINHVAC-7 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | EF-10 | EXHAUST FAN [236] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPMAINHVAC-20 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-041 | NIGHT LIGHTS [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-22 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-041 | NIGHT LIGHTS [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-24 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-041 | NIGHT LIGHTS [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-26 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-041 | NIGHT LIGHTS [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-28 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-042 | FILTER AREA [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-30 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-042 | FILTER AREA [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-32 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-042 | FILTER AREA [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-34 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | LC-042 | FILTER AREA [229] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-2 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | OHD-2 | OVERHEAD DOOR [236] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-9,11 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | UH-04 | UNIT HEATER [236] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPMAINHVAC-4 | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | UH-13, UH-14, IRH-01 | HEATERS [233] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE VI

| | |
|---|---|
| project 98101 | contract |

drawing **E351 — 0** rev.

sheet 426 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPPRE-32 | LP-PRE | 120/208V LIGHTING PANEL | COs [100] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-16 | LP-PRE | 120/208V LIGHTING PANEL | COs [213] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-043-1 |
| LPPRE-28 | LP-PRE | 120/208V LIGHTING PANEL | COs [213] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-30 | LP-PRE | 120/208V LIGHTING PANEL | COs [213] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-18 | LP-PRE | 120/208V LIGHTING PANEL | COs [216,217] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-043-2 |
| LPPRE-18 | LP-PRE | 120/208V LIGHTING PANEL | COs [216,217] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-8 | LP-PRE | 120/208V LIGHTING PANEL | COs [219,221] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-24 | LP-PRE | 120/208V LIGHTING PANEL | COs [220] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-38 | LP-PRE | 120/208V LIGHTING PANEL | COs [233 EAST] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-36 | LP-PRE | 120/208V LIGHTING PANEL | COs [233 NORTH] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-20 | LP-PRE | 120/208V LIGHTING PANEL | COs [LOX] | | PWR | SE2 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPPRE-26 | LP-PRE | 120/208V LIGHTING PANEL | COs [ROOF] | | PWR | SE2 | 2 | 1/C | #10 AWG | #12 AWG | |
| LPPRE-41 | LP-PRE | 120/208V LIGHTING PANEL | FAP-LCP-75104 | GAC FILTER CONTROL PANEL | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-042-3 |
| LPPRE-11 | LP-PRE | 120/208V LIGHTING PANEL | LC-043 | CHEMICAL CORRIDOR [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-041-2 |
| LPPRE-9 | LP-PRE | 120/208V LIGHTING PANEL | LC-043 | CHEMICAL CORRIDOR [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-041-1 |
| LPPRE-13 | LP-PRE | 120/208V LIGHTING PANEL | LC-044 | SED BASIN AREA [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-041-3 |
| LPPRE-15 | LP-PRE | 120/208V LIGHTING PANEL | LC-044 | SED BASIN AREA [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-041-4 |
| LPPRE-17 | LP-PRE | 120/208V LIGHTING PANEL | LC-044 | SED BASIN AREA [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-042-1 |
| LPPRE-1 | LP-PRE | 120/208V LIGHTING PANEL | LC-051 | LIGHTING CONTACTOR [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-051-1 |
| LPPRE-3 | LP-PRE | 120/208V LIGHTING PANEL | LC-051 | LIGHTING CONTACTOR [218] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-051-2 |
| LPPRE-5 | LP-PRE | 120/208V LIGHTING PANEL | LC-051 | LIGHTING CONTACTOR [218] | PWR | SVN3 | 2 | 1/C | #6 AWG | #10 AWG | LC-051-3 |
| LPPRE-10 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [100] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-12 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [100] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-14 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [100] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-042-4 |
| LPPRE-2 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [216,217] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-6 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [219,220] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-4 | LP-PRE | 120/208V LIGHTING PANEL | LIGHTS [220] | | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-37 | LP-PRE | 120/208V LIGHTING PANEL | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPPRE-39 | LP-PRE | 120/208V LIGHTING PANEL | RP-01 | HOT WATER CIRC PUMP [217] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LC-042-2 |
| LPPRE-33 | LP-PRE | 120/208V LIGHTING PANEL | RWS-SMP-11000-1 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPPRE-35 | LP-PRE | 120/208V LIGHTING PANEL | RWS-SMP-11000-5 | SAMPLING PUMP | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & RWS-SMP-11000-9, INSTALL INDIVIDUAL SWITCH FOR EACH SAMPLE PUMP |
| LPPRE-31 | LP-PRE | 120/208V LIGHTING PANEL | WATER SOFTENER | WATER SOFTENING SYSTEM | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE VII

| project | contract |
|---|---|
| 98101 | |

**drawing** E352 **rev.** 0

**sheet** 427 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

1 2

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LPSECHVAC-18,20 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | CU-01 | CONDENSER UNIT [211] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-22,24 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | CU-02 | CONDENSER UNIT [211] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-26,28 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | CU-03 | CONDENSER UNIT [210] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-30,32 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | CU-04 | CONDENSER UNIT [210] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-19 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | EF-06A | EXHAUST FAN [216] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPSECHVAC-21 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | EF-06C | EXHAUST FAN [222] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & EF-06F VIA STARTERS, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPSECHVAC-25 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | EF-08A | EXHAUST FAN [208,209] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| LPSECHVAC-2,4 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | FCU-01 | FAN COIL UNIT [211] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-6,8 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | FCU-02 | FAN COIL UNIT [211] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-10,12 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | FCU-03 | FAN COIL UNIT [210] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-14,16 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | FCU-04 | FAN COIL UNIT [210] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-1 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | OHD-1 | OVERHEAD DOOR [205] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| LPSECHVAC-3 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | OHD-3 | OVERHEAD DOOR [216] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| LPSECHVAC-5 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | OHD-4 | OVERHEAD DOOR [220] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| LPSECHVAC-7 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-01 | UNIT HEATER [217] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-9 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-02 | UNIT HEATER [224] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-11 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-03 | UNIT HEATER [224] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-13 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-11, UH-12 | UNIT HEATER [231] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-15 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-16 | UNIT HEATER [233] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-17 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | UH-15, IRH-02 | HEATERS [205] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-27,29 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | VAV-01 | DUCT REHEATER [203,204] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-31,33 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | VAV-02 | DUCT REHEATER [237] | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | |
| LPSECHVAC-35,37 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | VAV-03 | DUCT REHEATER [201] | PWR | SVN3 | 2 | 1/C | #10 AWG | #10 AWG | |
| LPSECHVAC-39,41 | LP-SEC-HVAC | 120/208V LIGHTING PANEL | VAV-04 | DUCT REHEATER [202] | PWR | SVN3 | 2 | 1/C | #8 AWG | #10 AWG | |
| P048 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | EF-09 | EXHAUST FAN [304] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| P043 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54001 | BACKWASH SUPPLY PUMP | PWR | SEV2 | 1 | 3/C+G | #4/0 AWG | | LOCAL DISCONNECT W/ AUX CONTACT |
| P044 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54002 | BACKWASH SUPPLY PUMP | PWR | SEV2 | 1 | 3/C+G | #4/0 AWG | | LOCAL DISCONNECT W/ AUX CONTACT |
| P045 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54003 | BACKWASH SUPPLY PUMP | PWR | SEV2 | 1 | 3/C+G | #4/0 AWG | | LOCAL DISCONNECT W/ AUX CONTACT |
| P052 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-V-54002 | BACKWASH SUPPLY DIVERSION... | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P046 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55001 | BACKWASH WASTE PUMP | PWR | SEV2 | 1 | 3/C+G | #10 AWG | | LOCAL DISCONNECT W/ AUX CONTACT |
| P047 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55002 | BACKWASH WASTE PUMP | PWR | SEV2 | 1 | 3/C+G | #10 AWG | | LOCAL DISCONNECT W/ AUX CONTACT |
| P049 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | T-LP-BWPS | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 1/11/19 | AG | ED | ISSUED PER PCO 24 |
| 2 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE VIII

| | |
|---|---|
| project 98101 | contract |
| drawing E353 — 2 | rev. |
| sheet 428 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P015 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | EG-1 | EMERGENCY GENERATOR | PWR | SE2 | 3 | 1/C | #6 AWG | #10 AWG | |
| P011 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44001 | AIR SCOUR BLOWER | PWR | SEV2 | 1 | 3/C+G | #3/0 AWG | | |
| P012 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44002 | AIR SCOUR BLOWER | PWR | SEV2 | 1 | 3/C+G | #3/0 AWG | | |
| P013 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44003 | AIR SCOUR BLOWER | PWR | SEV2 | 1 | 3/C+G | #3/0 AWG | | |
| P007 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-DP-46001 | FILTER DRAIN PUMP | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P008 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | OZO-P-36501 | PRE-FILTER FLASH MIX PUMP | PWR | SVN3 | 3 | 1/C | #10 AWG | #10 AWG | |
| P018 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PP-MAIN-FLTR | 480V POWER PANEL | PWR | SVN3 | 3 | 1/C | #2 AWG | #8 AWG | |
| P014 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PP-MAIN-HVAC | 480V POWER PANEL | PWR | SVN3 | 3 | 1/C | #2 AWG | #8 AWG | |
| P009 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | SWI-P-30101 | SIDESTREAM INJECTION PUMP #1 | PWR | SEV2 | 1 | 3/C+G | #8 AWG | | |
| P010 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | SWI-P-30102 | SIDESTREAM INJECTION PUMP #2 | PWR | SEV2 | 1 | 3/C+G | #8 AWG | | |
| P016 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | T-LP-MAIN | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| P019 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | T-LP-MAIN-HVAC | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| P051 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FAP-EWH-75103 | HOT WATER HEATER | PWR | SVN3 | 3 | 1/C | #2 AWG | #8 AWG | |
| P030 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20201 | FLASH MIX PUMP #1 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P031 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20202 | FLASH MIX PUMP #2 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P032 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20203 | FLASH MIX PUMP #3 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P033 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | OZN-LCP-31001 | NITROGEN BOOST PANEL | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| P028 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | OZO-LCP-34101 | OZONE GENERATOR #1 | PWR | SVN3 | 3 | 1/C | #1 AWG | #6 AWG | |
| P029 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | OZO-LCP-34201 | OZONE GENERATOR #2 | PWR | SVN3 | 3 | 1/C | #1 AWG | #6 AWG | |
| P041 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PP-RW | 480V POWER PANEL | PWR | SVN3 | 3 | 1/C | #2 AWG | #8 AWG | |
| P039 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PP-SEC | 480V POWER PANEL | PWR | SVN3 | 3 | 1/C | #1/0 AWG | #6 AWG | |
| P036 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PP-SEC-EF | 480V POWER PANEL | PWR | SVN3 | 3 | 1/C | #1/0 AWG | #6 AWG | |
| P034 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PP-SEC-HVAC | 480V POWER PANEL | PWR | SE2 | 3 | 1/C | 500 kcmil | #2 AWG | |
| P022 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21111 | STAGE 1A FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P023 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21121 | STAGE 1B FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P024 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21131 | STAGE 1C FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P025 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21211 | STAGE 2A FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P026 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21221 | STAGE 2B FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P027 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21231 | STAGE 2C FLOCCULATOR | PWR | SEV2 | 1 | 3/C+G | #12 AWG | | |
| P-AIT33503 | MOCP | MAIN OZONE CONTROL PANEL | GOX-AIT-33503 | GOX DEW POINT | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT35101 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35101 | DESTRUCT INLET OZONE | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-PERIMETER-1 | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | | | PWR | SE2 | 2 | 1/C | #10 AWG | #10 AWG | PERIMITER SECURITY |
| P-PERIMETER-2 | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | | | PWR | SE2 | 2 | 1/C | #10 AWG | #10 AWG | PERIMITER SECURITY |
| P-LCPNGATE | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | LCP-NGATE | NORTH GATE CONTROL PANEL | PWR | SE2 | 2 | 1/C | #10 AWG | #10 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE IX

| project | contract |
|---|---|
| 98101 | |

**drawing** **E354 — 0** **rev.**

**sheet** 429 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

1

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-FIT54001 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-FIT-54001 | BACKWASH SUPPLY DIVERSION FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT54002 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-FIT-54002 | BACKWASH TO FILTERS FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT430011 | PLC-CHM1 | CLEARWELL PLC CABINET | FLT-AIT-43001-1 | COMBINED FILTER EFFLUENT TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT430012 | PLC-CHM1 | CLEARWELL PLC CABINET | FLT-AIT-43001-2 | COMBINED FILTER EFFLUENT TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT430013 | PLC-CHM1 | CLEARWELL PLC CABINET | FLT-AIT-43001-3 | COMBINED FILTER EFFLUENT PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT62012 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62012 | FINISHED WATER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT62013 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62013 | FINISHED WATER PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT62014 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62014 | FINISHED WATER AMMONIA/CHLORAMINES | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT62015 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62015 | FINISHED WATER TOTAL CHLORINE | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-XACHEM | PLC-CHM1 | CHEMICAL AREA PLC CABINET | | | PWR | CVV1 | 1 | 3/C | #14 AWG | | CHEM HALLWAY EMERGENCY PULLS, HOME-RUN ONLY (SEE PLANS FOR ALL DEVICES) |
| P-FIT74013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-FIT-74013 | COAG AID POLYMER TO TRAIN #1 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT74014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-FIT-74014 | COAG AID POLYMER TO TRAIN #2 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT72013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-FIT-72013 | FERRIC SULFATE TO FLASH MIX #1 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT72014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-FIT-72014 | FERRIC SULFATE TO FLASH MIX #2 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT78013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78013 | HYDROGEN PEROXIDE TO SETTLED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT78014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78014 | HYDROGEN PEROXIDE TO OZONE CONTACT EFFLUENT FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT78015 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78015 | HYDROGEN PEROXIDE TO CLEARWELL FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LICAP | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-CAP | REMOTE FILL STATION | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LIFES | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-FES | REMOTE FILL STATION | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LIHYP | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-HYP | REMOTE FILL PANEL | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LISPE | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-SPE | REMOTE FILL STATION | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT66001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | PSW-FIT-66001 | PLANT SERVICE WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT76013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-FIT-76013 | PERMANGANATE TO STANDLEY RAW FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT76014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-FIT-76014 | PERMANGANATE TO EGL4 RAW FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE X

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E355 — 1**

**sheet** 430 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-FIT77013 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77013 | AMMONIUM SULFATE TO OZONATED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT77014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77014 | AMMONIUM SULFATE TO CLEARWELL EFFLUENT FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT77015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77015 | AMMONIUM SULFATE TO SETTLED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT71014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71014 | CAUSTIC TO FLASH MIX #1 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT71015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71015 | CAUSTIC TO FLASH MIX #2 FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT71016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71016 | CAUSTIC TO SETTLED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT71017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71017 | CAUSTIC TO OZONATED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT71018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71018 | CAUSTIC TO CLEARWELL EFFLUENT FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-AIT62001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62001-1 | CLEARWELL FREE CHLORINE | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT62002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62002-1 | CLEARWELL FREE CHLORINE | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-LIAMS | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-AMS | REMOTE FILL PANEL | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LICAS | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-CAS | REMOTE FILL PANEL | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-LISHP | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-SHP | REMOTE FILL STATION | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT79513 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-FIT-79513 | PHOSPHORIC ACID TO OZONATED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-WIT79510 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-WIT-79510 | PHOSPHORIC ACID TOTE SCALE CONTROLLER | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT79014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-FIT-79014 | SODIUM BISULFITE TO OZONE CONTACT EFFLUENT FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT79015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-FIT-79015 | SODIUM BISULFITE TO BACKWASH SUPPLY FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-WIT79010 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-WIT-79010 | SODIUM BISULFITE TOTE SCALE CONTROLLER | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73014 | SODIUM HYPO TO STANDLEY RAW FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73015 | SODIUM HYPO TO EGL4 RAW FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73016 | SODIUM HYPO TO SETTLED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73017 | SODIUM HYPO TO OZONATED WATER FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73018 | SODIUM HYPO TO CLEARWELL INLET FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |
| P-FIT73019 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73019 | SODIUM HYPO TO CLEARWELL INTERMEDIATE FLOW | PWR | CVV1 | 1 | 3/C | #14 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XI

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E356 — 0**

**sheet** 431 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-AIT401001 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-40102 | PRE-FILTER PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT401002 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-40103 | PRE-FILTER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41111 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41111 | FILTER #1 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41211 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41211 | FILTER #2 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41311 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41311 | FILTER #3 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41411 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41411 | FILTER #4 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41511 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41511 | FILTER #5 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT41611 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41611 | FILTER #6 BED EXSPANSION TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43101 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43101 | FILTER #1 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43201 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43201 | FILTER #2 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43301 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43301 | FILTER #3 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43401 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43401 | FILTER #4 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43501 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43501 | FILTER #5 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT43601 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43601 | FILTER #6 TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41101 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41101 | FILTER #1 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41201 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41201 | FILTER #2 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41301 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41301 | FILTER #3 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41401 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41401 | FILTER #4 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41501 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41501 | FILTER #5 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT41601 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41601 | FILTER #6 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT360011 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-1 | OZONE CONTACT BASIN OZONE #1 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT360012 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-2 | OZONE CONTACT BASIN OZONE #2 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT360013 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-3 | OZONE CONTACT BASIN OZONE #3 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT360014 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-4 | OZONE CONTACT BASIN OZONE #4 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT360015 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-5 | OZONE CONTACT BASIN ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT26101 | PLC-FLTR | FILTER PLC CABINET | PRE-AIT-26101 | TRAIN #1 SETTLED WATER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT26201 | PLC-FLTR | FILTER PLC CABINET | PRE-AIT-26201 | TRAIN #2 SETTLED WATER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XII

| | |
|---|---|
| project 98101 | contract |

drawing **E357 — 0** rev.

sheet 432 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P-AIT203011 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20301-1 | PRE TREATMENT TRAIN #1 PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT203012 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20301-2 | PRE TREATMENT TRAIN #1 STREAMING CURRENT | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT203021 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20302-1 | PRE TREATMENT TRAIN #2 PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT203022 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20302-2 | PRE TREATMENT TRAIN #2 STREAMING CURRENT | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT1100010 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-10 | NORTHERN SUPPLY PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT1100011 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-11 | NORTHERN SUPPLY TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT1100012 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-12 | NORTHERN SUPPLY ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-2 | STANDLEY LAKE PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-3 | STANDLEY LAKE TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-4 | STANDLEY LAKE ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-6 | EAST GRAVEL LAKES PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-7 | EAST GRAVEL LAKES TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT110008 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-8 | EAST GRAVEL LAKES ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT11002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11002 | STANDLEY LAKE CORRECTED ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT11004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11004 | EAST GRAVEL LAKES CORRECTED ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT11025 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11025 | NORTHERN SUPPLY CORRECTED ORP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT120011 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12001-1 | TRAIN #1 BLENDED WATER PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT120012 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12001-2 | TRAIN #1 BLENDED WATER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT120023 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12002-3 | TRAIN #2 BLENDED WATER PH/TEMP | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-AIT120024 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12002-4 | TRAIN #2 BLENDED WATER TURBIDITY | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11001 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11001 | STANDLEY LAKE FLOW TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11003 | STANDLEY LAKE FLOW TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11006 | EAST GRAVEL LAKES FLOW TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11007 | EAST GRAVEL LAKES FLOW TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11026 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11026 | NORTHERN SUPPLY FLOW TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT11030 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11030 | NORTHERN SUPPLY FLOW TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT20201 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-20201 | FLASH MIX TO TRAIN #1 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT20202 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-20202 | FLASH MIX TO TRAIN #2 FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |

Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XIII

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E358 — 0**

**sheet** 433 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PPMAINFLTR-37,39 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41101 | FILTER #1 INLET VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41201/41301, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-7,9 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41102 | FILTER #1 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41103/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-19,21,23 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41105 | FILTER #1 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-1,3,5 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41106 | FILTER #1 BACKWASH WASTE VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | & FLT-V-41206/41306, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-11,13 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41202 | FILTER #2 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41203/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-25,27,29 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41205 | FILTER #2 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-15,17 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41302 | FILTER #3 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41303/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-31,33,35 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41305 | FILTER #3 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-38,40 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41401 | FILTER #4 INLET VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41501/41601, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-8,10 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41402 | FILTER #4 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41403/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-20,22,24 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41405 | FILTER #4 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-2,4,6 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41406 | FILTER #4 BACKWASH WASTE VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | & FLT-V-41506/41606, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-12,14 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41502 | FILTER #5 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41503/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-26,28,30 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41505 | FILTER #5 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-16,18 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41602 | FILTER #6 CONTROL VALVE | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & FLT-V-41603/4/7, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-32,34,36 | PP-MAIN-FLTR | 480V POWER PANEL | FLT-V-41605 | FILTER #6 BACKWASH SUPPLY VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPMAINFLTR-41,43 | PP-MAIN-FLTR | 480V POWER PANEL | SLD-V-22102 | SLUDGE VALVE 1A | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & SLD-V-22103, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINFLTR-42,44 | PP-MAIN-FLTR | 480V POWER PANEL | SLD-V-22202 | SLUDGE VALVE 2A | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | & SLD-V-22203, INSTALL LOCAL DISCONNECT FOR EACH VALVE |
| PPMAINHVAC-1,3,5 | PP-MAIN-HVAC | 480V POWER PANEL | EF-03D | EXHAUST FAN [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-7,9,11 | PP-MAIN-HVAC | 480V POWER PANEL | EF-03E | EXHAUST FAN [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-13,15,17 | PP-MAIN-HVAC | 480V POWER PANEL | EF-06E | EXHAUST FAN [225] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-19,21,23 | PP-MAIN-HVAC | 480V POWER PANEL | EF-07B | EXHAUST FAN [224] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-25,27,29 | PP-MAIN-HVAC | 480V POWER PANEL | EF-07C | EXHAUST FAN [228] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-37,39,41 | PP-MAIN-HVAC | 480V POWER PANEL | EF-13 | EXHAUST FAN [101] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPMAINHVAC-2,4,6 | PP-MAIN-HVAC | 480V POWER PANEL | MAU-03B | MAKEUP AIR UNIT [224,225,226,228,230] | PWR | SVN3 | 3 | 1/C | #10 AWG | #10 AWG | |
| PPMAINHVAC-8,10,12 | PP-MAIN-HVAC | 480V POWER PANEL | RTU-04B | ROOF TOP UNIT [233] | PWR | SVN3 | 3 | 1/C | #8 AWG | #10 AWG | |
| PPMAINHVAC-14,16,18 | PP-MAIN-HVAC | 480V POWER PANEL | RTU-06 | ROOF TOP UNIT [101] | PWR | SVN3 | 3 | 1/C | #8 AWG | #10 AWG | |
| PPMAINHVAC-20,22,24 | PP-MAIN-HVAC | 480V POWER PANEL | RTU-07 | ROOF TOP UNIT [229] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPRW-1,3,5 | PP-RW | 480V POWER PANEL | RWS-V-11001 | STANDLEY LAKE SLEEVE VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-7,9,11 | PP-RW | 480V POWER PANEL | RWS-V-11002 | STANDLEY LAKE BALL VALVE | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-2,4,6 | PP-RW | 480V POWER PANEL | RWS-V-11003 | STANDLEY LAKE TO TRAIN #2 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-13,15 | PP-RW | 480V POWER PANEL | RWS-V-11004 | FLASH MIX TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-8,10,12 | PP-RW | 480V POWER PANEL | RWS-V-11005 | STANDLEY LAKE TO TRAIN #1 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-14,16 | PP-RW | 480V POWER PANEL | RWS-V-11006 | FLASH MIX TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-17,19 | PP-RW | 480V POWER PANEL | RWS-V-11007 | EAST GRAVEL LAKES TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-21,23 | PP-RW | 480V POWER PANEL | RWS-V-11008 | EAST GRAVEL LAKES TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-18,20 | PP-RW | 480V POWER PANEL | RWS-V-11026 | NORTHERN SUPPLY TO TRAIN #1 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-22,24 | PP-RW | 480V POWER PANEL | RWS-V-11030 | NORTHERN SUPPLY TO TRAIN #2 | PWR | SVN3 | 2 | 1/C | #12 AWG | #12 AWG | LOCAL DISCONNECT |
| PPRW-38,40,42 | PP-RW | 480V POWER PANEL | T-LP-CHEM | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #4 AWG | #8 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XIV

| project | contract |
|---|---|
| 98101 | |

**drawing** **E359 — 0** **rev.**

**sheet** 434 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

1

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PPSEC-13,15,17 | PP-SEC | 480V POWER PANEL | AGO-1 | ACCESS GATE OPERATOR [NGATE ENTRANCE] | PWR | SE2 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-37,39,41 | PP-SEC | 480V POWER PANEL | AGO-2 | ACCESS GATE OPERATOR [NGATE EXIT] | PWR | SE2 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-19,21,23 | PP-SEC | 480V POWER PANEL | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| PPSEC-2,4,6 | PP-SEC | 480V POWER PANEL | HST-205 | BRIDGE CRANE [205] | PWR | SVN3 | 3 | 1/C | #8 AWG | #8 AWG | |
| PPSEC-20,22,24 | PP-SEC | 480V POWER PANEL | HST-216 | HOIST [216] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-8,10,12 | PP-SEC | 480V POWER PANEL | HST-233 | BRIDGE CRANE [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-1,3,5 | PP-SEC | 480V POWER PANEL | OZD-LCP-35101 | OZONE DESTRUCT #1 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-7,9,11 | PP-SEC | 480V POWER PANEL | OZD-LCP-35201 | OZONE DESTRUCT #2 | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-25,27,29 | PP-SEC | 480V POWER PANEL | PRE-LCP-22100 | SED BASIN #1 SLUDGE PANEL | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-31,33,35 | PP-SEC | 480V POWER PANEL | PRE-LCP-22200 | SED BASIN #2 SLUDGE PANEL | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSEC-14,16,18 | PP-SEC | 480V POWER PANEL | RCP-205-1 | WELDING RECEPTACLE [205] | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| PPSEC-38,40,42 | PP-SEC | 480V POWER PANEL | T-LP-IT | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| PPSECEF-7,9,11 | PP-SEC-EF | 480V POWER PANEL | EF-01 | EXHAUST FAN [220] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-13,15,17 | PP-SEC-EF | 480V POWER PANEL | EF-02 | EXHAUST FAN [205] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-19,21,23 | PP-SEC-EF | 480V POWER PANEL | EF-03A | EXHAUST FAN [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-25,27,29 | PP-SEC-EF | 480V POWER PANEL | EF-03B | EXHAUST FAN [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-31,33,35 | PP-SEC-EF | 480V POWER PANEL | EF-03C | EXHAUST FAN [233] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-2,4,6 | PP-SEC-EF | 480V POWER PANEL | EF-06D | EXHAUST FAN [221] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-8,10,12 | PP-SEC-EF | 480V POWER PANEL | EF-11 | EXHAUST FAN [217] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-14,16,18 | PP-SEC-EF | 480V POWER PANEL | EF-14 | EXHAUST FAN [100] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-20,22,24 | PP-SEC-EF | 480V POWER PANEL | EF-15 | EXHAUST FAN [205] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA STARTER, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-1,3,5 | PP-SEC-EF | 480V POWER PANEL | LEF-01 | FUME HOOD EXHAUST [215] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | VIA VFD, REFER TO SCHEMATICS AND COORDINATE W/ MECH FOR CONTROLS |
| PPSECEF-37,39,41 | PP-SEC-EF | 480V POWER PANEL | T-LP-ADMIN | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #4 AWG | #8 AWG | |
| PPSECEF-38,40,42 | PP-SEC-EF | 480V POWER PANEL | T-LP-PRE | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |
| PPSECHVAC-1,3,5 | PP-SEC-HVAC | 480V POWER PANEL | MAU-01 | MAKEUP AIR UNIT [220] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-7,9,11 | PP-SEC-HVAC | 480V POWER PANEL | MAU-02 | MAKEUP AIR UNIT [205] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-13,15,17 | PP-SEC-HVAC | 480V POWER PANEL | MAU-03A | MAKEUP AIR UNIT [216,219,221,222,223] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-32,34,36 | PP-SEC-HVAC | 480V POWER PANEL | PSA-C-66100 | CHEMICAL AREA AIR COMPRESSOR | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-19,21,23 | PP-SEC-HVAC | 480V POWER PANEL | RTU-01 | ROOF TOP UNIT [ADMIN AREA] | PWR | SVN3 | 3 | 1/C | #4 AWG | #8 AWG | |
| PPSECHVAC-25,27,29 | PP-SEC-HVAC | 480V POWER PANEL | RTU-02 | ROOF TOP UNIT [213,214] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-31,33,35 | PP-SEC-HVAC | 480V POWER PANEL | RTU-03 | ROOF TOP UNIT [215] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-37,39,41 | PP-SEC-HVAC | 480V POWER PANEL | RTU-04A | ROOF TOP UNIT [233] | PWR | SVN3 | 3 | 1/C | #8 AWG | #10 AWG | |
| PPSECHVAC-2,4,6 | PP-SEC-HVAC | 480V POWER PANEL | RTU-05 | ROOF TOP UNIT [100] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-8,10,12 | PP-SEC-HVAC | 480V POWER PANEL | RTU-08 | ROOF TOP UNIT [218] | PWR | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | |
| PPSECHVAC-38,40,42 | PP-SEC-HVAC | 480V POWER PANEL | T-LP-SEC-HVAC | LIGHTING TRANSFORMER | PWR | SVN3 | 3 | 1/C | #4 AWG | #8 AWG | |
| P-FIT24101 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-FIT-24101 | SLUDGE COLLECTION FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-RCP2052 | RCP-205-1 | WELDING RECEPTACLE [205] | RCP-205-2 | WELDING RECEPTACLE [205] | PWR | SVN3 | 3 | 1/C | #6 AWG | #10 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XV

| | |
|---|---|
| project 98101 | contract |
| drawing E360 — 1 | rev. |
| sheet 435 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P002-1 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P002-2 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P002-3 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P002-4 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P002-5 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P002-6 | SWGR-1 | METERING SWITCHGEAR | SWGR-MAIN | MAIN SWITCHGEAR | PWR | SE2 | 3 | 1/C | 500 kcmil | 250 kcmil | |
| P005-1 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | PWR | SE2 | 3 | 1/C | 500 kcmil | #1/0 AWG | |
| P005-2 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | PWR | SE2 | 3 | 1/C | 500 kcmil | #1/0 AWG | |
| P004-1 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P004-2 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P004-3 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P004-4 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-MAIN | MAIN ELEC ROOM [229] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P006-1 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P006-2 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P006-3 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P006-4 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PWR | SE2 | 3 | 1/C | 350 kcmil | #3/0 AWG | |
| P-FIT30101 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-FIT-30101 | OZONE FLOW TO INJECTOR #1 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT32001 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-FIT-32001 | INJECTOR #1 WATER FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT30105 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-FIT-30105 | OZONE FLOW TO INJECTOR #2 | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P-FIT32002 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-FIT-32002 | INJECTOR #2 WATER FLOW | PWR | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| P037 | T-LP-ADMIN | LIGHTING TRANSFORMER | LP-ADMIN | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #1/0 AWG | #6 AWG | |
| P050 | T-LP-BWPS | LIGHTING TRANSFORMER | LP-BWPS | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #2 AWG | #8 AWG | |
| P042 | T-LP-CHEM | LIGHTING TRANSFORMER | LP-CHEM | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #1/0 AWG | #6 AWG | |
| P040 | T-LP-IT | LIGHTING TRANSFORMER | LP-IT | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #2 AWG | #8 AWG | |
| P017 | T-LP-MAIN | LIGHTING TRANSFORMER | LP-MAIN | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #2 AWG | #8 AWG | |
| P020 | T-LP-MAIN-HVAC | LIGHTING TRANSFORMER | LP-MAIN-HVAC | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #2 AWG | #8 AWG | |
| P038 | T-LP-PRE | LIGHTING TRANSFORMER | LP-PRE | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #2 AWG | #8 AWG | |
| P035 | T-LP-SEC-HVAC | LIGHTING TRANSFORMER | LP-SEC-HVAC | 120/208V LIGHTING PANEL | PWR | SVN3 | 4 | 1/C | #1/0 AWG | #6 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
POWER CABLE SCHEDULE XVI

| | |
|---|---|
| project 98101 | contract |
| drawing **E361 — 0** | rev. |
| sheet 436 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-EG1-2 | EG-1 | EMERGENCY GENERATOR | EG1-ESTOP | GENERATOR REMOTE E-STOP | CNTRL | SE2 | 2 | 1/C | #14 AWG | #14 AWG | E-STOP |
| C-FAPAUG75116 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-AUG-75116 | FLOC-AID POLYMER AUGER FEED | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPC75105 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-C-75105 | FLOC-AID POLYMER AIR COMPRESSOR | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-LSH75117 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-LSH-75117 | FLOC-AID POLYMER BIN SENSOR | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-LSL75116 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-LSL-75116 | FLOC-AID POLYMER BIN SENSOR | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPMXR75120 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-MXR-75120 | FLOC-AID POLYMER MIXER | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPP75001 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75001 | FLOC-AID POLYMER DOSING PUMP | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPP75002 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75002 | FLOC-AID POLYMER DOSING PUMP | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPP75003 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75003 | FLOC-AID POLYMER DOSING PUMP | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPP75110 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75110 | FLOC-AID POLYMER MAKEUP PUMP | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-PSL75115 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-PSL-75115 | SOFTENED WATER SUPPLY PRESSURE | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-V75031 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-V-75031 | FLOC-AID POLYMER DILUTION WATER | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-V75032 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-V-75032 | FLOC-AID POLYMER DILUTION WATER | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-V75033 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-V-75033 | FLOC-AID POLYMER DILUTION WATER | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-V75115 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-V-75115 | SOFTENED WATER SUPPLY VALVE | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-FAPVIB75116 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-VIB-75116 | FLOC-AID POLYMER BIN VIBRATOR | CNTRL | | 0 | | | | HOLD FOR SUBMITTAL |
| C-LCPAMS-1 | LCP-AMS | TRANSFER PUMP CONTROLLER | AMS-TP-77010 | AMMONIUM SULFATE TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPCAP-1 | LCP-CAP | TRANSFER PUMP CONTROLLER | CAP-TP-74010 | COAG AID POLYMER TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPCAS-1 | LCP-CAS | TRANSFER PUMP CONTROLLER | CAS-TP-71010 | CAUSTIC SODA TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPFES-1 | LCP-FES | TRANSFER PUMP CONTROLLER | FES-TP-72010 | FERRIC SULFATE TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPHYP-1 | LCP-HYP | TRANSFER PUMP CONTROLLER | HYP-TP-78010 | HYDROGEN PEROXIDE TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPSHP-1 | LCP-SHP | TRANSFER PUMP CONTROLLER | SHP-TP-73010 | SODIUM HYPO TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |
| C-LCPSPE-1 | LCP-SPE | TRANSFER PUMP CONTROLLER | SPE-TP-76010 | SODIUM PERMANGANATE TRANSFER PUMP | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | FLOW SWITCH |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE I

| | |
|---|---|
| project 98101 | contract |

drawing **E362 — 0** rev.

sheet 437 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-FBSP54001-1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54001 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FBSP54001-2 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54001 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FBSP54001-3 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54001 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FBSP54001-4 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54001 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCONNECT AUX CONTACT |
| C-FBSP54002-1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54002 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FBSP54002-2 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54002 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FBSP54002-3 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54002 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FBSP54002-4 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54002 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCONNECT AUX CONTACT |
| C-FBSP54003-1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54003 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FBSP54003-2 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54003 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FBSP54003-3 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54003 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FBSP54003-4 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBS-P-54003 | BACKWASH SUPPLY PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCONNECT AUX CONTACT |
| C-FBWP55001-1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55001 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FBWP55001-2 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55001 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FBWP55001-3 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55001 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FBWP55001-4 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55001 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCONNECT AUX CONTACT |
| C-FBWP55002-1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55002 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FBWP55002-2 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55002 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FBWP55002-3 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55002 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FBWP55002-4 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | FBW-P-55002 | BACKWASH WASTE PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCONNECT AUX CONTACT |
| C-BWPSARMS1 | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | MCC-BWPS-ARMS-1 | MCC-BWPS MAINTENANCE MODE STATION | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-FLTBLW44001-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44001 | AIR SCOUR BLOWER | CNTRL | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | BLOWER ENCLOSURE FAN/CONTROL POWER |
| C-FLTBLW44001-2 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44001 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FLTBLW44001-3 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44001 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FLTBLW44002-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44002 | AIR SCOUR BLOWER | CNTRL | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | BLOWER ENCLOSURE FAN/CONTROL POWER |
| C-FLTBLW44002-2 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44002 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FLTBLW44002-3 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44002 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FLTBLW44003-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44003 | AIR SCOUR BLOWER | CNTRL | SVN3 | 3 | 1/C | #12 AWG | #12 AWG | BLOWER ENCLOSURE FAN/CONTROL POWER |
| C-FLTBLW44003-2 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44003 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FLTBLW44003-3 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-BLW-44003 | AIR SCOUR BLOWER | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FLTDP46001-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-DP-46001 | FILTER DRAIN PUMP | CNTRL | SVN3 | 5 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FLTDP46001-2 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-DP-46001 | FILTER DRAIN PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FLTDP46001-3 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | FLT-DP-46001 | FILTER DRAIN PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-SWIP30101-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | MOCP | MAIN OZONE CONTROL PANEL | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | SWI-P-30101 |
| C-SWIP30102-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | MOCP | MAIN OZONE CONTROL PANEL | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | SWI-P-30102 |
| C-OZOP36501-1 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | OZO-P-36501 | PRE-FILTER FLASH MIX PUMP | CNTRL | SVN3 | 5 | 1/C | #14 AWG | #14 AWG | HOA |
| C-OZOP36501-2 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | OZO-P-36501 | PRE-FILTER FLASH MIX PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-OZOP36501-3 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | OZO-P-36501 | PRE-FILTER FLASH MIX PUMP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE II

| | |
|---|---|
| project 98101 | contract |
| drawing E363 | rev. 0 |
| sheet 438 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-FMPP20201-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20201 | FLASH MIX PUMP #1 | CNTRL | SVN3 | 5 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FMPP20201-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20201 | FLASH MIX PUMP #1 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FMPP20201-3 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20201 | FLASH MIX PUMP #1 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FMPP20202-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20202 | FLASH MIX PUMP #2 | CNTRL | SVN3 | 5 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FMPP20202-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20202 | FLASH MIX PUMP #2 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FMPP20202-3 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20202 | FLASH MIX PUMP #2 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-FMPP20203-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20203 | FLASH MIX PUMP #3 | CNTRL | SVN3 | 5 | 1/C | #14 AWG | #14 AWG | HOA |
| C-FMPP20203-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20203 | FLASH MIX PUMP #3 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | WINDING TSTAT |
| C-FMPP20203-3 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | FMP-P-20203 | FLASH MIX PUMP #3 | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | DISCHARGE PRESSURE |
| C-SECRST1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | MCC-SEC-RST-1 | REMOTE SHUNT TRIP | CNTRL | CVV1 | 1 | 2/C | #14 AWG | | |
| C-PREFLC21111-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21111 | STAGE 1A FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21111-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21111 | STAGE 1A FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |
| C-PREFLC21121-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21121 | STAGE 1B FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21121-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21121 | STAGE 1B FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |
| C-PREFLC21131-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21131 | STAGE 1C FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21131-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21131 | STAGE 1C FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |
| C-PREFLC21211-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21211 | STAGE 2A FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21211-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21211 | STAGE 2A FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |
| C-PREFLC21221-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21221 | STAGE 2B FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21221-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21221 | STAGE 2B FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |
| C-PREFLC21231-1 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21231 | STAGE 2C FLOCCULATOR | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | HOA |
| C-PREFLC21231-2 | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | PRE-FLC-21231 | STAGE 2C FLOCCULATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | TORQUE SWITCH |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE III

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E364 — 0**

**sheet** 439 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-LOXLCP33001-1 | MOCP | MAIN OZONE CONTROL PANEL | LOX-LCP-33001 | LIQUID OXYGEN PANEL | CNTRL | SE2 | 12 | 1/C | #14 AWG | #14 AWG | LOX-ZI-33001/2, LOX-FC/ZI-33005 |
| C-AIT350071 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35007-1 | AMBIENT OZONE - OZONE DESTRUCT [236] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT350072 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35007-2 | AMBIENT OZONE - OZONE DESTRUCT [236] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT350081 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35008-1 | AMBIENT OZONE - OXYGEN DESTRUCT [236] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT350082 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35008-2 | AMBIENT OZONE - OXYGEN DESTRUCT [236] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-OZDLCP35101 | MOCP | MAIN OZONE CONTROL PANEL | OZD-LCP-35101 | OZONE DESTRUCT #1 | CNTRL | CVV1 | 1 | 37/C | #14 AWG | | 10 SPARE |
| C-OZDLCP35201 | MOCP | MAIN OZONE CONTROL PANEL | OZD-LCP-35201 | OZONE DESTRUCT #2 | CNTRL | CVV1 | 1 | 37/C | #14 AWG | | 10 SPARE |
| C-YC35007A | MOCP | MAIN OZONE CONTROL PANEL | OZD-YC-35007A | AMBIENT GAS STROBE [236] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC35007B | MOCP | MAIN OZONE CONTROL PANEL | OZD-YC-35007B | AMBIENT GAS STROBE [236] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC35007S | MOCP | MAIN OZONE CONTROL PANEL | OZD-YC-35007S | AMBIENT GAS HORN [236] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-OZNLCP31001 | MOCP | MAIN OZONE CONTROL PANEL | OZN-LCP-31001 | NITROGEN BOOST PANEL | CNTRL | CVV1 | 1 | 37/C | #14 AWG | | 10 SPARE |
| C-AIT30003 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30003 | AMBIENT OZONE - OZONE GEN [220] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT30004 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30004 | AMBIENT OXYGEN - OZONE GEN [220] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT30005 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30005 | AMBIENT OZONE - OZONE GEN [220] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT30006 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30006 | AMBIENT OXYGEN - OZONE GEN [220] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300091 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30009-1 | AMBIENT OZONE - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300092 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30009-2 | AMBIENT OZONE - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300101 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30010-1 | AMBIENT OXYGEN - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300102 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30010-2 | AMBIENT OXYGEN - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT30011 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30011 | AMBIENT OXYGEN - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT30012 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30012 | AMBIENT OXYGEN - FILTER AREA [233] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-HS30010 | MOCP | MAIN OZONE CONTROL PANEL | OZO-HES-30010 | EAST DOOR EMERGENCY STOP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-HS30011 | MOCP | MAIN OZONE CONTROL PANEL | OZO-HES-30011 | WEST DOOR EMERGENCY STOP | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC30003A | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30003A | AMBIENT GAS STROBE [220] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | & OZO-YC-30004A |
| C-YC30003B | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30003B | AMBIENT GAS STROBE [220] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | & OZO-YC-30004B |
| C-YC30003S | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30003S | AMBIENT GAS HORN [220] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | & OZO-YC-30004S |
| C-YC30009A | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30009A | AMBIENT GAS STROBE [233] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC30009B | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30009B | AMBIENT GAS STROBE [233] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC30009S | MOCP | MAIN OZONE CONTROL PANEL | OZO-YC-30009S | AMBIENT GAS HORN [233] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-SWIJB30101 | MOCP | MAIN OZONE CONTROL PANEL | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | CNTRL | SVN3 | 58 | 1/C | #14 AWG | #12 AWG | |
| C-SWIJB30102 | MOCP | MAIN OZONE CONTROL PANEL | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | CNTRL | SVN3 | 49 | 1/C | #14 AWG | #12 AWG | |
| C-YC30001A | MOCP | MAIN OZONE CONTROL PANEL | SWI-YC-30001A | AMBIENT GAS STROBE [101] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC30001B | MOCP | MAIN OZONE CONTROL PANEL | SWI-YC-30001B | AMBIENT GAS STROBE [101] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |
| C-YC30001S | MOCP | MAIN OZONE CONTROL PANEL | SWI-YC-30001S | AMBIENT GAS HORN [101] | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE IV

| | |
|---|---|
| project 98101 | contract |

drawing **E365 — 0** rev.

sheet 440 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-LSH62000 | PLC-BWPS | CLEARWELL PLC CABINET | CCC-LSH-62000 | CLEARWELL LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-LSH53001 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-LSH-53001 | BACKWASH SUPPLY LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-FBSV54002 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-V-54002 | BACKWASH SUPPLY DIVERSION VALVE | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-LSH55001 | PLC-BWPS | CLEARWELL PLC CABINET | FBW-LSH-55001 | FILTER WASTE CELL A LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-LSH55002 | PLC-BWPS | CLEARWELL PLC CABINET | FBW-LSH-55002 | FILTER WASTE CELL B LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-FBSP54001-5 | PLC-BWPS | CLEARWELL PLC CABINET | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | FBS-P-54001 |
| C-FBSP54002-5 | PLC-BWPS | CLEARWELL PLC CABINET | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | FBS-P-54002 |
| C-FBSP54003-5 | PLC-BWPS | CLEARWELL PLC CABINET | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | FBS-P-54003 |
| C-FBWP55001-5 | PLC-BWPS | CLEARWELL PLC CABINET | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | FBW-P-55001 |
| C-FBWP55002-5 | PLC-BWPS | CLEARWELL PLC CABINET | MCC-BWPS | CLEARWELL/BWPS ELEC ROOM [304] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | FBW-P-55002 |
| C-XACHEM | PLC-CHM1 | CHEMICAL AREA PLC CABINET | | | CNTRL | CVV1 | 1 | 2/C | #14 AWG | | CHEM HALLWAY EMERGENCY PULLS, HOME-RUN ONLY (SEE PLANS FOR ALL DEVICES) |
| C-CAPP74001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74001 | COAG AID POLYMER DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CAPP74002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74002 | COAG AID POLYMER DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CAPP74003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74003 | COAG AID POLYMER DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CAPV74013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-V-74013 | COAG AID POLYMER DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-CAPV74014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-V-74014 | COAG AID POLYMER DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-FESP72001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72001 | FERRIC SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-FESP72002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72002 | FERRIC SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-FESP72003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72003 | FERRIC SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-HYPP78001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78001 | HYDROGEN PEROXIDE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-HYPP78002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78002 | HYDROGEN PEROXIDE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-HYPP78003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78003 | HYDROGEN PEROXIDE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-LCPCAP-2 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LCP-CAP | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | CAP-TP-74010 |
| C-LCPFES-2 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LCP-FES | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | FES-TP-72010 |
| C-LCPHYP-2 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LCP-HYP | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | HYP-TP-78010 |
| C-LCPSPE-2 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LCP-SPE | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | SPE-TP-76010 |
| C-SPEP76001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76001 | SODIUM PERMANGANATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SPEP76002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76002 | SODIUM PERMANGANATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SPEP76003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76003 | SODIUM PERMANGANATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE V

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E366 — 0**

**sheet** 441 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-AMSP77001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77001 | AMMONIUM SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-AMSP77002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77002 | AMMONIUM SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-AMSP77003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77003 | AMMONIUM SULFATE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASP71001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71001 | CAUSTIC SODA DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASP71002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71002 | CAUSTIC SODA DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASP71003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71003 | CAUSTIC SODA DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASP71004 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71004 | CAUSTIC SODA DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASP71005 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71005 | CAUSTIC SODA DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-CASV71014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-V-71014 | CAUSTIC SODA DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-CASV71015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-V-71015 | CAUSTIC SODA DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-CASV71016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-V-71016 | CAUSTIC SODA DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-CASV71017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-V-71017 | CAUSTIC SODA DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-CASV71018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-V-71018 | CAUSTIC SODA DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-LCPAMS-2 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LCP-AMS | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | AMS-TP-77010 |
| C-LCPCAS-2 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LCP-CAS | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | CAS-TP-71010 |
| C-LCPSHP-2 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LCP-SHP | TRANSFER PUMP CONTROLLER | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | SHP-TP-73010 |
| C-PHAP79501 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-P-79501 | PHOSPHORIC ACID DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-PHAP79502 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-P-79502 | PHOSPHORIC ACID DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SBI79001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79001 | SODIUM BISULFITE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SBI79002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79002 | SODIUM BISULFITE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SBI79003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79003 | SODIUM BISULFITE DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73001 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73002 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73003 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73004 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73004 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73005 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73005 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPP73006 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73006 | SODIUM HYPO DOSING PUMP | CNTRL | CVV1 | 1 | 12/C | #14 AWG | | IN AUTO, RUN STATUS, HIGH PRESSURE, LOW PRESSURE, S/S |
| C-SHPV73011 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73011 | SODIUM HYPO TANK CLEANING WATER VALVE | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73012 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73012 | SODIUM HYPO TANK CLEANING WATER VALVE | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73013 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73013 | SODIUM HYPO TANK CLEANING WATER VALVE | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73014 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73015 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73016 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73017 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73018 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |
| C-SHPV73019 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-V-73019 | SODIUM HYPO DILUTION WATER | CNTRL | CVV1 | 1 | 7/C | #14 AWG | | OPENED, CLOSED, O/C |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE VI

| | |
|---|---|
| project 98101 | contract |
| drawing E367 | rev. 0 |
| sheet 442 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-LSH41110 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41110 | FILTER #1 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-LSH41210 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41210 | FILTER #2 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-LSH41310 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41310 | FILTER #3 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-LSH41410 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41410 | FILTER #4 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-LSH41510 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41510 | FILTER #5 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-LSH41610 | PLC-FLTR | FILTER PLC CABINET | FLT-LSH-41610 | FILTER #6 LEVEL | CNTRL | CVV1 | 1 | 3/C | #14 AWG | | |
| C-FLTV41101 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41101 | FILTER #1 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41102 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41102 | FILTER #1 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41103 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41103 | FILTER #1 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41104 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41104 | FILTER #1 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41105 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41105 | FILTER #1 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41106 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41106 | FILTER #1 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41107 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41107 | FILTER #1 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41201 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41201 | FILTER #2 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41202 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41202 | FILTER #2 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41203 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41203 | FILTER #2 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41204 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41204 | FILTER #2 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41205 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41205 | FILTER #2 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41206 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41206 | FILTER #2 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41207 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41207 | FILTER #2 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41301 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41301 | FILTER #3 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41302 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41302 | FILTER #3 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41303 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41303 | FILTER #3 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41304 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41304 | FILTER #3 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41305 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41305 | FILTER #3 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41306 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41306 | FILTER #3 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41307 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41307 | FILTER #3 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41401 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41401 | FILTER #4 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41402 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41402 | FILTER #4 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41403 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41403 | FILTER #4 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41404 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41404 | FILTER #4 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41405 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41405 | FILTER #4 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41406 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41406 | FILTER #4 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41407 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41407 | FILTER #4 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41501 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41501 | FILTER #5 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41502 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41502 | FILTER #5 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41503 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41503 | FILTER #5 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41504 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41504 | FILTER #5 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41505 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41505 | FILTER #5 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41506 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41506 | FILTER #5 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE VII

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E368 — 0**

**sheet** 443 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-FLTV41507 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41507 | FILTER #5 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41601 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41601 | FILTER #6 INLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41602 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41602 | FILTER #6 CONTROL VALVE | CNTRL | CVV1 | 1 | 5/C | #14 AWG | | FAIL, L/R |
| C-FLTV41603 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41603 | FILTER #6 OUTLET VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41604 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41604 | FILTER #6 WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41605 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41605 | FILTER #6 BACKWASH SUPPLY VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41606 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41606 | FILTER #6 BACKWASH WASTE VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTV41607 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41607 | FILTER #6 AIR SCOUR VALVE | CNTRL | CVV1 | 1 | 9/C | #14 AWG | | OPEN, CLOSE, OPENED, CLOSED |
| C-FLTBLW44001-5 | PLC-FLTR | FILTER PLC CABINET | MCC-MAIN | MAIN ELEC ROOM [229] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | | FLT-BLW-44001 |
| C-FLTBLW44002-5 | PLC-FLTR | FILTER PLC CABINET | MCC-MAIN | MAIN ELEC ROOM [229] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | | FLT-BLW-44002 |
| C-FLTBLW44003-5 | PLC-FLTR | FILTER PLC CABINET | MCC-MAIN | MAIN ELEC ROOM [229] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | | FLT-BLW-44003 |
| C-FLTDP46001-4 | PLC-FLTR | FILTER PLC CABINET | MCC-MAIN | MAIN ELEC ROOM [229] MCC | CNTRL | SVN3 | 7 | 1/C | #14 AWG | | FLT-DP-46001 |
| C-OZOP36501-4 | PLC-FLTR | FILTER PLC CABINET | MCC-MAIN | MAIN ELEC ROOM [229] MCC | CNTRL | SVN3 | 7 | 1/C | #14 AWG | | OZO-P-36501 |
| C-FMPP20201-4 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | FMP-P-20201 |
| C-FMPP20202-4 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | FMP-P-20202 |
| C-FMPP20203-4 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 7 | 1/C | #14 AWG | #14 AWG | FMP-P-20203 |
| C-PREFLC21111-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21111 |
| C-PREFLC21121-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21121 |
| C-PREFLC21131-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21131 |
| C-PREFLC21211-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21211 |
| C-PREFLC21221-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21221 |
| C-PREFLC21231-3 | PLC-PRE | PRE TREATMENT PLC CABINET | MCC-SEC | SECONDARY ELEC ROOM [218] MCC | CNTRL | SVN3 | 8 | 1/C | #14 AWG | #14 AWG | PRE-FLC-21231 |
| C-LSH21101 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-LSH-21101 | FLOC BASIN #1 LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-LSH21201 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-LSH-21201 | FLOC BASIN #2 LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-RWSV11001 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11001 | STANDLEY LAKE SLEEVE VALVE | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11002 | STANDLEY LAKE BALL VALVE | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11003 | STANDLEY LAKE TO TRAIN #2 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11004 | FLASH MIX TO TRAIN #1 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11005 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11005 | STANDLEY LAKE TO TRAIN #1 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11006 | FLASH MIX TO TRAIN #2 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11007 | EAST GRAVEL LAKES TO TRAIN #2 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11008 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11008 | EAST GRAVEL LAKES TO TRAIN #1 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-RWSV11026 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11026 | NORTHERN SUPPLY TO TRAIN #1 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | |
| C-RWSV11030 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11030 | NORTHERN SUPPLY TO TRAIN #2 | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE VIII

| | |
|---|---|
| project 98101 | contract |
| drawing E369 | rev. 0 |
| sheet 444 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C-SLDV22102 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22102 | SLUDGE VALVE 1A | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-SLDV22103 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22103 | SLUDGE VALVE 1B | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-SLDV22202 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22202 | SLUDGE VALVE 2A | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-SLDV22203 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22203 | SLUDGE VALVE 2B | CNTRL | SVN3 | 4 | 1/C | #14 AWG | | FAIL, L/R |
| C-SWGR1-1 | SWGR-1 | METERING SWITCHGEAR | SWGR-1-MIMIC | SWGR-1 MIMIC PANEL | CNTRL | SE2 | 12 | 1/C | #14 AWG | #14 AWG | |
| C-EG1-1 | SWGR-MAIN | MAIN SWITCHGEAR | EG-1 | EMERGENCY GENERATOR | CNTRL | SVN3 | 2 | 1/C | #14 AWG | #14 AWG | CALL TO START |
| C-SECARMS1 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC-ARMS-1 | MCC-SEC MAINTENANCE MODE STATION | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-SECARMS2 | SWGR-MAIN | MAIN SWITCHGEAR | MCC-SEC-ARMS-2 | MCC-SEC MAINTENANCE MODE STATION | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-SWGRMAIN-1 | SWGR-MAIN | MAIN SWITCHGEAR | SWGR-MAIN-ARMS-1 | SWGR-MAIN MAINTENANCE MODE STATION | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-SWGRMAIN-2 | SWGR-MAIN | MAIN SWITCHGEAR | SWGR-MAIN-ARMS-2 | SWGR-MAIN MAINTENANCE MODE STATION | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300011 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-AIT-30001-1 | AMBIENT OZONE - INJECTION AREA [101] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300021 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-AIT-30002-1 | AMBIENT OXYGEN - INJECTION AREA [101] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-LSH30104 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-LSH-30104 | INJECTOR #1 KO POT LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-SWIV30103 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-V-30103 | INJECTOR #1 OZONE CONTROL VALVE | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-SWIV30104 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-V-30104 | INJECTOR #1 OPEN/CLOSE VALVE | CNTRL | SVN3 | 10 | 1/C | #14 AWG | #14 AWG | |
| C-SWIV32001 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-V-32001 | INJECTOR #1 WATER CONTROL VALVE | CNTRL | SVN3 | 10 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300012 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-AIT-30001-2 | AMBIENT OZONE - INJECTION AREA [101] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-AIT300022 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-AIT-30002-2 | AMBIENT OXYGEN - INJECTION AREA [101] | CNTRL | SVN3 | 6 | 1/C | #14 AWG | #14 AWG | |
| C-LSH30108 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-LSH-30108 | INJECTOR #2 KO POT LEVEL | CNTRL | SVN3 | 2 | 1/C | #14 AWG | | |
| C-SWIV30107 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-V-30107 | INJECTOR #2 OZONE CONTROL VALVE | CNTRL | SVN3 | 4 | 1/C | #14 AWG | #14 AWG | |
| C-SWIV30108 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-V-30108 | INJECTOR #2 OPEN/CLOSE VALVE | CNTRL | SVN3 | 10 | 1/C | #14 AWG | #14 AWG | |
| C-SWIV32002 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-V-32002 | INJECTOR #2 WATER CONTROL VALVE | CNTRL | SVN3 | 10 | 1/C | #14 AWG | #14 AWG | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CONTROL CABLE SCHEDULE IX

| | |
|---|---|
| project 98101 | contract |

drawing **E370 — 0** rev.

sheet 445 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F-CMRNGATE-1 | LCP-NGATE | NORTH GATE CONTROL PANEL | CMR-NGATE-1 | POLE-MOUNT CAMERA | DATA | FIB1 | 1 | 2-str | | | |
| ICOM-# | LCP-NGATE | NORTH GATE CONTROL PANEL | ICOM-DS-2 | INTERCOM DOOR STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | NGATE |
| MOCP-5 | MOCP | MAIN OZONE CONTROL PANEL | OZO-LCP-34101 | OZONE GENERATOR #1 | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| MOCP-6 | MOCP | MAIN OZONE CONTROL PANEL | OZO-LCP-34201 | OZONE GENERATOR #2 | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| PSEC-BWPS-# | NWP-BWPS | BWPS ELEC ROOM [304] NETWORK RACK | | | DATA | DAT2 | 4 | 4-pr | #23 AWG | | CAMERAS |
| F-FACP2-1 | NWP-BWPS | BWPS ELEC ROOM [304] NETWORK RACK | FACP-2 | CLEARWELL BUILDING FIRE ALARM PANEL | DATA | FIB1 | 1 | 2-str | | | |
| F-PLCBWPS-1 | NWP-BWPS | BWPS ELEC ROOM [304] NETWORK RACK | PLC-BWPS | CLEARWELL PLC CABINET | DATA | FIB1 | 1 | 6-str | | | |
| PSEC-MAIN-# | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | | | DATA | DAT2 | 13 | 4-pr | #23 AWG | | CAMERAS |
| F-CMRROOF-3 | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | CMR-ROOF-3 | PTZ ROOF CAMERA | DATA | FIB1 | 1 | 2-str | | | |
| F-CMRROOF-4 | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | CMR-ROOF-4 | PTZ ROOF CAMERA | DATA | FIB1 | 1 | 2-str | | | |
| F-SCADA-4 | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | NWP-BWPS | BWPS ELEC ROOM [304] NETWORK RACK | DATA | FIB1 | 1 | 48-str | | | |
| F-PLCCHM2-1 | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | PLC-CHM2 | CHEMICAL AREA PLC CABINET | DATA | FIB1 | 1 | 6-str | | | |
| F-PLCFLTR-1 | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | PLC-FLTR | FILTER PLC CABINET | DATA | FIB1 | 1 | 6-str | | | |
| SCADA-MAIN-# | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| SCADA-MAIN-# | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | SWGR-MAIN | MAIN SWITCHGEAR | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| PSEC-SEC-# | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | | | DATA | DAT2 | 10 | 4-pr | #23 AWG | | CAMERAS |
| SCADA-SEC-# | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | MOCP | MAIN OZONE CONTROL PANEL | DATA | FIB1 | 1 | 6-str | | | |
| F-SCADA-3 | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | NWP-MAIN | MAIN ELEC ROOM [229] NETWORK RACK | DATA | FIB1 | 1 | 48-str | | | |
| F-PLCCHM1-1 | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | PLC-CHM1 | CHEMICAL AREA PLC CABINET | DATA | FIB1 | 1 | 6-str | | | |
| F-PLCPRE-1 | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | PLC-PRE | PRE TREATMENT PLC CABINET | DATA | FIB1 | 1 | 6-str | | | |
| PLCCHM1-# | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| PLCFLTR-# | PLC-FLTR | FILTER PLC CABINET | FLT-BLW-44001 | AIR SCOUR BLOWER | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| PLCFLTR-# | PLC-FLTR | FILTER PLC CABINET | FLT-BLW-44002 | AIR SCOUR BLOWER | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| PLCFLTR-# | PLC-FLTR | FILTER PLC CABINET | FLT-BLW-44003 | AIR SCOUR BLOWER | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters

Scale For Microfilming

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DATA CABLE SCHEDULE I

| project | contract |
|---|---|
| 98101 | |

**drawing** E371 — 0 **rev.**

**sheet** 446 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ADMIN-# | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | DAT2 | 23 | 4-pr | #23 AWG | | DATA JACKS |
| F-COT-1 | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | FIB2 | 1 | 24-str | | | CITY FIBER |
| F-COT-2 | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | FIB2 | 1 | 24-str | | | CITY FIBER |
| F-ZONE34-1 | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | FIB1 | 1 | 24-str | | | ZONE 3/4 PS |
| PSEC-IT-# | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | DAT2 | 11 | 4-pr | #23 AWG | | CAMERAS |
| WIFI-# | RACK-IT-1 | IT ROOM NETWORK RACK | | | DATA | DAT2 | 8 | 4-pr | #23 AWG | | WAP SYSTEM (EST. 8 LOCATIONS) |
| F-CMRROOF-1 | RACK-IT-1 | IT ROOM NETWORK RACK | CMR-ROOF-1 | PTZ ROOF CAMERA | DATA | FIB1 | 1 | 2-str | | | |
| F-CMRROOF-2 | RACK-IT-1 | IT ROOM NETWORK RACK | CMR-ROOF-2 | PTZ ROOF CAMERA | DATA | FIB1 | 1 | 2-str | | | |
| F-FACP1-1 | RACK-IT-1 | IT ROOM NETWORK RACK | FACP-1 | MAIN BUILDING FIRE ALARM PANEL | DATA | FIB1 | 1 | 2-str | | | |
| ICOM-# | RACK-IT-1 | IT ROOM NETWORK RACK | ICOM-DS-1 | INTERCOM DOOR STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | FRONT DOOR |
| ICOM-# | RACK-IT-1 | IT ROOM NETWORK RACK | ICOM-MS-1 | INTERCOM MASTER STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | OFFICE [203] |
| ICOM-# | RACK-IT-1 | IT ROOM NETWORK RACK | ICOM-MS-2 | INTERCOM MASTER STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | OFFICE [204] |
| ICOM-# | RACK-IT-1 | IT ROOM NETWORK RACK | ICOM-MS-3 | INTERCOM MASTER STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | RECEPTION [201] |
| ICOM-# | RACK-IT-1 | IT ROOM NETWORK RACK | ICOM-MS-4 | INTERCOM MASTER STATION | DATA | DAT2 | 1 | 4-pr | #23 AWG | | CONTROL ROOM [213] |
| F-NGATE-1 | RACK-IT-1 | IT ROOM NETWORK RACK | LCP-NGATE | NORTH GATE CONTROL PANEL | DATA | FIB1 | 1 | 72-str | | | HOLD FOR SECURITY SUBMITTAL |
| ADMIN-# | RACK-IT-1 | IT ROOM NETWORK RACK | MCP-MECH | BUILDING AUTOMATION CONTROLS | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| ADMIN-# | RACK-IT-1 | IT ROOM NETWORK RACK | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | DATA | DAT2 | 1 | 4-pr | #23 AWG | | SCADA RACK UPS |
| F-SCADA-1 | RACK-IT-1 | IT ROOM NETWORK RACK | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | DATA | FIB1 | 1 | 48-str | | | |
| PSEC-IT-# | RACK-IT-1 | IT ROOM NETWORK RACK | SCP-1 | SECURITY PANEL [211] | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |
| F-RADIO-1 | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | | | DATA | FIB1 | 1 | 24-str | | | RADIO TOWER |
| SCADA-# | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | | | DATA | DAT2 | 23 | 4-pr | #23 AWG | | DATA JACKS |
| F-SCADA-2 | RACK-SCADA-1 | SCADA ROOM NETWORK RACK | NWP-SEC | SEC ELEC ROOM [218] NETWORK RACK | DATA | FIB1 | 1 | 48-str | | | |
| N-EG1-1 | SWGR-MAIN | MAIN SWITCHGEAR | EG-1 | EMERGENCY GENERATOR | DATA | DAT2 | 1 | 4-pr | #23 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** H. MORTON |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DATA CABLE SCHEDULE II

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** **E372 — 0** **rev.**

**sheet** 447 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-FIT75101 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75101 | GAC FILTER #1 FLOW | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FIT75102 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75102 | GAC FILTER #2 FLOW | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FIT75141 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75141 | FLOC-AID TO TRAIN #1 FLOW | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FIT75142 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-FIT-75142 | FLOC-AID TO TRAIN #2 FLOW | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-LT75120 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-LT-75120 | FLOC-AID POLYMER MIXING TANK LEVEL | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-LT75140 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-LT-75140 | FLOC-AID POLYMER FEED TANK LEVEL | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FAPP75001 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75001 | FLOC-AID POLYMER DOSING PUMP | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FAPP75002 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75002 | FLOC-AID POLYMER DOSING PUMP | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-FAPP75003 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-P-75003 | FLOC-AID POLYMER DOSING PUMP | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-WT751161 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-WT-75116-1 | FLOC-AID POLYMER BIN SENSOR | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-WT751162 | FAP-MCP-75100 | FLOC-AID POLYMER CONTROL PANEL | FAP-WT-75116-2 | FLOC-AID POLYMER BIN SENSOR | INST | | 0 | | | | HOLD FOR SUBMITTAL |
| I-LIT77011 | LI-AMS | REMOTE FILL PANEL | AMS-LIT-77011 | AMMONIUM SULFATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT77012 | LI-AMS | REMOTE FILL PANEL | AMS-LIT-77012 | AMMONIUM SULFATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT74011 | LI-CAP | REMOTE FILL STATION | CAP-LIT-74011 | COAG AID POLYMER TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT74012 | LI-CAP | REMOTE FILL STATION | CAP-LIT-74012 | COAG AID POLYMER TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT71011 | LI-CAS | REMOTE FILL PANEL | CAS-LIT-71011 | CAUSTIC SODA TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT71012 | LI-CAS | REMOTE FILL PANEL | CAS-LIT-71012 | CAUSTIC SODA TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT71013 | LI-CAS | REMOTE FILL PANEL | CAS-LIT-71013 | CAUSTIC SODA TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT72011 | LI-FES | REMOTE FILL STATION | FES-LIT-72011 | FERRIC SULFATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT72012 | LI-FES | REMOTE FILL STATION | FES-LIT-72012 | FERRIC SULFATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT78011 | LI-HYP | REMOTE FILL PANEL | HYP-LIT-78011 | HYDROGEN PEROXIDE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT78012 | LI-HYP | REMOTE FILL PANEL | HYP-LIT-78012 | HYDROGEN PEROXIDE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT73011 | LI-SHP | REMOTE FILL STATION | SHP-LIT-73011 | SODIUM HYPO TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT73012 | LI-SHP | REMOTE FILL STATION | SHP-LIT-73012 | SODIUM HYPO TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT73013 | LI-SHP | REMOTE FILL STATION | SHP-LIT-73013 | SODIUM HYPO TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT76011 | LI-SPE | REMOTE FILL STATION | SPE-LIT-76011 | SODIUM PERMANGANATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT76012 | LI-SPE | REMOTE FILL STATION | SPE-LIT-76012 | SODIUM PERMANGANATE TANK LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SWIP30101 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | MOCP | MAIN OZONE CONTROL PANEL | INST | IVV1 | 2 | 1-pr | #16 AWG | | |
| I-SWIP30102 | MCC-MAIN | MAIN ELEC ROOM [229] MCC | MOCP | MAIN OZONE CONTROL PANEL | INST | IVV1 | 2 | 1-pr | #16 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE I

| | |
|---|---|
| project 98101 | contract |
| drawing E373 — 0 | rev. |
| sheet 448 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-AIT33503 | MOCP | MAIN OZONE CONTROL PANEL | GOX-AIT-33503 | GOX DEW POINT | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PDIT33501 | MOCP | MAIN OZONE CONTROL PANEL | GOX-PDIT-33501 | GOX FILTER DIFF PRESSURE XMTR | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-TIT33501 | MOCP | MAIN OZONE CONTROL PANEL | GOX-TIT-33501 | GOX INLET TEMPERATURE XMTR | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LOXLCP33001-1 | MOCP | MAIN OZONE CONTROL PANEL | LOX-LCP-33001 | LIQUID OXYGEN PANEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | LOX-LIT-33000 |
| I-LOXLCP33001-2 | MOCP | MAIN OZONE CONTROL PANEL | LOX-LCP-33001 | LIQUID OXYGEN PANEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | LOX-PIT-33000 |
| I-AIT350071 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35007-1 | AMBIENT OZONE - OZONE DESTRUCT [236] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT350072 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35007-2 | AMBIENT OZONE - OZONE DESTRUCT [236] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT350081 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35008-1 | AMBIENT OZONE - OXYGEN DESTRUCT [236] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT350082 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35008-2 | AMBIENT OZONE - OXYGEN DESTRUCT [236] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT35101 | MOCP | MAIN OZONE CONTROL PANEL | OZD-AIT-35101 | DESTRUCT INLET OZONE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-OZDLCP35101 | MOCP | MAIN OZONE CONTROL PANEL | OZD-LCP-35101 | OZONE DESTRUCT #1 | INST | IVV1a | 1 | 8-pr | #16 AWG | | 1 SPARE |
| I-OZDLCP35201 | MOCP | MAIN OZONE CONTROL PANEL | OZD-LCP-35201 | OZONE DESTRUCT #2 | INST | IVV1a | 1 | 8-pr | #16 AWG | | 1 SPARE |
| I-PIT35101 | MOCP | MAIN OZONE CONTROL PANEL | OZD-PIT-35101 | DESTRUCT INLET PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-OZNLCP31001 | MOCP | MAIN OZONE CONTROL PANEL | OZN-LCP-31001 | NITROGEN BOOST PANEL | INST | IVV1a | 1 | 8-pr | #16 AWG | | |
| I-AIT30003 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30003 | AMBIENT OZONE - OZONE GEN [220] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT30004 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30004 | AMBIENT OXYGEN - OZONE GEN [220] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT30005 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30005 | AMBIENT OZONE - OZONE GEN [220] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT30006 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30006 | AMBIENT OXYGEN - OZONE GEN [220] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300091 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30009-1 | AMBIENT OZONE - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300092 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30009-2 | AMBIENT OZONE - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300101 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30010-1 | AMBIENT OXYGEN - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300102 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30010-2 | AMBIENT OXYGEN - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT30011 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30011 | AMBIENT OXYGEN - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT30012 | MOCP | MAIN OZONE CONTROL PANEL | OZO-AIT-30012 | AMBIENT OXYGEN - FILTER AREA [233] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SWIJB30101 | MOCP | MAIN OZONE CONTROL PANEL | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | INST | IVV1a | 1 | 12-pr | #16 AWG | | 2 SPARE |
| I-SWIJB30102 | MOCP | MAIN OZONE CONTROL PANEL | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | INST | IVV1a | 1 | 12-pr | #16 AWG | | 2 SPARE |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters
Scale For Microfilming
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE II

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E374 — 0**

**sheet** 449 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-LIT62000 | PLC-BWPS | CLEARWELL PLC CABINET | CCC-LIT-62000 | CLEARWELL LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT54001 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-FIT-54001 | BACKWASH SUPPLY DIVERSION FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT54002 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-FIT-54002 | BACKWASH TO FILTERS FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT53001 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-LIT-53001 | BACKWASH SUPPLY LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT54002 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-PIT-54002 | BACKWASH SUPPLY PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT54003 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-PIT-54003 | BACKWASH SUPPLY REGULATED PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FBSV54002 | PLC-BWPS | CLEARWELL PLC CABINET | FBS-V-54002 | BACKWASH SUPPLY DIVERSION VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-LIT55001 | PLC-BWPS | CLEARWELL PLC CABINET | FBW-LIT-55001 | FILTER WASTE CELL A LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT55002 | PLC-BWPS | CLEARWELL PLC CABINET | FBW-LIT-55002 | FILTER WASTE CELL B LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT430011 | PLC-BWPS | CLEARWELL PLC CABINET | FLT-AIT-43001-1 | COMBINED FILTER EFFLUENT TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT430012 | PLC-BWPS | CLEARWELL PLC CABINET | FLT-AIT-43001-2 | COMBINED FILTER EFFLUENT TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT430013 | PLC-BWPS | CLEARWELL PLC CABINET | FLT-AIT-43001-3 | COMBINED FILTER EFFLUENT PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT62012 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62012 | FINISHED WATER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT62013 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62013 | FINISHED WATER PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT62014 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62014 | FINISHED WATER AMMONIA/CHLORAMINES | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT62015 | PLC-BWPS | CLEARWELL PLC CABINET | FWT-AIT-62015 | FINISHED WATER TOTAL CHLORINE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT24501 | PLC-BWPS | CLEARWELL PLC CABINET | SLD-LIT-24501 | DETENTION BASIN LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE III

| | |
|---|---|
| project 98101 | contract |

drawing **E375 — 0** rev.

sheet 450 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-FIT74013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-FIT-74013 | COAG AID POLYMER TO TRAIN #1 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT74014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-FIT-74014 | COAG AID POLYMER TO TRAIN #2 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-CAPP74001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74001 | COAG AID POLYMER DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CAPP74002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74002 | COAG AID POLYMER DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CAPP74003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | CAP-P-74003 | COAG AID POLYMER DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-FIT72013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-FIT-72013 | FERRIC SULFATE TO FLASH MIX #1 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT72014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-FIT-72014 | FERRIC SULFATE TO FLASH MIX #2 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FESP72001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72001 | FERRIC SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-FESP72002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72002 | FERRIC SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-FESP72003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | FES-P-72003 | FERRIC SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-FIT78013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78013 | HYDROGEN PEROXIDE TO SETTLED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT78014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78014 | HYDROGEN PEROXIDE TO OZONE CONTACT EFFLUENT FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT78015 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-FIT-78015 | HYDROGEN PEROXIDE TO CLEARWELL FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-HYPP78001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78001 | HYDROGEN PEROXIDE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-HYPP78002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78002 | HYDROGEN PEROXIDE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-HYPP78003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | HYP-P-78003 | HYDROGEN PEROXIDE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-LICAP | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-CAP | REMOTE FILL STATION | INST | IVV1 | 2 | 1-pr | #16 AWG | | LI-74011/2 |
| I-LIFES | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-FES | REMOTE FILL STATION | INST | IVV1 | 2 | 1-pr | #16 AWG | | LI-72011/2 |
| I-LIHYP | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-HYP | REMOTE FILL PANEL | INST | IVV1 | 2 | 1-pr | #16 AWG | | LI-78011/2 |
| I-LIPSE | PLC-CHM1 | CHEMICAL AREA PLC CABINET | LI-SPE | REMOTE FILL STATION | INST | IVV1 | 2 | 1-pr | #16 AWG | | LI-76011/2 |
| I-FIT66001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | PSW-FIT-66001 | PLANT SERVICE WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT76013 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-FIT-76013 | PERMANGANATE TO STANDLEY RAW FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT76014 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-FIT-76014 | PERMANGANATE TO EGL4 RAW FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SPEP76001 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76001 | SODIUM PERMANGANATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SPEP76002 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76002 | SODIUM PERMANGANATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SPEP76003 | PLC-CHM1 | CHEMICAL AREA PLC CABINET | SPE-P-76003 | SODIUM PERMANGANATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE IV

| | |
|---|---|
| project 98101 | contract |

drawing **E376 — 0** rev.

sheet 451 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-FIT77013 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77013 | AMMONIUM SULFATE TO OZONATED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT77014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77014 | AMMONIUM SULFATE TO CLEARWELL EFFLUENT FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT77015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-FIT-77015 | AMMONIUM SULFATE TO SETTLED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AMSP77001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77001 | AMMONIUM SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-AMSP77002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77002 | AMMONIUM SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-AMSP77003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | AMS-P-77003 | AMMONIUM SULFATE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-FIT71014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71014 | CAUSTIC TO FLASH MIX #1 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT71015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71015 | CAUSTIC TO FLASH MIX #2 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT71016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71016 | CAUSTIC TO SETTLED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT71017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71017 | CAUSTIC TO OZONATED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT71018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-FIT-71018 | CAUSTIC TO CLEARWELL EFFLUENT FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-CASP71001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71001 | CAUSTIC SODA DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CASP71002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71002 | CAUSTIC SODA DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CASP71003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71003 | CAUSTIC SODA DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CASP71004 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71004 | CAUSTIC SODA DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-CASP71005 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CAS-P-71005 | CAUSTIC SODA DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-AIT620011 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62001-1 | CLEARWELL FREE CHLORINE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT620012 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62001-2 | CLEARWELL PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT620021 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62002-1 | CLEARWELL FREE CHLORINE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT620022 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | CCC-AIT-62002-2 | CLEARWELL PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-LIAMS | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-AMS | REMOTE FILL PANEL | INST | IVV1 | 2 | 1-pr | #16 AWG | | LI-77011/2 |
| I-LICAS | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-CAS | REMOTE FILL PANEL | INST | IVV1 | 3 | 1-pr | #16 AWG | | LI-71011/2/3 |
| I-LISHP | PLC-CHM2 | CHEMICAL AREA PLC CABINET | LI-SHP | REMOTE FILL STATION | INST | IVV1 | 3 | 1-pr | #16 AWG | | LI-73011/2/3 |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE V

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E377 — 0**

**sheet** 452 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-FIT79513 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-FIT-79513 | PHOSPHORIC ACID TO OZONATED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PHAP79501 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-P-79501 | PHOSPHORIC ACID DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-PHAP79502 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-P-79502 | PHOSPHORIC ACID DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-WIT79510 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | PHA-WIT-79510 | PHOSPHORIC ACID TOTE SCALE CONTROLLER | INST | IVV1 | 2 | 1-pr | #16 AWG | | WI-79511/2 |
| I-FIT79014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-FIT-79014 | SODIUM BISULFITE TO OZONE CONTACT EFFLUENT FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT79015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-FIT-79015 | SODIUM BISULFITE TO BACKWASH SUPPLY FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SBIP79001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79001 | SODIUM BISULFITE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SBIP79002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79002 | SODIUM BISULFITE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SBIP79003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-P-79003 | SODIUM BISULFITE DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-WIT79010 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SBI-WIT-79010 | SODIUM BISULFITE TOTE SCALE CONTROLLER | INST | IVV1 | 3 | 1-pr | #16 AWG | | WI-79011/2/3 |
| I-FIT73014 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73014 | SODIUM HYPO TO STANDLEY RAW FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT73015 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73015 | SODIUM HYPO TO EGL4 RAW FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT73016 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73016 | SODIUM HYPO TO SETTLED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT73017 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73017 | SODIUM HYPO TO OZONATED WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT73018 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73018 | SODIUM HYPO TO CLEARWELL INLET FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT73019 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-FIT-73019 | SODIUM HYPO TO CLEARWELL INTERMEDIATE FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SHPP73001 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73001 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SHPP73002 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73002 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SHPP73003 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73003 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SHPP73004 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73004 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SHPP73005 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73005 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |
| I-SHPP73006 | PLC-CHM2 | CHEMICAL AREA PLC CABINET | SHP-P-73006 | SODIUM HYPO DOSING PUMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | SPEED COMMAND, SPEED FEEDBACK |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE VI

| project | contract |
|---|---|
| 98101 | |

**drawing** **rev.**
**E378 — 0**

**sheet** 453 **of** 542 **sheets**
**file** 98101_E_CENTRAL (Revit 2017)

1

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-AIT401001 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-40102 | PRE-FILTER PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT401002 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-40103 | PRE-FILTER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT41111 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41110 | FILTER #1 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT41211 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41210 | FILTER #2 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT41311 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41310 | FILTER #3 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT41411 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41410 | FILTER #4 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT41511 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41510 | FILTER #5 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT41611 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-41610 | FILTER #6 BED EXSPANSION TURBIDITY | INST | IVV1 | 3 | 1-pr | #16 AWG | | WATER LEVEL, BED LEVEL, TURBIDITY |
| I-AIT43101 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43101 | FILTER #1 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT43201 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43201 | FILTER #2 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT43301 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43301 | FILTER #3 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT43401 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43401 | FILTER #4 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT43501 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43501 | FILTER #5 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT43601 | PLC-FLTR | FILTER PLC CABINET | FLT-AIT-43601 | FILTER #6 TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41101 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41101 | FILTER #1 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41201 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41201 | FILTER #2 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41301 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41301 | FILTER #3 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41401 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41401 | FILTER #4 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41501 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41501 | FILTER #5 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT41601 | PLC-FLTR | FILTER PLC CABINET | FLT-FIT-41601 | FILTER #6 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41110 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41110 | FILTER #1 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41210 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41210 | FILTER #2 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41310 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41310 | FILTER #3 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41410 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41410 | FILTER #4 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41510 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41510 | FILTER #5 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT41610 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-41610 | FILTER #6 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT44010 | PLC-FLTR | FILTER PLC CABINET | FLT-PIT-44010 | AIR SCOUR HEADER PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FLTV41102 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41102 | FILTER #1 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-FLTV41202 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41202 | FILTER #2 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-FLTV41302 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41302 | FILTER #3 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-FLTV41402 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41402 | FILTER #4 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-FLTV41502 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41502 | FILTER #5 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-FLTV41602 | PLC-FLTR | FILTER PLC CABINET | FLT-V-41602 | FILTER #6 CONTROL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-LIT40101 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-40101 | EAST FILTER INLET CHANNEL LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT40102 | PLC-FLTR | FILTER PLC CABINET | FLT-LIT-40102 | WEST FILTER INLET CHANNEL LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT360011 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-1 | OZONE CONTACT BASIN OZONE #1 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT360012 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-2 | OZONE CONTACT BASIN OZONE #2 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT360013 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-3 | OZONE CONTACT BASIN OZONE #3 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT360014 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-4 | OZONE CONTACT BASIN OZONE #4 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT360015 | PLC-FLTR | FILTER PLC CABINET | OZO-AIT-36001-5 | OZONE CONTACT BASIN ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT26101 | PLC-FLTR | FILTER PLC CABINET | PRE-AIT-26101 | TRAIN #1 SETTLED WATER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT26201 | PLC-FLTR | FILTER PLC CABINET | PRE-AIT-26201 | TRAIN #2 SETTLED WATER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed H. MORTON |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE VII

| | |
|---|---|
| project 98101 | contract |

drawing **E379 — 1** rev.

sheet 454 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-AIT203011 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20301-1 | PRE TREATMENT TRAIN #1 PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT203012 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20301-2 | PRE TREATMENT TRAIN #1 STREAMING CURRENT | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT203021 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20302-1 | PRE TREATMENT TRAIN #2 PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT203022 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-AIT-20302-2 | PRE TREATMENT TRAIN #2 STREAMING CURRENT | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT21101 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-LIT-21101 | FLOC BASIN #1 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-LIT21201 | PLC-PRE | PRE TREATMENT PLC CABINET | PRE-LIT-21201 | FLOC BASIN #2 LEVEL | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT1100010 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-10 | NORTHERN SUPPLY PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | |
| I-AIT1100011 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-11 | NORTHERN SUPPLY TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT1100012 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-12 | NORTHERN SUPPLY ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT110002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-2 | STANDLEY LAKE PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT110003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-3 | STANDLEY LAKE TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT110004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-4 | STANDLEY LAKE ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT110006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-6 | EAST GRAVEL LAKES PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT110007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-7 | EAST GRAVEL LAKES TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT110008 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11000-8 | EAST GRAVEL LAKES ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT11002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11002 | STANDLEY LAKE CORRECTED ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT11004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11004 | EAST GRAVEL LAKES CORRECTED ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT11025 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-11025 | NORTHERN SUPPLY CORRECTED ORP | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT120011 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12001-1 | TRAIN #1 BLENDED WATER PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT120012 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12001-2 | TRAIN #1 BLENDED WATER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT120023 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12002-3 | TRAIN #2 BLENDED WATER PH/TEMP | INST | IVV1 | 2 | 1-pr | #16 AWG | | PH, TEMP |
| I-AIT120024 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-AIT-12002-4 | TRAIN #2 BLENDED WATER TURBIDITY | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11001 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11001 | STANDLEY LAKE FLOW TO TRAIN #1 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11003 | STANDLEY LAKE FLOW TO TRAIN #2 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11006 | EAST GRAVEL LAKES FLOW TO TRAIN #1 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11007 | EAST GRAVEL LAKES FLOW TO TRAIN #2 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11026 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11026 | NORTHERN SUPPLY FLOW TO TRAIN #1 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT11030 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-11030 | NORTHERN SUPPLY FLOW TO TRAIN #2 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT20201 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-20201 | FLASH MIX TO TRAIN #1 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT20202 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-FIT-20202 | FLASH MIX TO TRAIN #2 FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT11001 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-PIT-11001 | STANDLEY LAKE PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT11002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-PIT-11002 | STANDLEY LAKE REGULATED PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT11004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-PIT-11004 | EAST GRAVEL LAKES PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT11024 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-PIT-11024 | NORTHERN SUPPLY PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE VIII

| project | contract |
|---|---|
| 98101 | |

**drawing** **E380 — 0** **rev.** 0

**sheet** 455 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| Cable Tag | From Tag | From Description | To Tag | To Description | Class | Type | Qty | Assembly | Size | Ground | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I-RWSV11001 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11001 | STANDLEY LAKE SLEEVE VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11002 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11002 | STANDLEY LAKE BALL VALVE | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11003 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11003 | STANDLEY LAKE TO TRAIN #2 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11004 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11004 | FLASH MIX TO TRAIN #1 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11005 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11005 | STANDLEY LAKE TO TRAIN #1 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11006 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11006 | FLASH MIX TO TRAIN #2 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11007 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11007 | EAST GRAVEL LAKES TO TRAIN #2 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11008 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11008 | EAST GRAVEL LAKES TO TRAIN #1 | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-RWSV11026 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11026 | NORTHERN SUPPLY TO TRAIN #1 | INST | IVV1 | 2 | 1-pr | #16 AWG | | |
| I-RWSV11030 | PLC-PRE | PRE TREATMENT PLC CABINET | RWS-V-11030 | NORTHERN SUPPLY TO TRAIN #2 | INST | IVV1 | 2 | 1-pr | #16 AWG | | |
| I-FIT24101 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-FIT-24101 | SLUDGE COLLECTION FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SLDV22102 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22102 | SLUDGE VALVE 1A | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-SLDV22103 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22103 | SLUDGE VALVE 1B | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-SLDV22202 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22202 | SLUDGE VALVE 2A | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-SLDV22203 | PRE-MCP-22000 | SLUDGE COLLECTION MAIN PANEL | SLD-V-22203 | SLUDGE VALVE 2B | INST | IVV1 | 2 | 1-pr | #16 AWG | | % OPEN, % OPENED |
| I-AIT300011 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-AIT-30001-1 | AMBIENT OZONE - INJECTION AREA [101] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300021 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-AIT-30002-1 | AMBIENT OXYGEN - INJECTION AREA [101] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT30101 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-FIT-30101 | OZONE FLOW TO INJECTOR #1 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT32001 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-FIT-32001 | INJECTOR #1 WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT30113 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-PIT-30113 | INJECTOR #1 OZONE PRE-INJECTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT30150 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-PIT-30150 | INJECTOR #1 SOLUTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT32001 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-PIT-32001 | INJECTOR #1 PUMP SUCTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT32010 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-PIT-32010 | INJECTOR #1 PUMP DISCHARGE PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SWIV30103 | SWI-JB-30101 | OZONE INJECTION #1 JUNCTION BOX | SWI-V-30103 | INJECTOR #1 OZONE CONTROL VALVE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300012 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-AIT-30001-2 | AMBIENT OZONE - INJECTION AREA [101] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-AIT300022 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-AIT-30002-2 | AMBIENT OXYGEN - INJECTION AREA [101] | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT30105 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-FIT-30105 | OZONE FLOW TO INJECTOR #2 | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-FIT32002 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-FIT-32002 | INJECTOR #2 WATER FLOW | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT30114 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-PIT-30114 | INJECTOR #2 OZONE PRE-INJECTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT30151 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-PIT-30151 | INJECTOR #2 SOLUTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT32002 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-PIT-32002 | INJECTOR #2 PUMP SUCTION PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-PIT32011 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-PIT-32011 | INJECTOR #2 PUMP DISCHARGE PRESSURE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |
| I-SWIV30107 | SWI-JB-30102 | OZONE INJECTION #2 JUNCTION BOX | SWI-V-30107 | INJECTOR #2 OZONE CONTROL VALVE | INST | IVV1 | 1 | 1-pr | #16 AWG | | |

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | H. MORTON |
| **designed** | **checked** |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
ANALOG CABLE SCHEDULE IX

| project | contract |
|---|---|
| 98101 | |

**drawing** E381 — **rev.** 0

**sheet** 456 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Millimeters
Inches
Scale For Microfilming

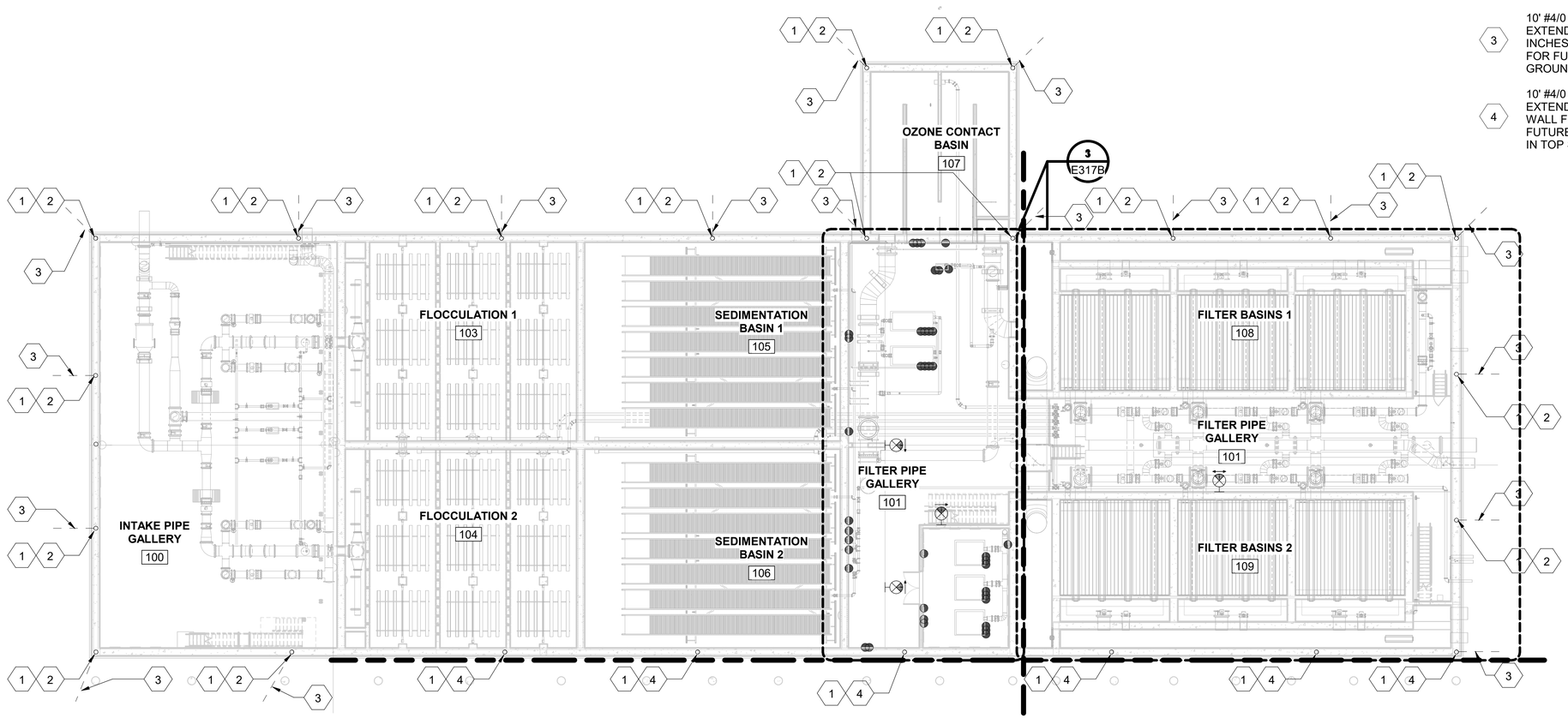
COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTES:

1. SEE EG002 FOR CONTINUATION TO UPPER LEVEL.

KEYED NOTES:

1. BOND GROUNDING CONDUCTORS TO BOTTOM MATT OF REINFORCING STEEL.
2. ROUTE #4/0 BARE COPPER CONDUCTOR ON EXTERIOR OF VERTICAL CONCRETE WALL TO 30 INCHES (MIN) BELOW FINISHED GRADE.
3. 10' #4/0 BARE COPPER CABLE EXTENDING FROM WALL AT 30 INCHES (MIN) BELOW GRADE FOR FUTURE CONNECTION TO GROUND GRID.
4. 10' #4/0 BARE COPPER GROUND EXTENDING FROM TOP OF WALL FOR CONNECTION TO FUTURE GROUND CONDUCTOR IN TOP SLAB.



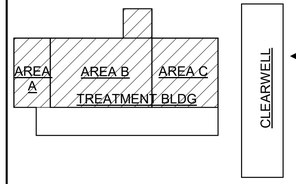

OVERALL LOWER LEVEL FLOOR SLAB

0 8' 16' 32'

SCALE IN FEET

NORTH

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KS | RN | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed A. GREENLIEF | checked E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
OVERALL LOWER LEVEL - FLOOR SLAB

| | |
|---|---|
| project 98101 | contract |
| drawing EG001 | rev. 1 |
| sheet 457 of 542 sheets | |
| file 98101_E_CENTRAL (Revit 2017) | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

NOTES:

1. SEE EG001 FOR CONTINUATION TO LOWER LEVEL.

KEYED NOTES:

1. CONNECT 10' #4/0 BC GROUND EXTENDING FROM WALL TO GROUND GRID.
2. BOND GROUNDING CONDUCTORS TO BOTTOM MATT OF REINFORCING STEEL.
3. CONNECT 10' #4/0 BC GROUND EXTENDING FROM TOP OF WALL TO GROUND CONDUCTOR IN TOP SLAB.
4. BOND DUCT BANK GROUND TO GROUND GRID. REFER TO DRAWINGG E100.
5. ROUTE #4/0 AWG BC TO GROUND BUS. REFER TO DRAWING E206.
6. ROUTE #4/0 AWG BC TO GROUND BUS. REFER TO DRAWING E318.
7. ROUTE #4/0 AWG BC TO GROUND BUS. REFER TO DRAWING E209.

MAINTENANCE SHOP 205
JANITOR CLOSET 206
OFFICE 204
COPY/PRINT/ FILE STORAGE 207
OFFICE 203
WOMENS 208
MENS 209
IT 211
SCADA 210
CONFERENCE/ BREAK 202
RECEPTION 201
VESTIBULE 238
CONTROL ROOM 213
LAB 215
SECONDARY ELECTRICAL ROOM 218
OZONE GENERATORS 220
CORRIDOR 231
SODIUM BISULFITE 225
PHOSPHORIC ACID 226
UNISEX RESTROOM 232
MAIN ELECTRICAL ROOM 229
BREAK AREA 214
POLYMER 216
MECHANICAL 217
COAG AID 219
FERRIC CHLORIDE/SULFATE 221
SODIUM PERMANGANATE 222
HYDROGEN PEROXIDE 223
CAUSTIC SODA 224
SODIUM HYPOCHLORITE 228
AMMONIUM SULFATE 230
FLOCCULATION 1 102
FLOCCULATION 2 103
SEDIMENTATION BASIN 1 104
SEDIMENTATION BASIN 2 105
FILTER BASINS 1 107
FILTER BASINS 2 108
TREATMENT 233
OZONE DESTRUCT 236

TO BWPS, SEE DRAWING EG003 FOR CONTINUATION

TO GLU/XFMR PAD

OVERALL UPPER LEVEL FLOOR SLAB

0 8' 16' 32'
SCALE IN FEET

NORTH

AREA A | AREA B | AREA C | TREATMENT BLDG | AREA D | AREA E | CLEARWELL

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| A. GREENLIEF | E. DIENBERG |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
OVERALL UPPER LEVEL - FLOOR SLAB

| project | contract |
|---|---|
| 98101 | |

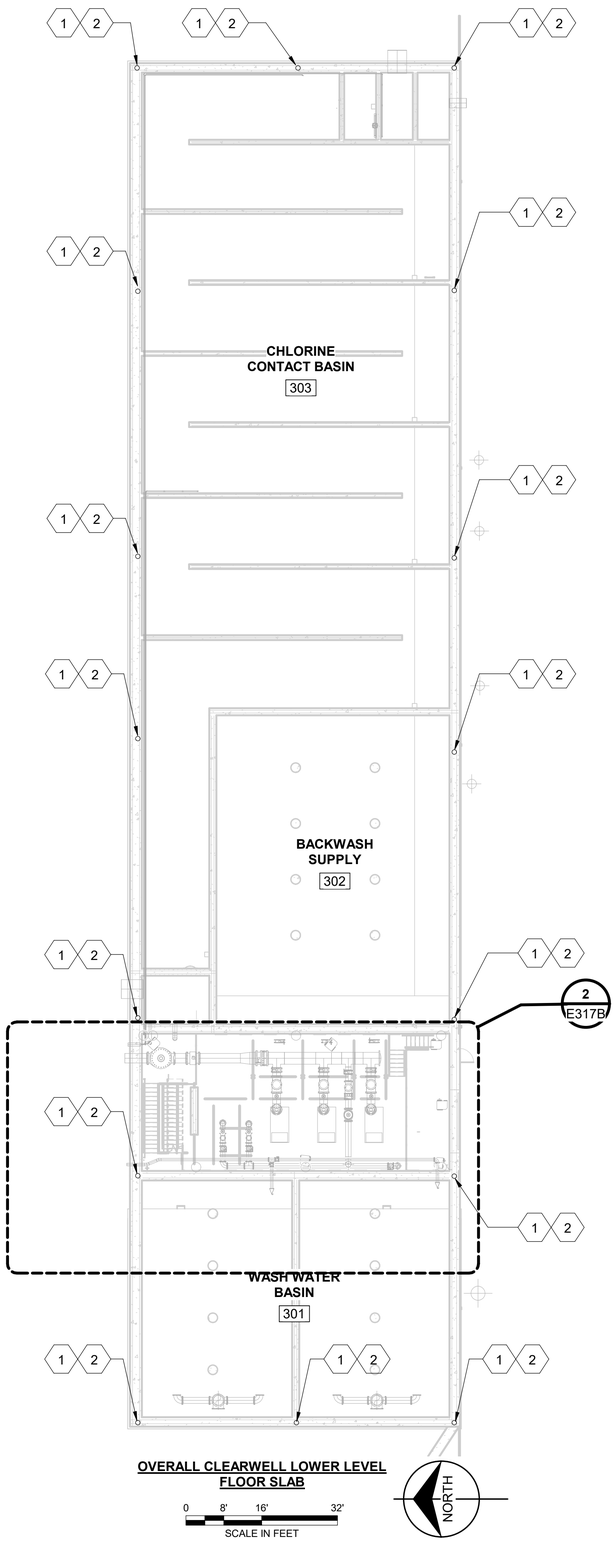
drawing EG002 — 0 rev.

sheet 458 of 542 sheets

file 98101_E_CENTRAL (Revit 2017)

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

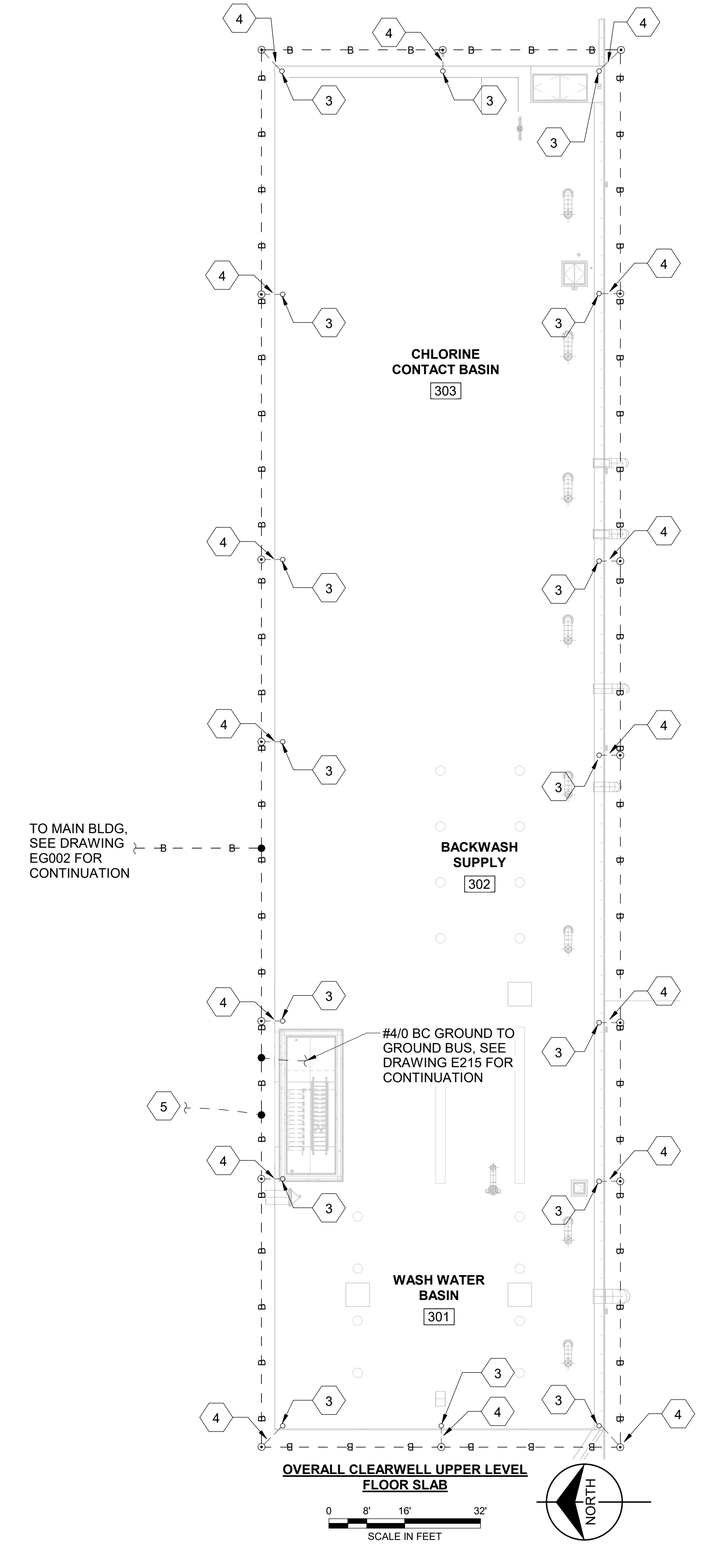
Scale For Microfilming
Millimeters
Inches




OVERALL CLEARWELL LOWER LEVEL FLOOR SLAB

0 8' 16' 32'
SCALE IN FEET

NORTH




OVERALL CLEARWELL UPPER LEVEL FLOOR SLAB

0 8' 16' 32'
SCALE IN FEET

NORTH

KEYED NOTES:

1. BOND GROUNDING CONDUCTORS TO BOTTOM MATT OF REINFORCING STEEL.
2. ROUTE #4/0 BARE COPPER CONDUCTOR ON EXTERIOR OF VERTICAL CONCRETE WALL TO 30 INCHES BELOW FINISHED GRADE.
3. ROUTE #4/0 BARE COPPER DOWN TO LOWER LEVEL IN VERTICAL CONCRETE WALL OR ON EXTERIOR OF VERTICAL CONCRETE WALL.
4. 10' #4/0 BC GROUND EXTENDING FROM WALL AT 30 INCHES (MIN) BELOW GRADE FOR CONNECTION TO GROUND GRID.
5. BOND DUCT BANK GROUND TO GROUND GRS. REFER TO DRAWING E100.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 3/9/18 | KS | RN | WP2-ISSUED FOR CONSTRUCTION |
| 1 | 12/7/18 | AG | ED | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | AG | JS | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** A. GREENLIEF | **checked** E. DIENBERG |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OVERALL CLEARWELL - FLOOR SLAB

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** EG003 — **rev.** 1

**sheet** 459 **of** 542 **sheets**

**file** 98101_E_CENTRAL (Revit 2017)

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## PIPING

- GATE VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- STOP CHECK VALVE
- AUTOMATIC RECIRCULATION CHECK VALVE
- PLUG VALVE
- 3-WAY VALVE
- 4-WAY VALVE
- ANGLE VALVE
- PRESSURE AND VACUUM RELIEF VALVE
- PRESSURE RELIEF VALUE
- HOSE GATE DRAIN VALVE
- PINCH VALVE
- NEEDLE VALVE
- DIAPHRAGM VALVE
- BALL VALVE
- SELF-CONTAINED PRESSURE REDUCING (REGULATING VALVE)
- SURGE RELIEF VALVE
- KNIFE GATE VALVE
- BACK PRESSURE VALVE
- CORPORATION STOP
- AIR RELEASE VALVE
- VACUUM VALVE
- AIR AND VACUUM VALVE
- COMBINATION AIR VALVE
- LOCKED OPEN
- LOCKED CLOSED
- DIAPHRAGM SEAL
- ROTARY VALVE
- VACUUM REGULATOR VALVE
- AUTOMATIC SWITHOVER VALVE
- DIFFUSER
- MUD VALVE
- EXHAUST TO ATMOSPHERE (INSIDE)
- EXHAUST TO ATMOSPHERE (OUTSIDE)
- CALIBRATION COLUMN
- PULSATION DAMPENER
- SLIDE GATE
- EJECTOR/EDUCTOR

- BP BACKFLOW PREVENTER
- VB VACUUM BREAKER
- MS MOISTURE SEPARATOR
- ROTAMETER
- SIGHT FLOW INDICATOR
- FLEXIBLE HOSE
- EXPANSION ELEMENT (JOINT)
- FLEXIBLE BALL JOINT
- BASKET TYPE STRAINER
- TEE TYPE STRAINER
- Y-TYPE STRAINER
- CONICAL STRAINER
- DUPLEX STRAINER
- SLEEVE COUPLING (SC)
  HARNESSED SLEEVE COUPLING (HSC)
  INSULATED SLEEVE COUPLING (ISC)
- FLANGED COUPLING ADAPTER (FCA)
- DRAINER ASSEMBLY
- SAMPLE COOLER
- INSULATING FLANGE (IF)
- RESTRICTING ORIFICE
- STRAIGHTENING VANE
- RUPTURE DISK
- PIPE GUIDE
- PIPE WITH HEATING CABLE
- DRIP POCKET ASSEMBLY
- UNION
- PIPE ANCHOR
- REDUCER
- DISCHARGE ELBOW ASSEMBLY
- HOSE CONNECTION
- REMOVABLE PLUG
- REMOVABLE CAP
- WELDED CAP
- BF BLIND FLANGE
- CO CLEANOUT
- YH YARD HYDRANT
- AC AIR COCK
- HB HOSE BIBB
- WH WALL HYDRANT
- QUICK DISCONNECT COUPLING
- DRAIN
- SLUICE GATE

## LINESTYLES AND INTERFACE SYMBOLS

- PROCESS LINE
- INSTRUMENT OR CONTROL ELEMENT CONNECTION TO PROCESS LINE
- ELECTRICAL SIGNAL (ANALOG)
- ELECTRICAL SIGNAL (DISCRETE)
- ELECTRICAL SIGNAL (POWER)
- SOFTWARE OR DATA LINK
- FIELDBUS SYSTEM (MODBUS)
- SPECIAL SIGNAL CABLE
- COMPRESSED/INSTRUMENT AIR
- CABINET BOUNDARY
- DIRECTION OF FLOW
- SIGNAL CONNECTION
- CROSSOVER - NO CONNECTION

PROCESS

CONNECTOR NUMBER → SERVICE DESCRIPTION | NO. | P&ID NO. | ORIGIN/DESTINATION

INTERFACE FROM PROCESS EXTERNAL TO PROJECT

SIGNAL

CONNECTOR NUMBER → SERVICE DESCRIPTION | NO. | P&ID NO. | ORIGIN/DESTINATION

INTERFACE FROM PROCESS EXTERNAL TO PROJECT

- BROKEN SIGNAL LINE X = SAME SHEET DESTINATION NO.
- CONTROL INTERLOCK

## VALVE OPERATORS

- SOLENOID
- DIAPHRAGM
- CYLINDER
- CHAINWHEEL
- MOTOR
- VANE
- MANUAL (HAND)

## PRIMARY ELEMENT SYMBOLS

- M IN-LINE MAGNETIC FLOW METER
- FLUME
- WEIR
- ULTRASONIC LEVEL
- RDR RADAR LEVEL
- FLOAT SWITCH
- THERMAL MASS FLOW METER

## MOTOR STARTER SYMBOLS

- MOTOR STARTER
- VFD VARIABLE FREQUENCY DRIVE
- RVSS REDUCED VOLTAGE SOLID-STATE STARTER

## ROTATING MACHINES

- XX METERING PUMP
- CENTRIFUGAL PUMP (DRY PIT)
- PERISTALTIC PUMP
- PUMP OR COMPRESSOR
- BLOWER
- MOTOR
- AGITATOR/MIXER
- STATIC MIXER AND PROGRESSIVE CAVITY PUMP
- DIAPHRAGM PUMP
- PULSATION DAMPER

## SELF-ACTUATED REGUATORS AND VALVES

- PRESSURE-REDUCING REGULATOR, SELF-CONTAINED, WITH HANDWHEEL ADJUSTABLE SET POINT
- PRESSURE-REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP
- DIFFERENTIAL-PRESSURE-REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESSURE TAP
- BACKPRESSURE REGULATOR, SELF CONTAINED
- BACKPRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP
- PI PRESSURE-REDUCING REGULATOR WITH INTEGRAL OUTLET PRESSURE RELIEF VALVE AND OPTIONAL PRESSURE INDICATOR

## PROCESS EQUIPMENT

- FLOCCULATION BASIN
- SEDIMENTATION BASIN
- DEMISTER

## AIR OPERATED MACHINES

- PNEUMATIC OPERATED DIAPHRAGM PUMP

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**

PROCESS AND INSTRUMENTATION LEGEND I

| | |
|---|---|
| project 98101 | contract |
| drawing I001 – | rev. 0 |
| sheet 460 of 542 sheets | |
| file 98101I001.dwg | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## EQUIPMENT TAG NUMBER

EQUIPMENT TAG NUMBER - AAA-YYY-ZZZ

AAA = PROCESS SYSTEM/BUILDING
YYY = EQUIPMENT DESIGNATION
ZZZ = PROCESS LOOP NUMBER

### PLANT PROCESS SYSTEM/BUILDING DESIGNATION (AAA)

| DESIGNATION (AAA) | SYSTEM |
|---|---|
| AMS | AMMONIUM SULFATE |
| CAP | COAGULANT AID |
| CAS | CAUSTIC SODA |
| CBC | CARBON CONTACT |
| CHM | CHEMICAL FEED SYSTEM |
| CLA | CLARIFICATION |
| CLR | CHLORINE |
| CPS | CONTRACT USERS PUMP STATION |
| DFS | DISINFECTION & STORAGE |
| ELC | ELECTRICAL BUILDING |
| ENT | ENTRANCE GATE |
| FAP | FLOC-AID POLYMER |
| FAS | FILTER AIR SCOUR |
| FBS | FILTER BACKWASH SUPPLY |
| FBW | FILTER BACKWASH WASTE |
| FES | FERRIC SULFATE |
| FLE | EAST FILTER BUILDING |
| FLT | FILTRATION |
| FLW | WEST FILTER BUILDING |
| FMP | FLASH MIX PUMPING |
| FWP | FINISHED WATER PUMPING |
| FWT | FINISHED WATER |
| HDH | HEAD HOUSE |
| HDL | HYDRATED LIME |
| HYP | HYDROGEN PEROXIDE |
| LOX | LIQUID OXYGEN |
| OCC | OZONE CONTACT CHAMBER |
| OZD | OZONE DESTRUCT |
| OZN | OZONE NITROGEN BOOST |
| OZO | OZONE SYSTEM |
| PAC | POWDERED ACTIVATED CARBON |
| PHA | PHOSPORIC ACID |
| PLD | PLANT DRAINS |
| PLM | POLYMER |
| PRE | PRETREATMENT |
| PSW | PLANT SERVICE WATER |
| RLN | RESIDUALS LAGOONS |
| RWS | RAW WATER SUPPLY |
| SAN | SANITARY |
| SBI | SODIUM BISULFITE |
| SDA | SODA ASH |
| SHP | SODIUM HYPOCHLORITE |
| SLD | SOLIDS |
| SPE | SODIUM PERMANGANATE |
| SWI | SETTLED WATER INJECTION |

### EQUIPMENT DESIGNATION

| DESIGNATOR (YYY) | EQUIPMENT DESIGNATOR DESCRIPTION |
|---|---|
| AC | AIR COMPRESSOR |
| AF | AIR FILTER |
| AFB | AGITATOR |
| AFC | AFTERCOOLER |
| AG | AGITATION BLOWER |
| AS | ACOUSTIC SILENCER |
| B | BASIN |
| BCH | BATTERY CHARGER |
| BLW | AIR SCOUR SYSTEM BLOWER |
| C | COMPRESSOR |
| CC | CALIBRATION COLUMN |
| CDR | CONDENSER |
| CLO | CHLORONATOR |
| CWP | COOLING WATER PUMPING |
| D | DEWATERING EQUIPMENT |
| DC | DESTRUCT CATALYST |
| DB | DESTRUCT BLOWER |
| DDR | DESICANT DRYER |
| DEM | DEMISTER |
| EG | ENGINE GENERATOR |
| EJ | EJECTOR |
| F | FAN BLOWERS |
| FLC | FLOCCULATOR |
| FVNR (1) | FULL VOLTAGE NON-REVERSING STARTER |
| G | GATE |
| GEN | GENERATOR |
| HTR | HEATER |
| INJ | INJECTOR |
| IPS | INCLINED PLATE SETTLERS |
| LCP | LOCAL CONTROL PANEL |
| M | MOTOR, ELECTRIC |
| ME | MECHANICAL EQUIPMENT |
| MM | MAGNETIC FLOW METER |
| MP | METERING PUMP |
| MXR | MIXER |
| P | PUMP |
| PD | PULSATION DAMPER |
| PFR | PIPELINE FLASH REACTOR |
| PFS | PACKAGED FEED SYSTEM |
| PIR | POLYMER INJECTION RING |
| PMF | POLYMER MAKEUP AND FEED UNIT |
| PWF | PADDLE WHEEL FLOCCULATOR |
| RC | RECIRCULATING COMPRESSOR |
| RCV | AIR RECEIVER |
| REG | REGULATOR |

### EQUIPMENT DESIGNATION

| DESIGNATOR (YYY) | EQUIPMENT DESIGNATOR DESCRIPTION |
|---|---|
| RO | ROTAMETER |
| SC | SLUDGE COLLECTOR |
| SCL | SLUDGE COLLECTOR, LONGITUDINAL |
| SCP | SCUM PUMP |
| SCX | SLUDGE COLLECTOR, CROSS |
| SG | SLIDE GATE |
| SKD | SKID EQUIPMENT |
| SLG | SLUICE GATE |
| SMP | SAMPLE PUMP |
| SP | SUMP PUMP |
| STR | STRAINER |
| TMM | THERMAL MASS FLOWMETER |
| TNK | TANK |
| TP | TRANSFER PUMP |
| V | VALVE (ALL TYPES) |
| VC | VACUUM REGULATOR |
| VFD | VARIABLE FREQUENCY DRIVE |
| VTR | VENTURI |
| XFMR | TRANSFORMER |

## INSTRUMENT SYMBOLS

- FIELD MOUNTED INSTRUMENT
- PANEL-MOUNTED INSTRUMENT
- INSTRUMENT MOUNTED INSIDE PANEL
- INTEGRALLY-MOUNTED TRANSMITTER (_T . / _E .)
- REMOTE-MOUNTED TRANSMITTER (_T . / _E .)

## SCADA SYMBOLS

- VISIBLE/OPERATOR ACCESSIBLE AT MAIN TERMINAL
- NOT VISIBLE/OPERATOR ACCESSIBLE AT MAIN TERMINAL
- VISIBLE/OPERATOR ACCESSIBLE AT SECONDARY TERMINAL
- NOT VISIBLE/OPERATOR ACCESSIBLE AT SECONDARY TERMINAL

## TAGGING SCHEME

| A | BB | CC | -D | DESCRIPTION |
|---|---|---|---|---|
| 1 | | | | RAW WATER / HEADWORKS |
| | 10 | | | RAW WATER SOURCES |
| 2 | | | | PRETREATMENT |
| | 0 | | | EYEWASH STATIONS |
| | 1 | | | |
| | 2 | | | FLASH MIX PUMPING |
| | 3 | | | INFLUENT WATER QUALITY MEASUREMENT (WQM) |
| | 7 | | | INFLUENT FLOW SPLITTING WQM |
| | 11 | | | FLOCCULATION TRAIN NO. 1 |
| | 12 | | | FLOCCULATION TRAIN NO. 2 |
| | 21 | | | SEDIMENTATION TRAIN NO. 1 |
| | 22 | | | SEDIMENTATION TRAIN NO. 2 |
| | 31 | | | SOLIDS DRAIN VALVE (SED. BASIN NO.1) |
| | 32 | | | SOLIDS DRAIN VALVE (SED. BASIN NO. 1) |
| | 41 | | | SOLIDS METERING |
| | 51 | | | SETTLED WATER PIPE/CHANNEL |
| | 60 | | | SETTLED WATER WQM |
| | 70 | | | HVAC |
| | 90 | | | NETWORK COMPONENTS |
| | 95 | | | MISC. ELECTRICAL EQUIPMENT & SYSTEMS |
| 3 | | | | OZONE |
| | 1 | | | INJECTOR AND CONTACTOR |
| | 10 | | | NITROGEN BOOST |
| | 20 | | | SIDESTREAM PUMPS |
| | 30 | | | LOX TANK AND VAPORIZERS |
| | 35 | | | GASEOUS OXYGEN CONDITIONING |
| | 40 | | | OZONE GENERATION |
| | 45 | | | COOLING WATER PUMPS (OPEN-LOOP) |
| | 46 | | | COOLING WATER PUMPS (CLOSED-LOOP) |
| | 50 | | | OZONE DESTRUCT |
| | 60 | | | WQM AND DRAINAGE SUMP PUMPS |
| | 70 | | | HVAC |
| | 90 | | | NETWORK COMPONENTS |
| | 95 | | | MISC. ELECTRICAL EQUIPMENT & SYSTEMS |
| 4 | | | | FILTERS |
| | 0 | | | EYEWASH STATION |
| | 1 | | | COMBINED FILTERS |
| | 11 | | | FILTER NO. 1 |
| | 12 | | | FILTER NO. 2 |
| | 13 | | | FILTER NO. 3 |
| | 14 | | | FILTER NO. 4 |
| | 15 | | | FILTER NO. 5 |
| | 16 | | | FILTER NO. 6 |
| | 30 | | | FILTER EFFLUENT WQM |
| | 40 | | | AIR SCOUR BLOWERS |
| | 60 | | | FILTER DRAIN PUMP |
| | 70 | | | HVAC |
| | 90 | | | NETWORK COMPONENTS |
| | 95 | | | MISC. ELECTRICAL EQUIPMENT & SYSTEMS |
| 5 | | | | BACKWASH SYSTEM |
| | 40 | | | BACKWASH SUPPLY PUMPING |
| | 50 | | | BACKWASH WASTE PUMPING |
| | 70 | | | HVAC |
| | 90 | | | NETWORK COMPONENTS |
| | 95 | | | MISC. ELECTRICAL EQUIPMENT & SYSTEMS |
| 6 | | | | CHLORINE CONTACT CHAMBER |
| | 10 | | | CHAMBER |
| | 20 | | | FINISHED WQM |
| | 70 | | | DENVER WATER CONNECTION |
| | 90 | | | NETWORK COMPONENTS |
| | 95 | | | MISC. ELETRICAL EQUIPMENT & SYSTEMS |
| 9 | | | | ELECTRICAL SYSTEMS |
| | 10 | | | ELECTRICAL ROOM (HVAC, TEMP, INTRUSION) |
| | 20 | | | SECURITY SYSTEM |
| | 30 | | | PLANT SCADA UPS |
| | 40 | | | FIRE ALARM SYSTEM |
| | 80 | | | AUTOMATIC TRANSFER SWITCH |
| | 90 | | | GENERATOR |

## INSTRUMENT SOCIETY OF AMERICA

| LETTER | FIRST LETTER(S) | | SUCCEEDING LETTER | | |
|---|---|---|---|---|---|
| | PROCESS OR INITIATING VARIABLE | MODIFIER | READOUT OR PASSIVE FUNCTION | OUTPUT FUNCTION | MODIFIER |
| A | ANALYSIS (*) | | ALARM | | |
| B | BURNER, COMBUSTION | | USERS CHOICE (*) | CLOSE,STOP,DECREASE | USERS CHOICE (*) |
| C | CONDUCTIVITY | | CLOSED | CONTROL | CLOSED |
| D | DENSITY (SG) | DIFFERENTIAL | | OPEN,START,INCREASE | DEVIATION |
| E | VOLTAGE | | SENSOR (PRIMARY ELEMENT) | EMERGENCY | |
| F | FLOW RATE | RATIO/BIAS | | | |
| G | | | GLASS, VIEWING, GAUGE | GATE | |
| H | HAND (MANUAL) | | | | HIGH |
| I | CURRENT (AMPS) | | INDICATE | | |
| J | POWER | | SCAN | | |
| K | TIME, SCHEDULE | RATE OF CHANGE | | CONTROL STATION | |
| L | LEVEL | | LIGHT | | LOW |
| M | MOTION, MOTOR | MOMENTARY | | | MIDDLE, INTRMDT |
| N | TORQUE | | USERS CHOICE (*) | ISOLATOR | ON, OPERATE |
| O | USERS CHOICE (*) | | ORIFICE, OPEN | | OPENED |
| P | PRESSURE, VAC | | POINT (TEST CONN) | | |
| Q | QUANTITY | INTEGRATE, TOTALIZE | INTEGRATE, TOTALIZE | | |
| R | RADIATION | | RECORD | | RUN |
| S | SPEED, FREQUENCY | SAFETY | | SWITCH | STOP |
| T | TEMPERATURE | | | TRANSMIT | |
| U | MULTIVARIABLE (*) | | MULTIFUNCTIONAL (*) | | |
| V | VIBRATION | | | VALVE, DAMPER, LOUVER | |
| W | WEIGHT, FORCE | | WELL, PROBE | | |
| X | UNCLASSIFIED (*) | X-AXIS | UNCLASSIFIED (*) | TRANSDUCER | |
| Y | EVENT, STATE (*) | Y-AXIS | | RELAY, COMPUTER | |
| Z | POSITION, DIMENSION | Z-AXIS | | DRIVE, ACTUATOR | |

(*) WHEN USED EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL.

## INSTRUMENT/CONTROL SWITCH NOTATION

ZZZ
XX
YYY

XX = INSTRUMENT TYPE
YYY = NUMBER
ZZZ =

| | |
|---|---|
| CHL | CHLORINE |
| CL | CLOSE |
| DEW | DEWPOINT |
| ES | EMERGENCY STOP |
| FAIL | FAILURE |
| F/R | FORWARD-REVERSE |
| H/A | HAND-AUTO |
| H/O/A | HAND-OFF-AUTO |
| H/O/R | HAND-OFF-REMOTE |
| L/O/R | LOCAL-OFF-REMOTE |
| L/R | LOCAL-REMOTE |
| O3 | OZONE |
| O3G | OZONE GAS |
| OP | OPEN |
| O/C | OPEN-CLOSE |
| OL | OVERLOAD |
| O/C/A | OPEN-CLOSE-AUTO |
| O/O | ON-OFF |
| O/S/C | OPEN-STOP-CLOSE |
| OX | OXYGEN |
| pH | pH |
| P1/O/P2 | PUMP 1 RUN- OFF-PUMP 2 RUN |
| RDR | RADAR |
| REV | REVERSE |
| RUN | RUN |
| SC | STREAMING CURRENT |
| S/S | START-STOP |
| TEMP | TEMPERATURE |
| TURB | TURBIDITY |
| % | PERCENT OPEN, PERCENT FULL SPEED |

## LCP/HMI SYMBOLS

- FIELD-MOUNTED LOCAL CONTROL OR DISPLAY
- PANEL-MOUNTED LOCAL CONTROL OR DISPLAY (PRIMARY)
- LOCAL CONTROL OR DISPLAY MOUNTED INSIDE PANEL (PRIMARY)
- PANEL-MOUNTED LOCAL CONTROL OR DISPLAY (SECONDARY)
- LOCAL CONTROL MOUNTED INSIDE PANEL OR DISPLAY (SECONDARY)

## PLC I/O SYMBOLS

- AI ANALOG INPUT TO PLC
- AO ANALOG OUTPUT FROM PLC
- DI DIGITAL INPUT TO PLC
- DO DIGITAL OUTPUT FROM PLC

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PROCESS AND INSTRUMENTATION
LEGEND II

| project | contract |
|---|---|
| 98101 | |

drawing **I002** rev. **1**

sheet 461 of 542 sheets

file 98101I002.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I002.DWG 10/20/2020 11:19 AM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

AI 11000-2 | AAH 11000-2 | AI 11000-3 | AAH 11000-3 | AI 11000-4 | AAH 11000-4

PH/TEMP AI 11000-2 | TURB AI 11000-3 | ORP AI 11000-4

PI 11001 | HI 11002 (IN REMOTE DI) | FC 11002 (AO) | ZI 11002 (% AI) | YA 11002 (FAIL DI)

YA 11001 (FAIL DI) | ZI 11001 (% AI) | FC 11001 (AO) | HI 11001 (IN REMOTE DI) | PI 11002 (AI)

FI 11001 | FQIR 11001 | FC 11001

YA 11005 (FAIL DI) | ZI 11005 (% AI) | FC 11005 (AO) | HS 11005 (IN REMOTE DI)

AI 11002 (ORP AI) | AAH 11002

FI 11003 | FQIR 11003 | FC 11003

YA 11003 (FAIL DI) | ZI 11003 (% AI) | FC 11003 (AO) | HI 11003 (IN REMOTE DI)

E I006 | E I007 | E I008

120V, 1ø, LP-PRE

S/S HS 11000-1

120V, 1ø, PLC-PRE (x3)

480V, 3ø, PP-RW

120V, 1ø, PLC-PRE

480V, 3ø, PP-RW

480V, 3ø, PP-RW

120V, 1ø, PLC-PRE

120V, 1ø, PLC-PRE

480V, 3ø, PP-RW

HS 11002 | FC 11002 | ZIT 11002 | YA 11002

YA 11005 | ZIT 11005 | FC 11005 | HS 11005

YA 11001 | ZIT 11001 | FC 11001 | HS 11001

YA 11003 | ZIT 11003 | FC 11003 | HS 11003 (FAIL % L/R)

PI 11001 | PIT 11001 | PE 11001

PI 11002 | PIT 11002 | PE 11002

VAULT

BLIND FLANGE FOR FUTURE CHEMICAL

3/4"

STANDLEY LAKE RW — STANDLEY LAKE — 30"

OUTSIDE / INSIDE

SODIUM PERMANGANATE A I064 — SODIUM PERMANGANATE FEED SYSTEM

20" RWS-V-11011

30" RWS-V-11002

30" RWS-V-11012

24" RWS-MM-11001 (FIT 11001) RWS-V-11017

RWS-V-11005

SODIUM HYPOCHLORITE I055 A — SODIUM HYPOCHLORITE FEED SYSTEM

3/4"

AIT 11002 ORP | AE 11002

30" RWS-V-11001

30" RWS-V-11009

RWS-V-11010

RWS-V-11013

24" RWS-MM-11003 (FIT 11003) RWS-V-11003

STANDLEY LAKE A I006 — PRETREATMENT TRAIN #1 RW BLENDING POINT

STANDLEY LAKE B I006 — PRETREATMENT TRAIN #2 RW BLENDING POINT

RWS-V-11021

4" STANDLEY LAKE C I006 — FLASH MIX #1

4" STANDLEY LAKE D I006 — FLASH MIX #2

PH/TEMP AIT 11000-2 / AE 11000-2 | TURB AIT 11000-3 / AE 11000-3 | ORP AIT 11000-4 / AE 11000-4

RWS-SMP-11000-1

STANDLEY LAKE RW — LAB SAMPLE SINK

24" RWS-V-11027

STANDLEY LAKE RW A I004 — EGL4 RW

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

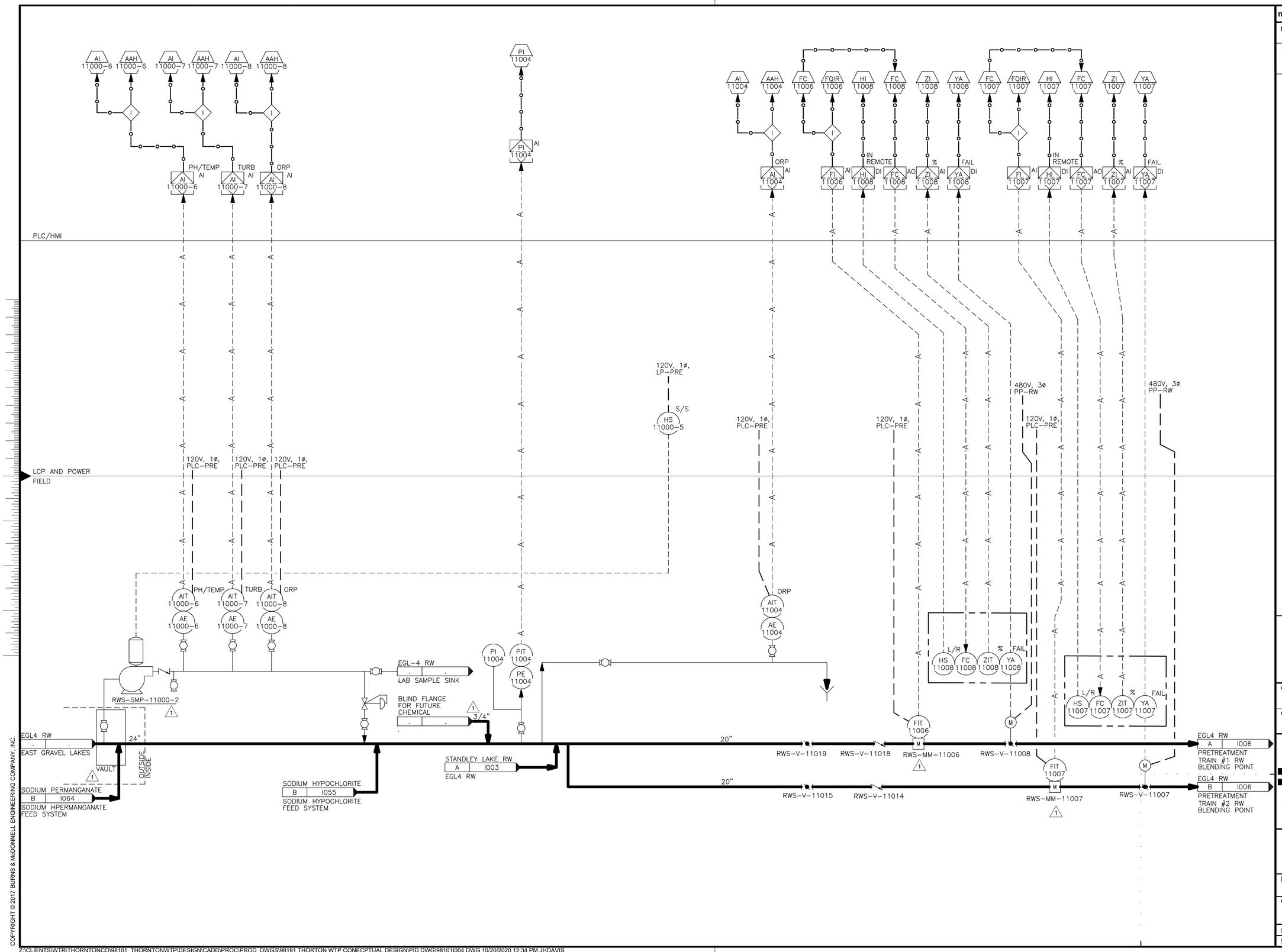
**CITY OF THORNTON**
**TTP - PACKAGE 3**
RAW WATER CONTROL P&ID
SHEET I

| project | contract |
|---|---|
| 98101 | |

drawing **I003** — rev. **1**

sheet 462 of 542 sheets

file 98101I003.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**

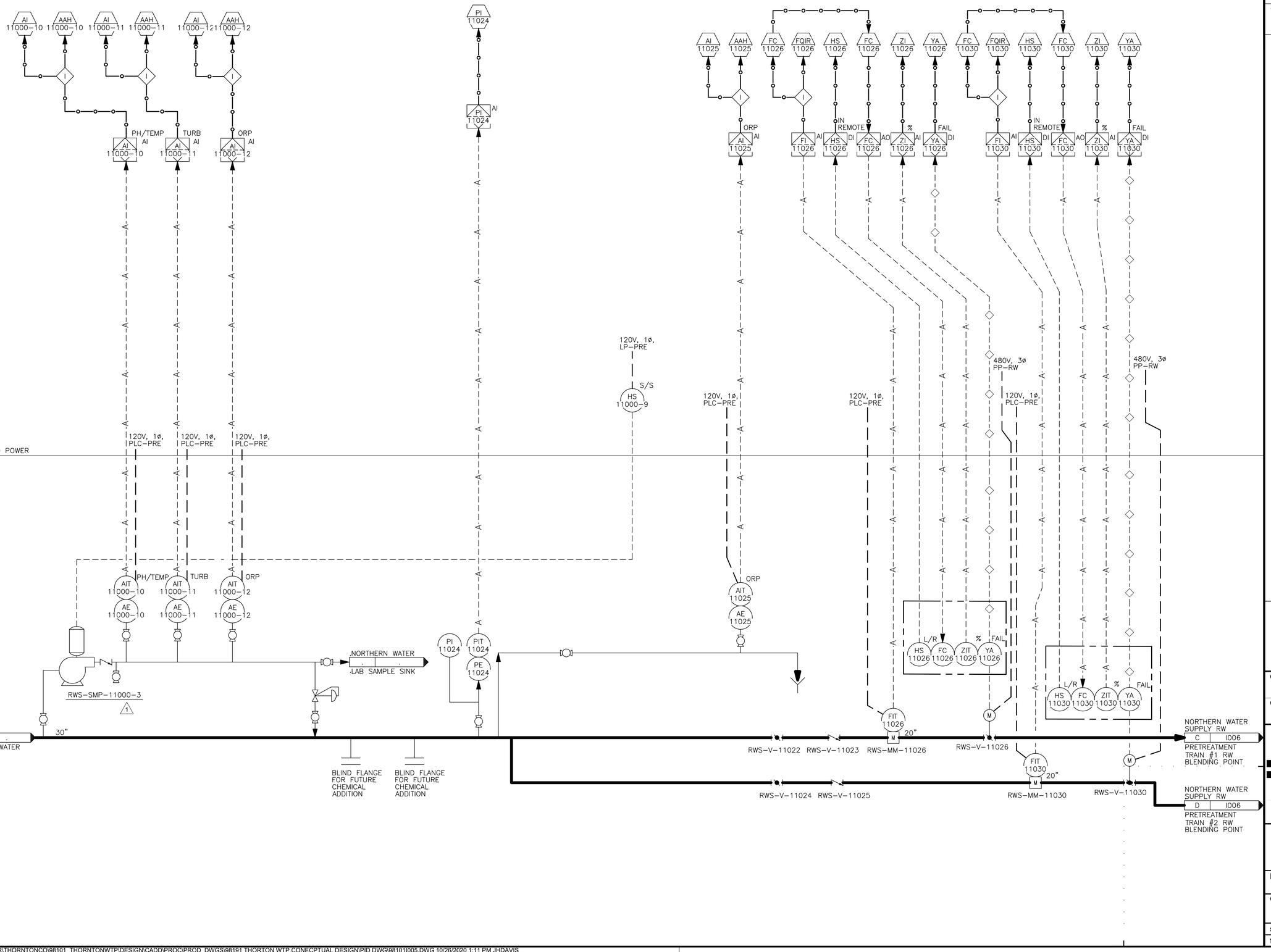
RAW WATER CONTROL P&ID SHEET II

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** I004 | **rev.** – 1 |
| **sheet** 463 **of** 542 sheets | |
| **file** 98101I004.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I004.DWG 10/20/2020 12:34 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
RAW WATER CONTROL P&ID SHEET III

| project | contract |
|---|---|
| 98101 | |

drawing **I005** – rev. **1**

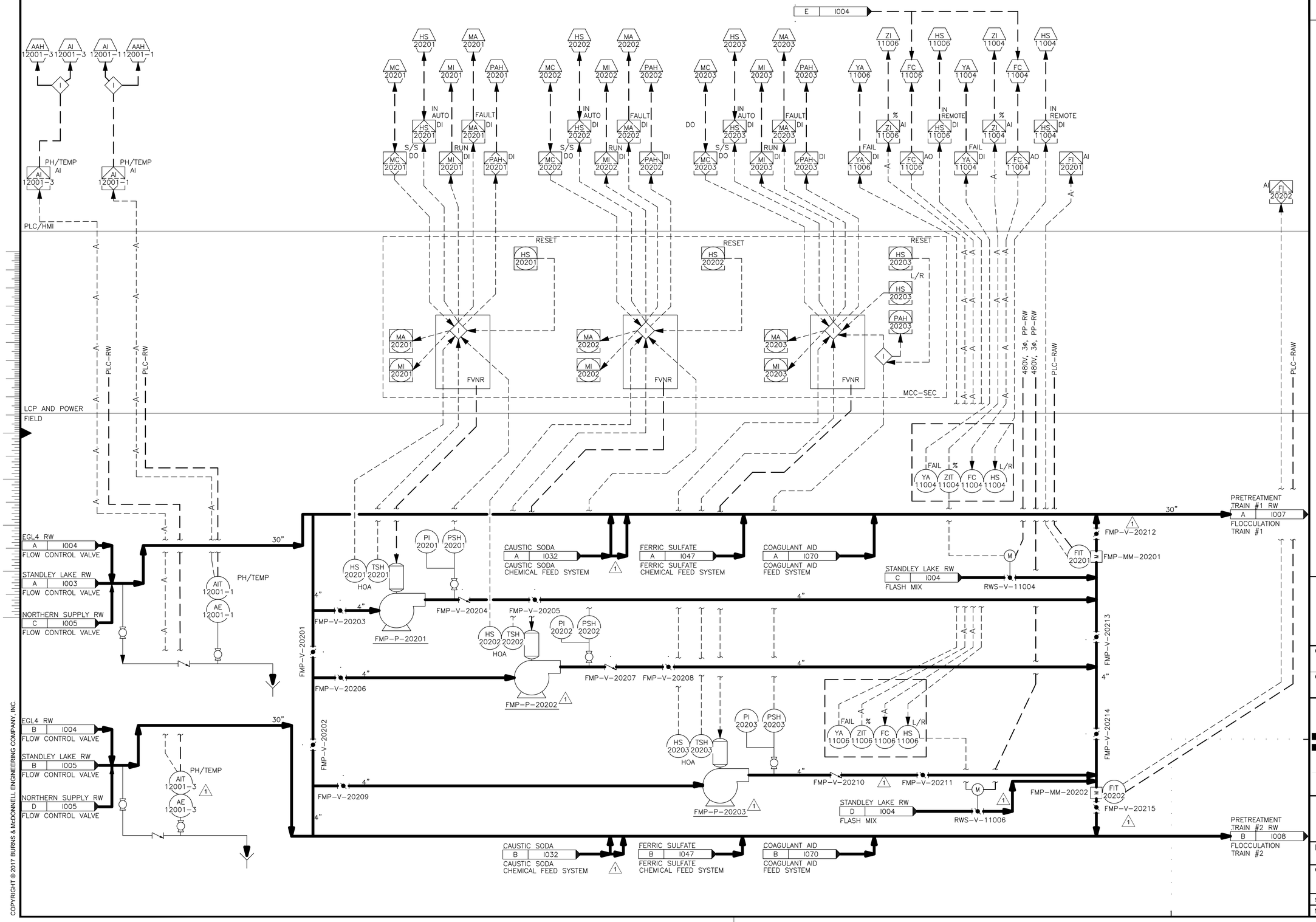
sheet 464 of 542 sheets

file 98101I005.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I005.DWG 10/26/2020 1:11 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLASH MIX P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I006** – rev. **1**

sheet 465 of 542 sheets

file 98101I006.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

E | I003

AI 20301-1 — PH/TEMP — AI 20301-1 AI

AI 20301-2 — SC — AI 20301-2 AI

LI 21101 AI

LAH 21101 DI

MC 21110 — S/S — MC 21110 DO

SC 21110 — % — SC 21110 AO

HS 21110 — IN-AUTO — HS 21110 DI

MI 21110 — RUN — MI 21110 DI

MA 21110 — FAIL — MA 21110 DI

SI 21110 — % — SI 21110 AI

NAH 21110 — TORQUE — NAH 21110 DI

VFD ENCLOSURE (SEE NOTE)

VFD

IN-HAND HS 21110

RESET HS 21110

NAH 21111

1

120V, 1ϕ PLC-FLTR

120V, 1ϕ PLC-RW

120V, 1ϕ PLC-RW

KC 22101

FC 22101

HS 22101

MI 22101

MA 22101

KC 22102

FC 22102

HS 22102

MI 22102

MA 22102

5

MC 22101 DO

MI 22101 DI

MA 22101 DI

MC 22102 DO

MI 22102 DI

MA 22102 DI

PRE-MCP-22000

480V, 3ϕ, PP-SEC

PRE-LCP-22100

120V, 1ϕ, LP-RW-5

HS 26100

AI 26101 — TURB — AI 26101 AI

S/S

120V, 1ϕ PLC-FLTR

OVERFLOW D | I008 — PRETREATMENT TRAIN #2 OVERFLOW

36"

OVER FLOW D | I013 — OVERFLOW MAIN

FLOC-AID POLYMER I075 | A — FLOC-AID POLYMER FEED SYSTEM

COOLING WATER I008 | C — 1 OZONE GENERATORS

LIT 21101

LE 21101

LSH 21101

PRE-FLC-21111

HS 21111 HOA

2

NSH 21111

PRE-FLC-21121

HS 21121 HOA

3

NSH 21121

PRE-FLC-21131

HS 21131 HOA

4

NSH 21131

COAGULANT AID I070 | C — COAGULANT AID FEED SYSTEM

PRE-SCL-22101

PRE-SCL-22102

TURB AIT 26101 AE 26101

PRETREATMENT TRAIN NO. 1 SETTLED WATER

LAB SAMPLE SINK

STW-V-25013

PRE-SMP-26100

PRETREATMENT TRAIN #2 SETTLED WATER E | I008

PRETREATMENT TRAIN #1 SETTLED WATER A | I009

OZONE INJECTION POINT

PRETREATMENT TRAIN #1 RW A | I006 — FLASH MIX #1

PH/TEMP AIT 20301-1 AE 20301-1

SC AIT 20301-2 AE 20301-2

RWS-V-11016

STAGE 1A | STAGE 1B | STAGE 1C

FLOCCULATION BASIN NO. 1

SEDIMENTATION BASIN NO. 1

48"

4"

SOLIDS B | I024 — SOLIDS REMOVAL VALVES

4"

SOLIDS E | I024 — SOLIDS REMOVAL VALVES

6"

SEDIMENTATION BASIN NO. 1 DRAIN D | I024 — DRAIN HEADER

6"

FLOCCULATION BASIN NO. 1 DRAIN C | I024 — DRAIN HEADER

KEYED NOTES:

1. EACH FLOCCULATION STAGE SHALL HAVE ONE VFD THAT POWERS AND CONTROLS THE FLOCCULATOR IN THAT ITS STAGE.
   STAGE 1A VFD TAG: 21110
   STATE 1B VFD TAG: 21120
   STAGE 1C VFD TAG: 21130
2. STAGE 1A FLOCCULATOR TAG: 21111
3. STAGE 1B FLOCCULATOR TAG: 21121
4. STAGE 1C FLOCCULATOR TAG: 21131
5. PACKAGED CONTROL PANEL SHALL BE PROVIDED BY SLUDGE COLLECTION SYSTEM VENDOR.

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOCCULATION AND SEDIMENTATION BASINS NO. 1 P&ID

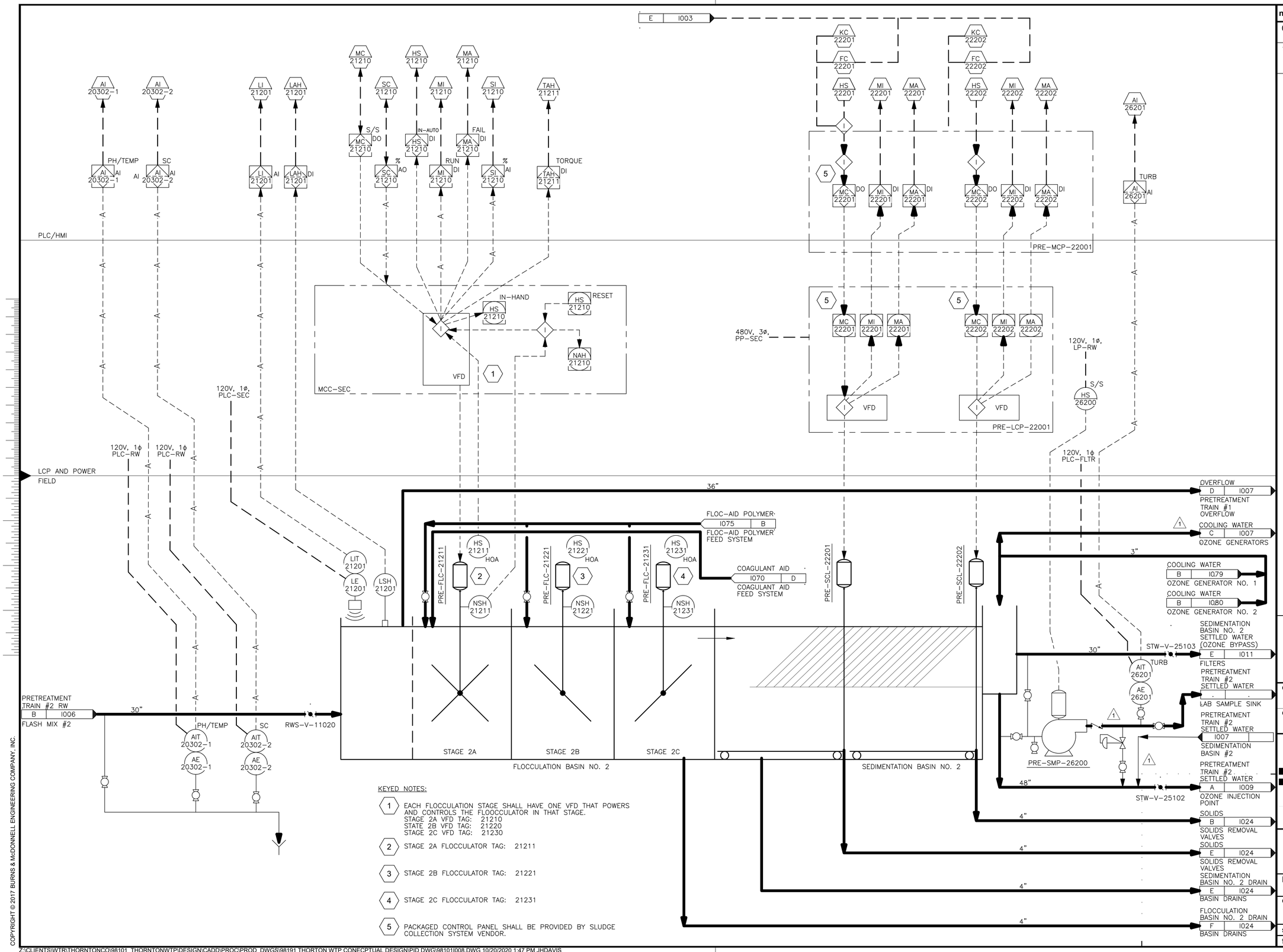
| project | contract |
|---|---|
| 98101 | |

drawing I007 — rev. 1

sheet 466 of 542 sheets

file 981011007.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




KEYED NOTES:

1. EACH FLOCCULATION STAGE SHALL HAVE ONE VFD THAT POWERS AND CONTROLS THE FLOOCCULATOR IN THAT STAGE.
   STAGE 2A VFD TAG: 21210
   STATE 2B VFD TAG: 21220
   STAGE 2C VFD TAG: 21230
2. STAGE 2A FLOCCULATOR TAG: 21211
3. STAGE 2B FLOCCULATOR TAG: 21221
4. STAGE 2C FLOCCULATOR TAG: 21231
5. PACKAGED CONTROL PANEL SHALL BE PROVIDED BY SLUDGE COLLECTION SYSTEM VENDOR.

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOCCULATION AND SEDIMENTATION BASINS NO. 2 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I008 — rev. 1

sheet 467 of 542 sheets

file 98101I008.dwg

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

PLC/HMI

LCP AND POWER FIELD

HYDROGEN PEROXIDE C I042
HYDROGEN PEROXIDE FEED SYSTEM
1"

1" REDUNDANT 1

CAUSTIC SODA C I032
CAUSTIC SODA FEED SYSTEM
1"

SODIUM HYPOCHLORITE C I055
SODIUM HYPOCHLORITE FEED SYSTEM
1" LINE

3/4" REDUNDANT 1

AMMONIUM SULFATE C I037
AMMONIUM SULFATE FEED SYSTEM
3/4"

3/4" QUILLS

PRETREATMENT TRAIN #2 SETTLED WATER A I008
SEDIMENTATION BASIN #2
48"

SAMPLE TAP FOR FUTURE USE (TYP 2)

OZO-V-32001

PRETREATMENT TRAIN #1 SETTLED WATER A I007
SEDIMENTATION BASIN #1
48"

SIDESTREAM WATER A I010
OZONE INJECTION SKID
8"

AIR DAM

2"
VENT A I011
CONTACTOR BASIN

PIPELINE FLASH REACTOR* OZO-PFR-30160
48"

OZONE SOLUTION A I010
OZONE INJECTION SKID
6"
OZO-V-32002

OZONE SOLUTION B I010
OZONE INJECTION SKID
6"
OZO-V-32003

1

SETTLED WATER B I011
OZONE CONTACTOR

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OZONE FLASH REACTOR P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I009** – rev. **1**

sheet 468 of 542 sheets

file 98101I009.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I009.DWG 10/19/2020 9:00 AM JHDAVIS

KEYED NOTES:

1 SST VENT LINES FOR PRV TO BE ROUTED TO THE UPPER LEVEL OF THE TREATMENT BUILDING. VENT SHALL EXIT THE BUILDING AT LEAST 8 FEET AFF.

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

PLC/HMI

MOCP*

LCP-30100*

LCP AND POWER FIELD

OZONE GAS A 1079 FROM OZONE GENERATION SYSTEM

SIDESTREAM WATER A 1009 SETTLED WATER HEADER

SWI-V-32003

SWI-MM-30101

SWI-V-30103

SWI-V-30102

SWI-V-32001

SWI-P-30101

SWI-MM-32001

SWI-V-32003

INJECTOR NO. 1 SWI-INJ-30101

OZO-V-32004

OZONE SOLUTION A 1009 PIPELINE FLASH REACTOR

SWI-SKD-30101* SKID BOUNDARY

SWI-V-30105

SWI-MM-30105

SWI-V-30106

SWI-V-30107

NOTE:
ALL CONTROLS FOR SECOND TRAIN IDENTICAL TO TRAIN CONTROLS SHOWN. SEE INSTRUMENT LIST FOR THE INSTRUMENT TAG NUMBER.

SWI-P-30102

SWI-MM-32002

SW-V-32004

INJECTOR NO. 2 SWI-INJ-30102

OZO-V-32005

OZONE SOLUTION B 1009 PIPELINE FLASH REACTOR

SWI-SKD-30102* SKID BOUNDARY

OUTSIDE SKID BOUNDARY

LIQUID TRAP

SWI-V-30104

SWI-V-30108

AMBIENT AIR

WALL-MOUNTED MONITOR* (TYP OF 2)

480V 3ø

VFD

MCC-MAIN

120V, 1ø

PER MFR.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3

OZONE INJECTION P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I010 – rev. 1

sheet 469 of 542 sheets

file 98101I010.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

AI 36001-1 | AI 36001-2 | AI 36001-3 | AI 36001-4 | AI 36001-5

03 AI AI 36001-1 | 03 AI AI 36001-2 | 03 AI AI 36001-3 | 03 AI AI 36001-4 | ORP AI AI 36001-5

PLC/HMI

120V, 1ϕ LP-MAIN → S/S → HS 36004

120V, 1ϕ LP-MAIN → S/S → HS 36003

120V, 1ϕ LP-MAIN → S/S → HS 36002

120V, 1ϕ LP-MAIN → S/S → HS 36001

120V, 1ϕ PLC-FLTR | 120V, 1ϕ PLC-FLTR | 120V, 1ϕ PLC-FLTR | 120V, 1ϕ PLC-FLTR | 120V, 1ϕ PLC-FLTR | 120V, 1ϕ PLC-FLTR

LCP AND POWER

VENT FIELD
A | I009
PIPELINE FLASH REACTOR

SETTLED WATER
B | I009
PIPELINE FLASH REACTOR

48" 2"

AV PI HYDROGEN PEROXIDE
A | I042
HYDROGEN PEROXIDE FEED SYSTEM

OZONE OFF GAS
B | ####
DESTRUCT UNITS

DEMISTER* OZO-DEM-30170

OZONE CONTACT CHAMBER

STW-V-25101 (1)

AIT 36001-4 O3 * | AIT 36001-5 ORP *
AE 36001-4 | AE 36001-5
OZO-SMP-36004

SAMPLE TAP
AIT 36001-3 O3 *
AE 36001-3
OZO-SMP-36003

SAMPLE TAP
AIT 36001-2 O3 *
AE 36001-2
OZO-SMP-36002

SAMPLE TAP
AIT 36001-1 O3 *
AE 36001-1
OZO-SMP-36001

SAMPLE TAP

(1)

HYDROGEN PEROXIDE
D | I042
HYDROGEN PEROXIDE FEED SYSTEM

SODIUM BISULFITE
A | I058
SODIUM BISULFITE FEED SYSTEM

OZONE EFFLUENT CHAMBER

48" STW-V-25104

AI 78010

120V

AIT 78023 H2O2
AE 78023
WALL-MOUNTED MONITOR*

AMBIENT AIR

OZONATED WATER
A | I012
PRE-FILTER FLASH MIX

6" 6"

OZONE CONTACTOR DRAIN
B | I024
EXISTING DETENTION BASIN

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I011.DWG 4/5/2021 11:36 AM ERGARVEY

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OZONE CONTACTOR P&ID

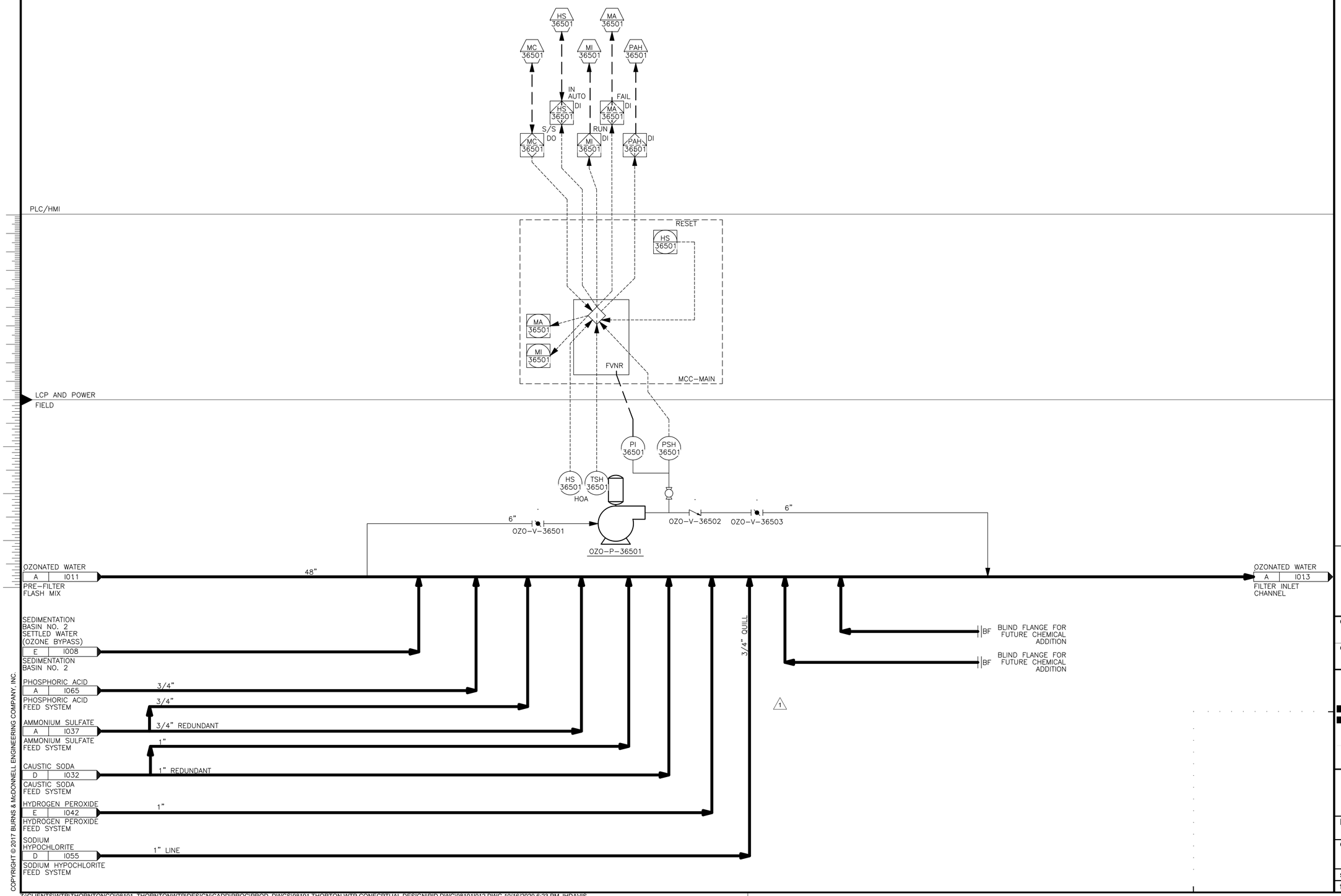
| project | contract |
|---|---|
| 98101 | |

drawing **I011** – rev. **1**

sheet 470 of 542 sheets

file 98101I011.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I012.DWG 10/16/2020 6:23 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PRE-FILTER FLASH MIX

| project | contract |
|---|---|
| 98101 | |

drawing **I012** – rev. **1**

sheet 471 of 542 sheets

file 98101I012.dwg

KEYED NOTES:

1. AAH REPRESENTS COMMON AAH ALARM BLOCK. THE DETAILED FOUR (4) BLOCKS INCLUDE AAH-30009-1, AAH-30009-2, AAH-30010-1, AND AAH-30010-2.
2. AAH REPRESENTS COMMON AAH ALARM BLOCK. THE DETAILED TWO (2) BLOCKS INCLUDE AAH-30011 AND AAH-30012.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

AI 40102 | AAH 40102 | AI 40103 | AAH 40103

PH/TEMP AI 40102

TURB AI 40103

LI 40102 | LI 40101

MC 46001 | HS 46001 | MI 46001 | MA 46001 | PAH 46001

IN AUTO | RUN | FAIL

MC 46001 DO | MI 46001 DI | MA 46001 DI | PAH 46001 DI

AAH 30009-1 | AI 30009-1 | AI 30009-2 | AAH 30009-2 | AAH 30011-1 | AI 30011-1 | AI 30012-2 | AAH 30012-2

AAH 30009-1 | AI 30009-1 03G AI | AAH 30009-2 | AI 30009-2 OX | MOCP

AAH 30011-1 | AI 30011-1 03G AI | AAH 30012-2 | AI 30012-2 OX | MOCP

HS 46001 | MA 46001 | MI 46001 | FVNR | MCC-MAIN

120V, 1ø, PLC-FLTR | 120V, 1ø, PLC-FLTR | 120V, 1ø, PLC-FLTR | 120V, 1ø, PLC-FLTR

120V, 1ø MOCP | 120V, 1ø MOCP | 120V, 1ø MOCP | 120V, 1ø MOCP

AAH 30012 | AAH 30011

FLT-SG-40101 | EAST FILTER INLET CHANNEL | LIT 40101

OZONATED WATER A I012 OZONE CONTACT CHAMBER

TURB AIT 40103 AE 40103 | PH/TEMP AIT 40102 AE 40102

EAST BACKWASH WASTE CHANNEL

OZONATED WATER A I014 FILTER NO. 1 | OZONATED WATER B I015 FILTER NO. 2 | OZONATED WATER C I016 FILTER NO. 3

BW WASTE A I014 FILTER NO. 1 | BW WASTE A I015 FILTER NO. 2 | BW WASTE C I016 FILTER NO. 3

FLT-V-46001 | AIR GAP

FTW C I014 FILTER NO. 1 | FTW C I015 FILTER NO. 2 | FTW B I016 FILTER NO. 3

FTW C I017 FILTER NO. 4 | FTW C I018 FILTER NO. 5 | FTW C I019 FILTER NO. 6

HS 46001 HOA | TSH 46001 | PI 46001 | PSH 46001

FLT-V-46002 | FLT-DP-46001 | FLT-V-46004 | FLT-V-46003

FLT-V-40101

BW WASTE A I017 FILTER NO. 4 | BW WASTE A I018 FILTER NO. 5 | BW WASTE A I019 FILTER NO. 6

OZONATED WATER D I017 FILTER NO. 4 | OZONATED WATER E I018 FILTER NO. 5 | OZONATED WATER F I019 FILTER NO. 6

WEST BACKWASH WASTE CHANNEL | LIT 40102

FLT-SG-40102 | WEST FILTER INLET CHANNEL

OVERFLOW D I007 SEDIMENTATION BASIN NO. 2

IN-LINE CHECK VALVE

AIT 30009-1 AE 30009-1 03G | AIT 30010-1 AE 30010-1 OX

WALL-MOUNTED MONITOR * (TYP OF 2) | AMBIENT AIR

AIT 30011-1 AE 30011-1 OX | AIT 30012-1 AE 30012-1 OX

OVERFLOW G I023 WASTE WASHWATER BASIN CELL A

BW WASTE H I023 WASTE WASHWATER BASIN CELL A

YARD VALVE

BW WASTE H I023 WASTE WASHWATER BASIN CELL B

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters | Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
FILTER P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I013 — rev. 1

sheet 472 of 542 sheets

file 98101I013.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

ZIO 41101 · ZO 41101 · ZIC 41101 · ZC 41101 · ZIC 41101 DI · ZIO 41101 DI · ZO 41101 DO · ZC 41101 DO

ZC 41106 · ZIO 41106 · ZO 41106 · ZIC 41106 · LAH 41110 · LI 41110 · ZO 41106 DO · ZC 41106 DO · ZIO 41106 DI · ZIC 41106 DI · LAH 41110 DI · LI 41110 AI

ZC 41107 · ZIC 41107 · LI 41110-1 · AI 41110-2 · LI 41110-3 · ZO 41107 · ZIO 41107 · ZC 41107 DO · ZIC 41107 DI · LI 41110-1 BED EXP · LI 41110-3 LEVEL · AI 41110-2 TURB · ZO 41107 DO · ZIO 41107 DI

ZIC 41105 · ZC 41105 · ZIO 41105 · ZO 41105 · ZIC 41105 DI · ZC 41105 DO · ZIO 41105 DI · ZO 41105 DD

PI 41101 · FI 41101 · PAH 41101 · PAH 41101 · PI 41101 AI · FI 41101 AI

AI 43101 · AI 43101 TURB AI

ZI 41102 · YA 41102 · FC 41102 · HS 41102 · ZI 41102 % AI · HS 41102 L/R DI · YA 41102 FAIL DI · FC 41102 AO

ZIC 41103 · ZC 41103 · ZIO 41103 · ZO 41103 · ZIC 41103 DI · ZC 41103 DO · ZIO 41103 DI · ZO 41103 DD

ZO 41104 · ZIO 41104 · ZC 41104 · ZIC 41104 · ZO 41104 DD · ZIO 41104 DI · ZC 41104 DO · ZIC 41104 DI

480V, 3ø, MCC–FLTR · 120V, 1ø, PLC–FLTR · 120V, 1ø PLC–FLTR

ZSC 41101 · ZSO 41101 · ZC 41101 · ZO 41101 · ZO 41106 · ZC 41106 · ZSC 41106 · ZSO 41106 · ZSO 41105 · ZSC 41105 · ZO 41105 · ZC 41105 · ZSO 41103 · ZSC 41103 · ZO 41103 · ZC 41103 · ZC 41104 · ZO 41104 · ZSC 41104 · ZSO 41104

BW SUPPLY A I021 — 30" — BW SUPPLY HEADER

OZONATED WATER A I013 — 20" — EAST FILTER INLET CHANNEL

FLT–V–41101 · FLT–V–41106 · FLT–V–41105 · FLT–V–41102 · FLT–V–41103 · FLT–V–41104 · FLT–V–41107

FILTER NO. 1

BW WASTE A I013 — EAST BW WASTE CHANNEL

AS A I022 — 14" — AS BLOWERS

LSH 41110 · LIT 41110 · LE 41110 · LE 41110-1 · AIT 41110 BED EXP LEVEL TURB · AE 41110-2 · LIT 41110 LEVEL · LE 41110-3

AIT 43101 TURB · AE 43101 · PIT 41101 · MM 41101 · FLT–MM–41101 · DRAIN

YA 41102 · ZIT 41102 FAIL % · FC 41102 · HS 41102 L/R

FW B I020 — FW HEADER

FTW C I013 — EAST FTW HEADER

Millimeters · Inches · Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I014.DWG 10/15/2020 4:26 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER NO. 1 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I014** – rev. **1**

sheet 473 of 542 sheets

file 98101I014.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

ZIO 41201 DI
ZO 41201 DO
ZIC 41201 DI
ZC 41201 DO
ZSC 41201
ZSO 41201
ZC 41201
ZO 41201

ZC 41206 DO
ZIO 41206 DI
ZO 41206 DO
ZIC 41206 DI
ZO 41206
ZC 41206
ZSC 41206
ZSO 41206

LAH 41210 DI
LI 41210 AI

ZC 41207 DO
ZIC 41207 DI
ZO 41207 DO
ZIO 41207 DI
AI 41210

ZIC 41205 DI
ZC 41205 DO
ZIO 41205 DI
ZO 41205 DD
ZSO 41205
ZSC 41205
ZO 41205
ZC 41205

PI 41201
PAH 41201
PI 41201 AI
FI 41201 AI

AI 43201 AI
TURB

ZI 41202 AI
%
YA 41202 DI
FAIL
FC 41202 AO
HS 41202 DI
L/R
YA 41202
ZIT 41202
FC 41202
HS 41202

ZIO 41203 DI
ZIC 41203 DI
ZO 41203 DD
ZC 41203 DO
ZSO 41203
ZSC 41203
ZO 41203
ZC 41203

ZC 41204 DO
ZIC 41204 DI
ZO 41204 DD
ZIO 41204 DI
ZC 41204
ZO 41204
ZSC 41204
ZSO 41204

480V, 3ø, MCC–FLTR
120V, 1ø, PLC–FLTR
120V, 1ø PLC–FLTR

BW SUPPLY
B | I021
30"
BW SUPPLY HEADER

OZONATED WATER
B | I013
20"
EAST FILTER INLET CHANNEL

FLT–V–41201
FLT–V–41206
FLT–V–41205
FLT–V–41207
FLT–V–41202
FLT–V–41203
FLT–V–41204

LIT 41210
LE 41210
LSH 41210
AIT 41210
AE 41210

FILTER NO. 2

PIT 41201

TURB
AIT 4321
AE 4321
DRAIN

MM 41201
20"
FLT–MM–41201
1

BW WASTE
A | I013
EAST BW WASTE CHANNEL

AS
B | I022
14"
AS BLOWERS

FW
B | I020
FW HEADER

FTW
C | I013
EAST FTW HEADER

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER NO. 2 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I015** – rev. **1**

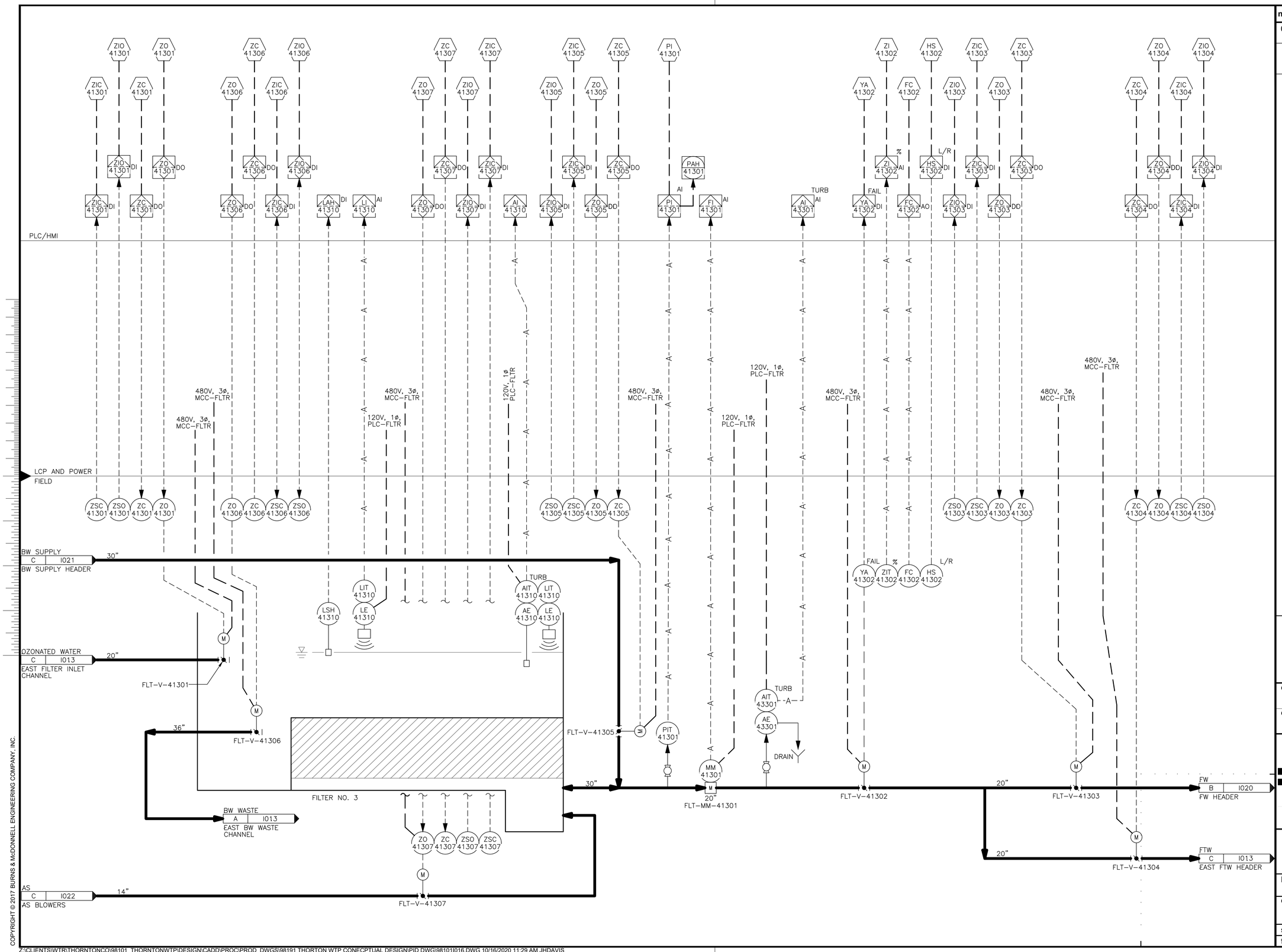
sheet 474 of 542 sheets

file 98101I015.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I015.DWG 10/16/2020 11:27 AM JHDAVIS

Scale For Microfilming
Millimeters
Inches




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER NO. 3 P&ID

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** I016 | **rev.** – 0 |
| **sheet** 475 **of** 542 sheets | |
| **file** 98101I016.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I016.DWG 10/16/2020 11:29 AM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

BW SUPPLY D I021 — 30" — BW SUPPLY HEADER

OZONATED WATER D I013 — 20" — WEST FILTER INLET CHANNEL

AS D I022 — 14" — AS BLOWERS

FLT-V-41401

FLT-V-41406

FLT-V-41405

FLT-V-41407

FILTER NO. 4

BW WASTE A I013 — WEST BW WASTE CHANNEL

FLT-MM-41401

FLT-V-41402

FLT-V-41403

FLT-V-41404

FW B I020 — FW HEADER

FTW C I013 — WEST FTW HEADER

480V, 3ø, MCC-FLTR

120V, 1ø, PLC-FLTR

120V, 1ø, PLC-FLTR

Millimeters

Inches

Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I017.DWG 10/16/2020 11:32 AM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER NO. 4 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I017** — rev. **0**

sheet 476 of 542 sheets

file 98101I017.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

ZIO 41501 · ZO 41501 · ZIC 41501 · ZC 41501 · ZIO 41501 DI · ZO 41501 DO · ZIC 41501 DI · ZC 41501 DO

ZC 41506 · ZIO 41506 · ZO 41506 · ZIC 41506 · ZC 41506 DO · ZIO 41506 DI · ZO 41506 DO · ZIC 41506 DI

LAH 41510 DI · LI 41510 AI

ZC 41507 · ZIC 41507 · ZO 41507 · ZIO 41507 · ZC 41507 DO · ZIC 41507 DI · ZO 41507 DO · ZIO 41507 DI

AI 41510

ZIO 41505 · ZC 41505 · ZIC 41505 · ZO 41505 · ZIC 41505 DI · ZC 41505 DO · ZIO 41505 DI · ZO 41505 DO

PI 41501 · PAH 41501 · PI 41501 AI · FI 41501 AI

AI TURB AI

ZI 41502 · HS 41502 · YA 41502 · FC 41502 · ZI 41502 AI · HS 41502 DI · YA 41502 DI · FC 41502 AO

ZIC 41503 · ZC 41503 · ZIO 41503 · ZO 41503 · ZIO 41503 DI · ZC 41503 DO · ZIC 41503 DI · ZO 41503 DD

ZO 41504 · ZIO 41504 · ZC 41504 · ZIC 41504 · ZO 41504 DD · ZIO 41504 DI · ZC 41504 DO · ZIC 41504 DI

480V, 3ø, MCC–FLTR · 120V, 1ø, PLC–FLTR · 120V, 1ø PLC–FLTR

ZSC 41501 · ZSO 41501 · ZC 41501 · ZO 41501

ZO 41506 · ZC 41506 · ZSC 41506 · ZSO 41506

ZSO 41505 · ZSC 41505 · ZO 41505 · ZC 41505

ZSO 41503 · ZSC 41503 · ZO 41503 · ZC 41503

ZC 41504 · ZO 41504 · ZSC 41504 · ZSO 41504

BW SUPPLY E I021 — 30" — BW SUPPLY HEADER

OZONATED WATER E I013 — 20" — WEST FILTER INLET CHANNEL

FLT–V–41501 · FLT–V–41506 · 36"

LSH 41510 · LIT 41510 · LE 41510 · AIT 41510 · AE 41510

FILTER NO. 5

BW WASTE A I013 — WEST BW WASTE CHANNEL

ZO 41507 · ZC 41507 · ZSO 41507 · ZSC 41507

AS E I022 — 14" — AS BLOWERS

FLT–V–41507

FLT–V–41505 · PIT 41501 · MM 41501 · 20" · FLT–MM–41501 · 30"

AIT 4350I · AE 4350I · TURB · DRAIN

FAIL · % · L/R · YA 41502 · ZIT 41502 · FC 41502 · HS 41502

FLT–V–41502 · FLT–V–41503 · FLT–V–41504

20" · FW B I020 — FW HEADER

20" · FTW C I013 — WEST FTW HEADER

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER NO. 5 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing **I018** – rev. **1**

sheet 477 of 542 sheets

file 98101I018.dwg

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I018.DWG 10/15/2020 4:19 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

ZIO 41601 DI
ZIC 41601 DI
ZC 41601 DI
ZO 41601 DO
ZSC 41601
ZSO 41601
ZC 41601
ZO 41601

ZC 41606 DO
ZIC 41606 DI
ZIO 41606 DI
ZO 41606 DO
ZIC 41606 DI
LAH 41610 DI
LI 41610 AI
ZO 41606
ZC 41606
ZSC 41606
ZSO 41606

ZC 41607 DO
ZIC 41607 DI
ZO 41607 DO
ZIO 41607 DI
AI 41610
ZO 41607
ZIO 41607
ZSC 41607
ZSO 41607

ZIC 41605 DI
ZC 41605 DO
ZIO 41605 DI
ZO 41605 DO
ZSO 41605
ZSC 41605
ZO 41605
ZC 41605

PAH 41601
PI 41601 AI
FI 41601 AI

TURB
AI 43601 AI

ZI 41602 %
YA 41602 DI
FC 41602 AO
HS 41602 L/R DI
FAIL
YA 41602
ZIT 41602
FC 41602
HS 41602

ZIC 41603 DI
ZC 41603 DO
ZIO 41603 DI
ZO 41603 DO
ZSO 41603
ZSC 41603
ZO 41603
ZC 41603

ZC 41604 DO
ZIC 41604 DI
ZO 41604 DO
ZIO 41604 DI
ZC 41604
ZO 41604
ZSC 41604
ZSO 41604

480V, 3ø, MCC–FLTR
120V, 1ø, PLC–FLTR

BW SUPPLY
F | 1021
30"
BW SUPPLY HEADER

OZONATED WATER
F | 1013
20"
WEST FILTER INLET CHANNEL

FLT–V–41601
FLT–V–41606
FLT–V–41605
FLT–V–41602
FLT–V–41603
FLT–V–41604
FLT–V–41607

LSH 41610
LIT 41610
LE 41610
TURB
AIT 41610
LIT 41610
AE 41610
LE 41610

PIT 41601
MM 41601
20"
FLT–MM–41601

TURB
AIT 43601
AE 43601
DRAIN 1

FILTER NO. 6

BW WASTE
A | 1013
WEST BW WASTE CHANNEL

FW
B | 1020
FW HEADER

FTW
C | 1013
WEST FTW HEADER

AS
F | 1022
14"
AS BLOWERS

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I019.DWG 10/15/2020 4:24 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
FILTER NO. 6 P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I019 – rev. 1

sheet 478 of 542 sheets

file 98101I019.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

CAUSTIC SODA E 1032 1" CAUSTIC SODA FEED SYSTEM

AMMONIUM SULFATE B 1037 1" AMMONIA FEED SYSTEM

SODIUM HYPOCHLORITE E 1055 1" SODIUM HYPOCHLORITE FEED SYSTEM

SODIUM HYPOCHLORITE F 1055 1" SODIUM HYPOCHLORITE FEED SYSTEM

FW B 1014 FILTER NO. 1

FW B 1015 FILTER NO. 2

FW B 1016 FILTER NO. 3

FW B 1017 FILTER NO. 4

FW B 1018 FILTER NO. 5

FW B 1019 FILTER NO. 6

FLT-SMP-43000

COMBINED FILTER EFFLUENT

LAB SAMPLE SINK

OVERFLOW TO STORMWATER POND

BACKWASH SUPPLY DIVERSION

CLEARWELL

EXTERIOR

CCC-V-61001

CCC-V-61002

BW SUPPLY TANK A 1021 BW SUPPLY

BW SUPPLY TANK B 1021 CCC DRAIN

CCC-SMP-62001

CCC-SMP-62002

CCC-SG-61001

DISTRIBUTION

DENVER WATER CONNECTION

FWT-SMP-62010

FWT-SMP-62011

BWPS SUMP

FINISHED WATER LAB SAMPLE SINK

TRENCH DRAIN

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Millimeters

Scale For Microfilming

Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FILTER EFFLUENT HEADER AND DISINFECTION BASIN P&ID

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I020 – | 1 |

sheet 479 of 542 sheets

file 98101I020.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

VFD ENCLOSURE

MCC–BWPS

MCC–BWPS

HMI

VFD

VFD

VFD

L/R

IN HAND

RESET

120V, 1ø, PLC–BWPS

480V, 3ø, PP–BWPS

480V, 3ø, MCC–BWPS

120V, 1ø, PLC–BWPS

120V, 1ø, PLC–BWPS

120V, 1ø, PLC–BWPS

IN REMOTE

IN AUTO

S/S

%

RUN

FAIL

HOA

OVERFLOW TO STORM WATER POND

BW SUPPLY A I020 — BW SUPPLY DIVERSION

FBS–V–54001

FBS–MM–54001

FBS–V–54002

SODIUM BISULFITE A I059 — BACKWASH SUPPLY BASIN

PLANT SERVICE WATER — FIRE LOOP

FB–V–54019

FBS–V–54018

SODIUM HYPOCHLORITE G I055 — SODIUM HYPOCHLORITE FEED SYSTEM

CCC DRAIN B I020 — DISINFECTION CONTACT BASIN

BW SUPPLY TANK FBS–TNK–53001

FBS–V–54003

FBS–P–54001

FBS–V–54006

FBS–V–54009

FBS–V–54017

FBS–MM–54002

FBS–V–54012

FB–V–54004

FBS–P–54002

FBS–V–54007

FBS–V–54010

FB–V–54008

FBS–V–54011

FBS–P–54003

FBS–V–54005

HYDROGEN PEROXIDE B I042 — HYDROGEN PEROXIDE FEED SYSTEM

BLIND FLANGE FOR FUTURE CHEMICAL ADDITION

CCC–V–61003

CCC–V–61004

CCC–V–61005

CCC–V–61006

BW SUPPLY A I014 — FILTER NO. 1

BW SUPPLY B I015 — FILTER NO. 2

BW SUPPLY C I016 — FILTER NO. 3

BW SUPPLY D I017 — FILTER NO. 4

BW SUPPLY E I018 — FILTER NO. 5

BW SUPPLY F I019 — FILTER NO. 6

BW SUPPLY A I023 — WASTE BASIN

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3

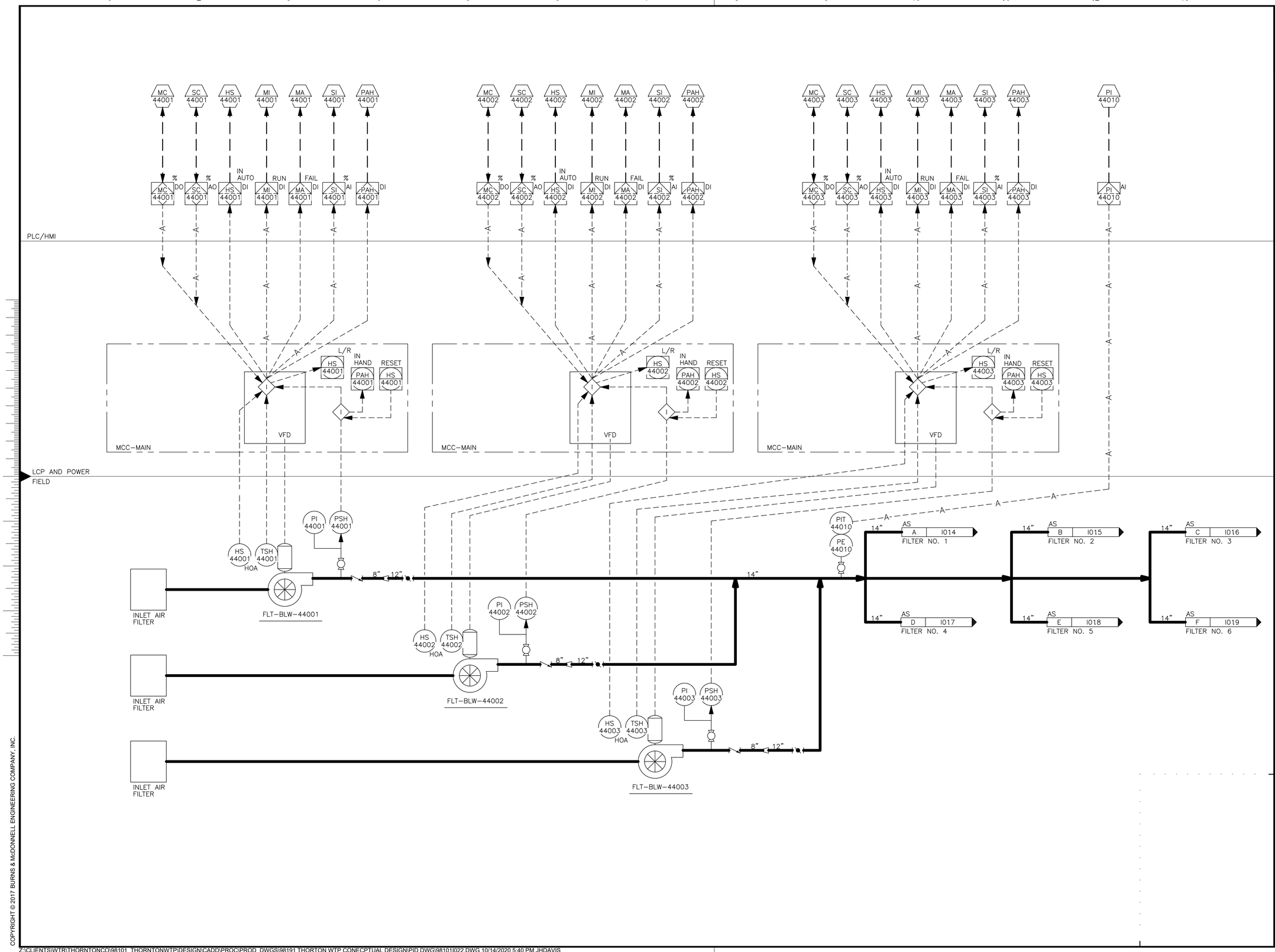
FILTER BACKWASH SUPPLY P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I021 – rev. 1

sheet 480 of 542 sheets

file 98101I021.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
AIR SCOUR BLOWERS P&ID

| | |
|---|---|
| **project** 98101 | **contract** |

**drawing** I022 — **rev.** 0

**sheet** 481 **of** 542 sheets

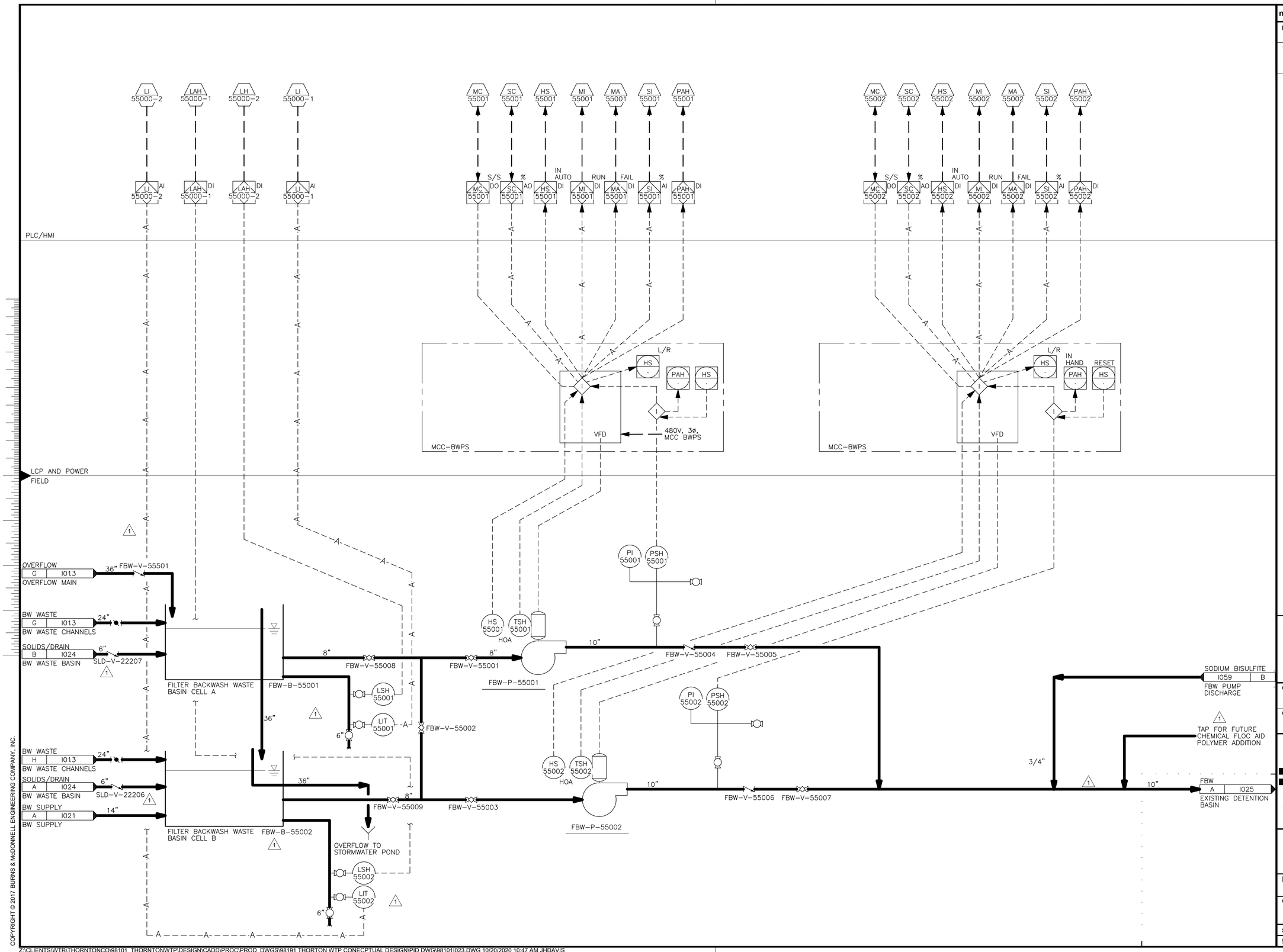
**file** 98101I022.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I022.DWG 10/14/2020 5:40 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I023.DWG 10/20/2020 10:47 AM JHDAVIS

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** J. SCHAEFER | **checked** A. BEESON |

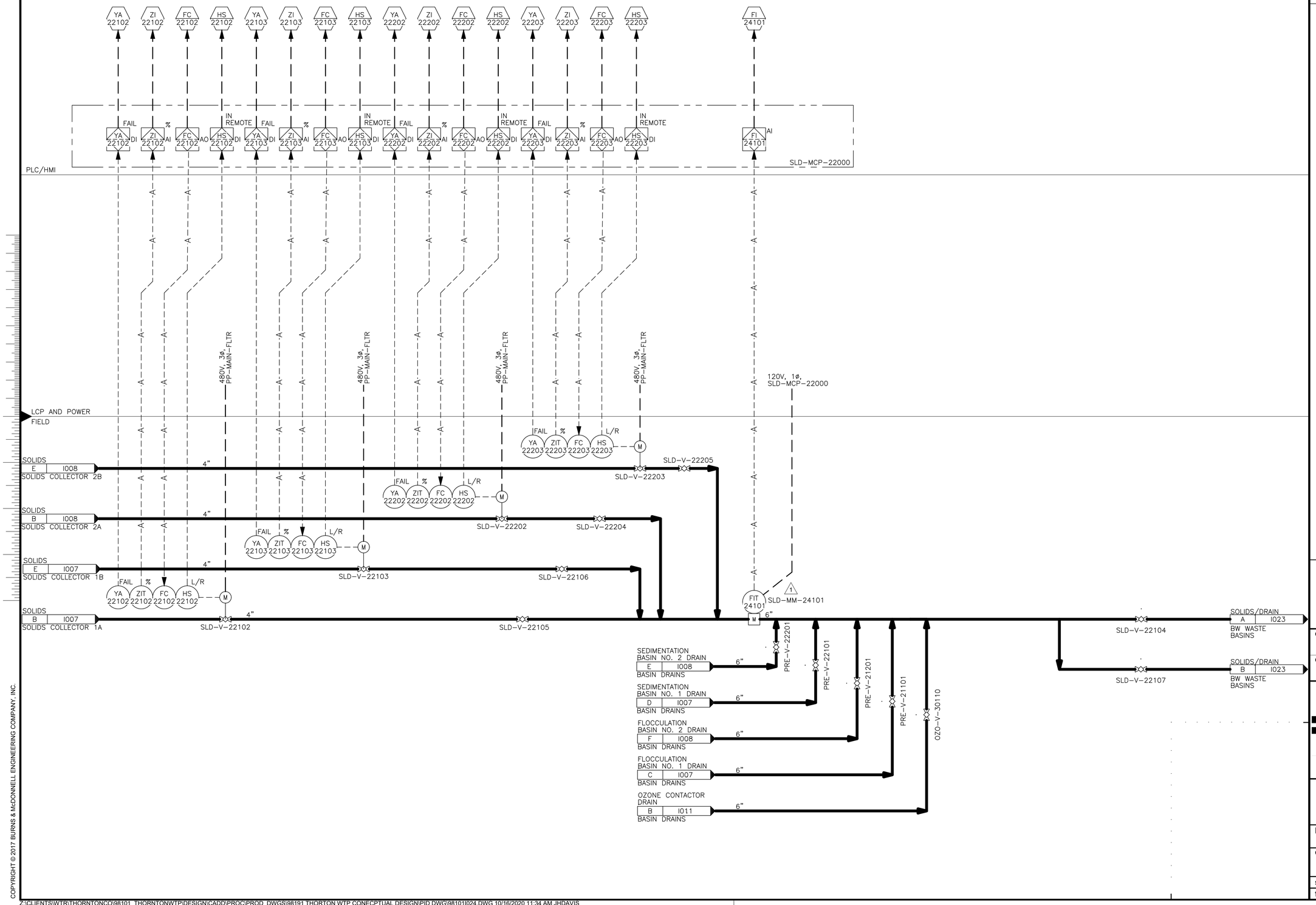
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
BACKWASH WASTE BASINS AND PUMPING P&ID

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** I023 | **rev.** 1 |

**sheet** 482 **of** 542 sheets

**file** 98101I023.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
DETENTION BASIN P&ID I

| project | contract |
|---|---|
| 98101 | |

drawing **I024** – rev. **1**

sheet 483 of 542 sheets

file 98101I024.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I024.DWG 10/16/2020 11:34 AM JHDAVIS

1 2 3 4 5 6 7 8 9 10 11 12 13

A B C D E F G H I

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

Millimeters

Scale For Microfilming

Inches

LI 24501

LI 24501 AI

PLC/HMI

LCP AND POWER FIELD

BW WASTE A 1023 BW WASTE HEADER

10"

FBW-V-55010

1

LIT 24501

EXISTING DETENTION BASIN

TO WES BROWN LAGOON'S

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**

DETENTION BASIN P&ID II

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I025 – | 0 |

**sheet** 484 **of** 542 sheets

**file** 98101I025.dwg

KEYED NOTES:

1 ALL CAUSTIC SODA FILL LINES TO BE INSULATED.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

LAH 71011 | LI 71011 | LAH 71011 | LI 71011 AI

LAH 71012 | LI 71012 | LAH 71012 | LI 71012 AI

LAH 71013 | LI 71013 | LAH 71013 | LI 71013 AI

MI 71010 | RUN | MI 71010 DI

120V, 1ø, LP-CHEM

LAH 71011 | LIT 71011

LAH 71012 | LIT 71012

LAH 71013 | LIT 71013 | REMOTE FILL PANEL

LCP-CAS

MI 71010 | HS 71010 | MA 71010

120V, 1ø, LP-CHEM

CAUSTIC SODA FILL STATION

2" | 1

LIT 71011 | LE 71011 | RDR

LIT 71012 | LE 71012 | RDR

LIT 71013 | LE 71013 | RDR

VENT WITH INSECT SCREEN

VENT WITH INSECT SCREEN

VENT WITH INSECT SCREEN

LG 71011

LG 71012

LG 71013

CAUSTIC SODA STORAGE TANK 9,600 GALLONS

CAUSTIC SODA STORAGE TANK 9,600 GALLONS

CAUSTIC SODA STORAGE TANK 9,600 GALLONS

4" | 1

CAS-TNK-71011

CAS-TNK-71012

CAS-TNK-71013

CAS-TP-71010

VENT B 1031 PUMP 5

VENT B 1030 PUMP 4

VENT B 1029 PUMP 3

VENT B 1028 PUMP 2

VENT B 1027 PUMP 1

3/4" CAUSTIC SODA A 1027 PUMP 1

3/4" CAUSTIC SODA B 1028 PUMP 2

3/4" CAUSTIC SODA C 1029 PUMP 3

3/4" CAUSTIC SODA D 1030 PUMP 4

3/4" CAUSTIC SODA E 1031 PUMP 5

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM
P&ID I

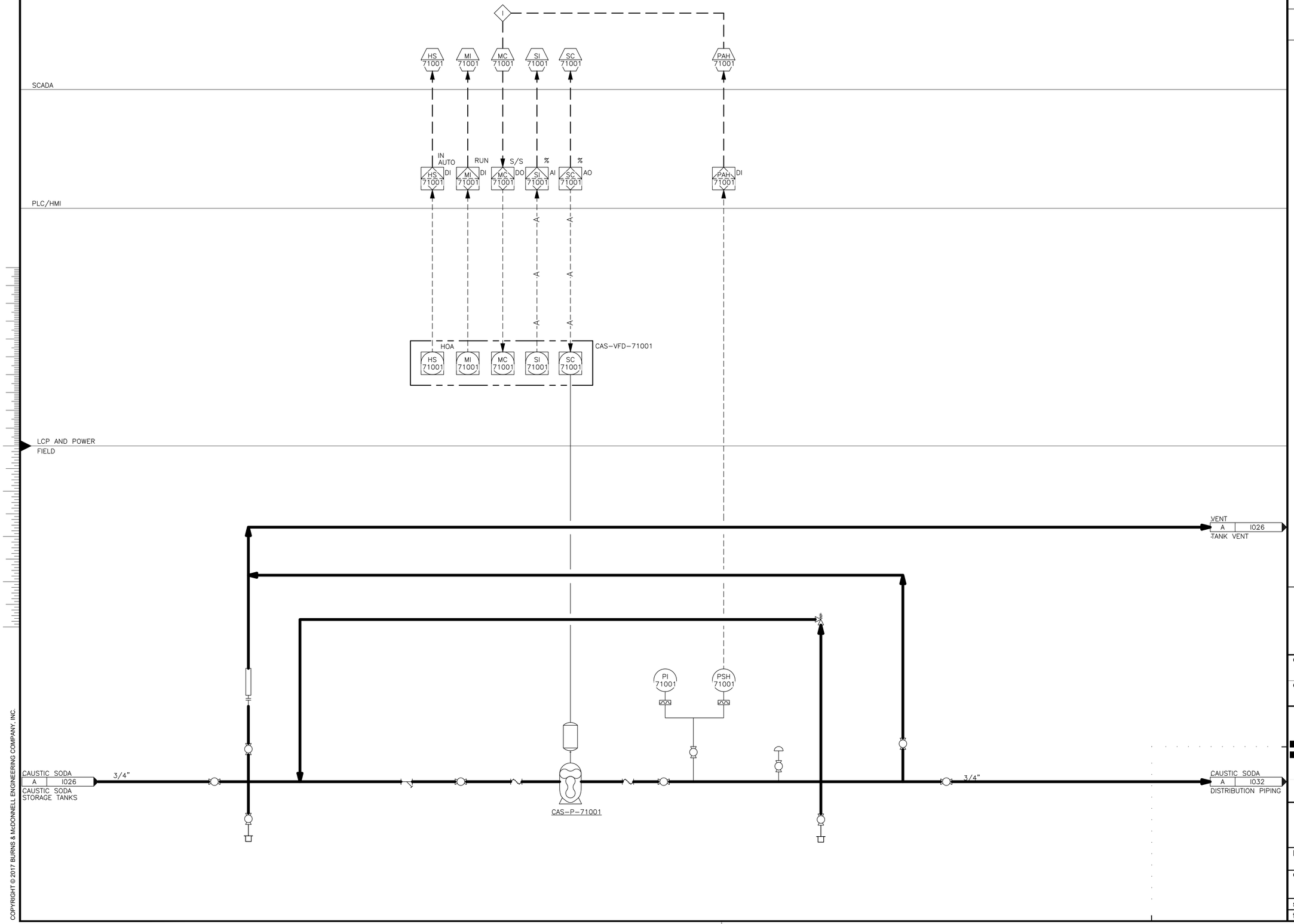
| project | contract |
|---|---|
| 98101 | |

drawing **I026 – 1** rev.

sheet 485 of 542 sheets

file 981011026.dwg

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I026.DWG 10/15/2020 5:42 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

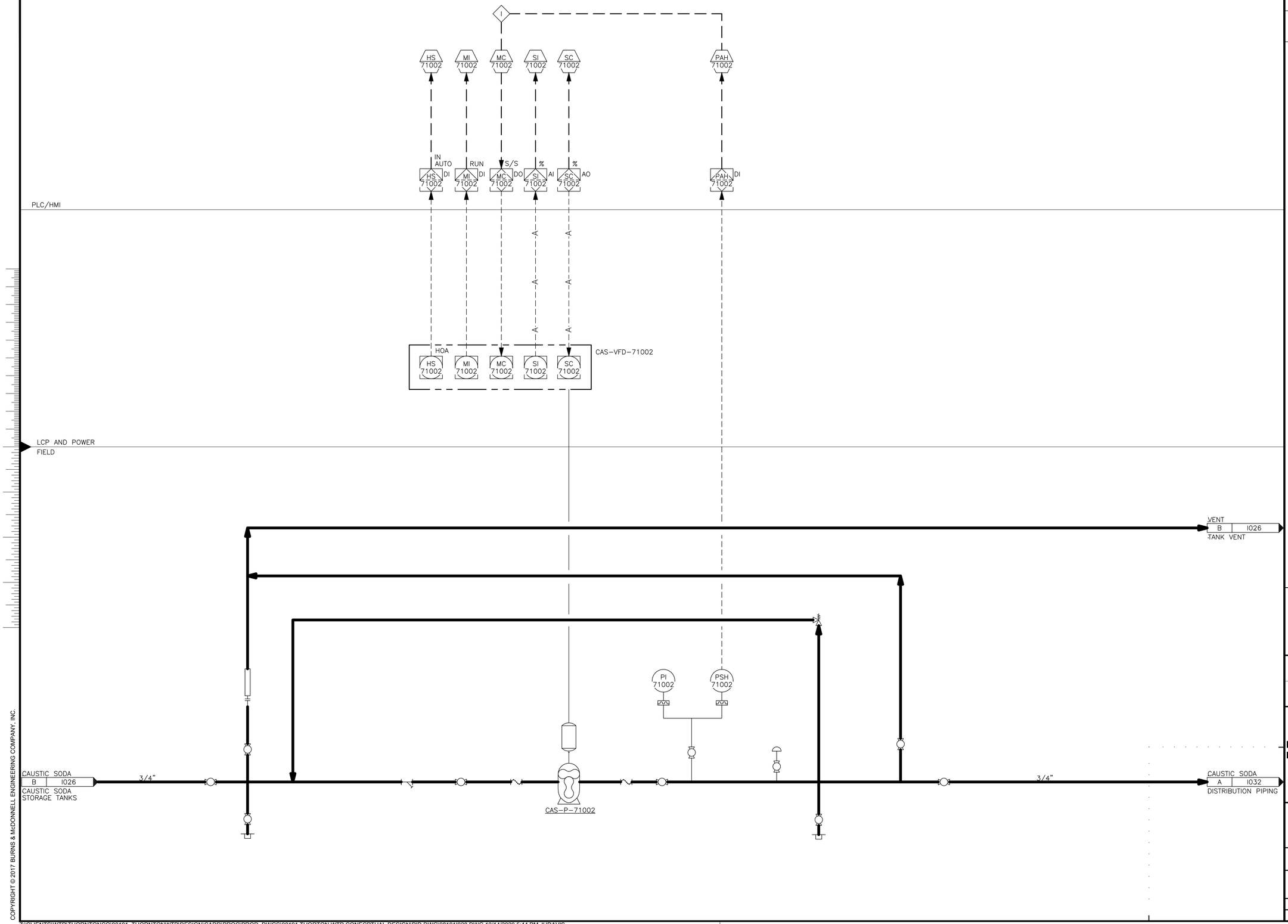
| drawing | rev. |
|---|---|
| I027 – | 0 |

**sheet** 486 **of** 542 sheets

**file** 98101I027.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

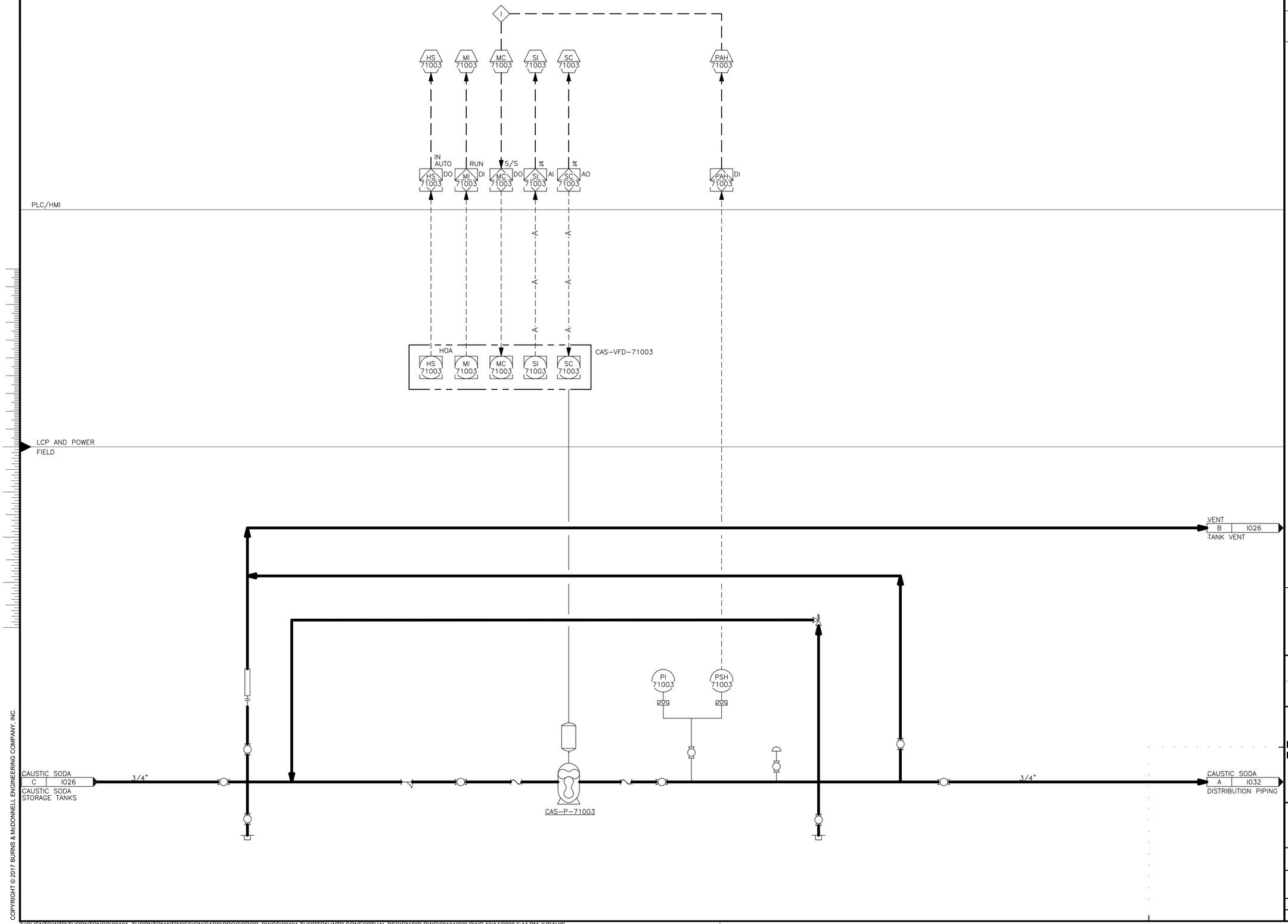
**drawing** I028 — **rev.** 0

**sheet** 487 **of** 542 sheets

**file** 98101I028.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

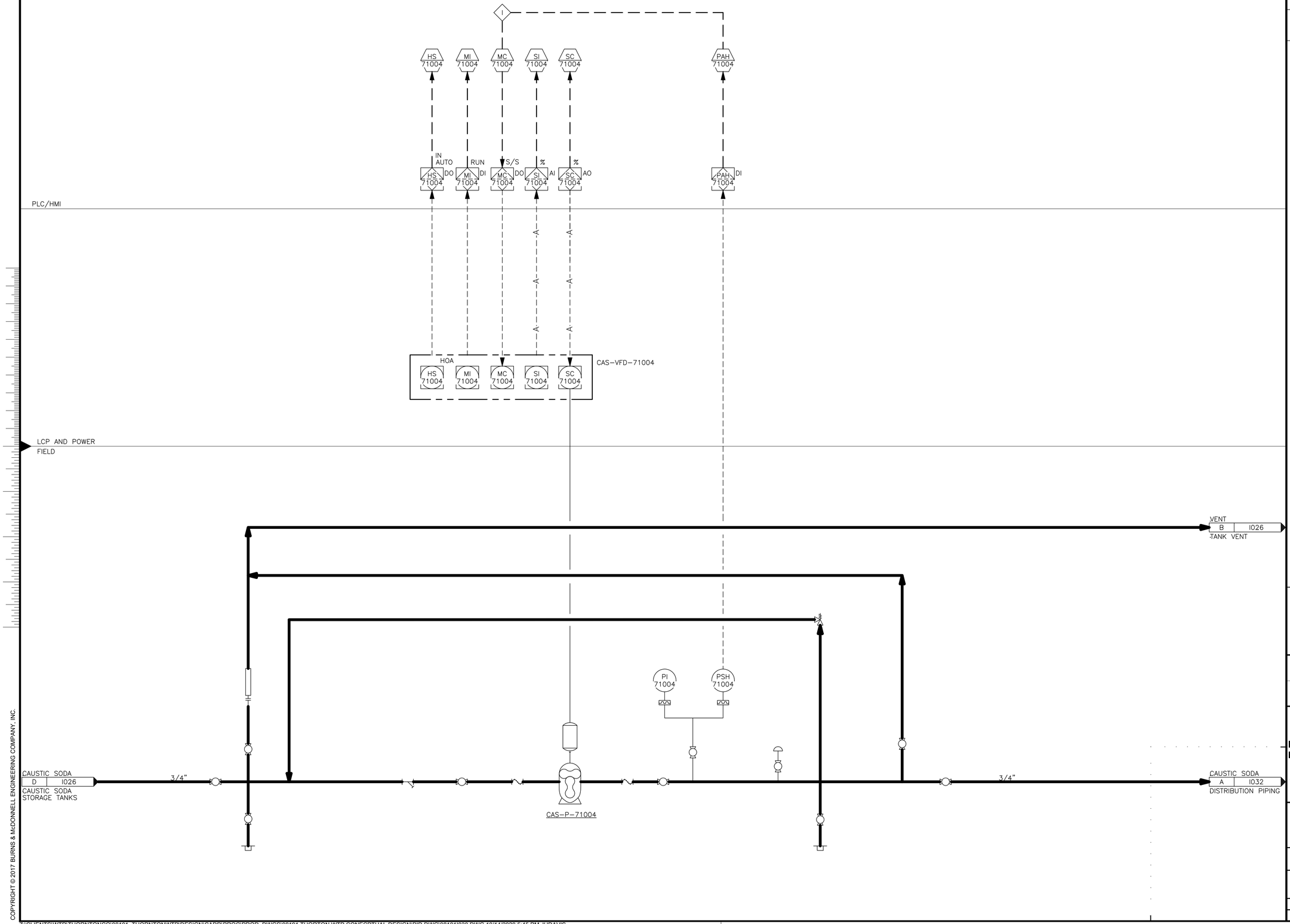
**drawing** I029 — **rev.** 0

**sheet** 488 **of** 542 sheets

**file** 98101I029.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM
P&ID V

| project | contract |
|---|---|
| 98101 | |

**drawing** I030 — **rev.** 0

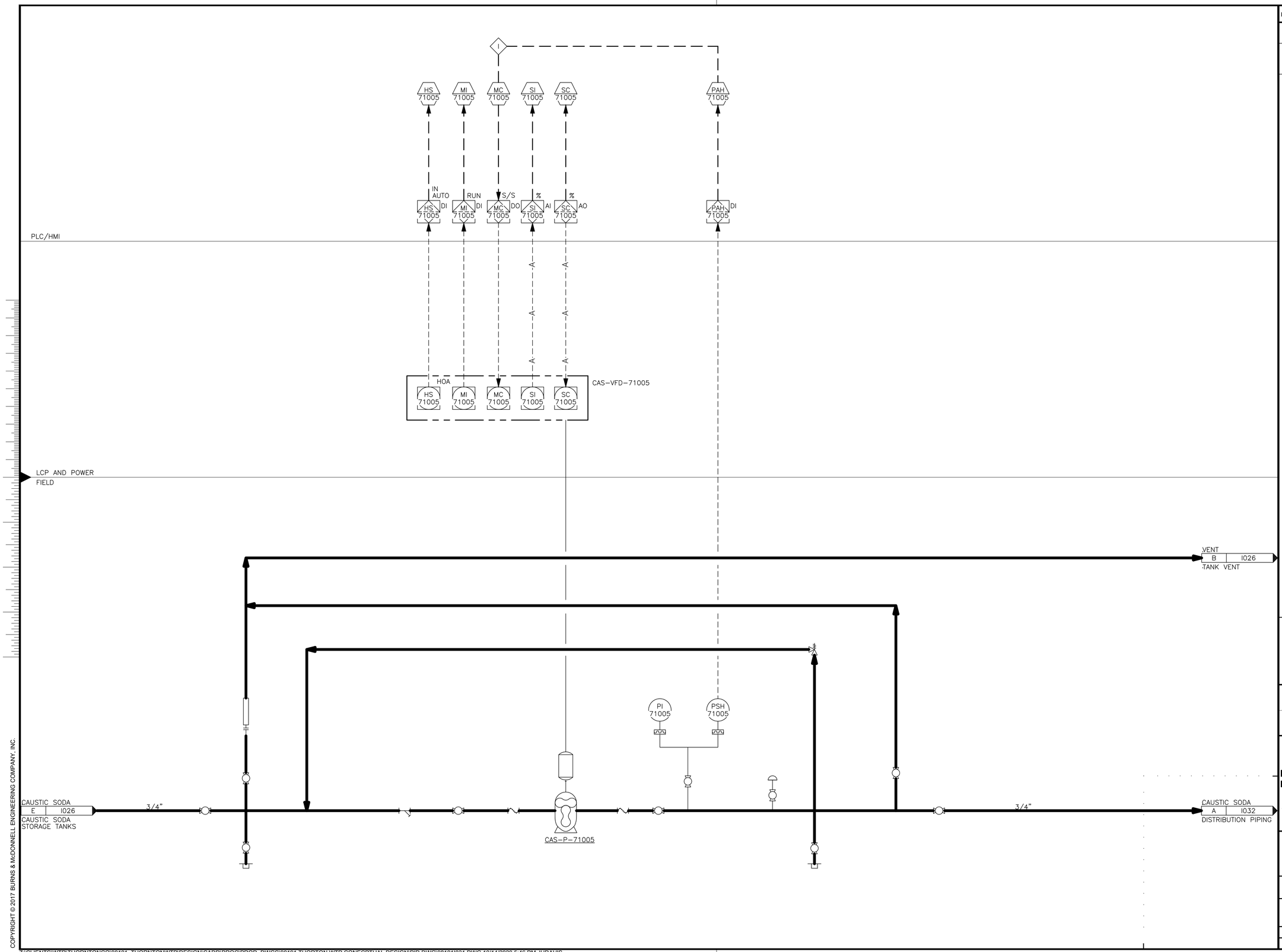
**sheet** 489 **of** 542 sheets

**file** 98101I030.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I030.DWG 10/14/2020 5:45 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM
P&ID VI

| project | contract |
|---|---|
| 98101 | |

**drawing** I031 — **rev.** 0

**sheet** 490 **of** 542 sheets

**file** 98101I031.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I031.DWG 10/14/2020 5:46 PM JHDAVIS

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

CAUSTIC SODA A I027 PUMP 1

CAUSTIC SODA A I028 PUMP 2

CAUSTIC SODA A I029 PUMP 3

CAUSTIC SODA A I030 PUMP 4

CAUSTIC SODA A I031 PUMP 5

3/4"

FI 71018, FI 71017, FI 71016, FI 71015, FI 71014

ZSC 71014, ZSO 71014, FC 71014 — DI, DI, DO

ZSC 71015, ZSO 71015, FC 71015 — DI, DI, DO

ZSC 71016, ZSO 71016, FC 71016 — DI, DI, AO

ZSC 71017, ZSO 71017, FC 71017 — DI, DI, DO

ZSC 71018, ZSO 71018, FC 71018 — DI, DI, DO

120V, 1ø, PLC–CHM2

CAS–V–71014

CAS–V–71015

CAS–V–71016

CAS–V–71017

CAS–V–71018

RO 71020

RO 71021

RO 71022

RO 71023

RO 71024

1"

SOFTENED WATER F I083 WATER SOFTENING SYSTEM

FIT 71014 — CAS–MM–71014

FIT 71015 — CAS–MM–71015

FIT 71016 — CAS–MM–71016

FIT 71017 — CAS–MM–71017

FIT 71018 — CAS–MM–71018

CAUSTIC SODA A I006 FLASH MIX #1

CAUSTIC SODA B I006 FLASH MIX #2

CAUSTIC SODA C I009 SETTLED WATER

CAUSTIC SODA D I011 OZONATED WATER

CAUSTIC SODA E I020 CLEARWELL EFFLUENT

CAUSTIC SODA F I048 SODIUM HYPOCHLORITE STORAGE TANKS

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I032.DWG 10/14/2020 5:47 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
CAUSTIC SODA CHEMICAL FEED SYSTEM
P&ID VII

| project | contract |
|---|---|
| 98101 | |

drawing **I032** – rev. **0**

sheet 491 of 542 sheets

file 98101I032.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

LAH 77011 · LI 77011 · LAH 77011 · I · LI 77011 AI

LAH 77012 · LI 77012 · LAH 77012 · I · LI 77012 AI

MI 77010 · RUN · MI 77010 DI

120V, 1ø, LP–CHEM

LAH 77011 · LIT 77011 · LAH 77012 · LIT 77012 · REMOTE FILL PANEL

LCP–AMS

MI 77010 · HS 77010 · MA 77010 · 120V, 1ø, LP–CHEM

LIT 77011 · LE 77011 · RDR

LIT 77012 · LE 77012 · RDR

AMMONIUM SULFATE FILL STATION

2" · 2"

VENT WITH INSECT SCREEN

VENT WITH INSECT SCREEN

AMMONIUM SULFATE STORAGE TANK 4,000 GALLONS

AMMONIUM SULFATE STORAGE TANK 4,000 GALLONS

LG 77011 · LG 77012

4" · 4" · 4" · 4"

1 · 1

AMS–TNK–77011 · AMS–TNK–77012

2" · 2" · 2" · 2" · 2" · 2" · 2" · 3/4"

AMS–TP–77010

VENT B PUMP 3 I036

VENT B PUMP 2 I035

VENT B PUMP 1 I034

3/4" AMMONIUM SULFATE A I034 PUMP 1

3/4" AMMONIUM SULFATE B I035 PUMP 2

3/4" AMMONIUM SULFATE C I036 PUMP 3

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I033.DWG 10/21/2020 8:58 AM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

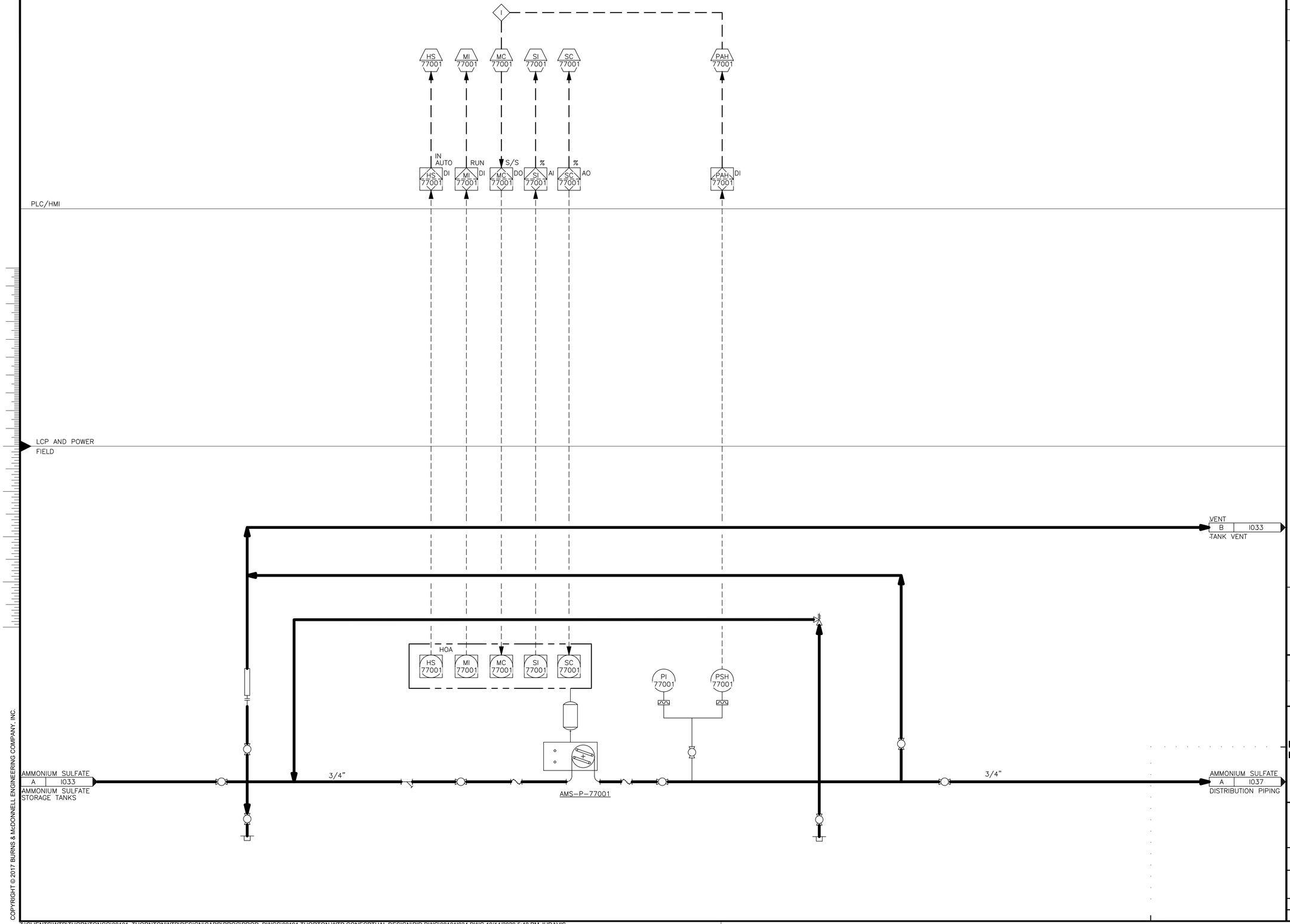
**CITY OF THORNTON**
**TTP - PACKAGE 3**
AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID I

| project | contract |
|---|---|
| 98101 | |

drawing **I033** – rev. **1**

sheet 492 of 542 sheets

file 98101I033.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

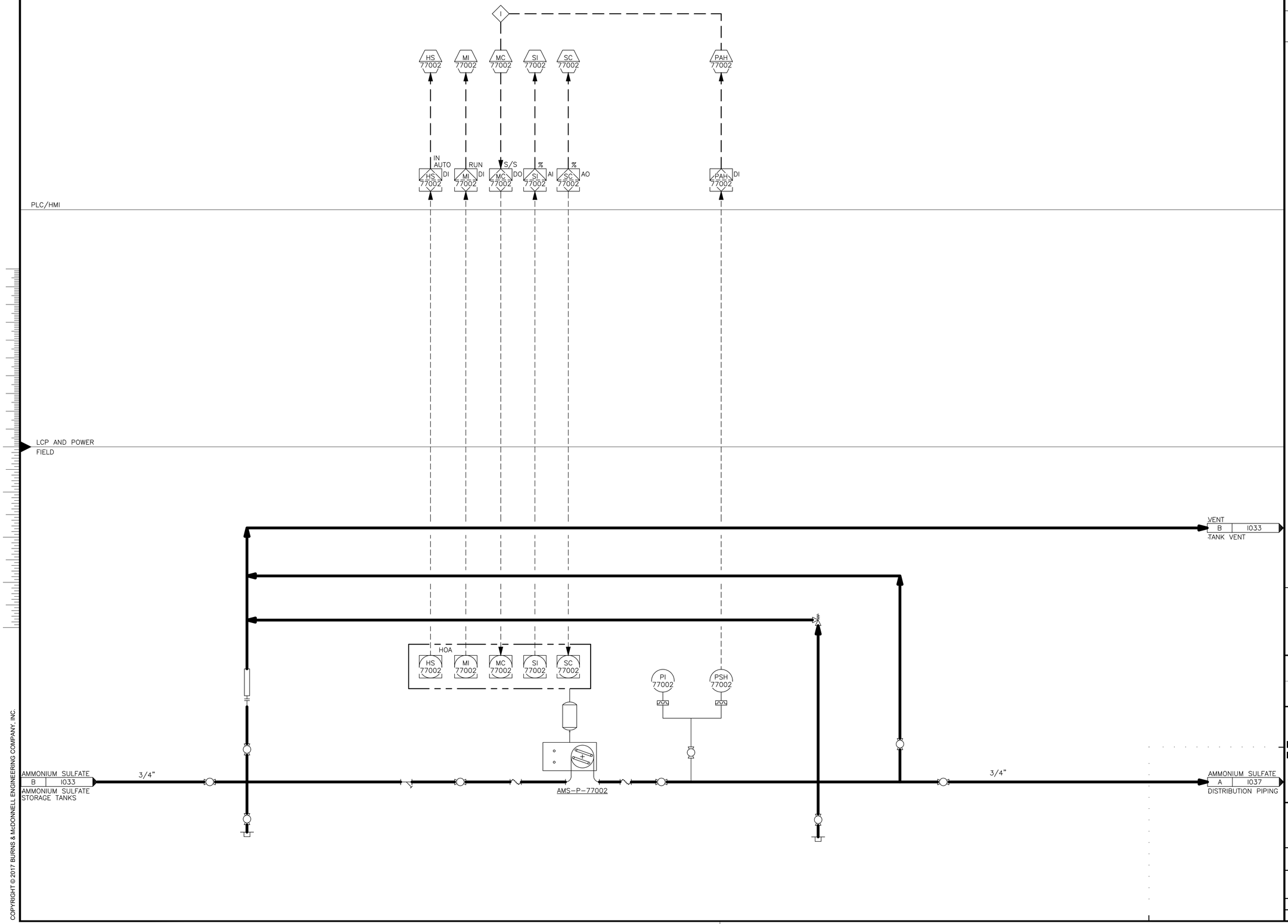
| drawing | rev. |
|---|---|
| I034 – | 0 |

**sheet** 493 **of** 542 sheets

**file** 98101I034.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

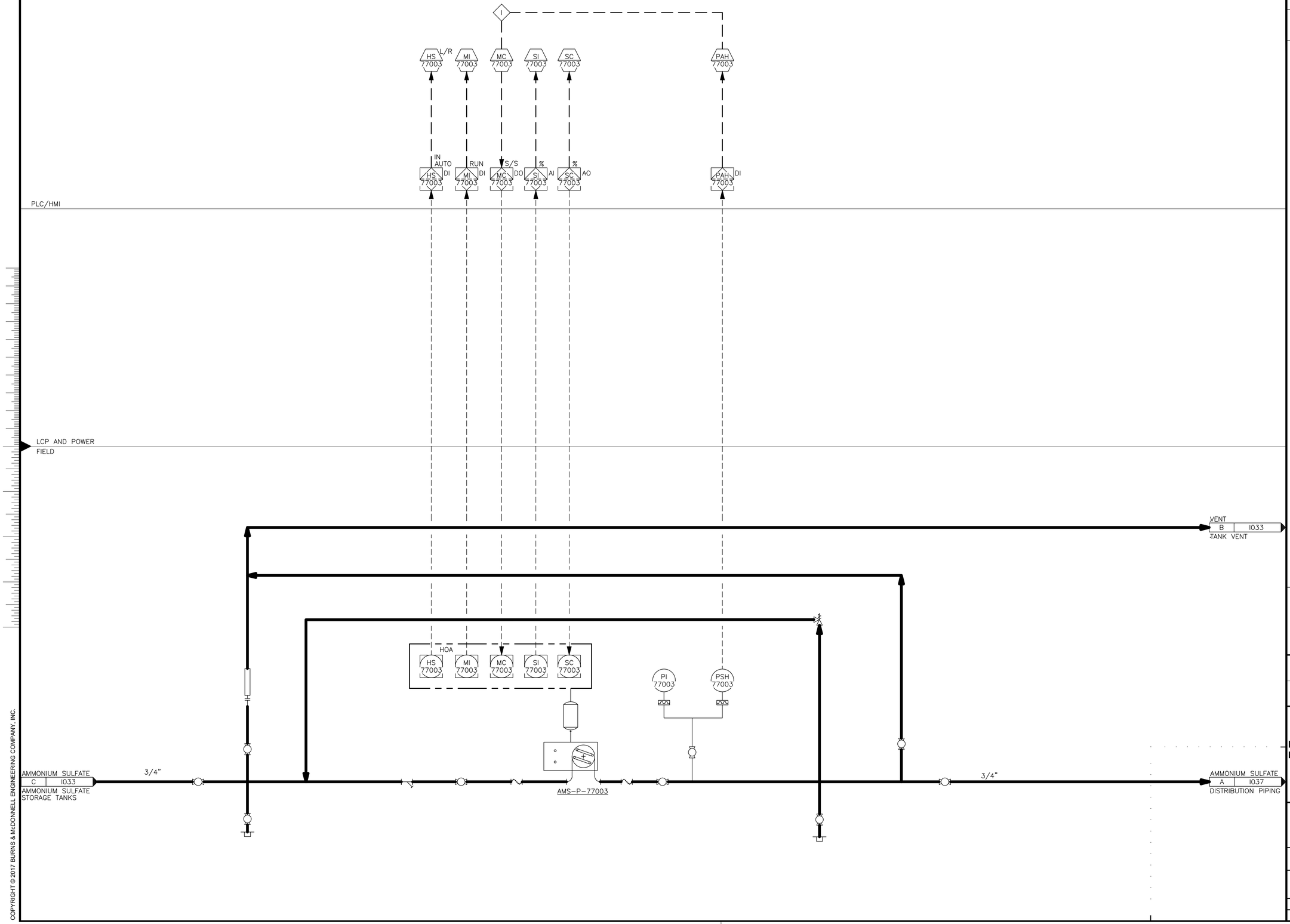
**drawing** I035 — **rev.** 0

**sheet** 494 **of** 542 sheets

**file** 98101I035.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

**drawing** I036 — **rev.** 0

**sheet** 495 **of** 542 sheets

**file** 98101I036.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

FI 77015
FI 77014
FI 77013

120V, 1ø PLC-CHM2 — FI 77015
120V, 1ø PLC-CHM2 — FI 77014
120V, 1ø PLC-CHM2 — FI 77013

PLC/HMI

LCP AND POWER FIELD

AMMONIUM SULFATE A 1034 PUMP 1
AMMONIUM SULFATE A 1035 PUMP 2
AMMONIUM SULFATE A 1036 PUMP 3

3/4"
1"

FIT 77013 M AMS-MM-77013
FIT 77014 M AMS-MM-77014
FIT 77015 M AMS-MM-77015

AMMONIUM SULFATE A 1011 WATER OZONATED
AMMONIUM SULFATE B 1020 CLEARWELL EFFLUENT WEIR
AMMONIUM SULFATE C 1009 SETTLED WATER

PLANT SERVICE WATER A 1083 PLANT SERVICE WATER (1)
M
RO

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
AMMONIUM SULFATE CHEMICAL FEED SYSTEM P&ID V

| project | contract |
|---|---|
| 98101 | |

drawing I037 — rev. 1

sheet 496 of 542 sheets

file 98101I037.dwg

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I037.DWG 10/16/2020 8:52 AM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LAH 78011 · LI 78011 · LAH 78011 · I · LI 78011 AI

LAH 78012 · LI 78012 · LAH 78012 · I · LI 78012 AI

MI 78010 · RUN · MI 78010 DI

120V, 1ø, LP–CHEM

LAH 78011 · LIT 78011

LAH 78012 · LIT 78012 · REMOTE FILL PANEL

L/O/R FAIL · MI 78010 · HS 78010 · MA 78010 · LCP–HYP

120V, 1ø, LP–CHEM

AI 78010

120V, 1ø

LCP AND POWER FIELD

LIT 78011 · LE 78011 · RDR

LIT 78012 · LE 78012 · RDR

HYDROGEN PEROXIDE FILL STATION

2" · 2"

VENT WITH INSECT SCREEN

VENT WITH INSECT SCREEN

4"

78011 LG

HYDROGEN PEROXIDE STORAGE TANK 3150 GALLONS

HYP–TNK–78011

78012 LG

HYDROGEN PEROXIDE STORAGE TANK 3150 GALLONS

HYP–TNK–78012

4" · 1 · 4" · 1

2" · 2" · 2" · 2" · 2" · 2" · 2"

HYP–TP–78010

VENT B I039 PUMP 1

VENT B I040 PUMP 2

VENT B I041 PUMP 3

H202 · AIT 78022 · AAH 78022 · AE 78022A · AE 78022B

AMBIENT AIR

WALL–MOUNTED MONITOR ✳

3/4" HYDROGEN PEROXIDE A I039 PUMP 1

3/4" HYDROGEN PEROXIDE B I040 PUMP 2

3/4" HYDROGEN PEROXIDE C I041 PUMP 3

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID I

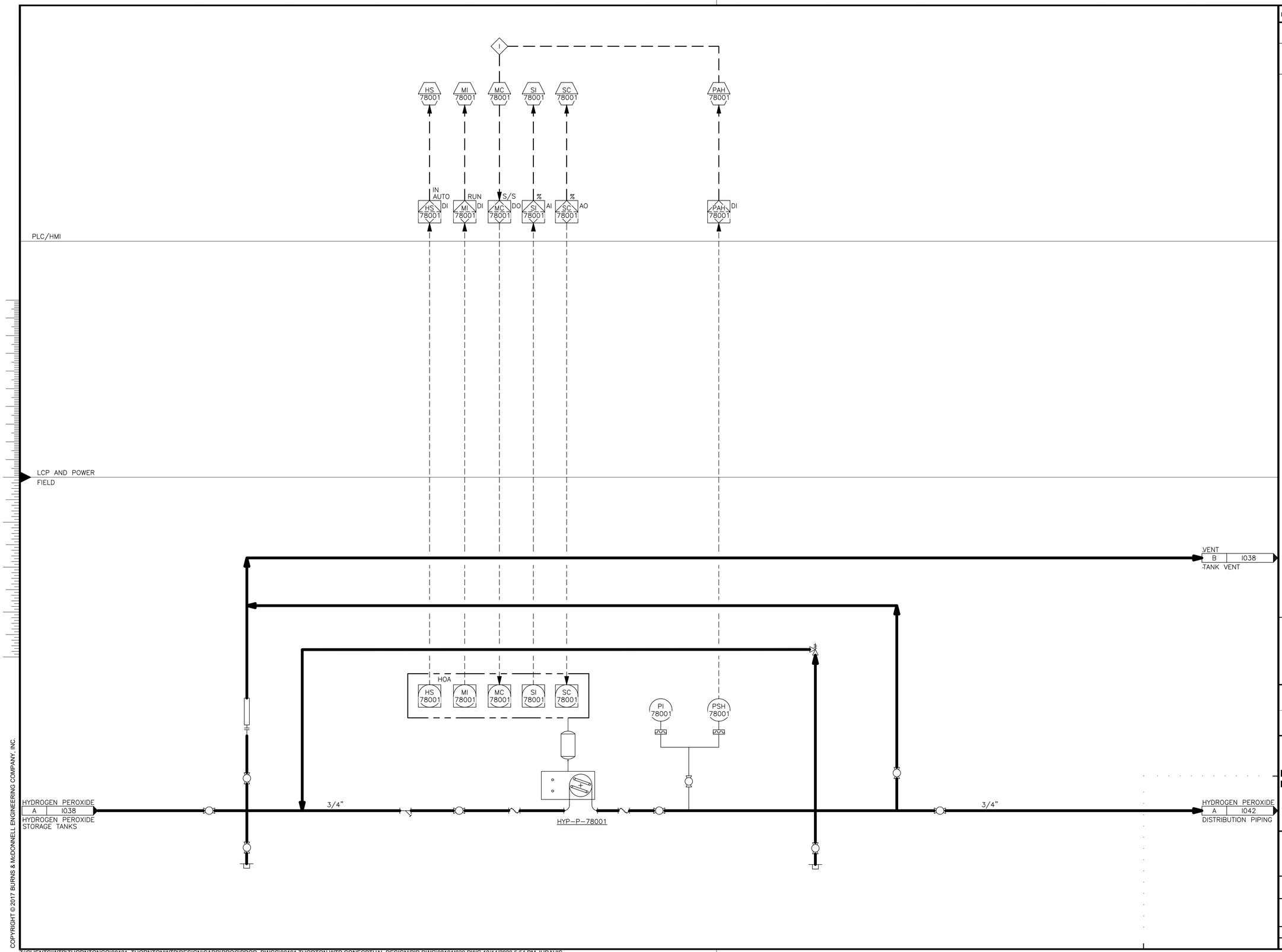
| project | contract |
|---|---|
| 98101 | |

drawing **I038** – rev. **1**

sheet 497 of 542 sheets

file 981011038.dwg

\\BMCD\DFS\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\981011038.DWG 4/5/2021 11:34 AM ERGARVEY




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

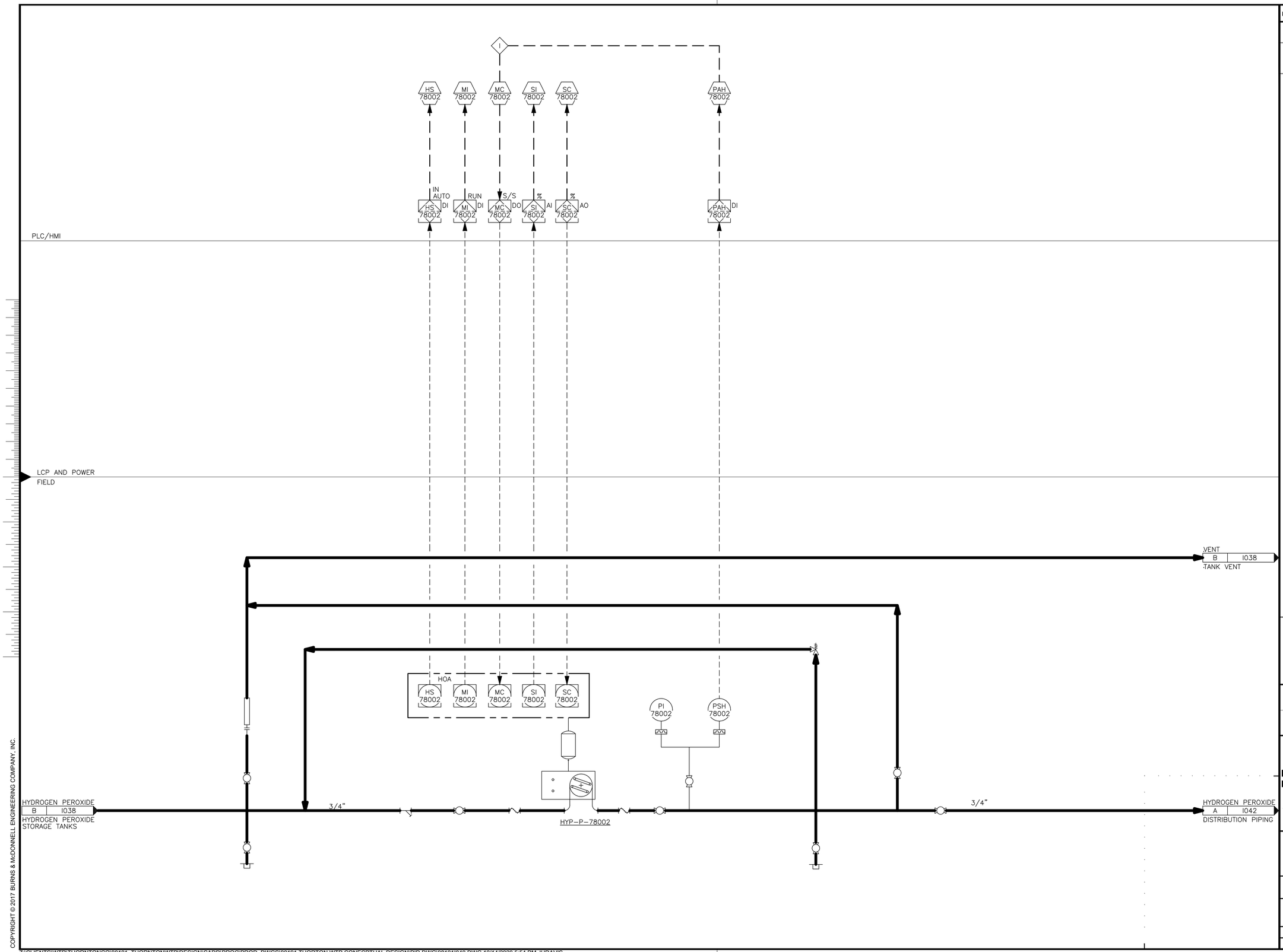
**drawing** I039 — **rev.** 0

**sheet** 498 **of** 542 sheets

**file** 98101I039.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

**drawing** I040 — **rev.** 0

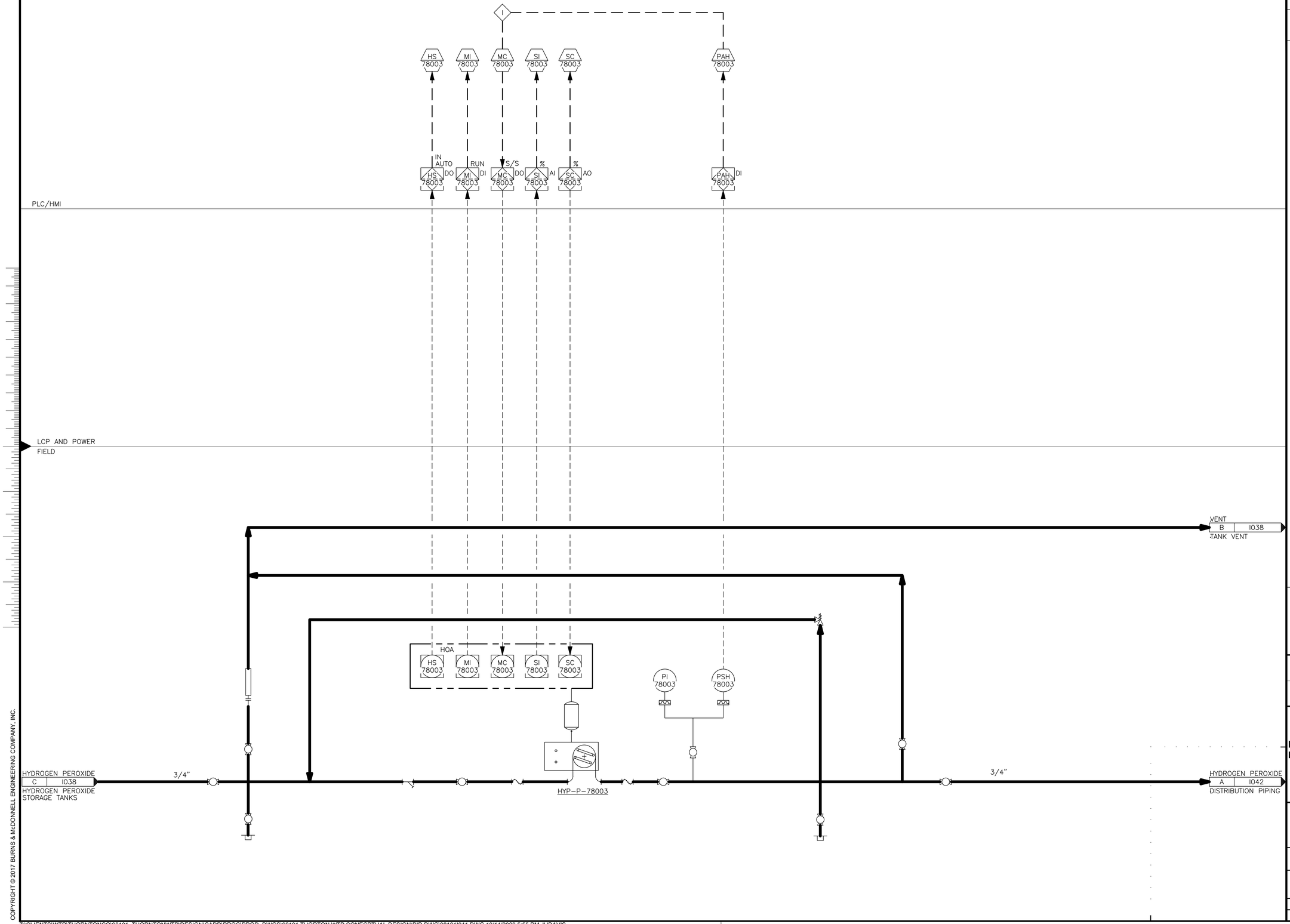
**sheet** 499 **of** 542 sheets

**file** 98101I040.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I040.DWG 10/14/2020 5:54 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

**drawing** I041 — **rev.** 0

**sheet** 500 **of** 542 sheets

**file** 98101I041.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I041.DWG 10/14/2020 5:55 PM JHDAVIS

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER FIELD

ZSC 78016, ZSO 78016, FC 78016 — DI, DI, DO — 120V, 1ø, PLC–CHM2

ZSC 78017, ZSO 78017, FC 78017 — DI, DI, DO — 120V, 1ø, PLC–CHM2

ZSC 78018, ZSO 78018, FC 78018 — DI, DI, DO — 120V, 1ø, PLC–CHM2

FI 78015 — 120V, 1ø PLC–CHM1

FI 78014 — 120V, 1ø PLC–CHM1

FI 78013 — 120V, 1ø PLC–CHM1

O\C: ZSC 78016, ZSO 78016, FC 78016

O\C: ZSC 78017, ZSO 78017, FC 78017

O\C: ZSC 78018, ZSO 78018, FC 78018

HYDROGEN PEROXIDE A | I039 — PUMP 1 — 3/4"

HYDROGEN PEROXIDE A | I040 — PUMP 2 — 3/4"

HYDROGEN PEROXIDE A | I041 — PUMP 3 — 3/4"

SOFTENED WATER A | I083 — WATER SOFTENING SYSTEM

M — 1" — RO 78016

M — 1" — RO 78017

M — 1" — RO 78018

1"

FIT 78013 (M) — HYP–MM–78013

FIT 78014 (M) — HYP–MM–78014

FIT 78015 (M) — HYP–MM–78015

HYDROGEN PEROXIDE C | I009 — SETTLED WATER

HYDROGEN PEROXIDE D | I011 — OZONE CONTACT CHAMBER EFFLUENT

HYDROGEN PEROXIDE E | I011 — OZONATED WATER

HYDROGEN PEROXIDE A | I011 — OZONE CONTACT CHAMBER INTERMEDIATE

HYDROGEN PEROXIDE B | I021 — BACKWASH SUPPLY

Scale For Microfilming: Millimeters / Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
HYDROGEN PEROXIDE CHEMICAL FEED SYSTEM P&ID V

| project | contract |
|---|---|
| 98101 | |

drawing I042 — rev. 1

sheet 501 of 542 sheets

file 98101I042.dwg

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I042.DWG 10/23/2020 11:49 AM JHDAVIS

NOTE:

1. FERRIC CHLORIDE MAY BE USED ALSO AS A COAGULANT IN THIS SYSTEM.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

LAH 72011 · LI 72011 · LAH 72011 · I · LI 72011 AI

LAH 72012 · LI 72012 · LAH 72012 · I · LI 72012 AI

MI 72010 · RUN · MI 72010 DI

120V, 1ø, LP–CHEM

LAH 72011 · LIT 72011

LAH 72012 · LIT 72012

REMOTE FILL PANEL

LCP–FES

MI 72010 · HS 72010 · MA 72010

120V, 1ø, LP–CHEM

FERRIC SULFATE FILL STATION

2"

LIT 72011 · LE 72011 · RDR

LIT 72012 · LE 72012 · RDR

VENT WITH INSECT SCREEN

VENT WITH INSECT SCREEN

VENT B 1046 PUMP 3

VENT B 1045 PUMP 2

VENT B 1044 PUMP 1

4"

FERRIC SULFATE STORAGE TANK 14,100 GALLONS

FERRIC SULFATE STORAGE TANK 14,100 GALLONS

LG 72011

LG 72012

FES–TNK–72011

FES–TNK–72012

FES–TP–72010

3/4" FERRIC SULFATE A 1044 PUMP 1

3/4" FERRIC SULFATE B 1045 PUMP 2

3/4" FERRIC SULFATE C 1046 PUMP 3

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I043.DWG 10/21/2020 9:15 AM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FERRIC SULFATE CHEMICAL FEED SYSTEM
P&ID I

| project | contract |
|---|---|
| 98101 | |

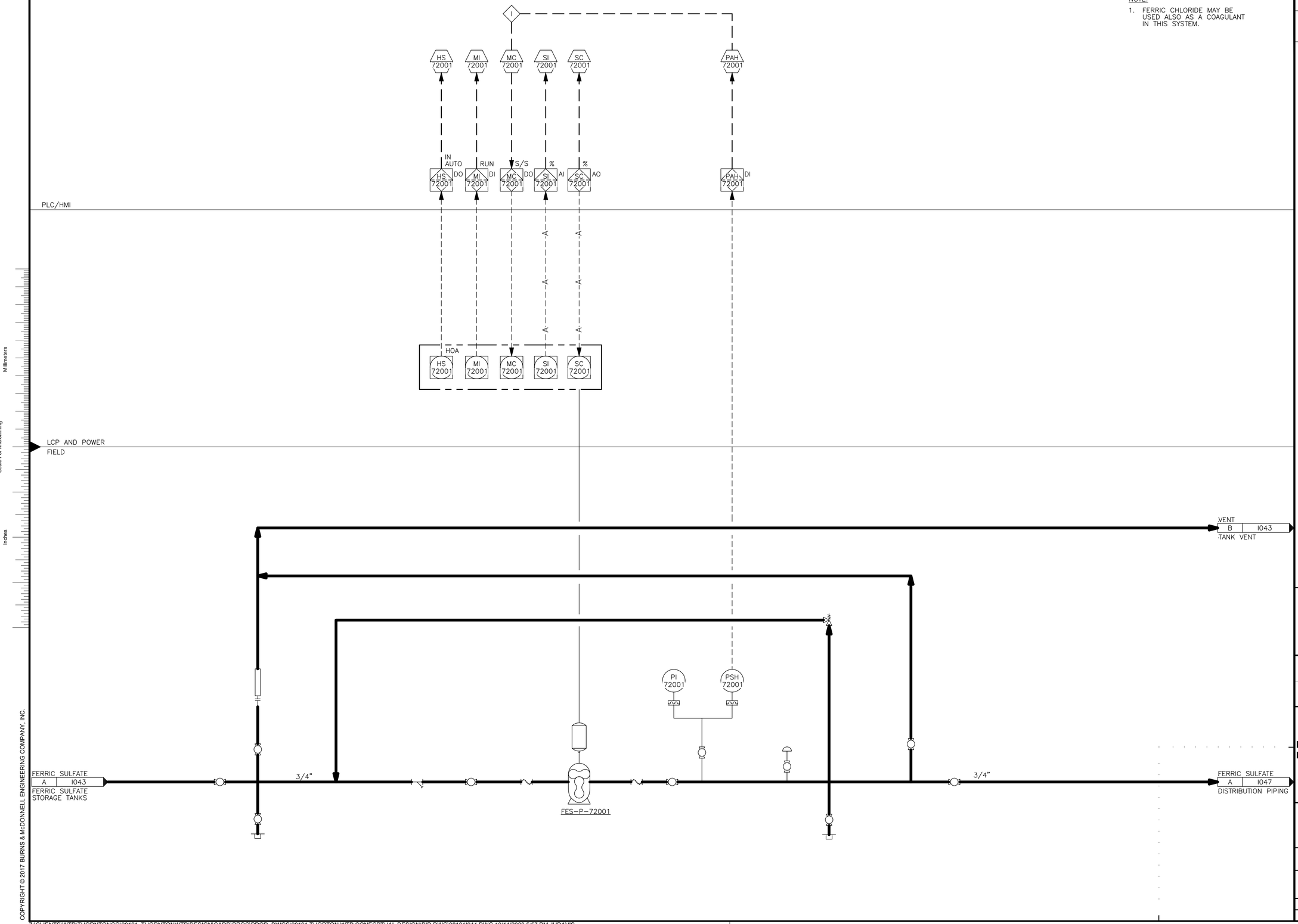
drawing **I043** – rev. **1**

sheet 502 of 542 sheets

file 981011043.dwg

NOTE:

1. FERRIC CHLORIDE MAY BE USED ALSO AS A COAGULANT IN THIS SYSTEM.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FERRIC SULFATE CHEMICAL FEED SYSTEM
P&ID II

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I044 | 0 |

**sheet** 503 **of** 542 sheets

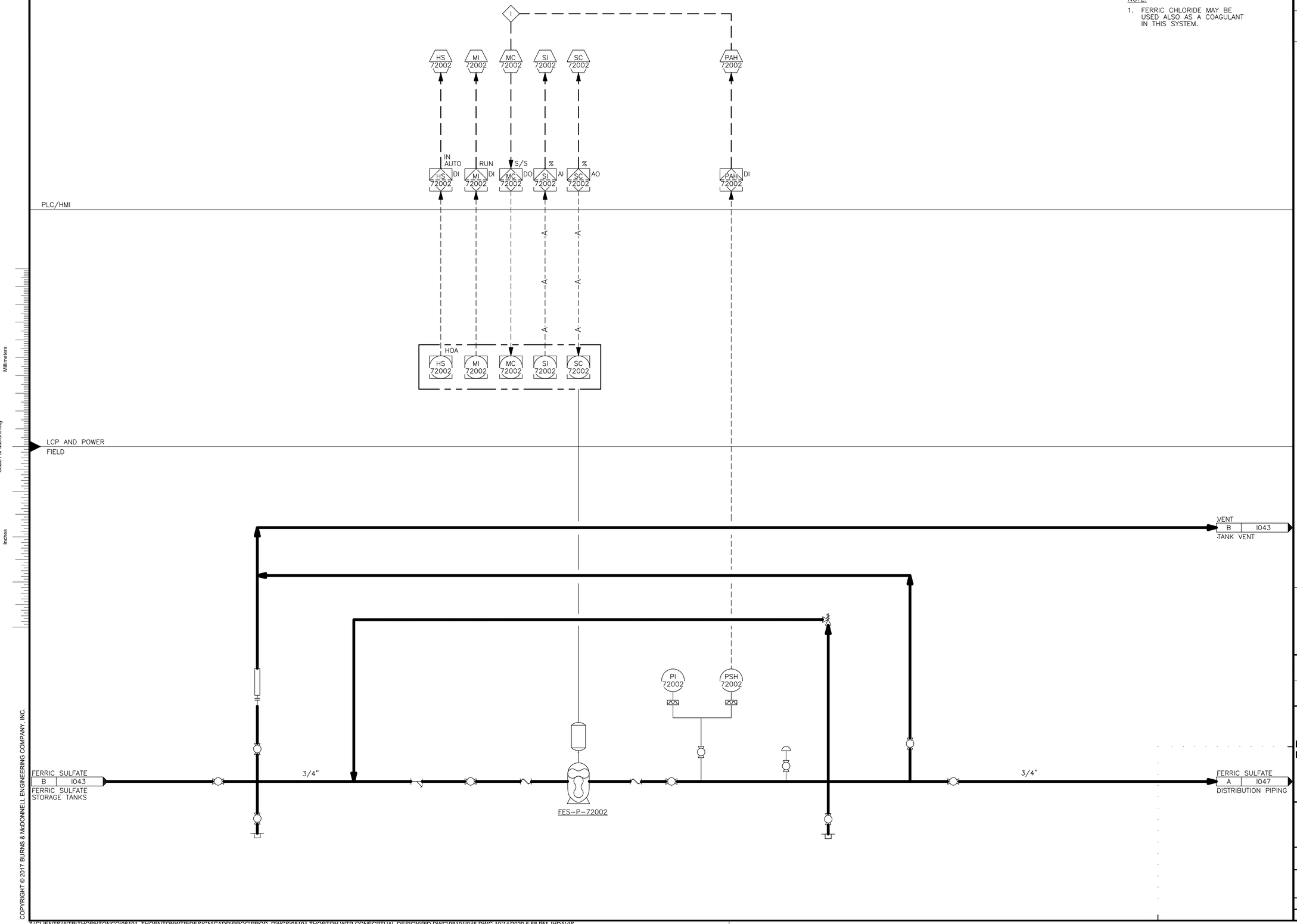
**file** 98101I044.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTE:

1. FERRIC CHLORIDE MAY BE USED ALSO AS A COAGULANT IN THIS SYSTEM.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FERRIC SULFATE CHEMICAL FEED SYSTEM
P&ID III

| project | contract |
|---|---|
| 98101 | |

**drawing** I045 — **rev.** 0

**sheet** 504 **of** 542 sheets

**file** 98101I045.dwg

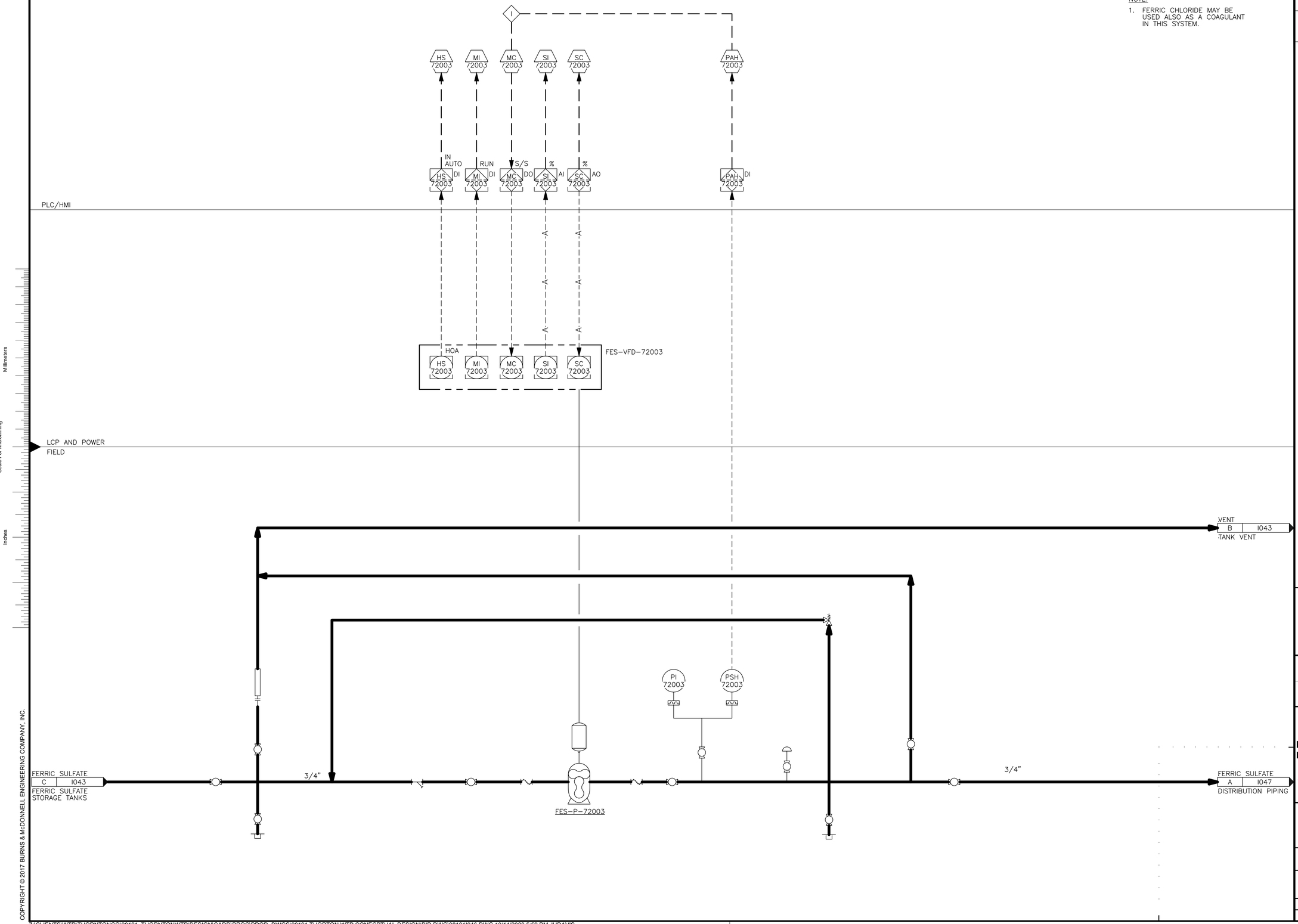
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I045.DWG 10/14/2020 5:58 PM JHDAVIS

NOTE:

1. FERRIC CHLORIDE MAY BE USED ALSO AS A COAGULANT IN THIS SYSTEM.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FERRIC SULFATE CHEMICAL FEED SYSTEM
P&ID IV

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I046 | 0 |

**sheet** 505 **of** 542 sheets

**file** 98101I046.dwg

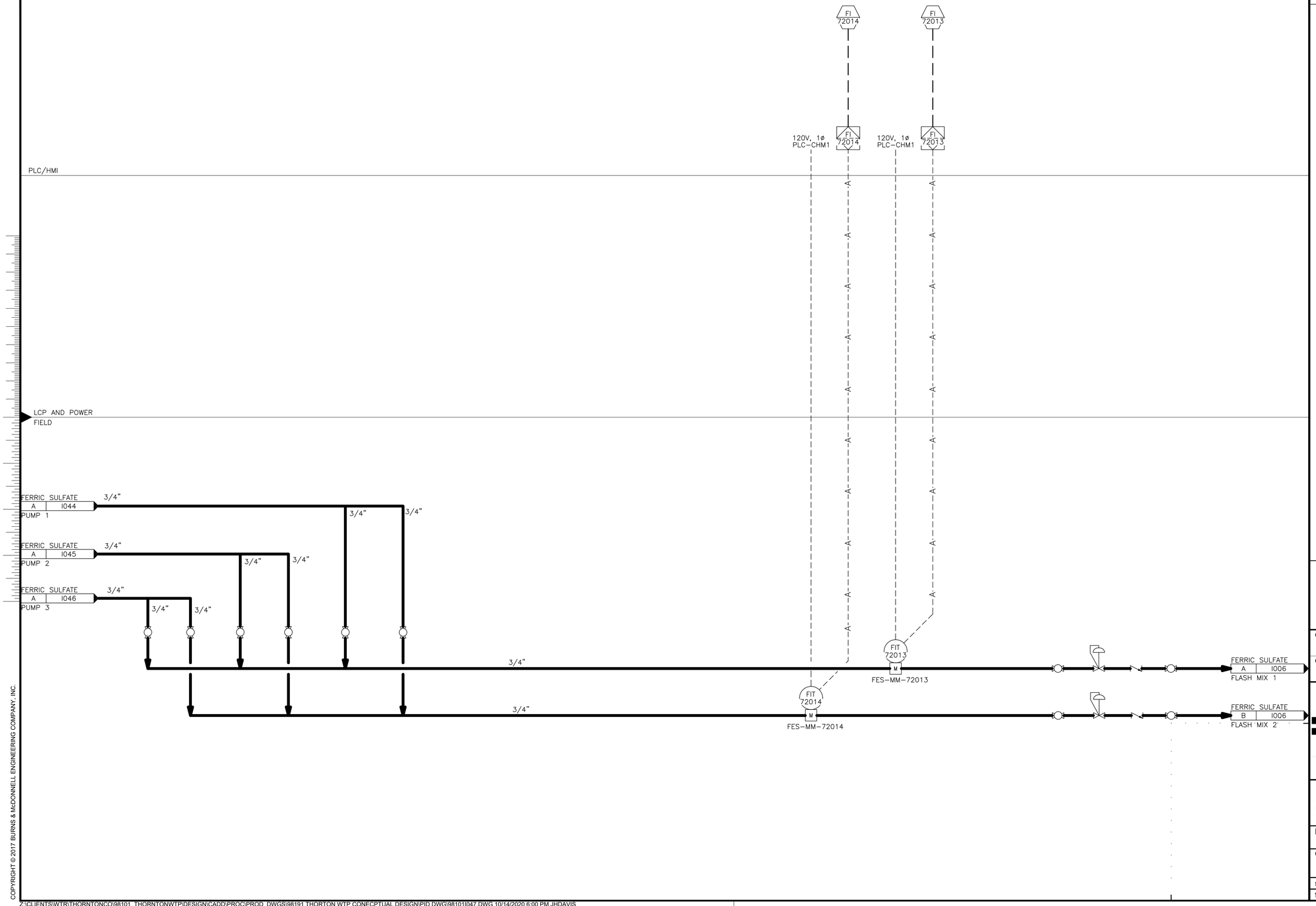
Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I046.DWG 10/14/2020 5:59 PM JHDAVIS

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| **date** APRIL 2021 | **detailed** P. HUNTZINGER |
| **designed** J. SCHAEFER | **checked** A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FERRIC SULFATE CHEMICAL FEED SYSTEM
P&ID V

| | |
|---|---|
| **project** 98101 | **contract** |
| **drawing** I047 – | **rev.** 0 |
| **sheet** 506 **of** 542 sheets | |
| **file** 98101I047.dwg | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I047.DWG 10/14/2020 6:00 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

120V, 1ø LP-CHEM

REMOTE FILL PANEL

LCP-SHP

SOFTENED WATER E I083

CAUSTIC SODA F I032

CAUSTIC SODA FEED SYSTEM

SODIUM HYPOCHLORITE FILL STATION

SHP-V-73011

SHP-V-73012

SHP-V-73013

SODIUM HYPOCHLORITE STORAGE TANK 10,450 GALLONS

SHP-TNK-73011

SHP-TNK-73012

SHP-TNK-73013

SHP-TP-73010

VENT WITH INSECT SCREEN

SOFTENED WATER E I055

VENT B I049 PUMP 1

VENT B I050 PUMP 3

VENT B I051 PUMP 3

VENT B I052 PUMP 4

VENT B I053 PUMP 5

VENT B I054 PUMP 6

SODIUM HYPOCHLORITE A I049 PUMP 1

SODIUM HYPOCHLORITE B I050 PUMP 2

SODIUM HYPOCHLORITE C I051 PUMP 3

SODIUM HYPOCHLORITE D I052 PUMP 4

SODIUM HYPOCHLORITE E I053 PUMP 5

SODIUM HYPOCHLORITE F I054 PUMP 6

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

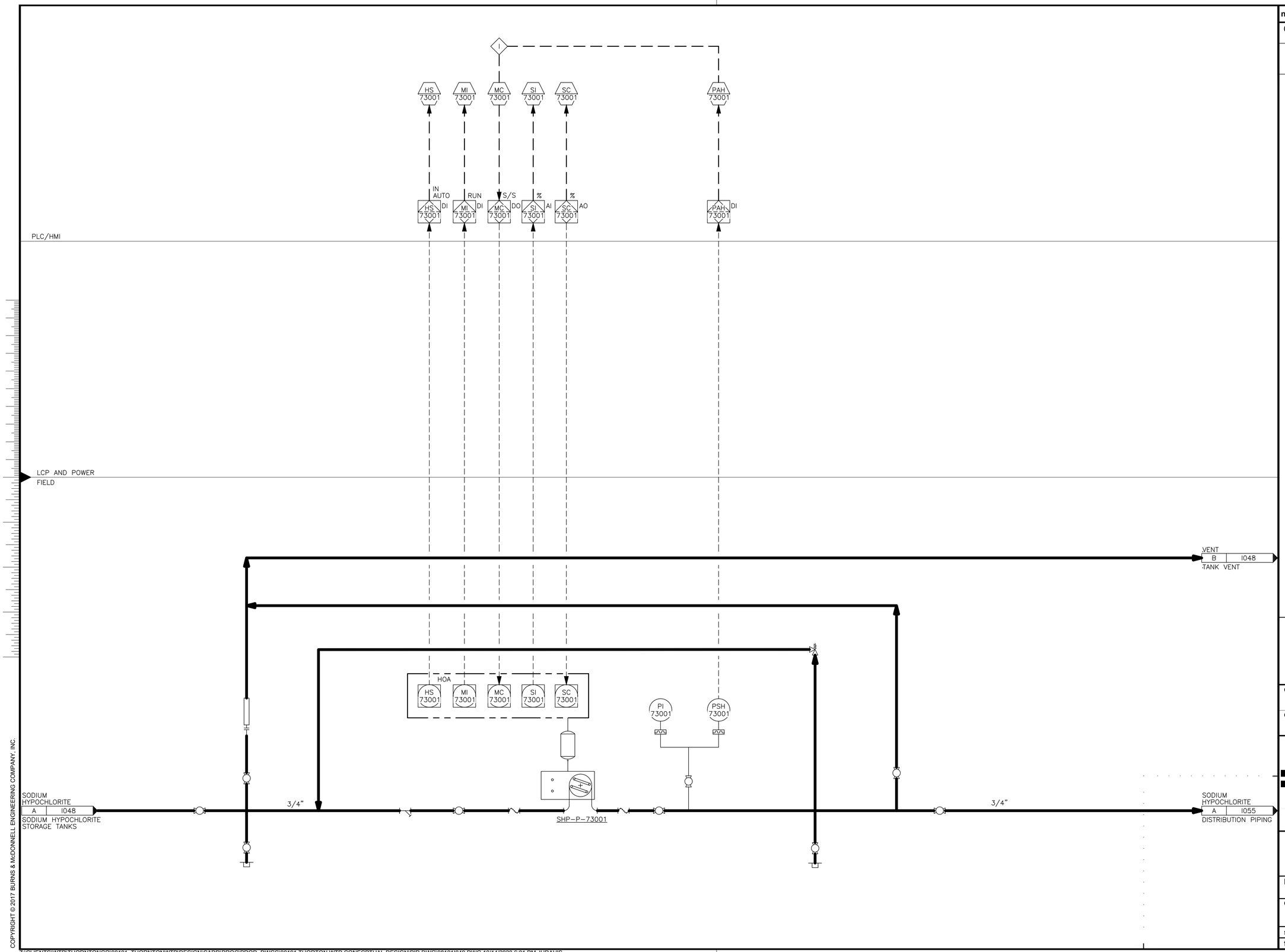
City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID I

| | |
|---|---|
| project 98101 | contract |
| drawing I048 | rev. 1 |
| sheet 507 of 542 sheets | |
| file 981011048.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I048.DWG 10/16/2020 9:45 AM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

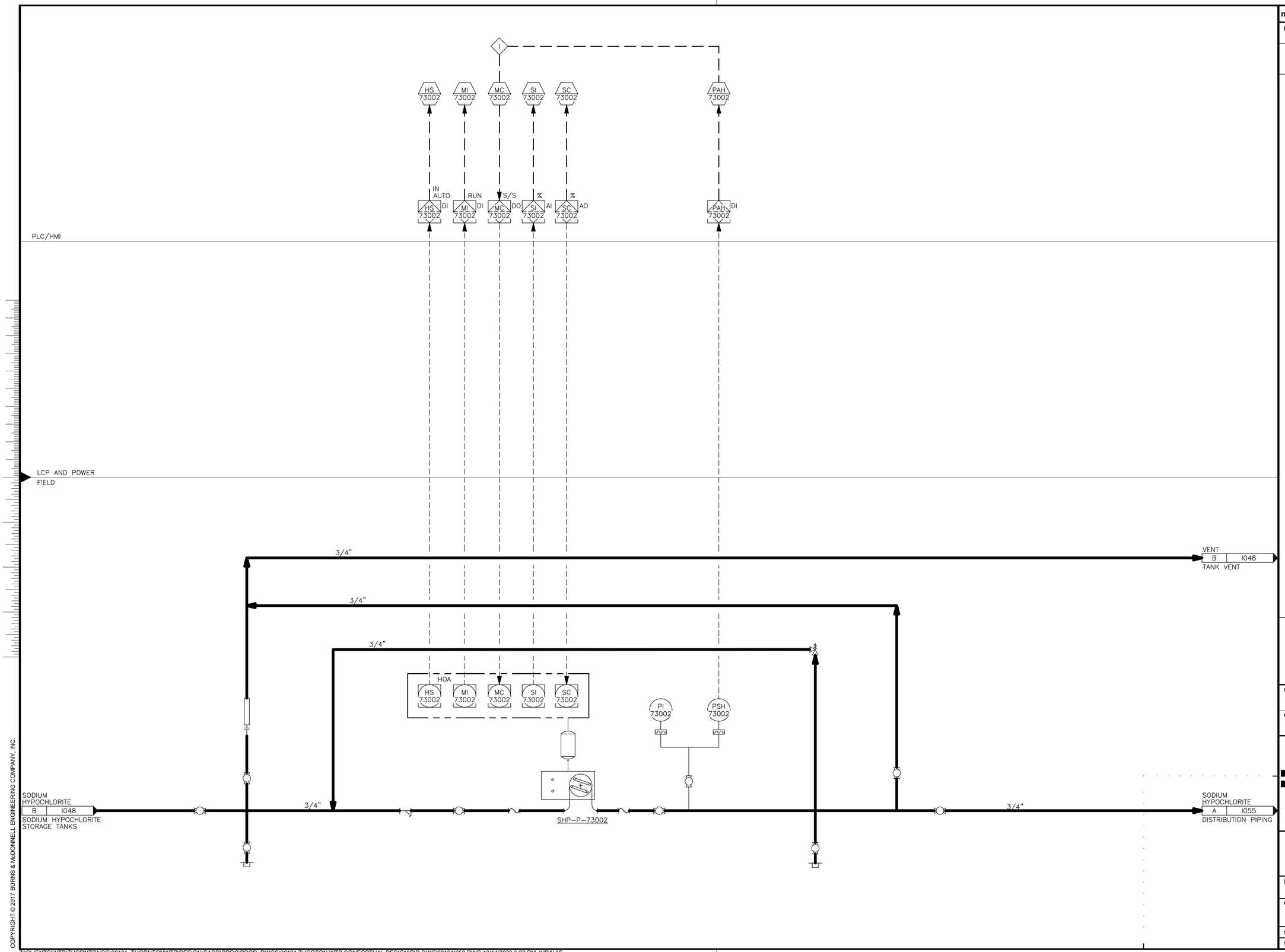
**drawing** I049 — **rev.** 0

**sheet** 508 **of** 542 sheets

**file** 98101I049.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

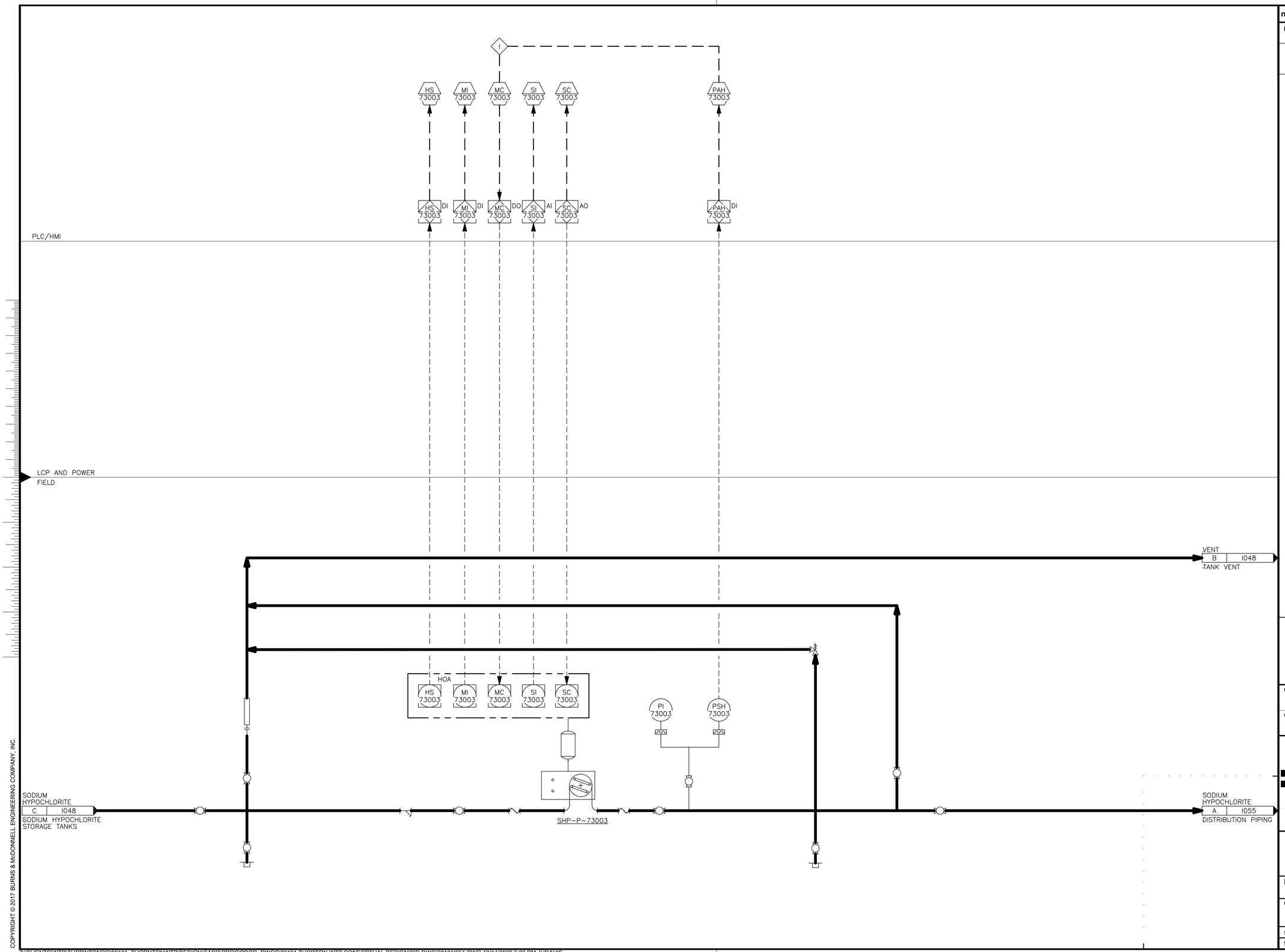
**drawing** I050 — **rev.** 0

**sheet** 509 **of** 542 sheets

**file** 98101I050.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

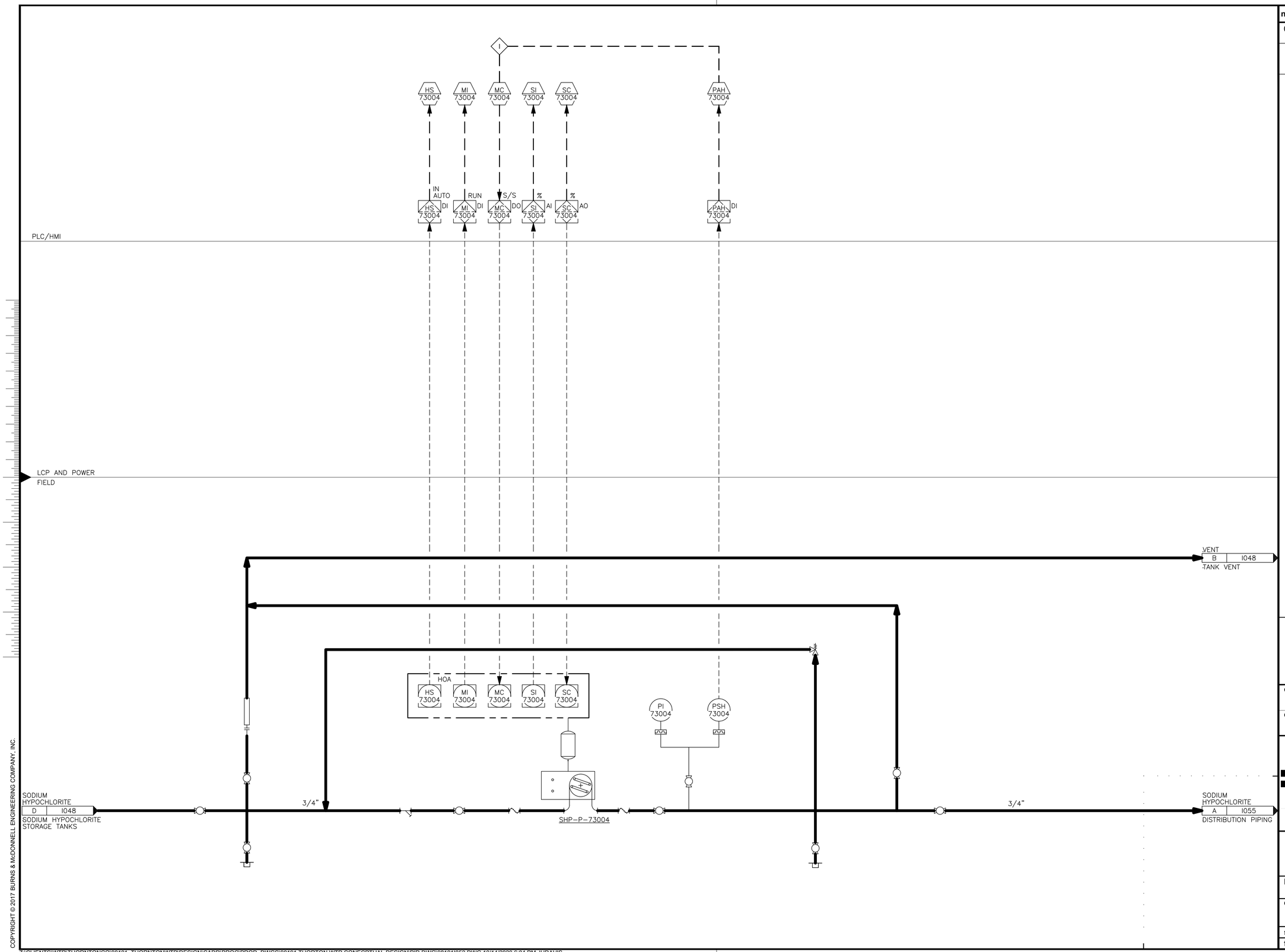
**drawing** I051 — **rev.** 0

**sheet** 510 **of** 542 sheets

**file** 98101I051.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID V

| project | contract |
|---|---|
| 98101 | |

**drawing** I052 — **rev.** 0

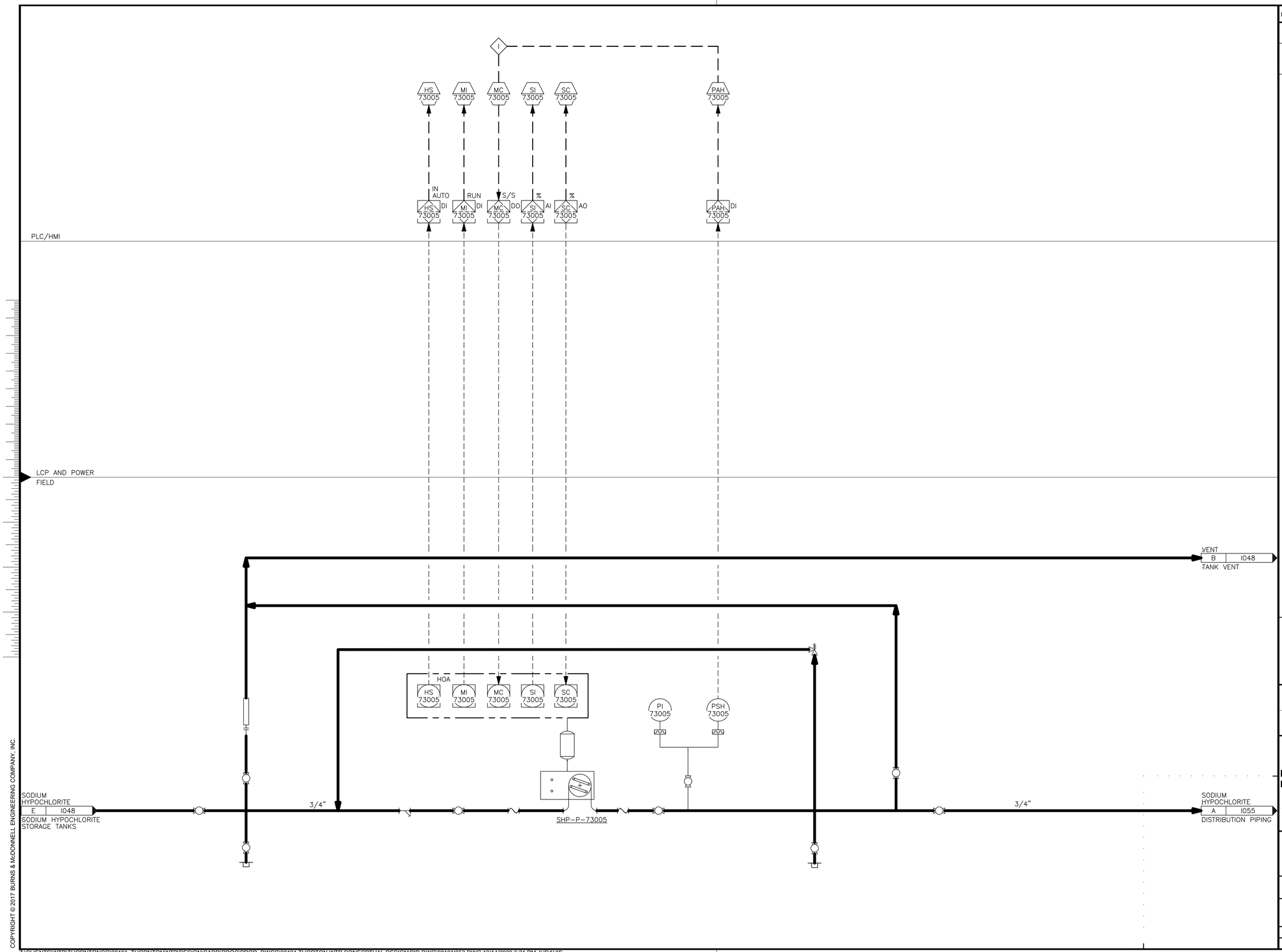
**sheet** 511 **of** 542 sheets

**file** 98101I052.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I052.DWG 10/14/2020 6:04 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID VI

| project | contract |
|---|---|
| 98101 | |

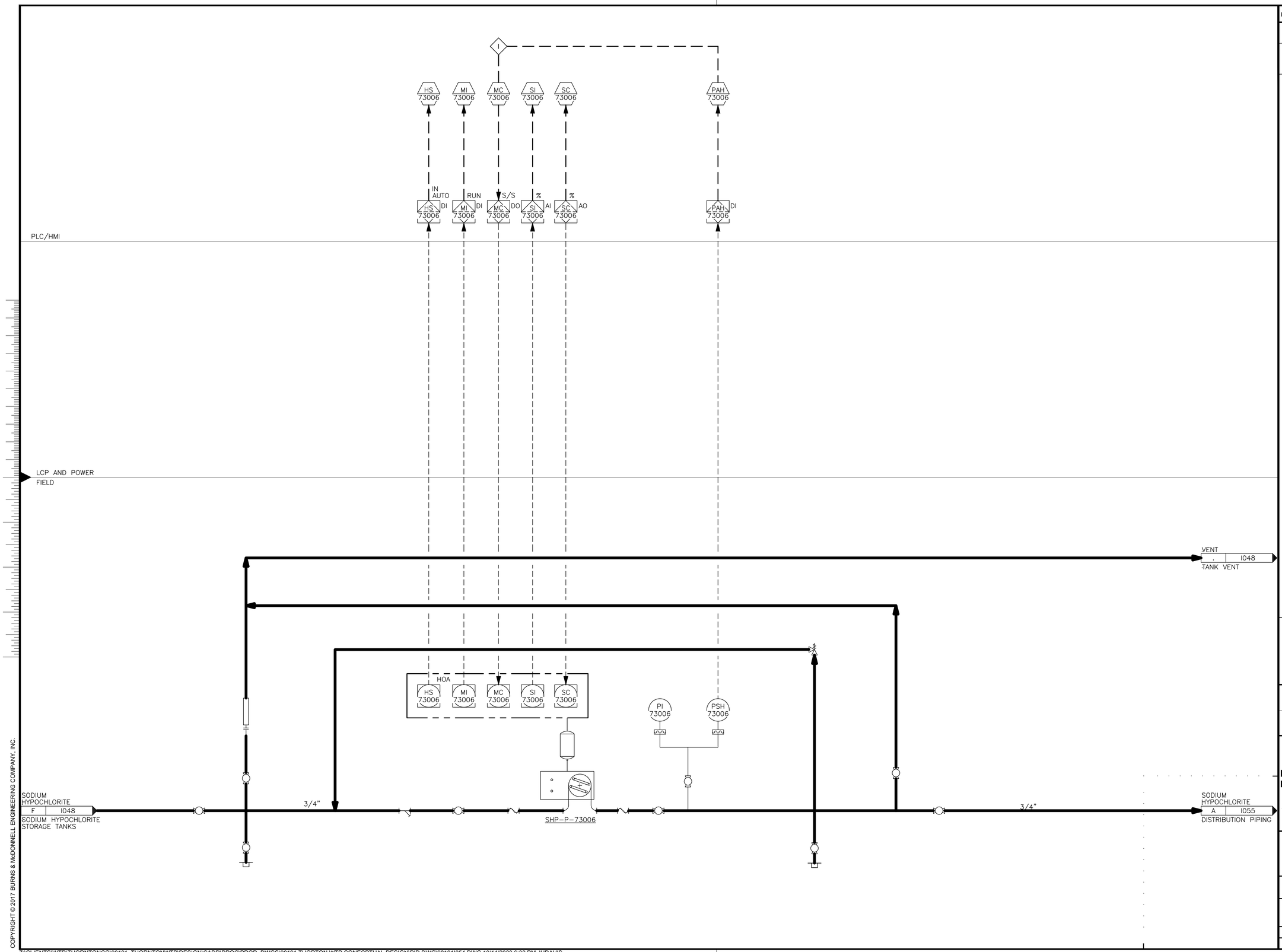
**drawing** I053 — **rev.** 0

**sheet** 512 **of** 542 sheets

**file** 98101I053.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID VII

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I054 – | 0 |

**sheet** 513 **of** 542 sheets

**file** 98101I054.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

PLC/HMI

LCP AND POWER FIELD

SOFTENED WATER E | I083 WATER SOFTENING SYSTEM

SODIUM HYPOCHLORITE
A | I049 PUMP 1
A | I050 PUMP 2
A | I051 PUMP 3
A | I052 PUMP 4
A | I053 PUMP 5
A | I054 PUMP 6

SMP-MM-73014
SMP-MM-73015
SMP-MM-73016
SMP-MM-73017
SMP-MM-73018
SMP-MM-73019

SODIUM HYPOCHLORITE
G | I021 BACKWASH SUPPLY BASIN

SODIUM HYPOCHLORITE
A | I003 STANDLEY LAKE RAW WATER
B | I004 EGL4 RAW WATER
C | I009 SETTLED WATER
D | I011 OZONATED WATER LINE
E | I020 CLEARWELL INLET
F | I020 CLEARWELL INTERMEDIATE FEED

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM HYPOCHLORITE CHEMICAL FEED SYSTEM P&ID VIII

| project | contract |
|---|---|
| 98101 | |

drawing **I055** – rev. **1**

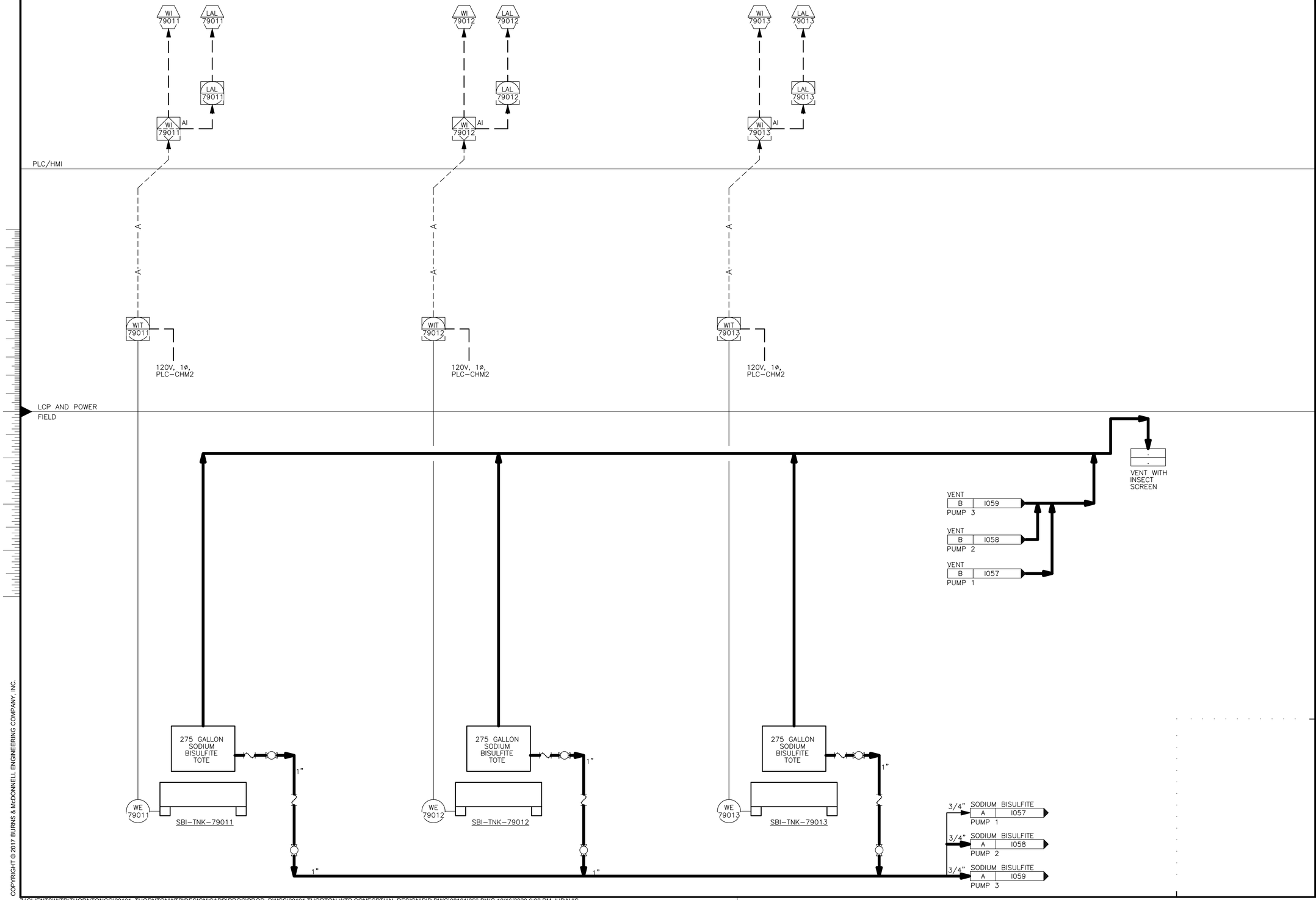
sheet 514 of 542 sheets

file 98101I055.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I055.DWG 10/21/2020 11:17 AM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I056.DWG 10/16/2020 6:00 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

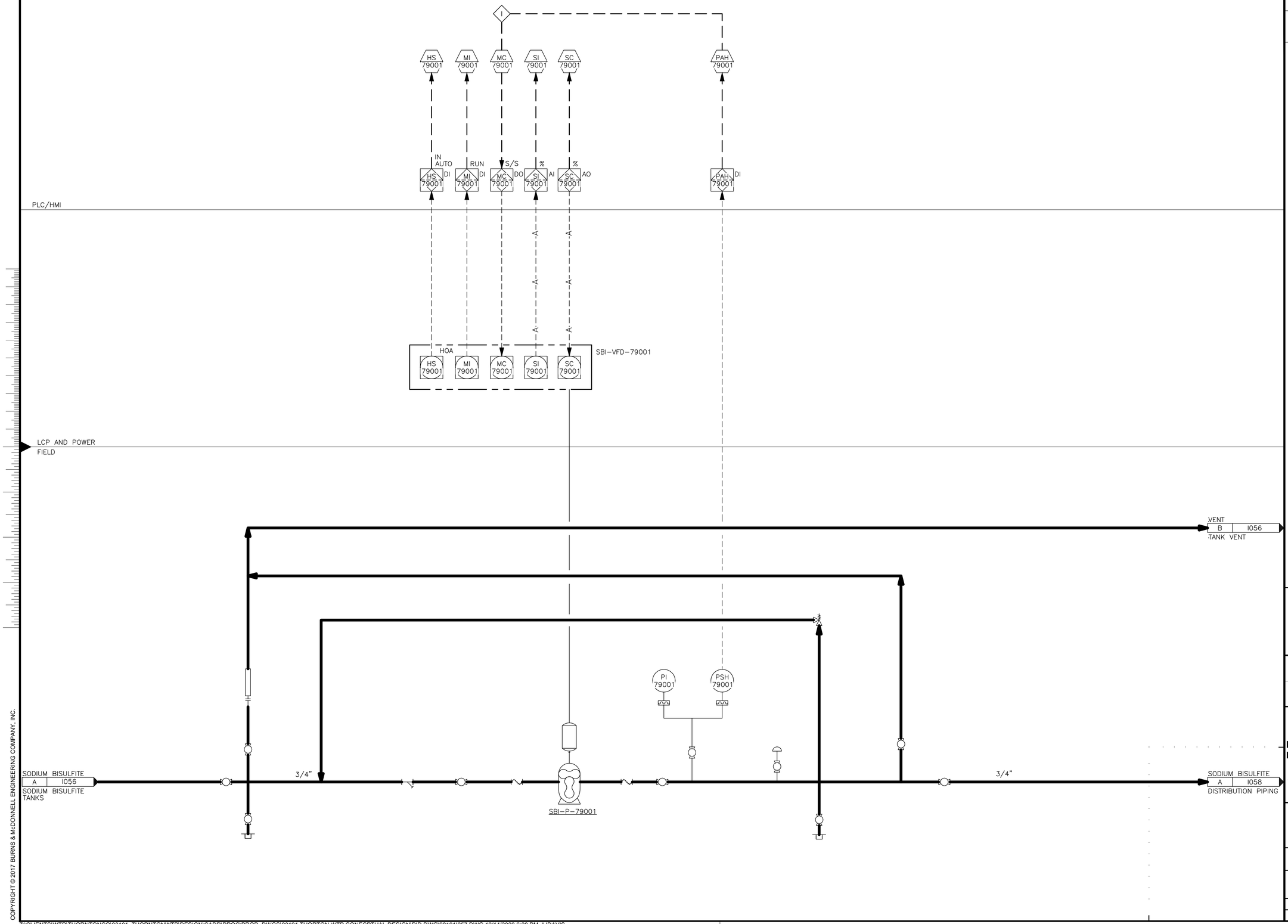
**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID I

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I056 – | 0 |

**sheet** 515 **of** 542 sheets

**file** 98101I056.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I057 | 0 |

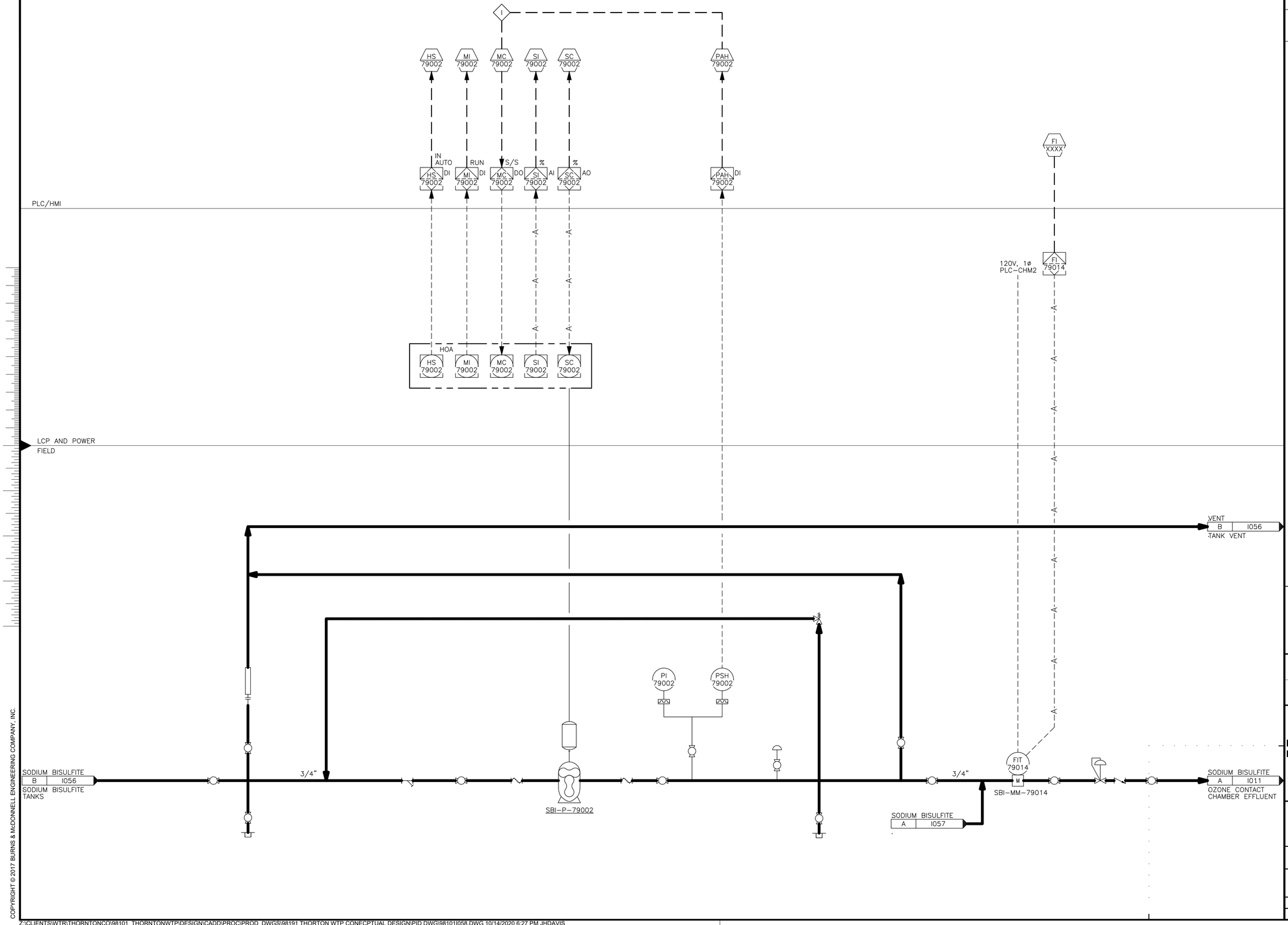
**sheet** 516 **of** 542 sheets

**file** 98101I057.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I057.DWG 10/14/2020 6:28 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

drawing **I058** – rev. **0**

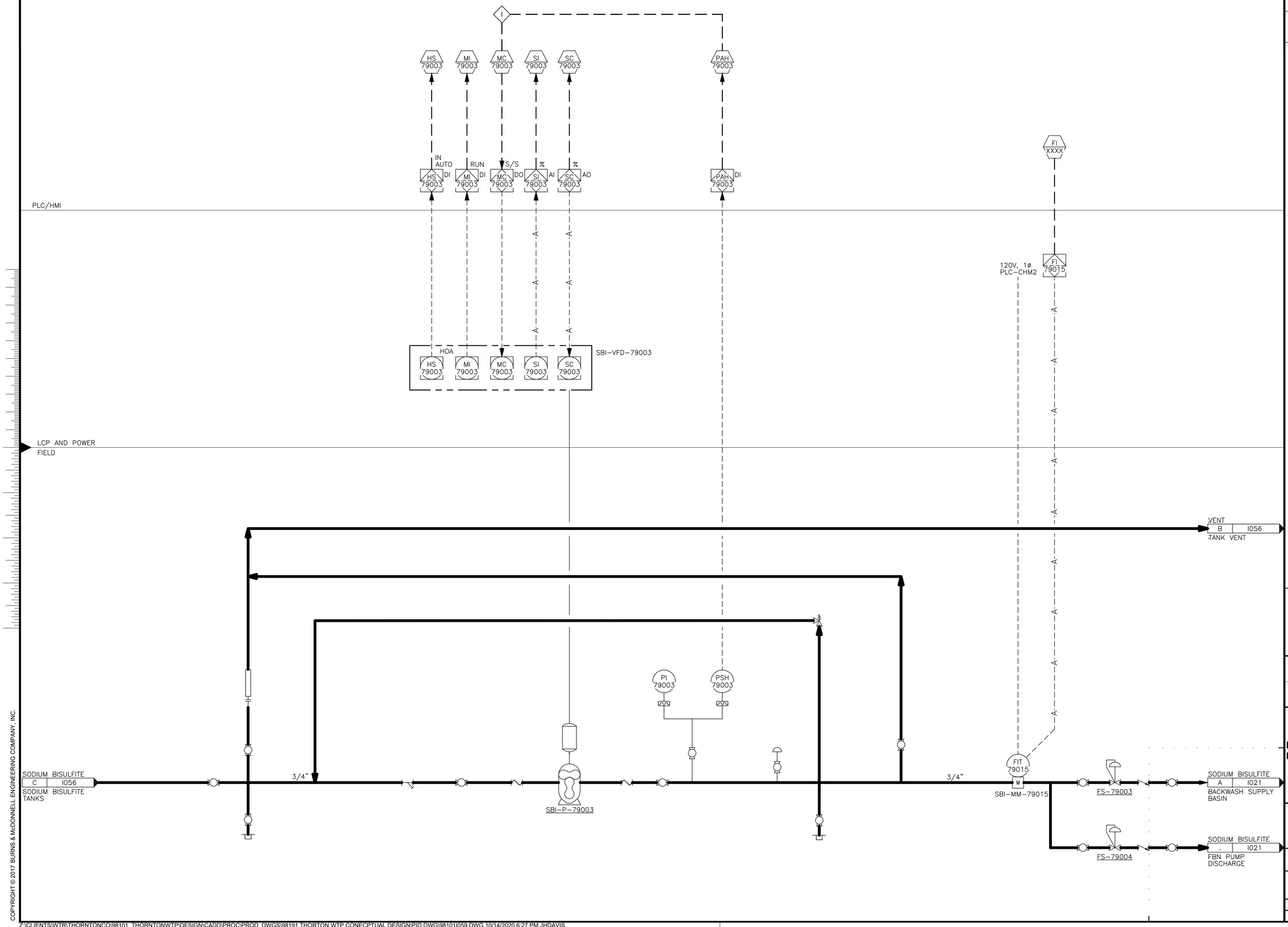
sheet 517 of 542 sheets

file 98101I058.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I058.DWG 10/14/2020 6:27 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM BISULFITE CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

drawing **I059** – rev. **0**

sheet 518 of 542 sheets

file 98101I059.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I059.DWG 10/14/2020 6:27 PM JHDAVIS

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

LAH 76011
LI 76011
I
LAH 76011
LI 76011 AI
PLC/HMI

LAH 76012
LI 76012
I
LAH 76012
LI 76012 AI
PLC/HMI

MI 76010
RUN
MI 76010 DI
PLC/HMI

120V, 1ø
LP-CHEM

LAH 76011
LIT 76011

LAH 76012
LIT 76012
REMOTE FILL PANEL

LCP-SPE
MI 76010
HS 76010
MA 76010
120V, 1ø, LP-CHEM

LCP AND POWER
FIELD

LIT 76011
LE 76011
LG 76011
LIT 76012
LE 76012
LG 76012

SODIUM PERMANGANATE FILL STATION
2"
2"

RDR
RDR

VENT WITH INSECT SCREEN
VENT WITH INSECT SCREEN

SODIUM PERMANGANATE STORAGE TANK 2,700 GALLONS
SODIUM PERMANGANATE STORAGE TANK 2,700 GALLONS

4"
4"
4"
4"
1
1

SPE-TNK-76011
SPE-TNK-76012

2"
2"
2"
2"
2"
2"

SPE-TP-76010

VENT
B | I063
PUMP 3

VENT
B | I062
PUMP 2

VENT
B | I061
PUMP 1

SODIUM PERMANGANATE
A | I061
PUMP 1
3/4"

SODIUM PERMANGANATE
B | I062
PUMP 2
3/4"

SODIUM PERMANGANATE
C | I063
PUMP 3
3/4"

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM PERMANGANATE
CHEMICAL FEED SYSTEM P&ID I

| project | contract |
|---|---|
| 98101 | |

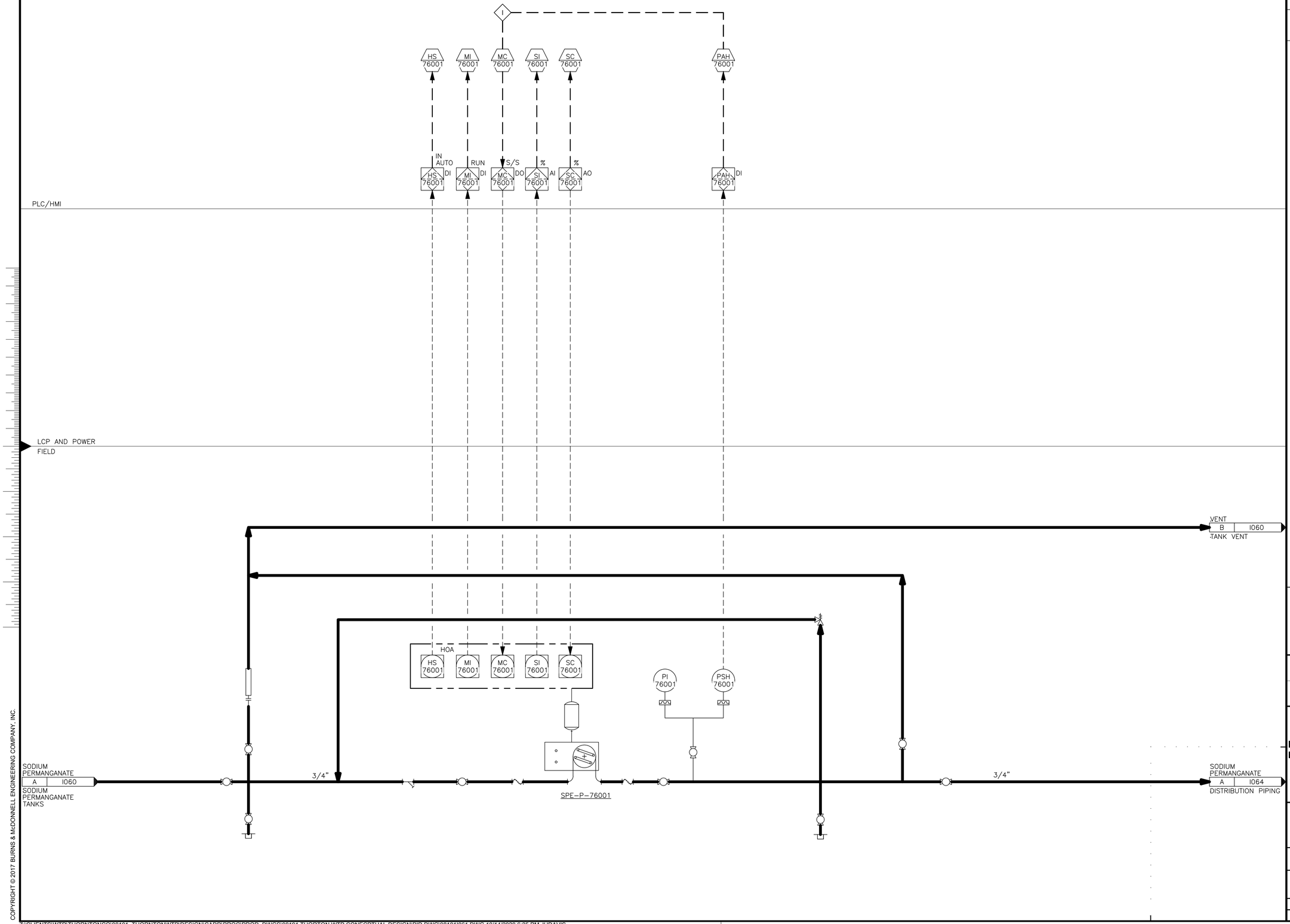
drawing I060 – rev. 1

sheet 519 of 542 sheets

file 98101I060.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM PERMANGANATE
CHEMICAL FEED SYSTEM P&ID II

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I061 – | 0 |

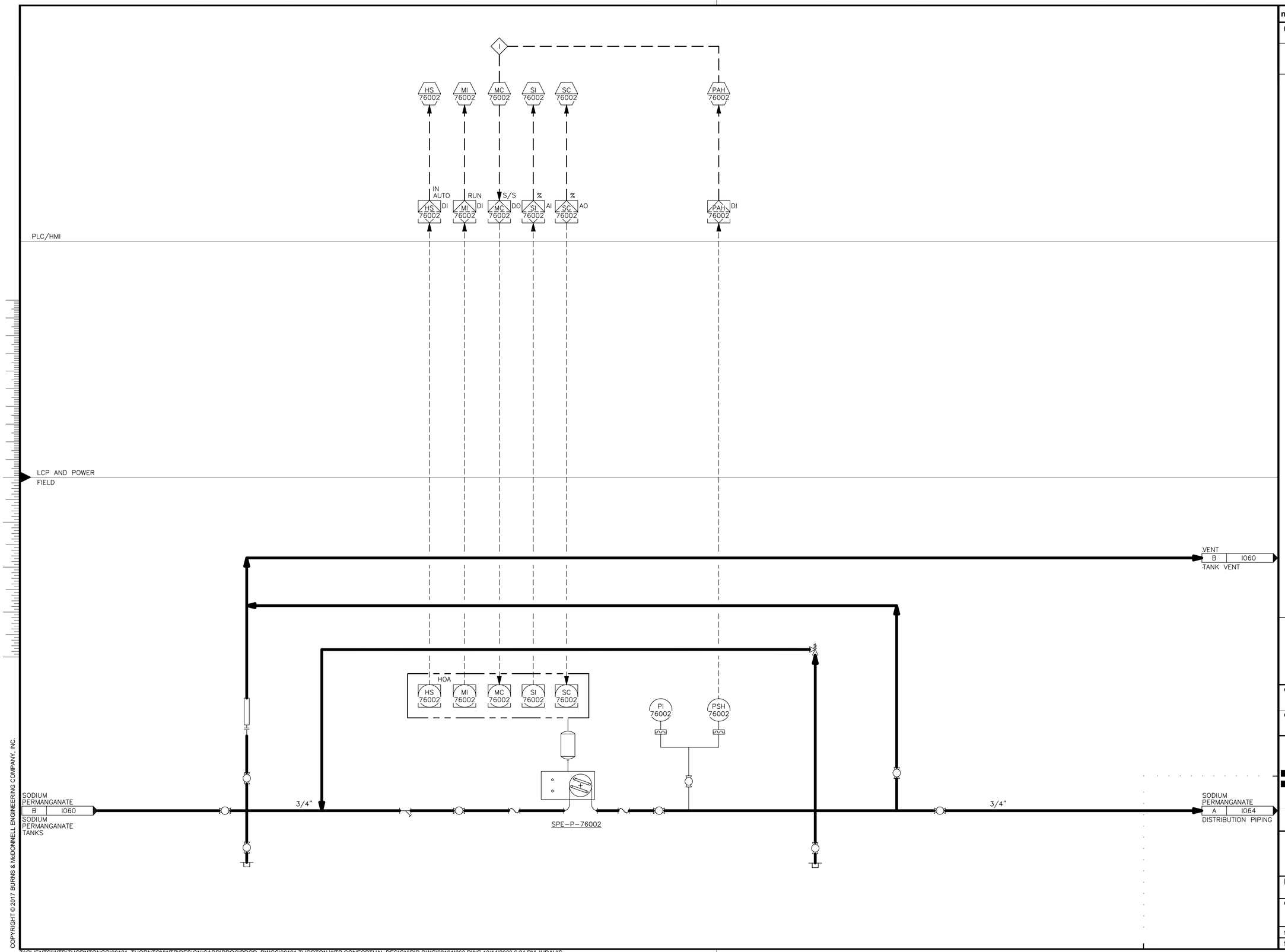
**sheet** 520 **of** 542 sheets

**file** 98101I061.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I061.DWG 10/14/2020 6:25 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM PERMANGANATE
CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

| drawing | rev. |
|---|---|
| I062 | 0 |

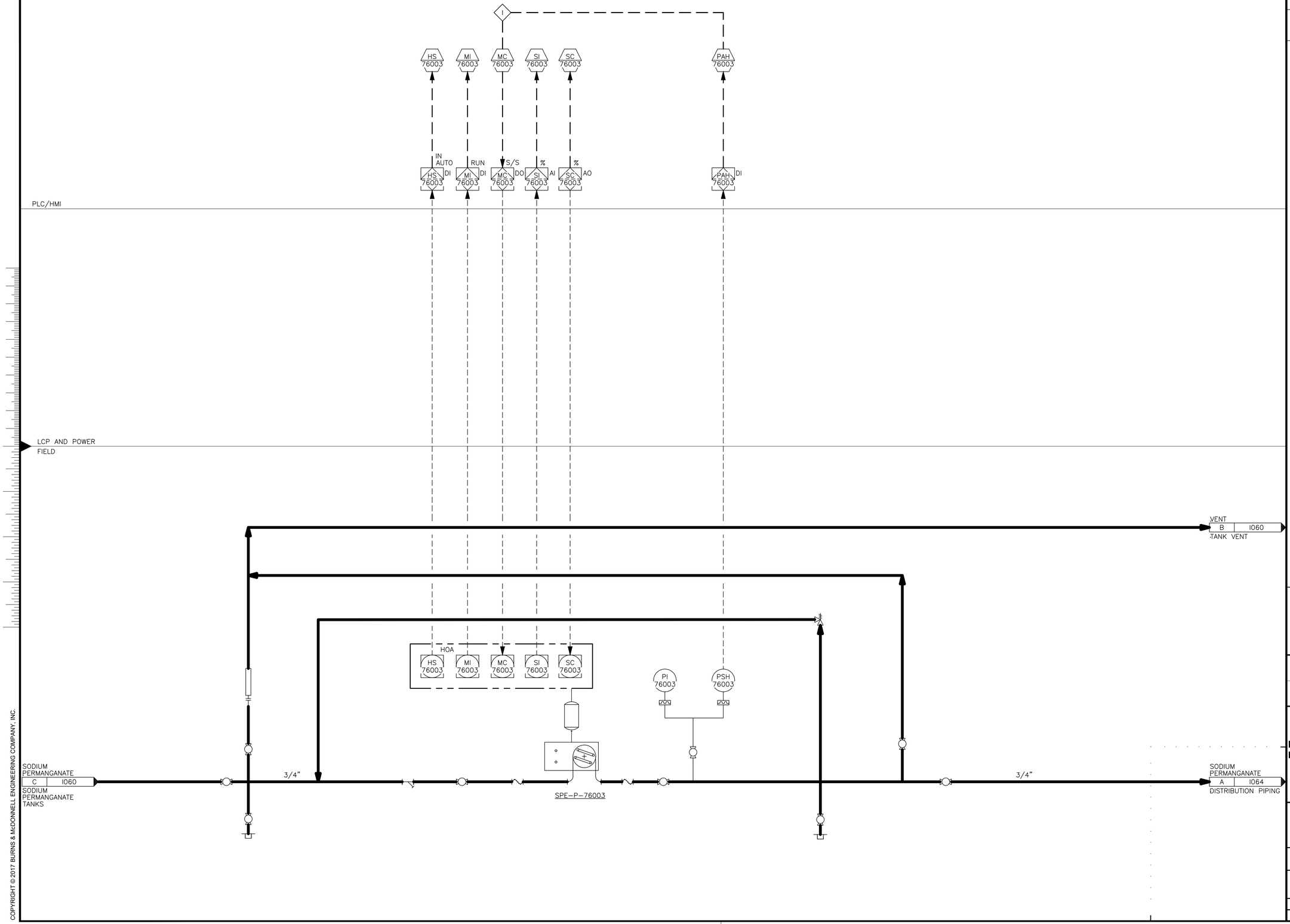
**sheet** 521 **of** 542 sheets

**file** 98101I062.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I062.DWG 10/14/2020 6:24 PM JHDAVIS




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
SODIUM PERMANGANATE
CHEMICAL FEED SYSTEM P&ID IV

| project | contract |
|---|---|
| 98101 | |

**drawing** I063 — **rev.** 0

**sheet** 522 **of** 542 sheets

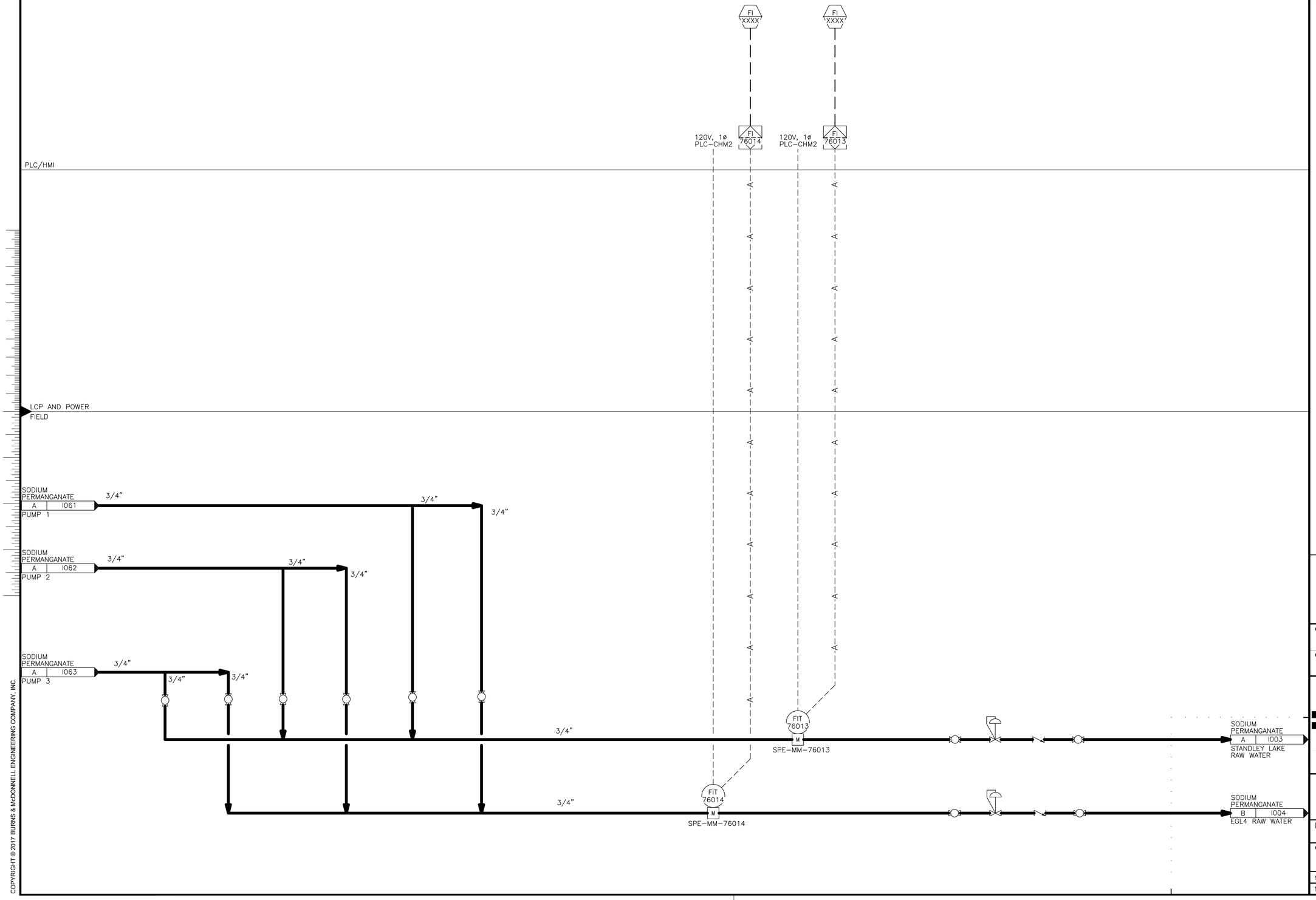
**file** 98101I063.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**2TTP - PACKAGE 3**
SODIUM PERMANGANATE
CHEMICAL FEED SYSTEM P&ID V

| project | contract |
|---|---|
| 98101 | |

drawing **I064** – rev. **0**

sheet 523 of 542 sheets

file 98101I064.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

WI 79511 — AI — WI 79511 — LAL 79511 — LAL 79511

WI 79512 — DO — WI 79512 — LAL 79512 — LAL 79512

HS 79501 — IN AUTO — DI — HS 79501

MI 79501 — RUN — DI — MI 79501

MC 79501 — S/S — DO — MC 79501

SI 79501 — % — AI — SI 79501

SC 79501 — % — AO — SC 79501

PAH 79501 — DI — PAH 79501

HS 79502 — IN AUTO — DI — HS 79502

MI 79502 — RUN — DI — MI 79502

MC 79502 — S/S — DO — MC 79502

SI 79502 — % — AI — SI 79502

SC 79502 — % — AO — SC 79502

PAH 79502 — DI — PAH 79502

120V, 1ø, PLC–CHM2

FI 79513

HOA: HS 79501, MI 79501, MC 79501, SI 79501, SC 79501

HOA: HS 79502, MI 79502, MC 79502, SI 79502, SC 79502

WIT 79511 — 120V, 1ø, PLC–CHM2

WIT 79512 — 120V, 1ø, PLC–CHM2

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

PI 79501 — PSH 79501 — PHA–P–79501

PI 79502 — PSH 79502 — PHA–P–79502

1" — 3/4" — 3/4" — 3/4" — 3/4"

FIT 79513 — M — PHA–MM–79513

PHOSPORIC ACID — A — I011 — OZONATED WATER

VENT WITH INSECT SCREEN

PHOSPHORIC ACID 55 GALLON DRUM OR 275 GALLON TOTE

PHOSPHORIC ACID 55 GALLON DRUM OR 275 GALLON TOTE

WE 79511 — PHA–TNK–79511

WE 79512 — PHA–TNK–79512

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed: J. SCHAEFER | checked: A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PHOSPHORIC ACID CHEMICAL FEED SYSTEM P&ID

| project | contract |
|---|---|
| 98101 | |

drawing I065 — rev. 0

sheet 524 of 542 sheets

file 98101I065.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

LAH 74011
LI 74011
LAH 74011
I
LI 74011 AI
LAH 74012
LI 74012
LAH 74012
I
LI 74012 AI
MI 74010
RUN
MI 74010 DI

PLC/HMI

120V, 1ø
LP-CHEM

LAH 74011
LIT 74011
LAH 74012
LIT 74012
REMOTE FILL PANEL

MI 74010
HS 74010
MA 74010
120V, 1ø, LP-CHEM
LCP

LCP AND POWER
FIELD

LIT 74011
LE 74011
LIT 74012
LE 74012

COAGULANT AID POLYMER FILL STATION
2"
2"

RDR
RDR
VENT WITH INSECT SCREEN
4"
4"

LG 74011
LG 74012

COAGULANT AID STORAGE TANK 2,700 GALLONS
COAGULANT AID STORAGE TANK 2,700 GALLONS

CAP-TNK-74011
CAP-TNK-74012

4"
4"
1
1
2"
2"
2"
2"
2"
2"

CAP-TP-74010

VENT B 1069 PUMP 3
VENT B 1068 PUMP 2
VENT B 1067 PUMP 1
VENT WITH INSECT SCREEN

3/4" COAGULANT AID A 1067 PUMP 1
3/4" COAGULANT AID B 1068 PUMP 2
3/4" COAGULANT AID C 1069 PUMP 3

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I066.DWG 10/16/2020 10:22 AM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

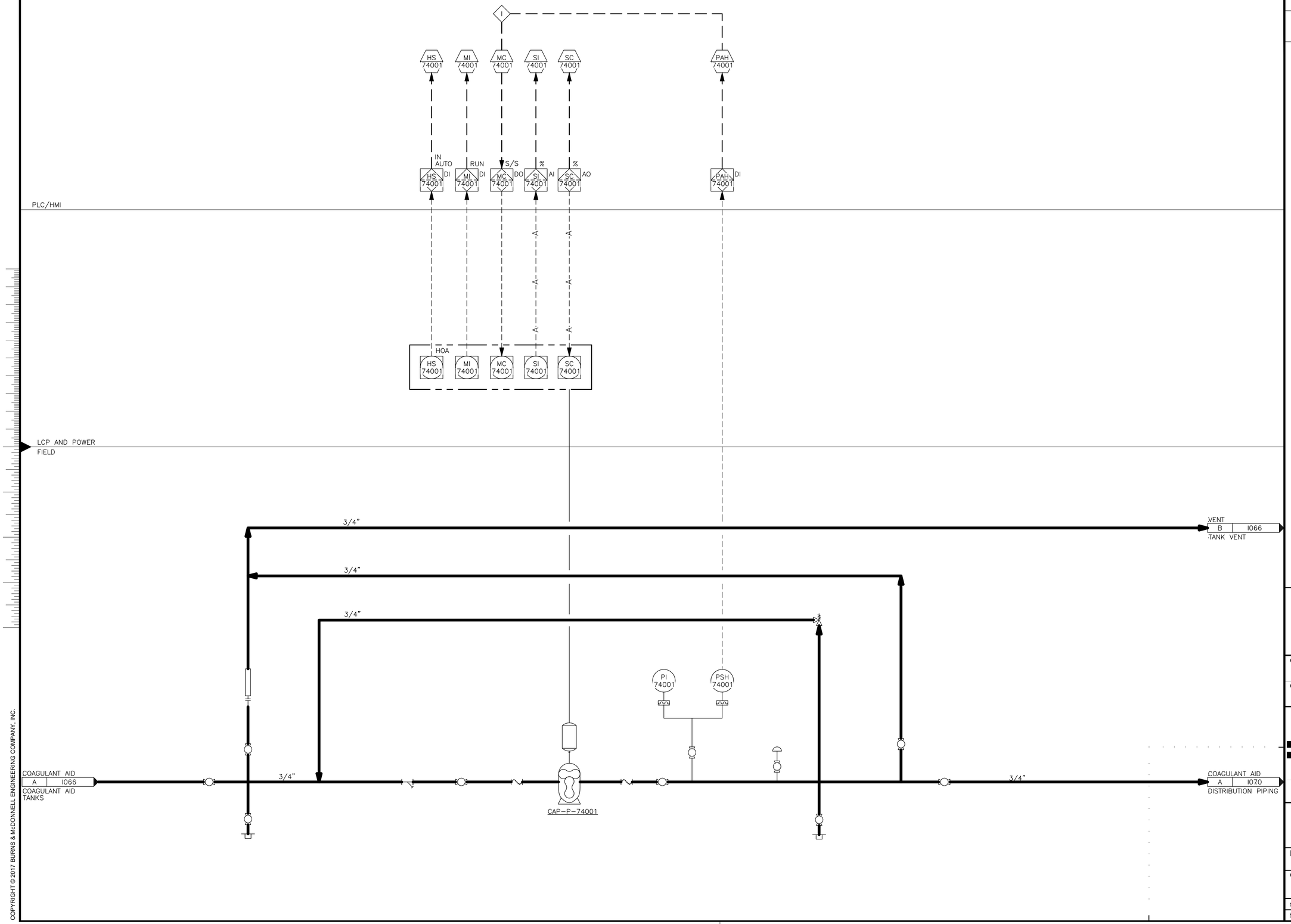
**CITY OF THORNTON**
**TTP - PACKAGE 3**
COAGULANT AID CHEMICAL FEED SYSTEM P&ID I

| project | contract |
|---|---|
| 98101 | |

drawing I066 – rev. 1

sheet 525 of 542 sheets

file 98101I066.dwg




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COAGULANT AID CHEMICAL FEED SYSTEM
P&ID II

| project | contract |
|---|---|
| 98101 | |

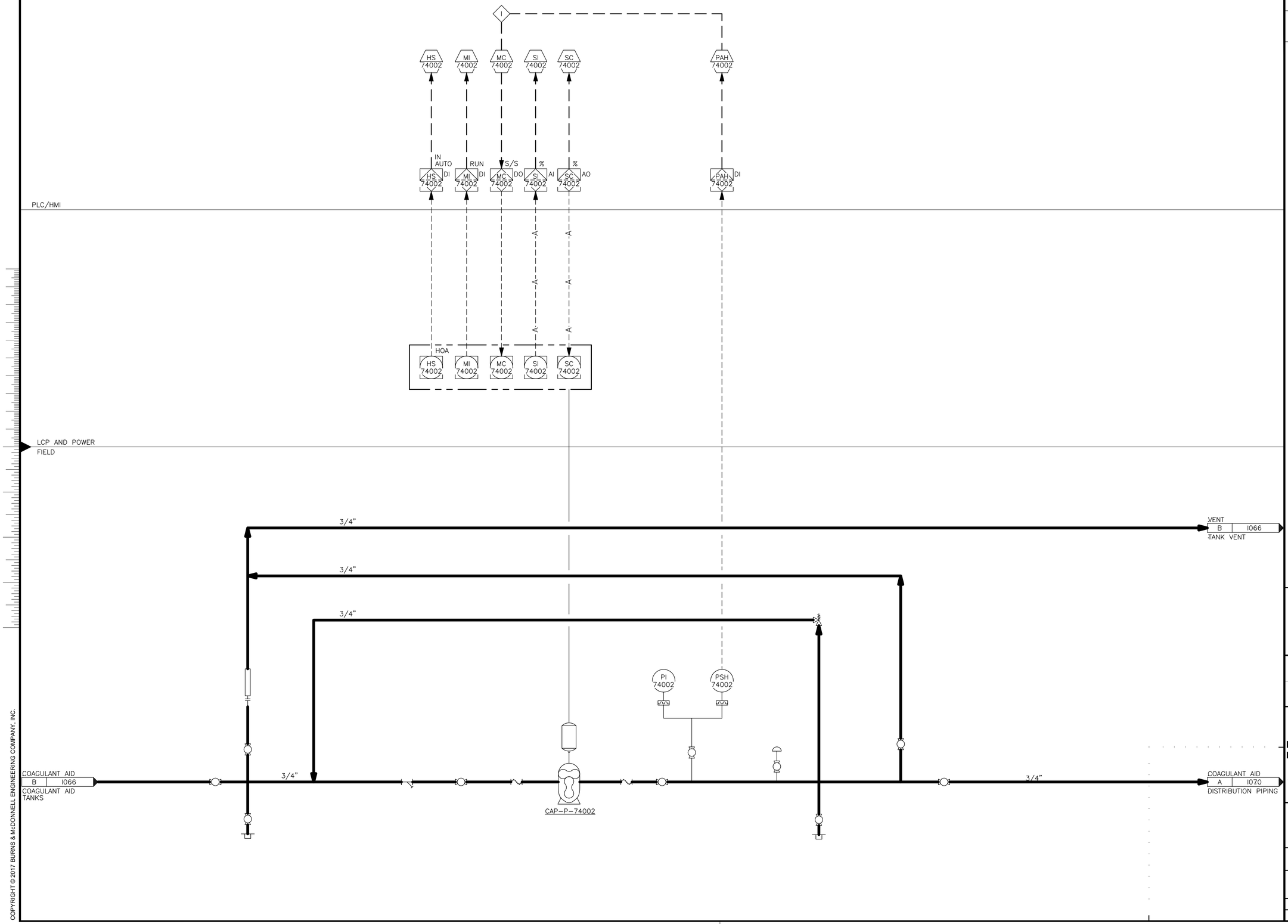
| drawing | rev. |
|---|---|
| I067 – | 0 |

**sheet** 526 **of** 542 sheets

**file** 98101I067.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COAGULANT AID CHEMICAL FEED SYSTEM P&ID III

| project | contract |
|---|---|
| 98101 | |

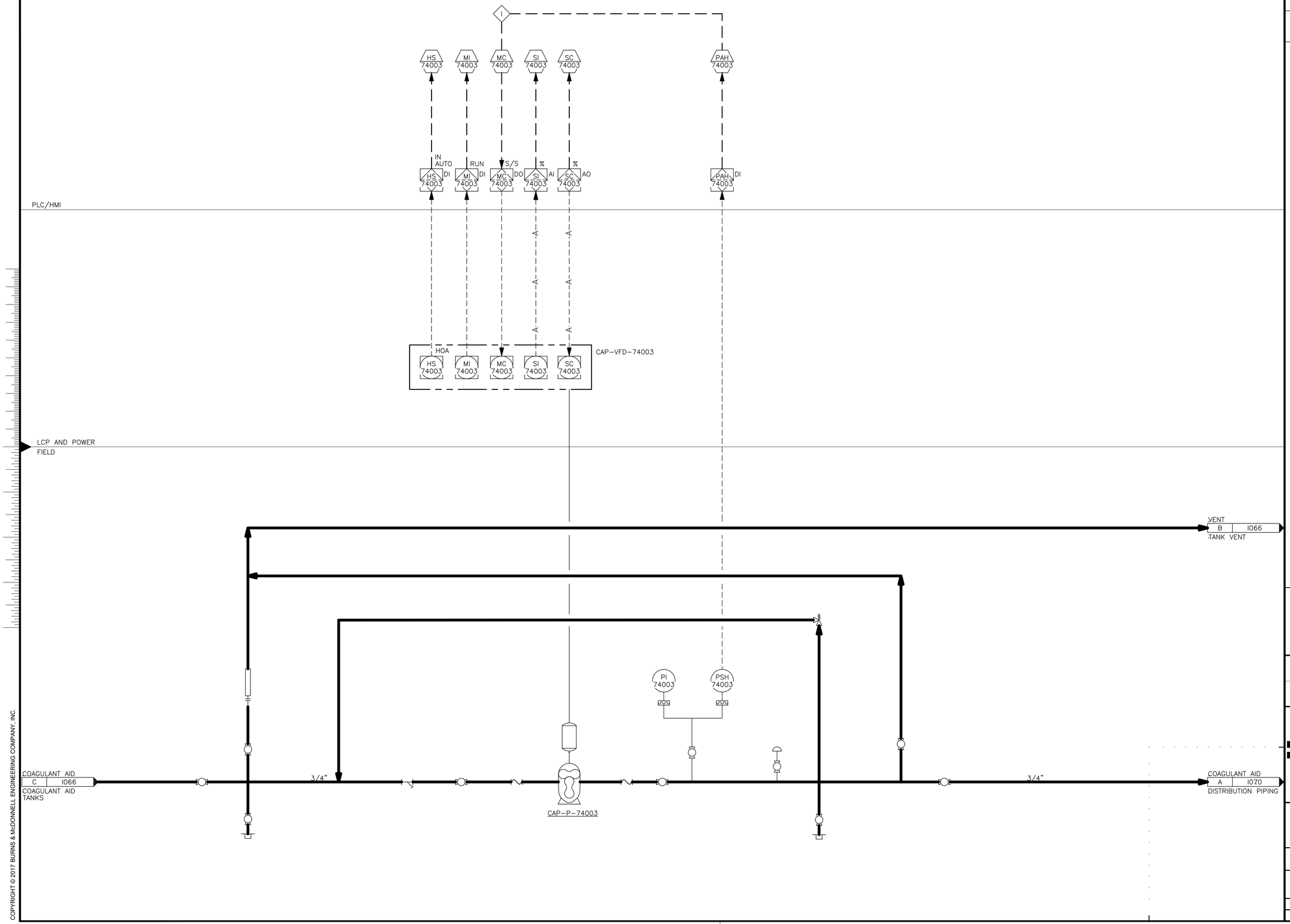
**drawing** I068 — **rev.** 0

**sheet** 527 **of** 542 sheets

**file** 98101I068.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COAGULANT AID CHEMICAL FEED SYSTEM
P&ID IV

| project | contract |
|---|---|
| 98101 | |

**drawing** I069 — **rev.** 0

**sheet** 528 **of** 542 sheets

**file** 98101I069.dwg

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTE:

1. FLOWMETERS TO BE INSTALLED IN VERTICAL ORIENTATION WITH UPWARD FLOW DIRECTION.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

PLC/HMI

LCP AND POWER

FIELD

FI XXXX

FI XXXX

ZSC 74013

ZSO 74013

FC 74013

ZSC 74014

ZSO 74014

FC 74014

120V, 1ø PLC–CHM2

120V, 1ø PLC–CHM2

FI 74014

FI 74013

120V, 1ø, PLC–CHM2

120V, 1ø, PLC–CHM2

ZSC 74013 DI

ZSO 74013 DI

FC 74013 DO

ZSC 74014 DI

ZSO 74014 DI

FC 74014 DO

ZSC 74013 ZSO 74013 FC 74013 O\C

ZSC 74014 ZSO 74014 FC 74014 O\C

COAGULANT AID A 1067 PUMP 1

COAGULANT AID A 1068 PUMP 2

COAGULANT AID A 1069 PUMP 3

3/4"

1"

FIT 74013 M CAP–MM–74013

FIT 74014 M CAP–MM–74014

SOFTENED WATER H 1083 NEW PLANT SERVICE WATER

M CAP–V–74013

M CAP–V–74014

RO 74013

RO 74014

COAGULANT AID POLYMER C 1007 TO FLOC BASIN 1

COAGULANT AID POLYMER A 1006 TO FLASH MIX 1

COAGULANT AID POLYMER B 1006 TO FLASH MIX 2

COAGULANT AID POLYMER D 1008 TO FLOC BASIN 2

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
COAGULANT AID CHEMICAL FEED SYSTEM P&ID V

| project | contract |
|---|---|
| 98101 | |

drawing **I070** – rev. **1**

sheet 529 of 542 sheets

file 98101I070.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

SCADA

PLC/HMI

LCP AND POWER

FIELD

FAP–MCP–75100

LAH 75117 | LAL 75116 | TAH 75116 | LALL 75140 | LI 75140 | LI 75120 | PAL 75115

FI 75101 AI | FI 75102 AI | MA 75110 DI | MC 75110 DO | LAH 75117 DI | LAL 75116 DI | TAH 75116 DI | WI 75116–1 AI | MC 75116 DO | WI 75116–2 AI | LI 75140 AI | LI 75120 AI | PAL 75115 DI | FC 75115 DO | MC 75120 DO | FC 75130 DO

480V, 3ø

MA 75110

HS 75118 ESTOP

PER MFR

WT 75116–1

S/S

HS 75116

480V, 3ø

WT 75116–2

FC 75115

MC 75120

FC 75130

480V, 3ø PP–SEC

SOFTENED WATER A | 1083

FLOC–AID POLYMER FEED SYSTEM

2"

RO 75000

FIT 75101

FIT 75102

GAC FILTERS

FAP–FLT–75104

WATER HEATERS

FAP–HTR–75103

COMPRESSED AIR

AIR COMPRESSOR

FAP–VIB–75116

HS 75118

WE 75116–1

IRIS VALVE

SLIDE GATE

WE 75116–2

TSH 75116

LSL 75116

FAP–AUG–75116

LSH 75117

REGENERATIVE BLOWER

FAP–BLW–75110

FLOCCULATION POLYMER SKID FAP–SKD–7510

PI 75115 | PSL 75115 | M

FAP–MXR–75120

LT 75120

MIX/AGE TANK FAP–TNK–75120

OVERFLOW

M

FAP–V–75130

LT 75140

FEED TANK

FAP–TNK–75140

2"

1"

DECHLORINATED WATER H | 1072 FEED PUMP 1

DECHLORINATED WATER I | 1073 FEED PUMP 2

DECHLORINATED WATER J | 1074 FEED PUMP 3

FLOC–AID POLYMER A | 1072 FEED PUMP 1

FLOC–AID POLYMER B | 1073 FEED PUMP 2

FLOC–AID POLYMER C | 1074 FEED PUMP 3

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I071.DWG 10/14/2020 6:13 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOC-AID POLYMER CHEM FEED SYSTEM
P&ID SHEET I

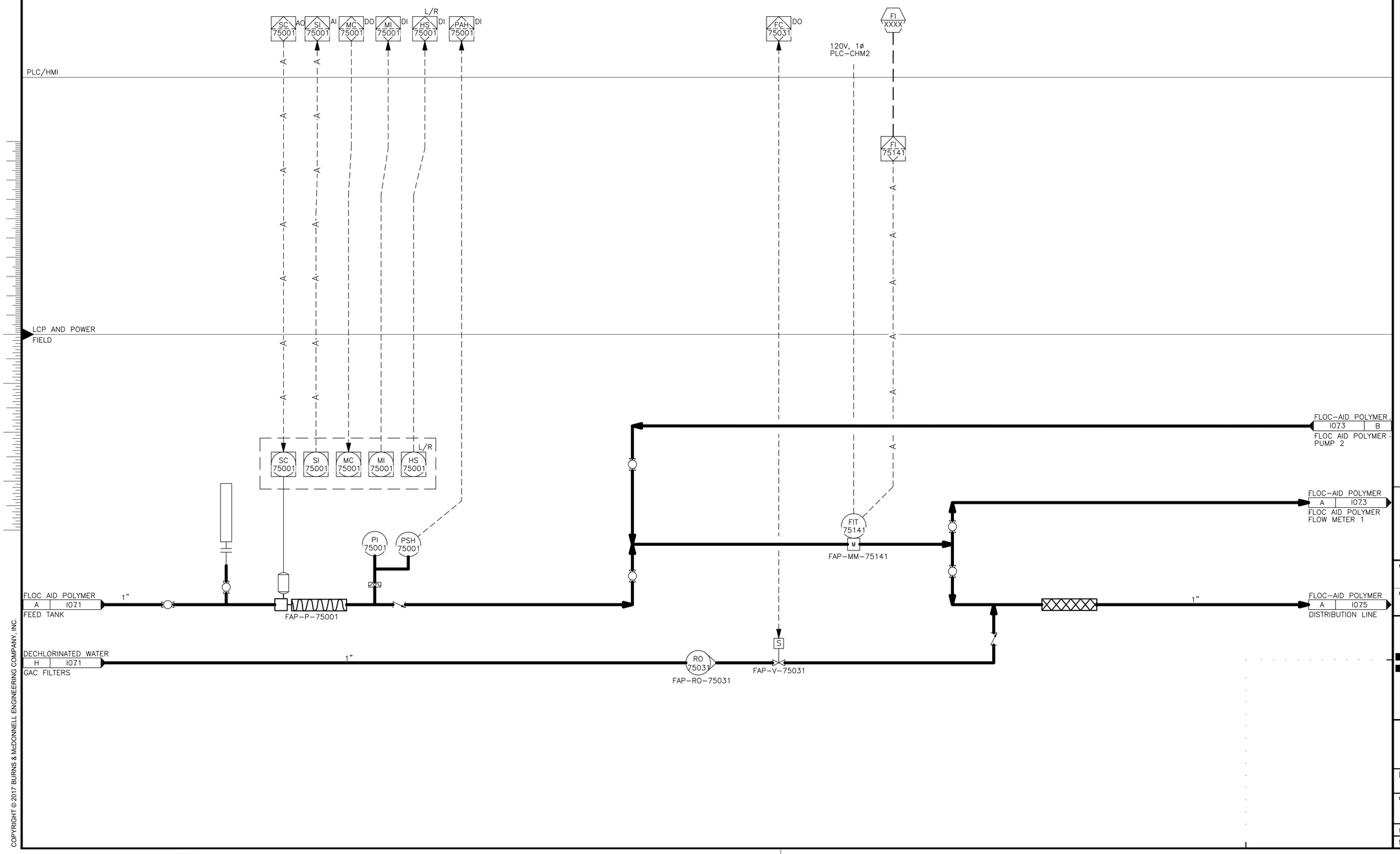
| project | contract |
|---|---|
| 98101 | |

drawing **I071** – rev. **0**

sheet 530 of 542 sheets

file 981011071.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOC-AID POLYMER CHEM FEED SYSTEM
P&ID SHEET II

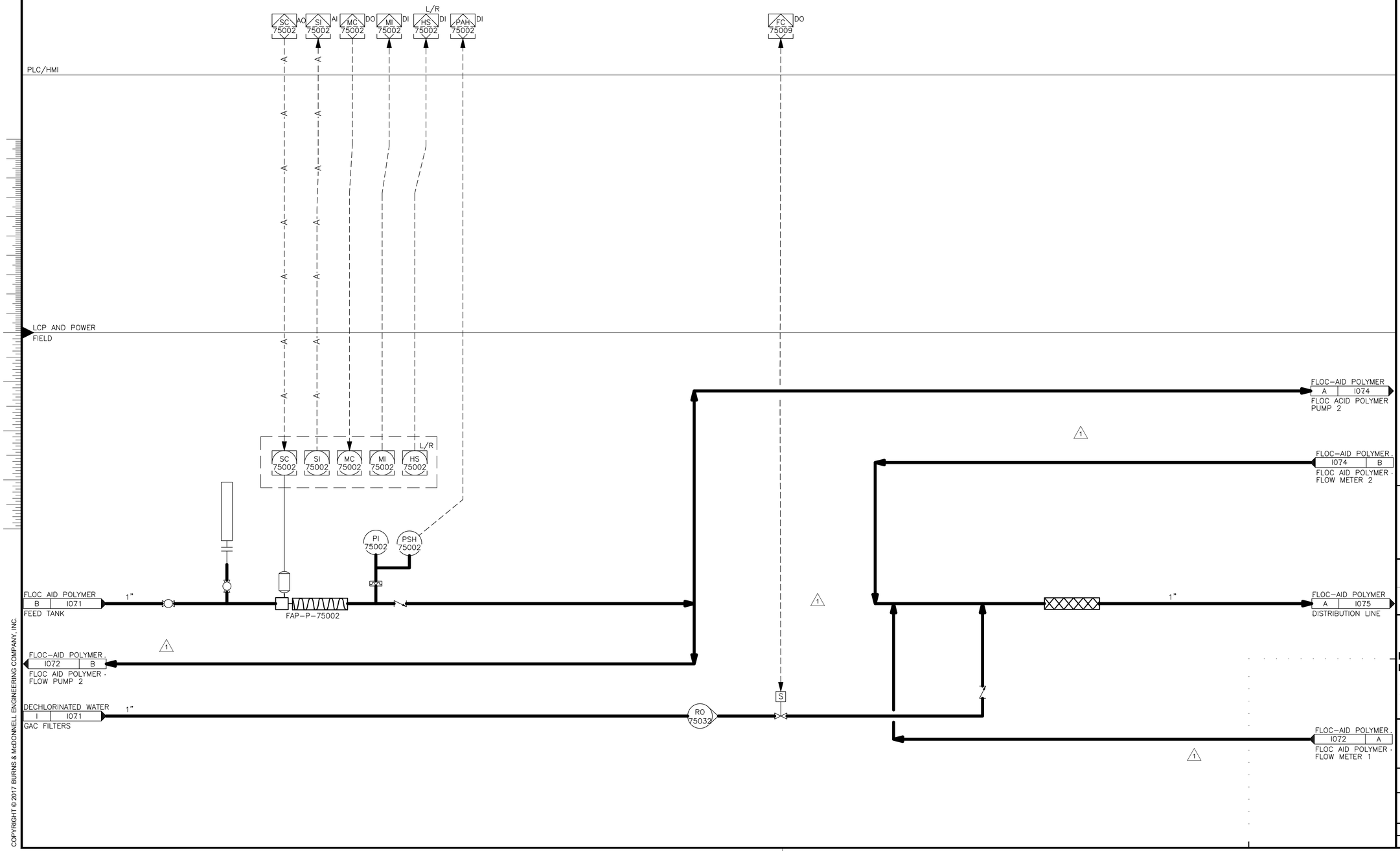
| project | contract |
|---|---|
| 98101 | |

drawing **I072** – rev. **1**

sheet 531 of 542 sheets

file 98101I072.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOC-AID POLYMER CHEM FEED SYSTEM
P&ID SHEET III

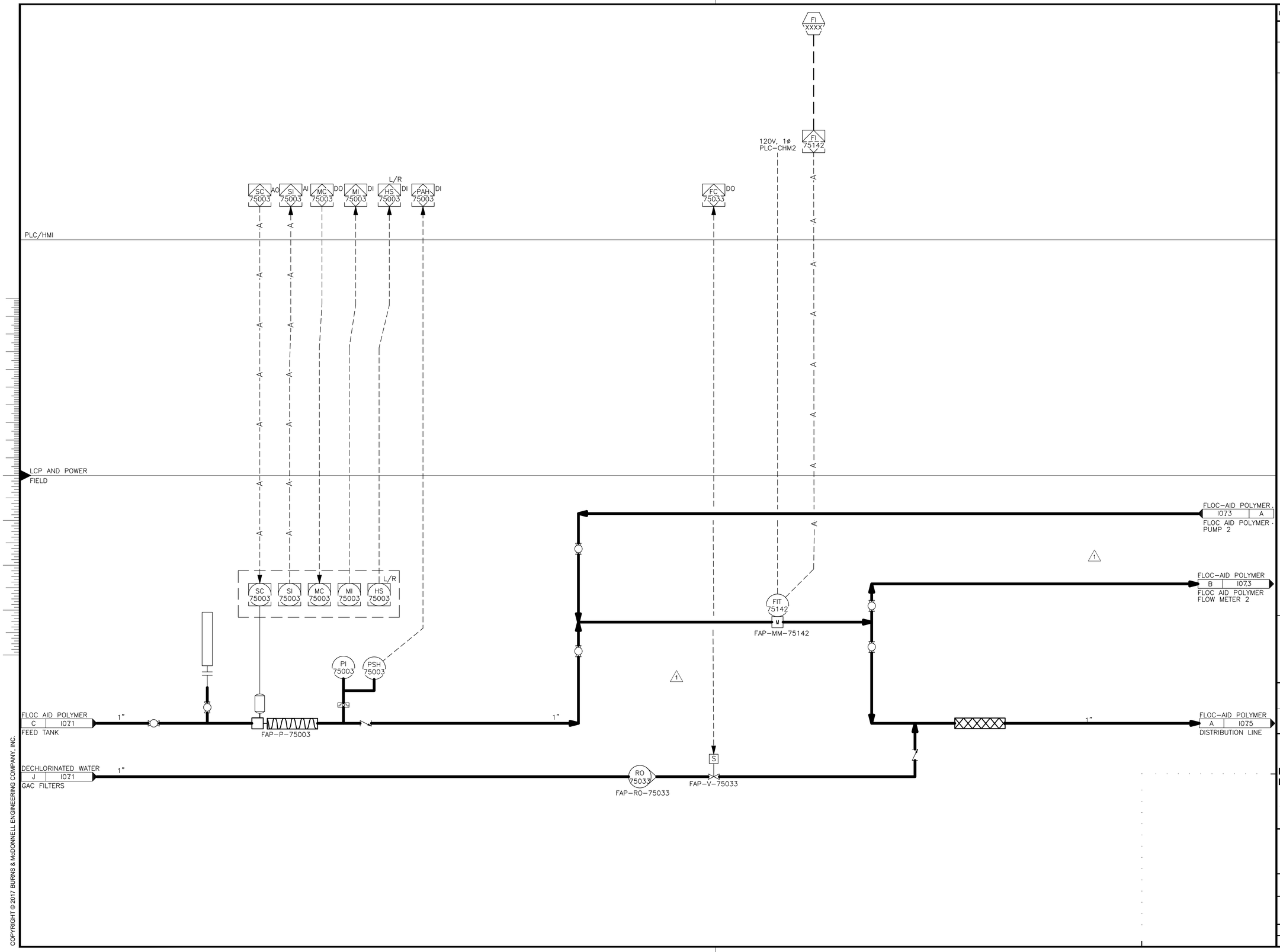
| project | contract |
|---|---|
| 98101 | |

drawing **I073** – rev. **1**

sheet 532 of 542 sheets

file 98101I073.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOC-AID POLYMER CHEM FEED SYSTEM
P&ID SHEET IV

| project | contract |
|---|---|
| 98101 | |

drawing **I074** – rev. **1**

sheet 533 of 542 sheets

file 98101I074.dwg

PLC/HMI

LCP AND POWER
FIELD

FLOC-AID POLYMER
A | 1072
PUMP NO. 1

1"

FLOC-AID POLYMER
A | 1073
PUMP NO. 2

1"

FLOC-AID POLYMER
C | 1074
PUMP NO. 3

1"

1"

FLOC-AID POLYMER
A | 1007
FLOC BASIN NO. 1

1"

FLOC-AID POLYMER
B | 1008
FLOC BASIN NO. 2

1

1

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| **designed** | **checked** |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
FLOC-AID POLYMER CHEM FEED SYSTEM
P&ID SHEET V

| project | contract |
|---|---|
| 98101 | |

drawing I075 – rev. 1

sheet 534 of 542 sheets

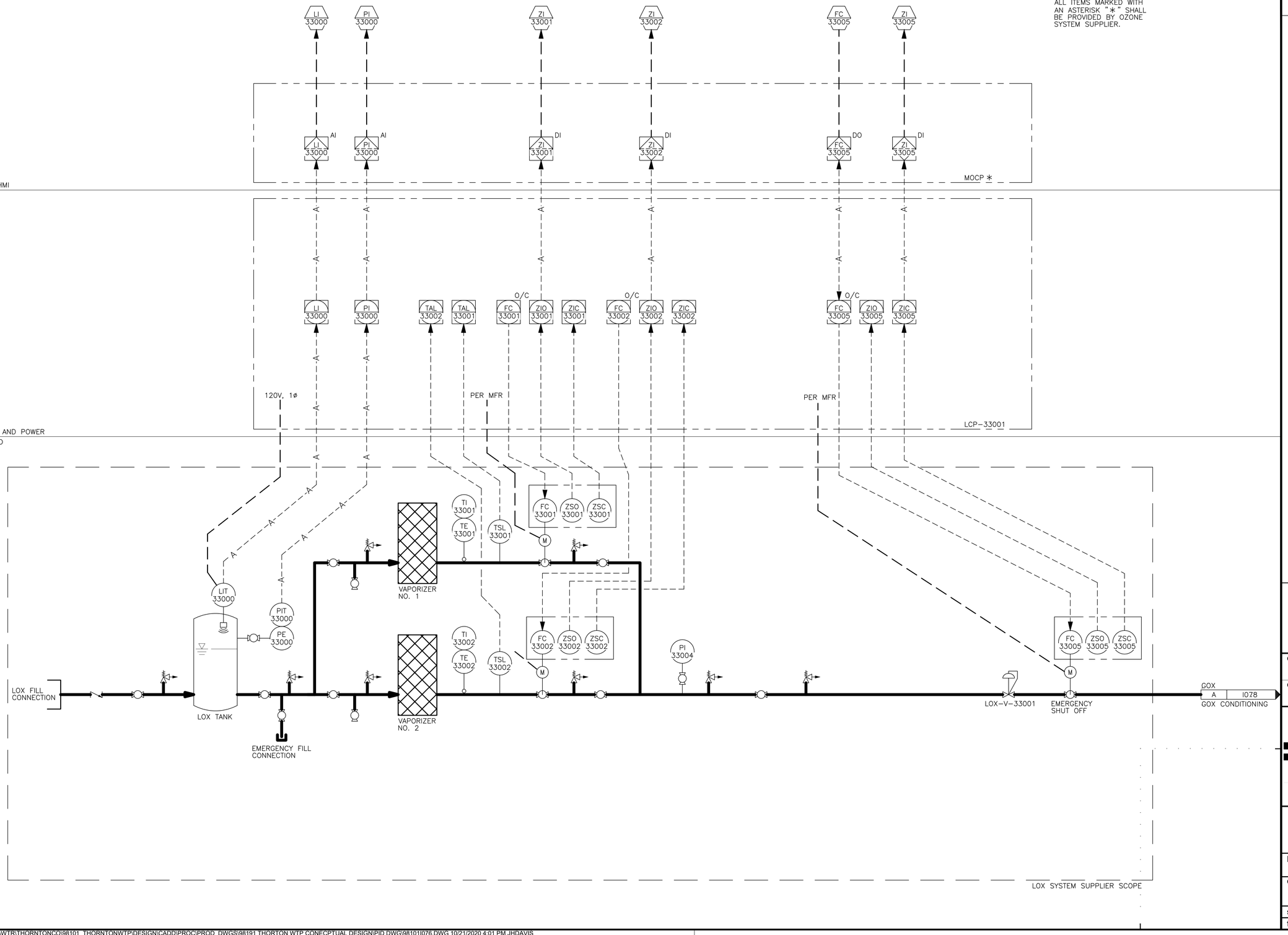
file 981011075.dwg

Millimeters
Inches
Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.




| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
LOX SUPPLY P&ID

| | |
|---|---|
| project 98101 | contract |
| drawing I076 | rev. 0 |
| sheet 535 of 542 sheets | |
| file 98101I076.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

SCADA

PLC/HMI

MOCP*

MCC-SEC

OZN-LCP-31001*

LCP AND POWER FIELD

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

480V, 3ø

480V, 3ø

120v,1ø

120v,1ø

PER MFR

OZN-AF-31001

OZN-C-31001

OZN-AFC-31001

OZN-AF-31002

OZN-C-31002

OZN-AFC-31002

AIR RECEIVER OZN-TNK-31011

OZN-V-31011

OZN-FLT-31021

OZN-FLT-31022

OZN-FLT-31041

OZN-FLT-31042

OZN-DDR-31031

OZN-DDR-31032

OZN-MM-31051

OZN-V-31051

COMPRESSED AIR A | I078

OZONE GENERATION SYSTEM

OZN-SKD-31001*

SKID BOUNDARY

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
NITROGEN BOOST

| | |
|---|---|
| project 98101 | contract |
| drawing I077 | rev. 0 |
| sheet 536 of 542 sheets | |
| file 98101I077.dwg | |

Scale For Microfilming
Millimeters
Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

KEYED NOTES:

1. SST VENT LINES FOR PRV TO BE ROUTED THROUGH THE ROOF OF THE OZONE ROOM.

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

SCADA

PLC/HMI

LCP AND POWER FIELD

TI 33501

PDI 32501

DEW AI 33503

FI 33503

AI 33501 AI

PDI 33501 AI

DEW AI AI 33503

FI 33503 AI

MOCP

GOX-LCP-33501*

120V, 1ø

120V, 1ø

PDIT 33501

TIT 33501

TE 33501

PI 33501

GDX-FLT-33501

PI 33502

PI 33503

DEW* AIT 33503

AE 33503

FIT 33503 *

GOX A 1076
LOX SUPPLY

COMPRESSED AIR A 1077
NITROGEN BOOST

GOX A 1079
TO OZONE GENERATOR NO. 1

GOX B 1080
TO OZONE GENERATOR NO. 2

GOX-SKD-33501*
SKID BOUNDARY

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
GOX CONDITIONING

| project | contract |
|---|---|
| 98101 | |

drawing I078 – rev. 0

sheet 537 of 542 sheets

file 98101I078.dwg

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

KEYED NOTES:

1. SST VENT LINES FOR PRV TO BE ROUTED THROUGH THE ROOF OF THE OZONE ROOM.

SCADA

PLC/HMI

LCP AND POWER

FIELD

FC 34112 — O/C — DO
FC 34101 — O/C — DO
PI 34101 — AI
FI 34101 — AI
FAL 34111 — DI
MA 34120 — DI
MC 34120 — DO
TI 34101 — AI
PAH 34101 — DI
PAL 34101 — DI
FI 34122 — AI
TAH 34122 — DI
FC 34102 — O/C — DO
AI 34102 — O3G AI
AAH 34102 — O3G
HEA 30010 — ESTOP
HEI 30010 — ESTOP — DI
AAH 30003-1
AI 30003-1 — O3G AI
AI 30004-1 — OX AI
MOCP*

S/S
HS 34120
MA 34120
480V, 3ø
MCC-SEC

120V, 1ø
OZO-LCP-34101*

HEA 30010
ESTOP
HES 30010
AAH 30012
EAST DOOR
AMBIENT AIR
AIT 30003-1 — O3G
AE 30003-1
WALL-MOUNTED MONITOR *
AIT 30004-1 — OX
AE 30004-1
WALL-MOUNTED MONITOR *
AMBIENT AIR

VENT TO ATMOSPHERE
1

TIT 34101
TE 34101
PSH 34101
PSL 34101
TI 34102
TE 34102
PI 34102
AIT 34102 — O3G
AE 34102
PIT 34101
FIT 34101

GOX
A | 1078
GOX CONDITIONING
OZO-V-34112
OZO-TMM-34101

OZONE GENERATOR NO. 1 OZO-GEN-34101

OZO-V-34102

OZONE GAS
A | 1010
OZONE INJECTION SKID

OZONE GAS
1080 | A
OZONE GENERATOR NO. 2

PI 34120
MAKE-UP WATER CONNECTION
EXPANSION TANK
PI 34121
TI 34121
TE 34121

TI 34111
TE 34111
PI 34111
FSL 34111

COOLING WATER
1008 | B
SEDIMENTATION BASIN

CHEMICAL POT FEEDER

OZO-P-34120

PSU NO. 1 OZO-PSU-34150
F1

TI 34112
TE 34112
PI 34112
PI 34122
TI 34122
TE 34122
FIT 34122
TSH 34122

COOLING WATER
B | 1083
PLANT SERVICE WATER
OZO-V-34112?

OZO-MM-34122

SKID BOUNDARY
OZO-GEN-34001*

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming
Millimeters
Inches

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
OZONE GENERATOR NO. 1

| project | contract |
|---|---|
| 98101 | |

drawing I079 — rev. 0

sheet 538 of 542 sheets

file 98101I079.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

NOTE:

ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.

KEYED NOTES:

1. SST VENT LINES FOR PRV TO BE ROUTED THROUGH THE ROOF OF THE OZONE ROOM.

SCADA

PLC/HMI

LCP AND POWER

FIELD

MOCP*

OZO-LCP-34201*

MCC-SEC

480V, 3ø

120V, 1ø

S/S

HS 34220

MA 34220

FC 34212

FC 34201

PI 34201

FI 34201

FAL 34211

MA 34220

MC 34220

TI 34201

PAH 34201

PAL 34201

FI 34222

TAH 34222

FC 34202

AI 34202 03G

AAH 34202 03G

HEA 30011 ESTOP

HEI 30011 ESTOP DI

AAH 30005-1

AI 30005-1 03G

AI 30006-1 OX

HEA 30011

HES 30011 ESTOP

AAH 30013

ESTOP HES 3001 WEST DOOR

AIT 30005-1 03G

AE 30005-1

AIT 30006-1 OX

AE 30006-1

WALL-MOUNTED MONITOR*

AMBIENT AIR

VENT TO ATMOSPHERE 1

GOX B 1078 GOX CONDITIONING

OZO-V-34201

OZO-TMM-34101?

PIT 34201

FIT 34201

TIT 34201

TE 34201

PSH 34201

PSL 34201

OZONE GENERATOR NO. 2 OZO-GEN-34201

TI 34202

TE 34202

PI 34202

AIT 34202 03G

AE 34202

OZO-V-34202

OZONE GAS A 1079 OZONE GAS HEADER

PI 34220

MAKE-UP WATER CONNECTION

EXPANSION TANK

PI 34221

TI 34221

TE 34221

TI 34211

TE 3421

PI 34211

FSL 34211

COOLING WATER I008 B SEDIMENTATION BASIN

OZO-P-34220

CHEMICAL POT FEEDER

PSU NO. 2 OZO-PSU-34250

TI 34212

TE 34212

PI 34212

COOLING WATER C 1080 PLANT SERVICE WATER

OZO-V-34212

FIT 34222

TSH 34222

OZO-MM-34122?

SKID BOUNDARY

OZO-GEN-34002*

Scale For Microfilming

Millimeters

Inches

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

CITY OF THORNTON
TTP - PACKAGE 3
OZONE GENERATOR NO. 2

| project | contract |
|---|---|
| 98101 | |

drawing I080 – rev. 0

sheet 539 of 542 sheets

file98101I080.dwg

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

SCADA

PLC/HMI

LCP AND POWER FIELD

I

03G AI 35101

ZI 35101 | % FC 35101 | FAL 35101 | PI 35101 | TI 35101 | ZI 35120 | O/C FC 35120 | TC 35101 | TI 35111

PDI 35111 | TI 35112

PDI 35121 | MC 35121 | SC 35121 | TAH 35121 | PAH 35122 | 03G AI 35122

03G AI 35007-1 | OX 35008-1

AAH 35007-1 | AAH 35008-1

MOCP*

480V, 3ø — VFD — TAH 35121 — MCC-FLTR

120V, 1ø | PER MFR | 120V, 1ø | 120V, 1ø | 120V, 1ø | 120V, 1ø | 120V, 1ø

AAH 30014

OZO-LCP-35101*

NOTES:

1. ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.
2. PROVIDE ENLARGED SECTION OF CLEAR PIPING FOR COLLECTION AND VISUAL OBSERVANCE OF MOISTURE.

VENT TO ATMOSPHERE

03G AIT 35007-1 / AE 35007-1 — AMBIENT AIR — WALL-MOUNTED MONITOR* (TYP OF 2)

OX AIT 35008-1 / AE 35008-1 — AMBIENT AIR — WALL-MOUNTED MONITOR* (TYP OF 2)

ZIT 35120 | FC 35120 — M

03G* AIT 35101 / AE 35101

ZIT 35101 | FC 35101 — M

PIT 35101 | PE 35101 | TIT 35101 | TE 35101 | FSL 35101

TIT 35111 | TE 35111 — HEATER OZO-DB-35101

PDIT 35111 | DESTRUCT CATALYST OZO-DC-35111

TIT 35112 | TE 35112

PDIT 35121 | TSH 35121 — OZO-DB-35121

PSH 35122

03G AIT 35122 / AE 35122

OZONE OFFGAS B 1011 — CONTACTOR BASIN — OZO-V-35003

NOTE 2

OZO-SKD-35001* SKID BOUNDARY

OZONE DESTRUCTOR NO. 1

OZONE OFF GAS A 1082 — OZONE DESTRUCTOR NO. 2

Millimeters

Inches

Scale For Microfilming

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Z:\CLIENTS\WTR\THORNTONCO\98101_THORNTONWTP\DESIGN\CADD\PROC\PROD_DWGS\98191 THORTON WTP CONECPTUAL DESIGN\PID DWG\98101I081.DWG 10/14/2020 6:11 PM JHDAVIS

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
OZONE DESTRUCTOR NO. 1

| project | contract |
|---|---|
| 98101 | |

drawing **I081** — rev. **0**

sheet 540 of 542 sheets

file 98101I081.dwg

NOTES:

1. ALL ITEMS MARKED WITH AN ASTERISK "*" SHALL BE PROVIDED BY OZONE SYSTEM SUPPLIER.
2. PROVIDE ENLARGED SECTION OF CLEAR PIPING FOR COLLECTION AND VISUAL OBSERVANCE OF MOISTURE.

SCADA

PLC/HMI

MOCP*

480V, 3ø

VFD

TAH 35221

MCC-FLTR

120V, 1ø

OZO-CP-35201*

LCP AND POWER FIELD

PER MFR

VENT TO ATMOSPHERE

AIT 35201 O3G*

AE 35201

ZIT 35201 FC 35201

OZO-V-35201

FSL 35201

PIT 35201

PE 35201

TIT 35201

TE 35201

ZIT 35220 FC 35220

OZO-V-35220

HEATER OZO-HTR-35201

TIT 35211

TE 35211

PDIT 35211

DESTRUCT CATALYST OZO-DC-35211

TIT 35212

TE 35212

PDIT 35221

TSH 35221

OZO-DB-35221

PSH 35222

AIT 35222 O3G

AE 35222

OZONE OFFGAS A 1081 OZONE OFFGAS HEADER

NOTE 2

OZO-SKD-35002*
SKID BOUNDARY

OZONE DESTRUCTOR NO. 2

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |

BURNS McDONNELL

| | |
|---|---|
| date APRIL 2021 | detailed P. HUNTZINGER |
| designed J. SCHAEFER | checked A. BEESON |

City of Thornton

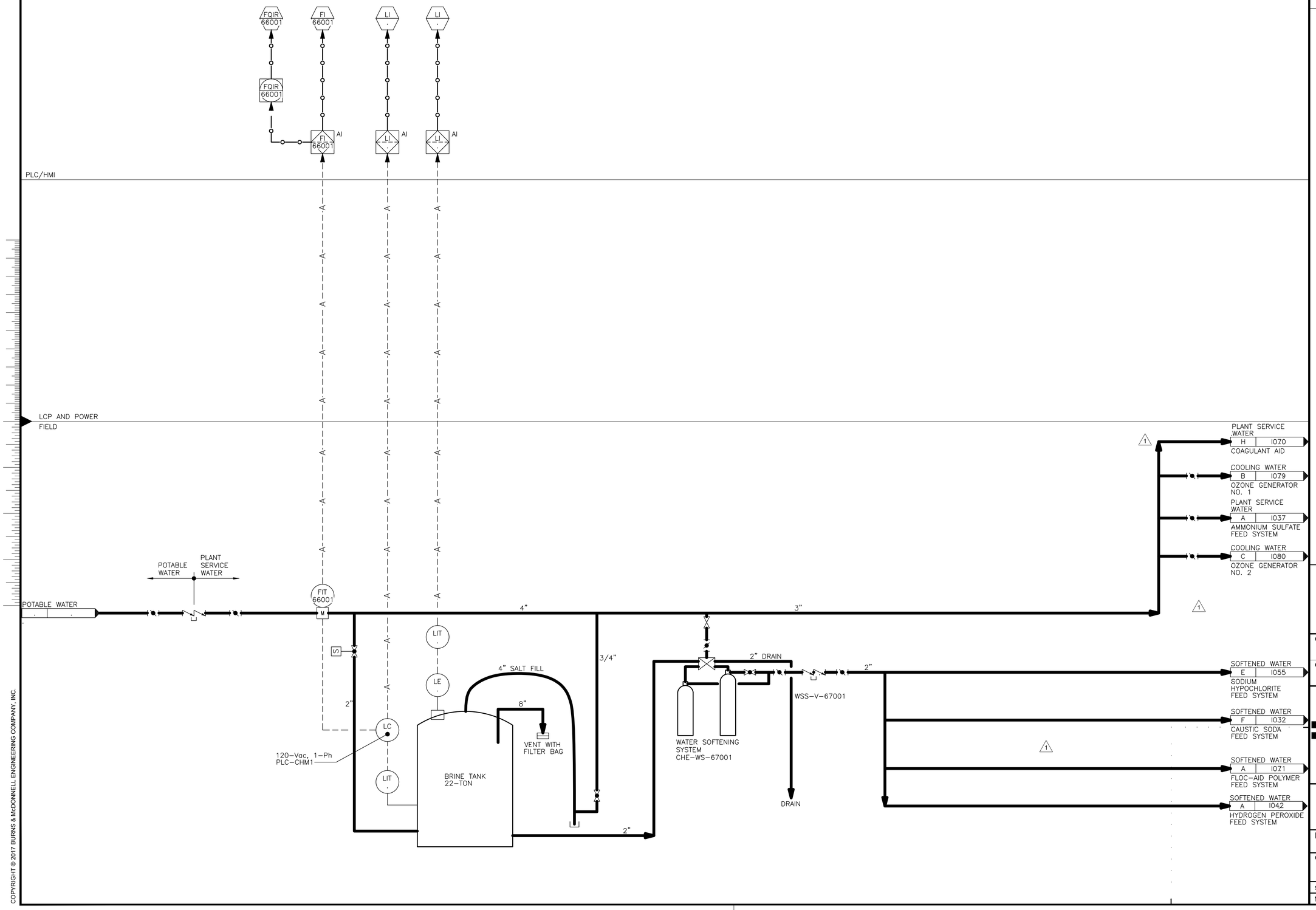
CITY OF THORNTON
TTP - PACKAGE 3
OZONE DESTRUCTOR NO. 2

| | |
|---|---|
| project 98101 | contract |
| drawing I082 – | rev. 0 |
| sheet 541 of 542 sheets | |
| file 98101I082.dwg | |

COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Scale For Microfilming: Millimeters / Inches

| no. | date | by | ckd | description |
|---|---|---|---|---|
| 0 | 12/7/18 | JS | AB | WP3 - ISSUED FOR CONSTRUCTION |
| 1 | 4/26/21 | JS | AB | CONFORMING TO CONSTRUCTION RECORDS |




COPYRIGHT © 2017 BURNS & McDONNELL ENGINEERING COMPANY, INC.

BURNS McDONNELL

| date | detailed |
|---|---|
| APRIL 2021 | P. HUNTZINGER |
| designed | checked |
| J. SCHAEFER | A. BEESON |

City of Thornton

**CITY OF THORNTON**
**TTP - PACKAGE 3**
PLANT SERVICE WATER

| project | contract |
|---|---|
| 98101 | |

drawing **I083** – rev. **1**

sheet 542 of 542 sheets

file 98101I083.dwg